MARGINAL DEPOSITS OF MAAR VOLCANOES IN THE FIRST FLAT MESA AREA, HOPI BUTTES VOLCANIC FIELD, NAVAJO NATION, ARIZONA

by Mallory Zelawski

A Thesis

Submitted in Partial Fulfillment

of the Requirements for the Degree of

Master of Science

in Geology

Northern Arizona University

August 2011

Approved:

____
Michael H. Ort, Ph.D., Chair

____
Nancy R. Riggs, Ph.D.

____
George Billingsley, USGS

____
Margaret Hiza, Ph.D., USGS

ABSTRACT

MARGINAL DEPOSITS OF MAAR VOLCANOES IN THE FIRST FLAT MESA AREA OF THE HOPI BUTTES VOLCANIC FIELD, NAVAJO NATION, ARIZONA

MALLORY ZELAWSKI

The late Miocene-Pliocene Hopi Buttes volcanic field contains at least 300 maar and diatreme features in an area of 1800 km^2. Phreatomagmatic explosions involved the interactions of monchiquitic to nephelinitic magma with groundwater, lake water, or liquiefied sediments from the underlying Bidahochi Formation. These maars produced craters within the underlying strate that then increased in size due to subsidence of unstable crater walls. The field relations between marginal deposits, maar crater deposits, and country rock both inside and outside of the crater link deformation of sediments with processes occurring during and due to an eruption.

At least 23 vents are exposed within approximately 51 km^2 of the First Flat Mesa area in the north-central Hopi Buttes. Locally these vents provide well-preserved exposures of marginal deposits, maar crater deposits, and country rock. These units provide critical geologic constraints regarding the vertical and lateral facies changes that occur proximal to the vent. Ten volcanic facies, three limestone facies, and one marl facies have been described and provide spatial and temporal information about processes and interactions that occur within and adjacent to the vent during a phreatomagmatic eruption. A majority of these facies suggest magma interaction with water-saturated

sediment which created explosive eruptions that produced juvenile lapilli, blocks and bombs, and clasts of country rock that were recycled within the vent or dispersed away from the vent by base surges or fallout. These consist of massive lapilli tuff to moderately bedded lapilli tuff that typically contains blocks and bombs up to 2-3 meters. Where vents occur within close proximity, saturated sediments filling one crater may break the wall between them and slump from one vent into the neighboring vent as it is erupting. Some eruptions began phreatomagmatically, used up the available water, and became magmatic, producing scoria deposits that filled in the craters. Crater-lake facies suggest that most of the material removed by the eruption was deposited outside of the crater, allowing water to fill the crater and deposit limestone. Crater-lake facies are not found in vents where scoria deposits are found, although occasionally lapilli and ash are found within the limestone, from a nearby vent eruption and depositing volcanic material into the lake. Facies descriptions and interpretations provided information used to produce an eruptive model for the vents within the study area.

ACKNOWLEDGEMENTS

I would like to thank my committee members: Michael Ort, Nancy Riggs, George Billingsley, and Margaret Hiza-Redsteer for all of their support, advice, and knowledge. I would also like to thank Tom Hoish for the use of his microscope camera and Larry Middleton for helping me with thin sections descriptions. In addition, I would like to thank Piero Dellino and Tony Maria for all of their input and help with Image and fraccalc. I thank all of those who helped me out with field work through the hot summers: Matt Sagi, Aaron Wonders, Megan Beach, Byron Charley, Lang Suby, Tyler Brown, Courtney Silverberg, Sean Rudzitis, and Phil Lindner. Thank you to all of my friends who were there to listen, provide advice, and distractions when necessary.

I would like to give a special thanks to my family. My parents have provided support, both emotional and financial, throughout my education. Without their help there is no way that I would have been able to complete this adventure. They have supported me in everything that I have done, and I appreciate all they have done for me through the years.

Support for this thesis was provided by the U. S. Geological Survey, National Cooperative Geologic Mapping Program, under USGS award number G09AC00135. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U. S. Government. Additional funding for this thesis was provided by the Four Corners Geological Society, Tom and Rose Bedwell Physical Sciences Scholarship, Pioneer Natural Resources Research Grant, and Friday Lunch Clubbe.

The Navajo Nation Minerals Department graciously provided permission to work in Tsézhin bii'. Any persons wishing to conduct geologic investigations on the Navajo Nation must first apply for and receive a permit from the Navajo Nation Minerals Department, P.O. Box 9000, Window Rock, AZ 86515. I would like to thank the White Cone Chapter and the families around the First Flat Mesa area for their hospitality and friendliness. In particular I would like to thank Francis Lester, Sally Ann Dick and their family for their incredible generosity, advice, and friendship in allowing me to become a part of their family.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

CHAPTER 1
INTRODUCTION AND BACKGROUND

INTRODUCTION

The Hopi Buttes Volcanic Field contains a high concentration of well-preserved diatremes and maar volcanoes within the mesas and buttes of the area (Williams, 1936; Hack, 1942; Shoemaker et al., 1962; Ort et al., 1998). These mesas and buttes are capped by the lavas that preserve the underlying crater vents and the associated pyroclastic strata. Cross sections of the vents and related maar-crater deposits are well exposed along cliffs. Intramaar deposits are not well understood in relation to how they correlate with extramaar deposits or eruption events. The exposures within the Hopi Buttes Volcanic Field provide good laterally and vertically continuous deposits to study.

Eruption style and explosivity are controlled by several factors, including rheology, magma gas content, vent and conduit geometry, and the presence of external water (Fisher and Schmincke, 1984; Cas and Wright, 1987). Eruptions in which external (non-magmatic) water mixes with the magma can be exceptionally violent and destructive, converting an effusive eruption into an explosive one; this type of eruption is called hydromagmatism, phreatomagmatism, or hydrovolcanism. The water present in these eruptions may be provided by groundwater, lakes, swamps, or water-saturated mud. Phreatomagmatism, the term I use herein, is any subaerial volcanic activity in which explosivity results from the interaction between magma or lava and groundwater or surface water, including seawater, meteoric water, hydrothermal water, or lake water (Morrissey et al., 2000; White, 1996).

TECTONOMAGMATIC SETTING

Colorado Plateau

The Hopi Buttes Volcanic Field is located on the southeastern Colorado Plateau (Figure 1.1). This tectonic and physiographic region is characterized by a 3-5-km-thick section of flat to gently dipping Phanerozoic sedimentary rocks that lie unconformably above igneous and metamorphic rocks with crystallization ages ranging from 1.69 to 1.79 Ga (Tingey et al., 1991). Throughout most of Phanerozoic time, the Colorado Plateau has been a fixed tectonic feature that has experienced only minor deformation during and since the Laramide orogeny (Best and Brimhall, 1974). In contrast, the tectonic regions surrounding the Colorado Plateau (the Basin and Range, Rio Grande Rift, and central Rocky Mountains) experienced considerable orogenic and magmatic activity during Cenozoic time (Cross and Pilger, 1978; Christiansen and Lipman, 1972) (Figure 1.1).

To the south and west of the Colorado Plateau, the exposed Proterozoic rocks range from metabasalts to granitoid rocks, orthogneissic units, and meta-siliciclastic sequences (e.g. Karlstrom et al., 1987; Karlstrom and Bowring, 1993). The orientations of these Proterozoic terranes (Yavapai and Mazatzal) suggest that these rock types make up most of the base of the Colorado Plateau (Nelson and Davidson, 1998). Many workers have suggested that a large lithospheric boundary, separating the Yavapai and Mazatzal tectonic provinces, lies somewhere beneath the Colorado Plateau (Bennett and DePaolo, 1987; Karlstrom et al., 1987; Condie, 1992; Selverstone et al., 1999). The exact location of the boundary is uncertain, but is thought to be south of the Four Corners area (Selverstone et al., 1999). At least one author (Condie, 1992) has drawn the boundary through the Hopi Buttes Volcanic Field. This is supported by a gravity and magnetic lineament along with a vertical rise in the Moho toward the southern end of the Hopi Buttes (Ealy, 1994). The Hopi Buttes Volcanic Field is one of the most volumetrically significant areas of late Tertiary volcanic activity on the Colorado Plateau, and produced nephelinites, monchiquites, and basanites (Shafiqullah and Damon, 1986; Ort et al., 1998; Vazquez, 1998).

Volcanism along the southern and western edges of the Colorado Plateau is related to edge-driven convection (van Wijk et al., 2010). Destabilization of the Colorado Plateau is linked to the extension of the Basin and Range and Rio Grande Rift that surround it. This destabilization is a plausible mechanism for generating the Neogene magmatic pulse that occurred along the southern edge of the Plateau. Extension and thinning of the surrounding provinces has created a large difference in lithosphere thickness that allows for lateral heat conduction. This heat conduction thins the mantle lithosphere and results in hot asthenosphere replacing the lithosphere. Early Neogene to present magmatism within the Plateau is explained by this model, as well as the prediction that these mafic rocks are derived from the melting of mantle lithosphere and/or asthenospheric sources. Metasomatism and rehydration of the lithosphere and subsequence destabilitzation may be a significant driver for the volcanic encroachment onto the southern parts of the Colorado Plateau. The basaltic end members of the bimodal volcanism includes both subalkaline (tholeiitic) and alkali olivine compositions which are derived from the melting of relatively anhydrous lherzolite of OIB-affinity (van Wijk et al., 2010).

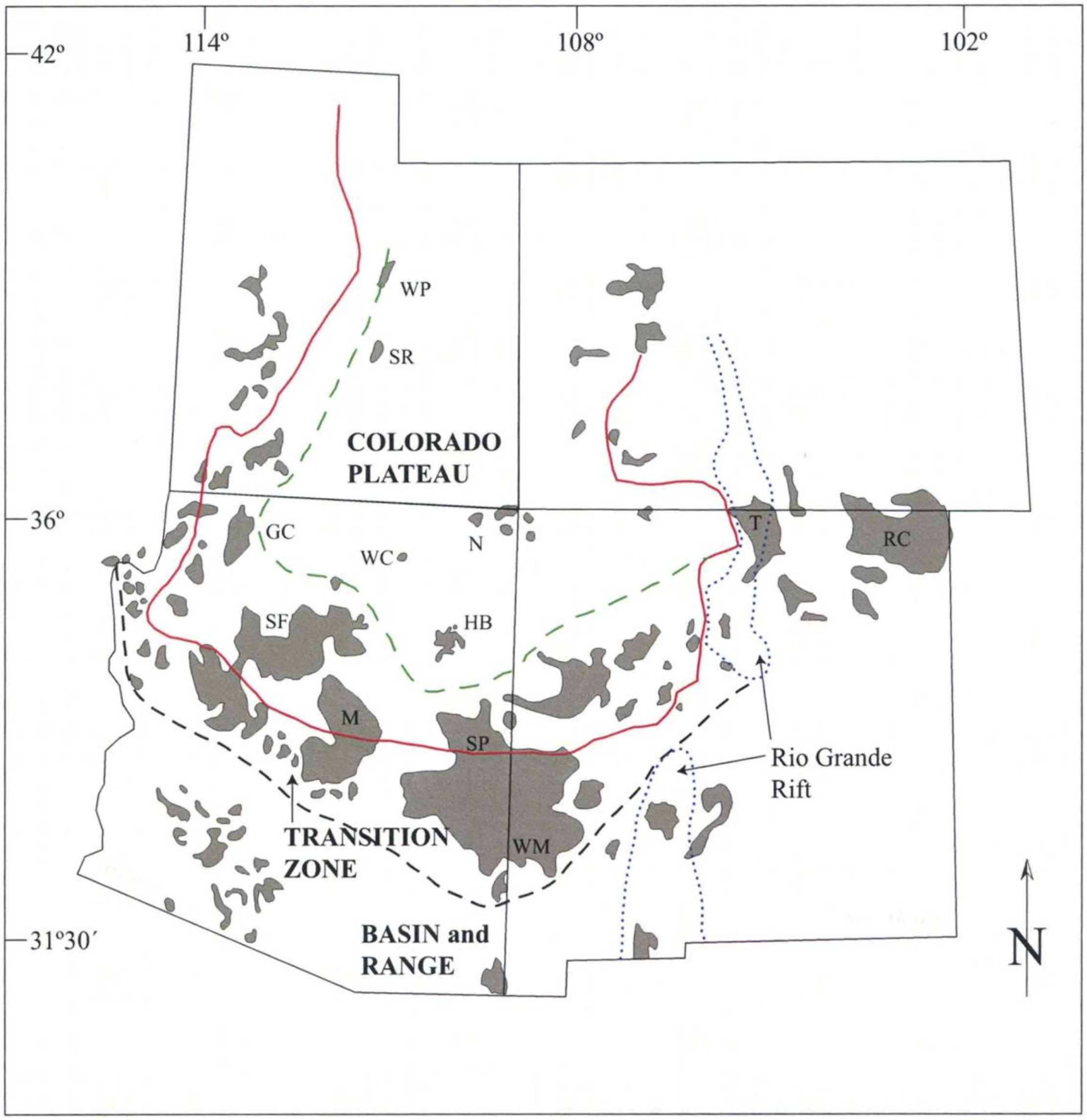


Figure 1.1. Distribution of middle to late Cenozoic volcanic centers in the southwestern United States. Solid red line represents the physiographic boundary of the Colorado Plateau. Dashed green and blue lines represent the geophysical boundaries of the Colorado Plateau and Basin and Range, respectively. Dotted blue line denotes the Rio Grande Rift. Volcanic fields are denoted by letters: GC, Grand Canyon; HB, Hopi Buttes; M, Mormon; N, Navajo; RC, Raton-Clayton; T, Taos; SP, Springerville; SF, San Francisco; SR, San Rafael Swell; WC, Wildcat Peak; WM, White Mountains; WP, Wasatch Plateau. Adapted and modified from Akers et al. (1971), Kempton et al. (1991), Tingey et al. (1991), and Delaney and Gartner (1997).

Hopi Buttes Volcanic Field

The Hopi Buttes are a group of mesas and buttes on Navajo Nation land in northeastern Arizona. About 300 late Miocene maar-diatreme volcanic centers occur within the ~1800 km^2 Hopi Buttes Volcanic Field (Shoemaker et al., 1962). Due to differences in depth of erosion, the eastern vents preserve the surficial features of the maars whereas the western vents expose the sub-volcanic "plumbing" system or diatremes. The Hopi Buttes volcanic rocks form the middle member of the Bidahochi Formation (Repenning and Irwin, 1954). The maars formed through the explosive interaction of groundwater, liquefied lower Bidahochi sediments, and/or lake water with monchiquitic and nephelinitic magmas (White, 1990a).

Uncomformably underlying the Bidahochi Formation are Mesozoic sandstones of the Jurassic Moenave Formation, which is up to 50 m thick in the Hopi Buttes region (Billingsley et al., in press). Sandstones within this formation are well lithified and contain limited water within fracture systems. The Moenave Formation overlies the Triassic Chinle Formation, which is up to 110 m thick in the Hopi Buttes region (Billingsley et al., in press). The Chinle Formation overall is poorly lithified siltstone, sandstone, and claystone with more lithified beds of chert capping the formation and is largely impermeable (Cooley et al., 1969; Kraus and Middleton, 1987). Neither the Moenave Formation nor Chinle Formation likely contained large amounts of available water. It is likely that water was only available in these units where regional fractures formed permeable layers through which water could flow.

The Mio-Pliocene Bidahochi Formation occurs in the southern part of the Colorado Plateau and covers over 16,000 km^2 with a thickness ranging up to 240 meters

(Love, 1989) and is informally divided into three members (Reagan, 1924; Repenning and Irwin, 1954). The lower member is composed of sandstone and siltstone interpreted as lacustrine and playa sediments; the middle member consists of mafic lava, tuff, and volcaniclastic material from the Hopi Buttes (Dallegge et al., 2003); the upper member, found to the north and east of the Hopi Buttes, is composed of sandstone and siltstone interpreted to represent deposition in eolian and fluvial environments (White, 1991a). Correlation between members of the Bidahochi Formation is poorly understood, as a complete stratigraphic section through all members does not exist at any one locality. Complex interfingering of the middle member with both lower and upper members is present and creates complicated stratigraphic and age relations (White, 1990a; Dallegge et al., 2003). Shoemaker et al. (1957, 1962) produced an informal six-member subdivision. This division is preferred by Dallegge (1999) and Dallegge et al. (2000, 2003) because lateral and vertical stratigraphic relations are easier to identify and correlate and the four members that correspond to the lower member of Repenning and Irwin (1954) appear to represent changes in the paleoenvironment. In this thesis, I will use the three-part division of Repenning and Irwin (1954) because the First Flat Mesa area contains volcanic rocks of the middle member, with only four isolated locations with lower-member deposits, so a more detailed division of underlying stratigraphy is unnecessary.

It is important to understand the lower member, though, because it provides information on the environment in which the maars formed. The lower member lies unconformably on the Mesozoic strata and consists of lacustrine and playa mudstones with intercalated felsic ash tuffs (Shoemaker et al., 1962; Sutton, 1974). Deposition of the lower member began at ~ 16 Ma and continued until ~13.7 Ma, when the rate of deposition decreased by an order of magnitude (Dallegge et al., 2000, 2003). This significant drop in apparent deposition rate may also be due to a condensed section or possible hidden disconformities indicating a time of erosion. Early workers (Williams 1936; Repenning and Irwin, 1954; Repenning et al., 1958; McKee et al., 1967; Sutton, 1974) interpreted the lower member to have formed through the evolution of a long-lived, extensive lake (Hopi Lake of Williams, 1936) (Love, 1989). Several problems with this interpretation include the lack of fossil evidence for lacustrine flora and fauna, very low sedimentation rates, and outcrop evidence indicating only ephemeral lake or playa deposits (White, 1990b; Vazquez, 1998; Dallegge et al., 2000). Love (1989) suggested that small, ephemeral lakes were created by springs that dried and formed playas or local, temporary lakes were produced by volcanic eruptions damming streams, which would only affect sediments that occur within the maars. It is unlikely that a long-lived, extensive lake existed in the Bidahochi basin.

The middle member of the Bidahochi Formation is composed of mafic volcanic units of the Hopi Buttes, including interbedded volcanogenic strata, primary volcanic deposits, mudrock, and lavas (Repenning et al., 1958; Shoemaker et al., 1962; White, 1989, 1990a, 1991a). Eruptions within the Hopi Buttes occurred from 8.7 to 6 Ma (Shafiqullah and Damon, 1986; Reynolds et al., 1986; Damon et al., 1996; Vazquez, 1998; Hooten, 1999; Damon and Spencer, 2000), although unpublished $^{40}Ar/^{39}Ar$ dates obtained are within the 7.5 to 6.8 Ma range, which may be closer to the real range of eruption dates (Ort, personal comm., 2009). Magma erupted into a playa basin (White, 1990a; Dallegge, 1999) as shown by the presence of thick deposits of playa units below the majority of the volcanic product (White, 1990b). The sedimentary environment into which the volcanoes erupted was sand and mud flats and shallow playa lakes, all present within a flat, broad plain (Hack, 1942; White, 1990a). Several authors have suggested that magmatism occurred within a large lake (Williams, 1936; Sutton, 1974; Scarborough, 1989), although features such as dune deposits, paleosols, desiccation structures, and stream channels indicate that the eruptions occurred in a subaerial environment that was perhaps seasonally wet with water-saturated, nonlithified sediments within the basin (White, 1990a, b). Migrating ephemeral lakes and the flooding of the basin influenced the dispersal of sediment and reworking of pyroclastic products (White, 1990a). This environment was important in determining the style of magmatism in the Hopi Buttes. The style of eruption (phreatomagmatic and magmatic) and the morphologic characteristics of the volcanoes (maars, tuff rings, and scoria cones) are similar to eruptions that occur in wet, low-lying areas (Heiken, 1971; Lorenz, 1986; White, 1991b; Godchaux et al., 1992).

The upper member, interpreted as fluvial and eolian, is exposed to the north and east of the volcanic field and consists of abundant cross-bedded sandstone and siltstone with minor amounts of claystone (Repenning and Irwin, 1954; Repenning et al., 1958; Howell, 1959; Shoemaker et al., 1962; Dallegge et al., 2003). Paleocurrent measurements suggest south-flowing streams (Love, 1989; Dallegge, 1999). Although fish and mollusk fossils occur locally in channel-sandstone units (Uyeno and Miller, 1965; Dallegge, 1999), age and stratigraphic correlations of the upper member are poorly constrained and it may even be coeval with lower and middle members (Dallegge et al., 2000). There is no evidence that this member ever covered the lava-capped mesas and buttes of the Hopi Buttes Volcanic Field (Dallegge et al., 2003). Defining the upper contact of the upper member is difficult because exposures are generally poor and Quaternary sediments overlie the eroded top in places (Love, 1989).

Study Area

The study area covers approximately 60 km^2 in the central and southern part of the First Flat Mesa 7½ minute quadrangle in the north-central portion of the Hopi Buttes Volcanic Field (Figure 1.2). The mesas in the study area are located west and southwest of White Cone, Arizona, and northwest of Indian Wells, Arizona. Most published maps of the Hopi Buttes (Hooten, 1999; Vazquez, 1999) cover the region to the south of the study area, although some maps at much smaller scales (Cooley et al., 1969; Akers et al., 1971; Hackman and Olson, 1977; Ulrich et al., 1984; Scarborough, 1985, 1986; Richard et al., 2000) include First Flat Mesa. The mesas of the study area are geomorphologically similar to the surrounding mesas of the of the Hopi Buttes region. The study area contains a few isolated, small buttes that are related to only one vent, but most vents are contained within the larger mesas.

The First Flat Mesa area contains a continuous vertical stratigraphic section of volcanogenic deposits and lava flows and lacks significant exposure of lower Bidahochi strata. Pyroclastic and epiclastic strata compose the volumetric majority of the volcanic material with overlying lava flows contributing lesser amounts. The volcanic vents are not prominent topographic features and are contained within the large mesas. The lava flows dominate the area because of their erosional resistance and create a large contiguous mesa within most of the study area.

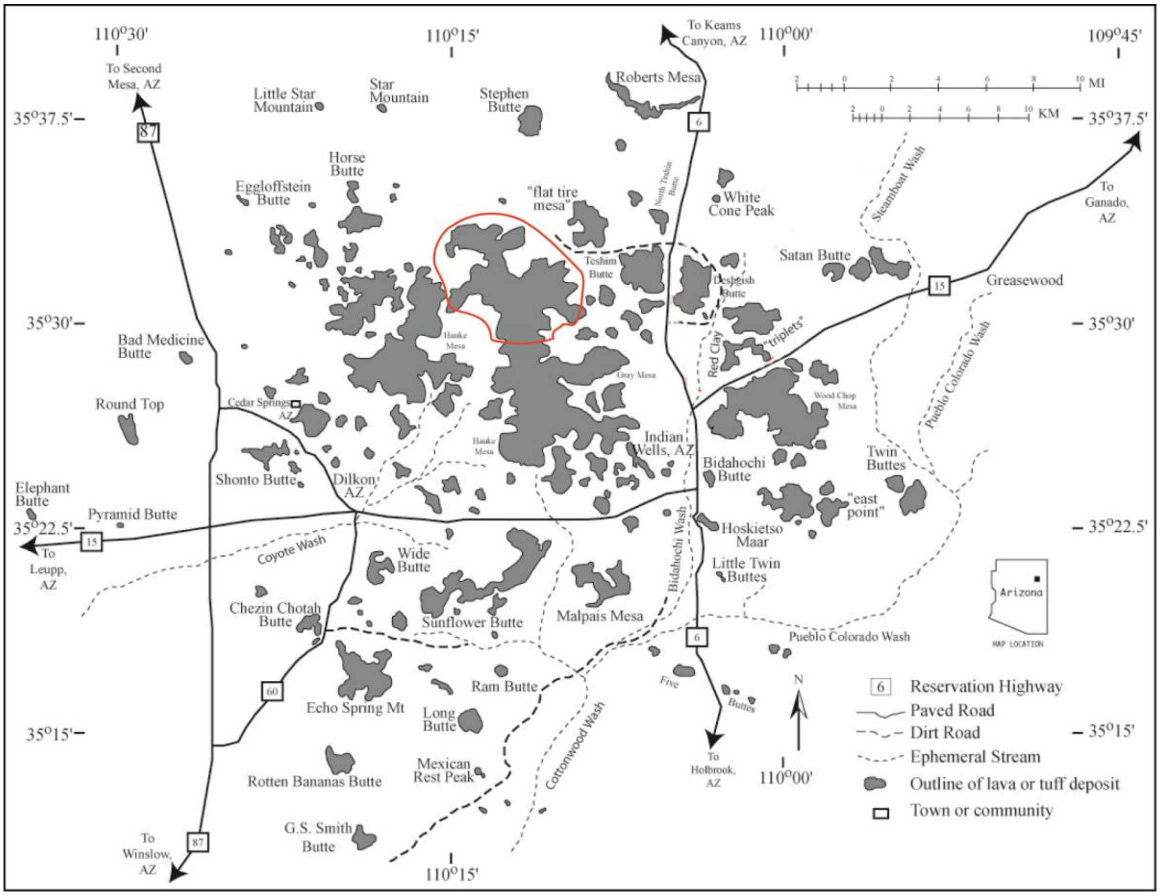


Figure 1.2. Map of the Hopi Buttes (Tzézhin Bií) Volcanic Field, with the lava-covered buttes shaded. Area mapped in this study is in the north-central sector and comprises much of the volcanic rocks of the First Flat Mesa 7.5-minute quadrangle on Navajo Nation land (area within red polygon). Modified from Wenrich (1989) and Love (1989).

PHREATOMAGMATISM

Phreatomagmatic eruptions can produce polygenetic volcanoes such as Vesuvius (Sigurdsson et al., 1985) and Mt. Lassen (Williams and McBirney, 1979), but are most commonly associated with monogenetic volcanoes. These latter phreatomagmatic eruptions produce several distinctive types of volcanoes, referred to as maar volcanoes *sensu lato*. Maars are the second most common volcanic landform after cinder cones (Cas and Wright, 1987). Within a monogenetic volcanic field, maars are typically a minority, except in low-lying or poorly drained basins (Lorenz, 1986; White, 1991b).

Phreatomagmatic fields are volcanic fields dominated by maar volcanoes; active examples include West Eifel (Germany), Auckland (New Zealand), and the Serdán-Oriental (Mexico) volcanic fields (Schmincke et al., 1990; White, 1991b; Allen et al., 1996; Johnston et al., 1997; Carrasco-Núñez et al., 2007; Cassidy et al., 2007). The word 'maar' means *lake* in the colloquial German of the Eifel District, derived from the Latin 'mare' for sea (Steininger, 1819).

Maar volcanoes *sensu lato* include several different types of edifices characterized by diverse crater geometry and tephra accumulation. These edifices include maars *sensu stricto*, tuff rings, and tuff cones (Figure 1.3; Cas and Wright, 1987). Maars, narrowly defined, are characterized by steep-sided craters cut below the pre-eruptive surface, commonly filled with a small lake and surrounded by low-lying outward-dipping ejecta layers that rapidly decrease in thickness away from the vent rim. Tuff rings are characterized by craters at or above the pre-eruptive surface with both inward- and outward-dipping beds of ejecta. Tuff cones are characterized by small craters above the pre-eruptive surface and surrounded by steeply dipping pyroclastic aprons. Conduits that feed maar volcanoes are composed of accidental wall rock and fragmented magmatic material and are known as diatremes (Figure 1.3; Lorenz, 1986).

The type of maar volcano created may be controlled by water/magma ratios during the eruption; maars are produced at low ratios, tuff rings and tuff cones result from high ratios (Heiken, 1971; Wohletz and Sheridan, 1983). More recent studies suggest that magma/water ratios are not the only controlling factor that determines the topographic feature produced (Fröhlich, 1987; Zimanowski et al., 1991: Dobran and Papale, 1993; Sohn, 1996). In addition to magma/water ratios, the process whereby water is brought into contact with magma and the pre-eruptive mixing of water and magma may be just as important (Sohn, 1996). Hydrogeological factors such as aquifer rock type and permeability may also affect the type of volcano produced, as they determine the water/magma ratio by controlling the movement of water within the aquifer. Hydrostatic pressure of an aquifer will determine whether groundwater can move from an aquifer into a pressurized volcanic conduit (Mastin, 1997). Explosive interaction of magma and water occurs with maximum efficiency at pressures of 20-30 bars (Lorenz, 1986), although higher pressures will still allow for explosive interaction (Lorenz, 2007). Maintaining this pressure requires that explosion loci migrate downward. A cone of depression is created by extraction of ground water, allowing the explosion loci to migrate downward (Lorenz, 1986). Migration of volcanic explosions downward into drier strata, lacking water, may cause the eruption to “dry out” (Aranda-Gómez and Luhr, 1996; Sohn, 1996), but downward migration may also bring magma into contact with a fractured aquifer and cause the eruption to become wetter, as seen at Atexcac crater, Mexico (Carrasco-Núñez et al., 2007). Additionally, external water may be added by water, or fluidized mud, from higher stratigraphic levels flowing down to the explosion locus. Excavation of underlying layers causes slumping in surficial and overlying beds. This process as well as ejection of large amounts of rock creates maar craters (Lorenz, 1986, 2003).

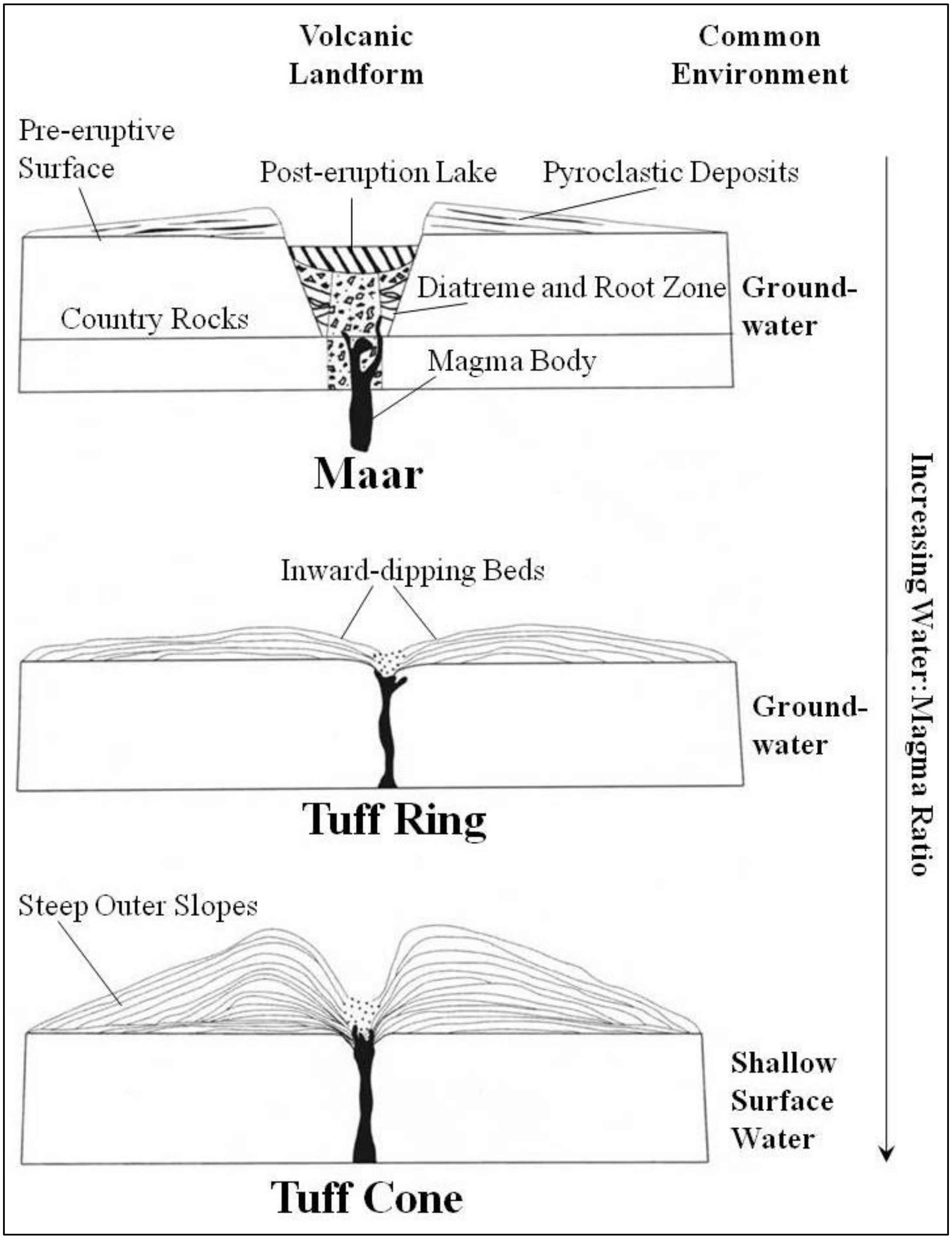


Figure 1.3. Phreatomagmatic landforms and hydrogeological environments. Maars cut into the surrounding country rock, while tuff rings and tuff cones build pyroclastic edifices above the pre-eruptive surface. Diatreme and root zone agglomerates record initial levels of hydromagmatic fragmentation. Both tuff rings and maars result from groundwater/magma interaction; contrasts in volcano type may be a result of different magma-water ratios within the vent environment. Modified from Cas and Wright (1987) and Wohletz and Heiken (1992).

Maar volcanoes

Maars, strictly defined, consist of a central crater surrounded by a tephra ring. The inner slope of the tephra ring dips toward the crater at approximately 33° and the outer slope dips away from the crater at much shallower angles (5-10°). Both of these angles are dependent on the total volume ejected, pre-eruptive topography, moisture content of the tephra, and additional erosional processes. This tephra ring is built up by emplacement of tens to over 1000 tephra beds, ranging from a few mm to 1-2 dm thick. These beds represent the proximal tephra deposits and indicate the number of explosions of the maar volcano (Lorenz, 2003). Maar craters represent a depocenter that collects crater-wall debris that falls and backflows onto the crater floor, requiring that primary tephra beds will be overlain by reworked tephra-ring deposits and underlain by country rocks (Lorenz, 2003). The deposits within the maar crater represent marginal deposits and the thin tephra beds over 500 m from the vent represent distal deposits (Figure 1.4). The importance of studying these deposits is discussed later in this chapter.

Lorenz (2003) and Auer et al. (2007) described two distinct types of maars as hard-substrate and soft-substrate maars. Hard-substrate maars are produced when magma interacts with water in fractured or jointed aquifers. Soft-substrate maars are produced when magma interacts with wet, unconsolidated sediment or pore aquifers with high permeability; these maars involve downward penetration of explosion loci and produce subsurface structures. The surficial expressions of these two types are distinctly different. Maars produced in hard substrates occur in areas of structural weakness and produce craters with steep angles of repose. Soft-substrate maars produce a crater with a shallow angle of repose and a steep-walled diatreme beneath (Lorenz, 2003; Auer et al., 2007). Maars also occur in a combined hard-substrate and soft-substrate setting. These involve a layer of unconsolidated sediment overlying solid country rock; the Hopi Buttes (Lorenz, 2003) and Atexcac crater (Mexico) (Carrasco-Núñez et al., 2007) are examples of this type of setting. The volcanic products of the Hopi Buttes were extruded into a playa setting of unconsolidated sediments that are underlain by Mesozoic sandstones (White, 1991b). This often caused initial phreatomagmatic eruptions that became magmatic when the eruption locus occured within the water-poor, hard rock that underlies the wet unconsolidated sediment (Lorenz, 2003); however, it is possible to return to a phreatomagmatic eruption if the explosion foci hit an aquifer that allowed a new influx of water (Carrasco-Núñez et al., 2007). Within this environment, sediments can be liquefied during earthquakes and explosive volcanism, releasing water to interact with the rising magma, or interacting directly with the magma (Lorenz, 2003).

Maar deposits include features such as bomb sags, accretionary lapilli, crater infill (including crater-lake deposits), several types of cross-stratification, fluidized sediments, accretionary lapilli, and deposits formed by the collapse of the eruption column. Features such as bomb sags and dune-form axes can provide information on the direction from which products were erupted from the vent (Nemeth et al., 2001; Auer et al., 2007; Ort and Carrasco-Núñez, 2009). Bomb asymmetry indicates the direction from which the bomb hit the underlying deposits, indicating the direction of flow away from the vent. At Tecuitlapa Maar in Mexico, bomb-sag asymmetry suggests that dune-form axes were roughly perpendicular to the flow direction (Ort and Carrasco-Núñez, 2009). Fluidized sediments at the maar edge and incorporated into the maar deposits have been interpreted to indicate the interaction of sediments and magma (Hooten, 1999; Ort and Carrasco-

Núñez, 2009). Lapilli and accretionary lapilli provide information on the amount of water interacting with the magma and the fragmenting ability of the eruption (Fisher and Schmincke, 1984; Cas and Wright, 1987). Juvenile lapilli and fine ash result from large amounts of energy being released. Accretionary lapilli increase in percentage when additional water is added to the system, indicating changes in water-magma ratio (Carrasco-Núñez et al., 2007).

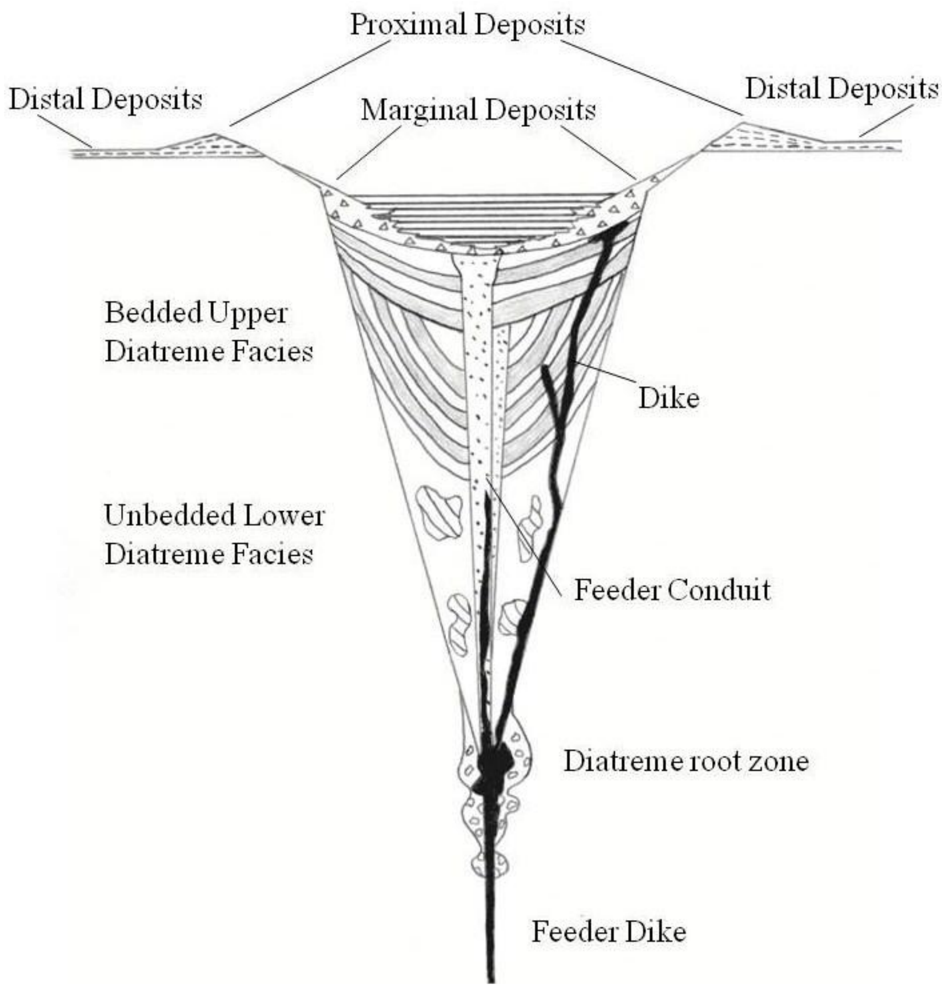


Figure 1.4. Location of marginal, proximal, and distal deposits in relation to the volcanic vent and underlying diatreme and root zone. Feeder dike is not to scale and is too thick. Faults may occur within the diatreme during syn-eruptive slumping and propagate upward during diagenesis. Horizontal and vertical scales are approximately equal. Modified from Lorenz (1986, 2003, 2007).

Magma-water interactions

Phreatomagmatic eruptions result from the hydrodynamic mixing of magma and water or water-saturated sediment. This phenomenon is the most effective volcanic mechanism for conversion of thermal energy into kinetic energy (Lorenz, 1987; Wohletz, 1983, 1986; Lorenz et al., 1994; Wohletz and Brown, 1995; Zimanowski et al., 1997b). The kinetic energy produced by phreatomagmatic eruptions is approximately one to two orders of magnitude greater than in volumetrically equivalent magmatic eruptions of similar compositions that are driven by magmatic gas exsolution (Sato and Taniguchi, 1997).

Phreatomagmatism is interpreted as a natural type of molten fuel-coolant interaction (Wohletz, 1983, 1986; Zimanowski et al., 1991, 1997b; Wohletz and Heiken, 1992; White, 1996). Molten fuel-coolant interactions (MFCI) result from the mixing of molten fuel and a coolant in which heat is exchanged between the two materials at catastrophic rates (Wohletz and Heiken, 1992). In volcanic eruptions, magma is the fuel and water or water-saturated sediment is the coolant (Wohletz and Heiken, 1992; White, 1996). Experiments on MFCI provide insight into the fragmentation process and pyroclastic characteristics observed in nature (Wohletz, 1983, 1986; Wohletz and McQueen, 1984; Zimanowski et al., 1991, 1997a, b). Three fragmentation regimes occur in phreatomagmatic experiments and only two fragmentation regimes occur in magmatic experiments. Phreatomagmatic processes produce significantly more particles with diameters of less than 180 μm (Zimanowski et al., 1997a, b). Each fragmentation regime involves different fragmentation mechanisms or processes and creates distinctly different particle shapes (Zimanowski et al., 1997a). The three fragmentation regimes are (1) intra-crucible fragmentation during acceleration in a confined geometry, (2) extra-crucible fragmentation during decelerated movement of melt on ballistic trajectories in free air, and (3) MFCI fine fragmentation (Zimanowski et al., 1997a). Intra-cricible and extra-crucible fragmentation occur in both phreatomagmatic and magmatic experiments. Intra-crucible fragmentation occurs while the maximum fragmentation energy is available and fragmentation is described as stimulated Taylor instability growth. Cooling rates are relatively low and the surface tension forces fragments into spherical shapes. Extra-crucible fragmentation occurs at low ejection velocities and melt fragmentation can be described by gravitational jet disintegration or Taylor instability (Zimanowski et al., 1997a). Larger fragment sizes and higher cooling rates result in elongated particles and, at higher ejection velocities, Pele's hair or highly elongated fragments are formed (Zimanowski et al., 1997a).

The third fragmentation mechanism, MFCI fine fragmentation, is unique to phreatomagmatic systems and occurs by two effective mechanisms. The first mechanism involves thermal granulation caused by stress induced by extremely high cooling rates, which causes an intense brittle reaction. The second mechanism involves brittle reaction of the melt caused by excess fluid pressure. High stress rates on the melt are due to hydraulic coupling of the water-melt system when the two liquids are in direct contact. If these stress rates exceed the temperature-dependent critical shear stress of the melt, an intense brittle reaction is induced (Zimanowski et al., 1997a). It is likely that both of these mechanisms play a role in MFCI fine fragmentation, due to the extremely high cooling rates and very high stress rates caused by pressurized water (Zimanowski et al., 1997a).

Experiments have shown that it is possible to use particle shape to determine the occurrence and efficiency of MFCI (Büttner et al., 1999, 2002; Austin-Erickson et al., 2008). The mechanics of this interaction are well understood, initially within basaltic melts, and now with some understanding of rhyolitic MFCI. Four stages occur within MFCI (Wohletz, 1986; Wohletz and Heiken, 1992; Frohlich et al., 1995; White, 1996; Zimanowski et al., 1997a) (Figure 1.5). The first stage is the initial interaction of the magma and coolant, with the development of a steam film that provides thermal insulation between the two materials. This stage is considered the coarse mixing of the magma and coolant. The second stage involves the collapse of the film and contact of the magma and coolant. Fragmentation of the fuel occurs and promotes even greater mixing and heat transfer (Zimanowski et al., 1991). This fine fragmentation stage is poorly understood but is believed to be caused by two interacting processes; thermal granulation caused by extremely high cooling rates and brittle reaction of the melt by excess fluid pressure (Zimanowski et al., 1997a). The third stage is the explosive discharge and expansion of the mixed materials (White, 1996). During this stage, the superheated water expands explosively (White, 1996). The fourth and final stage involves exposing the molten interior to the expanding system, causing fragmentation into droplets (Zimanowski et al., 1991). The particle shapes produced from these processes include stepped, moss-like, angular, elongated (Pele's hair), and rounded (Pele's tears). Some of these particles have additional features such as quench cracks and a film or skin that coats the particle surface (Büttner et al., 2002). Thermohydraulic explosions produce fine fragments (< 130 μm) and these particles are angular and have rough, uneven surfaces (Zimanowski et al., 1997a; Büttner et al., 2002). Natural grain shapes were compared to those produced in the laboratory during dry and wet explosion experiments and striking similarities were found between natural grains and experimentally produced grains (Büttner et al., 1999, 2002; Austin-Erickson et al., 2008).

Most of the thermal energy that is converted into mechanical energy is released as shock waves during fine fragmentation (stage 2) in a brittle mode, acting under extremely high cooling rates (>10^6 K/s) (Büttner and Zimanowski, 1998). This produces active particles with no system expansion during this phase (Büttner and Zimanowski, 1998; Büttner et al., 2002). Electrical signals are produced during this phase and are linearly proportional to the explosion intensity and to the total surface area of the particles generated by the brittle process (Büttner and Zimanowski, 1998).

Specific surface area of active particles can be determined using the Brunauer-Emmett-Teller (BET) method and the fundamental BET equation, which rely upon the mass of gas absorbed at a relative pressure (Zimanowski et al., 1997a). Fragments of all grain sizes produced from both thermohydraulic and magmatic experiments were compared using the BET method. In grain sizes from 32 to 130 μm, thermohydraulically produced fragments had higher surface areas than the particles produced by magmatic experiments (Zimanowski et al., 1997a). Using a linear proportionality between the total kinetic energy release of thermohydraulic explosion experiments and surface area of active particles, specific amounts of kinetic energy release can be assigned for one kilogram of active particles (Büttner et al., 2002). Passive particles are formed in confined and free air, whereas ductile fragmentation occurs during expansion (stage 3) (Büttner et al., 2002).

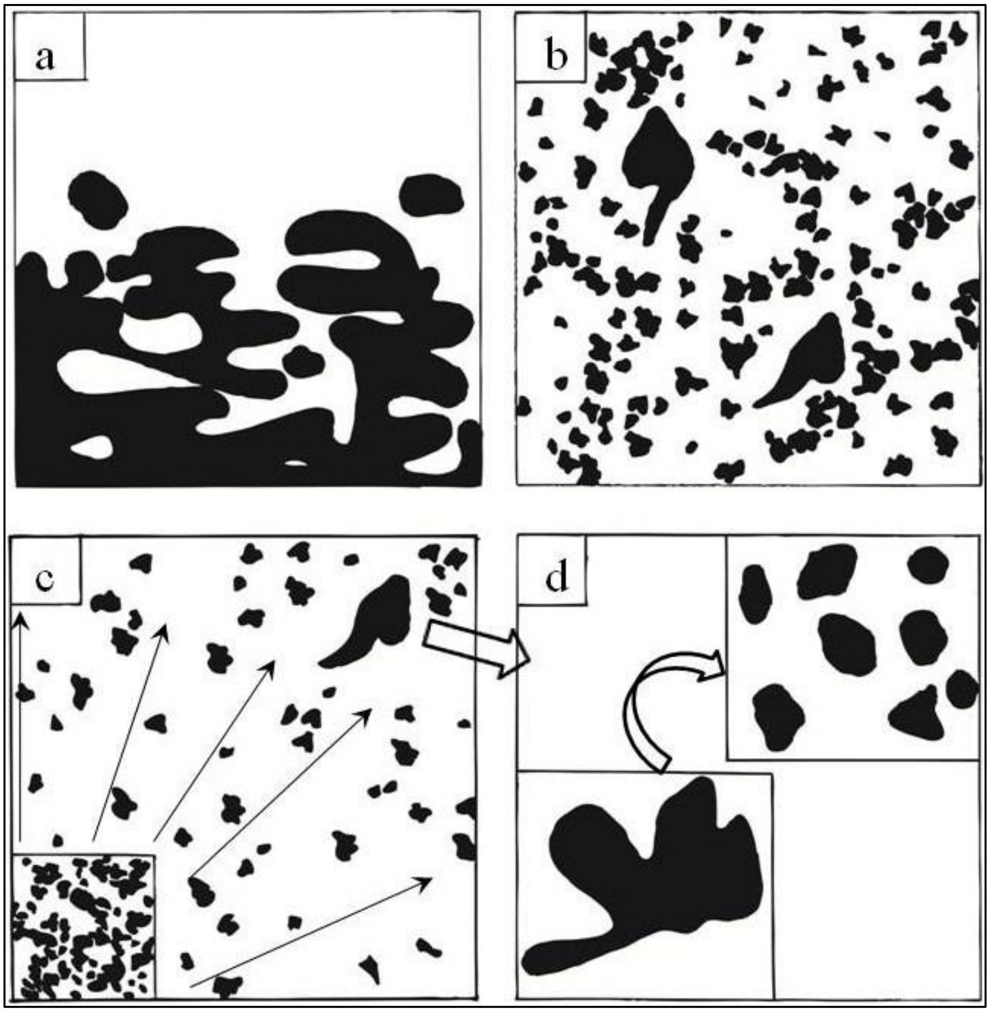


Figure 1.5. Schematic illustration showing a four-stage fuel-coolant interaction. a) Stage 1 is coarse mixing or intermingling, at a scale from centimeters to meters, of magma with coolant. b) Stage 2 is thermal fragmentation of clast sizes in the micron to tens of microns range, together with rapid superheating of the coolant. Local remnants of larger (mm-dm scale) bodies of fluid magma have not fragmented before ignition of Stage 3. c) Stage 3 is dominated by explosive expansion of the system by one to two orders of magnitude as the superheated coolant flashes to vapor. Bodies of fluidal fuel are accelerated during this expansion, which leads to d) Stage 4, "induced" fragmentation by fluid shear processes, which breaks apart the magma bodies formed in stage 2 to form somewhat smaller, fluid-form particles (Modified from White, 1996).

The kinetic energy released during expansion represents a small amount (10%) of the total kinetic energy released (Büttner and Zimanowski, 1998; Büttner et al., 2002). Determination of particle shape and surface area allow the amount of energy released during an explosion to be calculated, using the methods stated above.

MFCI experiments have provided significant information on the processes that occur during phreatomagmatic eruptions. Experiments have been varied to test several factors that influence eruptive characteristics. These variables include melt composition, melt viscosity, water volume, differential flow speed, and impure coolants (White, 1996; Büttner et al., 1999, 2002; Zimanowski et al., 1997a, b, 2003, 2004; Grunewald et al., 2007). Initial MFCI experiments used only pure water, but impure coolants require testing also. Natural eruptions involve recycling of clastic debris that mixes with water and therefore magma will mix with sediment-laden water (White, 1996). Most plausible coolants contain dissolved compounds and solid particles. Additions to pure water alter the coolant density, viscosity, thermal conductivity, and lower the heat capacity but also promote increased bubble nucleation rates and decrease bubble wetting angles (Wohletz, 1986); all of these factors act to change the ability of the mixture to explode (White, 1996). Most of these factors damp the explosivity of interactions compared to other experimental examples, yet the impure coolant also leads to much more effective intermingling during stage 1. Decreased bubble-wetting angles allow vaporization to be achieved more easily, which favors the initiation of interaction. Overall, the unit-volume explosivity in large mixed volumes of impure coolant and magma is reduced (White, 1996). These experiments show that it is important to keep in mind geologically plausible and relevant factors. Although MFCI experiments have provided significant information about processes occurring during phreatomagmatic eruptions, many other processes may influence the shapes and distribution patterns of the pyroclasts produced. These processes include degassing of magma, variations in vesiculation of the magma, crystallization and chemical variations in the erupted magma reservoir, coalescence of particles, formation of aggregates, transport and depositional processes, and post-eruptive physical and chemical alterations (Zimanowski et al., 1997a).

Magma interacts with water-saturated sediment as it intrudes upward into unconsolidated sediments and produces a vent. Volcanic vents are host to several different types of coolants (water and/or water-saturated sediments), containing abundant wet debris enclosed by unstable walls. The wet debris becomes an impure coolant and raises the confining pressure at the site where magma enters the base of the vent. The increase of confining pressure suppresses early explosivity and allows magma to intermix with the impure coolant. Occasionally, large clasts or intact masses from the vent margin may settle into the rising magma, which may enhance fragmentation. Volcanogenic seismicity, collapse of wall rock, and fallback of clasts may also provide shock-wave reflection within the vent and increase fragmentation. Clasts consist of recycled ash, fragmented country rock, and disaggregated sediment, which interact with magma when they fall back into the vent and cause magma to continuously interact with an impure coolant. Mixing of magma with water-saturated sediment is likely to be a universal process in volcanic vents during phreatomagmatism due to constant fallback of clasts (White, 1996).

When magma interacts with water-saturated sediment and produces small-scale explosions, it forms peperite. Peperite textures range from blocky, angular clasts surrounded by fine- to coarse-grained sediment to more globular varieties in which the igneous clasts have highly irregular margins and blocky, phreatomagmatic fragments are nearly absent (Busby-Spera and White, 1987). The blocky, angular peperite is likely a product of both in situ quench fragmentation and localized steam generation and fluidization (Kokelaar, 1982; Busby-Spera and White, 1987). The globular textures of peperite may be representative of the coarse mixing stage of MFCIs between molten magma and sediment-laden impure coolants (Kokelaar, 1982; Busby-Spera and White, 1987; White, 1996). Within the study area, no true peperite was seen along edges of dikes. However, intermingling of hot lava and water-saturated sediments is visible at the base of several lava flows and within some of the facies identified.

Particle Morphology Analysis

The shape of particles carries information about origin and transportation (Maria and Carey, 2007). The characterization of ash particles can identify the process responsible for pyroclastic deposit formation. The classification of volcanic-particle shape can provide information about the processes responsible, including magma viscosity, volatile content, degree of interaction with external water, particle transport, and sedimentation (Sheridan and Marshall, 1983; Wohletz, 1983, 1986, 1987; Dellino and LaVolpe, 1996; Riley et al., 2003). Particular morphological features of volcanic particles that are seen using scanning electron microscopy (SEM) are systematically described in various publications (Heiken, 1974; Heiken and Wohletz, 1985; Wohletz, 1987). However, classification and interpretation of these particles is highly subjective and dependent upon experience and training (Dellino and Liotino, 2002).

Geometric forms poorly describe particles, due to the complex shapes of particles (Dellino and Liotino, 2002). Dellino and LaVolpe (1996) proposed the use of adimensional shape parameters to describe deposits at Monte Pilato-Rocche Rosse (Lipari, Italy). The study by Dellino and LaVolpe (1996) used multivariate elaboration of data, which allowed the discrimination of particles produced by phreatomagmatic and magmatic eruptions. Additional methods for quantitative particle analysis were still needed. Kaye (1978) was the first to use fractal analysis on volcanic particles. Fractal analysis methods are used to describe particle morphology in several branches of research including aerosol particles (Kindratenko et al., 1994), marine snow (Kilps et al., 1994), biological cells (Baumann et al., 1994), and material science (Bérubé and Jébrak, 1999; Gonzato et al., 1998). These methods have been successful in describing complex and irregular shapes.

Carey et al., (2000) used fractal dimensions to successfully discriminate between primary and reworked jokülhaup deposits in Iceland. Dellino and Liotino (2002) used similar fractal and multifractal analyses on the same particles from Monte Pilato-Rocche-Rosse (Lipari, Italy) that Dellino and LaVolpe (1996) analyzed. Dellino and Liotino (2002) described the shape of volcanic particles and the fragmentation dynamics that produced the particles.

The utility of fractal analysis for describing particle shape results from the idea that a shape can be circumscribed by equilateral polygons. As the sidelength gets shorter, the number of sides increases, and the perimeter of the polygon also increases and better approximates the true particle outline. The true particle perimeter would be reached by using a polygon with an infinite number of sides (Dellino and Liotino, 2002). By defining the steplength as the side of the polygon, and plotting the log of the steplength vs the log of the resulting perimeter on a diagram, the fractal behavior of a particle can be determined. If the data points approximate a straight line, then the particle is self-similar, in that it has the same degree of irregularity at all scales. This particle then has true fractal (mono-fractal) behavior. If there is a break in the slope, this indicates that the particle has a multifractal behavior. Typically, two different slopes can be identified. The fractal dimension can be determined using the equation $D = 1 - S$, where S is the slope of the line, as calculated by using the least squares method. The rate of increase of perimeter as steplength decreases (measured by the slope of the line) is a measure of the particle irregularity (Dellino and Liotino, 2002).

Marginal and Proximal deposits

Maar volcanoes consist of several parts that are illustrated in Figure 1.4. These include intramaar (within the vent), marginal (within the vent at the edges), proximal (immediately outside the vent), and distal (far from the outside of the vent) deposits. Deposits at the margins of maars have not yet been studied in detail to understand the timing and origin of deformation, such as fluidized sediments, slumps, faults, and folds. These structures indicate that the sediments, and the water within them, were interacting with the magma during the eruption. Water-escape features also indicate that water was interacting with magma or pyroclastic material during stages of the eruption. The timing of these structures is unclear with respect to volcanism and determining this timing is a significant portion of my project work. This study provides detailed descriptions of these features.

Understanding volcanic vent processes during an eruption relies upon proximal deposits, since more distal deposits may undergo processes that remove or filter indicators of vent processes. Marginal deposits provide information about the water and/or sediments that interact with magma to produce explosive eruptions (Figure 1.3).

Understanding the formation of these deposits allows for temporal and spatial constraints on explosivity parameters during the eruption. Marginal deposits are composed of several facies. Descriptions of these facies present the information necessary to create facies associations. Interpretations of these facies associations supply information about the processes occurring during an eruption and how these processes change throughout an eruption, as well as what processes occur at these locations after an eruption.

PURPOSE AND OBJECTIVES

Further study of phreatomagmatic deposits is necessary to advance understanding of the complex processes that occur during this style of eruption. The Hopi Buttes Volcanic Field provides an excellent opportunity for the examination of phreatomagmatic deposits, maar crater deposits, and proximal deposits of several phreatomagmatic vents.

This thesis is a comprehensive study of the volcanic geology of the First Flat Mesa area. The goals of this study are to link the deformation and fluidization of proximal sediments with the maar-crater fill, and to determine the evolution of eruptions as the relative amounts of water interacting with magma varied. These goals were achieved through:

1) Identification of volcanic vents and establishment of volcano-stratigraphic relations in the study area. This involved determining relative timing of the vents within the study area and was accomplished by documenting stratigraphic relations of units from distinct vents to other nearby vents. This is not possible for all vents, since some vents are isolated and no stratigraphic relations were observed. Establishing relative timing is important because it provides

information on how vents interact with each other and whether one vent has any influence on a nearby vent. These interactions may be caused by seismicity or direct deformation of vent deposits by the eruption of another vent.

2) Identification of features within maar-crater deposits. This involved identifying faults, folds, slumps, or fluidization of sediments within the maar-crater deposits (marginal deposits) and was accomplished by noting and photographing any of these features within the deposits. This allows for some processes that occurred during an eruption to be identified, as well as some processes that occurred after an eruption.

3) Documentation of lateral and vertical facies characteristics of maar crater deposits. This involved describing and resolving the facies that compose the maar crater deposits and observing how they change laterally and vertically within one vent. This was accomplished by describing different facies within these deposits and noting how they change. Once the facies were described, they were put into facies associations and interpretations of how the facies formed provided the information necessary to identify processes occurring during an eruption and after an eruption.

4) Characterization of particle morphology using fractal analysis on samples from marginal and proximal facies previously defined in this study. Fractal analysis allows for particles to be identified as having true fractal (mono-fractal) behavior or multifractal behavior. From this characterization it is possible to differentiate between phreatomagmatic and magmatic particles and facies that were produced by different processes.

CHAPTER 2
FIELD UNITS

INTRODUCTION

The Hopi Buttes have been classified as a "lamprophyric" volcanic field (Wenrich and Mascarenas, 1982; Ort et al., 1998). Alibert et al. (1986) classified rocks in the Hopi Buttes as nephelinites based on their geochemistry, but many of the rocks do not fit into either of these classifications. Lamprophyres are defined as fine-grained mafic rocks that contain feldspar-free, glass- and feldspathoid-bearing matrix and predominantly mafic phenocrysts with at least one hydroxyl-bearing phase (Le Bas and Streckeisen, 1991). Within lamprophyres, amphibole or mica occurs as phenocrysts and/or within the groundmass phase with the presence of olivine and pyroxene (Rock, 1987; Woolley et al., 1997).

Vazquez (1998) and Hooten (1999) used modal mineral assemblages, petrographic analysis, and geochemical analysis to determine that lavas within their respective study areas are basanites, monchiquites, and melanephelinites. Lamprophyres that contain pyroxene, olivine, and amphibole and are feldspar and melitite free are termed monchiquites (Le Bas and Streckeisen, 1991). Lamprophyres are defined mineralogically, but the definition of basinite and nephelinite is based upon major-element composition (TAS diagram). Some inferences about the rock type can be drawn from mineral assemblages, though. Basanite typically lacks hydrous minerals and is associated with plagioclase phenocrysts (Le Bas, 1989) but water reduces the stability field of plagioclase (Yoder et al., 1957). The generally high water content within the Hopi Buttes rocks (perhaps even in the non-lamprophyres) may explain the lack of plagioclase phenocrysts (Suda et al., 1982; Alibert et al., 1986; Wenrich, 1989). Nephelinite rocks are distinguished from lamprophyres by the lack of a hydrous phase. Melanephelinites contain little or no modal nepheline and may resemble basanites (Le Bas, 1989). Lavas within the First Flat Mesa area are monchiquites, basanites, and melanephelinites, based upon mineral assemblages determined from field, hand samples, and petrographic analysis. No geochemical analysis was done on lava samples from this study area. Thin-section examination and geochemical analysis of the lavas within this study area and the study areas of Vazquez (1998) and Hooten (1999) reveal that no nepheline occurs in these rocks. Most of the lavas in their study areas are monchiquites or basanites, depending upon the occurrence of hydrous minerals. Therefore, rocks in the Hopi Buttes cannot be designated solely as lamprophyres or nephelinites.

UNIT DESCRIPTIONS

Geologic mapping at a scale of 1:12,000 provided the information necessary to identify volcanic centers and associated geologic units (Plate 1). Only Tertiary and Quaternary rocks crop out within the study area. Within the study area, 23 volcanic centers were defined, with the potential of additional vents that were not visible due to overlying lava flows or due to overlapping of deposits from closely spaced centers. Tertiary units consist of two non-volcanic deposits, while 35 Tertiary volcanic units are divided based upon field relations of vents and field identification of lavas. Volcanic grain-size terms are based on divisions from White and Houghton (2006). Quaternary alluvium deposits are prevalent throughout the study area and occur typically on top of the mesas as well as in low-lying topographic areas. Within the alluvium deposits, some eolian sand-dune and sand-sheet deposits are present and visible due to their ability to move across the landscape. A total of five defined Quaternary units overlie the Tertiary units within the study area. The Quaternary units will be described first so as to provide more detail to the Tertiary volcanic units.

Determination of the relative timing of the volcanic vents was not possible for most locations since deposits from the vents do not exist adjacent to each other. Within the central portion of the field area, some time relations can be observed, such as vent 4 erupted before vent 7. The timing of these two is demonstrated by the deposits of vent 4 flowing into vent 7. In addition, vent 8 erupted after vent 7 since deposits from vent 7 are cut off by deposits of vent 8.

QUATERNARY UNITS

The surficial deposits within the study area fall into three distinctive categories (alluvium, colluviums, and eolian) and combinations of the categories**.** Alluvium is located only within active stream channels, while eolian or mixed eolian and alluvial deposits compose the surficial units within all other areas of Quaternary units.

Quaternary Alluvium (Qal, Plate 1)

Alluvium is red to orange, poorly consolidated to unconsolidated clay, silt, and sand. This unit forms recent stream fill located adjacent to buttes. No sedimentary structures are seen within alluvium.

Quaternary Colluvium (Qc, Plate 1)

This unit consists of slump deposits consisting of Tl, Tt, and Tlt (described within the Tertiary volcanic units) adjacent to buttes. Stratigraphic relations of bedding are maintained and Tl lies over Tt and Tlt as seen on the adjacent butte from which the slump was derived. Most blocks of colluvium are slightly rotated, indicating a curvilinear plane of slumping.

Quaternary Eolian Sand (Qes)

Sand deposits are red to orange, unconsolidated clay, silt, and sand composing reactivated and active dunes. This includes barchan-type dunes that are mostly stabilized by vegetation, as well as large dunes that are unconsolidated and form nearly parallel dune faces. These dunes support moderate growth of grass and small high-desert shrubs that help stabilize or trap accumulating deposits.

Quaternary Dune Sand and Sand Sheet Deposits (Qd)

Sand deposits are light-red, fine-grained quartz sand locally derived mainly from other surficial units whose sediment is easily eroded by wind. Originally those sand grains were derived from erosion of nearby bedrock outcrops of Moenave, Kayenta, and Bidahochi Formations and include fragmented grains of volcanic rock. They form lumpy, undefined sand-dune or sand-sheet deposits commonly concealed beneath moderate growths of grass, sagebrush, and piñon pine/juniper woodlands at higher elevations of volcanic mesas and buttes.

Quaternary Mixed Alluvium and Eolian Deposits (Qae)

This gray, light-red and brown clay, silt, and fine- to coarse-grained sand and is interbedded with lenses of pebbly gravel. It contains black, white, and gray angular to sub-rounded locally derived volcanic fragments. The unit accumulates by both alluvial and eolian processes, resulting in an interbedded sequence of thin-bedded mixed clay, silt, sand, and small gravel typically of young fluvial and eolian deposits. It is commonly overlapped by young or fresh eolian sand deposits. The unit supports light to moderate growths of grass, cactus, and small high desert shrubs.

TERTIARY UNITS

Tertiary Marl Rocks (Tm, Plate 1)

Marl is varicolored (green, pink, white, tan, brown), poorly consolidated to moderately consolidated, mudstone, siltstone, and sandstone. These rocks occur only locally in small outcrops.

Tertiary Sedimentary Crater Rocks (Tc, Plate 1)

These rocks are tan to yellowish-white, laminated to medium-bedded lime-siltstone, with very thinly interbedded mudrock and crinkly laminated travertine. These beds have variable amounts of pyroclastic and epiclastic material ranging from fine to coarse ash and localized interbeds of mafic tuffs and localized ripple marks. This unit is located in vent zones and generally forms circular outcrops with inward-dipping beds, locally showing soft-sediment deformation. Outcrops of white-gray massive medium-grained limestone are rare.

Figure 2.1. Field photo of a small marl deposit. Note the variable colors within the deposit and the poor consolidation of the unit. Field book is approximately 19 cm long.

Figure 2.2. Field photos of crater-lake deposits. The left photo shows thin beds of limestone within thinly bedded volcanic tuff deposits. The right photo shows soft sediment deformation within the limestone beds. Hammer is 32 cm long, pencil is approximately 15 cm long.

TERTIARY VOLCANIC ROCKS

The following descriptions will be divided by volcanic unit type (e.g. bedded tuff, lapilli tuff, lava) and by the vent from which the deposit erupted. Tertiary bedded tuff and Tertiary bedded tuff to bedded lapilli tuff (black) are described without an associated vent due to an inability to locate the potential source vent for these deposits. In addition, the bedded tuff is so prevalent throughout the study area that it would not be possible to indicate all of the potential source vents for every deposit. Lavas that are denoted with a letter have potential source vents listed since a definitive source vent was not determined. Lavas and lapilli tuff units denoted with numbers indicate the source vent from which these products were erupted; this association was determined by the dip of beds and the type of deposit. These units are described in numerical order, according to the associated vent.

***Tertiary Bedded Tuff* (Tt, Plate 1)**

These rocks are gray to tan, and thin to thick bedded, ranging from well sorted and clast-supported to moderately to poorly sorted and matrix-supported tuff and lapilli tuff. Beds range from structureless to cross-bedded or reverse graded. Clasts within beds are angular to sub-rounded and include juvenile fine lapilli to medium blocks/bombs, crystals of pyroxene, amphibole, and phlogopite, and accidental lithic clasts. Volcanic clasts are composed of scoria to non-vesicular fine to coarse lapilli and non-vesicular to slightly vesicular, fine to medium blocks/bombs. Accidental lithic clasts are composed of red, well-sorted quartz arenite, light-colored mudstone and siltstone, and bedded tuff. Matrix is fine to coarse ash.

In thin section, this unit ranges from very poorly sorted to well sorted, matrix-supported and locally is clast-supported, finely laminated with poorly to moderately defined laminae. Clasts are angular to sub-rounded and consist of accidental lithic clasts, crystals and volcanic clasts. Accidental lithic clasts consist of sandstone and siltstone/mudstone that contain clay-sized particles and sand-sized quartz grains. Phenocrysts (10%) of orthopyroxene, clinopyroxene, phlogopite and few kaersutite and plagioclase crystals are 1 mm or less in diameter. Orthopyroxene and clinopyroxene crystals are euhedral to subhedral and highly fractured and some are highly altered. Volcanic clasts are vesicular with a fine-grained groundmass consisting of plagioclase microlites and devitrified glass. Vesicles are filled or rimmed with calcite or zeolites and small (less than 0.2 mm) angular quartz and plagioclase or k-feldspar crystals. The matrix consists of calcite, chalcedony, or secondary zeolites.

Figure 2.3. Field photos of Tt. Notice the thin to medium beds that are moderately to well defined. Some of these beds have sedimentary structures (within box in the left photo). Field book is approximately 19 cm long.

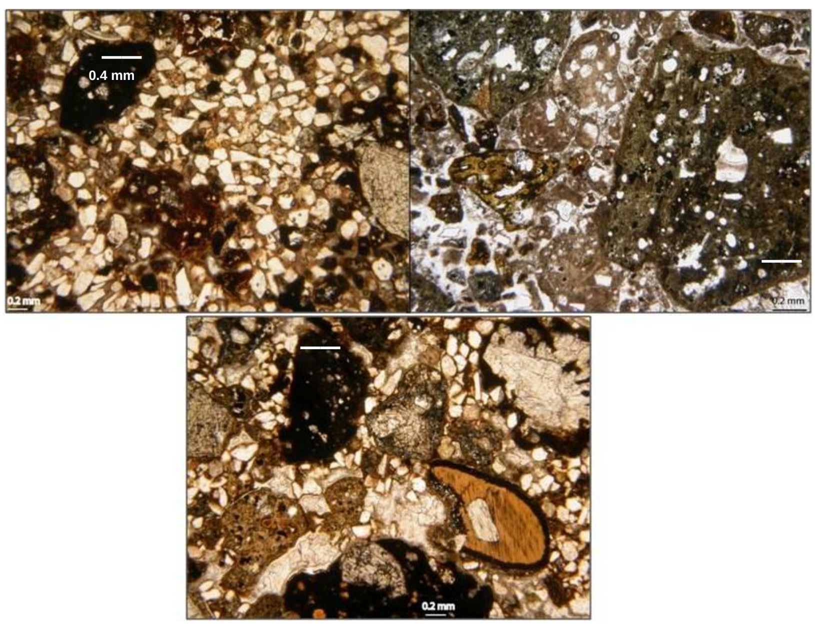


Figure 2.4. Photomicrographs of deposits within Tt. The fine-grained matrix is visible within these photos. Also notice how poorly sorted these deposits are and include sedimentary and volcanic clasts ranging in size. Also note the kaersutite crystals within the bottom photo (orangish-brown crystal). White scale bar in each photo is 0.4 mm long.

Tertiary Bedded Tuff to Bedded Lapilli Tuff (Black) (Ttb, Plate 1)

These rocks are dark gray to black, thin to thick bedded, and range from well-sorted and clast-supported to poorly to moderately sorted and matrix-supported, tuff, lapilli tuff and lapillistone. Clasts are sub-angular to rounded and consist of juvenile lapilli, lava and accidental lithic clasts. Volcanic clasts are scoria ranging from fine to medium lapilli and non-vesicular to vesicular fine to medium blocks/bombs. Accidental lithic clasts are composed of red, well sorted, quartz arenite and light-colored mudstone and siltstone. Matrix is fine to coarse ash.

Figure 2.5. Field photo of Ttb. Notice the dark gray to black color of these tuff beds as compared to Tt. Field book is 19 cm long.

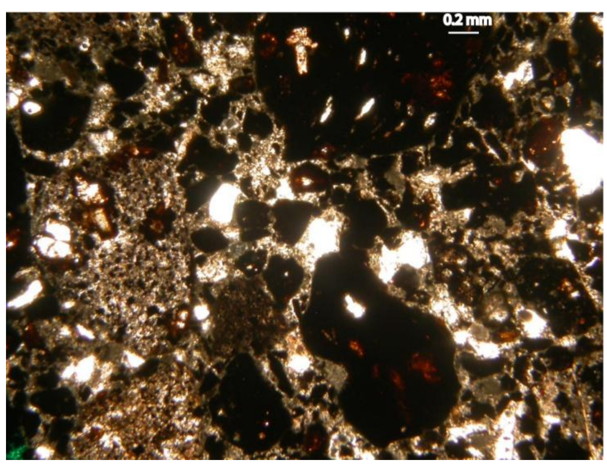


Figure 2.6. Photomicrograph of Ttb. Notice the dark sideromelane matrix within this deposit. Also note poor sorting and the different types of clasts. White scale bar in upper right corner is 0.2 mm long.

Tl$_a$ – This is a dark gray to black, slightly vesicular to vesicular, fine-grained and porphyritic monchiquite lava flow. The phenocrysts (8%) are pyroxene and olivine, some highly altered, and range from less than 1 mm up to 3 mm in diameter. The vesicles are filled or rimmed with carbonate or zeolites.

In thin section, this lava is vesicular with most vesicles filled or rimmed with calcite or zeolites. A microcrystalline groundmass is composed of plagioclase microlites and devitrified glass. Parts of the groundmass have a trachytic texture and much of the groundmass has been highly altered. Fe-Ti oxides are abundant. Euhedral to subhedral phenocrysts of orthopyroxene, clinopyroxene and plagioclase are typically fractured and have resorption rims. Resoption rims, sieve textures, and alteration occur due to the presence of water within the magma or mixing of magmas that cause the phenocrysts to no longer be at equilibrium with the magma. This lava flow likely extruded from vent number 4 or 3 (Plate 1).

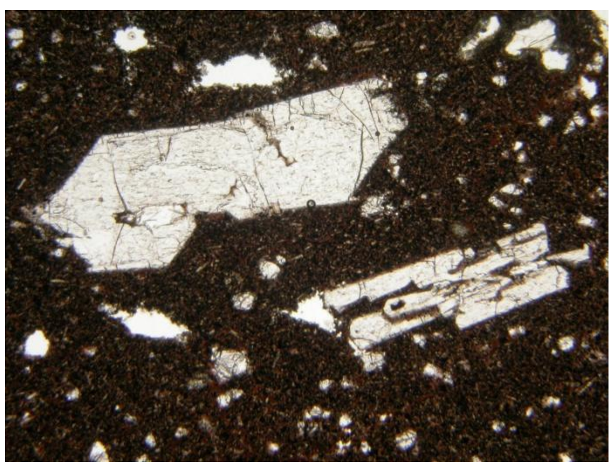


Figure 2.7. Photomicrograph of lava Tl$_a$. This lava has a glassy to fine-grained groundmass with plagioclase microlites and pyroxene phenocrysts ranging from slightly larger than groundmass crystals up to several millimeters. Large pyroxene phenocrysts (upper left) is approximately 1 mm long.

Tl$_b$ – This is a dark gray, non-vesicular to slightly vesicular, fine-grained to glassy, porphyritic monchiquite lava flow. The phenocrysts (10%) are highly altered pyroxene and range from 3 mm up to 7 mm in diameter. Pyroxene xenocrysts (20%) are highly variable in size and range from 2 mm up to 20 mm in diameter. Xenocrysts are identified by their large size since phenocrysts are not often capable of producing such large crystals. Vesicles are filled or rimmed with carbonate or zeolites. This lava flow likely extruded from vent 3 (Plate 1).

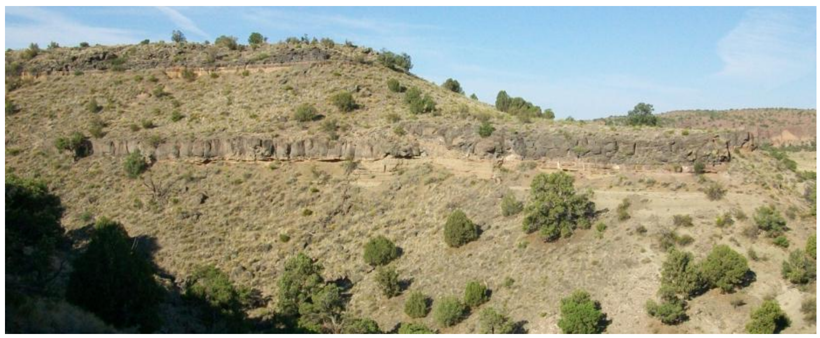


Figure 2.8. Field photo of lava flows Tl_a, capping the mesa, and Tl_b, within the middle of the mesa. Each of these lava flows is approximately 5 meters thick.

Tl_c – This is a medium to dark gray, non-vesicular, fine-grained porphyritic monchiquite lava flow. The phenocrysts (20%) are amphibole, pyroxene, olivine, and possibly plagioclase or feldspathoid. Most are highly weathered and range from less than 1 mm up to 4 mm in diameter.

In thin section, this lava is slightly vesicular with vesicles filled or rimmed by calcite or zeolites. The fine-grained groundmass is composed of plagioclase microlites and devitrified glass. Fe-Ti oxides are abundant. Phenocrysts are small, euhedral and composed of clinopyroxene and orthopyroxene, which have been highly altered and have resorption rims or have been completely replaced. This lava flow likely extruded from vent 16 or 17 (Plate 1).

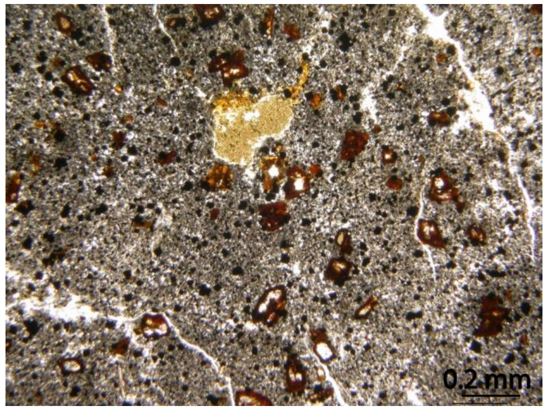


Figure 2.9. Photomicrograph of Tl_c. This photo shows the glassy to fine-grained groundmass with plagioclase microlites and iron oxides as well as the small pyroxene phenocrysts that have been highly altered or removed. Scale bar in lower right is 0.2 mm long.

Tl_d – This is a dark gray to black, non-vesicular to slightly vesicular, fine-grained, porphyritic basanite lava flow. The phenocrysts (5%) are of pyroxene and amphibole and range from 1 mm up to 3 mm in diameter. Most are highly altered. This lava flow likely either extruded from vent 14 or is a volcanic neck (Plate 1).

Tl_e – This is a medium gray, non-vesicular, very fine-grained, microporphyritic, basanite lava flow. The phenocrysts (1-2%) are of pyroxene or amphibole and less than 1 mm in diameter. This lava flow likely extruded from a vent outside the field area.

Tl_f – This is a dark gray, non-vesicular, fine-grained, porphyritic, monchiquite lava flow. The phenocrysts (5%) are of pyroxene and/or amphibole, all are highly weathered and range from less than 1 mm up to 1.5 mm in diameter. The xenocrysts (1%) are of claystone or mudstone with reaction rims 1.5 mm in diameter. This lava flow likely extruded from a vent outside the field area.

Figure 2.10. Field photo of Tl_f capping the mesa in the distance, taken from the south. This lava is approximately 6 meters thick.

Tl$_g$ – This is a dark gray, slightly vesicular to vesicular, fine-grained, porphyritic monchiquite lava flow. The phenocrysts (8-10%) are of pyroxene and amphibole, some highly altered, and range from 1 mm up to 3 mm in diameter. Vesicles are rimmed or filled with carbonate or zeolites. This lava flow likely extruded from vent 10 (Plate 1).

Tl$_{ext}$ – This is a dark gray, slightly vesicular to vesicular, fine-grained, porphyritic monchiquite lava. The phenocrysts (15%) are of pyroxene and/or amphibole and plagioclase and range from less than 1 mm up to 3 mm in diameter. The xenocrysts (10%) are of pyroxene from 3 mm up to 6 mm in diameter. Vesicles rimmed or filled with carbonate or zeolites. This lava flow was extruded from a vent outside the field area.

Tl$_u$ – This is a dark gray to reddish gray, non-vesicular to slightly vesicular, fine-grained, porphyritic monchiquite lava lake to lava flow. The phenocrysts (10%) are of pyroxene and/or amphibole, most highly altered, and range from 1 mm up to 3 mm in diameter. The xenocrysts (15%) are of pyroxene from 3 mm up to 10 mm in diameter, and some are highly altered. The vesicles are rimmed or filled with carbonates or zeolites. This lava was extruded from non-exposed vents within the central portion of the field area (Plate 1).

Figure 2.11. Field photo of Tl_u within the central portion of the field area, looking east to northeast. The black layers within the maar deposits are the lava flows or lava lakes that compose Tl_u. Lava in right of photo is approximately 2 meters thick.

The following deposits are grouped by their source vents, as located on Plate 1.

Vent 1

Tlt_1 – This is a dark brown to orangish brown, massive to medium-bedded medium to coarse lapilli tuff to lapillistone. It ranges from very poorly sorted and matrix-supported to moderately sorted and clast-supported. Cross-beds are rare within these deposits. Clasts are sub-angular to sub-rounded and clasts are composed of volcanic and accidental lithic fragments and crystals of pyroxene and amphibole. Volcanic clasts are composed of scoria ranging from fine to coarse lapilli and non-vesicular to slightly vesicular fine to coarse blocks and bombs. Accidental lithic clasts are composed of red, well-sorted quartz arenite (Jurassic Moenave Formation) and light-colored (tan, white, pink, green) siltstone and mudstone (Lower Bidahochi Formation). Matrix is fine to coarse ash. Distinct zones of pyroclastic breccias to tuff breccia (proximal) and lapilli tuff to lapillistone (medial) occur relative to the vent location. Deposits are massive, very poorly sorted and contain boulder-sized clasts of country rock and juvenile blocks and bombs near the vent and are bedded, with better sorting and does not contain large clasts farther from the vent.

Vent 2

Tl$_2$ – This is a dark gray, slightly vesicular, fine-grained, porphyritic monchiquite lava flow. The phenocrysts (10%) are of pyroxene and olivine, some highly altered, ranging from less than 1 mm up to 2 mm in diameter.

In thin section, this lava is vesicular with many vesicles filled or rimmed with calcite or zeolites. The groundmass is fine grained and is composed of plagioclase microlites with some devitrified glass. Fe-Ti oxides are abundant within the matrix. Phenocrysts are euhedral to subhedral cored clinopyroxene and orthopyroxene. Most have resorption rims and some have sieve textures. Many of the pyroxene phenocrysts are zoned, indicating a change in chemistry of the magma. Clinopyroxene phenocrysts are larger than orthopyroxene phenocrysts.

Figure 2.12. Field photo of Tl$_2$ showing the edge of the lava flow, looking north. This lava flow is approximately 6 to 10 meters thick.

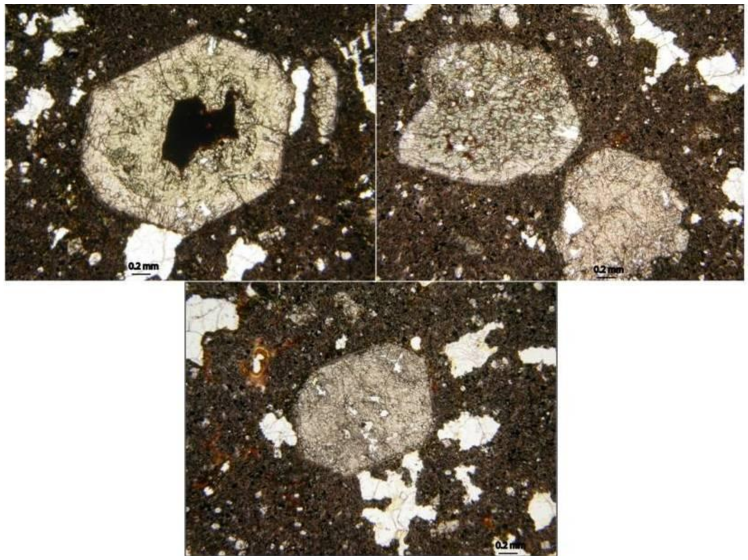


Figure 2.13. Photomicrograph of Tl_2 showing the glassy to fine-grained groundmass that contains plagioclase microlites. This lava is slightly vesicular as seen in these photos and contains phenocrysts and xenocrysts of pyroxene. The phenocrysts tend to be small and highly altered while the xenocrysts have a subhedral to euhedral form and tend to be zoned, with the center being destroyed or altered. Black scale bars on each photo are 0.2 mm long.

Ts_2 – This is a reddish brown to reddish black, massive to crudely stratified, vesicular, clast-supported, scoriaceous tuff to scoriaceous tuff breccia. This deposit has visible individual scoria lapillus and blocks/bombs. Inter-bedded with the scoriaceous tuff and tuff breccias is a reddish gray, massive, slightly vesicular lava flow. The lava flow contains clasts of lapilli and blocks/bombs that compose the scoriaceous tuff, leading to the interpreatation that the flow is spatter fed. In thin section, this unit is poorly sorted with vesicular volcanic clasts. Volcanic clasts have a fine-grained to glassy groundmass. Vesicles are rimmed or filled with calcite or zeolites. Phenocrysts are highly weathered and make original mineral identification difficult. Angular crystals of quartz are contained within the matrix, but are less than 1% of the deposit. Angular clasts of sandstone and siltstone/mudstone lithic clasts compose a few percent of the clasts.

Figure 2.14. Field photos of Ts_2 showing the textures within this unit. The upper left photo shows a large bomb preserved within the deposit. The bottom left photo shows the distinct clasts of scoria within these deposits. The right photo shows the alignment of larger clasts within the unit, producing a poorly defined bedding. Field book is approximately 19 cm long, person for scale in upper left photo.

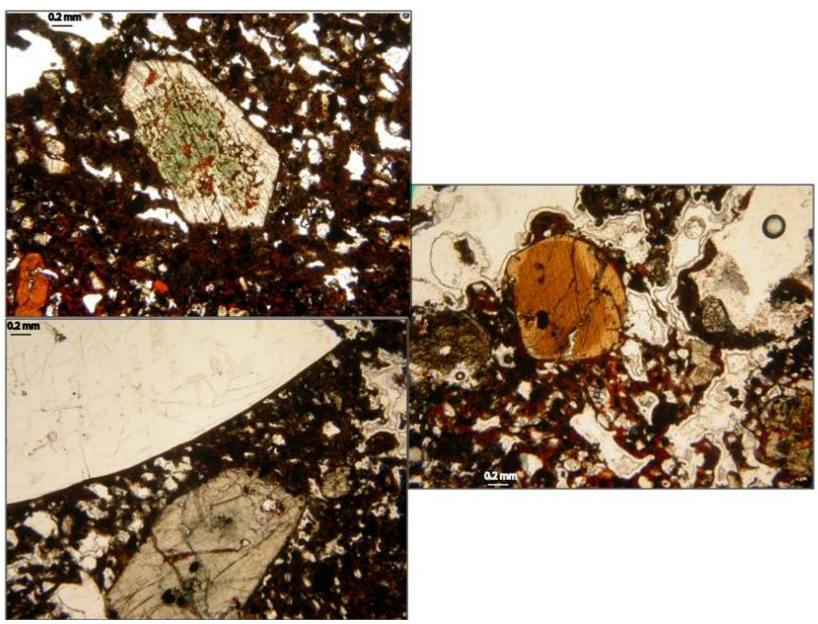


Figure 2.15. Photomicrographs from Ts_2 showing the vesicularity of the clasts. Also note the large crystals of pyroxene, some cored, and kaersutite. Most of the vesicles are lined or filled with chalcedony or calcite. White or black scale bars in photos are 0.2 mm long.

Vent 3

Ts_3 – This is a reddish-black to black, massive, vesicular, clast-supported, scoriaceous tuff breccia with visible individual scoria lapilli and blocks/bombs. The margins with underlying lapilli tuff and tuff are highly peperitic, containing domains of lava and sediment intermingled. The deposit consists of lava domains within sediment closest to the bottom and becomes domains of sediment within lava closer to the base of the lava flow.

Tlt_3 – This is a buff to gray, massive to poorly bedded, poorly sorted, matrix-supported, fine to coarse lapilli tuff to lapilli tuff breccia. Clasts are sub-angular to rounded and composed of scoria ranging from fine to coarse lapilli; non-vesicular, fine to medium blocks/bombs; rare crystals of amphibole and pyroxene; and accidental lithic clasts of red, well sorted, quartz arenite and light-colored mudstone and siltstone. The matrix is fine to coarse ash.

Vent 4

Ts_4 – This is a reddish-black to black, massive, clast-supported, scoriaceous tuff breccia with visible individual scoria lapilli and blocks/bombs. A peperitic margin occurs with the underlying lapilli tuff. This unit inter-bedded with the scoriaceous tuff breccia is a black, massive, thickly bedded, non-vesicular to slightly vesicular lava flow or rootless flow.

Tlt_4 – This is a buff to gray, massive to poorly bedded, poorly sorted, matrix-supported, fine to coarse lapilli tuff to lapilli tuff breccia. Clasts are sub-angular to rounded and composed of scoria ranging from fine to coarse lapilli; non-vesicular, fine to medium blocks/bombs; sparse crystals of amphibole and pyroxene; and accidental lithic clasts of red, well sorted, quartz arenite and light-colored mudstone and siltstone. The matrix is fine to coarse ash.

Vent 5

Tlt$_5$ – This is a greenish-gray to brown, massive, poorly sorted, clast-supported to matrix-supported, fine to coarse lapilli tuff to tuff breccia. Clasts are sub-angular to sub-rounded and composed of scoria ranging from fine to coarse lapilli; non-vesicular to slightly vesicular, fine to coarse blocks/bombs; sparse crystals of phlogopite, amphibole, and pyroxene; and rare accidental lithic clasts of red, well sorted, quartz arenite and light-colored mudstone and siltstone. The matrix is fine to coarse ash.

Vent 6

Tlt$_6$ – This is a red to reddish-brown, massive, poorly sorted, matrix-supported, fine to coarse lapilli tuff to lapillistone. Clasts are sub-angular to sub-rounded and composed of scoria ranging from fine to coarse lapilli; non-vesicular fine to medium blocks/bombs; crystals of pyroxene and sparse phlogopite crystals; and accidental lithic clasts of red, well sorted, quartz arenite, and light-colored mudstone and siltstone. The matrix is fine to coarse ash.

Vent 7

Tlt$_7$ – This is a buff to gray, massive to poorly bedded, poorly sorted, matrix-supported, fine to coarse lapilli tuff to lapilli tuff breccia. Clasts are sub-angular to rounded and composed of scoria ranging from fine to coarse lapilli; non-vesicular, fine to medium blocks/bombs; sparse crystals of amphibole and pyroxene; and accidental lithic clasts of red, well sorted, quartz arenite and light-colored mudstone and siltstone. The matrix is fine to coarse ash.

Vent 8

Tlt_8 – This is a buff to gray, massive to poorly bedded, poorly sorted, matrix-supported, fine to coarse lapilli tuff to lapilli tuff breccia. Clasts are sub-angular to rounded and composed of scoria ranging from fine to coarse lapilli; non-vesicular, fine to medium blocks/bombs; sparse crystals of amphibole and pyroxene; and accidental lithic clasts of red, well-sorted, quartz arenite and light-colored mudstone and siltstone. The matrix is fine to coarse ash.

Vent 9

Tlt_9 – This is a light brown to tan, massive to poorly bedded with thin to medium beds. This unit ranges from poorly sorted and clast-supported to very poorly sorted and matrix-supported, fine to coarse lapilli tuff to lapilli tuff breccia. Clasts are angular to sub-rounded and composed of scoria ranging from fine to coarse lapilli; non-vesicular fine to coarse blocks/bombs; and accidental lithic clasts of red, well-sorted quartz arenite and light-colored mudstone and siltstone. The matrix is fine to coarse ash.

Vent 10

Tlt_u – This is a brown to light brown to reddish brown, massive to poorly bedded thin to medium beds, poorly sorted to very poorly sorted, matrix-supported to clast-supported, fine to coarse lapilli tuff to lapilli tuff breccia. Clasts are angular to sub-angular and composed of scoria ranging from fine to coarse lapilli; non-vesicular to slightly vesicular fine to coarse blocks/bombs; crystals of pyroxene and amphibole and sparse phlogopite crystals; and accidental lithic clasts of red, well-sorted quartz arenite and light-colored mudstone and siltstone. The matrix is fine to coarse ash.

In thin section, this unit is finely laminated, fine grained and moderately to well sorted. Clasts are composed of volcanic clasts that have a fine-grained to glassy groundmass composed of plagioclase microlites and devitrified glass. Phenocrysts of orthopyroxene and clinopyroxene are euhedral and highly altered and fractured. Sandstone lithic clasts are fine-grained and well-sorted.   Small, angular quartz crystals are abundant, composing nearly half of the clasts. Cement within this deposit is calcite or zeolites that are likely to be secondary.

Vent 11

Tl_{11} – This is a dark gray, non-vesicular to slightly vesicular, fine-grained, porphyritic monchiquite lava. The phenocrysts (5-8%) are of olivine, pyroxene, and/or amphibole range from less than 1 mm up to 2 mm in diameter. The phenocrysts (1-2%) of plagioclase range up to 2 mm in diameter.

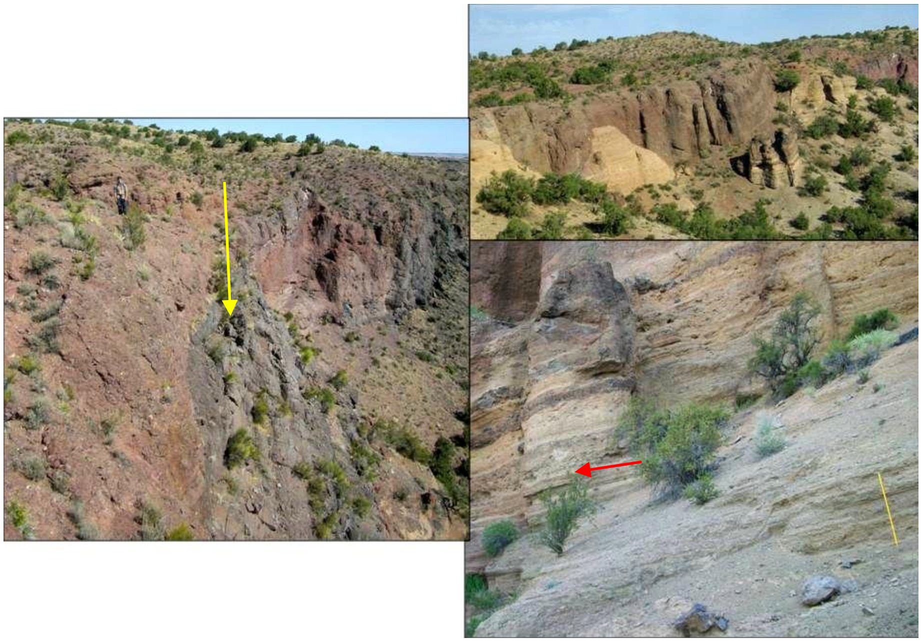


Figure 2.16. Field photos of Tlt_u within the central portion of the study area. Notice the darker color dikes present in the bottom center of the left photo (arrow points to the dike). The upper right photo shows the contact of Tlt_u (dark red deposits) and Tt (light tan deposits). The lower right photo shows how poorly sorted these deposits are. Large (10's of cm's; red arrow) clasts can be seen within these deposits, which have a fine-grained matrix. Meter stick in bottom right photo is 1 m long, person for scale in upper left of left photo.

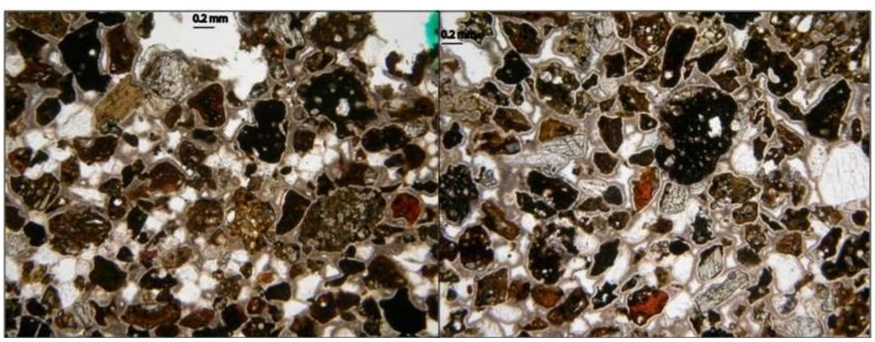


Figure 2.17. Photomicrograph of Tlt_u showing the fine-grained matrix composed of angular clasts, both sedimentary and volcanic. These clasts are coated by either chalcedony or calcite that is post-depositional. Also, the larger clasts within these units cannot be seen within these photos. Black scale bar in photos are 0.2 mm long.

Tlt_u – This is a brown to light brown to reddish brown, massive to poorly bedded thin to medium beds, poorly sorted to very poorly sorted, matrix-supported to clast-supported, fine to coarse lapilli tuff to lapilli tuff breccia. Clasts are angular to sub-angular and composed of scoria ranging from fine to coarse lapilli; non-vesicular to slightly vesicular fine to coarse blocks/bombs; crystals of pyroxene and amphibole and sparse phlogopite crystals; and accidental lithic clasts of red, well-sorted quartz arenite and light-colored mudstone and siltstone. The matrix is fine to coarse ash.

In thin section, this unit is finely laminated, fine grained and moderately to well sorted. The clasts are composed of volcanic lapilli that have a fine-grained to glassy groundmass composed of plagioclase microlites and devitrified glass. Phenocrysts of orthopyroxene and clinopyroxene are euhedral and highly altered and fractured. Sandstone lithic clasts are fine-grained and well-sorted. Small, angular quartz crystals are abundant, composing nearly half of the clasts. Cement within this deposit is calcite or zeolite that is likely to be secondary.

Vent 12

$\mathbf{Tl_{12}}$ – This is a medium gray, highly vesicular, fine-grained, porphyritic, monchiquite lava flow. The phenocrysts (8-10%) are of amphibole and pyroxene, some highly altered, and range from less than 1 mm up to 2 mm in diameter. The phenocrysts of phlogopite (1%) are as much as 1 mm in diameter. The vesicles are rimmed or filled with carbonate or zeolite.

$\mathbf{Tlt_u}$ – This is a brown to light brown to reddish brown, massive to poorly bedded thin to medium bedded fine to coarse lapilli tuff to lapilli tuff breccia. This unit is poorly sorted to very poorly sorted and matrix-supported to clast-supported. Clasts are angular to sub-angular and composed of scoria ranging from fine to coarse lapilli; non-vesicular to slightly vesicular fine to coarse blocks/bombs; crystals of pyroxene and amphibole and rare phlogopite crystals; and accidental lithic clasts of red, well-sorted quartz arenite and light-colored mudstone and siltstone. The matrix is fine to coarse ash.

In thin section, this unit is finely laminated, fine-grained and moderately to well sorted. Clasts are volcanic with a fine grained to glassy groundmass composed of plagioclase microlites and devitrified glass. Orthopyroxene and clinopyroxene phenocrysts are euhedral and highly altered and fractured. Sandstone lithic clasts are fine grained and well sorted. Small, angular quartz crystals are abundant, composing nearly half of the clasts. Cement within this deposit is calcite or zeolite that is likely to be secondary.

Vent 13

Tl_{13} –This is a dark gray to black, non-vesicular, very fine-grained to glassy, porphyritic monchiquite lava flow. The phenocrysts (15%) are of highly altered olivine and pyroxene and range from less than 1 mm up to 4 mm in diameter. The xenocrysts (20%) are pyroxene and range from 1 mm up to 8 mm in diameter.

Ts_{13} – This is a reddish black to black, massive, vesicular, clast-supported, scoriaceous tuff to scoriaceous tuff breccia with visible individual scoria lapilli and blocks/bombs. Scoria range from fine to medium lapilli with blocks and bombs that range up to medium.

Tlt_u – This is a brown to light brown to reddish brown, massive to poorly bedded thin to medium beds, poorly sorted to very poorly sorted, matrix-supported to clast-supported, fine to coarse lapilli tuff to lapilli tuff breccia. The clasts are angular to sub-angular and composed of scoria ranging from fine to coarse lapilli; non-vesicular to slightly vesicular fine to coarse blocks/bombs; crystals of pyroxene and amphibole and sparse phlogopite crystals; and accidental lithic clasts of red, well-sorted quartz arenite and light-colored mudstone and siltstone. The matrix is fine to coarse ash.

In thin section, this unit is finely laminated, fine grained and moderately to well sorted. The clasts are volcanic lapilli that have a fine grained to glassy groundmass composed of plagioclase microlites and devitrified glass. Orthopyroxene and clinopyroxene phenocrysts are euhedral and highly altered and fractured. Sandstone lithic clasts are fine-grained and well-sorted. Small, angular quartz crystals are abundant, composing nearly half of the clasts. Cement within this deposit is calcite or zeolite that is likely to be secondary.

Vent 14

Tlt_u – This is a brown to light brown to reddish brown, massive to poorly bedded thin to medium beds, poorly sorted to very poorly sorted, matrix-supported to clast-supported, fine to coarse lapilli tuff to lapilli tuff breccia. Clasts are angular to sub-angular and composed of scoria ranging from fine to coarse lapilli; non-vesicular to slightly vesicular fine to coarse blocks/bombs; crystals of pyroxene and amphibole and sparse phlogopite crystals; and accidental lithic clasts of red, well-sorted quartz arenite and light-colored mudstone and siltstone. The matrix is fine to coarse ash.

In thin section, this unit is finely laminated, fine-grained and moderately to well sorted. The clasts are volcanic lapilli that have a fine-grained to glassy groundmass composed of plagioclase microlites and devitrified glass. Orthopyroxene and clinopyroxene phenocrysts are euhedral and highly altered and fractured. Sandstone lithic clasts are fine-grained and well-sorted. Small, angular quartz crystals are abundant, composing nearly half of the clasts. Cement within this deposit is calcite or zeolite that is likely to be secondary.

Vent 15

Tl$_{15}$ – This is a dark gray to black, non-vesicular, very fine-grained to glassy porphyritic monchiquite lava flow. The phenocrysts (25-30%) are of pyroxene, phlogopite, and amphibole that range from less than 1 mm up to 1.5 mm in diameter.

Tlt$_{u}$ – This is a brown to light brown to reddish brown, massive to poorly bedded thin to medium beds, poorly sorted to very poorly sorted, matrix-supported to clast-supported, fine to coarse lapilli tuff to lapilli tuff breccia. The clasts are angular to sub-angular and composed of scoria ranging from fine to coarse lapilli; non-vesicular to slightly vesicular fine to coarse blocks/bombs; crystals of pyroxene and amphibole and sparse phlogopite crystals; and accidental lithic clasts of red, well-sorted quartz arenite and light-colored mudstone and siltstone. The matrix is fine to coarse ash.

In thin section, this unit is finely laminated, fine-grained and moderately to well sorted. The clasts are volcanic lapilli that have a fine-grained to glassy groundmass composed of plagioclase microlites and devitrified glass. Orthopyroxene and clinopyroxene phenocrysts are euhedral and highly altered and fractured. Sandstone lithic clasts are fine-grained and well-sorted. Small, angular quartz crystals are abundant, composing nearly half of the clasts. Cement within this deposit is calcite or zeolite that is likely to be secondary.

Vent 16

Tlt_{16} – This is a red to reddish brown, massive, poorly sorted, matrix-supported, fine to coarse lapilli tuff to lapillistone. The clasts are sub-angular to sub-rounded and composed of scoria ranging from fine to coarse lapilli; non-vesicular fine to coarse blocks/bombs; rare crystals of pyroxene and possible amphibole; and accidental lithic clasts of red, well-sorted quartz arenite, and light-colored mudstone and siltstone. The matrix is fine to coarse ash. This unit is inter-bedded with lapilli tuff is dark gray to black, massive, fine-grained porphyritic lava flows or rootless flows.

Vent 17

Tl_{17} – This is a dark gray, non-vesicular to slightly vesicular, fine-grained, porphyritic monchiquite lava flow. The phenocrysts (1-2%) are of pyroxene or amphibole that range from less than 1 mm up to 4 mm in diameter. The xenocrysts (5%) are of pyroxene that range up to 7 mm.

Figure 2.18. Field photo of Tl17 lava flow, which erupted from vent 17. This lava flow is the darker gray to black within the red layers of the maar deposits. The thickness of the lava flow varies between different locations within the maar deposits and ranges from approximately 3 meters thick on the left side of the photo to 10 meters thick in the center of the photo.

Tlt_{17} – This is a green to brown to red, massive to poorly-bedded with thin beds, moderately to poorly sorted, clast-supported to matrix-supported, fine to coarse lapilli tuff to lapilli breccias. The clasts are sub-angular to sub-rounded and composed of juvenile scoria and non-vesicular fine to coarse lapilli; non-vesicular to slightly vesicular fine to coarse blocks/bombs; crystals of pyroxene, phlogopite, and possibly some amphibole; and large amounts of accidental lithic clasts of red, well-sorted quartz arenite and light-colored mudstone and siltstone. The matrix is fine to coarse ash.

Vent 18

Tl_{18} – This is a dark gray, non-vesicular, massive, fine-grained, porphyritic basanite lava flow. Glomerocrysts of olivine range up to 3-4 mm in diameter and are highly altered to iddingsite or serpentine. The phenocrysts (8-10%) are of highly altered pyroxene and/or amphibole and range from 3-4 mm in diameter.

Tlt_{18} – This is a red to reddish brown to greenish gray to brown, massive to poorly-bedded with thin to medium beds, poorly sorted, matrix- to clast-supported, fine to coarse lapilli tuff to lapillistone. The clasts are sub-angular to rounded and composed of scoria ranging from fine to coarse lapilli; non-vesicular fine to coarse blocks/bombs; pyroxene and amphibole crystals; and sparse accidental lithic clasts of red, well-sorted quartz arenite and light-colored mudstone and siltstone. The matrix is fine to coarse ash. Bedding is defined by horizontal bands of lava blocks/bombs and thin beds of fluidized light-colored mudstone and siltstone.

Vent 19

Tlt_{19} – This is a medium brown to dark gray, massive, poorly to very poorly sorted, matrix-supported, fine to coarse lapilli tuff to lapillistone. The clasts are sub-angular to sub-rounded and composed of scoria ranging from fine to coarse lapilli; non-vesicular fine to coarse bombs/blocks; with very rare accidental lithic clasts, of red, well-sorted quartz arenite and light-colored mudstone and siltstone. The matrix is fine to coarse ash. Locally, scoria deposits up to 1 m thick overlie the lapilli tuff.

Vent 20

This vent is defined by Tc (Tertiary crater-lake deposits) with inward-dipping attitudes, indicating a circular depression.

Vent 21

This vent is defined by Tc with inward-dipping attitudes indicating a circular depression.

Vent 22

Tl_{22} – This is a dark gray, slightly vesicular, very fine-grained, porphyritic basanite lava flow. The phenocrysts (1-2%) are of plagioclase, pyroxene or amphibole that range up to 1 mm in diameter. The vesicles are rimmed or filled with carbonate or zeolites.

Vent 23

Tlt_{23} – This is a reddish gray to gray, massive to very crudely bedded, moderately sorted and clast-supported to poorly sorted and matrix-supported, medium to coarse lapilli tuff to lapillistone. Clasts are sub-angular to sub-rounded and composed of scoria ranging from medium to coarse lapilli; non-vesicular to vesicular fine to coarse blocks/bombs; sparse crystals of pyroxene and amphibole; and accidental lithic clasts of red, well-sorted quartz arenite and light-colored siltstone and mudstone. Interbedded with the lapilli tuff is medium gray, massive, non-vesicular, fine- to medium-grained porphyritic lava flow or rootless flow. The matrix is fine to coarse ash.

CHAPTER 3
FACIES DESCRIPTIONS AND INTERPRETATIONS

INTRODUCTION

Facies were established according to vent locations and geologic units within the map area. Vent location was determined through geologic mapping using bedding dip angles and field relations of geologic units and facies changes. Ten volcanic facies, three limestone, and one marl facies are described below with their respective interpretation for method of deposition and approximate location of deposition. Volcanic grain-size terms are based on divisions from White and Houghton (2006).

The focus of this facies analysis is to identify units that are contained within the vent or immediately adjacent to the vent and the information they provide about the eruption and post-eruption processes. The volcanic units were produced by phreatomagmatic, magmatic and/or a combination of eruption processes. The characteristics of deposits from each type of eruption provide information about the specific processes occurring within the vent during the eruption as well as processes that occur after the eruption. Several of the facies are from post-eruption deposition within the vent locations. Vazquez (1998) provided a detailed lithofacies analysis of eruption units deposited by the passage of individual base surges and the information they provide about surge emplacement dynamics. The lithofacies described by Vazquez (1998) are located outside of the craters up to 1-2 km away from the vent, but do not provide significant information about facies within or immediately adjacent to the vents. In the following section, each facies is described based upon the grains, juvenile content, sedimentary structures, and relation to the vent location. An interpretation of the depositional processes is made for each facies.

FACIES DESCRIPTIONS AND INTERPRETATIONS

LT 1 (Figure 3.1): This is a massive lapilli tuff that is dark brown to greenish brown, massive, poorly to very poorly sorted, matrix-supported, with a matrix of fine to coarse ash. The clasts are sub-angular to sub-rounded and consist of juvenile lapilli that are slightly vesicular to vesicular and range from fine to coarse lapilli with a majority of medium lapilli. Accidental lithic clasts of white mudstone and orange sandstone range from coarse ash to 5 cm lapilli with occasional fluidal textures. Juvenile blocks and bombs range from 2 cm up to 50-60 cm, and pyroxene and amphibole crystals are up to 0.5 cm in diameter. Juvenile lava is dark gray to black, slightly vesicular to vesicular, with a very fine grained groundmass that weathers to brownish black. Phenocrysts (20-25% of the rock) of pyroxene and amphibole have been highly weathered to a green color and are up to 0.2 cm in diameter. Some larger phenocrysts, up to 0.7 cm, of pyroxene occur. The base is gradational to sharp, typically over a poorly bedded lapilli tuff, and horizontal, although it can be slightly erosive locally. This facies overlies LT2 with a gradational base and has also been found to overlie LF, T1, and T2 with sharp contacts. The upper contact is eroded at most locations or has an irregular contact with overlying LF. This facies is found within vent locations or immediately adjacent to the vent.

In thin section, this deposit is massive, very poorly to poorly sorted and matrix supported with a matrix of calcite, chalcedony, zeolites, and palagonite. Clasts are angular to sub-rounded, ranging from 0.125 mm up to 75 mm, and consist of volcanic clasts, euhedral to subhedral fractured crystals of orthopyroxene and clinopyroxene, and accidental lithic clasts of mudstone/siltstone and sandstone with quartz grains and rare plagioclase and potassium feldspar grains. The volcanic clasts have a devitrified glassy to palagonitic groundmass with phenocrysts of orthopyroxene, clinopyroxene, olivine, phlogopite, kaersutite and rare plagioclase, which are mostly fractured. The orthopyroxene and clinopyroxene crystals are zoned and highly altered, particularly in the center of the crystals.

Interpretation**:** This facies was produced from base surges that were contained within the vent or proximal to the vent or eruption column collapse. This is suggested by the poor sorting of this facies and by the large clasts of juvenile lava and accidental lithic clasts. The lack of sedimentary structures also suggests that the energy was too high to sort clasts or produce bedding.

LT 2 (Figure 3.1): This is a moderately to poorly bedded lapilli tuff that is dark brown, poorly sorted with poorly defined thin beds, and is matrix supported with a matrix of fine to coarse ash. These beds are 1-3 cm thick, laterally continuous for 1-5 m, and defined by changes in relative amount of matrix. Bedding is parallel. Within these beds there are small lenses that are up to 0.5 cm thick are laterally continuous for up to 20 cm. These lenses are matrix poor with lots of coarse ash to fine and medium lapilli. Clasts are juvenile and sub-angular to sub-rounded, slightly vesicular to vesicular, and range from fine to coarse lapilli, with a majority of fine lapilli. Euhedral to subhedral crystals of amphibole and pyroxene range up to 4 mm in diameter are present. Accidental lithic clasts of white mudstone and orange sandstone range from coarse ash to lapilli up to 1 cm in diameter. Juvenile blocks and bombs up to 10 cm in diameter are rare. The basal contact is horizontal and sharp with underlying facies of L1 and LT 1. The upper contact, where exposed, is gradational to sharp with LT1 and horizontal with very little erosion. This facies is found within vents or immediately adjacent to vents and is typically associated with LT1.

In thin section, this deposit is poorly sorted, massive, and vesicular, with vesicles that are filled or rimmed with sparry calcite. Clasts are angular to sub-rounded, ranging from 0.125 mm up to 1 mm in diameter, and consist of highly vesicular juvenile volcanic clasts, accidental lithic clasts of sandstone composed of quartz crystals, euhedral to subhedral and fractured crystals of orthopyroxene and clinopyroxene and abundant fine ash within the matrix. Volcanic clasts have a fine-grained matrix with phenocrysts of orthopyroxene and clinopyroxene. Crystals of clinopyroxene and orthopyroxene are highly altered or replaced.

***Interpretation*:** These are proximal to medial deposits from base surges that were produced by base surges that had begun to separate and produce occasional bedforms. This is evidenced by the poor to moderate sorting and poorly defined sedimentary structures, which require some separation within a base surge.

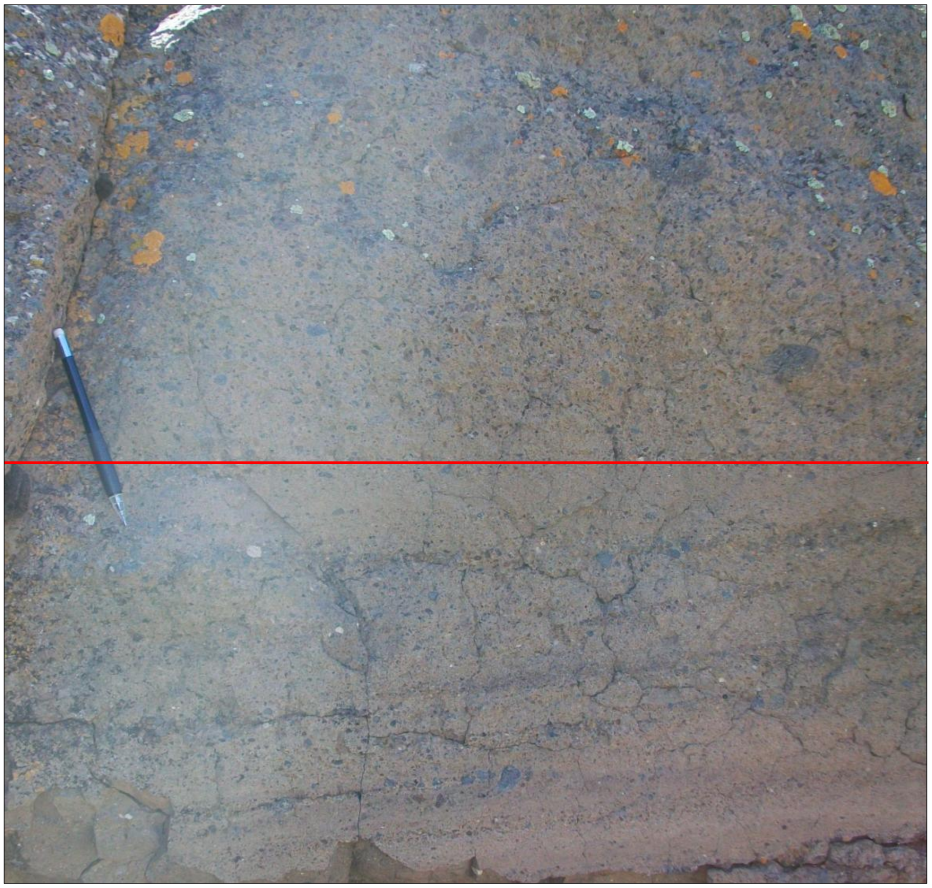


Figure 3.1. LT 1 disorganized and massive lapilli tuff is visible above the red line while LT 2 moderately to poorly bedded lapilli tuff is visible below the red line. Pencil is approximately 15 cm long.

LT 3 (Figure 3.2): LT 3 is lenticular bedded lapilli tuff that is brown to tan to gray, very poorly to poorly sorted and matrix-supported with a matrix of fine to coarse ash. The bedding consists of lenticular to lensoidal beds that are laterally continuous for 50 cm or less. Clasts are sub-angular to sub-rounded and consist of juvenile lapilli that are vesicular to slightly vesicular and range from fine to coarse lapilli, and juvenile blocks and bombs up to 15 cm in diameter. Lapilli and blocks and bombs make up much of the deposit. Accidental lithic clasts of white and green mudstone and orange sandstone clasts range from less than 0.1 cm up to 10 cm in diameter. Larger clasts of mudstone and sandstone are fractured and broken. Most accidental lithic clasts are composed of mudstone. Crystals of pyroxene and amphibole range up to 1 cm in diameter, but most crystals are 0.2-0.3 cm in diameter. Lenses are defined by changes in relative amounts of fine material. Beds typically dip steeply and range from 2 cm up to 25 cm thick. Beds are disorganized and lack grading, but contain distinct changes in relative amounts of fine materials. This unit is at least 5 m thick. Lower contact is not visible but is likely undulatory and possibly erosive. The upper contact is sharp and at a steep angle with overlying LT1. This unit is found within and between two vents, flowing from one vent into a neighboring vent.

***Interpretation*:** This facies was formed when a nonlithified lapilli tuff was fluidized by the eruption of a neighboring vent, breached the crater wall and flowed into the neighboring vent. The contacts and the lenses within the facies are at steep angles, above the angle of repose. This suggests that these angles were post-depositional. The angles also dip towards the neighboring vent. The location of this facies is between two closely spaced vents (less than 50 m apart). The close proximity suggests that the older vent would likely have been affected by the eruption of the younger vent. Figure 3.3 shows the progression of the initial vent and how it is then affected by a second erupting vent nearby.

LT 4 (Figure 3.4): Chaotic lapilli tuff to lapilli breccia that is tan to brown to gray, massive, very poorly sorted, and clast- to matrix-supported with a matrix of lapilli tuff to fine to coarse ash. The clasts are angular to sub-rounded and consist of juvenile lava (some that was still fluid at time of deposition and has peperitic margins with surrounding lapilli tuff and mudstone) up to 1.5-2 m in diameter. Clasts of lapilli tuff are green to tan, weakly bedded to massive and are up to 3 m in diameter. Clasts include bedded tuff with thin to medium beds, white mudstone that is well bedded with thin to medium beds or that is massive and fractured or have a fluidal texture. Clasts of juvenile blocks and bombs that are non-vesicular to slightly vesicular and range up to 1-2 m in diameter are seen. Deposit is up 10 m thick and 4-5 m in lateral extent, with no deposit continuing beyond this. The basal contact is either non-visible or undulatory and erosive. The upper contact is sharp with overlying poorly to moderately bedded lapilli tuff and ranges from horizontal to undulatory. Overlying facies include LT1 and LT2.

Figure 3.2. LT 3 is visible with beds dipping steeply toward the front left of the photo (direction of red arrow). This deposit is flowing from vent 4 into vent 7. Water bottle is approximately 21 cm tall.

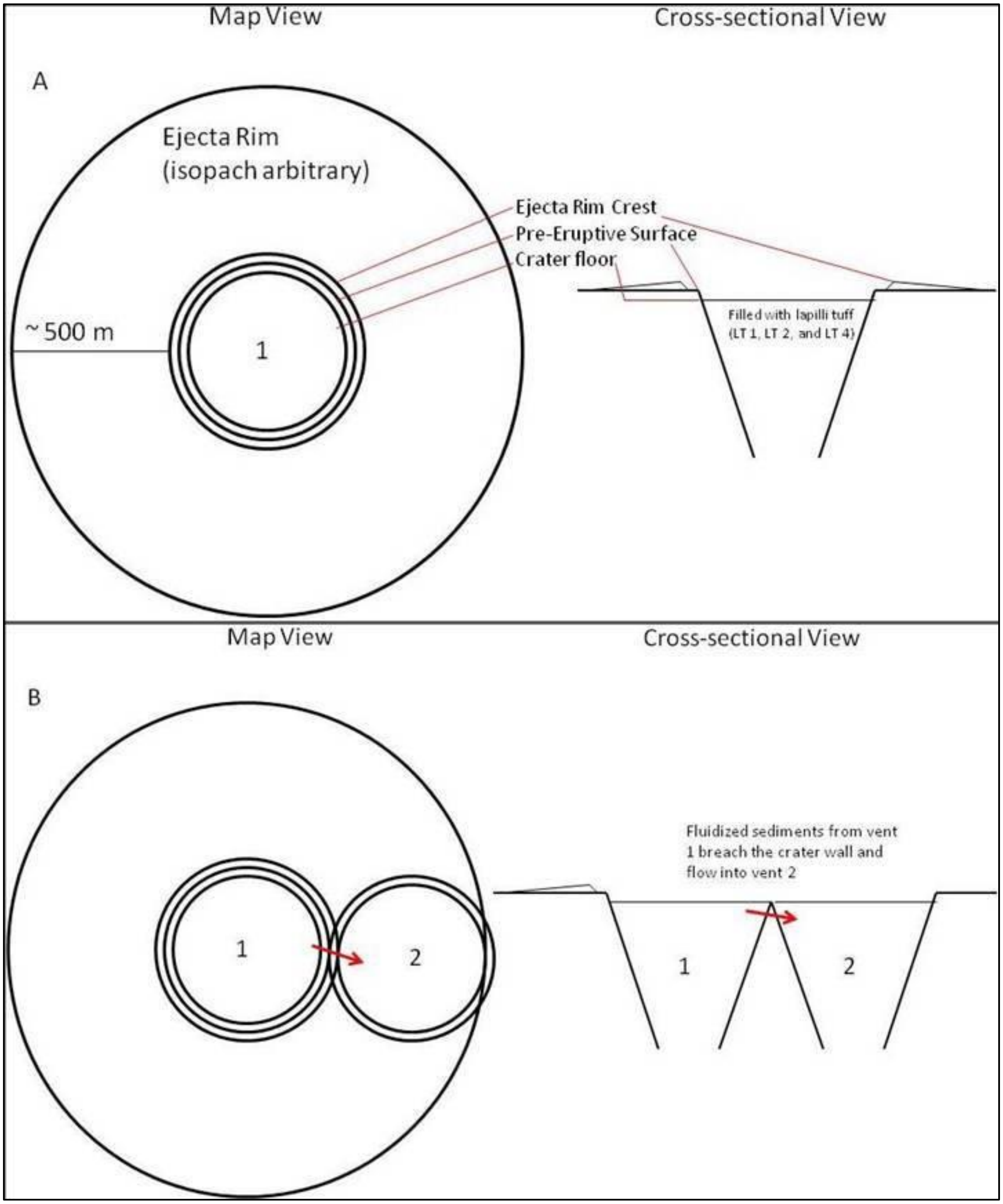


Figure 3.3. Schematic drawing of the interaction between two neighboring vents. A) the initial vent in both map and cross-section view; B) diagram showing how, when a second vent erupts at the edge of the first vent, the ejecta rim and crater wall are removed and breached. This allows fluidized sediments that were filling vent 1 to flow into vent 2, providing the water-saturated sediments to continue phreatomagmatic eruptions in vent 2.

***Interpretation*:** This facies was produced from slumping of extra-maar beds into a vent during an eruption, in some cases while the lava/magma was still fluid and hot enough to create peperitic margins. These peperitic margins show that there was water-saturated sediment available to mix with the hot lava/magma. The sediment forming the peperite is mudstone, which is contained within the Bidahochi Formation, explaining the formation of maars via phreatomagmatic eruptions. This facies is found within a vent, likely near the inside edge of the vent and indicates that the maar craters were enlarged through failure of the crater walls slumping or falling into the vent. The disorganized, large clasts of juvenile lava and country rock provide evidence that the crater walls fell into the crater.

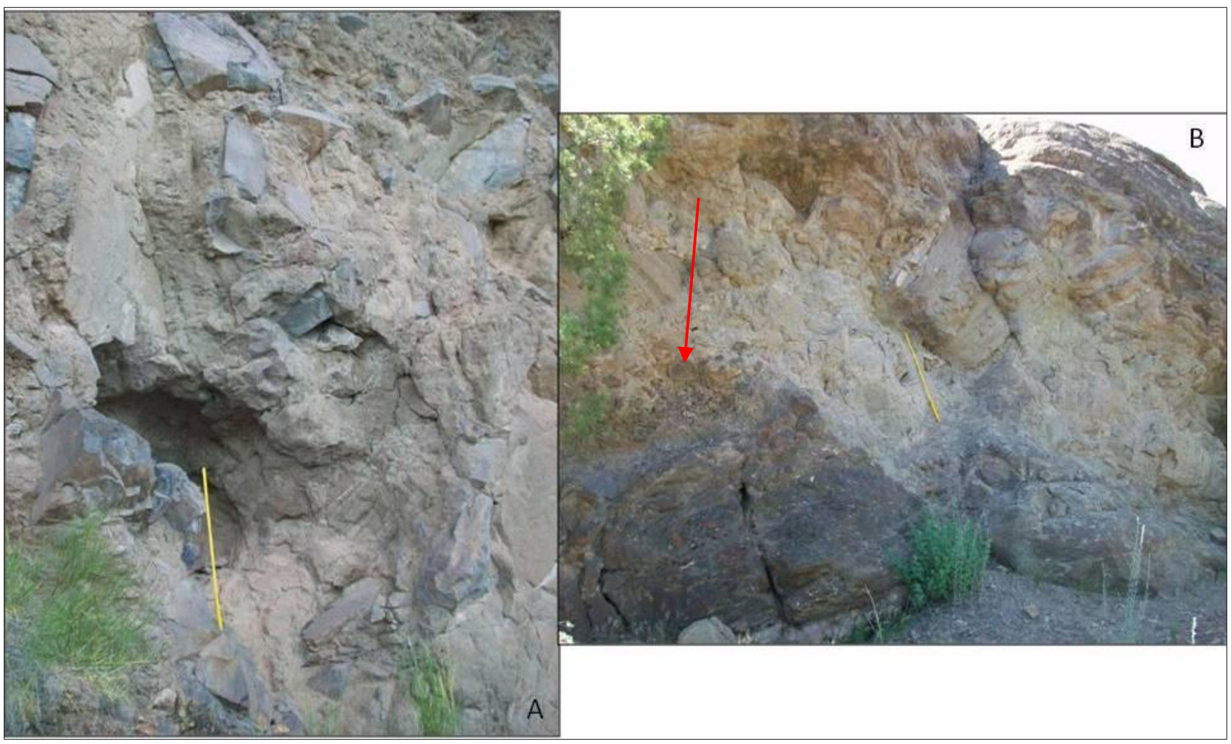


Figure 3.4. LT 4 chaotic lapilli tuff. Large clasts up to 2 m in diameter are visible. A has a large number of juvenile blocks and bombs, while B consists mostly of bedded tuff clasts and mudstone and siltstone clasts. A peperitic margin around the lava clast in the bottom left of B is visible (red arrow). Yellow meter stick in center of each photo is 1 m tall.

L 1 (Figure 3.5): This facies is a lapillistone to lapilli breccia that is brown to greenish brown, moderately to well sorted and clast-supported with very little matrix, which is composed of mud. Clasts are sub-angular to sub-rounded and consist of non-vesicular to slightly vesicular juvenile fine to coarse lapilli, with very few scoriaceous clasts, euhedral to subhedral crystals of amphibole and phlogopite up to 0.2 cm in diameter, and very rare accidental lithic clasts of orange sandstone up to 0.7 cm in diameter that have a fluidal texture. Accidental lithic clasts compose up to only 1-2%. Basal contact is not visible although bedding indicates a horizontal base. The upper contact is horizontal, non-erosive and sharp with overlying beds of LT1 of LT2. This facies is typically found outside the vent, up to 100's of meters away from the vent.

In thin section, this deposit is moderately sorted and clast-supported with secondary sparry calcite cement between clasts. Clasts are sub-angular to sub-rounded and consist of euhedral to subhedral and slightly fractured orthopyroxene and clinopyroxene crystals that are ~0.5 mm in diameter. Highly vesicular volcanic clasts have a devitrified glassy groundmass and cored orthopyroxene and clinopyroxene phenocrysts up to 1 mm in diameter and many have been altered. Clasts also consist of oolitic limestone with rare quartz crystals and very rare plagioclase crystals. This facies contains small amounts of fine ash.

***Interpretation*:** This is fallout from nearby vents (up to several 100's of meters away), as shown by the complete lack of matrix between lapilli clasts and moderate to good sorting.

S 1 (Figure 3.6): This facies is a spatter/scoria deposit that is reddish brown, very poorly sorted, clast-supported and lacking matrix. This facies is welded. The clasts are angular to sub-angular and consist of juvenile scoriaceous fine lapilli and dark gray to black lava that ranges up to coarse blocks and bombs. Clasts also consist of amphibole and phlogopite crystals and very rare accidental lithic clasts of sandstone or mudstone and bedded tuff up to 12 cm in diameter. Blocks and bombs range up to 2 m in diameter and include spindle and ribbon bombs.

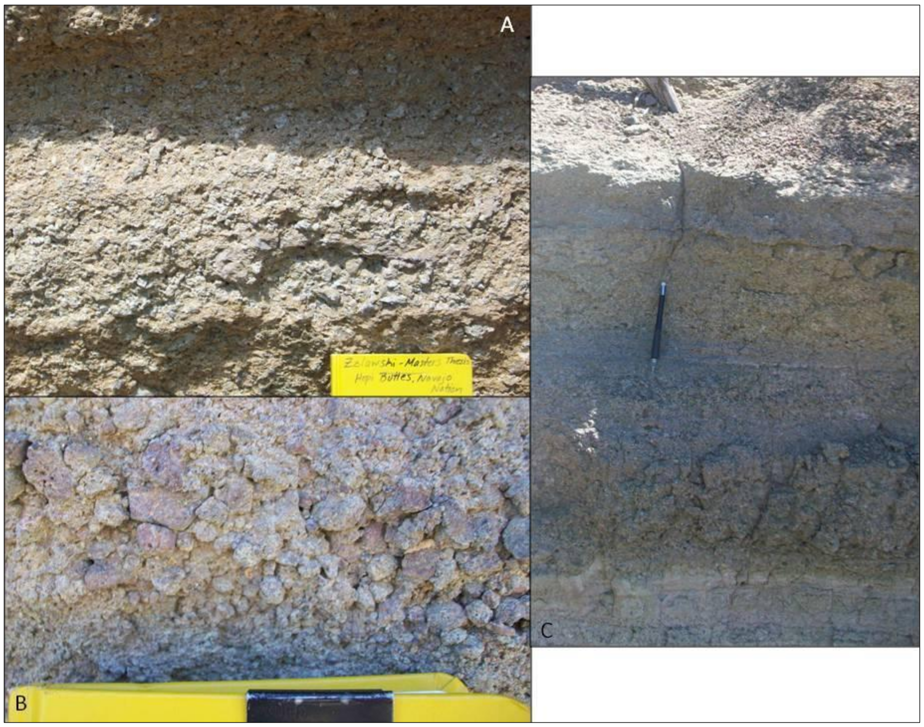


Figure 3.5. L 1 lapilli to lapilli breccia. Field book is 12 cm wide. Pencil is approximately 15 cm long.

Clasts are rich in amphibole and phlogopite phenocrysts. Occasional clasts contain accidental lithic clasts of less than 1 cm in diameter. Locally, lapilli to fine blocks and bombs are aligned in ‘trains’ to create poorly defined 5-10-cm-thick bedding. The basal and some upper contacts are gradational with the spatter-fed lava flow, whereas the basal contact with the underlying bedded tuff is sharp, undulatory and angular. This facies overlies T1 and T2 and also interfingers with LF. This facies is found within vents, but is also found around the inside edges of the vent.

In thin section, this facies is poorly to moderately sorted, massive and clast-supported with secondary calcite within pore spaces. Clasts are sub-angular to sub-rounded and consist of highly vesicular volcanic clasts with palagonitic groundmass with Fe-Ti oxides and euhedral to subhedral, fractured phenocrysts of cored clinopyroxene and orthopyroxene that have been altered, phlogopite up to 1.5 mm in diameter, and kaersutite crystals that typically have inclusions or reaction rims. Phenocrysts are up to 50 mm in diameter.

***Interpretation*:** This deposit was formed from strombolian to phreato-strombolian eruptions that involved very little to no external water, which produced a scoria cone. The change from phreatomagmatic to magmatic eruption is evidenced by the lack of fine ash, which is produced during phreatomagmatic eruptions, and the significant amount of scoriaceous lapilli with blocks and bombs. Magmatic eruptions produce scoria due to exsolution of magmatic gases, while processes of phreatomagmatic eruptions produce less vesicular particles. There is also a lack of mud or country rock within the matrix and clasts, indicating little to no interaction with water.

Figure 3.6.   In A, S 1 deposits showing slight alignment of lapilli clasts (along red line) within scoria deposits, field book is 19.125 cm long. B shows a large bomb found within the scoria deposits.

S 2 (Figure 3.7): This facies is a spatter-fed lava flow that weathers to reddish brown to reddish gray. The lava flow contains clast outlines of the same lava that composes the matrix. The clasts are typically scoriaceous and range from 1 cm to 30 cm in diameter with ribbon bombs that have breadcrusts and spindle bombs up to 40 cm in diameter. Rare clasts of orange sandstone also occur. The lava is red to reddish gray, non-vesicular to slightly vesicular, with a fine to medium grained groundmass and consists of 20-25% phenocrysts. The phenocrysts are typically 0.1-0.2 cm in diameter and consist of euhedral amphiboles up to 1.5 cm, phlogopite phenocrysts up to 0.5 to 1 cm in diameter, and possible plagioclase phenocrysts up to 0.1 cm in diameter. Some phenocrysts have been completely altered to red oxidized material and many are fractured. The basal contact and top contact are gradational with spatter facies. These contacts are undulatory. This facies is found within vents and is associated with S1.

In thin section, this deposit is highly vesicular and the vesicles are rimmed or filled with sparry calcite. The lava has a palagonitic groundmass with Fe-Ti oxides and phenocrysts of cored orthopyroxene and clinopyroxene, kaersutite, phlogopite, and very few large crystals of quartz or potassium feldspar that are highly fractured and range up to 2 mm in diameter.

***Interpretation*:** Spatter deposits from a low fountain were being so rapidly emplaced that the heat did not escape and the spatter formed a rootless lava flow. Some preserved clast outlines show that scoria clasts may have been what formed the lava flow. This is also evident since the lava flow is only seen within the S1 scoria/spatter deposit and contains clasts of S1. The outlines of the S1 clasts range from well defined to poorly defined, showing that the rate of emplacement changed throughout the eruption.

LF 1 (Figure 3.8): Lava flow/lake that is dark gray to black, non-vesicular to slightly vesicular with a fine grained groundmass and consists of 10-15 % phenocrysts. Phenocrysts are composed of large euhedral to subhedral pyroxene phenocrysts up to 1.5-2 cm in diameter and are fractured. Some phenocrysts are highly altered to orange. The basal contact is flat with peperitic margins up to 20 cm thick. This facies overlies many different facies, including LT1, LT2, T1, T2, S1, and S2. The upper contact is eroded or covered by Quaternary alluvium or eolian deposits or overlain by LT1. This facies is found capping mesas or within vent deposits. The lava flows may have flowed outside of the source vent.

Figure 3.7. S 2 deposits showing the outline of scoria clasts within the lava flow, seen directly below tip of pencil (within red circle). Pencil for scale is 15 cm long.

Interpretation: This facies was produced by an effusive eruption of lava from a vent. Once the eruption had used up all available water or water-saturated sediments and extruded lava in a more effusive eruption. The lava flows were possibly associated with fire-fountaining and some spatter deposits, which indicate a slightly explosive eruption, but lacking water. At vent 2, the S1 and S2 facies are associated with LF, indicating that the lava flow can occur with fire-fountaining and spatter deposits.

Figure 3.8. Lava flow capping mesas within the study area. Thickness of lava flows differs depending upon the mesa. Lava cap is approximately 6 to 8 m thick.

T 1 (Figure 3.9): This facies is a well-bedded tuff that is light in color (including tan, pink, light gray, light green, white) to darker red, reddish orange and reddish brown and is horizontally bedded with beds that are less than 20 cm thick, with most beds less than 10 cm thick. This facies ranges from poorly sorted to well sorted and matrix-supported to clast-supported with a matrix of fine- to medium-grained sand and ash. Clasts are sub-angular to rounded and consist of non-vesicular to scoriaceous lapilli that range from fine to medium lapilli. Crystals of amphibole and pyroxene of less than 0.2 cm in diameter are present. Accidental lithic clasts of orange sandstone, green, white, and pink mudstone range up to medium lapilli are present. Some beds within this facies are normally graded. Beds that are normally graded commonly pinch and swell and are less than 5 cm thick. Reverse graded bedding is also present, but is rare. This unit is found several 100's of meters up to 1-2 km from the vent. It is typically overlain by LF or LT1.

***Interpretation*:** The distal ash within this facies came from nearby vents, likely deposited as base surges from 500 m out beyond 1 km from the erupting vent. This is shown by the moderate to good sorting, medium to thin beds, and sedimentary structures within this facies. Good sorting occurs only in medial to distal deposits of base surges. In addition, base surges produce sedimentary structures within beds only when they have separated into a traction carpet at the bottom of the surge with a diffuse cloud above.

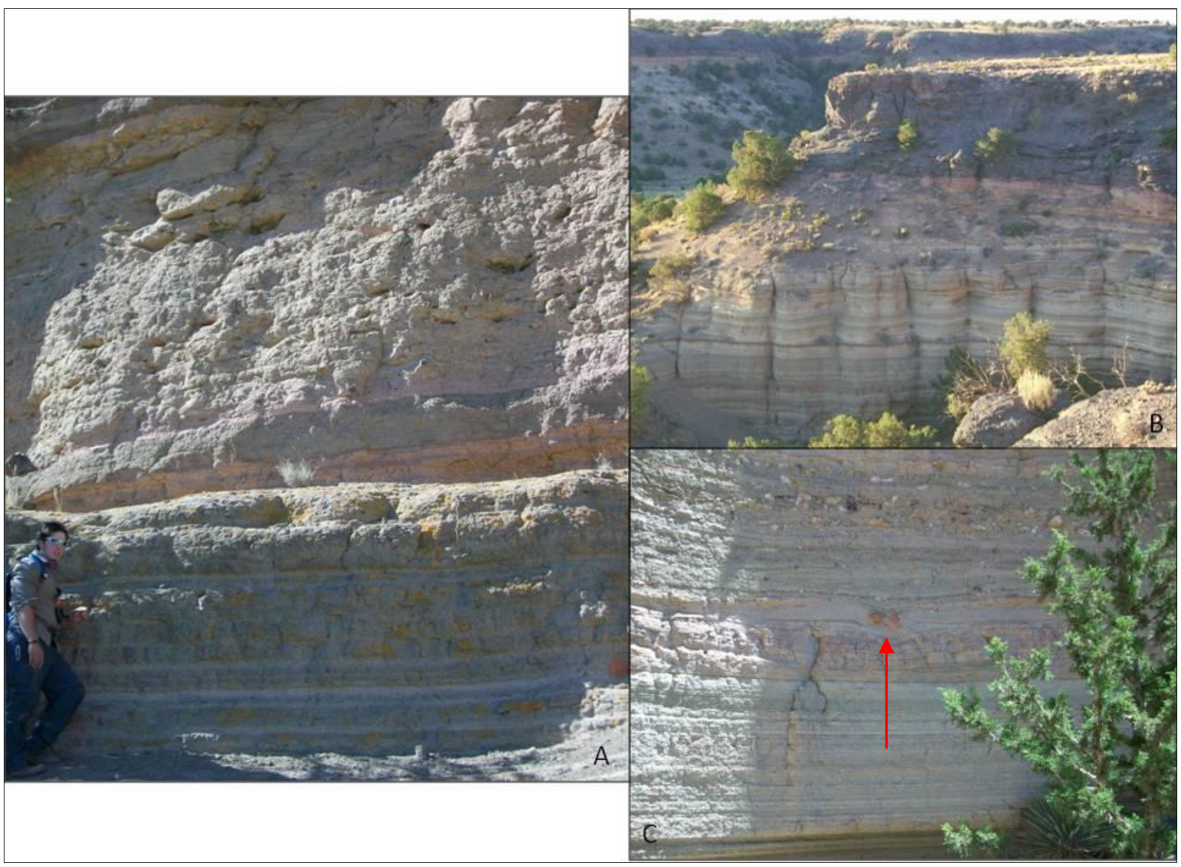


Figure 3.9. T 1 well bedded tuff deposits that are medial to distal from the originating vent. B shows approximately 20 m thickness of T 1 beds. In C, bomb that created bomb sag (red arrow) is approximately 20 cm long horizontally.

T 2 (Figure 3.10): This facies is a well bedded tuff to lapilli that is tan to light brown, very poorly to moderately sorted and matrix-supported to clast-supported with a matrix of mud and sand. Clasts are angular to sub-rounded and consist of non-vesicular to scoriaceous juvenile lapilli ranging from fine to coarse lapilli and slightly vesicular to vesicular, fine blocks and bombs that are less than 10 cm in diameter. Accidental lithic clasts of white and green mudstone and orange sandstone from less than 1 cm up to 5 cm in diameter are present. White mudstone is the most common accidental lithic clast type. Clasts also include very rare crystals of pyroxene and amphibole up to 0.5 cm in diameter. The bedding is defined by clast size and amounts of fine material. The finer grained beds are poorly sorted; the overall clast size is smaller and it is matrix-supported. Beds are 20 cm thick and laterally continuous for many meters. Locally, beds that are 0.5 cm thick or thinner and consist of coarser grained material are contained within finer-grained beds. Coarse-grained beds are poorly sorted, clast supported and consist mainly of juvenile lapilli ranging from fine lapilli to fine blocks and bombs and accidental lithic clasts. This facies is at least 10 m thick. The basal contact is sharp and horizontal with underlying beds. The upper contact is eroded away, or interacts with the base of LF. This facies is found several 100's of m's away from the vent.

In thin section, this deposit is moderately sorted, poorly to moderately bedded, and matrix-supported with a matrix of sideromelane or volcanic glass. Clasts are sub-angular to sub-rounded, range from 0.5 mm up to 2 mm in diameter and consist of vesicular volcanic clasts. Volcanic clasts have a devitrified glassy groundmass with phenocrysts of orthopyroxene and clinopyroxene. Accidental lithic clasts calcite and rare quartz crystals are within this sample. Crystals of orthopyroxene and clinopyroxene that have resorbed rims, are fractured and highly altered are also present.

Interpretation**:** This deposit is medial to distal ash produced from nearby vents, likely deposited as base surges produced from vents several 100's of m's up to 1 km away from the vent. This is evidenced by the poor to good sorting, and the majority of matrix-supported beds. The occasional sedimentary structures also suggest that this was deposited by base surges that had divided into a lower traction carpet and an upper dilute cloud. The presence of significant amounts of accidental lithic clasts also suggests a phreatomagmatic source. Discrete phreatomagmatic explosions produce base surges that deposit two relatively thin beds as seen within this facies. The range of sorting and clast size indicate that these base surges were likely more medial than T1, but with some distal deposition.

Figure 3.10. T 2 medial to distal tuff beds from vents ranging from a few 100 m's to 1 km away from the originating vent, some cross-beds are visible in A. Field book is 19.125 cm tall, hammer is 32 cm long, and pencil is 15 cm long.

LS 1 (Figure 3.11): This facies consists of well bedded crater-lake deposits that are limestone to limey sandstone. Weathered surfaces are tan to buff, while fresh surfaces are white, light gray and light green with fine- to medium-grained to crystalline grains. Beds are laminated or thinly bedded but range to massive. Laminations range from 0.1 cm to 0.5 cm thick and massive beds are 30 cm to 1 m thick. Laminae have wavy to planar structures and some beds have symmetric ripples. Thickly bedded to massive crater-lake sediments are tan to pinkish tan, poorly sorted and beds are approximately 15-20 cm thick. Clasts are sub-angular to sub-rounded, grains are fine to coarse sand, and consist of volcanically derived ash, crystals of pyroxene and amphibole. Basal and upper contacts are sharp with lava and range from horizontal to sub-vertical. The basal contacts are horizontal to slightly inclined but non-erosive. This facies is found within vents and associated with LS3. Soft-sediment deformation is visible if any slumping or sliding along the base of the crater occurred.

In thin section, this deposit is moderately to well sorted, finely laminated, and matrix supported. Clasts are from 0.125 up to 2 mm in diameter and consist mainly of calcite as ooids, peloids, and pisoids that have been replaced by micrite and cemented together by sparry calcite. Quartz clasts and crystals of orthopyroxene and clinopyroxene smaller than 0.125 mm in diameter are rare. Fe-Ti oxide grains are present within the matrix.

***Interpretation*:** The crater was filled with a shallow lake from which calcium carbonate was deposited into beds on the bottom of the crater, forming thin laminated layers. Most beds tend to occur beneath wave base for the lake, based upon the general lack of sedimentary structures. Symmetric ripples in some beds indicate a near-shore environment so these particular deposits must have been located close to shore or above wave base.

Figure 3.11. LS 1 defining the edge of a vent approximately 1 km in diameter. The dashed white circle indicates the approximate outline of the vent.

LS 2 (Figure 3.12): Crater-lake deposits interbedded with well-bedded tuff beds are buff to gray, moderately to well sorted and matrix-supported with a limestone matrix. The clasts are sub-angular to rounded and consist of juvenile scoria ranging from medium to coarse lapilli with rare fine blocks and bombs that are less than 8 cm in diameter. Crystals of amphibole and pyroxene range up to 0.5 cm in diameter and accidental lithic clasts of orange sandstone or mudstone are rare. The basal contact is slightly gradational and horizontal. The upper contact is also horizontal. The facies thins toward the edge of the lake and some deposits were tilted so contacts are at high angles now, but these angles are post-depositional deformation and are likely due to the creation of another vent or slumping within the vent. This facies is associated with T1 and T2 above and below. This facies is found inside a vent.

***Interpretation*:** The crater filled with a shallow lake from which calcium carbonate was deposited on the bottom of the crater intermittently. These intervals are defined by bedded tuff beds deposited at a much higher rate than the limestone was deposited. The eruption from which the tuff beds were deposited would finish and limestone production would resume as the primary deposition within the lake. This is shown by the alternating layers of laminated limestone beds with thinly bedded tuff. Much of the matrix in the bedded tuff is calcium carbonate, indicating that limestone deposition was still occurring, but tuff was being deposited more quickly than the limestone could form laminated beds.

Figure 3.12. LS 2 laminated limestone beds interbedded with well-bedded tuff. Hammer is 32 cm long.

LS 3 (Figure 3.13): This facies consists of crater-lake deposits with scoria clasts that are buff to cream, poorly sorted and matrix supported. The matrix is limestone consisting of fine- to coarse-grained particles with significant amounts of mud and ash. Beds are laminated to thinly bedded with beds up to 1 cm thick. Beds undulate slightly and lapilli produced sags within the limestone beds. Fossilized vertical burrows are present. Clasts are sub-rounded to rounded and consist of scoria ranging from medium to coarse lapilli, highly rounded crystals of phlogopite and amphibole up to medium ash. This facies thins toward the edge of lake. The basal and upper contacts are gradational and were originally horizontal. This deposit is tilted to high angles from post-depositional deformation. This tilting likely occurred through slumping or by another volcanic vent disrupting the beds. This facies is associated with LS1 and is found within a vent.

Interpretation**:** The crater filled with a shallow lake and was continuously depositing calcium carbonate in thin beds while eruptions occurring nearby would occasionally add scoria clasts to the deposit. These clasts created bomb sags and it is likely that the limestone was still unconsolidated and easily deformed. The matrix present around the scoria clasts is limestone, indicating that limestone was being deposited. Bomb sags from the scoria clasts occur within the limestone beds, showing that the limestone was still malleable. The limestone beds above this facies lack any scoria clasts, showing that the eruption that produced the scoria had ended and limestone deposition continued undisturbed in the lake.

Figure 3.13. LS 3 limestone beds with scoria clasts, bottom beds contains large amounts of scoria clasts and then gradually decrease in frequency moving up section. Pencil is 15 cm long.

M 1 (Figure 3.14): Marl that is varicolored (green, pink, white, tan, brown), well to moderately sorted and poorly to moderately consolidated mudstone, siltstone, and sandstone.

***Interpretation*:** Mostly dry environment (playa) with seasonal wetness, likely from flooding of local channels, which produced the fine-grained mudstone, siltstone and sandstone. It is likely to be seen in small areas because it is poorly consolidated, and therefore easily erodible.

Figure 3.14. M 1 deposits that are poorly consolidated to moderately consolidated. Field book is 19.125 cm tall.

CHAPTER 4
PARTICLE SHAPE ANALYSIS

INTRODUCTION

Fractal and multifractal dimension analysis effectively describes the shape of volcanic particles and helps discriminate fragmentation dynamics. Particle shape analysis can provide information on the approximate magma/water ratios present during a volcanic eruption (Dellino and Liotino, 2002). Using this analysis on marginal deposits of maar volcanoes can provide clearer information about the processes occurring during an eruption than using distal deposits. Marginal deposits are preferred since distal deposits have additional sources of fragmentation and particle shape alteration such as transport mechanisms within base surges. Determining the approximate magma/water ratios is important because the type of eruption that occurs is partially dependent on this ratio. In addition, phreatomagmatic eruptions are highly explosive and understanding the processes that occur during these eruptions can allow for better understanding of what leads to these highly explosive eruptions.

When using fractal techniques, perfect Euclidean forms (smooth curves) have a fractal value equal to 1 and the value increases as the shape acquires irregularities. This increase continues until a line becomes so irregular that it is defined by a Brownian motion (Mandlebrot, 1977), completely fills a plane (Kaye, 1978), and tends to the value of 2. Therefore, the fractal dimension of a closed bidimensional form (such as particles in photomicrographs and SEM images) belongs to the interval 1 – 2. Particles of interest in geology have a more restricted interval (Dellino and Liotino, 2002), ranging between 1 and 1.36 (Clark, 1986).

Volcanic particles are not true fractals (mono fractals), since they define segmented lines (or curvilinear trends) in a Mandlebrot-Richardson (M-R) plot, which plots the log of the steplength vs the log of the perimeter (Dellino and Liotino, 2002). True fractals (mono fractals) plot as a single straight line on an M-R plot. The fractal dimension(s) for particles are calculated using the formula $D = 1 - S$ where S is equal to the slope of the line calculated from the least square method from an M-R plot. The utility of the fractal dimension is preserved even if multiple fractal segments are recognized (Orford and Whalley, 1987). Kennedy and Lin (1992) proposed that multiple fractal components can be defined to characterize particles more completely. Five components were used by Dellino and Liotino (2002). The first component covered the interval of 3 pixels to 30 pixels, the second from 33 to 60 pixels and so on until the entire range of pixels (150 pixels) was covered. The average for each fractal component was calculated and used as variable in a multivariate statistical analysis that was similar to the one used by Dellino and LaVolpe (1996). Dellino and Liotino (2002) found that approximately 70% of the variance in the system is explained by the first two components. From these data, the authors produced a diagram plotting the location of the magmatic field, phreatomagmatic field, and the overlap field. This study provides evidence that fractal analysis is useful on particles that are not true fractals.

If a significant change in slope is identified on an M-R plot, then more than one fractal dimension is present. If a change in slope of the line segments is not easily obtained, or more segments are identified, then several fractal components may be designated. If only two segments are clearly definable, then a small-scale (textural; 0.5-10 µm) and a large-scale (structural; 10.5-25 µm) fractal dimension are recognized

(Kaye, 1978; Flook, 1979; Dellino and Liotino, 2002). These fractal dimensions indicate that, at small scales, magmatic particles are moderately irregular while at larger scales they are much more irregular. The larger structural dimension is related to the rupture of vesicle walls occurring on a particle boundary (Dellino and Liotino, 2002). Particles with two fractal dimensions tend to have a textural dimension that is smaller than the structural dimension due to the irregularity of outlines from vesicle rupture (Carey et al., 2000).

METHODS

To analyze particles from the study area, the NIH program Image 1.61 (developed at the U.S. National Institute of Health and available on the Internet at http://rsb.info.nih.gov/nih-image) was run on a PPC Macintosh G3 computer running OS 9.2. This program, distinct from the current ImageJ software, only runs on older Macintosh computers, but was used because no fractal analysis macro exists for ImageJ. The fractal analysis was run using the macro 'fraccalc', written by Matthew Warfel (1998). This is available online at http://www.kaomfr.org/wwwboard/data/kaomfr/fraccalc.txt. The hybrid-fast method was used as defined by Clark (1986). This technique has a steplength defined by r. The calculation starts by determining the distance $d_{p,i}$ from a starting point (x_p, y_p) to the second coordinate (x_i, y_i), using the equation $[(x_i - x_{i+1})^2 + (y_i - y_{i+1})^2]^{1/2} = d_{p,i}$. If the distance is less than r, then the next point (x_{i+1}, y_{i+1}) is then selected, the distance is computed again and the test against the steplength is made again. The process continues until the distance $d_{p,i+k} > r$. If $| d_{p,i+k} - r| \leq | d_{p,(k-1)} - r|$, then the point ($x_{i+k}$, y_{i+k}) is selected. If not, the point ($x_{i+(k-1)}$, $y_{i+(k-1)}$) is selected. Then the calculation is started again from this new point, until the whole particle perimeter is traced. As the endpoint of the curve is approached, the distance between the last point and the endpoint will be less than *r*, and a fraction of the steplength is computed for closing the curve. The perimeter is then calculated by $P = \sum_{i=1}^{N-1} \mathrm{d}i, i+1$. The calculation is then started again with a longer steplength, until a specified range of *r* is covered (Dellino and Liotino, 2002). This study used 50 steplengths ranging from 3 pixels to 150 pixels (0.89 μm to 44.53 μm) to cover the interval of 0.085-0.25 of the particle diameter, as suggested by Orford and Whalley (1983). This interval was used for all particles because all the images used were the same size.

The particles analyzed range in size from about 60 μm to 150 μm in their longest diameter. This size fraction, roughly 3-4 phi, was chosen because it is most useful for discerning between different fragmentation dynamics. Particles of this size also represent an important source of knowledge about the most energetic processes of explosive dynamics, as discussed by Dellino and LaVolpe (1996) and Büttner et al. (1999). Each particle to be analyzed was outlined using Adobe Photoshop and saved as a tiff file. This image was then turned into a binary image in Image. For a complete description of the methods used within Image, refer to Appendix A. Each particle was analyzed three times, using three different starting points within the program, but without rotation of the image. The average was calculated from the three runs and the data plotted on an M-R diagram. This diagram was developed by Mandlebrot (1967) using Richardson's unpublished data. Richardson's data involved the measurement of coastlines, and the smaller the unit of measurement, the longer the perimeter length of a fixed coastline appears to become (Orford and Whalley, 1983). Mandlebrot plotted the logarithm of both the steplength and perimeter, creating a nearly linear relation (Orford and Whalley, 1983).

ANALYSIS AND RESULTS

Particles for analysis are contained within five samples taken from the study area that were identified within the marginal to proximal facies previously described. Four of these samples are from the T1 facies. Their sample ID numbers are 191 (24 particles analyzed), 7131 (48 particles analyzed), 193 (35 particles analyzed), and 1152 (43 particles analyzed). The fifth sample is 846 (29 particles analyzed), which is from the LT1 facies.

Particles formed from both phreatomagmatic and magmatic fragmentation dynamics are present within each of these samples. Sample 191 in particular had many particles that showed significant scatter (low R^2 correlation values) on the M-R plots (Figure 4.1), although scatter was present in data from all samples.

For several analyzed particles, significant scatter is evident on the M-R diagram. This scatter may be explained by three possibilities. The first explanation is that the boundary of the particle may not be fractal. The second possibility is that the points representing the particle coordinates are only an approximation of the real particle boundary. The third possible cause of scatter is that fractal dimension, as executed by computers, is not rotation invariant (Kennedy and Lin, 1986). By changing the starting point along the boundary, the resulting perimeter estimate changes and is attributed to the wavelength of irregularities that characterize the particle boundary (footnote of Schwarz and Exner, 1980, by an anonymous reviewer). As the steplength approaches the characteristic wavelength, and if the starting point is in-phase with the wavelength, the

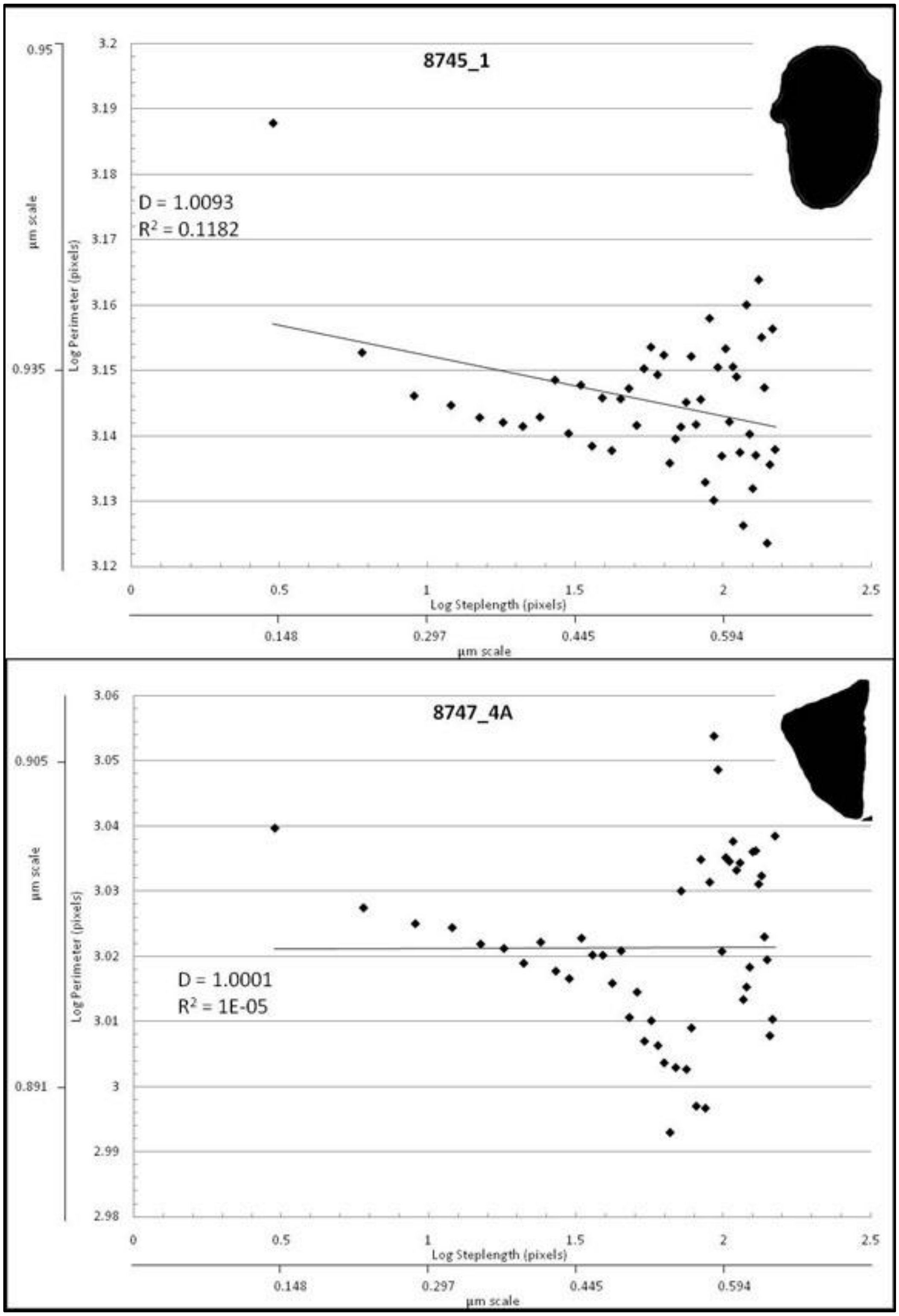
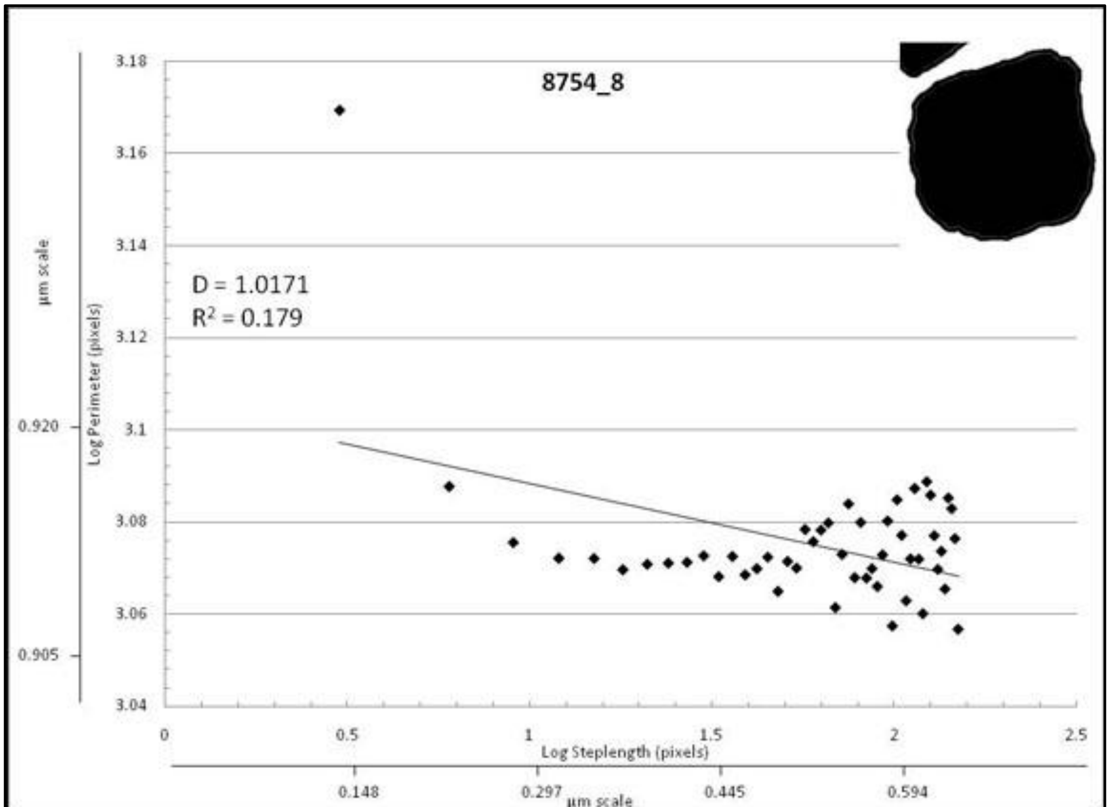


Figure 4.1. Some M-R plots of analyzed particles contained large amounts of scatter that result in low R^2 values for the best-fit line. These plots do not provide much information about the particles. The particle outline that was used in the analysis appears in the upper right corner of the diagram.



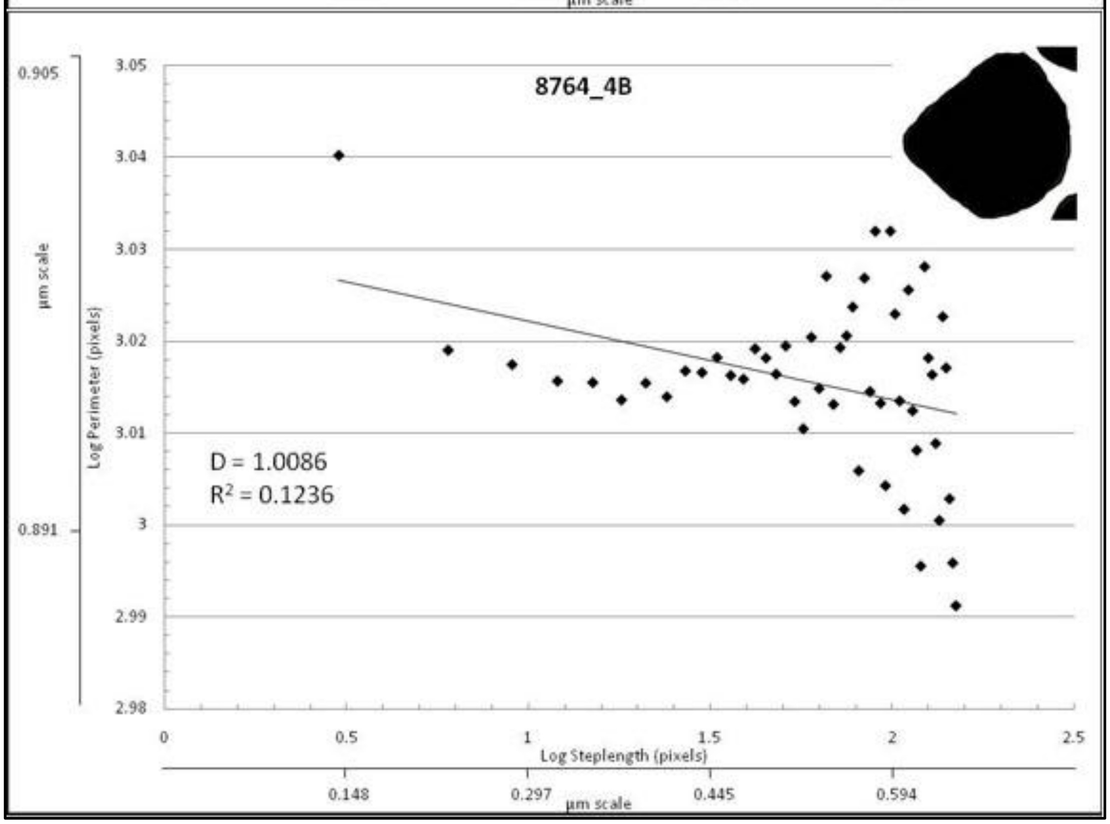


Figure 4.1. Continued.

perimeter estimate will be shorter than expected (Dellino and Liotino, 2002). All of the samples contained examples of both magmatic and phreatomagmatic fragmentation regimes, as determined by the number of fractal dimensions that are easily visible. Phreatomagmatic particles contain only one fractal dimension and are self-similar over the range of the scale (Figure 2). Fractal behavior for these particles can be describe as true fractal (mono fractal) (Dellino and Liotino, 2002). Overall, the fractal dimension is low, which indicates a moderately irregular boundary to the particle (Figure 4.2). The fractal dimension, as determined by the D = 1 – S equation, in these particles tends to range between 1.04 and 1.2.In addition to the fractal analysis results that suggest a phreatomagmatic source, many of the particles showing self-similarity throughout all scales also show features such as quench cracks and equant and blocky particle morphology (Figure 4.3). These features all suggest interaction of magma with external water during an eruption (Heiken, 1972; Wohletz and Krinsley, 1982; Wohletz, 1983; Lorenz et al., 1994; Zimanowski et al., 1991, 1997a; Büttner et al., 1999, 2002; Ersoy et al., 2007).

The magmatic particles contained two distinct segments in the M-R plot. Their particles are multifractal in shape and contain both structural (large-scale) and textural (small-scale) fractal dimensions. The size range of calculations for textural dimension is 0.5-10 µm and the size range of calculations for structural dimension ranges from 10.5-25 µm (Dellino and Liotino, 2002). The structural dimension tends to be larger than the textural dimension (Figure 4). Textural dimensions range from 1.02 to 1.1 while structural dimensions range from 1.05 up to 1.9.

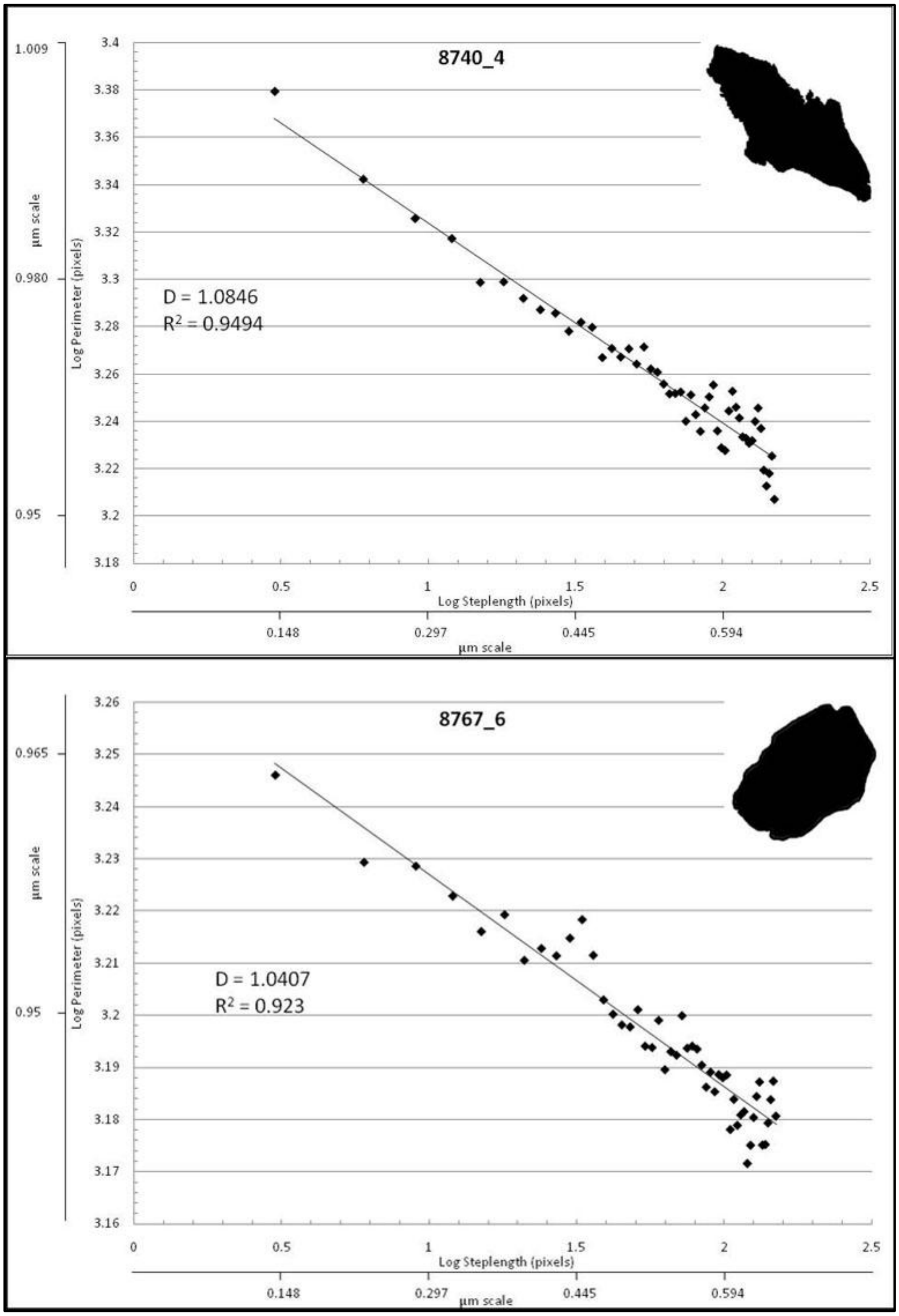
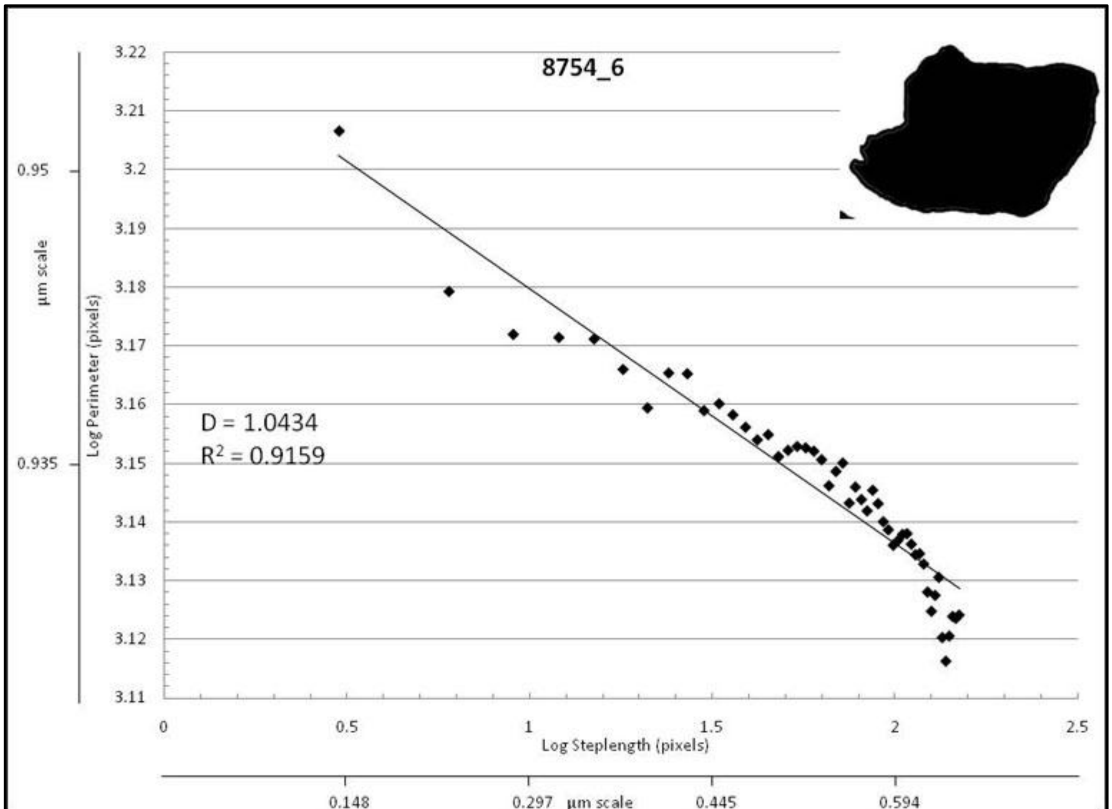


Figure 4.2. Many particles exhibit phreatomagmatic fragmentation behavior, as seen by the single fractal dimension, calculated from the slope of the single line. The examples provided here are some of the best correlated examples, with R^2 values approaching 1. The particle outline that was used in the analysis is provided in the upper right corner of the diagram.



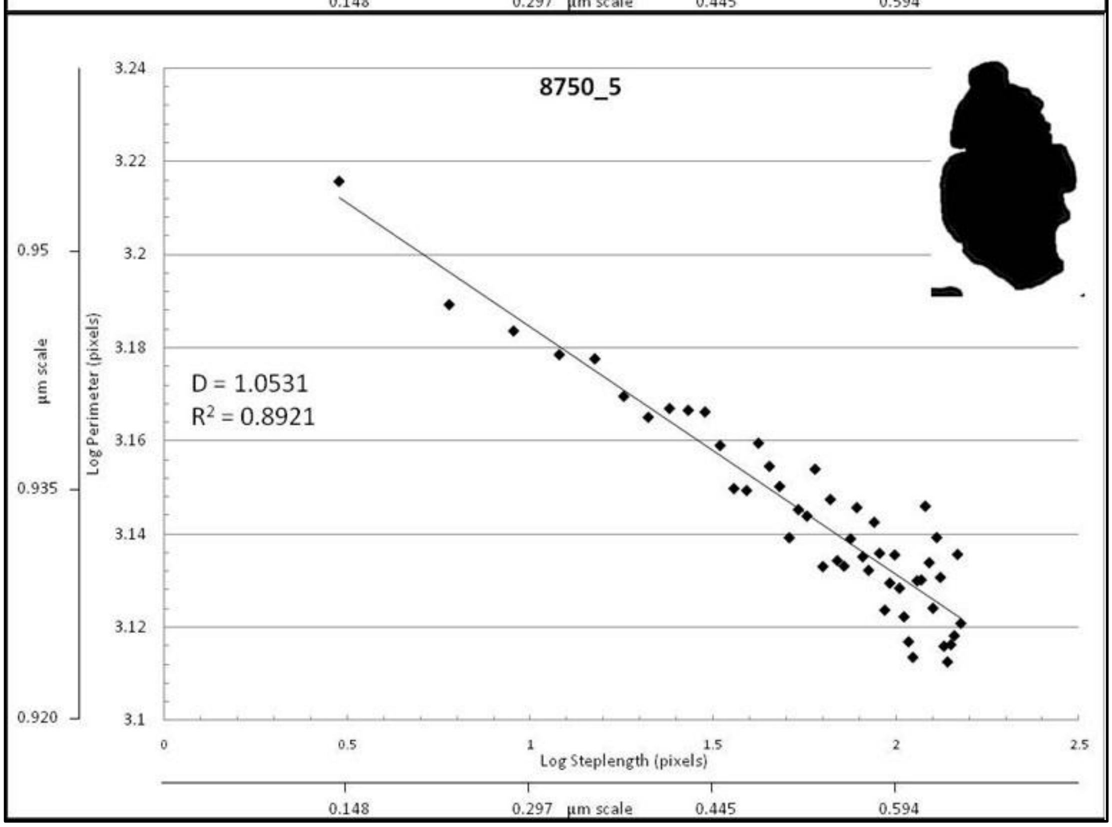


Figure 4.2. Continued.

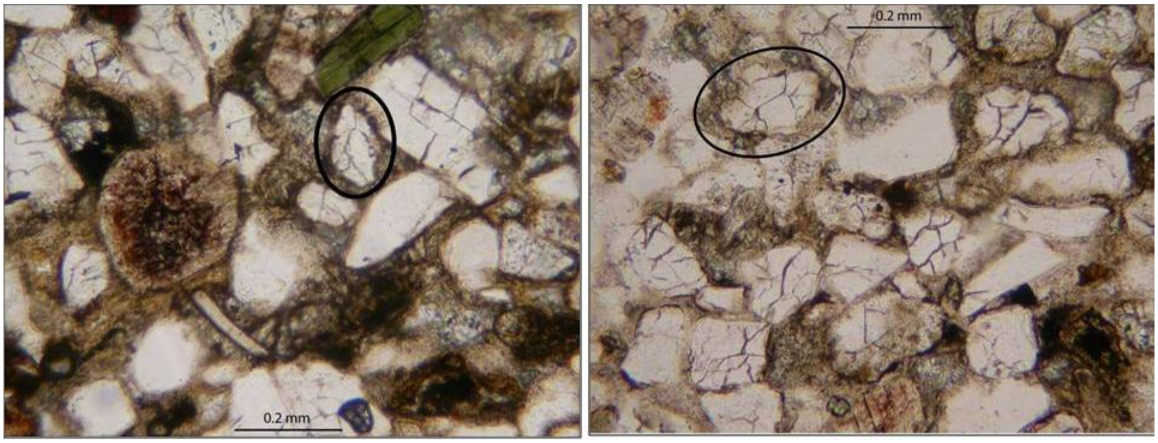


Figure 4.3. Photomicrographs of samples 8750 (let) and 8754 (right). Particles 8750_5 (left) and 8754_6 (right) are circled in green and show quench crack morphology. The equant shape and quench cracks are present in many of the other particles within the images. Refer to figure 2 for the M-R plots of these two particles.

DISCUSSION

All five samples contain particles with significant scatter (R^2 value of less than 0.65), so the slope of the line cannot be used to provide information about the particular particles. In addition, many particles from each sample contain high correlation values for both phreatomagmatic and magmatic fragmentation regimes. Particles that had R^2 values of 0.65 or above (at least one of the two fractal dimensions must meet this requirement) were considered to provide enough information about the fragmentation dynamics. This value was chosen because it is greater than 0.50 and still included enough particles to analyze. This value may not provide statistical certainty, but a higher R^2 value would reduce the number of particles that met this requirement. Samples from the T1 facies contained more phreatomagmatic particles than magmatic, although in some samples it is not significantly more (Table 4.1).

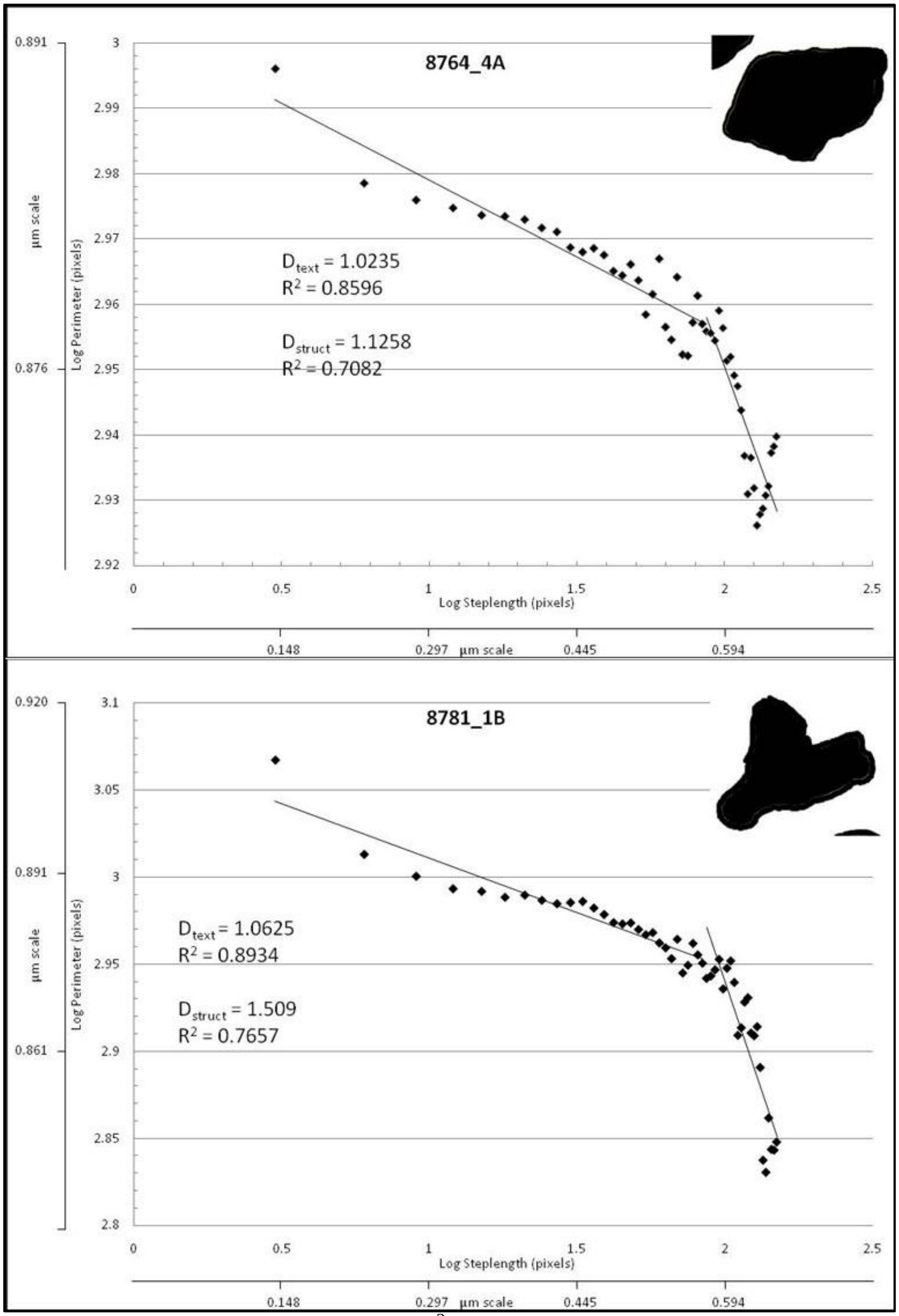


Figure 4.4. Magmatic particles with high R^2 values are seen in each of the samples and can be distinguished by having two fractal dimensions, textural (small-scale) and structural (large-scale). The particle outline that was used in the analysis is provided in the upper right corner of each diagram.

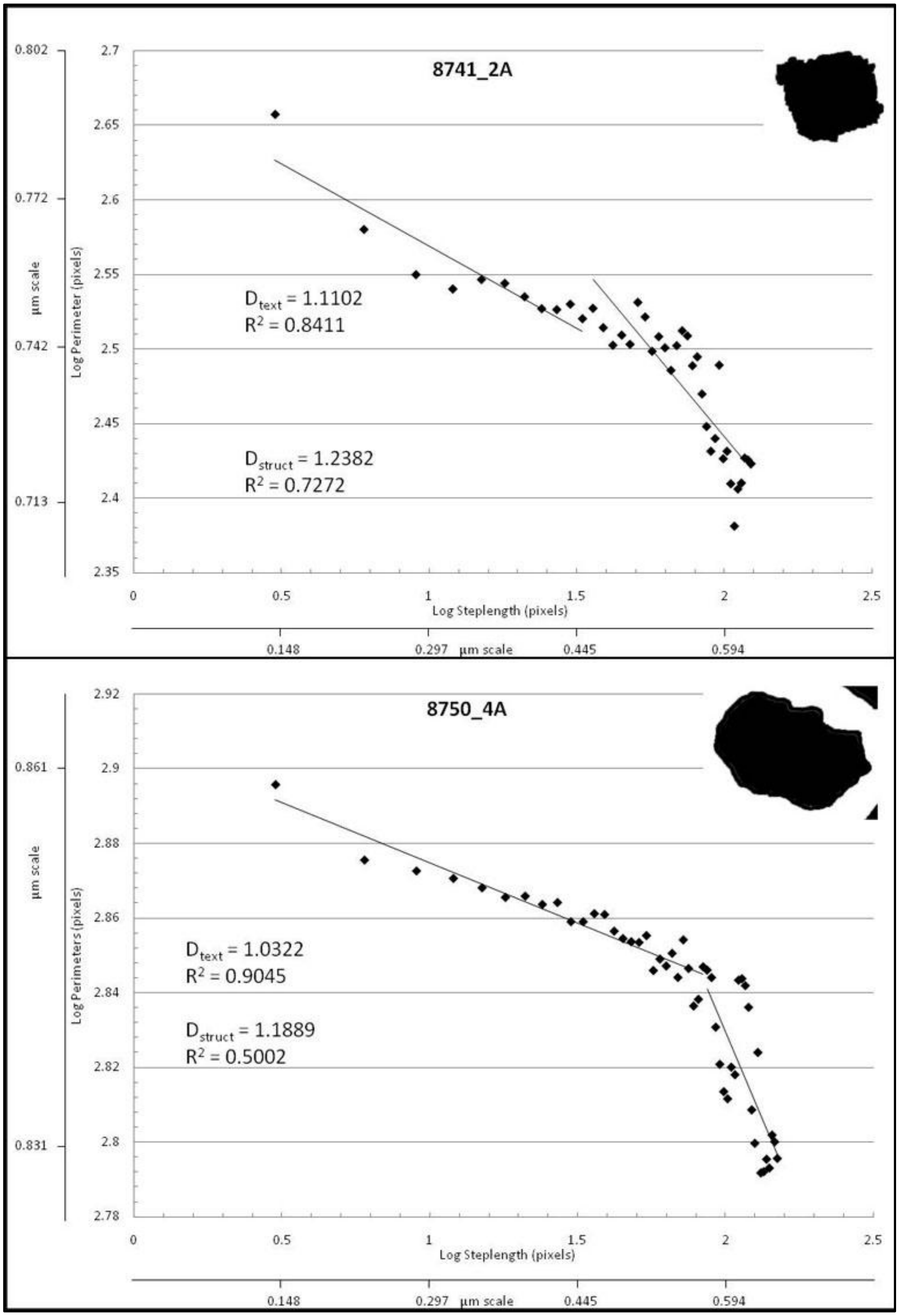


Figure 4.4. Continued.

Sample #	Facies	# of Particles	
		Phm	Mag
191	T1	10	9
193	T1	17	12
1152	T1	18	14
7131	T1	23	17
846	LT1	7	13

Table 4.1. Number of analyzed particles that are phreatomagmatic or magmatic for each sample analyzed, including the facies that each sample falls into.

These samples only have a few more phreatomagmatic particles than magmatic particles, indicating a phreatomagmatic source, but with strong magmatic influence.

Sample 846 comes from the LT1 facies, which is typically contained within or immediately adjacent to a vent, and has fewer phreatomagmatic particles than magmatic particles. This is contrary to what would be expected from this facies, since lapilli tuff deposits are commonly associated with pyroclastic density currents produced by phreatomagmatic eruptions (Waters and Fisher, 1971; Fisher and Schmincke, 1984; Lowe, 1988; Branney and Kokelaar, 2002). This may be a result of many particles with too much scatter to be useful; many of the particles from this sample contained higher levels of scatter and had low correlation values.

Several sources of scatter may be identified, in addition to those found by Dellino and Liotino (2002). These other sources include the type of samples used, the quality of the initial photomicrographs, how the particle outlines were delineated in Adobe Photoshop, and the lack of rotation and multivariate statistic analysis for each particle. Several other studies (Dellino and Liotino, 2002; Carey et al., 2002; Maria and Carey, 2002, 2007) used loose ash particles placed onto a grain mount for SEM imaging. The samples used in this study have been consolidated by mud filling pore spaces, so thin sections had to be used for the particle images. In addition, the particles in this study are late Miocene in age, whereas the ash particles used in the other studies are latest Pleistocene and Holocene in age. Ash-particle-shape analyses from the Hopi Buttes Volcanic Field are still useful because the deposits have not been buried or compacted. Grain mounts allowed the researchers in other studies to image the particles using scanning electron microscopy (SEM), whereas in this study, particles were photographed using a petrographic-microscope-mounted camera that provided 100X photomicrographs of the particles. The images acquired from the SEM provide significantly more detail about the particles since the images provide a three-dimensional view of the particle outline and also a higher contrast of the image from the background. This contrast allows for the particle outline to be determined more easily than by using the microscope camera images. The difference in contrast in thin section is far less than that of an SEM image, so the determination of the particle outline is a bit more difficult, which adds an additional source of scatter.

The NIH Image program was unable to distinguish the edges of most of the particles within the initial images. Therefore, the particles were outlined using Adobe Photoshop. This was completed by hand-drawing the boundary of the particle while at a high magnification of the image. This adds a user bias since other researchers may have outlined the particles differently. After the particles were outlined, Image consistently distinguished the edge of the particles.

A final source of scatter may result from the lack of rotation while analyzing particles within Image. Dellino and Liotino (2002) determined that rotation of particles introduced too much variability, which can create data scatter even if one orientation of a particle provides a clearly defined trend. For this reason, rotation of particles was not carried out in this study. However, three separate analyses were run for each particle with three different starting points. This was done so that, if one starting point happened to be in-phase with irregularities, the smaller calculated perimeter would be averaged, and not solely relied upon. In addition to the lack of rotation, this study did not include any multivariate statistical analyses. Dellino and Liotino (2002) used multivariate statistics on the results returned from each of three rotations of each particle. After the results were returned from all three runs, a weighted average was used to determine which of five fractal dimensions were the most important. Once this was determined, it allowed Dellino and Liotino (2002) to create a diagram of phreatomagmatic and magmatic particles, with a large overlapping field. Multivariate analysis was not completed in this study because the initial rotation of the particle was also not part of the analysis, since Dellino and Liotino (2002) determined that rotation of the particles was not useful.

CONCLUSIONS

Fractal and multifractal analysis of ash particles is successful in describing particle shapes and fragmentation dynamics, and was also effective in discerning whether samples from this study were phreatomagmatic or magmatic. A large number of particles within the analysis had too much scatter to make them effective in determining particle shape or fragmentation dynamics, but nearly half of the particles provided useful data of high quality. This analysis provided information about the overall shape of particles, and was useful in determining the fragmentation dynamics that produced the samples and their respective facies.

All of the samples have phreatomagmatic and magmatic particles. This was not expected, especially from sample 846. The same facies found at other maar volcanoes have been produced by phreatomagmatic eruptions. The presence of magmatic particles within these facies may be explained by two vents being active at the same time. One of the vents was phreatomagmatic and produced a small majority of the deposits, while the second vent was magmatic and produced a large minority of the particles within the deposits. T1 was formed by base surge deposits moving away from the vent and could easily have incorporated particles from the magmatic vent if it passed near or over the vent. LT1 (sample 846) is contained within the vent or immediately adjacent to the vent and involved juvenile and recycled clasts that were erupted up and fell back into the vent. The higher number of magmatic particles than phreatomagmatic particles can be explained by the sample that was collected was closer to the magmatic vent than the phreatomagmatic vent. This would result in a higher percentage of magmatic particles in a facies that is expected to be phreatomagmatic. The existence of two vents within close proximity would explain the presence of magmatic and phreatomagmatic particles within all samples analyzed. In addition, particles that were analyzed may have been influenced by processes that rounded the particles. The existence of two coevally erupting vents has been observed at the Rothenberg Scoria cone (Figure 8; Houghton and Schmincke, 1986). The northern vent was purely Strombolian and the southern vent was phreatomagmatic. Two vents were also seen during the 1977 Ukinrek, Alaska eruption (Self et al., 1980). From the inception of the East Maar, lava was present with a separate vent for the ejecta of phreatomagmatic explosions.

Another explanation for the presence of both particle types would be one vent that was erupting but water was only able to access the outer part of the magma column. This would result in phreatomagmatic particles being created at the outer part of the magma column and magmatic particles being created in the middle of the magma column and could result from an increased rate of magma discharge. Ort and Carrasco-Núñez (2009) suggested that a low magma discharge rate in unconsolidated sediments would allow for the collapse of sediment into the dike. The collapse would result in mingling of sediments with magma and possible phreatomagmatic explosions. A third possibility is that one vent produced both phreatomagmatic and magmatic particles at different times during the eruption. This would occur if water entering the vent was not steady or magma came in pulses, at times overwhelming the water supply. At times, the water supply rate was ideal for phreatomagmatism. This would result in the creation of phreatomagmatic particles when water had access to the magma column, but magmatic eruptions would occur when water was not available. The 1977 eruption of Ukinrek also provided evidence of water accessing magma periodically, explaining the change from phreatomagmatic to Strombolian (Self et al., 1980). The phreatomagmatic explosions would erupt large amounts of cognate particles from earlier in the eruption. These particles may be of phreatomagmatic or magmatic origin. This would be a way to have both particle types within the same deposit. Base surge deposits might have a higher cognate particle component than fallout beds that are present with T1 deposits. The occurrence of both particles types within T1 and LT1 deposits can be explained by any one of these processes or a combination of these processes. Additional field analyses would be necessary to determine which of these scenarios would have been most likely to occur.

Recycled clasts and depositional processes within base surges supply mechanisms to round particles, and would change the slope of the particles on an M-R plot. Within maar volcanoes, recycled clasts can compose up to 2/3 of the clasts and base surges may occur with each discrete explosion. Recycled clasts have been exploded out of the vent, returned back into the vent, and then re-exploded from the vent. If a clast is only recycled once, it is likely that the particle outline would not be highly altered from its original shape. If a clast were to undergo several rounds of recycling, the particle could become rounded, thus introducing additional processes that would obscure the initial eruptive processes of formation. This results in a single line with a lower slope on an M-R plot and therefore would have a lower D. These clasts cannot be distinguished from juvenile magmatic particles. Base surge deposition involves particle-to-particle contact and particle-to-surface contact. Both of these processes would produce rounding of particles and removal of sharp corners. Recycled clasts and depositional processes have the ability to change the slope or roundness of particles.

The samples analyzed provide information about the processes that were occurring during eruptions that formed maar volcanoes within the study area. It is evident from the presence of both magmatic and phreatomagmatic that both types of eruptions were occurring contemporaneously.

CHAPTER 5
DISCUSSION

INTRODUCTION

Models of phreatomagmatic formation of maar-diatreme volcanoes have been produced with increasing detail by authors including Ollier (1967, 1974), Fisher and Waters (1969, 1970), Lorenz (1970, 2004, 2007), Waters and Fisher (1970, 1971), Heiken (1971), Schmincke (1977, 2000, 2004), Wohletz (1983, 1986, 2003), Wohletz and Sheridan (1983), Wohletz and McQueen (1984), Zimanowski (1986, 1998), Zimanowski et al. (1986, 1997a, b), Godchaux et al. (1992), Büttner and Zimanowski (1998), Lorenz et al. (1994, 2003), Lorenz and Zimanowski (2000), Lorenz and Kurszlaukis (2003), Lorenz and Haneke (2004), Lorenz and Kurszlaukis (2006), and Büttner et al. (2006). These models provided a basis for field observations completed during this study. Field units and facies that were defined by field observations provide evidence that the vents formed from similar processes proposed in previous models. By using field units and facies, a model of eruptive processes and post-eruptive processes was created for the maars within the study area.

MODEL BACKGROUND

The stratigraphic units that underlie the Hopi Buttes Volcanic Field, Triassic Chinle Formation, Jurassic Moenave and Tertiary Bidahochi Formations, controlled the eruption style that produced the volcanic edifices. Directly underlying the volcanic units are the nonlithified lower Bidahochi Formation sediments, which are up to 100 m thick (Billingsley et al., in press). These sediments are composed of silt-, sand-, and clay-sized particles deposited within a playa setting. The playa was typically dry, but it received seasonal moisture that produced water-saturated sediments. The underlying hard rocks of did not provide much water for the magma to interact with, based on the arguments in the paragraph below. The sediments of the Bidahochi Formation had significant amounts of water available in the form of water-saturated sediments.

Intrusion of magma into underlying strata before actual eruptions did not encounter much available water. The lack of underlying Chinle Formation clasts and the few Moenave Formation clasts within the volcanic deposits provide evidence that magma intruded into these units without significant explosive interaction with the surrounding country rock. The magma began to interact with the country rock when it reached the wet sediments contained in the Bidahochi Formation as documented in Hooten (1999) and Hooten and Ort (2002). Hooten (1999) studied peperite because the clasts have not been recycled and therefore provide information about magma-sediment mixing processes.

Hooten (1999) assumed that peperite is a "frozen" record of the coarse mixing stage of MFCI. Non-explosive interactions within the Hopi Buttes are shown by the peperitic margins of dike buds described by Hooten (1999) and Hooten and Ort (2002). Hooten and Ort's (2002) study focused on a dike along the north face of French Butte and dikes and peperite pods present at Arch Rocks Vents. These locations were used because the pre-eruptive surface level was easily determined and peperite within the buds is exposed vertically and laterally, providing information on any changes present. Peperite at all of the buds shares several characteristics; (1) sharp, irregularly shaped contacts with surrounding monchiquite, (2) juvenile clasts of blocky to globular fragments, (3) both types of clasts are present in the same peperite domain, (4) clasts are cm-sized and vesicle poor, and (5) fractures are filled with stringers of sediment that permeate the monchiquite (Hooten and Ort, 2002).

Using these characteristics and properties of the surrounding sediment, Hooten and Ort (2002) calculated the approximate confining pressure that produced these deposits. Hooten and Ort's (2002) results yield confining pressures of approximately 0.6-1.0 MPa, somewhat less than the 1.3 MPa confining pressure of Wohletz (1986), which corresponds to burial depths of 50-100 m. This implies that magma/water interaction occurred at 25-80 m depth in the Hopi Buttes. This is consistent with field observations from the study area. Xenoliths within T1 and LT1 include Bidahochi sediments and Moenave Formation. The Moenave Formation is at the depths suggested by Hooten and Ort's (2002) calculated confining pressure. This indicates that the explosion loci do not occur below the Moenave Formation.

Low confining pressures are expected with small masses of interacting material (Wohletz, 1986), such as those seen by Hooten and Ort (2002). This low confining pressure coupled with unconsolidated and fine-grained host sediment at the time of intrusion suggest that increased pore pressure from vaporized groundwater would have been sufficient to exceed the lithostatic pressures (Hooten and Ort, 2002). Remobilized and vesiculated sediment has been recognized as resulting from fluidization processes along the margins of igneous bodies (Kokelaar, 1982), such as those seen within Hooten's (1999) and this study. The presence of peperite within phreatomagmatic vents suggests that the mixing geometries recorded in domains are related to processes that control the pre-explosive phases of maar-diatreme development (Hooten, 1999). Dikes within the First Flat Mesa area have peperitic margins, suggesting that some non-explosive mixing of magma with water-saturated sediment occurred before, during, or after phreatomagmatic eruption.

Some interactions were explosive, producing the maar-diatreme vent and cutting down into the underlying strata. Figure 5.1 provides evidence for maar craters cutting downward into the surrounding strata within the study area, although there is no evidence of diatremes within the study area. White (1990) suggested that most maar craters in the Hopi Buttes are approximately 200 m deep and underlain by a diatreme. He also says that several vent locations preserve both upper and lower diatreme facies, including the western of the two Standing Rocks, Round Butte, and Hoskeitso Claim. The interaction of magma with this water-saturated sediment leads to brittle fragmentation of the involved magma volume. This produces shock waves that can fragment the surrounding country rocks (Zimanowski et al., 1997c; Kurszlaukis et al., 1998; Zimanowski, 1998; Lorenz et al., 1999, 2000, 2002; Lorenz and Zimanowski, 2000). The water vapor generated from the interaction of water-saturated sediment and magma leads to further fragmentation of the magma surrounding the interacting volume of magma. Water vapor and fragmented wall rock rises toward the surface, producing an eruption cloud containing ash and lapilli. The partial evacuation of fragmented clasts and fragmented magma by the eruption cloud leads to a mass deficit below the surface. The mass deficiency then leads to the collapse of the surficial rock into the diatreme and root zone (Branney, 1995; Lorenz, 2003). This collapse is seen within the lower diatreme exposed at the western of the two Standing Rocks and Round Butte (White, 1991) but is not seen within this study area. Field evidence for this process is shown by the large amounts of

Bidahochi clasts found within facies LT 1, LT 2, LT 3, and LT 4, as well as the down-cutting relation of LT 1 with surrounding country rock strata (Figure 5.1), indicating a maar.

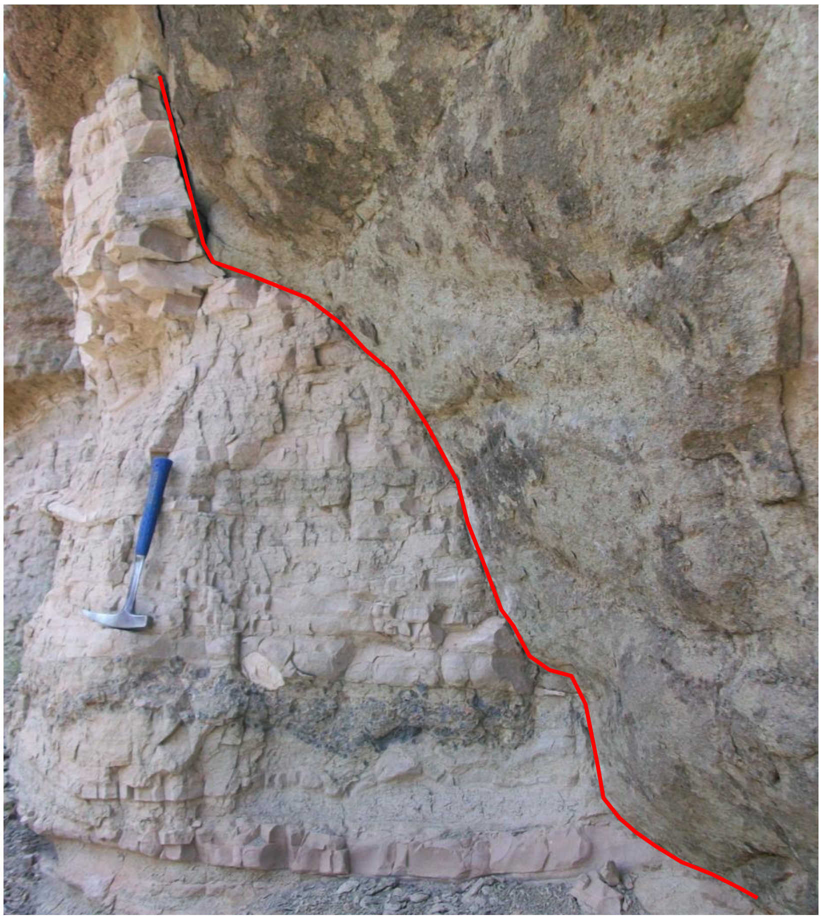


Figure 5.1. Field photo of intramaar LT 1 (right side of photo) in contact with surrounding country rock strata at the edge of a maar (vent 7). Hammer is 32 cm long.

Collapse of the surficial rock into the diatreme and along the maar crater walls is evidenced by LT 4. This facies contains large blocks of wall rock along with juvenile lava and mud from the Bidahochi Formation. Evidence that this slumping occurred throughout the eruption is shown by the fluidal juvenile lava clast within LT 4 that has peperitic margins with the mud and bedded tuff clasts around it. The lava block must have been hot enough to interact with the wet sediment to produce peperite during the slumping event. Continued explosions penetrated downward into the Moenave

Formation, but no deeper. This is shown by the significant amounts of Bidahochi Formation sediments and Moenave Formation sandstone clasts within the maar deposits, and a lack of underlying Chinle Formation clasts. The downward penetration was likely caused by a cone of depression produced in the water table around the eruption site (Lorenz, 2007), or drying of the water-saturated sediments immediately around the explosion locus. The explosion locus penetrated downward to where more water-saturated sediments were present. Water-saturated sediments also may flow into the magma and explosively interact, producing additional explosions. This is seen by facies LT 3 within the study area and also seen at the Triplets Maar, east of the study area (Ort, personal comm., 2009). At Triplets Maar, fluidized Bidahochi sediments flowed into the vent and provided water for the eruption.

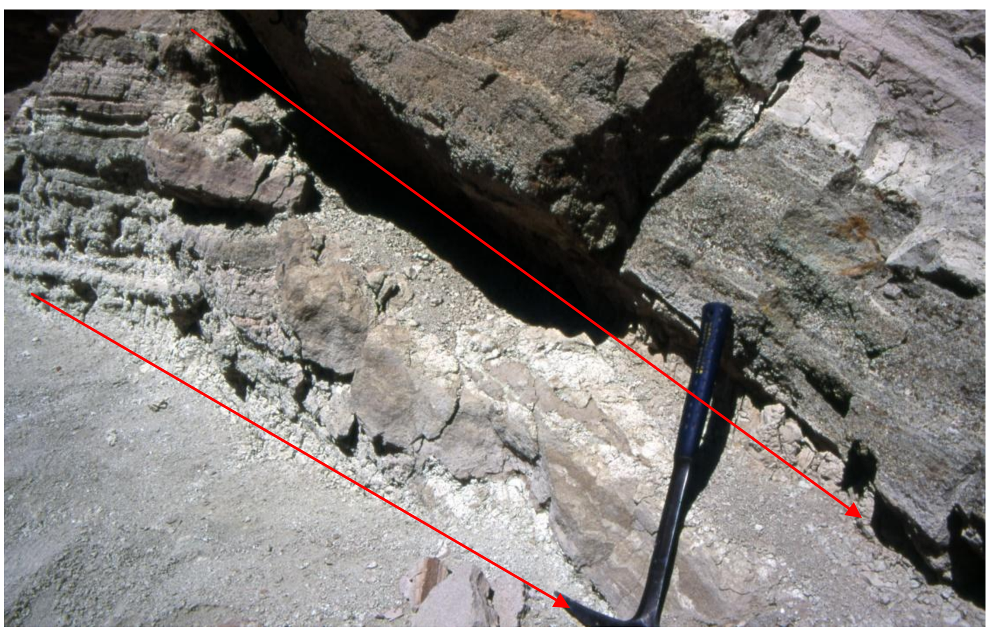


Figure 5.2. Fluidized sediments flowing to the right into the maar crater at Triplets Maar (red arrows show general direction that sediments flowed). Hammer is approximately 32 cm long. Photo courtesy of Michael Ort.

The eruption cloud continued to be produced as additional material is added throughout the eruption. Base surges occurred throughout the eruption and deposited lapilli, ash, and blocks outward, away from the center of the vent. Base surges occur when discrete phreatomagmatic explosions occur and produce thin beds as they pass over an area. During the course of an eruption, dozens of base surges can be produced and deposit many thin beds on the tephra ring. Vazquez (1998) and Vazquez and Ort (2006) provided a model for base-surge-emplacement dynamics and a facies analysis of the units deposited by the passage of a single base surge. Proximal to the vent, these units are highly disorganized and massive, represented by LT1 in this study, but this facies was not described by Vazquez (1998) and Vazquez and Ort (2006). As the base surge moves farther from the vent, the deposits begin to stratify and develop bedforms. LT2 represents a likely proximal to medial deposit according to this model. T1 and T2 represent the distal deposits of these base surges, since they are typically finer grained and contain sedimentary structures. Once the juvenile magma had stopped intruding and interacting with the surrounding sediments, air-borne material was deposited into the vent area and immediately adjacent to the vent.

Particle shape analysis of fine ash within the T1 and LT1 facies provides evidence for the fragmentation dynamics that produced these deposits. Table 4.1 presents the number of grains formed from phreatomagmatic and magmatic fragmentation processes for each sample analyzed. These counts indicate that the majority of fragmentation occurred through phreatomagmatic explosions; however, all of the samples also have a significant number of particles with a magmatic source. This magmatic influence can be explained by several possible eruption models previously described in Chapter 4.

If juvenile magma continued to intrude into the surrounding country rock, the phreatomagmatic eruption continued if water was available. Many of the eruptions ran out of available water or water-saturated sediments to fuel the MFCI. When this occurred, either effusive Strombolian to phreato-Strombolian eruptions continued. The lack of well-defined tuff rings and maar craters provide evidence that phreatomagmatic phases were limited and magmatic phases followed the phreatomagmatic phases or were simultaneous. Effusive eruptions led to the production of lava lakes or lava flows. The facies LF shows that, at many vents, the effusive eruption of lava produced large amounts of lava that filled the crater and then flowed out over the tephra ring surrounding the crater. If Strombolian or phreato-Strombolian eruptions occurred, scoria cones were produced within the initial maar crater. Facies S1 and S2 are evidence that this occurred in a few of the vents within the study area. If the scoria production rate was fast enough and enough heat was contained within the pyroclasts, spatter-fed lava flows formed within the scoria cone. The scoria cone may not have fully filled the crater, but produced a topographic high within the crater itself. Strombolian or phreato-Strombolian eruptions may have also occurred before effusive eruptions. This is evidenced by vent 2 within the study area, where a scoria cone mostly fills the crater, but then a lava flow extruded from the western side of the cone.

Large amounts of laminated limestone were deposited within a few of the vents. The facies LS1, LS2, and LS3 are evidence of crater lakes within the craters. These craters must have filled with water, fed by ephemeral streams (White, 1989, 1990) and were deep enough to deposit beds of limestone. Facies LS2 and LS3 provide evidence that other volcanic vents were erupting while some craters had already filled with water and were depositing limestone. Some of these craters may have been supplied with water from ephemeral streams that then were cut off and water was no longer provided to the crater. If this occurred, a playa formed in the center of the crater and may have been seasonally wet by rainfall. This is evidenced by the marl facies M1 present in a few craters.

ERUPTIVE AND DEPOSITIONAL MODEL

Pre-Eruption

Eruptions within the Hopi Buttes Volcanic Field began with the intrusion of nephelinitic or monchiquitic magma into the Paleozoic strata. The lithified strata provided little water with which the magma could interact (Figure 5.3A).

Eruption

When the intrusion reached the nonlithified and water-saturated sediments of the Bidahochi Formation, the magma began to interact with the surrounding sediments. Some of these interactions resulted in the formation of peperitic margins, which formed non-explosively (Figure 5.3B). These interactions involved the injection of magma into wet sediment and resulted in domains of intermingled magma and sediment. If the mixture of magma and water reacted explosively, an initial maar crater formed (Figure 5.3C). This crater was formed by excavating the country rock from above the explosion locus. Some of the country rock that was not removed slumped back into the vent, due to the instability caused by removal of underlying material. The country rock was highly fragmented and extruded from the vent along with juvenile ash, lapilli, and blocks and bombs. An eruption cloud of these materials formed, initially small, but it enlarged as the eruption continued.

As the eruption continued, more material was excavated by the downward penetration of the explosion locus. This downward migration occurred due to the creation of a cone of depression, and the magma encountered water lower down in the stratigraphic section. This migration continued downward into the Moenave Formation. Phreatomagmatic explosions continued due to fluidized Bidahochi sediments flowing into the vent and providing a water source for the eruption. The maar crater itself gets larger in diameter, excavating additional country rock, and producing juvenile material that was contained within the eruption cloud. The cloud of material created base surges that radiated away from the vent. These base surges deposited material that is poorly sorted near the vent and progressively better sorted farther from the vent. Typically, these base surges travelled up to one kilometer or more away from the vent, depositing material as the density and velocity of the base surge cloud lowered.

When vents occur within close proximity to one another, eruptions can cause interactions between the older and younger craters. This is seen when the eruption from one vent fluidized sediments within a nearby vent. These fluidized sediments then breached the crater wall and flowed into the erupting vent, providing additional water sources for the ongoing eruption. Facies LT 3 provides field evidence for this process.

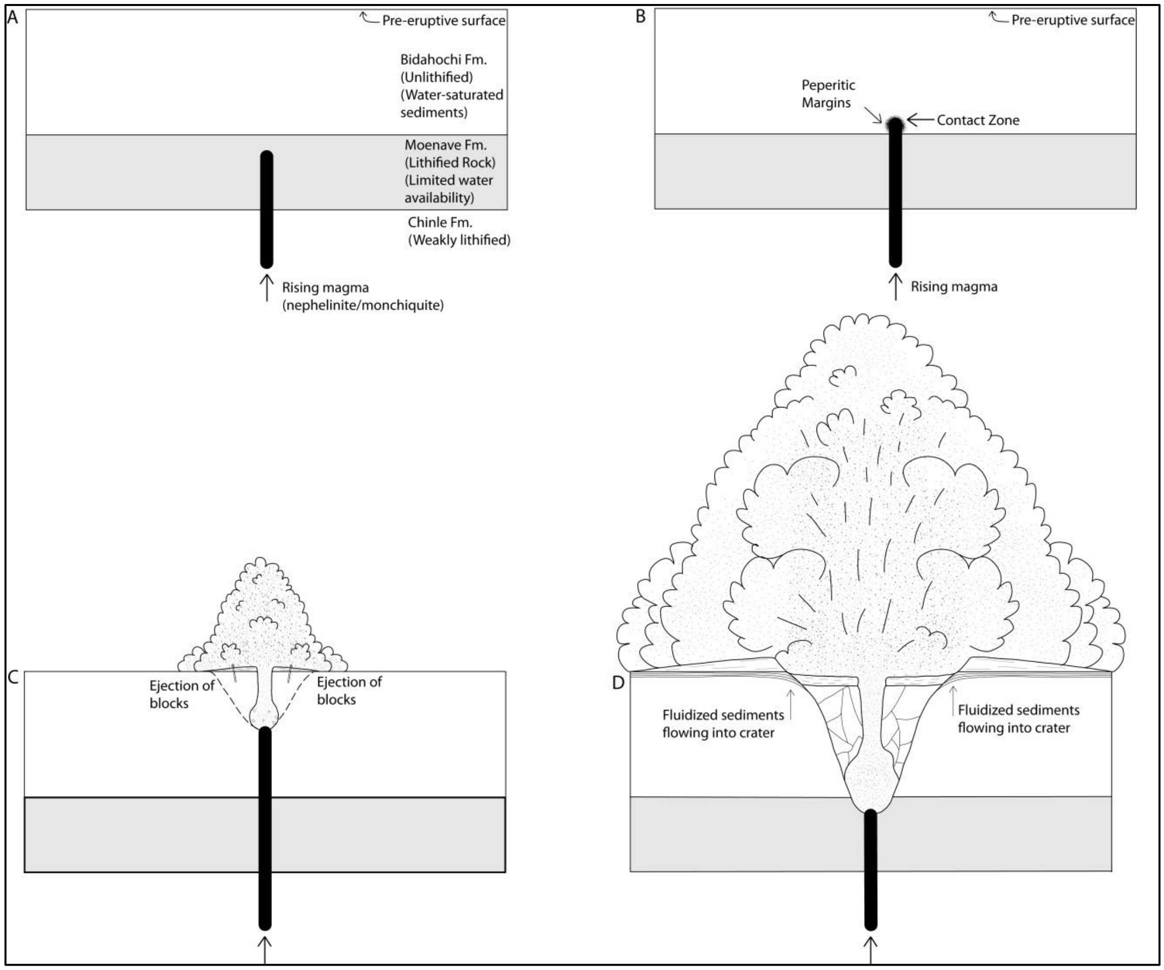


Figure 5.3. Eruptive model for the maar volcanoes within the study area. A) Nephelinitic or monchiquitic magma begins to intrude into the underlying strata. Water is limited in most of these units. B) The rising magma intrudes into the water-saturated sediments of the Bidahochi Formation and interacts. At the edges of the feeder dike, peperitic margins can be formed in non-explosive interactions. C) The magma interacts with the water-saturated sediments explosively. This produces the initial maar crater. The blocks of country rock are broken up and ejected, producing an enlarging crater. D) The eruption continues as the explosion locus deepens into the Moenave Formation and the availability of water becomes limited, except where fluidized Bidahochi sediments flow into the crater and provide water. Country rock continues to be fragmented and ejected from the crater. The eruption cloud becomes larger and occasionally collapses to produce base surges. This cloud also has the ability to collapse and deposit ash, blocks and bombs, lapilli, and accidental lithic clasts of country rock back into the crater.

As the magma ran out of water with which to interact, the eruptions either became effusive, Strombolian to phreato-Strombolian, or simply ended. As the eruption ended, material from the eruption cloud was deposited within the vent region. If additional magma was available, then effusive or Strombolian to phreato-Strombolian eruptions continued.

Effusive eruptions produced lava lakes or lava flows (Figure 5.4A). Lava lakes filled the maar craters, but were contained within the pyroclastic beds deposited outside the crater. Lava flows began from within the crater and then breached the crater wall and flowed out over the surrounding area. Strombolian to phreato-Strombolian eruptions produced fire-fountaining eruptions. This created scoria cones that partially to completely fill the initial maar crater (Figure 5.4B). Occasionally, the rate of scoria production was fast enough to generate spatter-fed lava flows within the scoria cones. Both effusive and Strombolian to phreato-Strombolian eruptions ended when the magma supply was diminished.

Post-Eruption

Many maar craters not completely filled by lapilli tuff, lava lakes, or scoria cones during the eruption filled with water fed by groundwater or ephemeral stream systems following cessation of eruptive activity (Figure 5.4C). These shallow crater lakes produced laminated limestone deposits. Ripples marks and ooids are common within the deposits, due to the shallow water. Limestone laminae occur interbedded with volcanic ash or scoria provided from nearby eruptions. Typically, the volcanic products inundated and overtook limestone production, which led to thinly bedded tuff, up to several centimeters thick, between several-centimeters-thick limestone beds once the eruption ended.

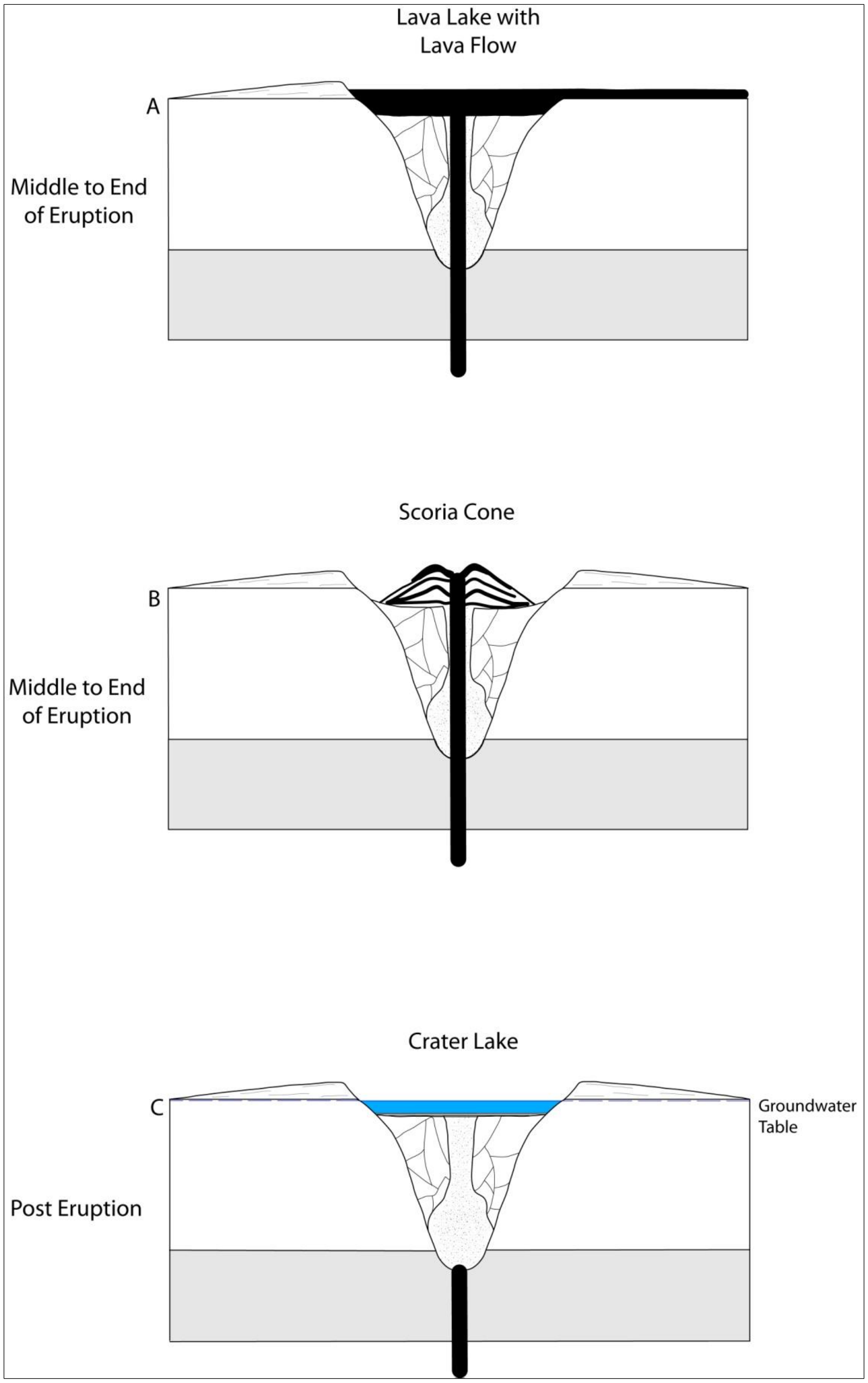


Figure 5.4. Eruption to post-eruption. A) An effusive eruption may lead to a lava lake that fills the crater. This lava lake may become a lava flow if the lava breaches the crater walls and flows out of the crater. B) Strombolian to phreato-Strombolian eruptions begin when magma runs out of water to interact with and produces a scoria cone with some scoria fed lava flows within the initial maar crater. C) After eruptions end, unfilled maar crater may be filled with a crater lake fed by groundwater or ephemeral streams. Crater lakes may dry up and become playas, creating marl deposits.

Some craters became playas that produced marl deposits. This may be a result of a previous crater lake that dried up and was only periodically wet. A playa could also have been a result of a fluctuating groundwater table that resulted in wetting and drying of the crater as the level of groundwater changed.

CONCLUSIONS

Most eruptions within the Hopi Buttes Volcanic Field began as phreatomagmatic eruptions involving the interaction of magma with external water. After this water was no longer available, eruptions became effusive or Strombolian to phreato-Strombolian or ended, due to lack of magma supply. Unfilled maar craters often became crater lakes that deposited limestone, and occasionally became playas and deposited marl.

The model presented within this study is similar to the model by Ort and Carrasco-Núñez (2009) for the late Pleistocene Tecuitlapa maar within the Mexican Volcanic Belt. Tecuitlapa maar occurred in hard-rock substrate overlain by water-saturated sediments. Phreatomagmatic eruptions began within the water-saturated sediments and continued due to liquefaction, failure, and fluidization of these sediments. Once these liquefied sediments were used up, the phreatomagmatic eruption ended and became magmatic, producing scoria cones. The main difference between the model proposed by Ort and Carrasco-Núñez (2009) and the model proposed here is that the explosion loci at Tecuitlapa moved laterally rather than vertically. At Tecuitlapa, this is likely due to the lithologic differences between the sediments and underlying bedrock. These lithologic differences include density, porosity, permeability and access to water. The surficial pyroclastic sediments were non-consolidated and easily fluidized, providing water, in the form of mud, to the vent. The underlying limestones and volcanic rocks would have only had water access through fractures. This is similar to the stratigraphy seen underlying the Hopi Buttes. However, volcanic products within the Hopi Buttes contain clasts of underlying sandstones and volcanic products from Tecuitlapa contain only clasts of previous pyroclastic deposits. This model also takes into account the alignment of vents that are parallel to the underlying regional structural trends (Ort and Carrasco-Núñez, 2009).

The model published by Auer et al. (2007) for the Pliocene Fekete-hegy volcanic complex within the Bakony Balaton Highland Volcanic Field in the Pannonian Basin of Hungary is similar to the model proposed here. However, the Fekete-hegy volcanic complex had additional water sources. This came in the form of karstic waters within the underlying limestones. Phreatomagmatic eruptions involved water-saturated surficial sediments and karstic waters. The production of this volcanic complex did not result in any magmatic activity. Nemeth et al. (2001) proposed a similar model for the late Miocene Tihany Maar volcanic complex within the Bakony-Balaton Highland Volcanic Field in Hungary. The Tihany maar involved water-saturated surficial sediments, karstic water, and water from underlying schists and sandstones. The large amounts of groundwater produced wet phreatomagmatic eruptions when the explosion locus was within the schists and sandstones and became drier as the explosion locus became shallower. The eruption at Tihany maar resulted in the production of scoria cones (Nemeth et al., (2001). Although the model presented in this study does not include additional groundwater interaction with the ascending magma, it is similar to the models presented for maar complexes within the Bakony-Balaton Highland Volcanic Field. These models are all similar to the models published by Lorenz (2004, 2007) for the formation of maar-diatremes. However, other models for the creation of maars are significantly different.

One such model, proposed by Gutmann (2002), explains the formation of maars within the Pinacate Volcanic Field, Sonora, Mexico. Most of these maars were produced after scoria cones were built. Initial Strombolian eruptions may have facilitated the access of groundwater to the magma conduits, producing phreatomagmatic eruptions. These maars are also located within a possible ancient river channel that contained permeable river gravels that could act as an aquifer. Most of the volcanoes within this field are scoria cones with few maars (200 and 8 respectively), indicating that access to water was very limited.

The model proposed for the Atexcac crater in the Serdán-Oriental basin within the Mexican Volcanic Belt (Carrasco-Núñez et al., 2007) differs from the previously discussed models. Atexcac crater occurred within substrates of limestone with some shale and older volcanic deposits, including small plutons of granodiorite, monzanite, and syenite, the "toba café" (a reworked tuff) and a rhyolitic pumice-rich tuff. The initial eruption was phreatic, which then produced an ephemeral eruptive column. After the short-lived phreatic eruption, phreatomagmatic explosions began with a shallow explosion locus that then penetrated downward into deeper country rock, producing drier eruptions. The eruption then became magmatic as the access to water was cut off. The final phase of the eruption returned to a phreatomagmatic eruption that produced wet base surges, indicating large amounts of water (Carrasco-Núñez et al., 2007). This final phase of eruption differs from the Lorenz (2004, 2007) models. These models all suggest that water should become more limited as the eruption continues, but Atexcac accessed additional water at the end of the eruption.

The Pleistocene Rothenberg scoria cone within the East Eifel Volcanic Field, Germany, provides evidence for three phases of Strombolian eruptions and three phases of phreatomagmatism (Houghton and Schmincke, 1989). This volcano includes up to six vents located along a fissure. The initial phreatomagmatic eruption produced a tuff ring followed by the production of two coalescing scoria cones. Overall, Strombolian eruptions dominate the deposits volumetrically, indicating a limited water supply. The underlying strata include weathered tuff that overlies non-welded pyroclastic deposits from two nearby volcanoes. These volcanic units overlie quartzite that contains water in fractures. The pyroclastic deposits from the two older volcanoes act as major aquifers in the area. Phreatomagmatic eruptions began once the magma encountered the pyroclastic aquifer. These early explosions were accompanied by collapse and production of a maar. Houghton and Schmincke (1989) suggest that an increase in magma discharge rate led to Strombolian eruptions that produced a scoria cone. The magma discharge rate decreased again and resulted in the magma intruding laterally to the south and initiating a second phase of phreatomagmatism. This new eruption was potentially coeval with the end of the first vent's Strombolian activity (Houghton and Schmincke, 1989). This model does not require that all the available water be used up, but relies upon magma discharge rate to change the eruption type. This is significantly different from previous models.

The model proposed in this study incorporates aspects of many previously published models. It does not present any additional features that have not been described within maars from Germany, Mexico, and Hungary. The particle shape analysis provides evidence for two coeval events, as was seen at Rothenberg scoria cone, but with eruptions that were mainly phreatomagmatic. This model shows that maars within close proximity can produce many different volcanic and morphologic features including maars, scoria cones, lava flows, and crater-lake deposits.

CHAPTER 6
CONCLUSIONS

- The First Flat Mesa study area comprises at least 23 volcanic vents, most of which were phreatomagmatic vents. These volcanoes include maars *sensu stricto*, one possible tuff ring, maars filled with scoria cones and/or lava, and craters filled with lacustrine limestone or marl.
- Geologic mapping yielded 42 map units. Ten volcanic facies and four non-volcanic facies were identified from these map units. These facies were contained within 23 identified volcanic vents, or immediately adjacent to the vents. The description and interpretation of these facies provide information on the processes occurring during phreatomagmatic eruptions and post-eruption processes.
- Particle-shape analysis using fractal and multifractal analysis provided the ability to determine particle shape and fragmentation dynamics. Some particles showed show significant scatter on a Mandlebrot-Richardson (M-R) plot, but many particles from each sample provided high enough (>0.65) R^2 correlation values for valid interpretation. If the particles exhibited a single slope on a M-R plot, they were interpreted as having formed through phreatomagmatic fragmentation dynamics with a true fractal (mono fractal) behavior. Particles showing two distinct slopes were interpreted as having formed through magmatic fragmentation dynamics with a multifractal behavior. The two slopes are due to structural (large-scale) and textural (small-scale) dimensions.
- All of the samples analyzed had proportions of magmatic and phreatomagmatic particles, indicating that both fragmentation dynamics occurred within the study area

during eruptions. The presence of these two fragmentation types may be explained by one or more of several possible occurrences. One possibility is two coevally eruption vents with one of these vents being phreatomagmatic and producing base surges that radiate away from the vent, while the second vent is magmatic and producing scoria. A second possibility is that the magma is discharging at a high rate, which allowed water to access only the outer portion of the magma column. This would produce phreatomagmatic particles around the outer edge of the magma column and magmatic particles in the center of the magma. Another possibility is that water only gained access to the magma column in discrete pulses. When water was not available, magmatic particles would be erupted, and when water reached the magma column, phreatomagmatic explosions would occur. These explosions would produce phreatomagmatic particles, as well as cognate particles from earlier in the eruption that could contain both types of particles.

- Interpretation of volcanic and non-volcanic facies provided information necessary to create an eruption to post-eruption model for the maar volcanoes in the study area. The eruptions were initially phreatomagmatic, producing the maar craters or tuff rings. Pyroclasts of accidental lithic clasts composed of lower Bidahochi sediment indicate that the eruptions occurred due to molten fuel-coolant interactions between the intruding magma and water-saturated Bidahochi sediments. As the eruptions continued, the magma had less water-saturated sediments to interact with, leading to more magmatic eruptions. Magmatic eruptions produced scoria cones and/or lava flows. Craters not filled with phreatomagmatic or magmatic products filled with water and began to deposit limestone. If the crater experienced wetting and drying, a playa formed, producing marl deposits.

- This model is similar to those proposed for maar complexes within the Bakony-Balaton Highland Volcanic Field, Hungary, Tecuitlapa maar in the Volcanic Belt of Mexico, and the Rothenberg scoria cone within the East Eifel Volcanic Field, Germany. All of these models are similar to the models proposed by Lorenz (1970, 2004, 2007). These differ from other models proposed for maars within the Pinacate Volcanic Field, Mexico and Atexcac crater in the Serdán-Oriental basin within the Mexican Volcanic Belt.

REFERENCES

Akers, J.P, Shorty, J.C., and Stevens, P.R., 1971, Hydrogeology of the Cenozoic igneous rocks, Navajo and Hopi Indian Reservations, Arizona, New Mexico, and Utah: United States Geological Survey Professional Paper 521-D.

Akers, J.P., Shorty, J.C., and Stevens, P.R., 1971b, Hydrogeology of the Navajo and Hopi Indiana Reservations, Arizona, New Mexico, and Utah: United States Geologic Survey Professional Paper 521-D, scale 1:500,000.

Alibert, C., Michard, A., and Albarede, F., 1986, Isotope and trace element geochemistry of Colorado Plateau volcanics: Geochemica et Cosmochimica Acta, v. 50, p. 2735-2750.

Allen, S.R., Bryner, V.F., Smith, I.E.M., Balance, P.F., 1996, Facies analysis of pyroclastic deposits within basaltic tuff-rings of the Auckland volcanic field, New Zealand: New Zealand Journal of Geology and Geophysics, v. 39, p. 309-327.

Aranda-Gómez, J.J., and Luhr, J.F., 1996, Origin of the Joya Honda maar, San Luis Potosí, México: Journal of Volcanology and Geothermal Research, v. 74, p. 1-18.

Auer, A., Martin, U., and Nemeth, K., 2007, The Fekete-hegy (Balaton Highland Hungary) “soft-substrate” and “hard-substrate” maar volcanoes in an aligned volcanic complex-Implications for vent geometry, subsurface stratigraphy and the palaeoenvironmental setting: Journal of Volcanology and Geothermal Research, v. 150, p. 225-245.

Austin-Erickson, A., Büttner, R., Dellino, P., Ort, M.H., and Zimanowski, B., 2008, Phreatomagmatic explosions of rhyolitic magma: Experimental and field evidence: Journal of Geophysical Research, v. 113, B11201.

Baumann, G., Barth, A., and Nonnenmacher, T., 1993, Measuring fractal dimension of cell contours: practical approaches and their limitations. In: Nonnenmacher, T.F., Losa, G.A., Weible, E.R. (Eds.). Proceedings of the First International Symposium on Fractals in Biology and Medicine, Birkhauser, Basel, p. 182-189.

Bennett, V., and DePaolo, D., 1987, Proterozoic crustal history of the western United States as determined by neodymium isotopic mapping: Geological Society of America Bulletin, v. 99, p. 674-685.

Bérubé., D., and Jébrak, M., 1999, High precision boundary fractal analysis for shape characterization. Comput. Geosci., v. 25, p. 1059-1071.

Best, M.G., and Brimhall, W.H., 1974, Late Cenozoic alkali basaltic magmas in the Western Colorado Plateaus and the Basin and Range transition zone, U.S.A, and their bearing on mantle dynamics: Geological Society of America Bulleting, v. 85, p. 1677-1690.

Billingsley, G.H., Block, Debra, and Redsteer, M., H., in press (2011), Geologic map of the Winslow 30' x 60' quadrangle, Coconino and Navajo Counties, northern Arizona: U.S. Geological Survey Scientific Investigations Map, xxxx,1:50,000-scale, xx p.

Branney, M.J., 1995, Downsag and extension at calderas. New perspectives on collapse geometries from ice-melt-, mining, and volcanic subsidence: Bulletin of Volcanology, v. 57, p. 303–318.

Branney, M.J., and Kokelaar, P., 2002, Pyroclastic density currents and the sedimentation of ignimbrites: Geological Society 27.

Busby-Spera, C.J., and White, J.D.L., 1987, Variation in peperite textures associated with differing host sediment properties: Bulletin of Volcanology, v. 49, p. 765-776.

Büttner, R. and Zimanowski, B., 1998, Physics of thermohydraulic explosions: Physical Review E, v. 57, p. 5726-5729.

Büttner R., Dellino P., and Zimanowski B., 1999, Identifying magma-water interaction from the surface features of ash particles: Nature, v. 401, p.688-690.

Büttner, R., Dellino, P., La Volpe, L., Lorenz, V., and Zimanowski, B., 2002, Thermohydraulic explosions in phreatomagmatic eruptions as evidenced by the comparison between pyroclasts and products from Molten Fuel Coolant Interaction experiments: Journal of Geophysical Research, v. 107, n. B11, 2277.

Büttner, R., Dellino, P., Raue, H., Sonder, I., and Zimanowski, B., 2006, Stress-induced brittle fragmentation of magmatic melts: theory and experiments: Journal of Geophysical Research, v. 111, B08204, doi:10.1029/2005JB003958.

Carey, S., Maria, A., and Sigurdsson, H., 2000, Use of fractal analysis for discrimination of particles from primary and reworked jokulhlaup deposits in SE Iceland: Journal of Volcanology and Geothermal Research, v. 104, p. 65-80.

Carrasco-Núñez, G., Ort, M.H., and Romero, C., 2007, Evolution and hydrological conditions of a maar volcano (Atexac crater, Eastern Mexico): Journal of Volcanology and Geothermal Research, v. 150, p. 179-197.

Cas, R.F., and Wright, J.V., 1987, Volcanic Successions: Modern and Ancient, Chapman and Hall: London, 528 p.

Cassidy, J., France, S.J., and Locke, C.A., 2007, Gravity and magnetic investigation of maar volcanoes, Auckland volcanic field, New Zealand: Journal of Volcanology and Geothermal Research, v. 159, p. 153-163.

Christiansen, R.L., and Lipman, P.W., 1972, Cenozoic volcanism and plate-tectonic evolution of the Western United States. II. Late Cenozoic: Phil. Trans. Royal Society of London, A271, p. 249-284.

Clark, N.N., 1986, Three techniques for implementing digital fractal analysis of particle shape: Powder Technol. v. 46, p. 45-52.

Condie, K.C. 1992, Proterozoic terranes and continental accretion in southwestern North American, *In* Condie, K.C., ed., Developments in Precambrian geology, v. 10, Elsevier Press: Amsterdam, Netherlands, p. 447-480.

Cooley, M.E., Harshbarger, J.W., Akers, J.P., Hardt, W.F., and Hicks, O.N., 1969, Regional hydrogeology of the Navajo and Hopi Indian Reservations, Arizona, New Mexico, and Utah with a section on vegetation: United States Geological Survey Professional Paper 521-A, scale 1:125,000.

Cross, T.A., and Pilger, R.H., 1978, Constraints on absolute motion and plate interaction inferred from Cenozoic igneous activity in the Western United States: American Journal of Science, 278, p. 865-902.

Dallegge, T.A., 1999, Correlation and chronology of the Miocene-Pliocene Bidahochi Formation, Navajo and Hopi Nations, northeastern Arizona [Masters thesis]: Northern Arizona University, Flagstaff, Arizona, 304 p.

Dallegge, T.A., Ort, M.H., McIntosh, W.C., and Perkins, M.E., 2000, Age and depositional basin morphology of the Bidahochi Formation and implications for the ancestral Upper Colorado River, *In* D.A. Young, ed., Abstracts for a working conference on the Cenozoic Geologic evolution of the Colorado River system and the erosional chronology of the Grand Canyon region, Grand Canyon National Park, June 7-9, p. 41-45.

Dallegge, T.A., Ort, M.H., and McIntosh, W.C., 2003, Mio-Pliocene chronostratigraphy, basin morphology and paleodrainage relations derived from the Bidahochi Formation, Hopi and Navajo Nations, northeastern Arizona: The Mountain Geologist, v. 40, p. 55-82.

Damon, P.E., Shafiqullah, M., and Harris, R.C., 1996, Compilation of unpublished Arizona K-Ar dates from the University of Arizona Laboratory of Isotope Geochemistry 1971-1991: Arizona Geological Survey Open File Report 96-18, 56 p.

Damon, P.E., and Spencer J.E., 2000, K-Ar geochronologic survey of the Hopi Buttes volcanic field, *In* D.A. Young, ed., Abstracts for a working conference on the Cenozoic Geologic evolution of the Colorado River system and the erosional chronology of the Grand Canyon region, Grand Canyon National Park, June 7-9, p. 8-11.

Delaney, P.T., and Gartner, A.E., 1997, Physical processes of shallow mafic dike emplacement near the San Rafael Swell, Utah: Geological Society of American Bulletin, v. 109, p. 1177-1192.

Dellino, P., and La Volpe, L., 1996, Image processing analysis in reconstructing fragmentation and transportation mechanisms of pyroclastic deposits. The case of

Monte Pilato-Rocche Rosse eruptions, Lipari (Aeolian Islands, Italy): Journal of Volcanology and Geothermal Research, v. 71, p. 13-29.

Dellino, P., and Liotino, G., 2002, The fractal and multifractal dimension of volcanic ash particles contour: a test study on the utility and volcanological relevance: Journal of Volcanology and Geothermal Research, v. 113, p. 1-18.

Dobran, F., and Papale, P., 1993, Magma-water interaction in closed systems and application to lava tunnels and volcanic conduits: Journal of Geophysical Research, v. 98, p. 14041–14058.

Ealy, P., 1994, Gravity and magnetic analysis of the Hopi Buttes volcanic field, Navajo Nation, Northeastern Arizona [Masters Thesis]: Northern Arizona University, 80 pp.

Ersoy, O., Gourgaud, A., Aydar, E., Chinga, G., and Thouret, J.-C., 2007, Quantitative SEM analysis of volcanic ash surfaces: application to the 1982–83 Galunggung eruption (Indonesia): Geol Soc Am Bull., v. 119 (5), p. 743–752.

Fisher, R.V., and Schmincke, H.-U., 1984, Pyroclastic rocks, Springer-Verlag: Berlin, 472 p.

Fisher, R.V., and Waters, A.C., 1969, Bed forms in base-surge deposits: lunar implications: Science, v. 165, p. 1349–1352.

Fisher, R.V., and Waters, A.C., 1970, Base surge bed forms in maar volcanoes: American Journal of Science, v. 268, p. 157-180.

Flook, A.G., 1979, The characterization of textural and structural profiles by automated measurement of their fractal dimension: Proceedings of the 2nd European Symposium on Particle Characterization, p. 591-599.

Fröhlich, G., 1987, Interaction experiments between water and hot melts in entrapment and stratification configurations: Chemical Geology, v. 62, p. 137-147.

Fröchlich, G., Schuermann, S., and Zimanowski, B., 1995, Fragmentation times at entrapment explosions: NHTC, Portland, p.1-5.

Godchaux, M.M., Bonnichsen, B., and Jenks, M.D., 1992, Types of phreatomagmatic volcanoes in the western Snake River Plain, Idaho, USA: Journal of Volcanology and Geothermal Research, v. 52, p. 1-25.

Gonzato, G., Mulargia, F., and Marzocchi, W., 1998, Practical application of fractal analysis: problems and solutions. Geophys. J. Int., v. 132, p. 275-282.

Grunewald, U., Zimanowski, B., Büttner, R., Phillips, L.F., Heide, K., and Büchel, G., 2007, MFCI experiments on the influence of NaCl-saturated water on phreatomagmatic explosions: Journal of Volcanology and Geothermal Research, v. 159, p. 126-137.

Hack, J.T., 1942, Sedimentation and volcanism in the Hopi Buttes, Arizona: Geological Society of America Bulletin, v. 53, p. 335-372.

Hackman, R.J., and Olson, A.B., 1977, Geology, structure, and uranium deposits of the Gallup 1 degree x 2 degrees quadrangle, New Mexico and Arizona, scale 1:250,000.

Heiken, G.H., 1971, Tuff rings: Examples from the Fort Rock-Christmas Lake Valley Basin, south-central Oregon: Journal of Geophysical Research, v. 76, p. 5615-5626.

Heiken, G. and Wohletz, K.H., 1985, Volcanic Ash: University of California Press, Berkeley, California. 245 p.

Hooten, J.A., 1999a, Phreatomagmatic diatremes of the western Hopi Buttes volcanic field, Navajo Nation, Arizona [Masters thesis]: Northern Arizona University, 140 p.

Hooten, J.A., 1999b, A Map of the Volcanic Geology of the Castle Butte Trading Post Vicinity, Hopi Buttes (Tsezhin Bii), Navajo Nation, Arizona, scale 1:12,000.

Hooten, J.A. and Ort, M. H., 2002, Peperite as a record of early-stage phreatomagmatic fragmentation processes: an example from the Hopi Buttes volcanic field, Navajo Nation, Arizona, USA: Journal of Volcanology and Geothermal Research, v. 114, p. 95-106.

Houghton, B.F., and Schmincke, H.-U., 1989, Rothenberg Scoria Cone, East Eifel: a complex Strombolian and phreatomagmatic volcanic: Bulletin of Volcanology, v. 52, p. 28-48.

Howell, P.W., 1959, The Cenozoic geology of the Chetoh Country, Arizona and New Mexico: Ph.D. dissertation, University of Arizona, Tucson, Arizona, 148 p.

Johnston, D.M., Nairn, I.A., Thordarson, T., and Daly, M., 1997, Volcanic impact assessment for the Auckland volcanic field: Auckland Regional Council Technical Publication 79, 208 p.

Karlstrom, K., Bowring, S., and Conway, C., 1987, Tectonic significance of an Early Proterozoic two-province boundary in central Arizona: Geological Society of America Bulletin, v. 99, p. 99-124.

Karlstrom, K., and Bowring, S., 1993, Proterozoic orogenic history of Arizona: *In* Reed, J., ed., Precambrian, conterminous U.S.: Boulder, Colorado, Geological Society of America, Geology of North America, v. C-2, p. 189-211.

Kaye, B.H., 1978, Specification of the ruggedness and/or texture of a fine particle progile by its fractal dimension: Powder Technol. v, 21, p. 1-16.

Kempton, P.D., Fitton, J.G., Hawkesworth, C.J., and Ormerod, D.S., 1991, Isotopic and trace element constraints on the composition and evolution of the lithosphere beneath the southwestern United States: Journal of Geophysical Research, v. 96, p. 13,713-13,735.

Kennedy, S., and Lin, W.H., 1986, Fract-A FORTRAN subroutine to calculate the variables necessary to determine the fractal dimension of closed forms: Comput. Geosci. v. 12, p. 705-712.

Kennedy, S.K., and Lin, W.H., 1992, A comparison of Fourier and fractal techniques in the analysis of closed forms: J. Sedim. Petrol., v. 62, p. 842-848.

Kindratenko, V., Van Espen, P.J.M., Treiger, B., and Van Grieken, R., 1994, Fractal dimensional classifcation of aerosol particles by computer-controlled scanning electron microscopy: Environ. Sci. Technol., v. 28, p. 2197-2202.

Klips, J., Logan, B., and Alldredge, A., 1994, Fractal dimensions of marine snow determined from image analysis of in situ photographs. Deep-Sea Research, v. 41, p. 1159-1169.

Kokelaar, B.P., 1982. Fluidization of wet sediments during the emplacement and cooling of various igneous bodies: Transcripts of the Royal Society of London, v. 139, p. 21-33.

Kraus, M.J., and Middleton, L.T., 1987, Dissected paleotopography and base-level changes in a Triassic fluvial sequence: Geology, v. 15, p. 18-21.

Kurszlaukis, S., Büttner, R., Zimanowski, B., and Lorenz, V., 1998, On the first experimental phreatomagmatic explosion of a kimberlite melt: Journal of Volcanology and Geothermal Research, v. 80, p. 323–326.

Le Bas, M.J., 1989, Nephelinitic and basanitic rocks: Journal of Petrology, v. 30, p. 1299-1312.

Le Bas, M.J., and Streckeisen, A.L., 1991, The IUGS systematics of igneous rocks: Journal of the Geological Society, London, v. 148, p. 825-833.

Lorenz, V., 1986, On the growth of maars and diatremes and its relevance to the formation of tuff rings: Bulletin of Volcanology, v. 48, p. 265-274.

Lorenz, V., 1987, Phreatomagmatism and its relevance: Chemical Geology, v. 62, p. 149-156.

Lorenz, V., 2003, Maar-diatreme volcanoes, their formation and their setting in hard-rock or soft-rock environments: Geolines, v. 15, p. 72-83.

Lorenz, V., 2004, Syn- and posteruptive hazards of maar–diatreme volcanoes, *in*: Németh, K., Martin, U., Goth, K., Lexa, J. (Eds.), 2nd Int. Maar Conf., Hungary Slovakia–Germany. Lajomizse/Kecskemét, Hungary, Abstr. Vol., Occas. Papers of the Geol. Institute of Hungary, v. 203, p. 71.

Lorenz, 2007, Syn- and posteruptive hazards of maar-diatreme volcanoes: Journal of Volcanology and Geothermal Research, v. 159, p. 285-312.

Lorenz, V., and Haneke, J., 2004, Relationship between diatremes, dykes, sills, laccoliths, intrusive-extrusive domes, lava flows, and tephra deposits with unconsolidated water-saturated sediments in the Late Variscan intermontane Saar-Nahe-Basin, SW Germany, *in*: Breitkreuz, C., Petford, N., (eds) Physical geology of high-level magmatic systems: Geologic Society of London Special Publication, v. 234, p. 75–124.

Lorenz, V., Zimanowski, B., Fröhlich, G., 1994, Experiments on explosive basic and ultrabasic, ultramafic, and carbonatitic volcanism: Proceedings of the International Kimberlite Conference, v. 5, p. 270-282.

Lorenz, V., Zimanowski, B., and Büttner, R., 1999, Discussion on the formation of kimberlite pipes; the phreatomagmatic model: Newsletter of the IAVCEI Commission on Explosive Volcanism, p. 11–17.

Lorenz, V., and Zimanowski, B., 2000, Vulkanologie der Maare der Westeifel. Volcanology of the West Eifel maars: Int. Maar Tagung, Int. Maar Conf., Daun/Vulkaneifel, Mainzer Naturwiss. Archiv, Beiheft, v. 24, p. 5–21.

Lorenz, V., and Kurszlaukis, S., 2003, Kimberlite pipes: growth models and resulting implications for diamond exploration: 8th Int. Kimberlite Conf., Victoria, BC, Canada, Ext. Abstr. and CD.

Lorenz, V., Suhr, P., and Goth, K., 2003, Maar–Diatrem–Vulkanismus-Ursachen und Folgen. Die Guttauer Vulkangruppe in Ostsachsenals Beispiel für die komplexen Zusammenhänge: Z. Geol. Wiss. v .31, p. 267–312.

Lorenz, V., Zimanowski, B., and Büttner, R., 2002, On the formation of deep-seated subterranean peperite-like magma-sediment mixtures: Journal of Volcanology and Geothermal Research, v. 114, p. 107-118.

Love, D.W., 1989, Bidahochi Formation: An interpretive summary: New Mexico Geological Society Guidebook, 40th Field Conference, Southeastern Colorado Plateau, p. 273-280.

Lowe, D.J., 1988, Late Quaternary volcanism in New Zealand: Towards an integrated record using distal airfall tephras in lakes and bogs: Journal of Quaternary Science, v.3, p. 111-120.

Mandelbrot, B.B., 1967, How long is the coast of Britain? Statistical self-similarity and fractal dimension: Science, v. 156, p. 636-638.

Mandelbrot, B.B., 1977, Form, Chance and Dimension: W.H. Freeman, San Francisco, CA, 316 p.

Maria, A., and Carey, S., 2002, Using fractal analysis to quantitatively characterize the shapes of volcanic particles: Journal of Geophysical Research 107 (B11), 2283, doi:10.1029/2001JB000822.

Maria, A. and Carey, S., 2007, Quantitative discrimination of magma fragmentation and pyroclastic transport processes using the fractal spectrum technique: Journal of Volcanology and Geothermal Research, v. 161, p. 234–246.

Mastin, L.G., 1997, Evidence for water influx from a caldera lake during the explosive hydromagmatic eruption of 1970, Kilauea volcano, Hawaii: Journal of Geophysical Research, v. 102, p. 20,093-20,109.

McKee, E.D., Wilson, R.F., Breed, W.J., and Breed, C.W., 1967, Evolution of the Colorado River in Arizona: Museum of Northern Arizona Bulletin 44, 67 p.

Morrissey, M., Zimanowski, B., Wohletz, K., and Büttner, R., 2000, Phreatomagmatic fragmentation *In* Sigurdsson, H., ed., Encylopedia of Volcanoes: Academic Press, San Diego, p. 431-446.

Nelson, S., and Davidson, J., 1998, The petrogenesis of the Colorado Plateau laccoliths and their relationship to regional magmatism: *In* Friedman, J., and Huffman, A., coord., Laccolith complexes of southeastern Utah: Time and emplacement and tectonic setting-workshop proceedings: Washington D.C., U.S. Geological Society Bulletin 2158, p. 85-100.

Nemeth, K., Martin, U., and Harangi, Sz., 2001, Miocene phreatomagmatic volcanism at Tihany (Pannonian Basin, Hungary): Journal of Volcanology and Geothermal Research, v. 111, p. 111-135.

Ollier, C., 1967, Maars their characteristics, varieties and definition: Bulletin of Volcanology, v. 31, p. 45-73.

Ollier, C., 1974, Phreatic eruptions and maars, *in*: L. Civetta et al., (Eds): Physical Volcanology, Elsevier, New York, N.Y., p. 289-310.

Orford, J.D., and Whalley, W.B., 1983, The use of the fractal dimension to quantify the morphology of irregular-shaped particles: Sedimentology, v. 30, p. 655-668.

Orford, J.D., and Whalley, W.B., 1987, The quantitative description of highly irregular sedimentary particles: the use of fractal dimension. *in*: Marshall, J.R. (Ed.), Clastic Particles. Van Nostrand Reinhold Company, New York, p. 267-280.

Ort, M.H., and Carrasco-Núñez, G., 2009, Lateral vent migration during phreatomagmatic and magmatic eruptions and Tecuitlapa Maar, east-central Mexico: Journal of Volcanology and Geothermal Research, v. 181, p. 67-77.

Ort, M., Dallegge, D., Vazquez, J., and White, J.D.L., 1998, Volcanism and sedimentation in the Mio-Pliocene Bidahochi Formation, Navajo Nation, northeastern Arizona *In* Duebendorfer, E.M., ed., Geologic excursions in northern and central Arizona: GSA, Field Trip Guidebook, Rocky Mountain Section Meeting, Northern Arizona University, Flagstaff, Arizona, p. 35-57.

Reagan, A.B., 1924, Stratigraphy of the Hopi Buttes volcanic field: Pan-American Geologist, v. 41, p. 355-366.

Repenning, C.A., and Irwin, J.H., 1954, Bidahochi Formation of Arizona and New Mexico: American Association of Petroleum Geologists Bulletin, v. 38, p. 1821-1826.

Repenning, C.A., Lance, J.F, and Irwin, J.H., 1958, Tertiary stratigraphy of the Navajo Country: New Mexico Geological Society Guidebook, Ninth Field Conference, p. 123-129.

Reynolds, S.J., Florence, F.P., Welty, J.W., Roddy, M.S., Currier, D.A., Anderson, A.V., and Keith, S.B., 1986, Compilation of radiometric age determinations in Arizona: Arizona Bureau of Geology and Mineral Technology, Geological Survey Branch Bulletin 197, 252 p.

Richard, S.M., Reynolds, S.J., Spencer, J.E., and Pearthree, P.A., 2000, Geologic Map of Arizona, scale 1:1,000,000.

Riley, C.M., Rose, W.I., and Bluth, G.J.S., 2003, Quantitative shape measurements of distal volcanic ash: Journal of Geophysical Research, v. 108 (B10), p. 2504. doi:10.1029/2001JB000818.

Rock, N.M.S., 1987, The nature and origin of lamprophyres: an overview, *in* Fitton, J.G., and Upton, B.G.J., eds., Alkaline Igneous Rocks: Geological Society Special Publications No. 30, p. 269-296.

Sato, H., and Taniguchi, H., 1997, Relationship between crater size and ejecta volume of recent magmatic and phreato-magmatic eruptions: Implications for energy partitioning: Geophysical Research Letters, v. 24, p. 205-208.

Scarborough, R.B., 1985, Map of Post-15-m.y. Volcanic Outcrops in Arizona, scale 1:1,000,000.

Scarborough, R. B., 1986, Map of Mid-Tertiary Volcanic, Plutonic, and Sedimentary Rock Outcrops in Arizona, scale 1:1,000,000.

Scarborough, R.B., 1989, Cenozoic erosion and sedimentation in Arizona, *In* Jenny, J.P., and Reynolds, S.J., eds., Geologic evolution of Arizona: Arizona Geological Society Digest, v. 17. P 515-537.

Schmincke, H.U., 1977, Phreatomagmatische phasen in quartären vulkanen der Osteifel: Geologisches Jahrbuch Reihe, v. A39, p. 3–45.

Schmincke, H.U., 2000, Vulkanismus: Wissenschaftliche Buchgesellschaft, Darmstadt.

Schmincke, H.U., 2004, Volcanism: Springer, Berlin, New York .

Schmincke, H.U., Bogaard, P., and Freundt, A., 1990, Quaternary Eifel volcanism: IAVCEI Workshop on Explosive Volcanism, August 27 to September 2, Excursion 1AI Guidebook, Pluto Press: Witten, 188 p.

Schwarz, H., and Exner, H.E., 1980, The implementation of the concept of fractal dimension on a semi-automatic image analyser: Powder Technol., v. 27, p. 207-213.

Self, S., Kienle, J., and Huot, J. -P, 1980, Ukinrek maars, Alaska, II. Deposits and formation of the 1977 craters: Journal of Volcanology and Geothermal Research, v. 7, p. 39-65.

Selverstone, J., Pun, A., and Condie, K., 1999, Xenolithic evidence for Proterozoic crustal evolution beneath the Colorado Plateau: Geological Society of America Bulletin, v. 111, p. 590-606.

Shafiqullah, M., and Damon, P., 1986, Hopi Buttes volcanism-geochronology and geologic evolution: Arizona geological Society Digest, v. 16, p. 499-500.

Sheridan, M.F. and Marshall, J.R., 1983, Interpretation of pyroclast surface features using SEM images: Journal of Volcanology and Geothermal Research, v. 16, p. 153-159.

Shoemaker, E.M., Hensley, F.S Jr., and Hallagan, R.W., 1957, Diatremes on the Navajo and Hopi Reservations, Arizona: *In* Geologic investifations of radioactive deposits-Semiannual Progress Report, December 1, 1956 to May 31, 1957: U.S. Geological Survey TEI-690, Book 2, issued by U.S. Atomic Energy Commission Technical Information service, Oak Ridge, Tennessee, p. 389-398.

Shoemaker, E.M., Roach, C.H., and Byers, F.M. Jr., 1962, Diatremes and uranium deposits in the Hopi Buttes, Arizona: *In* Engel, A.E.J., James, H.L., and Leonard, B.F., eds., Petrologic studies-A volume in honor of A.F. Buddington, Geological Society of America: New York, p 327-355.

Sigurdsson, H., Carey, S., Cornell, W., and Pescatore, T., 1985, The eruption of Vesuvius in A.D. 79: National Geographic Research, v. 1, p. 332-387.

Sohn, Y.K., 1996, Hydrovolcanic processes forming basaltic tuff rings and cones on Cheju Island, Korea: Geological Society America Memoir 172, p. 205-234.

Steininger, J., 1819, Geognostische Studien am Mitterlrhein: Mainz, 1-223 p.

Suda, C.E., Brookins, D.G., and Dell Valle, R.S., 1982, Uranium and other trace element geochemistry of the Hopi Buttes volcanic province, northeastern Arizona: Economic Geology, v. 77, p. 1210-1220.

Sutton, R.L., 1974, The geology of the Hopi Buttes, Arizona, *In* Geology of northern Arizona with notes on archeology and paleoclimate, Part II; Geological Society of America, Rocky Mountain Section, Guidebook 27, p. 647-671.

Tingey, D.G., Christiansen, E.H., Best, B.G., Joaquin, R., and Daniel, R.L., 1991, Tertiary minette and melanephelinite dikes, Wasatch Plateau, Utah: Records of mantle heterogeneities and changing tectonics: Journal of Geophysical Research, v. 96, p. 13529-13544.

Ulrich, G.E., Billingsley, G.H., Hereford, R., Wolfe, E.W., Nealey, L.D., and Sutton, R.L., 1984, Map showing geology, structure, and uranium deposits of the Flagstaff 1 degrees x 2 degrees quadrangle, Arizona, scale 1:250,000.

Uyeno, T., and Miller, R.R., 1965, Middle Pliocene cyprinid fishes from the Bidahochi Formation, Arizona: Copeia, v. 1, p. 28-41.

van Wijk, J.W., Baldridge, W.S., van Hunen, J., Goes, S., Aster, R., Coblentz, D.D., Grand, S.P., and Ni, J., 2010, Small-scale convection at the edge of the Colorado Plateau: Implications for topography, magmatism, and evolution of Proterozoic lithosphere: Geology, v. 38, p. 611–614, doi: 10.1130/G31031.1.

Vazquez, J.A., 1998, Maar volcanism in the Wood Chop Mesa area, Hopi Buttes volcanic field, Navajo Nation, Arizona [Masters thesis]: Northern Arizona University, 210 p.

Vazquez, J.A., 1999, A Map of Volcanic Geology of the Wood Chop Mesa Area, Hopi Buttes (Tsézhin Bii'), Navajo Nation, Arizona, scale 1:12,000.

Vazquez, J.A., and Ort, M.H., 2006, Facies variation of eruption units produced by the passage of single pyroclastic surge currents, Hopi Buttes volcanic field, USA: Journal of Volcanology and Geothermal Research, v. 154, p. 222-236.

Warfel, M.D., 1998, Characterization of particles from wastewater and sludge treatment facilities by size and morphology [Masters Thesis]: Cornell University, Ithaca, N.Y..

Waters, A.C., and Fisher, R.V., 1970, Maar volcanoes: Proceedings of Sec. Columbia River Basalt Symp. Cheney (Eastern Washington State College), Washington, p. 157–170.

Waters, A. C., and Fisher, R.V., 1971, Base Surges and Their Deposits: Capelinhos and Taal Volcanoes Journal of Geophysical Research, 76(23), 5596–5614, doi:10.1029/JB076i023p05596.

Wenrich, K.J., 1989, Hopi Buttes volcanic field: *In* Chapin, C.E., and Zidek, J., eds., Field excursions to volcanic terranes in the western United States, volume 1; Southern Rocky Mountain Region: New Mexico Bureau of Mines and Mineral Resources Memoir 46, p. 21-33.

Wenrich, K.J., and Mascarenas, J.F., 1982, Diatremes of the Hopi Buttes, Arizona: chemical and statistical analyses: U.S. Geol. Surv. Open-File Rep. 82-0740, 131 p.

White, J.D.L., 1989, Basic elements of maar-crater deposits in the Hopi Buttes volcanic field, northeastern Arizona, USA: Journal of Geology, v. 97, p. 117-125.

White, J.D.L., 1990a, Depositional architecture of a maar-pitted playa: Sedimentation in the Hopi Buttes volcanic field, northeastern Arizona, U.S.A.: Sedimentary Geology, v. 67, p. 55-84.

White, J.D.L., 1990b, Hydrovolcanism and associated sedimentation in the Mio-Pliocene Hopi Buttes volcanic field, northeastern Arizona [Ph.D. Dissertation]: Santa Barbara, University of California, 160 p.

White, J.D.L., 1991a, Maar-diatreme phreatomagmatism at Hopi Buttes, Navajo Nation (Arizona), USA: Bulletin of Volcanology, v. 53, p. 239-258.

White, J.D.L., 1991b, The depositional record of small, monogenetic volcanoes within terrestrial basins, *In* Fisher, R.V., and Smith, G.A., eds., Sedimentation in Volcanic Settings: Society of Economic Paleontologists and Minerologists Special Publication 45, p. 155-171.

White, J.D.L., 1996, Impure coolants and interaction dynamics of phreatomagmatic eruptions: Journal of Volcanology and Geothermal Research, v. 74, p. 155-170.

White, J.D.L. and Houghton, B.F., 2006, Primary volcaniclastic rocks: Geology, v. 34, no. 8, p. 677-680.

Williams, H., 1936, Pliocene volcanoes of the Navajo-Hopi country: Bulletin of the Geological Society of America, v. 47, p. 111-172.

Williams, H., and McBirney, A.R., 1979, Volcanology, Freeman Cooper and Company: San Francisco, 397 p.

Wohletz, K.H., 1983, Mechanics of hydrovolcanic pyroclast formation: Grain-size, scanning electron microscopy, and experimental studies: Journal of Volcanology and Geothermal Research, v. 17, p. 31-64.

Wohletz, K.H., 1986, Explosive magma-water interactions: Thermodynamics, explosion mechanics, and field studies; Bulletin of Volcanology, v. 48, p. 245-264.

Wohletz, K.H., 1987, Chemical and textural surface features of pyroclasts from hydrovolcanic eruption sequences. *In:* Marshall, J.R. (Ed.), Clastic Particles. Van Nostrand Reinhold Company, New York, p. 79-97.

Wohletz, K.H., 2003, Water/magma interaction: physical considerations for the deep submarine environment. in: White, J.D.L., Smellie, J.L., and Clague, D., (Eds): AGU Geophysical Monograph v. 140, p. 25–40.

Wohletz, K.H., and Brown, W., 1995, Particulate size distributions and sequential fragmentation/transport theory: Proceedings of the National Science Foundation/Japan Society Promoting Science AMIGO-IMI Seminar, Santa Barbara, California, USA, p. 235-241.

Wohletz, K.H., and Heiken, G., 1992, Volcanology and Geothermal Energy, University of California Press: Berkeley, 432 p.

Wohletz, K.H., and McQueen, R.G., 1984, Experimental studies of hydromagmatic volcanism, *In* Explosive Volcanism; Inception, Evolution, and Hazards, National Academy Press: Washington, D.C., p. 158-169.

Wohletz, K.H., and Sheridan, M.F., 1983, Hydrovolcanic explosions II. Evolution of basaltic tuff rings and tuff cones: American Journal of Science, v. 283, p. 385-413.

Woolley, A.R., Bergman, S.C., Edgar, A.D., Le Bas, M.J., Mitchell, R.H., Rock, N.M.S., and Scott Smith, B.H., 1997, Classification of lamprophyres, lamproites, kimberlites, and the kalsilitic, melilitic, and leucititic rocks: The Canadian Mineraologist, v. 34, p. 175-186.

Yoder, H.S., Steward, D.B., and Smith, J.R., 1957, Ternary feldspars: Carnegie Institute of Washington Yearbook, v. 55, p. 206-214.

Zimanowski, B. 1986. Fragmentationsprozesse beim explosive Vulkanismus in der Westeifel. Dr. rer. nat. thesis, Fachbereich Geowissenschaften, Universität Mainz, Germany, 251 p.

Zimanowski, B., 1998, Phreatomagmatic explosions, in: Freund, A., and Rossi, M., (Eds): From Magma to Tephra, Elsevier, Amsterdam, p. 25–54.

Zimanowski, B., Fröhlich, G., and Lorenz, V., 1991, Quantitative experiments on phreatomagmatic explosions: Journal of Volcanology and Geothermal Research, v. 48, p. 341-358.

Zimanowski, B., Büttner, R., Lorenz, V., and Häfele, D., 1997a, Fragmentation of basaltic melt in the course of explosive volcanism: Journal of Geophysical Research, v. 102, p. 803-814.

Zimanowski, B., Büttner, R., and Lorenz, V., 1997b, Premixing of magma and water in MFCI experiments: Bulletin of Volcanology, v. 58, p. 491-495.

Zimanowski, B., Büttner, R., and Nestler, J., 1997c, Brittle reaction of high temperature ion melt: Europhys. Lett., v. 38, p. 285-289.

Zimanowski, B., Lorenz, V., and Fröhlich, G., 1986, Experiments on phreatomagmatic explosions with silicate and carbonatitic melts: Journal of Volcanology and Geothermal Research, v. 30, p. 149–153.

Zimanowski, B., Wohletz, K., Dellino, P., and Büttner, R., 2003, The volcanic ash problem: Journal of Volcanology and Geothermal Research, v. 122, p. 1-5.)

Zimanowski, B., Büttner, R., and Koopmann, A., 2004, Experiments on magma mixing: Geophysical Research Letters, v. 31, L09612.

APPENDIX A

METHODS FOR NIH IMAGE

NIH (National Institute of Health) program Image version 1.61 or 1.63 for Macintosh PPC running OS 9 platform. Fraccalc macro written by Matthew Warfel. The fraccalc macro should be saved in the macro folder within the Image 1.61 or Image 1.63 folders in the Applications folder on the Macintosh Hard drive.

Open Image program. To open the macro, Special-Load Macros and load fraccalc macro from the macro folder where it was previously saved. When Special is opened after this, "Boundary Fractal Techniques" and "Mass Fractal Techniques" should appear below the initial Special menu, each with several choices underneath.

In order for fraccalc to run properly, the Undo and Clipboard buffer must be set to 8000 K. To do this, go to the Options menu, then Preferences and set the buffer. Click "OK." In addition, the max measurement must be set to 8000. To do this, go to the Analyze menu and then Options and set the Max Measurement to 8000, this can be done before or after opening the fraccalc macro. Then click "OK."

Open an image in the program. Images should be previously saved as 512 dpi and 640 x 480 pixels. To do this, go to File-Open and navigate to the folder in which the images are saved.

The scale must be set to pixels, and reset every time a new photo is opened. To do this, go to the Analyze menu, then Set Scale and set units to pixels. It should now read that 1 pixels per pixel. Click "OK."

The photo must be fit to the window of Image. To do this, go to the Options menu and then click on Scale to Fit Window. The photo should be a binary image in order to get the best analysis. In order to change the photo to black and white, go to the Options menu and click on Threshold. The threshold level can be changed using the LUT along the toolbar to the left.

Using the magic wand tool (9^{th} down on the left column of Tools), select the image for analysis. The outline of the image should appear to move when selected. Then run the appropriate fractal macro on the particle. To do this, go to the Special menu and select the macro to run. To complete the analysis used in this study, the Border Fractal Technique Hybrid-Fast Method was used. While running the macro, skip 0 iterations, complete 50 iterations, and use an interval size of 3. This was done so as to cover the range of 3-150 pixels for each particle.

After the macro returns the results for the particle, save the Tabulated Fractal Data table. To do this, click on the small box in the upper left corner of the Tabulated Fractal Data table window and click on "Yes" to save changes to the table. Save the table in the location of your choice, with the name of your choice.

APPENDIX B

PARTICLE SHAPE ANALYSIS

Sample 191						
Image 8738		Particle O_1A		Approximate particle size - 105.699 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	317.7561	319.3419	318.4247	318.5076	0.477121	2.50312
6	298.7432	288.8524	295.9967	294.5308	0.778151	2.469131
9	280.3969	280.4588	279.7182	280.1913	0.954243	2.447455
12	272.2185	283.2496	283.5497	279.6726	1.079181	2.44665
15	267.1186	267.5128	262.7519	265.7944	1.176091	2.424546
18	267.4106	263.0296	261.1496	263.8633	1.255273	2.421379
21	266.2169	256.2712	269.765	264.0844	1.322219	2.421743
24	266.5555	266.2632	267.286	266.7016	1.380211	2.426026
27	271.0666	278.436	256.8459	268.7828	1.431364	2.429402
30	277.0449	221.9556	240.3618	246.4541	1.477121	2.391736
33	268.1792	243.9592	261.5361	257.8915	1.518514	2.411437
36	234.8307	283.1946	252.3899	256.8051	1.556303	2.409604
39	231.0842	259.8463	255.6752	248.8686	1.591065	2.39597
42	253.2728	272.0705	273.6571	266.3335	1.623249	2.425426
45	193.3369	283.8044	233.2152	236.7855	1.653213	2.374355
48	219.9045	277.0705	299.873	265.616	1.681241	2.424254
51	234.4745	288.8375	306.3689	276.5603	1.70757	2.44179
54	173.5973	260.635	266.2628	233.4984	1.732394	2.368284
57	195.8663	267.6747	207.4203	223.6538	1.755875	2.349576
60	200.9395	219.0167	215.067	211.6744	1.778151	2.325668
63	206.5736	227.4208	219.3632	217.7859	1.799341	2.33803
66	219.2637	232.789	222.1085	224.7204	1.819544	2.351642
69	223.4652	241.4323	228.917	231.2715	1.838849	2.364122
72	232.4075	244.6301	236.0117	237.6831	1.857332	2.375998
75		248.3579	241.203	244.7805	1.875061	2.388777
78		256.0583		256.0583	1.892095	2.408339

Sample 191						
Image 8738		Particle O_1B		Approximate Particle size - 135.9084 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	403.7594	403.7594	403.7019	403.7402	0.477121	2.606102
6	374.0263	372.2429	370.6741	372.3144	0.778151	2.57091
9	373.2964	366.9161	365.1227	368.4451	0.954243	2.566373
12	366.2222	366.0381	365.2591	365.8398	1.079181	2.563291
15	356.6898	360.2534	356.7195	357.8876	1.176091	2.553747
18	356.2648	370.742	351.7205	359.5758	1.255273	2.55579
21	366.2672	361.5992	362.2916	363.386	1.322219	2.560368
24	361.6892	353.258	354.0897	356.3456	1.380211	2.551871
27	356.0352	377.6954	370.9538	368.2281	1.431364	2.566117
30	371.4409	358.9806	348.8446	359.7554	1.477121	2.556007
33	357.847	349.8944	344.0821	350.6078	1.518514	2.544822
36	343.5685	337.7271	344.1803	341.8253	1.556303	2.533804
39	340.619	335.3028	344.1073	340.0097	1.591065	2.531491
42	346.4398	371.9514	353.9357	357.4423	1.623249	2.553206
45	378.8924	367.2782	330.4941	358.8882	1.653213	2.554959
48	308.8865	305.536	331.9569	315.4598	1.681241	2.498944
51	313.229	344.0703	324.0261	327.1085	1.70757	2.514692
54	342.4667	336.8991	287.2406	322.2021	1.732394	2.508128
57	355.0143	346.4467	293.4341	331.6317	1.755875	2.520656
60	354.8771	346.4627	334.5503	345.2967	1.778151	2.538192
63	298.0589	352.6448	342.7672	331.157	1.799341	2.520034
66	290.0642	284.188	348.1646	307.4723	1.819544	2.487806
69	295.3243	289.2658	349.8377	311.4759	1.838849	2.493424
72	309.735	308.7463	320.9141	313.1318	1.857332	2.495727
75	291.2789	271.0106	367.809	310.0328	1.875061	2.491408
78	312.1597	308.2035	373.2304	331.1979	1.892095	2.520088
81	311.0678	308.169	375.6689	331.6352	1.908485	2.520661
84	319.7815	310.3004	379.8483	336.6434	1.924279	2.52717
87	325.2169	317.419	313.9453	318.8604	1.939519	2.503601
90	328.6644	320.2977	308.9683	319.3101	1.954243	2.504213
93	330.4439	324.5547	301.5714	318.8567	1.968483	2.503596
96	334.0972	327.8669	301.6723	321.2121	1.982271	2.506792
99	336.5915	332.9208	303.9191	324.4771	1.995635	2.511184
102	343.4683	335.9833	306.7319	328.7278	2.0086	2.516836
105	344.5105	338.9135	310.1459	331.19	2.021189	2.520077
108		342.0176	318.4026	330.2101	2.033424	2.51879
111			319.7862	319.7862	2.045323	2.50486
114			321.6916	321.6916	2.056905	2.50744
117			327.0384	327.0384	2.068186	2.514599
120			333.008	333.008	2.079181	2.522455
123			334.3528	334.3528	2.089905	2.524205
126			338.0559	338.0559	2.100371	2.528989
129			343.3815	343.3815	2.11059	2.535777

Sample 191						
Image 8738		Particle O_1C		Approximate Particle size - 164.8251 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	482.7254	484.9519	482.2531	483.3101	0.477121	2.684226
6	425.047	431.3767	427.5967	428.0068	0.778151	2.631451
9	415.7499	422.0327	419.3483	419.0436	0.954243	2.622259
12	411.2508	415.2619	409.2494	411.9207	1.079181	2.614814
15	409.4201	417.3824	412.8613	413.2213	1.176091	2.616183
18	404.8815	413.1766	404.043	407.367	1.255273	2.609986
21	400.8766	400.7969	392.3599	398.0111	1.322219	2.599895
24	396.4095	415.3534	397.4838	403.0822	1.380211	2.605394
27	392.848	396.9146	393.6563	394.473	1.431364	2.596017
30	394.9871	405.8384	403.902	401.5758	1.477121	2.603768
33	388.2321	387.2785	383.0061	386.1722	1.518514	2.586781
36	392.048	408.3118	386.6558	395.6719	1.556303	2.597335
39	385.1769	399.5971	391.1225	391.9655	1.591065	2.593248
42	381.1235	392.9813	392.2265	388.7771	1.623249	2.589701
45	381.1724	410.6123	351.4815	381.0887	1.653213	2.581026
48	362.0287	408.7655	362.7475	377.8472	1.681241	2.577316
51	377.5143	418.6552	381.9381	392.7025	1.70757	2.594064
54	337.5176	380.2009	344.564	354.0942	1.732394	2.549119
57	381.1875	384.7246	358.9885	374.9669	1.755875	2.573993
60	389.202	387.8365	371.8141	382.9509	1.778151	2.583143
63	400.4105	387.2592	334.4678	374.0458	1.799341	2.572925
66	403.8335	335.0774	365.8398	368.2502	1.819544	2.566143
69	344.5261	396.9878	370.4743	370.6627	1.838849	2.568979
72	351.9355	404.4301	378.663	378.3429	1.857332	2.577886
75	316.1908	410.3267	382.3958	369.6378	1.875061	2.567776
78	335.0672	370.5639	330.7729	345.468	1.892095	2.538408
81	289.1557	374.7667	336.1941	333.3722	1.908485	2.522929
84	291.1525	347.7317	361.4837	333.456	1.924279	2.523038
87	298.8064	348.0183	354.8507	333.8918	1.939519	2.523606
90	293.8861	351.7317	359.5618	335.0599	1.954243	2.525122
93	203.9862	355.948	314.9888	291.641	1.968483	2.464849
96	211.8644	231.421	323.011	255.4321	1.982271	2.407276
99	222.9038	241.7414		232.3226	1.995635	2.366091
102	232.1078	246.4057		239.2568	2.0086	2.378864
105	239.372	249.2997		244.3359	2.021189	2.387987
108	222.756	220.8496		221.8028	2.033424	2.345967
111	227.4822	246.0745		236.7784	2.045323	2.374342
114	242.2334	248.0362		245.1348	2.056905	2.389405
117	269.9671	237.8839		253.9255	2.068186	2.404706
120	278.1337	244.8011		261.4674	2.079181	2.417418
123	287.2929	253.5104		270.4017	2.089905	2.432009
126	297.2988	272.1407		284.7198	2.100371	2.454418
129	301.6846	263.41		282.5473	2.11059	2.451091
132		267.0733		267.0733	2.120574	2.42663
135		273.6083		273.6083	2.130334	2.437129
138		279.3412		279.3412	2.139879	2.446135
141		288.531		288.531	2.149219	2.460192
144		294.5933		294.5933	2.158362	2.469223

Sample 191						
Image 8738		Particle O_1D		Approximate Particle size - 131.3785 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	459.101	462.7109	461.7219	461.1779	0.477121	2.663869
6	378.7954	385.3494	386.8785	383.6744	0.778151	2.583963
9	372.2448	373.5733	373.5733	373.1305	0.954243	2.571861
12	358.8666	367.5521	374.1584	366.859	1.079181	2.564499
15	350.1629	360.3774	355.5325	355.3576	1.176091	2.550666
18	343.9543	365.7489	353.0546	354.2526	1.255273	2.549313
21	356.9111	359.9222	355.0888	357.3074	1.322219	2.553042
24	358.3039	341.4607	352.8184	350.861	1.380211	2.545135
27	352.2271	341.1802	345.1939	346.2004	1.431364	2.539328
30	341.7499	346.1761	347.3723	345.0994	1.477121	2.537944
33	323.7726	336.5538	346.0828	335.4697	1.518514	2.525653
36	330.0414	335.9287	342.0841	336.0181	1.556303	2.526363
39	349.4826	356.2945	339.3251	348.3674	1.591065	2.542038
42	302.643	308.8534	323.3392	311.6119	1.623249	2.493614
45	328.4851	342.3587	320.141	330.3283	1.653213	2.518946
48	312.1619	322.383	336.507	323.684	1.681241	2.510121
51	314.1063	321.3214	335.8061	323.7446	1.70757	2.510203
54	346.1941	355.4478	336.894	346.1786	1.732394	2.5393
57	353.3815	363.1195	303.9039	340.135	1.755875	2.531651
60	279.0297	283.4453	300.5257	287.6669	1.778151	2.45889
63	274.9729	282.3773	287.1732	281.5078	1.799341	2.44949
66	270.2444	274.9235	290.2412	278.4697	1.819544	2.444778
69	311.8559	314.3716	293.8091	306.6789	1.838849	2.486684
72	310.8377	316.3848	291.7165	306.313	1.857332	2.486165
75	317.1431	320.4824	337.2365	324.954	1.875061	2.511822
78	309.5664	325.7499	329.6562	321.6575	1.892095	2.507394
81	316.7426	324.1302	336.7826	325.8851	1.908485	2.513065
84	265.9594	309.022	335.807	303.5961	1.924279	2.482296
87	331.3373	301.9865	325.8151	319.713	1.939519	2.50476
90	337.8034	281.5683	293.5797	304.3171	1.954243	2.483326
93	346.178	359.4365	296.2947	333.9697	1.968483	2.523707
96	349.1815	362.4744	357.0755	356.2438	1.982271	2.551747
99	356.8961	368.1301	362.9378	362.6547	1.995635	2.559493
102	361.0836	372.3237	372.2541	368.5538	2.0086	2.566501
105	366.8028	378.3689	374.958	373.3766	2.021189	2.572147
108	367.2826	384.9956	387.6803	379.9862	2.033424	2.579768
111	374.2595	379.8417	393.211	382.4374	2.045323	2.58256
114	364.5927	384.3784		374.4856	2.056905	2.573435
117	354.1077	374.4949		364.3013	2.068186	2.561461

Sample 191						
Image 8738		Particle O_1E		Approximate Particle size - 86.79006 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	231.3625	232.699	232.6897	232.2504	0.477121	2.365956
6	209.4819	207.2925	211.4197	209.398	0.778151	2.320973
9	210.7985	204.1912	211.7999	208.9299	0.954243	2.320001
12	200.4452	196.4769	203.1568	200.0263	1.079181	2.301087
15	206.0398	207.8051	200.7136	204.8528	1.176091	2.311442
18	195.2522	196.4455	177.7088	189.8022	1.255273	2.278301
21	202.0054	198.3016	165.898	188.735	1.322219	2.275852
24	194.0317	194.0981	188.459	192.1963	1.380211	2.283745
27	211.4655	213.6545	212.4916	212.5372	1.431364	2.327435
30	165.9029	167.3972	161.6337	164.9779	1.477121	2.217426
33	177.6508	176.7896	178.9605	177.8003	1.518514	2.249932
36	187.101	192.6968	184.8336	188.2105	1.556303	2.274644
39	203.0826	202.8002	114.5009	173.4612	1.591065	2.239202
42	173.0455	168.7063	124.2672	155.3397	1.623249	2.191282
45	139.5654	136.4577	128.9919	135.005	1.653213	2.13035
48	142.9081	140.0774	138.3199	140.4351	1.681241	2.147476
51	147.0954	145.0341	138.9175	143.6823	1.70757	2.157403
54	153.2285	151.2586	148.582	151.023	1.732394	2.179043
57	157.0094	155.1464	154.2091	155.455	1.755875	2.191605
60	162.9637	161.2051	161.4192	161.8627	1.778151	2.209147
63	175.5374	173.8542	166.939	172.1102	1.799341	2.235807
66	175.5374	173.8542	171.3419	173.5778	1.819544	2.239494
69	179.7051	178.1264		178.9158	1.838849	2.252649

Sample 191						
Image 8739		Particle O_1A		Approximate Particle size - 111.057 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1088.17	1086.382	1090.011	1088.187	0.477121	3.036704
6	920.0792	917.3072	922.0461	919.8108	0.778151	2.963699
9	850.8156	850.4586	851.256	850.8434	0.954243	2.92985
12	858.1387	854.7554	856.2684	856.3875	1.079181	2.93267
15	834.5863	832.3242	832.181	833.0305	1.176091	2.920661
18	799.2437	789.0624	798.0106	795.4389	1.255273	2.900607
21	801.1437	794.2582	792.7946	796.0655	1.322219	2.900949
24	795.8137	795.5543	795.152	795.5067	1.380211	2.900644
27	793.3041	785.2582	794.0769	790.8797	1.431364	2.89811
30	794.0678	794.912	792.538	793.8393	1.477121	2.899733
33	792.7018	794.741	782.1552	789.866	1.518514	2.897553
36	786.1146	784.8425	784.0756	785.0109	1.556303	2.894876
39	780.2372	783.1401	786.2218	783.1997	1.591065	2.893873
42	787.7731	785.4736	773.8766	782.3744	1.623249	2.893415
45	784.4937	783.2666	779.0489	782.2697	1.653213	2.893357
48	773.2062	777.492	795.8509	782.183	1.681241	2.893308
51	785.6815	782.9634	769.7545	779.4665	1.70757	2.891797
54	771.975	772.5319	805.4495	783.3188	1.732394	2.893939
57	782.9242	767.8458	770.158	773.6427	1.755875	2.88854
60	772.1459	781.0842	785.6731	779.6344	1.778151	2.891891
63	771.892	769.122	803.5331	781.5157	1.799341	2.892938
66	778.4899	776.9144	765.3798	773.5947	1.819544	2.888513
69	761.2706	787.6299	803.864	784.2548	1.838849	2.894457
72	764.8187	779.717	772.4603	772.332	1.857332	2.887804
75	768.1288	779.9855	772.2682	773.4608	1.875061	2.888438
78	772.6722	769.6123	768.1191	770.1345	1.892095	2.886567
81	758.2322	779.6812	794.5107	777.4747	1.908485	2.890686
84	762.4474	765.0658	796.6962	774.7365	1.924279	2.889154
87	764.867	764.1329	802.2714	777.0904	1.939519	2.890472
90	764.6733	767.7978	757.5386	763.3366	1.954243	2.882716
93	767.4142	767.2836	785.3535	773.3504	1.968483	2.888376
96	744.1185	759.5845	784.183	762.6287	1.982271	2.882313
99	748.2739	746.564	783.8168	759.5516	1.995635	2.880557
102	740.7767	744.4712	760.8348	748.6942	2.0086	2.874304
105	781.855	791.7205	759.7203	777.7653	2.021189	2.890849
108	761.5145	799.0369	791.2286	783.9267	2.033424	2.894275
111	760.2274	776.9113	776.0302	771.0563	2.045323	2.887086
114	760.1051	744.3842	753.4051	752.6315	2.056905	2.876582
117	727.3634	745.649	747.3572	740.1232	2.068186	2.869304
120	772.5237	749.0594	746.5004	756.0278	2.079181	2.878538
123	749.4092	793.5846	747.5699	763.5212	2.089905	2.882821
126	749.3055	789.5762	777.7117	772.1978	2.100371	2.887729
129	746.4858	789.1506	783.8163	773.1509	2.11059	2.888264
132	743.6086	775.3844	779.0482	766.0137	2.120574	2.884237
135	732.809	767.0242	776.0576	758.6303	2.130334	2.88003
138	735.002	759.8405	757.3311	750.7245	2.139879	2.875481
141	721.6039	734.9193	742.0222	732.8485	2.149219	2.865014
144	792.0181	772.0737	739.58	767.8906	2.158362	2.885299
147	798.8778	764.6753	761.7844	775.1125	2.167317	2.889365
150	793.5248	761.783	739.9973	765.1017	2.176091	2.883719

Sample 191						
Image 8739		Particle O_1B		Approximate Particle size - 147.3356 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1561.284	1562.15	1562.662	1562.032	0.477121	3.19369
6	1346.134	1341.214	1342.305	1343.218	0.778151	3.128146
9	1183.689	1185.308	1181.801	1183.599	0.954243	3.073205
12	1035.494	1104.929	1096.258	1078.894	1.079181	3.032979
15	1060.988	1060.452	1059.918	1060.453	1.176091	3.025491
18	993.0339	988.7029	982.6641	988.1336	1.255273	2.994816
21	937.6715	939.8623	939.259	938.9309	1.322219	2.972634
24	936.8628	948.7194	937.8833	941.1552	1.380211	2.973661
27	916.7081	930.4373	919.8702	922.3385	1.431364	2.96489
30	933.113	941.3138	923.4461	932.6243	1.477121	2.969707
33	949.6299	945.0663	947.4926	947.3963	1.518514	2.976532
36	920.7073	928.5891	928.8201	926.0388	1.556303	2.966629
39	901.5895	914.4199	914.0161	910.0085	1.591065	2.959045
42	945.5283	916.6099	918.8025	926.9802	1.623249	2.96707
45	904.7604	914.0507	913.6044	910.8052	1.653213	2.959425
48	935.0215	966.0479	923.7042	941.5912	1.681241	2.973862
51	879.5263	961.6541	902.4154	914.5319	1.70757	2.961199
54	912.4702	940.5685	891.5606	914.8664	1.732394	2.961358
57	911.2506	955.5635	880.5084	915.7742	1.755875	2.961788
60	873.3105	961.6328	917.1571	917.3668	1.778151	2.962543
63	866.2369	947.3286	860.5039	891.3565	1.799341	2.950051
66	901.3057	936.4282	938.3555	925.3631	1.819544	2.966312
69	870.6401	954.3724	852.9519	892.6548	1.838849	2.950684
72	979.2765	938.8922	940.4795	952.8827	1.857332	2.979039
75	923.5701	948.7634	949.9444	940.7593	1.875061	2.973479
78	820.8781	987.3147	878.8131	895.6686	1.892095	2.952147
81	924.7109	931.7943	822.9446	893.1499	1.908485	2.950924
84	938.6627	924.3152	923.5699	928.8493	1.924279	2.967945
87	958.4292	914.3403	914.4495	929.073	1.939519	2.96805
90	910.2388	868.3788	869.4868	882.7015	1.954243	2.945814
93	953.9185	960.2851	949.7607	954.6548	1.968483	2.979846
96	963.1537	973.8186	957.9658	964.9794	1.982271	2.984518
99	966.2238	959.6703	958.9243	961.6061	1.995635	2.982997
102	902.3818	948.8331	952.551	934.5886	2.0086	2.97062
105	919.6758	972.4706	902.1458	931.4307	2.021189	2.969151
108	926.9434	894.7523	901.8027	907.8328	2.033424	2.958006
111	805.777	913.2356	796.5323	838.515	2.045323	2.923511
114	891.3691	921.49	906.8803	906.5798	2.056905	2.957406
117	907.3564	907.6513	897.1329	904.0469	2.068186	2.956191
120	891.0678	915.3389	897.317	901.2412	2.079181	2.954841
123	898.5957	860.9263	897.2551	885.5924	2.089905	2.947234
126	781.3754	882.1498	868.5069	844.0107	2.100371	2.926348
129	881.2028	881.1308	870.2782	877.5373	2.11059	2.943266
132	887.4726	888.0828	878.0753	884.5436	2.120574	2.946719
135	881.4718	884.0032	879.4122	881.6291	2.130334	2.945286
138	893.3708	887.0367	882.6002	887.6692	2.139879	2.948251
141	907.4893	907.4811	897.0044	903.9916	2.149219	2.956164
144	914.7957	921.8834	906.0977	914.2589	2.158362	2.961069
147	926.071	923.9285	916.2009	922.0668	2.167317	2.964762
150	914.2693	929.6399	927.8276	923.9123	2.176091	2.965631

Sample 191						
Image 8739		Particle O_2A		Approximate Particle size - 71.09596 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	646.4941	647.5555	645.7359	646.5952	0.477121	2.810632
6	573.7974	574.8589	572.8884	573.8482	0.778151	2.758797
9	568.0763	569.2336	565.1373	567.4824	0.954243	2.753952
12	560.8974	556.8765	557.9144	558.5628	1.079181	2.747072
15	559.3925	557.5004	567.9473	561.6134	1.176091	2.749437
18	554.1274	553.03	567.8803	558.3459	1.255273	2.746903
21	551.8988	563.1824	554.6714	556.5842	1.322219	2.745531
24	550.6727	547.0984	558.9199	552.2303	1.380211	2.74212
27	572.421	552.1521	553.522	559.365	1.431364	2.747695
30	551.5537	562.8295	560.8755	558.4196	1.477121	2.746961
33	562.1209	542.4351	552.091	552.2157	1.518514	2.742109
36	556.2599	532.4385	548.735	545.8111	1.556303	2.737042
39	549.1785	561.9167	535.4437	548.8463	1.591065	2.739451
42	552.1251	548.8287	541.269	547.4076	1.623249	2.738311
45	524.2495	542.9329	519.527	528.9031	1.653213	2.723376
48	526.4426	525.4551	548.1903	533.3627	1.681241	2.727023
51	549.1459	537.6151	557.2644	548.0085	1.70757	2.738787
54	537.3156	524.0701	568.3794	543.255	1.732394	2.735004
57	524.0034	555.0814	541.2994	540.1281	1.755875	2.732497
60	532.5255	551.8826	556.624	547.0107	1.778151	2.737996
63	481.0864	515.2421	521.8308	506.0531	1.799341	2.704196
66	485.5906	525.5813	536.4405	515.8708	1.819544	2.712541
69	529.7338	543.2487	518.4174	530.4666	1.838849	2.724658
72	528.5526	546.7706	580.9868	552.1033	1.857332	2.74202
75	514.0901	539.955	579.4781	544.5077	1.875061	2.736004
78	489.6394	506.8845	534.5201	510.348	1.892095	2.707866
81	480.1654	502.7277	530.3665	504.4199	1.908485	2.702792
84	450.1582	477.3531	542.3654	489.9589	1.924279	2.69016
87	445.668	486.7589	526.1605	486.1958	1.939519	2.686811
90	505.7143	484.9265	461.9082	484.183	1.954243	2.68501
93	506.2701	497.8824	455.485	486.5458	1.968483	2.687124
96	520.1346	523.1535	461.655	501.6477	1.982271	2.700399
99	525.2047	524.7233	458.3705	502.7662	1.995635	2.701366
102	527.4917	528.1229	459.3687	504.9944	2.0086	2.703287
105	531.697	535.9745	457.2795	508.317	2.021189	2.706135
108	529.9432	539.3172	450.3683	506.5429	2.033424	2.704616
111	512.7986	532.2252	520.9632	521.9957	2.045323	2.717667
114	512.5414	539.7988	382.8347	478.3916	2.056905	2.679784
117	458.7816	538.876	266.916	421.5245	2.068186	2.624823
120	343.2594	470.576	256.3665	356.734	2.079181	2.552344
123	337.4945	472.9158	274.2224	361.5442	2.089905	2.558161
126	330.9156	278.2582	277.2002	295.458	2.100371	2.470496
129	323.386	353.7273	282.2051	319.7728	2.11059	2.504842
132	330.4058	338.3706	281.8843	316.8869	2.120574	2.500904
135	312.7986	301.5567	278.3853	297.5802	2.130334	2.473604
138	317.578	301.5567	294.1837	304.4395	2.139879	2.483501
141	304.605	303.2321	305.3708	304.4026	2.149219	2.483448
144	356.2318	310.5967	302.5401	323.1229	2.158362	2.509368
147	339.6898	316.2942	313.2846	323.0895	2.167317	2.509323
150	341.5687	312.2394	343.9991	332.6024	2.176091	2.521925

Sample 191						
Image 8739		Particle O_2B		Approximate Particle size - 134.4082 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1740.915	1740.915	1744.462	1742.097	0.477121	3.241072
6	1591.878	1591.878	1591.975	1591.911	0.778151	3.201919
9	1546.851	1546.851	1562.748	1552.15	0.954243	3.190934
12	1506.106	1506.106	1505.813	1506.008	1.079181	3.177827
15	1483.418	1483.418	1482.598	1483.145	1.176091	3.171184
18	1449.183	1449.183	1446.63	1448.332	1.255273	3.160868
21	1449.096	1449.096	1447.652	1448.615	1.322219	3.160953
24	1444.576	1444.576	1442.356	1443.836	1.380211	3.159518
27	1423.599	1423.599	1419.299	1422.166	1.431364	3.15295
30	1433.424	1433.424	1436.083	1434.31	1.477121	3.156643
33	1417.022	1417.022	1415.781	1416.608	1.518514	3.15125
36	1414.424	1414.424	1414.875	1414.574	1.556303	3.150626
39	1372.315	1372.315	1420.246	1388.292	1.591065	3.142481
42	1413.442	1413.442	1411.498	1412.794	1.623249	3.150079
45	1385.35	1385.35	1385.687	1385.462	1.653213	3.141595
48	1380.076	1380.076	1376.682	1378.945	1.681241	3.139547
51	1369.244	1369.244	1368.474	1368.987	1.70757	3.136399
54	1403.58	1403.58	1402.986	1403.382	1.732394	3.147176
57	1353.267	1353.267	1346.652	1351.062	1.755875	3.130675
60	1411.079	1411.079	1410.779	1410.979	1.778151	3.149521
63	1377.177	1377.177	1373.81	1376.055	1.799341	3.138636
66	1365.54	1365.54	1364.778	1365.286	1.819544	3.135224
69	1402.682	1402.682	1402.369	1402.577	1.838849	3.146927
72	1333.843	1333.843	1333.983	1333.89	1.857332	3.12512
75	1358.294	1358.294	1354.919	1357.169	1.875061	3.132634
78	1388.255	1388.255	1389.77	1388.76	1.892095	3.142627
81	1389.034	1389.034	1382.924	1386.997	1.908485	3.142076
84	1348.366	1348.366	1347.446	1348.059	1.924279	3.129709
87	1315.856	1315.856	1317.434	1316.382	1.939519	3.119382
90	1320.684	1320.684	1315.398	1318.922	1.954243	3.120219
93	1402.686	1402.686	1402.185	1402.519	1.968483	3.146909
96	1342.987	1342.987	1342.734	1342.902	1.982271	3.128044
99	1338.951	1338.951	1328.423	1335.441	1.995635	3.125625
102	1371.651	1371.651	1371.072	1371.458	2.0086	3.137183
105	1368.446	1368.446	1368.005	1368.299	2.021189	3.136181
108	1354.676	1354.676	1353.493	1354.282	2.033424	3.131709
111	1269.779	1269.779	1266.556	1268.705	2.045323	3.103361
114	1296.988	1296.988	1299.8	1297.925	2.056905	3.11325
117	1428.833	1428.833	1428.486	1428.717	2.068186	3.154946
120	1437.701	1437.701	1437.354	1437.585	2.079181	3.157634
123	1403.507	1403.507	1405.189	1404.068	2.089905	3.147388
126	1366.304	1366.304	1364.268	1365.625	2.100371	3.135331
129	1320.367	1320.367	1319.807	1320.18	2.11059	3.120633
132	1353.219	1353.219	1346.987	1351.142	2.120574	3.130701
135	1363.326	1363.326	1362.717	1363.123	2.130334	3.134535
138	1289.362	1289.362	1286.961	1288.562	2.139879	3.110105
141	1357.44	1357.44	1357.116	1357.332	2.149219	3.132686
144	1321.631	1321.631	1321.315	1321.526	2.158362	3.121076
147	1248.098	1248.098	1244.268	1246.821	2.167317	3.095804
150	1240.892	1240.892	1238.464	1240.083	2.176091	3.093451

Sample 191						
Image 8740		Particle O_1A		Approximate Particle size - 137.662 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	912.2566	914.2969	914.3361	913.6299	0.477121	2.96077
6	758.7862	761.0175	757.0118	758.9385	0.778151	2.880207
9	680.8053	687.3805	684.9854	684.3904	0.954243	2.835304
12	626.2007	630.1356	622.9474	626.4279	1.079181	2.796871
15	604.071	608.9915	606.7009	606.5878	1.176091	2.782894
18	608.4023	604.4868	604.0127	605.6339	1.255273	2.78221
21	615.3286	632.0327	612.3859	619.9157	1.322219	2.792333
24	595.3511	618.5417	595.4033	603.0987	1.380211	2.780388
27	590.8593	617.824	595.2415	601.3083	1.431364	2.779097
30	587.3374	606.0381	586.3207	593.2321	1.477121	2.773225
33	586.9562	602.8673	586.4806	592.1014	1.518514	2.772396
36	617.8947	567.6031	591.7548	592.4175	1.556303	2.772628
39	567.67	598.0507	580.7654	582.162	1.591065	2.765044
42	601.7982	611.9296	564.8763	592.868	1.623249	2.772958
45	562.532	596.5066	589.7559	582.9315	1.653213	2.765618
48	566.9026	591.431	563.4039	573.9125	1.681241	2.758846
51	565.292	531.4479	528.4279	541.7226	1.70757	2.733777
54	562.8362	614.7483	570.8843	582.8229	1.732394	2.765537
57	559.3572	534.7214	507.0275	533.702	1.755875	2.727299
60	570.42	546.1241	524.7058	547.0833	1.778151	2.738053
63	590.3459	552.1965	547.5811	563.3745	1.799341	2.750797
66	580.3424	597.8679	557.6866	578.6323	1.819544	2.762403
69	630.3635	622.7576	561.2561	604.7924	1.838849	2.781606
72	529.8954	612.9193	496.0423	546.2857	1.857332	2.73742
75	540.4985	603.6033	517.0783	553.7267	1.875061	2.743295
78	548.689	515.2915	537.6749	533.8851	1.892095	2.727448
81	562.0986	582.7953	457.4839	534.1259	1.908485	2.727644
84	535.9031	599.3504	460.7737	532.0091	1.924279	2.725919
87	526.2805	605.8698	468.9703	533.7069	1.939519	2.727303
90	635.8975	622.1862	478.6346	578.9061	1.954243	2.762608
93	528.0864	629.3791	490.0423	549.1693	1.968483	2.739706
96	521.6667	524.2056	498.6253	514.8325	1.982271	2.711666
99	517.4491	504.1085	505.7871	509.1149	1.995635	2.706816
102	527.0911	488.4744	520.599	512.0548	2.0086	2.709316
105	534.3315	502.5348	563.5119	533.4594	2.021189	2.727101
108	539.7029	512.7534	437.1951	496.5505	2.033424	2.695963
111	541.6118	511.647	441.4683	498.2424	2.045323	2.697441
114	543.1882	513.058	446.7244	500.9902	2.056905	2.699829
117	557.5322	524.5209	449.0991	510.3841	2.068186	2.707897
120	556.0076	530.0808	466.2572	517.4485	2.079181	2.713867
123	571.5043	538.5675	475.7427	528.6048	2.089905	2.723131
126	582.1532	645.6712	474.5331	567.4525	2.100371	2.75393
129	583.4786	546.6115	472.8416	534.3106	2.11059	2.727794
132	676.916	672.2785	482.7995	610.6647	2.120574	2.785803
135	675.1536	676.2589	493.7794	615.064	2.130334	2.78892
138	473.4626	684.8151	504.4104	554.2294	2.139879	2.74369
141	469.3523	669.0701	507.5872	548.6699	2.149219	2.739311
144	469.4618	673.7617	497.7138	546.9791	2.158362	2.737971
147	472.6151	446.354	504.9881	474.6524	2.167317	2.676376
150	470.0645	445.2812	321.2997	412.2151	2.176091	2.615124

Sample 191						
Image 8740		Particle O_1B		Approximate Particle size - 130.0244 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	768.5645	769.0419	782.1766	773.261	0.477121	2.888326
6	609.578	616.8427	628.4561	618.2923	0.778151	2.791194
9	589.5483	598.0057	608.1232	598.5591	0.954243	2.777107
12	573.9231	583.1484	592.3806	583.1507	1.079181	2.765781
15	564.8313	576.2767	588.0259	576.378	1.176091	2.760707
18	560.7903	567.9671	583.954	570.9038	1.255273	2.756563
21	553.8967	563.751	579.798	565.8152	1.322219	2.752675
24	569.8793	564.7599	581.9644	572.2012	1.380211	2.757549
27	569.2583	555.59	576.1996	567.016	1.431364	2.753595
30	572.6354	568.4854	574.5907	571.9038	1.477121	2.757323
33	566.8416	551.3005	578.2475	565.4632	1.518514	2.752404
36	577.6048	569.4763	570.3158	572.4656	1.556303	2.757749
39	557.0322	567.4803	562.2538	562.2554	1.591065	2.749934
42	556.0743	567.9418	553.9885	559.3349	1.623249	2.747672
45	566.511	564.9951	550.4456	560.6506	1.653213	2.748692
48	543.8372	550.135	585.6465	559.8729	1.681241	2.748089
51	541.6209	551.2414	562.1017	551.6547	1.70757	2.741667
54	550.7759	547.448	564.6404	554.2881	1.732394	2.743736
57	562.9709	570.1673	571.9706	568.3696	1.755875	2.754631
60	531.3802	544.8989	557.6269	544.6353	1.778151	2.736106
63	527.3975	535.4529	550.0662	537.6389	1.799341	2.730491
66	533.6473	545.5156	544.1886	541.1172	1.819544	2.733291
69	534.3465	568.5465	523.7133	542.2021	1.838849	2.734161
72	559.9962	567.3573	485.3861	537.5799	1.857332	2.730443
75	564.0898	524.3769	488.7864	525.751	1.875061	2.72078
78	508.2163	513.2969	510.4283	510.6472	1.892095	2.708121
81	512.9906	513.1285	522.5964	516.2385	1.908485	2.71285
84	478.3134	491.0928	529.3582	499.5881	1.924279	2.698612
87	480.3848	496.8369	548.5018	508.5745	1.939519	2.706355
90	544.7166	563.0975	467.8556	525.2232	1.954243	2.720344
93	557.6973	567.4727	501.917	542.3623	1.968483	2.73429
96	564.5514	572.643	508.0998	548.4314	1.982271	2.739122
99	550.8455	590.694	503.7376	548.4257	1.995635	2.739118
102	584.0844	586.9451	513.3223	561.4506	2.0086	2.749312
105	559.4295	565.0057	523.8217	549.419	2.021189	2.739904
108	555.9392	564.3375	254.7411	458.3393	2.033424	2.661187
111	565.2506	451.1725	259.034	425.1524	2.045323	2.628545
114	569.1993	445.2192	264.5687	426.3291	2.056905	2.629745
117	445.0826	460.217	272.3264	392.542	2.068186	2.593886
120	447.3317	458.0173	277.3538	394.2343	2.079181	2.595754
123	447.2133	451.6714	280.4136	393.0994	2.089905	2.594502
126	462.0946	456.313	287.4487	401.9521	2.100371	2.604174
129	459.9329	463.0452	292.3878	405.122	2.11059	2.607586
132	463.4712	472.8377	307.4457	414.5849	2.120574	2.617613
135	451.0986	473.1331	310.5254	411.5857	2.130334	2.61446
138	455.9398	475.8469	312.0244	414.6037	2.139879	2.617633
141	468.3033	475.514	312.849	418.8888	2.149219	2.622099
144	469.7544	483.2219	318.8258	423.934	2.158362	2.627298
147	472.8469	488.8531	324.4702	428.7234	2.167317	2.632177
150	478.4605	497.7939	330.5477	435.6007	2.176091	2.639089

Sample 191						
Image 8740		Particle O_1C		Approximate Particle size - 78.84072 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	658.1235	662.4492	658.9493	659.8407	0.477121	2.819439
6	521.5335	523.6782	522.1723	522.4613	0.778151	2.718054
9	487.691	492.1246	496.8527	492.2228	0.954243	2.692162
12	475.8066	478.1559	483.1003	479.0209	1.079181	2.680354
15	447.4279	443.5358	456.6164	449.1934	1.176091	2.652433
18	440.7671	447.5114	447.84	445.3728	1.255273	2.648724
21	453.1569	438.6902	436.1752	442.6741	1.322219	2.646084
24	441.2298	437.1899	449.6972	442.7056	1.380211	2.646115
27	428.2883	429.6754	452.2405	436.7347	1.431364	2.640218
30	441.2978	424.1791	443.8062	436.4277	1.477121	2.639912
33	438.3669	418.4748	437.4405	431.4274	1.518514	2.634908
36	412.6515	427.3245	437.5945	425.8568	1.556303	2.629264
39	425.0397	424.5717	430.3434	426.6516	1.591065	2.630073
42	400.188	415.3024	418.1086	411.1997	1.623249	2.614053
45	409.5209	415.4172	394.1026	406.3469	1.653213	2.608897
48	392.2249	423.6949	432.0455	415.9884	1.681241	2.619081
51	393.175	416.219	438.0041	415.7994	1.70757	2.618884
54	398.8671	424.2454	418.7138	413.9421	1.732394	2.61694
57	430.2144	417.1322	425.4374	424.2613	1.755875	2.627633
60	401.8928	399.7233	425.054	408.89	1.778151	2.611607
63	408.1064	397.1843	432.6521	412.6476	1.799341	2.615579
66	411.8708	399.53	409.0031	406.8013	1.819544	2.609382
69	411.8313	403.0652	407.739	407.5452	1.838849	2.610176
72	390.2134	375.9742	407.8106	391.3327	1.857332	2.592546
75	416.1758	383.6487	397.2971	399.0405	1.875061	2.601017
78	380.4617	381.6559	368.2061	376.7746	1.892095	2.576082
81	394.3973	372.9128	376.8048	381.3716	1.908485	2.581348
84	397.4661	334.369	380.1479	370.661	1.924279	2.568977
87	395.2214	345.8035	376.5899	372.5383	1.939519	2.571171
90	382.3145	356.7358	447.4968	395.5157	1.954243	2.597164
93	413.3582	348.0837	453.2891	404.9103	1.968483	2.607359
96	401.627	354.4426	389.6956	381.9217	1.982271	2.581974
99	396.549	361.6127	389.1091	382.4236	1.995635	2.582545
102	396.549	361.9637	383.0137	380.5088	2.0086	2.580365
105	400.7933	372.6945	392.4044	388.6307	2.021189	2.589537
108	410.1671	375.4167	395.2789	393.6209	2.033424	2.595078
111	414.4033	385.9146	406.6716	402.3298	2.045323	2.604582
114	414.7883	389.4707	411.583	405.2807	2.056905	2.607756
117	381.8411	386.6353	411.0169	393.1644	2.068186	2.594574
120	400.2383	379.431	418.3172	399.3288	2.079181	2.601331
123	326.8145	367.0215	411.5734	368.4698	2.089905	2.566402
126	277.8505	282.7782	437.081	332.5699	2.100371	2.521883
129	279.6625	287.3241	431.5197	332.8354	2.11059	2.52223
132	285.5729	292.4872	314.3908	297.4836	2.120574	2.473463
135	286.2928			286.2928	2.130334	2.45681

Sample 191							
Image 8740		Particle O_2A		Approximate Particle size - 149.0697 µm			
(X)	(Y) 1	(Y) 2	(Y) 3	(Y) 4	(Y)AVG	log(X)	log(Y)
3	1701.935	1700.208	1699.699	1706.922	1702.191	0.477121	3.231008
6	1325.305	1329.593	1326.163	1332.584	1328.411	0.778151	3.123333
9	1214.557	1221.12	1214.866	1224.522	1218.766	0.954243	3.08592
12	1169.99	1163.678	1164.414	1161.628	1164.927	1.079181	3.066299
15	1136.905	1132.269	1134.155	1149.247	1138.144	1.176091	3.056197
18	1105.219	1116.708	1112.921	1125.237	1115.021	1.255273	3.047283
21	1108.023	1120.462	1105.036	1135.911	1117.358	1.322219	3.048192
24	1117.198	1113.389	1120.812	1116.229	1116.907	1.380211	3.048017
27	1112.817	1114.73	1106.376	1125.506	1114.857	1.431364	3.047219
30	1099.878	1096.469	1113.419	1104.101	1103.467	1.477121	3.042759
33	1114.097	1112.409	1096.929	1124.069	1111.876	1.518514	3.046056
36	1115.742	1113.122	1104.07	1104.198	1109.283	1.556303	3.045042
39	1112.109	1110.388	1120.049	1151.856	1123.6	1.591065	3.050612
42	1115.118	1112.023	1127.903	1143.289	1124.583	1.623249	3.050992
45	1083.896	1081.652	1081.115	1084.678	1082.835	1.653213	3.034562
48	1118.145	1109.819	1137.47	1144.191	1127.406	1.681241	3.05208
51	1080.934	1072.157	1103.13	1143.746	1099.992	1.70757	3.041389
54	1104.039	1120.703	1078	1089.477	1098.055	1.732394	3.040624
57	1092.391	1079.589	1127.13	1083.274	1095.596	1.755875	3.03965
60	1065.991	1100.88	1084.138	1136.97	1096.994	1.778151	3.040204
63	1080.172	1071.578	1136.664	1167.803	1114.054	1.799341	3.046906
66	1142.507	1142.483	1091.629	1161.35	1134.492	1.819544	3.054802
69	1079.658	1071.403	1065.252	1094.316	1077.657	1.838849	3.032481
72	1119.381	1104.684	1101.122	1129.19	1113.594	1.857332	3.046727
75	1080.813	1174.458	1160.329	1134.292	1137.473	1.875061	3.055941
78	1086.575	1076.949	1082.908	1106.229	1088.165	1.892095	3.036695
81	1116.398	1148.68	1205.175	1084.223	1138.619	1.908485	3.056378
84	1073.986	1072.792	1117.605	1130.434	1098.704	1.924279	3.040881
87	1175.905	1066.178	1198.397	1158.617	1149.774	1.939519	3.060613
90	1138.846	1136.429	1132.575	1126.972	1133.706	1.954243	3.0545
93	1162.313	1051.125	1065.421	1077.455	1089.078	1.968483	3.037059
96	1171.264	1172.855	1139.376	1182.477	1166.493	1.982271	3.066882
99	1053.961	1047.136	1105.423	1143.263	1087.446	1.995635	3.036408
102	1050.413	1042.173	1061.006	1078.075	1057.917	2.0086	3.024451
105	1193.136	1175.692	1165.587	1172.184	1176.65	2.021189	3.070647
108	1178.399	1171.503	1101.967	1158.018	1152.472	2.033424	3.06163
111	1123.411	1116.381	1101.252	1146.778	1121.955	2.045323	3.049976
114	1036.772	1199.939	1195.371	1051.088	1120.792	2.056905	3.049525
117	1158.86	1184.872	1160.122	1186.358	1172.553	2.068186	3.069133
120	1143.284	1137.548	1102.082	1157.487	1135.1	2.079181	3.055034
123	1019.434	1011.572	1106.408	1133.785	1067.8	2.089905	3.02849
126	1035.668	1194.91	1065.708	1090.788	1096.768	2.100371	3.040115
129	1211.393	1203.375	1189.298	1220.334	1206.1	2.11059	3.081383
132	1166.923	1156.301	1176.304	1173.399	1168.232	2.120574	3.067529
135	1151.926	1147.263	1127.77	1174.483	1150.361	2.130334	3.060834
138	1092.95	1072.2	1107.06	1142.593	1103.701	2.139879	3.042851
141	1110.667	1071.205	1110.84	1095.836	1097.137	2.149219	3.040261
144	1020.764	1073.069	1058.707	1054.844	1051.846	2.158362	3.021952
147	1144.495	1166.616	1209.878	1203.22	1181.052	2.167317	3.072269
150	1123.949	1120.17	1169.496	1195.599	1152.303	2.176091	3.061567

Sample 191						
Image 8740		Particle O_2B		Approximate Particle size - 74.93424 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	655.7062	655.7062	655.7062	655.7062	0.477121	2.816709
6	527.0654	526.6804	524.6114	526.1191	0.778151	2.721084

Sample 191						
Image 8740		Particle O_2C		Approximate Particle size - 60.7696 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	791.9421	792.6668	792.9465	792.5185	0.477121	2.899009
6	620.6087	617.6165	620.9756	619.7336	0.778151	2.792205
9	555.6406	557.7493	551.3903	554.9267	0.954243	2.744236
12	523.3344	526.1056	523.048	524.1627	1.079181	2.719466
15	488.4118	503.282	485.4404	492.3781	1.176091	2.692299
18	507.7231	493.5295	481.9674	494.4067	1.255273	2.694084
21	473.0781	490.1509	488.0186	483.7492	1.322219	2.68462
24	494.4181	485.8754	486.4351	488.9095	1.380211	2.689229
27	489.5593	487.7523	482.6429	486.6515	1.431364	2.687218
30	491.7195	485.1039	483.58	486.8011	1.477121	2.687352
33	495.686	481.3878	472.9512	483.3417	1.518514	2.684254
36	473.6716	469.4006	483.9472	475.6731	1.556303	2.677309
39	473.7741	477.3222	486.6451	479.2471	1.591065	2.68056
42	478.9407	478.8401	468.7952	475.5253	1.623249	2.677174
45	480.3326	474.7429	499.8765	484.984	1.653213	2.685727
48	486.8299	451.966	485.3317	474.7092	1.681241	2.676428
51	504.8101	479.3012	477.7903	487.3005	1.70757	2.687797
54	449.5468	453.498	485.1287	462.7245	1.732394	2.665322
57	495.1623	474.6045	486.1333	485.3	1.755875	2.68601
60	447.2349	456.4546	460.2838	454.6578	1.778151	2.657685
63	479.2523	464.1947	480.1628	474.5366	1.799341	2.67627
66	473.4427	469.8448	461.7588	468.3488	1.819544	2.670569
69	472.5981	445.4018	438.4834	452.1611	1.838849	2.655293
72	496.4256	444.9327	478.4224	473.2602	1.857332	2.6751
75	450.266	466.7819	461.7853	459.6111	1.875061	2.66239
78	438.4763	466.4121	427.5164	444.1349	1.892095	2.647515
81	418.7348	465.3908	435.6683	439.9313	1.908485	2.643385
84	488.9066	480.241	437.5027	468.8834	1.924279	2.671065
87	490.6325	486.2952	452.9498	476.6258	1.939519	2.678178
90	490.4546	479.4046	451.8357	473.8983	1.954243	2.675685
93	497.268	456.7765	456.0539	470.0328	1.968483	2.672128
96	483.9684	453.3233	433.6048	456.9655	1.982271	2.659883
99	467.2103	446.5939	436.524	450.1094	1.995635	2.653318
102	433.494	448.1031	453.3562	444.9844	2.0086	2.648345
105	468.558	439.7888	448.4268	452.2579	2.021189	2.655386
108	469.425	443.7072	442.4443	451.8588	2.033424	2.655003
111	474.3148	435.2572	452.0091	453.8604	2.045323	2.656922
114	462.7175	431.3596	437.2377	443.7716	2.056905	2.64716
117	450.5752	356.9051	413.7936	407.0913	2.068186	2.609692
120	449.7184	334.5739	396.2914	393.5279	2.079181	2.594976
123	312.0292	334.212	255.2248	300.4887	2.089905	2.477828
126	317.8575	337.5197	267.3281	307.5684	2.100371	2.487942
129	325.104	350.7027	267.856	314.5542	2.11059	2.497696
132	315.3495	351.0099	273.5037	313.2877	2.120574	2.495943
135	318.1963	352.1324	279.9338	316.7542	2.130334	2.500722
138	315.6033	373.5421	290.59	326.5785	2.139879	2.513988
141	353.3112	373.1872	290.5341	339.0108	2.149219	2.530214
144	338.8644	374.2654	310.24	341.1233	2.158362	2.532911
147	332.1627	373.168	310.9126	338.7478	2.167317	2.529876
150	375.4289	385.0423	311.2161	357.2291	2.176091	2.552947

Sample 191						
Image 8740		Particle O_3A		Approximate Particle size - 117.7886 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	747.4438	750.4122	753.2209	750.359	0.477121	2.875269
6	633.445	630.162	629.8841	631.1637	0.778151	2.800142
9	577.1506	574.5732	577.9233	576.549	0.954243	2.760836
12	535.3225	532.7452	542.0276	536.6984	1.079181	2.72973
15	535.2136	548.9363	542.0927	542.0809	1.176091	2.734064
18	531.6228	528.8647	548.3385	536.2753	1.255273	2.729388
21	507.3757	515.7286	512.7543	511.9529	1.322219	2.70923
24	513.9106	516.4122	576.0875	535.4701	1.380211	2.728735
27	504.2963	492.6274	559.791	518.9049	1.431364	2.715088
30	513.9287	571.7628	560.7903	548.8273	1.477121	2.739436
33	512.6758	522.2349	517.8719	517.5942	1.518514	2.713989
36	514.7764	509.7204	596.6823	540.393	1.556303	2.73271
39	500.7381	495.0339	585.1936	526.9885	1.591065	2.721801
42	482.7908	538.4883	565.5105	528.9299	1.623249	2.723398
45	485.6057	552.5524	525.5736	521.2439	1.653213	2.717041
48	473.3418	551.6446	555.6373	526.8746	1.681241	2.721707
51	479.3559	541.2136	513.4269	511.3321	1.70757	2.708703
54	489.4116	512.77	621.9613	541.381	1.732394	2.733503
57	493.9852	523.1037	506.2959	507.7949	1.755875	2.705688
60	469.0543	592.3705	600.4238	553.9495	1.778151	2.74347
63	474.0027	455.2311	577.8289	502.3542	1.799341	2.70101
66	467.6552	550.9258	582.6598	533.7469	1.819544	2.727335
69	460.3668	550.0822	561.0673	523.8388	1.838849	2.719198
72	428.0913	515.2563	513.8913	485.7463	1.857332	2.68641
75	428.4845	515.1698	515.0249	486.2264	1.875061	2.686839
78	445.4106	504.4955	508.4856	486.1306	1.892095	2.686753
81	445.6929	411.6853	538.6955	465.3579	1.908485	2.667787
84	413.1528	530.4898	528.5696	490.7374	1.924279	2.690849
87	387.2578	532.7311	526.9125	482.3005	1.939519	2.683318
90	390.8943	485.3199	482.5906	452.9349	1.954243	2.656036
93	402.5983	505.418	475.2538	461.09	1.968483	2.663786
96	444.7355	491.1223	494.9549	476.9376	1.982271	2.678462
99	457.4303	508.5565	497.3507	487.7792	1.995635	2.688223
102	450.5544	508.5565	497.3507	485.4872	2.0086	2.686178
105	453.524	497.5654	472.0573	474.3822	2.021189	2.676128
108	454.9116	499.8361	453.514	469.4206	2.033424	2.671562
111	453.8298	455.2387	510.023	473.0305	2.045323	2.674889
114	456.1187	460.1507	522.978	479.7491	2.056905	2.681014
117	391.1248	524.7958	537.0942	484.3383	2.068186	2.685149
120	385.0776	545.9031	560.4508	497.1438	2.079181	2.696482
123	380.2817	383.1508	569.1027	444.1784	2.089905	2.647557
126	389.6064	390.2523	401.2184	393.6924	2.100371	2.595157
129	389.6064	400.1093	414.893	401.5362	2.11059	2.603725
132	394.7986		418.8708	406.8347	2.120574	2.609418
135	394.7986			394.7986	2.130334	2.596376
138	397.9558			397.9558	2.139879	2.599835
141	416.7675			416.7675	2.149219	2.619894
144	416.7675			416.7675	2.158362	2.619894
147	416.7675			416.7675	2.167317	2.619894
150	423.3578			423.3578	2.176091	2.626708

Sample 191						
Image 8740		Particle O_3B		Approximate Particle size - 80.28251 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1330.99	1331.965	1326.169	1329.708	0.477121	3.123756
6	1077.085	1080.089	1080.158	1079.111	0.778151	3.033066
9	1043.924	1053.339	1050.293	1049.185	0.954243	3.020852
12	1009.141	1005.764	1010.957	1008.621	1.079181	3.003728
15	976.4812	973.8137	976.356	975.5503	1.176091	2.98925
18	944.1614	945.3674	941.2366	943.5885	1.255273	2.974783
21	936.3886	933.2105	929.908	933.169	1.322219	2.96996
24	935.5016	933.0419	930.8571	933.1335	1.380211	2.969944
27	929.9642	926.4641	921.3651	925.9311	1.431364	2.966579
30	933.5375	920.8491	934.0963	929.4943	1.477121	2.968247
33	907.1365	932.1511	916.8637	918.7171	1.518514	2.963182
36	923.2885	921.0164	914.4321	919.579	1.556303	2.963589
39	924.8228	917.3991	927.7604	923.3274	1.591065	2.965356
42	927.6058	930.4027	906.0463	921.3516	1.623249	2.964425
45	925.2657	913.9509	911.2979	916.8382	1.653213	2.962293
48	893.171	912.4433	911.3004	905.6382	1.681241	2.956955
51	909.8069	902.3995	896.8095	903.0053	1.70757	2.95569
54	919.9239	911.2855	914.7093	915.3062	1.732394	2.961566
57	911.5666	914.1523	910.0789	911.9326	1.755875	2.959963
60	880.5609	920.6202	876.989	892.7234	1.778151	2.950717
63	882.5469	904.1172	885.1516	890.6052	1.799341	2.949685
66	881.8128	918.6993	888.4705	896.3275	1.819544	2.952467
69	873.1457	886.5937	889.4866	883.0753	1.838849	2.945998
72	875.5457	909.4894	906.3791	897.1381	1.857332	2.952859
75	882.9418	888.3093	895.6065	888.9525	1.875061	2.948879
78	892.2145	892.5993	905.1826	896.6655	1.892095	2.95263
81	877.1389	885.7017	871.991	878.2772	1.908485	2.943632
84	891.8428	867.132	883.208	880.7276	1.924279	2.944842
87	866.5785	894.2009	867.4579	876.0791	1.939519	2.942543
90	870.7552	865.582	843.7944	860.0439	1.954243	2.934521
93	868.0701	861.5503	882.8469	870.8224	1.968483	2.93993
96	896.1935	891.808	876.1435	888.0483	1.982271	2.948437
99	854.3752	867.9103	872.0939	864.7931	1.995635	2.936912
102	847.1837	848.1743	850.0963	848.4848	2.0086	2.928644
105	894.7993	892.4935	898.4644	895.2524	2.021189	2.951945
108	895.5247	887.5693	871.1907	884.7616	2.033424	2.946826
111	882.2765	890.152	878.3881	883.6055	2.045323	2.946258
114	848.7197	849.0087	843.4017	847.0434	2.056905	2.927906
117	843.1332	830.6772	830.174	834.6615	2.068186	2.92151
120	881.3946	861.0396	891.9692	878.1345	2.079181	2.943561
123	884.1813	866.2281	889.9871	880.1322	2.089905	2.944548
126	874.366	864.9363	879.9965	873.0996	2.100371	2.941064
129	861.7708	861.0767	872.1839	865.0105	2.11059	2.937021
132	863.344	862.9551	880.3638	868.8876	2.120574	2.938964
135	870.3116	867.0106	875.7004	871.0075	2.130334	2.940022
138	871.3851	862.1968	879.667	871.083	2.139879	2.94006
141	868.0798	941.8997	875.8315	895.2703	2.149219	2.951954
144	919.7922	942.2746	914.3899	925.4856	2.158362	2.96637
147	895.8647	924.2094	897.1183	905.7308	2.167317	2.956999
150	872.871	887.5995	867.2064	875.8923	2.176091	2.942451

Sample 191						
Image 8740		Particle O_4		Approximate Particle size - 215.509 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	2395.368	2397.132	2395.368	2395.956	0.477121	3.379479
6	2202.288	2199.234	2197.48	2199.667	0.778151	3.342357
9	2113.395	2123.182	2114.595	2117.057	0.954243	3.325733
12	2076.024	2076.784	2075.259	2076.023	1.079181	3.317232
15	1986.119	1988.07	1993.525	1989.238	1.176091	3.298687
18	1991.034	1989.32	1990.648	1990.334	1.255273	3.298926
21	1960.302	1958.075	1957.276	1958.551	1.322219	3.291935
24	1972.9	1913.246	1925.185	1937.11	1.380211	3.287154
27	1930.05	1929.394	1931.897	1930.447	1.431364	3.285658
30	1901.525	1882.052	1906.883	1896.82	1.477121	3.278026
33	1894.968	1938.786	1906.743	1913.499	1.518514	3.281828
36	1892.492	1913.801	1906.26	1904.184	1.556303	3.279709
39	1834.916	1835.669	1875.708	1848.764	1.591065	3.266881
42	1839.897	1867.274	1888.931	1865.367	1.623249	3.270764
45	1872.372	1824.297	1852.644	1849.771	1.653213	3.267118
48	1858.76	1871.145	1864.414	1864.773	1.681241	3.270626
51	1819.601	1849.496	1842.514	1837.204	1.70757	3.264157
54	1829.805	1923.22	1851.045	1868.023	1.732394	3.271382
57	1822.846	1840.532	1821.77	1828.383	1.755875	3.262067
60	1821.497	1834.766	1811.93	1822.731	1.778151	3.260723
63	1809.025	1812.951	1783.416	1801.797	1.799341	3.255706
66	1777.704	1772.708	1803.322	1784.578	1.819544	3.251536
69	1795.497	1781.485	1778.769	1785.25	1.838849	3.251699
72	1818.444	1787.021	1758.035	1787.833	1.857332	3.252327
75	1702.856	1734.889	1775.317	1737.687	1.875061	3.239972
78	1755.434	1818.303	1774.4	1782.712	1.892095	3.251081
81	1733.417	1773.519	1739.988	1748.975	1.908485	3.242784
84	1699.522	1701.531	1760.54	1720.531	1.924279	3.235662
87	1741.719	1751.871	1787.889	1760.493	1.939519	3.245634
90	1767.205	1761.304	1809.72	1779.41	1.954243	3.250276
93	1789.873	1793.658	1817.027	1800.186	1.968483	3.255317
96	1687.764	1777.525	1698.979	1721.422	1.982271	3.235887
99	1685.747	1686.917	1707.326	1693.33	1.995635	3.228742
102	1690.82	1672.028	1703.361	1688.736	2.0086	3.227562
105	1763.203	1760.027	1741.811	1755.013	2.021189	3.24428
108	1793.203	1799.683	1774.57	1789.152	2.033424	3.252647
111	1715.586	1830.266	1738.759	1761.537	2.045323	3.245892
114	1727.674	1752.065	1749.853	1743.198	2.056905	3.241347
117	1708.803	1738.597	1686.395	1711.265	2.068186	3.233317
120	1735.943	1673.878	1717.812	1709.211	2.079181	3.232796
123	1766.682	1694.563	1641.211	1700.819	2.089905	3.230658
126	1700.212	1712.967	1702.529	1705.236	2.100371	3.231785
129	1753.683	1748.54	1709.698	1737.307	2.11059	3.239877
132	1775.199	1747.895	1757.193	1760.095	2.120574	3.245536
135	1661.94	1761.511	1752.98	1725.477	2.130334	3.236909
138	1650.108	1712.607	1607.663	1656.793	2.139879	3.219268
141	1691.236	1573.961	1629.053	1631.416	2.149219	3.212565
144	1708.928	1608.738	1636.664	1651.444	2.158362	3.217864
147	1709.826	1669.057	1660.166	1679.683	2.167317	3.225227
150	1659.346	1569.012	1602.527	1610.295	2.176091	3.206905

Sample 191						
Image 8741		Particle O_1A		Approximate Particle size - 135.4603 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	968.7367	972.7305	970.0391	970.5021	0.477121	2.986996
6	805.5991	805.1718	806.6916	805.8208	0.778151	2.906238
9	752.128	756.0322	752.778	753.6461	0.954243	2.877167
12	751.2038	750.2639	744.29	748.5859	1.079181	2.874242
15	722.7252	719.7898	721.233	721.2493	1.176091	2.858085
18	732.3543	725.611	730.8989	729.6214	1.255273	2.863098
21	707.1633	699.1578	706.4406	704.2539	1.322219	2.847729
24	722.4715	699.2615	700.4188	707.3839	1.380211	2.849655
27	705.872	714.4158	698.2793	706.189	1.431364	2.848921
30	672.9001	691.2437	712.3194	692.1544	1.477121	2.840203
33	689.7446	688.6655	701.3729	693.261	1.518514	2.840897
36	709.6548	695.6193	706.1906	703.8216	1.556303	2.847463
39	708.3043	681.2614	704.9675	698.1777	1.591065	2.843966
42	681.3124	691.1823	679.0557	683.8501	1.623249	2.834961
45	659.7003	669.5142	701.2118	676.8088	1.653213	2.830466
48	708.817	654.3959	703.8515	689.0215	1.681241	2.838233
51	686.3662	672.4288	656.3889	671.728	1.70757	2.827193
54	685.7322	678.8164	732.8936	699.1474	1.732394	2.844569
57	698.0342	653.6375	691.3205	680.9974	1.755875	2.833145
60	676.9636	657.2523	675.9588	670.0582	1.778151	2.826113
63	661.5479	624.179	657.0867	647.6045	1.799341	2.81131
66	697.3868	638.126	696.7923	677.435	1.819544	2.830868
69	697.3119	661.0724	700.4125	686.2656	1.838849	2.836492
72	660.3185	673.4185	695.4709	676.4026	1.857332	2.830205
75	670.9033	633.1006	655.683	653.229	1.875061	2.815065
78	649.4183	660.657	712.3179	674.1311	1.892095	2.828744
81	686.0197	677.6522	705.3399	689.6706	1.908485	2.838642
84	630.4457	655.5549	644.4921	643.4976	1.924279	2.808547
87	683.6588	622.5897	685.4323	663.8936	1.939519	2.822098
90	693.0748	627.3332	701.665	674.0243	1.954243	2.828676
93	697.571	579.0996	708.994	661.8882	1.968483	2.820785
96	719.7398	596.687	725.9176	680.7815	1.982271	2.833008
99	665.496	609.036	681.3914	651.9745	1.995635	2.814231
102	654.4927	713.7522	671.4334	679.8928	2.0086	2.83244
105	659.2302	721.5868	661.6037	680.8069	2.021189	2.833024
108	667.215	732.3094	681.0679	693.5308	2.033424	2.841066
111	672.4268	714.7726	674.3048	687.1681	2.045323	2.837063
114	646.3427	721.6784	640.992	669.671	2.056905	2.825862
117	646.0723	705.488	658.1545	669.9049	2.068186	2.826013
120	653.1541	696.6954	660.1223	669.9906	2.079181	2.826069
123	658.6606	690.1044	664.7381	671.1677	2.089905	2.826831
126	658.9777	663.0856	662.4058	661.4897	2.100371	2.820523
129	665.9221	673.2632	667.8703	669.0185	2.11059	2.825438
132	676.6268	682.856	675.9505	678.4778	2.120574	2.831536
135	678.25	698.325	675.3817	683.9856	2.130334	2.835047
138	661.4958	657.9051	648.2452	655.882	2.139879	2.816826
141	645.2989	660.2427	657.663	654.4015	2.149219	2.815844
144	648.6028	634.0484	655.3878	646.013	2.158362	2.810241
147	658.4105	635.9391	645.6144	646.6547	2.167317	2.810672
150	740.7307	637.3953	640.0026	672.7095	2.176091	2.827828

Sample 191						
Image 8741		Particle O_1B		Approximate Particle size - 148.904 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1085.926	1085.926	1083.708	1085.187	0.477121	3.035504
6	889.845	889.845	882.3223	887.3374	0.778151	2.948089
9	854.7351	854.7351	845.7617	851.744	0.954243	2.930309
12	829.4363	829.4363	823.7418	827.5381	1.079181	2.917788
15	827.9959	827.9959	819.1943	825.062	1.176091	2.916487
18	819.226	819.226	828.5405	822.3308	1.255273	2.915047
21	828.7162	828.7162	825.4764	827.6363	1.322219	2.91784
24	818.6575	818.6575	812.6215	816.6455	1.380211	2.912034
27	813.9645	813.9645	798.6761	808.8684	1.431364	2.907878
30	807.7152	807.7152	819.3315	811.5873	1.477121	2.909335
33	839.757	839.757	821.9913	833.8351	1.518514	2.92108
36	821.2916	821.2916	790.0758	810.8863	1.556303	2.90896
39	811.1912	811.1912	787.2009	803.1944	1.591065	2.904821
42	845.6716	845.6716	811.0035	834.1156	1.623249	2.921226
45	851.6399	851.6399	801.0327	834.7708	1.653213	2.921567
48	824.1652	824.1652	796.0157	814.782	1.681241	2.911041
51	848.3183	848.3183	815.4835	837.3734	1.70757	2.922919
54	837.0503	837.0503	792.5712	822.2239	1.732394	2.91499
57	806.1315	806.1315	806.7913	806.3514	1.755875	2.906524
60	772.3683	772.3683	777.3553	774.0306	1.778151	2.888758
63	835.0758	835.0758	817.4696	829.2071	1.799341	2.918663
66	830.1737	830.1737	802.3892	820.9122	1.819544	2.914297
69	826.1134	826.1134	807.8124	820.0131	1.838849	2.913821
72	778.6505	778.6505	766.3055	774.5355	1.857332	2.889041
75	828.687	828.687	790.1006	815.8249	1.875061	2.911597
78	831.9573	831.9573	788.5767	817.4971	1.892095	2.912486
81	833.6697	833.6697	777.4985	814.946	1.908485	2.911129
84	801.4539	801.4539	799.8171	800.9083	1.924279	2.903583
87	780.1044	780.1044	828.9425	796.3838	1.939519	2.901122
90	761.79	761.79	734.9372	752.8391	1.954243	2.876702
93	861.8952	861.8952	787.8636	837.218	1.968483	2.922839
96	813.5562	813.5562	764.1459	797.0861	1.982271	2.901505
99	805.8209	805.8209	749.5925	787.0781	1.995635	2.896018
102	774.9893	774.9893	723.0748	757.6845	2.0086	2.879488
105	845.8969	845.8969	792.0794	827.9577	2.021189	2.918008
108	731.1566	731.1566	783.8926	748.7353	2.033424	2.874328
111	712.0083	712.0083	714.1973	712.738	2.045323	2.85293
114	722.5655	722.5655	742.8586	729.3299	2.056905	2.862924
117	735.3398	735.3398	729.3958	733.3585	2.068186	2.865316
120	849.8102	849.8102	736.8505	812.157	2.079181	2.90964
123	874.511	874.511	735.1649	828.0623	2.089905	2.918063
126	891.2157	891.2157	735.3217	839.251	2.100371	2.923892
129	899.561	899.561	748.2924	849.1381	2.11059	2.928978
132	778.1196	778.1196	745.1251	767.1214	2.120574	2.884864
135	800.7581	800.7581	733.4536	778.3233	2.130334	2.89116
138	795.0743	795.0743	708.6536	766.2674	2.139879	2.88438
141	813.6963	813.6963	752.0519	793.1482	2.149219	2.899354
144	807.4912	807.4912	747.7256	787.5693	2.158362	2.896289
147	787.4005	787.4005	754.0791	776.2934	2.167317	2.890026
150	788.5688	788.5688	756.445	777.8609	2.176091	2.890902

Sample 191						
Image 8741		Particle O_2A		Approximate Particle size - 66.87774 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	458.1694	452.4393	451.3761	453.9949	0.477121	2.657051
6	378.0753	377.2189	385.2908	380.195	0.778151	2.580006
9	354.2415	354.8184	354.7877	354.6159	0.954243	2.549758
12	344.708	348.813	347.0512	346.8574	1.079181	2.540151
15	349.3813	350.1668	356.2201	351.9227	1.176091	2.546447
18	352.1682	350.9315	346.6257	349.9085	1.255273	2.543954
21	344.0298	341.8389	342.2926	342.7204	1.322219	2.53494
24	333.0983	334.6099	341.6659	336.458	1.380211	2.526931
27	339.6071	333.5415	334.8787	336.0091	1.431364	2.526351
30	340.3716	332.1784	343.8858	338.8119	1.477121	2.529959
33	333.8452	328.7196	331.4092	331.3247	1.518514	2.520254
36	334.718	337.5998	337.7749	336.6976	1.556303	2.52724
39	332.7498	330.7417	316.9427	326.8114	1.591065	2.514297
42	316.2688	321.8865	316.0616	318.0723	1.623249	2.502526
45	324.6739	320.1906	324.3332	323.0659	1.653213	2.509291
48	329.1111	327.579	298.8788	318.523	1.681241	2.503141
51	334.9748	332.3383	352.1039	339.8057	1.70757	2.531231
54	324.7351	325.4984	346.5361	332.2565	1.732394	2.521474
57	307.1066	309.8585	328.3258	315.097	1.755875	2.498444
60	309.6235	305.6206	351.6339	322.2927	1.778151	2.50825
63	303.1824	297.8357	349.4497	316.8226	1.799341	2.500816
66	304.3676	298.2453	315.399	306.004	1.819544	2.485727
69	315.7226	312.4276	325.406	317.8521	1.838849	2.502225
72	325.0846	319.3051	331.4409	325.2769	1.857332	2.512253
75	333.0367	322.2392	312.8515	322.7091	1.875061	2.508811
78	325.2789	325.5147	273.7265	308.1734	1.892095	2.488795
81	329.397	336.7285	271.1978	312.4411	1.908485	2.494768
84	261.6435	344.8311	278.6027	295.0258	1.924279	2.46986
87	269.4069	287.5103	284.829	280.5821	1.939519	2.44806
90	257.4193	267.2907	285.5797	270.0966	1.954243	2.431519
93	265.0137	274.6216	286.6812	275.4388	1.968483	2.440025
96	273.4218	281.5244	370.4263	308.4575	1.982271	2.489195
99	282.7113	288.3262	229.9726	267.0034	1.995635	2.426517
102	288.8401	293.9345	227.475	270.0832	2.0086	2.431498
105	296.4393	241.045	233.1873	256.8905	2.021189	2.409748
108	252.3335	245.3866	224.2094	240.6432	2.033424	2.381374
111	256.5522	253.0784		254.8153	2.045323	2.406226
114	259.3257	255.0162		257.171	2.056905	2.410222
117	273.6008	261.0511		267.326	2.068186	2.427041
120	275.397	257.5891		266.4931	2.079181	2.425686
123		264.9409		264.9409	2.089905	2.423149

Sample 191						
Image 8741		Particle O_2B		Approximate Particle size - 21.36386 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1808.352	1808.239	1807.767	1808.12	0.477121	3.257227
6	1533.932	1533.432	1533.851	1533.738	0.778151	3.185751
9	1439.595	1435.899	1434.943	1436.812	0.954243	3.1574
12	1421.825	1421.839	1426.832	1423.498	1.079181	3.153357
15	1408.149	1403.678	1415.5	1409.109	1.176091	3.148945
18	1403.954	1400.909	1410.858	1405.24	1.255273	3.147751
21	1390.998	1385.6	1387.197	1387.931	1.322219	3.142368
24	1371.862	1386.447	1401.554	1386.621	1.380211	3.141958
27	1388.334	1369.335	1382.762	1380.144	1.431364	3.139924
30	1379.101	1375.295	1385.249	1379.882	1.477121	3.139842
33	1369.615	1366.549	1379.591	1371.918	1.518514	3.137328
36	1384.834	1361.819	1392.13	1379.594	1.556303	3.139751
39	1356.085	1362.615	1404.446	1374.382	1.591065	3.138108
42	1378.447	1347.018	1348.268	1357.911	1.623249	3.132871
45	1370.456	1354.734	1394.282	1373.157	1.653213	3.13772
48	1359.939	1360.459	1388.916	1369.771	1.681241	3.136648
51	1363.73	1349.736	1408.763	1374.076	1.70757	3.138011
54	1376.102	1368.778	1413.757	1386.212	1.732394	3.14183
57	1346.281	1344.212	1380.194	1356.896	1.755875	3.132547
60	1363.004	1367.359	1347.627	1359.33	1.778151	3.133325
63	1318.974	1316.098	1411.573	1348.882	1.799341	3.129974
66	1365.032	1327.501	1346.961	1346.498	1.819544	3.129206
69	1370.318	1346.157	1404.071	1373.515	1.838849	3.137833
72	1321.779	1292.741	1353.487	1322.669	1.857332	3.121451
75	1331.682	1307.085	1380.678	1339.815	1.875061	3.127045
78	1366.12	1353.77	1394.401	1371.43	1.892095	3.137174
81	1312.816	1333.086	1370.797	1338.9	1.908485	3.126748
84	1298.79	1283.491	1388.666	1323.649	1.924279	3.121773
87	1346.091	1307.984	1372.904	1342.326	1.939519	3.127858
90	1341.294	1298.669	1402.741	1347.568	1.954243	3.129551
93	1258.334	1309.201	1270.292	1279.276	1.968483	3.106964
96	1295.482	1331.495	1328.998	1318.658	1.982271	3.120132
99	1307.368	1356.745	1327.105	1330.406	1.995635	3.123984
102	1324.961	1241.316	1286.617	1284.298	2.0086	3.108666
105	1310.319	1257.051	1334.117	1300.495	2.021189	3.114109
108	1329.032	1271.843	1330.035	1310.303	2.033424	3.117372
111	1381.913	1289.552	1308.274	1326.58	2.045323	3.122733
114	1216.8	1281.532	1358.938	1285.757	2.056905	3.109159
117	1203.273	1291.773	1315.92	1270.322	2.068186	3.103914
120	1213.316	1295.146	1295.004	1267.822	2.079181	3.103058
123	1306.313	1308.458	1302.703	1305.825	2.089905	3.115885
126	1317.598	1199.551	1288.497	1268.549	2.100371	3.103307
129	1333.507	1219.466	1437.986	1330.32	2.11059	3.123956
132	1349.032	1233.764	1455.243	1346.013	2.120574	3.129049
135	1355.468	1243.516	1437.971	1345.652	2.130334	3.128933
138	1378.395	1270.495	1312.509	1320.466	2.139879	3.120727
141	1230.846	1237.591	1267.648	1245.362	2.149219	3.095296
144	1211.729	1241.417	1195.154	1216.1	2.158362	3.084969
147	1197.979	1202.608	1319.168	1239.918	2.167317	3.093393
150	1199.519	1221.365	1317.017	1245.967	2.176091	3.095506

Sample 191					
Image 8742		Particle O_1		Approximate Particle size - 62.92255 µm	
(X)	(Y) 1	(Y) 2	(Y)AVG	log(X)	log(Y)
3	493.0822	495.7918	494.437	0.477121	2.694111
6	398.0558	398.5344	398.2951	0.778151	2.600205
9	385.1114	382.2939	383.7027	0.954243	2.583995
12	364.9125	365.2394	365.076	1.079181	2.562383
15	363.5545	372.4258	367.9902	1.176091	2.565836
18	363.3117	352.574	357.9429	1.255273	2.553814
21	353.7542	351.5799	352.6671	1.322219	2.547365
24	362.184	344.494	353.339	1.380211	2.548192
27	339.7652	352.1413	345.9533	1.431364	2.539017
30	336.6833	363.1278	349.9056	1.477121	2.543951
33	328.7779	337.4804	333.1292	1.518514	2.522613
36	342.4361	342.7924	342.6143	1.556303	2.534805
39	325.4211	345.4218	335.4215	1.591065	2.525591
42	351.2774	349.6429	350.4602	1.623249	2.544639
45	317.5054	348.929	333.2172	1.653213	2.522727
48	344.3279	299.1162	321.7221	1.681241	2.507481
51	294.7188	308.2993	301.5091	1.70757	2.4793
54	313.0949	294.551	303.823	1.732394	2.482621
57	318.1567	300.2951	309.2259	1.755875	2.490276
60	327.4684	339.5648	333.5166	1.778151	2.523117
63	286.5388	336.9576	311.7482	1.799341	2.493804
66	283.258	339.6617	311.4599	1.819544	2.493402
69	289.5175	310.5108	300.0142	1.838849	2.477142
72	302.0923	308.0059	305.0491	1.857332	2.48437
75	311.2888	318.9319	315.1104	1.875061	2.498463
78	319.1392	327.7722	323.4557	1.892095	2.509815
81	255.8549	337.8583	296.8566	1.908485	2.472547
84	263.741	351.0535	307.3973	1.924279	2.4877
87	260.7593	363.6049	312.1821	1.939519	2.494408
90	265.9727	369.371	317.6719	1.954243	2.501979
93	273.75	277.0967	275.4234	1.968483	2.440001
96	288.4987	291.7093	290.104	1.982271	2.462554
99	296.6612		296.6612	1.995635	2.472261
102	302.1291		302.1291	2.0086	2.480193
105	311.5897		311.5897	2.021189	2.493583
108	317.2843		317.2843	2.033424	2.501449

Sample 191						
Image 8742		Particle O_2		Approximate Particle size - 85.62194 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	492.3776	661.8318	673.7681	609.3258	0.477121	2.78485
6	400.2815	600.9519	604.3404	535.1913	0.778151	2.728509
9	399.6291	569.7532	596.661	522.0144	0.954243	2.717683
12	383.5178	572.9729	560.4373	505.6427	1.079181	2.703844
15	378.9466	575.6437	561.7127	505.4343	1.176091	2.703665
18	380.6922	549.8817	542.4751	491.0163	1.255273	2.691096
21	374.4352	567.5635	528.5262	490.175	1.322219	2.690351
24	372.7184	550.5582	544.6629	489.3132	1.380211	2.689587
27	353.0359	536.1044	527.7076	472.2826	1.431364	2.674202
30	366.2632	566.1482	518.1543	483.5219	1.477121	2.684416
33	355.3314	556.7398	530.5756	480.8823	1.518514	2.682039
36	345.6801	522.9135	510.1914	459.595	1.556303	2.662375
39	331.3079	537.0052	564.618	477.6437	1.591065	2.679104
42	340.6528	536.2782	552.9158	476.6156	1.623249	2.678168
45	365.5085	540.5556	568.4579	491.5073	1.653213	2.69153
48	307.1481	516.9576	554.7946	459.6334	1.681241	2.662412
51	343.7432	542.9813	562.8795	483.2013	1.70757	2.684128
54	291.4637	521.7715	557.0516	456.7623	1.732394	2.65969
57	338.1719	533.6729	561.8982	477.9143	1.755875	2.67935
60	355.0776	547.2849	547.7979	483.3868	1.778151	2.684295
63	358.6906	491.1691	549.9059	466.5885	1.799341	2.668934
66	376.6708	500.5159	570.459	482.5486	1.819544	2.683541
69	312.5948	533.1299	528.5455	458.0901	1.838849	2.660951
72	327.3147	482.3435	538.8679	449.5087	1.857332	2.652738
75	337.8602	483.0488	547.886	456.265	1.875061	2.659217
78	345.4715	519.2238	547.4186	470.7046	1.892095	2.672748
81	349.7741	507.1454	519.6202	458.8466	1.908485	2.661667
84	275.8758	456.4757	530.891	421.0808	1.924279	2.624365
87	283.2836	469.561	536.4097	429.7514	1.939519	2.633217
90	283.2867	485.5958	541.7994	436.894	1.954243	2.640376
93	286.0555	506.3605	532.9645	441.7935	1.968483	2.645219
96	301.239	528.5397	536.6057	455.4615	1.982271	2.658452
99	306.7991	431.1107	535.7535	424.5544	1.995635	2.627933
102	320.0824	433.0994	530.7332	427.9717	2.0086	2.631415
105	325.0273	437.8851	542.3887	435.1004	2.021189	2.638589
108	327.573	446.2537	550.0362	441.2876	2.033424	2.644722
111	332.6688	452.4571	515.2863	433.4707	2.045323	2.63696
114		459.7486	497.293	478.5208	2.056905	2.679901
117		485.0012	501.2744	493.1378	2.068186	2.692968
120		486.908	508.7852	497.8466	2.079181	2.697096
123		499.912	511.9493	505.9307	2.089905	2.704091
126		514.1278	515.4568	514.7923	2.100371	2.711632
129		376.3305	515.3014	445.816	2.11059	2.649156
132		380.7166	496.1864	438.4515	2.120574	2.641922
135		387.9511	390.0393	388.9952	2.130334	2.589944
138		392.9525	396.0116	394.4821	2.139879	2.596027
141		399.389	395.8732	397.6311	2.149219	2.59948
144		405.0687	394.5688	399.8188	2.158362	2.601863
147		410.1851	402.3108	406.248	2.167317	2.608791
150		421.3037	405.4025	413.3531	2.176091	2.616321

Sample 193						
Image 8777		Particle O_1A		Approximate Particle size - 764.4423 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	946.2173	950.3302	950.3302	948.9592	0.477121	2.977248
6	837.7435	849.0598	849.0598	845.2877	0.778151	2.927005
9	780.5514	784.9856	784.9856	783.5075	0.954243	2.894043
12	762.1712	767.032	767.032	765.4117	1.079181	2.883895
15	748.2726	753.6947	753.6947	751.8873	1.176091	2.876153
18	751.2779	764.5283	764.5283	760.1115	1.255273	2.880877
21	732.266	757.8303	757.8303	749.3089	1.322219	2.874661
24	778.3125	783.1	783.1	781.5042	1.380211	2.892931
27	695.8907	756.2397	756.2397	736.1234	1.431364	2.866951
30	696.3904	741.0645	741.0645	726.1731	1.477121	2.86104
33	750.8379	768.6122	768.6122	762.6874	1.518514	2.882347
36	736.8979	715.0455	715.0455	722.3296	1.556303	2.858735
39	768.1259	766.2662	766.2662	766.8861	1.591065	2.884731
42	768.7921	690.5827	690.5827	716.6525	1.623249	2.855309
45	778.3301	760.7634	760.7634	766.619	1.653213	2.88458
48	761.3618	736.4651	736.4651	744.764	1.681241	2.872019
51	770.416	720.6604	720.6604	737.2456	1.70757	2.867612
54	771.9355	786.5181	786.5181	781.6572	1.732394	2.893016
57	757.5681	765.28	765.28	762.7094	1.755875	2.882359
60	739.6035	787.6815	787.6815	771.6555	1.778151	2.887423
63	753.6451	759.145	759.145	757.3117	1.799341	2.879275
66	771.3243	779.1652	779.1652	776.5516	1.819544	2.89017
69	747.6658	803.6964	803.6964	785.0195	1.838849	2.89488
72	760.6097	761.8276	761.8276	761.4216	1.857332	2.881625
75	742.0945	776.1343	776.1343	764.7877	1.875061	2.883541
78	760.9377	735.751	735.751	744.1466	1.892095	2.871658
81	771.2938	753.6324	753.6324	759.5195	1.908485	2.880539
84	723.5255	763.2554	763.2554	750.0121	1.924279	2.875068
87	733.8933	783.4374	783.4374	766.9227	1.939519	2.884752
90	737.3469	747.1654	747.1654	743.8926	1.954243	2.87151
93	702.5194	745.6223	745.6223	731.2547	1.968483	2.864069
96	712.4132	766.2208	766.2208	748.2849	1.982271	2.874067
99	714.8926	764.7235	764.7235	748.1132	1.995635	2.873967
102	708.9289	733.8115	733.8115	725.5173	2.0086	2.860648
105	717.9617	741.4703	741.4703	733.6341	2.021189	2.86548
108	720.6916	740.0005	740.0005	733.5642	2.033424	2.865438
111	712.6978	739.8619	739.8619	730.8072	2.045323	2.863803
114	712.8284	752.9109	752.9109	739.5501	2.056905	2.868968
117	718.3934	761.6149	761.6149	747.2077	2.068186	2.873441
120	730.5862	780.7069	780.7069	764	2.079181	2.883093
123	734.1402	789.7816	789.7816	771.2345	2.089905	2.887186
126	728.6904	731.1487	731.1487	730.3293	2.100371	2.863519
129	721.7347	738.3062	738.3062	732.7824	2.11059	2.864975
132	714.2372	730.999	730.999	725.4117	2.120574	2.860585
135	702.936	734.4849	734.4849	723.9686	2.130334	2.85972
138	696.0059	736.1456	736.1456	722.7657	2.139879	2.858998
141	703.0841	746.8004	746.8004	732.2283	2.149219	2.864647
144	711.5106	747.3956	747.3956	735.4339	2.158362	2.866544
147	706.9094	743.8382	743.8382	731.5286	2.167317	2.864231
150	721.6666	684.7734	684.7734	697.0711	2.176091	2.843277

Sample 193						
Image 8777		Particle O_1B		Approximate Particle size - 98.08086 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	818.9771	818.9771	818.1261	818.6934	0.477121	2.913121
6	735.9622	735.9622	735.7189	735.8811	0.778151	2.866808
9	691.5511	691.5511	694.3203	692.4742	0.954243	2.840404
12	696.572	696.572	695.8829	696.3423	1.079181	2.842823
15	676.0006	676.0006	675.7113	675.9042	1.176091	2.829885
18	678.4894	678.4894	676.3386	677.7725	1.255273	2.831084
21	666.6506	666.6506	676.0046	669.7686	1.322219	2.825925
24	688.0684	688.0684	686.6064	687.5811	1.380211	2.837324
27	684.7302	684.7302	668.0659	679.1754	1.431364	2.831982
30	664.2831	664.2831	673.2048	667.257	1.477121	2.824293
33	664.8602	664.8602	654.5046	661.4083	1.518514	2.82047
36	664.9083	664.9083	660.4359	663.4175	1.556303	2.821787
39	667.2798	667.2798	647.2736	660.6111	1.591065	2.819946
42	680.3799	680.3799	666.825	675.8616	1.623249	2.829858
45	647.1994	647.1994	658.8573	651.0854	1.653213	2.813638
48	670.3578	670.3578	634.9516	658.5557	1.681241	2.818593
51	678.09	678.09	676.8853	677.6884	1.70757	2.83103
54	696.0482	696.0482	634.8204	675.6389	1.732394	2.829715
57	645.6741	645.6741	620.6703	637.3395	1.755875	2.804371
60	648.1911	648.1911	624.7529	640.3784	1.778151	2.806437
63	640.0826	640.0826	675.9737	652.0463	1.799341	2.814278
66	675.7094	675.7094	631.6755	661.0314	1.819544	2.820222
69	694.1389	694.1389	658.9185	682.3988	1.838849	2.834038
72	708.8553	708.8553	621.2484	679.653	1.857332	2.832287
75	652.4669	652.4669	616.8284	640.5874	1.875061	2.806578
78	649.0394	649.0394	623.2581	640.4456	1.892095	2.806482
81	653.354	653.354	641.9925	649.5668	1.908485	2.812624
84	638.0097	638.0097	599.9804	625.3333	1.924279	2.796112
87	609.4981	609.4981	600.8023	606.5995	1.939519	2.782902
90	592.1498	592.1498	603.5716	595.9571	1.954243	2.775215
93	594.5677	594.5677	635.2896	608.1417	1.968483	2.784005
96	592.7357	592.7357	640.1019	608.5244	1.982271	2.784278
99	667.7259	667.7259	658.525	664.6589	1.995635	2.822599
102	687.7818	687.7818	656.5836	677.3824	2.0086	2.830834
105	711.2836	711.2836	583.9135	668.8269	2.021189	2.825314
108	562.6672	562.6672	591.2582	572.1975	2.033424	2.757546
111	557.554	557.554	586.906	567.338	2.045323	2.753842
114	623.0605	623.0605	595.1664	613.7625	2.056905	2.788
117	624.7264	624.7264	626.7978	625.4169	2.068186	2.79617
120	630.0037	630.0037	518.8164	592.9413	2.079181	2.773012
123	636.4325	636.4325	523.6993	598.8548	2.089905	2.777322
126	647.0968	647.0968	536.3702	610.1879	2.100371	2.785464
129	650.689	650.689	642.9207	648.0996	2.11059	2.811642
132	670.2296	670.2296	649.9052	663.4548	2.120574	2.821811
135	553.4868	553.4868	658.0779	588.3505	2.130334	2.769636
138	539.0313	539.0313	661.7377	579.9334	2.139879	2.763378
141	546.8035	546.8035	672.0018	588.5363	2.149219	2.769773
144	546.0125	546.0125	673.0168	588.3473	2.158362	2.769634
147	558.9896	558.9896	652.1453	590.0415	2.167317	2.770883
150	561.428	561.428	579.9564	567.6041	2.176091	2.754046

Sample 193						
Image 8777		Particle O_2		Approximate Particle size - 67.83244 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	950.1561	949.606	949.519	949.7604	0.477121	2.977614
6	749.3412	755.1282	745.8108	750.0934	0.778151	2.875115
9	709.7709	711.4346	704.0764	708.4273	0.954243	2.850295
12	654.9619	662.1167	659.429	658.8359	1.079181	2.818777
15	636.0777	660.4939	638.8182	645.1299	1.176091	2.809647
18	630.2849	635.4234	628.0149	631.2411	1.255273	2.800195
21	623.2476	637.7206	629.0901	630.0194	1.322219	2.799354
24	614.436	623.6475	612.8152	616.9662	1.380211	2.790261
27	621.9128	636.2366	643.9291	634.0262	1.431364	2.802107
30	615.9567	625.2922	614.2733	618.5074	1.477121	2.791345
33	626.5991	633.6469	622.2892	627.5117	1.518514	2.797622
36	617.3429	626.918	606.3726	616.8778	1.556303	2.790199
39	620.239	640.3975	625.3694	628.6686	1.591065	2.798422
42	597.422	610.8484	629.0081	612.4262	1.623249	2.787054
45	604.5311	622.0911	625.949	617.5237	1.653213	2.790654
48	592.843	616.8397	616.0026	608.5618	1.681241	2.784305
51	621.6721	642.5757	595.3257	619.8578	1.70757	2.792292
54	605.0982	636.0587	630.9465	624.0345	1.732394	2.795209
57	608.4633	591.8403	626.0895	608.7977	1.755875	2.784473
60	596.2908	604.2751	634.3631	611.643	1.778151	2.786498
63	627.3719	603.1378	601.3351	610.6149	1.799341	2.785767
66	592.2618	612.8826	641.631	615.5918	1.819544	2.789293
69	579.0255	621.8217	571.7394	590.8622	1.838849	2.771486
72	596.3625	584.7855	609.1736	596.7739	1.857332	2.77581
75	624.387	595.9149	599.2068	606.5029	1.875061	2.782833
78	588.3098	580.0873	600.5214	589.6395	1.892095	2.770587
81	548.2352	592.5975	603.8516	581.5614	1.908485	2.764596
84	568.1963	625.4063	576.0358	589.8795	1.924279	2.770763
87	559.2134	554.9313	564.3185	559.4877	1.939519	2.747791
90	545.738	610.1681	518.8201	558.2421	1.954243	2.746823
93	529.7547	602.4614	498.175	543.4637	1.968483	2.735171
96	532.6658	615.2182	500.6991	549.5277	1.982271	2.73999
99	533.7156	627.6088	581.4929	580.9391	1.995635	2.764131
102	540.3624	640.0949	585.1296	588.529	2.0086	2.769768
105	561.4086	550.9644	583.666	565.3463	2.021189	2.752315
108	564.0366	572.0336	587.6254	574.5652	2.033424	2.759339
111	581.1296	514.4492	576.6958	557.4249	2.045323	2.746186
114	629.8305	503.2822	570.0153	567.7093	2.056905	2.754126
117	533.155	497.2543	502.292	510.9004	2.068186	2.708336
120	514.8567	500.8905	568.5928	528.1133	2.079181	2.722727
123	614.5682	501.6231	594.2183	570.1365	2.089905	2.755979
126	610.8752	509.263	573.2934	564.4772	2.100371	2.751646
129	617.2416	518.4334	581.3338	572.3363	2.11059	2.757651
132	609.1871	536.0072	582.0073	575.7339	2.120574	2.760222
135	614.3272	539.0828	582.8238	578.7446	2.130334	2.762487
138	633.1066	547.2718	593.7101	591.3628	2.139879	2.771854
141	620.454	549.4927	589.4438	586.4635	2.149219	2.768241
144	489.0641	563.9354	595.5878	549.5291	2.158362	2.739991
147		569.458	528.4066	548.9323	2.167317	2.739519
150		574.6024	534.3002	554.4513	2.176091	2.743863

Sample 193						
Image 8777		Particle O_3		Approximate Particle size - 67.83244 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1136.893	1136.815	1135.99	1136.566	0.477121	3.055595
6	882.9847	879.0294	882.7899	881.6013	0.778151	2.945272
9	788.6536	798.3954	786.4516	791.1669	0.954243	2.898268
12	755.3691	765.4594	751.8205	757.5497	1.079181	2.879411
15	729.314	738.5941	728.651	732.1864	1.176091	2.864622
18	703.9175	713.6927	702.3748	706.6617	1.255273	2.849212
21	711.1851	715.36	698.2819	708.2757	1.322219	2.850202
24	700.6932	705.4492	693.7661	699.9695	1.380211	2.845079
27	690.8188	718.881	692.6631	700.7876	1.431364	2.845586
30	705.4661	722.8555	700.4836	709.6017	1.477121	2.851015
33	690.049	713.6779	673.093	692.2733	1.518514	2.840278
36	674.0268	685.8491	674.874	678.25	1.556303	2.83139
39	695.3361	726.9164	675.5209	699.2578	1.591065	2.844637
42	673.5896	704.3711	681.4832	686.4813	1.623249	2.836629
45	730.2879	691.7943	687.6058	703.2293	1.653213	2.847097
48	671.6167	682.9154	682.0225	678.8515	1.681241	2.831775
51	717.6096	702.1761	681.399	700.3949	1.70757	2.845343
54	716.8388	698.7184	666.9539	694.1704	1.732394	2.841466
57	713.3764	682.6555	674.437	690.1563	1.755875	2.838947
60	697.0881	624.295	639.3381	653.5737	1.778151	2.815295
63	645.9718	716.6882	655.2858	672.6486	1.799341	2.827788
66	641.7847	733.8026	624.4294	666.6722	1.819544	2.823912
69	639.4498	689.6103	635.7639	654.9413	1.838849	2.816202
72	710.6721	654.8306	653.627	673.0432	1.857332	2.828043
75	707.4384	658.6551	669.9229	678.6721	1.875061	2.83166
78	584.8137	750.6936	631.7349	655.7474	1.892095	2.816737
81	587.9381	649.7556	644.5701	627.4213	1.908485	2.797559
84	625.3376	646.5674	562.5175	611.4742	1.924279	2.786378
87	634.9031	654.9351	564.8704	618.2362	1.939519	2.791154
90	644.5381	704.0687	586.4958	645.0342	1.954243	2.809583
93	758.439	699.356	610.6617	689.4856	1.968483	2.838525
96	728.9836	719.3975	626.882	691.7544	1.982271	2.839952
99	683.1719	679.2682	639.0423	667.1608	1.995635	2.824231
102	656.7863	679.5927	647.238	661.2057	2.0086	2.820337
105	626.7651	596.4434	559.0248	594.0778	2.021189	2.773843
108	667.5047	576.5966	564.4073	602.8362	2.033424	2.780199
111	660.5443	580.6567	575.7514	605.6508	2.045323	2.782222
114	670.9484	678.4866	663.8725	671.1025	2.056905	2.826789
117	627.4019	671.8719	619.0767	639.4502	2.068186	2.805807
120	583.4293	688.6142	620.8076	630.9504	2.079181	2.799995
123	563.9016	743.7809	527.8444	611.8423	2.089905	2.786639
126	512.6749	751.9483	509.545	591.3894	2.100371	2.771874
129	620.2295	755.6353	609.3324	661.7324	2.11059	2.820682
132	610.5914	760.5751	621.3472	664.1712	2.120574	2.82228
135	610.0076	653.5373	631.1198	631.5549	2.130334	2.800411
138	612.5812	637.4628	626.1208	625.3883	2.139879	2.79615
141	618.0593	591.678	634.2358	614.6577	2.149219	2.788633
144	626.4641	584.7462	646.0238	619.078	2.158362	2.791745
147	647.6614	579.2587	641.6268	622.849	2.167317	2.794383
150	668.3337	591.4761	632.4271	630.7456	2.176091	2.799854

Sample 193						
Image 8778		Particle O_1A		Approximate Particle size - 110.5309 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	826.8147	833.1252	824.9925	828.3108	0.477121	2.918193
6	762.3506	762.5971	764.96	763.3026	0.778151	2.882697
9	747.7731	742.7875	736.1718	742.2441	0.954243	2.870547
12	710.5875	710.9073	716.1606	712.5518	1.079181	2.852816
15	708.4586	717.1996	712.0939	712.584	1.176091	2.852836
18	691.3221	702.3633	706.6232	700.1029	1.255273	2.845162
21	716.5461	699.499	690.2925	702.1125	1.322219	2.846407
24	707.4586	685.5338	685.9263	692.9729	1.380211	2.840716
27	701.7996	690.4138	684.7996	692.3377	1.431364	2.840318
30	702.3913	701.8626	687.4218	697.2252	1.477121	2.843373
33	697.8984	702.2956	685.1975	695.1305	1.518514	2.842066
36	682.6254	688.6689	687.8735	686.3893	1.556303	2.83657
39	737.1367	689.1507	673.6188	699.9687	1.591065	2.845079
42	679.6096	689.9103	667.5155	679.0118	1.623249	2.831877
45	687.0039	705.2296	662.4973	684.9103	1.653213	2.835634
48	684.7775	696.8077	667.8223	683.1358	1.681241	2.834507
51	708.3594	714.7731	683.6012	702.2446	1.70757	2.846488
54	716.0477	727.6575	675.3083	706.3378	1.732394	2.849012
57	725.438	665.6243	662.8776	684.6466	1.755875	2.835466
60	701.379	705.3308	695.5629	700.7576	1.778151	2.845568
63	688.188	705.1606	646.2546	679.8677	1.799341	2.832424
66	707.4183	708.6487	678.8423	698.3031	1.819544	2.844044
69	685.5292	703.7367	693.2172	694.161	1.838849	2.84146
72	661.8946	672.4898	699.2712	677.8852	1.857332	2.831156
75	698.326	706.234	678.4202	694.3267	1.875061	2.841564
78	684.1161	691.3654	644.4273	673.3029	1.892095	2.828211
81	659.8854	737.0801	687.7286	694.898	1.908485	2.841921
84	710.0801	719.6926	692.7661	707.5129	1.924279	2.849734
87	665.1454	685.4047	690.8642	680.4714	1.939519	2.83281
90	655.4435	654.8408	708.0096	672.7646	1.954243	2.827863
93	735.2719	719.8421	688.6069	714.5736	1.968483	2.854047
96	695.5136	701.5468	679.2996	692.12	1.982271	2.840181
99	685.6115	720.3259	649.8548	685.2641	1.995635	2.835858
102	674.23	651.9314	649.5203	658.5606	2.0086	2.818596
105	729.1853	732.8746	639.2958	700.4519	2.021189	2.845378
108	730.5044	735.7978	676.5995	714.3006	2.033424	2.853881
111	732.0309	734.1923	682.3819	716.2017	2.045323	2.855035
114	664.3616	671.2165	690.0676	675.2152	2.056905	2.829442
117	670.6884	669.1384	676.5665	672.1311	2.068186	2.827454
120	658.3766	666.1597	628.2984	650.9449	2.079181	2.813544
123	705.4374	701.9842	720.7184	709.38	2.089905	2.850879
126	701.4557	710.3096	704.913	705.5594	2.100371	2.848534
129	703.7541	708.293	651.2578	687.7683	2.11059	2.837442
132	701.404	698.6287	645.3423	681.7917	2.120574	2.833652
135	689.249	693.343	641.2779	674.6233	2.130334	2.829061
138	642.889	651.2327	631.728	641.9499	2.139879	2.807501
141	656.1342	662.3463	580.283	632.9212	2.149219	2.80135
144	630.0823	649.7275	586.0816	621.9638	2.158362	2.793765
147	636.3618	633.9147	701.7462	657.3409	2.167317	2.817791
150	705.1915	704.5457	695.9938	701.9103	2.176091	2.846282

Sample 193						
Image 8778		Particle O_1B		Approximate Particle size - 179.396 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1449.274	1449.274	1449.274	1449.274	0.477121	3.16115
6	1332.995	1332.995	1332.995	1332.995	0.778151	3.124828
9	1263.341	1263.472	1276.089	1267.634	0.954243	3.102994
12	1219.744	1219.058	1231.676	1223.493	1.079181	3.087601
15	1222.152	1229.177	1235.498	1228.942	1.176091	3.089532
18	1211.382	1205.279	1202.355	1206.339	1.255273	3.081469
21	1212.59	1224.424	1217.98	1218.331	1.322219	3.085765
24	1191.973	1235.251	1206.018	1211.081	1.380211	3.083173
27	1188.147	1183.164	1198.387	1189.899	1.431364	3.07551
30	1178.052	1191.945	1177.504	1182.5	1.477121	3.072801
33	1170.588	1161.487	1200.998	1177.691	1.518514	3.071031
36	1174.521	1211.344	1179.383	1188.416	1.556303	3.074968
39	1162.983	1211.481	1168.729	1181.064	1.591065	3.072273
42	1176.802	1216.493	1165.545	1186.28	1.623249	3.074187
45	1176.085	1201.136	1175.433	1184.218	1.653213	3.073432
48	1169.417	1215.198	1237.441	1207.352	1.681241	3.081834
51	1159.444	1216.475	1227.468	1201.129	1.70757	3.07959
54	1186.457	1209.783	1179.971	1192.07	1.732394	3.076302
57	1198.446	1189.217	1181.984	1189.882	1.755875	3.075504
60	1155.108	1238.161	1192.09	1195.12	1.778151	3.077411
63	1175.835	1194.335	1171.015	1180.395	1.799341	3.072027
66	1207.745	1234.214	1208.525	1216.828	1.819544	3.085229
69	1201.393	1133.509	1163.924	1166.275	1.838849	3.066801
72	1131.395	1192.264	1135.019	1152.893	1.857332	3.061789
75	1167.655	1181.954	1216.365	1188.658	1.875061	3.075057
78	1163.131	1224.246	1133.948	1173.775	1.892095	3.069585
81	1116.86	1148.239	1129.414	1131.504	1.908485	3.053656
84	1152.24	1220.421	1133.577	1168.746	1.924279	3.06772
87	1081.284	1237.09	1159.419	1159.264	1.939519	3.064182
90	1174.267	1250.252	1154.66	1193.06	1.954243	3.076662
93	1175.987	1163.427	1186.058	1175.157	1.968483	3.070096
96	1191.568	1144.683	1174.963	1170.404	1.982271	3.068336
99	1151.907	1158.014	1152.877	1154.266	1.995635	3.062306
102	1075.365	1236.119	1094.133	1135.206	2.0086	3.055075
105	1105.742	1169.965	1087.759	1121.155	2.021189	3.049666
108	1102.588	1184.756	1179.117	1155.487	2.033424	3.062765
111	1176.467	1199.208	1179.298	1184.991	2.045323	3.073715
114	1101.773	1212.994	1105.943	1140.237	2.056905	3.056995
117	1100.536	1205.636	1112.672	1139.615	2.068186	3.056758
120	1112.809	1137.545	1114.041	1121.465	2.079181	3.049786
123	1125.322	1069.212	1121.004	1105.179	2.089905	3.043433
126	1142.762	1081.487	1120.622	1114.957	2.100371	3.047258
129	1102.209	1077.941	1126.543	1102.231	2.11059	3.042273
132	1060.071	1067.415	1055.68	1061.055	2.120574	3.025738
135	1004.844	1200.01	1009.384	1071.413	2.130334	3.029957
138	996.3274	1210.71	998.7186	1068.585	2.139879	3.028809
141	1090.411	1092.073	1091.892	1091.459	2.149219	3.038007
144	1108.7	1092.765	1111.238	1104.235	2.158362	3.043061
147	1112.64	1113.346	1110.465	1112.151	2.167317	3.046164
150	1121.696	1120.22	1122.917	1121.611	2.176091	3.049842

Sample 193						
Image 8778		Particle O_2		Approximate Particle size - 104.9878 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1279.935	1279.961	1279.883	1279.926	0.477121	3.107185
6	1057.806	1057.831	1059.968	1058.535	0.778151	3.024705
9	1036.348	1045.903	1038.586	1040.279	0.954243	3.01715
12	1029.308	1013.843	1045.143	1029.431	1.079181	3.012597
15	1003.88	989.8522	1035.451	1009.728	1.176091	3.004204
18	995.1544	1000.589	1011.688	1002.477	1.255273	3.001075
21	971.444	975.4385	964.3022	970.3949	1.322219	2.986949
24	974.7934	963.045	960.7697	966.2027	1.380211	2.985068
27	986.7497	973.4655	962.4343	974.2165	1.431364	2.988655
30	976.1959	947.1024	1021.649	981.6491	1.477121	2.991956
33	936.3362	958.7603	968.2678	954.4548	1.518514	2.979755
36	974.96	929.955	1014.909	973.2747	1.556303	2.988235
39	945.1807	929.8774	972.2612	949.1064	1.591065	2.977315
42	943.6561	928.1656	951.2739	941.0319	1.623249	2.973604
45	963.5438	937.6774	982.0456	961.0889	1.653213	2.982764
48	930.5056	952.8679	981.3752	954.9162	1.681241	2.979965
51	933.5181	939.8113	955.312	942.8805	1.70757	2.974457
54	945.7184	901.5891	956.8492	934.7189	1.732394	2.970681
57	948.9116	915.6085	982.9218	949.1473	1.755875	2.977334
60	990.0136	899.9031	961.334	950.4169	1.778151	2.977914
63	955.9529	949.0512	937.7393	947.5811	1.799341	2.976616
66	900.3369	915.8088	991.8118	935.9858	1.819544	2.971269
69	938.623	952.0099	1021.519	970.7173	1.838849	2.987093
72	934.3402	914.6715	991.1974	946.7364	1.857332	2.976229
75	934.9864	922.6234	1012.311	956.6401	1.875061	2.980749
78	931.0137	915.423	912.3668	919.6012	1.892095	2.9636
81	1014.891	968.0468	983.0942	988.6775	1.908485	2.995055
84	970.7738	937.5613	980.8956	963.0769	1.924279	2.983661
87	899.1541	967.3609	949.1881	938.5677	1.939519	2.972466
90	1008.275	948.2814	1020.893	992.4833	1.954243	2.996723
93	932.5421	945.6706	990.7107	956.3078	1.968483	2.980598
96	921.0946	904.1168	998.7485	941.32	1.982271	2.973737
99	1013.723	958.4913	980.3574	984.1907	1.995635	2.993079
102	977.3788	934.6568	953.8956	955.3104	2.0086	2.980145
105	923.5721	932.674	887.3644	914.5368	2.021189	2.961201
108	1007.724	925.7109	1001.247	978.2273	2.033424	2.99044
111	1000.346	919.3134	953.9229	957.8609	2.045323	2.981302
114	980.3801	899.595	952.8419	944.2723	2.056905	2.975097
117	963.0627	881.5957	901.525	915.3945	2.068186	2.961608
120	914.1097	886.8693	995.8951	932.2914	2.079181	2.969552
123	973.4407	886.013	1002.14	953.8645	2.089905	2.979487
126	953.1039	980.1228	1002.788	978.6716	2.100371	2.990637
129	925.0461	962.1425	992.6094	959.9327	2.11059	2.982241
132	906.7291	924.3744	996.8367	942.6467	2.120574	2.974349
135	888.4452	884.7894	996.0974	923.1107	2.130334	2.965254
138	893.2578	861.3466	1002.662	919.0889	2.139879	2.963358
141	893.1353	937.8732	982.2051	937.7379	2.149219	2.972081
144	1023.17	928.2695	932.8737	961.4379	2.158362	2.982921
147	993.1018	930.2323	1029.923	984.4189	2.167317	2.99318
150	982.3179	892.0597	986.923	953.7669	2.176091	2.979442

Sample 193						
Image 8778		Particle O_3		Approximate Particle size - 242.9713 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1989.101	1988.411	1990.051	1989.188	0.477121	3.298676
6	1800.205	1791.548	1795.077	1795.61	0.778151	3.254212
9	1657.822	1655.817	1657.261	1656.966	0.954243	3.219314
12	1588.65	1591.289	1580.98	1586.973	1.079181	3.20057
15	1515.493	1508.926	1507.242	1510.554	1.176091	3.179136
18	1510.685	1494.678	1500.304	1501.889	1.255273	3.176638
21	1456.771	1450.821	1463.656	1457.083	1.322219	3.163484
24	1429.821	1453.137	1430.738	1437.899	1.380211	3.157728
27	1421.639	1438.399	1436.655	1432.231	1.431364	3.156013
30	1405.025	1406.844	1418.134	1410.001	1.477121	3.149219
33	1380.844	1398.703	1399.681	1393.076	1.518514	3.143975
36	1388.355	1397.625	1396.188	1394.056	1.556303	3.14428
39	1374.777	1378.045	1380.328	1377.717	1.591065	3.13916
42	1383.577	1390.937	1405.925	1393.48	1.623249	3.144101
45	1362.176	1406.228	1429.901	1399.435	1.653213	3.145953
48	1358.66	1333.266	1368.953	1353.627	1.681241	3.131499
51	1362.86	1363.916	1355.282	1360.686	1.70757	3.133758
54	1392.632	1388.885	1387.081	1389.532	1.732394	3.142869
57	1356.108	1342.337	1376.372	1358.272	1.755875	3.132987
60	1377.902	1382.696	1402.902	1387.833	1.778151	3.142337
63	1330.722	1327.239	1354.067	1337.343	1.799341	3.126243
66	1315.525	1351.09	1336.037	1334.217	1.819544	3.125227
69	1334.057	1317.909	1375.429	1342.465	1.838849	3.127903
72	1301.641	1379.356	1348.989	1343.329	1.857332	3.128182
75	1321.918	1314.584	1348.643	1328.381	1.875061	3.123323
78	1331.704	1326.314	1319.526	1325.848	1.892095	3.122494
81	1359.014	1351.639	1309.268	1339.974	1.908485	3.127096
84	1329.291	1320.414	1354.678	1334.794	1.924279	3.125414
87	1348.998	1347.185	1330.933	1342.372	1.939519	3.127873
90	1292.298	1380.072	1363.965	1345.445	1.954243	3.128866
93	1312.996	1308.238	1296.044	1305.76	1.968483	3.115863
96	1302.557	1293.958	1321.995	1306.17	1.982271	3.116
99	1278.297	1274.052	1268.536	1273.628	1.995635	3.105043
102	1283.967	1279.441	1269.237	1277.548	2.0086	3.106377
105	1323.458	1298.661	1289.898	1304.006	2.021189	3.11528
108	1320.036	1430.276	1411.667	1387.326	2.033424	3.142179
111	1345.293	1331.276	1379.582	1352.05	2.045323	3.130993
114	1384.014	1374.783	1398.847	1385.881	2.056905	3.141726
117	1391.679	1381.257	1372.743	1381.893	2.068186	3.140474
120	1311.037	1315.341	1315.745	1314.041	2.079181	3.118609
123	1338.071	1272.901	1395.322	1335.431	2.089905	3.125622
126	1309.022	1294.925	1290.702	1298.216	2.100371	3.113347
129	1372.955	1360.993	1264.497	1332.815	2.11059	3.12477
132	1236.652	1311.507	1255.165	1267.775	2.120574	3.103042
135	1194.176	1245.397	1344.081	1261.218	2.130334	3.10079
138	1223.589	1221.551	1362.231	1269.124	2.139879	3.103504
141	1264.85	1249.664	1374.723	1296.412	2.149219	3.112743
144	1356.169	1347.167	1399.998	1367.778	2.158362	3.136016
147	1348.749	1332.365	1367.544	1349.552	2.167317	3.13019
150	1299.322	1301.629	1333.684	1311.545	2.176091	3.117783

Sample 193						
Image 8779		Particle O_1		Approximate Particle size - 178.6069 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	2706.776	2706.614	2706.776	2706.722	0.477121	3.432444
6	2150.384	2155.061	2149.822	2151.756	0.778151	3.332793
9	1968.807	1972.931	1969.533	1970.424	0.954243	3.29456
12	1903.784	1904.61	1909.292	1905.895	1.079181	3.280099
15	1845.983	1845.768	1851.125	1847.625	1.176091	3.266614
18	1811.442	1818.929	1801.161	1810.51	1.255273	3.257801
21	1780.727	1790.235	1781.797	1784.253	1.322219	3.251456
24	1777.621	1782.172	1787.115	1782.302	1.380211	3.250981
27	1775.399	1751.777	1787.492	1771.556	1.431364	3.248355
30	1759.555	1764.332	1754.811	1759.566	1.477121	3.245406
33	1707.713	1712.405	1716.073	1712.063	1.518514	3.23352
36	1710.971	1734.286	1714.543	1719.934	1.556303	3.235512
39	1709.564	1741.296	1704.784	1718.548	1.591065	3.235162
42	1732.955	1758.628	1703.509	1731.697	1.623249	3.238472
45	1673.133	1707.46	1672.259	1684.284	1.653213	3.226415
48	1609.927	1723.653	1686.027	1673.202	1.681241	3.223548
51	1617.47	1662.538	1689.51	1656.506	1.70757	3.219193
54	1655.233	1668.551	1639.793	1654.525	1.732394	3.218673
57	1677.386	1684.287	1662.356	1674.677	1.755875	3.223931
60	1599.159	1608.923	1655.662	1621.248	1.778151	3.209849
63	1635.206	1610.603	1662.016	1635.942	1.799341	3.213768
66	1665.097	1641.171	1658.499	1654.922	1.819544	3.218778
69	1594.379	1678.434	1662.755	1645.189	1.838849	3.216216
72	1607.348	1694.191	1655.026	1652.188	1.857332	3.21806
75	1650.536	1670.837	1670.256	1663.876	1.875061	3.221121
78	1654.705	1646.704	1641.03	1647.48	1.892095	3.21682
81	1551.035	1664.512	1644.14	1619.895	1.908485	3.209487
84	1566.399	1671.588	1648.184	1628.723	1.924279	3.211847
87	1561.478	1685.407	1611.057	1619.314	1.939519	3.209331
90	1582.572	1567.298	1622.83	1590.9	1.954243	3.201643
93	1586.583	1584.122	1652.774	1607.826	1.968483	3.206239
96	1514.165	1589.609	1650.14	1584.638	1.982271	3.19993
99	1545.427	1612.727	1658.951	1605.702	1.995635	3.205665
102	1523.656	1589.487	1635.322	1582.822	2.0086	3.199432
105	1469.252	1624.111	1624.263	1572.542	2.021189	3.196602
108	1566.074	1623.074	1617.015	1602.054	2.033424	3.204677
111	1564.686	1621.908	1602.472	1596.355	2.045323	3.20313
114	1515.505	1512.614	1598.82	1542.313	2.056905	3.188173
117	1547.35	1599.331	1612.764	1586.482	2.068186	3.200435
120	1575.999	1612.57	1660.02	1616.197	2.079181	3.208494
123	1589.291	1549.761	1624.753	1587.935	2.089905	3.200833
126	1598.383	1555.408	1635.445	1596.412	2.100371	3.203145
129	1615.88	1436.956	1631.19	1561.342	2.11059	3.193498
132	1628.713	1496.697	1644.092	1589.834	2.120574	3.201352
135	1632.646	1500.852	1679.796	1604.431	2.130334	3.205321
138	1639.383	1527.983	1630.91	1599.425	2.139879	3.203964
141	1532.616	1530.064	1636.199	1566.293	2.149219	3.194873
144	1512.498	1523.777	1646.685	1560.987	2.158362	3.193399
147	1470.617	1531.997	1570.879	1524.498	2.167317	3.183127
150	1437.273	1544.495	1574.434	1518.734	2.176091	3.181482

Sample 193						
Image 8779		Particle O_2A		Approximate Particle size - 145.8743 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1018.837	1022.356	1021.013	1020.735	0.477121	3.008913
6	954.894	950.6482	951.5132	952.3518	0.778151	2.978797
9	944.788	953.5016	942.9976	947.0957	0.954243	2.976394
12	933.8574	941.8345	934.8922	936.8614	1.079181	2.971675
15	933.7246	936.948	934.1135	934.9287	1.176091	2.970778
18	937.1465	930.7869	929.8248	932.5861	1.255273	2.969689
21	934.5632	930.6339	936.9719	934.0563	1.322219	2.970373
24	935.395	936.8304	921.2203	931.1486	1.380211	2.969019
27	922.2349	918.7163	937.0416	925.9976	1.431364	2.96661
30	926.6853	931.5646	956.9594	938.4031	1.477121	2.972389
33	935.0026	920.4761	949.8199	935.0995	1.518514	2.970858
36	921.0955	935.758	919.9851	925.6129	1.556303	2.966429
39	920.6968	936.125	966.4194	941.0804	1.591065	2.973627
42	906.968	920.8976	955.7509	927.8722	1.623249	2.967488
45	922.7413	913.5336	947.1512	927.8087	1.653213	2.967458
48	920.743	932.7218	947.494	933.6529	1.681241	2.970185
51	908.817	938.3422	926.2448	924.468	1.70757	2.965892
54	907.8102	940.4744	928.0774	925.454	1.732394	2.966355
57	934.4285	921.3997	967.1014	940.9765	1.755875	2.973579
60	929.9905	922.8145	969.883	940.896	1.778151	2.973542
63	928.2743	915.4884	960.9718	934.9115	1.799341	2.970771
66	928.1909	890.351	962.4896	927.0105	1.819544	2.967085
69	932.9177	954.829	940.1219	942.6229	1.838849	2.974338
72	913.3218	943.4364	952.9938	936.584	1.857332	2.971547
75	940.936	952.4756	943.785	945.7322	1.875061	2.975768
78	897.1436	917.7176	945.9634	920.2749	1.892095	2.963918
81	902.9351	932.5647	969.8477	935.1158	1.908485	2.970865
84	894.2921	948.8565	927.8893	923.6793	1.924279	2.965521
87	930.3984	926.6287	939.4402	932.1558	1.939519	2.969488
90	937.5431	933.8686	968.0072	946.473	1.954243	2.976108
93	915.0905	932.5417	915.3347	920.989	1.968483	2.964254
96	887.9124	900.6918	925.2855	904.6299	1.982271	2.956471
99	920.5345	964.2543	973.2756	952.6881	1.995635	2.978951
102	893.7485	940.853	957.498	930.6998	2.0086	2.96881
105	881.4276	915.626	908.549	901.8675	2.021189	2.955143
108	953.4807	943.6513	895.3945	930.8422	2.033424	2.968876
111	946.1309	932.1472	979.8209	952.6997	2.045323	2.978956
114	913.5966	930.8119	939.2382	927.8822	2.056905	2.967493
117	913.2055	888.0499	930.0633	910.4396	2.068186	2.959251
120	876.4778	879.2464	922.7965	892.8402	2.079181	2.950774
123	935.0737	894.6833	983.7153	937.8241	2.089905	2.972121
126	933.1513	913.4627	978.7814	941.7985	2.100371	2.973958
129	934.5359	917.1743	934.767	928.8257	2.11059	2.967934
132	916.8338	918.7668	919.8651	918.4886	2.120574	2.963074
135	870.8933	921.6034	909.9875	900.8281	2.130334	2.954642
138	878.3878	911.515	918.0199	902.6409	2.139879	2.955515
141	924.8673	971.163	906.8033	934.2779	2.149219	2.970476
144	898.9216	960.6278	975.9447	945.1647	2.158362	2.975507
147	884.1176	909.0829	973.7191	922.3065	2.167317	2.964875
150	884.762	892.7968	897.7075	891.7554	2.176091	2.950246

Sample 193						
Image 8779		Particle O_2B		Approximate Particle size - 174.9537 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1067.338	1065.5	1066.662	1066.5	0.477121	3.027961
6	973.4938	974.6907	973.9789	974.0545	0.778151	2.988583
9	957.4858	956.3876	961.549	958.4741	0.954243	2.98158
12	953.8889	960.613	958.7448	957.7489	1.079181	2.981252
15	944.7092	958.9801	949.675	951.1214	1.176091	2.978236
18	944.3884	953.0085	949.9286	949.1085	1.255273	2.977316
21	944.6168	963.5119	959.9556	956.0281	1.322219	2.980471
24	938.8582	935.3761	952.7052	942.3132	1.380211	2.974195
27	937.7928	953.0157	943.6353	944.8146	1.431364	2.975347
30	937.0601	970.4476	943.1486	950.2188	1.477121	2.977824
33	938.4522	948.631	943.5541	943.5458	1.518514	2.974763
36	938.4559	930.6297	959.3303	942.8053	1.556303	2.974422
39	938.0256	952.0388	941.7266	943.9303	1.591065	2.97494
42	932.6426	942.8477	928.4543	934.6482	1.623249	2.970648
45	929.1042	926.1055	929.6519	928.2872	1.653213	2.967682
48	931.2422	953.1605	942.5464	942.3164	1.681241	2.974197
51	911.6013	948.1664	935.1016	931.6231	1.70757	2.96924
54	915.6884	941.0681	938.115	931.6238	1.732394	2.969241
57	922.6608	954.4145	936.9371	938.0041	1.755875	2.972205
60	942.4597	965.303	960.4099	956.0575	1.778151	2.980484
63	906.4432	929.9805	911.4606	915.9614	1.799341	2.961877
66	898.8612	909.3079	890.9393	899.7028	1.819544	2.954099
69	944.537	921.8433	947.4335	937.9379	1.838849	2.972174
72	922.6302	885.9342	916.3442	908.3029	1.857332	2.958231
75	925.7533	962.9426	951.4103	946.7021	1.875061	2.976213
78	901.4223	927.9185	952.3032	927.2147	1.892095	2.96718
81	899.0777	947.8298	956.4804	934.4626	1.908485	2.970562
84	883.3301	964.0347	920.1555	922.5068	1.924279	2.96497
87	890.3313	914.155	924.4485	909.6449	1.939519	2.958872
90	934.7734	924.376	909.4426	922.864	1.954243	2.965138
93	933.3617	922.9285	900.0272	918.7725	1.968483	2.963208
96	915.3376	931.9071	936.5123	927.919	1.982271	2.96751
99	890.8693	887.8878	927.8581	902.2051	1.995635	2.955305
102	835.7797	887.7195	926.294	883.2644	2.0086	2.946091
105	899.6891	892.9769	915.8527	902.8396	2.021189	2.955611
108	896.2164	895.1973	910.9278	900.7805	2.033424	2.954619
111	890.4385	852.1758	966.6752	903.0965	2.045323	2.955734
114	824.0278	831.6345	937.2619	864.3081	2.056905	2.936669
117	886.4066	877.628	901.5783	888.5376	2.068186	2.948676
120	887.6348	893.0983	858.293	879.6754	2.079181	2.944322
123	875.9127	903.9939	819.5838	866.4968	2.089905	2.937767
126	885.0453	913.532	734.5403	844.3725	2.100371	2.926534
129	891.0984	924.5638	722.0718	845.9113	2.11059	2.927325
132	899.9262	692.1174	716.3087	769.4508	2.120574	2.886181
135	888.358	708.7488	721.3	772.8023	2.130334	2.888068
138	855.4801	721.6808	720.979	766.0466	2.139879	2.884255
141	925.8717	750.248	726.7835	800.9677	2.149219	2.903615
144	918.074	777.2471	733.2651	809.5287	2.158362	2.908232
147	684.9789	804.0331	824.9985	771.3368	2.167317	2.887244
150	685.3254	818.7427	828.0948	777.3876	2.176091	2.890638

Sample 193						
Image 8779		Particle O_3A		Approximate Particle size - 69.90745 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	563.8991	561.663	563.122	562.8947	0.477121	2.750427
6	526.0487	525.839	523.3942	525.094	0.778151	2.720237
9	508.003	509.7173	512.0674	509.9292	0.954243	2.70751
12	509.1266	510.8546	507.2853	509.0888	1.079181	2.706794
15	515.4288	510.2629	509.9565	511.8827	1.176091	2.70917
18	506.2345	501.9194	507.2429	505.1323	1.255273	2.703405
21	502.5295	484.2311	511.7447	499.5018	1.322219	2.698537
24	513.2205	488.0446	493.7673	498.3441	1.380211	2.697529
27	502.8583	479.3132	472.6199	484.9305	1.431364	2.685679
30	470.8589	497.2875	491.293	486.4798	1.477121	2.687065
33	503.2999	487.1044	470.5639	486.9894	1.518514	2.68752
36	461.0265	460.8167	468.8345	463.5592	1.556303	2.666105
39	482.7986	489.0359	505.7014	492.512	1.591065	2.692417
42	439.8344	444.1385	484.1503	456.0411	1.623249	2.659004
45	447.4265	455.0269	456.7232	453.0589	1.653213	2.656155
48	467.1821	480.4302	442.3199	463.3107	1.681241	2.665872
51	478.8622	477.1731	475.4354	477.1569	1.70757	2.678661
54	489.9308	518.0288	474.7643	494.2413	1.732394	2.693939
57	436.3276	432.871	483.0514	450.75	1.755875	2.653936
60	436.2696	442.2709	505.5569	461.3658	1.778151	2.664045
63	456.5601	401.743	508.7059	455.6697	1.799341	2.65865
66	436.3692	428.9827	454.5747	439.9755	1.819544	2.643429
69	427.6329	400.0714	456.2831	427.9958	1.838849	2.63144
72	451.2109	394.1677	432.1154	425.8313	1.857332	2.629238
75	449.8161	400.0372	444.784	431.5458	1.875061	2.635027
78	462.5664	405.6017	444.4012	437.5231	1.892095	2.641001
81	462.269	497.1913	447.5408	469.0004	1.908485	2.671173
84	383.9489	493.0541	452.2194	443.0741	1.924279	2.646476
87	390.3417	417.666	459.1945	422.4007	1.939519	2.625725
90	393.6518	408.075	472.9154	424.8807	1.954243	2.628267
93	404.2137	412.501	482.5756	433.0968	1.968483	2.636585
96	412.9943	411.096	486.2434	436.7779	1.982271	2.640261
99	361.0455	312.5097	435.4525	369.6692	1.995635	2.567813
102	348.7148	408.5363	436.6943	397.9818	2.0086	2.599863
105	351.8754	386.1724	438.8568	392.3015	2.021189	2.59362
108	346.9215	394.4754	443.6768	395.0246	2.033424	2.596624
111	353.3112	394.0638	451.9707	399.7819	2.045323	2.601823
114	360.8003	397.9402	453.4691	404.0699	2.056905	2.606456
117	359.9152	404.3839	456.7363	407.0118	2.068186	2.609607
120	469.6721	411.0307	461.5999	447.4342	2.079181	2.650729
123	476.2746	415.9949	469.8386	454.036	2.089905	2.65709
126	481.5485	421.983	461.8011	455.1109	2.100371	2.658117
129	484.7231	423.1794	455.4529	454.4518	2.11059	2.657488
132	490.7987	428.4025	377.4849	432.2287	2.120574	2.635714
135	496.1261	435.2203		465.6732	2.130334	2.668081
138	501.4541	440.2629		470.8585	2.139879	2.67289
141	501.8143	440.3346		471.0745	2.149219	2.67309
144	508.7851	445.2991		477.0421	2.158362	2.678557
147	515.6782	451.0057		483.342	2.167317	2.684254
150	521.1182	450.9583		486.0383	2.176091	2.68667

Sample 193						
Image 8779		Particle O_3B		Approximate Particle size - 139.133 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	842.1827	842.0204	841.1255	841.7762	0.477121	2.925197
6	800.6951	803.4901	804.8352	803.0068	0.778151	2.904719
9	794.1578	792.9269	791.3556	792.8134	0.954243	2.899171
12	785.7838	784.4617	789.0629	786.4361	1.079181	2.895663
15	769.7932	776.6544	776.7664	774.4047	1.176091	2.888968
18	777.6074	776.171	786.7057	780.1614	1.255273	2.892184
21	761.092	759.628	767.0357	762.5852	1.322219	2.882288
24	755.0869	753.4764	761.0851	756.5495	1.380211	2.878837
27	756.2996	754.7928	762.2558	757.7827	1.431364	2.879545
30	743.1873	741.9489	768.7255	751.2872	1.477121	2.875806
33	767.3222	768.3929	761.7511	765.8221	1.518514	2.884128
36	752.8723	751.5347	775.2753	759.8941	1.556303	2.880753
39	743.4335	741.7569	728.3745	737.855	1.591065	2.867971
42	765.0912	762.7202	749.8254	759.2123	1.623249	2.880363
45	750.7907	749.5244	770.1356	756.8169	1.653213	2.878991
48	740.8308	739.5897	753.6052	744.6752	1.681241	2.871967
51	739.1097	737.037	762.1785	746.1084	1.70757	2.872802
54	723.8973	722.7598	753.6565	733.4379	1.732394	2.865363
57	745.8984	744.5951	741.0031	743.8322	1.755875	2.871475
60	720.1797	712.8091	755.2644	729.4177	1.778151	2.862976
63	720.4686	719.0582	721.8841	720.4703	1.799341	2.857616
66	698.4561	697.3768	744.6397	713.4909	1.819544	2.853388
69	711.7086	710.3937	760.3141	727.4721	1.838849	2.861816
72	711.3809	709.972	737.3976	719.5835	1.857332	2.857081
75	700.6395	698.9793	701.9286	700.5158	1.875061	2.845418
78	740.9301	741.9203	740.5052	741.1185	1.892095	2.869888
81	696.0659	694.3289	698.2612	696.2187	1.908485	2.842746
84	735.6003	735.4879	719.2266	730.1049	1.924279	2.863385
87	705.4708	755.1722	746.9803	735.8744	1.939519	2.866804
90	745.6793	744.435	689.3452	726.4865	1.954243	2.861228
93	704.1146	703.0328	681.9358	696.3611	1.968483	2.842834
96	717.6163	717.5379	739.2421	724.7988	1.982271	2.860217
99	695.2703	693.9999	728.0364	705.7689	1.995635	2.848662
102	668.4574	666.8981	704.3279	679.8945	2.0086	2.832442
105	668.2134	661.1269	702.3926	677.2443	2.021189	2.830745
108	662.6562	661.0728	768.1111	697.28	2.033424	2.843407
111	722.0681	722.2549	766.4133	736.9121	2.045323	2.867416
114	722.3345	721.053	766.6887	736.6921	2.056905	2.867286
117	729.3969	731.8553	777.9289	746.3937	2.068186	2.872968
120	731.8204	737.2484	737.6436	735.5708	2.079181	2.866624
123	702.6559	701.4029	690.645	698.2346	2.089905	2.844001
126	657.2314	655.7318	760.5934	691.1855	2.100371	2.839595
129	717.2493	717.6846	752.6935	729.2091	2.11059	2.862852
132	709.0842	706.4423	748.9146	721.4804	2.120574	2.858225
135	703.9984	704.9693	753.0077	720.6585	2.130334	2.857729
138	706.9395	707.7797	754.6064	723.1085	2.139879	2.859203
141	709.7755	709.9418	764.1873	727.9682	2.149219	2.862112
144	716.0416	716.0671	784.0861	738.7316	2.158362	2.868487
147	731.1375	730.6129	776.247	745.9991	2.167317	2.872738
150	739.5014	738.5248	746.7933	741.6065	2.176091	2.870174

Sample 193						
Image 8779		Particle O_3C		Approximate Particle size - 124.3254 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	635.2993	634.4937	635.56	635.1177	0.477121	2.802854
6	612.051	610.0685	610.5846	610.9014	0.778151	2.785971
9	601.5872	611.6116	602.3101	605.1696	0.954243	2.781877
12	589.3306	590.4492	587.936	589.2386	1.079181	2.770291
15	592.4931	591.6846	592.5398	592.2392	1.176091	2.772497
18	594.4952	605.1567	579.4315	593.0278	1.255273	2.773075
21	580.3611	586.544	578.7451	581.8834	1.322219	2.764836
24	574.9901	576.5369	574.9197	575.4822	1.380211	2.760032
27	571.6255	581.3026	569.1684	574.0322	1.431364	2.758936
30	575.7958	583.1559	571.4414	576.7977	1.477121	2.761024
33	573.4456	580.1088	561.7029	571.7524	1.518514	2.757208
36	564.8174	575.0989	550.5262	563.4808	1.556303	2.750879
39	553.0433	556.7288	579.078	562.95	1.591065	2.75047
42	541.9158	561.2813	580.1473	561.1148	1.623249	2.749052
45	568.6185	557.9266	568.3441	564.9631	1.653213	2.75202
48	559.3029	556.4123	546.7275	554.1476	1.681241	2.743625
51	567.5373	547.7173	546.6027	553.9524	1.70757	2.743472
54	566.1808	557.7955	548.5492	557.5085	1.732394	2.746251
57	573.4116	566.99	561.0055	567.1357	1.755875	2.753687
60	540.3985	577.9705	559.9194	559.4295	1.778151	2.747745
63	540.0795	570.5446	582.3644	564.3295	1.799341	2.751533
66	556.6324	571.7299	562.5645	563.6423	1.819544	2.751004
69	534.1439	564.9744	520.0632	539.7272	1.838849	2.732174
72	536.6034	550.7123	521.027	536.1142	1.857332	2.729257
75	562.3515	554.8392	558.6839	558.6249	1.875061	2.74712
78	506.927	548.626	539.3982	531.6504	1.892095	2.725626
81	523.3358	531.9807	522.1196	525.812	1.908485	2.720831
84	516.9442	526.1293	509.5974	517.557	1.924279	2.713958
87	519.2791	538.6054	502.7049	520.1965	1.939519	2.716167
90	521.4899	467.0099	499.1091	495.8696	1.954243	2.695368
93	526.6808	471.647	502.8889	500.4056	1.968483	2.699322
96	526.3492	524.4535	505.3584	518.7204	1.982271	2.714933
99	535.9872	525.3394	515.1251	525.4839	1.995635	2.720559
102	548.8762	518.9865	540.1686	536.0104	2.0086	2.729173
105	556.6482	528.557	549.021	544.7421	2.021189	2.736191
108	559.2304	535.814	551.0623	548.7022	2.033424	2.739337
111	564.0408	539.6423	555.9485	553.2105	2.045323	2.74289
114	488.3099	510.6039	473.2936	490.7358	2.056905	2.690848
117	478.0367	516.6249	472.0296	488.8971	2.068186	2.689217
120	490.2381	525.1204	486.1679	500.5088	2.079181	2.699412
123	513.5117	526.7446	490.5287	510.2617	2.089905	2.707793
126	497.8781	534.5468	501.597	511.3406	2.100371	2.70871
129	409.4998	537.1858	499.995	482.2269	2.11059	2.683251
132	414.8602	544.4127	495.8717	485.0482	2.120574	2.685785
135	417.6491	556.73	397.3673	457.2488	2.130334	2.660153
138	423.2238	559.4578	396.88	459.8539	2.139879	2.66262
141	427.0446	565.2303	403.6686	465.3145	2.149219	2.667747
144	423.5979	569.1474	409.6795	467.4749	2.158362	2.669758
147	423.9459	533.3544	421.6707	459.657	2.167317	2.662434
150	432.0931	462.0715	422.2244	438.7963	2.176091	2.642263

Sample 193						
Image 8779		Particle O_4A		Approximate Particle size - 107.4622 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	769.9978	768.0901	767.6378	768.5752	0.477121	2.885686
6	719.3998	719.079	715.5853	718.0214	0.778151	2.856137
9	711.3239	711.0247	708.61	710.3195	0.954243	2.851454
12	703.8785	706.1749	702.8884	704.3139	1.079181	2.847766
15	708.3153	704.8038	702.3141	705.1444	1.176091	2.848278
18	703.2928	694.699	695.8212	697.9377	1.255273	2.843817
21	695.5227	699.7996	699.1754	698.1659	1.322219	2.843959
24	696.5167	694.7175	701.421	697.5517	1.380211	2.843576
27	690.3087	687.7178	695.8828	691.3031	1.431364	2.839669
30	709.0834	675.1337	682.683	688.9667	1.477121	2.838198
33	719.5452	697.8228	681.5856	699.6512	1.518514	2.844882
36	670.4846	674.1447	677.1805	673.9366	1.556303	2.828619
39	681.5109	690.9783	671.5464	681.3452	1.591065	2.833367
42	690.1011	692.1324	696.5215	692.9183	1.623249	2.840682
45	699.8764	684.0037	672.8927	685.5909	1.653213	2.836065
48	668.5399	667.021	692.5232	676.028	1.681241	2.829965
51	697.5948	661.5343	673.8397	677.6563	1.70757	2.831009
54	679.6522	670.8588	674.414	674.975	1.732394	2.829288
57	669.8703	648.5147	653.1865	657.1905	1.755875	2.817691
60	720.2997	656.6449	703.7733	693.5726	1.778151	2.841092
63	695.1741	686.8866	698.5117	693.5241	1.799341	2.841062
66	673.4448	650.9977	646.937	657.1265	1.819544	2.817649
69	678.9861	656.5739	648.9998	661.5199	1.838849	2.820543
72	725.0722	680.3037	703.2847	702.8869	1.857332	2.846885
75	673.0005	640.7714	721.03	678.2673	1.875061	2.831401
78	690.7696	654.5477	671.0614	672.1262	1.892095	2.827451
81	687.0834	660.1851	667.3083	671.5256	1.908485	2.827063
84	685.0922	599.1447	651.6507	645.2959	1.924279	2.809759
87	680.0262	610.504	652.0592	647.5298	1.939519	2.81126
90	694.8447	619.2949	663.031	659.0569	1.954243	2.818923
93	636.232	634.989	607.5654	626.2621	1.968483	2.796756
96	640.8818	575.3881	611.5555	609.2751	1.982271	2.784813
99	642.033	585.8568	615.2194	614.3697	1.995635	2.78843
102	688.4165	591.288	665.3851	648.3632	2.0086	2.811818
105	684.9213	593.3985	663.8035	647.3744	2.021189	2.811156
108	692.735	602.2314	672.0364	655.6676	2.033424	2.816684
111	693.0403	617.2192	673.9081	661.3892	2.045323	2.820457
114	703.789	622.6954	679.4476	668.644	2.056905	2.825195
117	709.127	641.6829	686.0579	678.9559	2.068186	2.831842
120	710.7844	652.2742	686.7369	683.2652	2.079181	2.834589
123	713.988	667.7926	682.7328	688.1711	2.089905	2.837696
126	613.2025	560.3433	588.774	587.4399	2.100371	2.768963
129	612.1501	568.5664	578.4041	586.3735	2.11059	2.768174
132	605.1766	578.5723	571.5285	585.0925	2.120574	2.767225
135	604.9749	584.2539	575.0745	588.1011	2.130334	2.769452
138	610.9984	596.1014	581.0759	596.0586	2.139879	2.775289
141	617.7906	601.6798	587.8649	602.4451	2.149219	2.779917
144	594.0804	602.1712	580.3493	592.2003	2.158362	2.772469
147	601.9453	457.6072	673.2414	577.598	2.167317	2.761626
150	686.7713	466.5782	671.4808	608.2768	2.176091	2.784101

Sample 193						
Image 8779		Particle O_4B		Approximate Particle size - 100.5261 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	900.059	903.6739	899.9888	901.2406	0.477121	2.954841
6	817.7404	818.5841	815.4861	817.2702	0.778151	2.912366
9	810.8736	814.2963	809.4776	811.5492	0.954243	2.909315
12	791.7925	788.8214	791.2767	790.6302	1.079181	2.897973
15	772.3971	778.2396	773.2992	774.6453	1.176091	2.889103
18	769.4967	766.9843	772.0975	769.5262	1.255273	2.886223
21	764.8275	760.7717	751.4089	759.0027	1.322219	2.880243
24	755.9613	767.1577	777.3076	766.8089	1.380211	2.884687
27	757.1743	752.3726	773.629	761.0586	1.431364	2.881418
30	737.2325	761.358	753.7324	750.7743	1.477121	2.875509
33	737.5775	732.5099	752.3129	740.8001	1.518514	2.869701
36	717.5403	738.3643	747.9228	734.6091	1.556303	2.866056
39	737.5495	738.4839	740.6818	738.9051	1.591065	2.868589
42	725.6851	724.9516	743.0765	731.2377	1.623249	2.864059
45	728.3349	723.24	749.2673	733.6141	1.653213	2.865468
48	745.4376	720.606	761.2294	742.4243	1.681241	2.870652
51	724.7724	721.4186	739.368	728.5197	1.70757	2.862441
54	736.623	732.1068	745.9563	738.2287	1.732394	2.868191
57	714.8605	712.4391	722.8336	716.7111	1.755875	2.855344
60	705.4043	692.0158	713.1464	703.5222	1.778151	2.847278
63	709.576	741.2457	732.946	727.9226	1.799341	2.862085
66	732.7628	733.739	711.3289	725.9436	1.819544	2.860903
69	731.5212	732.9478	716.5542	727.0077	1.838849	2.861539
72	691.9338	710.0908	688.4646	696.8297	1.857332	2.843127
75	740.4699	737.8876	728.9852	735.7809	1.875061	2.866749
78	734.616	733.5181	725.8538	731.3293	1.892095	2.864113
81	710.503	712.3823	745.1338	722.673	1.908485	2.858942
84	710.0966	711.5261	723.8323	715.1517	1.924279	2.854398
87	726.512	718.7516	726.8521	724.0386	1.939519	2.859762
90	735.3984	736.4684	717.2968	729.7212	1.954243	2.863157
93	674.8616	719.6116	700.9097	698.461	1.968483	2.844142
96	678.4459	732.0583	702.3833	704.2958	1.982271	2.847755
99	699.2963	709.8687	693.2584	700.8078	1.995635	2.845599
102	627.3741	699.5742	687.7673	671.5719	2.0086	2.827092
105	695.4512	695.6646	661.5494	684.2217	2.021189	2.835197
108	704.1113	682.0452	670.5029	685.5531	2.033424	2.836041
111	691.3783	700.0189	674.0521	688.4831	2.045323	2.837893
114	673.7814	674.3395	691.5021	679.8743	2.056905	2.832429
117	650.9182	650.907	687.6631	663.1628	2.068186	2.82162
120	650.0604	651.5231	687.241	662.9415	2.079181	2.821475
123	649.9467	641.4383	679.0063	656.7971	2.089905	2.817431
126	652.3259	646.0764	690.0317	662.8113	2.100371	2.82139
129	688.9482	680.0704	696.8663	688.6283	2.11059	2.837985
132	693.2651	685.3516	681.5542	686.7236	2.120574	2.836782
135	699.1235	692.668	752.8278	714.8731	2.130334	2.854229
138	712.665	700.0175	657.9442	690.2089	2.139879	2.838981
141	718.1105	712.4925	619.224	683.2757	2.149219	2.834596
144	721.6614	721.1093	621.4355	688.0687	2.158362	2.837632
147	721.5714	714.7264	616.869	684.3889	2.167317	2.835303
150	720.5211	715.9265	722.2687	719.5721	2.176091	2.857074

Sample 193						
Image 8779		Particle O_5		Approximate Particle size - 183.0297 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1315.965	1316.724	1317.372	1316.687	0.477121	3.119483
6	1240.149	1239.269	1240.149	1239.856	0.778151	3.093371
9	1232.772	1229.632	1232.319	1231.574	0.954243	3.090461
12	1226.773	1225.124	1225.564	1225.82	1.079181	3.088427
15	1217.191	1222.54	1224.044	1221.258	1.176091	3.086807
18	1215.611	1215.513	1228.472	1219.865	1.255273	3.086312
21	1216.386	1215.936	1218.801	1217.041	1.322219	3.085305
24	1222.215	1216.813	1212.212	1217.08	1.380211	3.085319
27	1222.721	1214.847	1210.97	1216.179	1.431364	3.084998
30	1212.035	1206.381	1206.9	1208.439	1.477121	3.082225
33	1210.079	1225.986	1207.881	1214.649	1.518514	3.084451
36	1199.944	1215.629	1199.221	1204.932	1.556303	3.080962
39	1216.382	1201.484	1223.508	1213.791	1.591065	3.084144
42	1231.243	1212.477	1200.386	1214.702	1.623249	3.08447
45	1199.073	1213.062	1207.681	1206.605	1.653213	3.081565
48	1190.872	1202.916	1202.064	1198.617	1.681241	3.078681
51	1195.787	1209.986	1209.02	1204.931	1.70757	3.080962
54	1219.269	1191.138	1234.79	1215.066	1.732394	3.0846
57	1211.256	1181.623	1181.452	1191.444	1.755875	3.076073
60	1223.73	1184.143	1183.676	1197.183	1.778151	3.07816
63	1222.622	1247.528	1191.127	1220.426	1.799341	3.086511
66	1197.601	1162.391	1168.87	1176.287	1.819544	3.070513
69	1203.363	1222.994	1243.728	1223.362	1.838849	3.087555
72	1200.265	1213.817	1230.818	1214.967	1.857332	3.084564
75	1190.584	1208.815	1249.257	1216.219	1.875061	3.085012
78	1202.531	1221.631	1245.086	1223.083	1.892095	3.087456
81	1218.08	1242.216	1182.157	1214.151	1.908485	3.084273
84	1167.316	1183.266	1237.973	1196.185	1.924279	3.077798
87	1196.943	1211.401	1233.097	1213.814	1.939519	3.084152
90	1142.11	1157.242	1225.618	1174.99	1.954243	3.070034
93	1149.128	1179.106	1216.264	1181.499	1.968483	3.072434
96	1169.139	1175.078	1242.566	1195.594	1.982271	3.077584
99	1130.107	1130.975	1235.111	1165.398	1.995635	3.066474
102	1300.073	1157.783	1230.261	1229.372	2.0086	3.089683
105	1262.51	1186.558	1218.555	1222.541	2.021189	3.087263
108	1260.545	1198.944	1213.029	1224.173	2.033424	3.087843
111	1147.331	1153.579	1127.583	1142.831	2.045323	3.057982
114	1306.186	1120.352	1229.496	1218.678	2.056905	3.085889
117	1128.228	1096.319	1208.229	1144.259	2.068186	3.058524
120	1301.249	1301.469	1221.071	1274.596	2.079181	3.105373
123	1298.212	1292.815	1218.678	1269.902	2.089905	3.10377
126	1271.918	1223.843	1252.432	1249.398	2.100371	3.096701
129	1076.32	1090.304	1224.313	1130.312	2.11059	3.053198
132	1280.902	1099.862	1166.834	1182.533	2.120574	3.072813
135	1278.708	1363.517	1195.218	1279.147	2.130334	3.106921
138	1276.445	1356.431	1178.265	1270.38	2.139879	3.103934
141	1277.622	1301.517	1180.753	1253.297	2.149219	3.098054
144	1282.274	1280.544	1170.519	1244.446	2.158362	3.094976
147	1293.285	1063.083	1215.594	1190.654	2.167317	3.075786
150	1252.839	1350.033	1204.998	1269.29	2.176091	3.103561

Sample 193						
Image 8780		Particle O_1		Approximate Particle size - 86.53677 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1159.655	1160.506	1157.353	1159.172	0.477121	3.064148
6	1066.831	1067.605	1064.509	1066.315	0.778151	3.027885
9	1042.213	1040.357	1043.415	1041.995	0.954243	3.017866
12	1046.376	1047.936	1048.205	1047.506	1.079181	3.020156
15	1038.399	1045.034	1041.474	1041.636	1.176091	3.017716
18	1035.417	1030.234	1033.991	1033.214	1.255273	3.01419
21	1033.789	1031.556	1028.601	1031.315	1.322219	3.013391
24	1034.444	1033.418	1036.011	1034.624	1.380211	3.014783
27	1025.932	1027.873	1042.927	1032.244	1.431364	3.013782
30	1016.434	1019.849	1037.863	1024.715	1.477121	3.010603
33	1015.399	1014.437	1031.729	1020.522	1.518514	3.008822
36	1002.128	1008.301	1006.671	1005.7	1.556303	3.002469
39	1019.197	1027.375	1026.989	1024.52	1.591065	3.010521
42	1019.817	1005.316	1020.373	1015.169	1.623249	3.006538
45	1012.33	1000.821	1024.527	1012.559	1.653213	3.00542
48	997.5936	1007.267	1012.372	1005.744	1.681241	3.002488
51	1011.15	1010.995	1000.094	1007.413	1.70757	3.003207
54	989.5886	1006.992	1015.383	1003.988	1.732394	3.001728
57	998.1641	1023.573	1017.441	1013.059	1.755875	3.005635
60	998.6033	1021.592	1014.339	1011.512	1.778151	3.004971
63	999.6158	995.2839	1006.533	1000.478	1.799341	3.000207
66	984.0536	983.8388	1024.963	997.6183	1.819544	2.998964
69	989.9425	981.2964	1029.266	1000.168	1.838849	3.000073
72	970.3813	979.6348	1010.698	986.9046	1.857332	2.994275
75	991.7175	985.9747	999.9736	992.5553	1.875061	2.996755
78	975.3784	976.7474	992.2651	981.4636	1.892095	2.991874
81	975.9251	994.9947	990.2785	987.0661	1.908485	2.994346
84	971.1435	976.8103	984.5208	977.4915	1.924279	2.990113
87	963.9965	987.2389	983.368	978.2011	1.939519	2.990428
90	977.0945	1016.389	1023.672	1005.718	1.954243	3.002476
93	981.6529	970.2327	982.8574	978.2477	1.968483	2.990449
96	979.6454	1013.899	1012.065	1001.87	1.982271	3.000811
99	986.1075	1001.018	1007.227	998.1177	1.995635	2.999182
102	983.5142	1001.594	991.8409	992.3163	2.0086	2.99665
105	973.5046	984.9764	989.9151	982.7987	2.021189	2.992465
108	956.666	1001.012	989.8892	982.5225	2.033424	2.992343
111	950.5159	956.853	993.5963	966.9884	2.045323	2.985421
114	955.9625	955.2698	985.3264	965.5196	2.056905	2.984761
117	969.374	1029.427	987.8374	995.546	2.068186	2.998061
120	962.3408	1029.239	1006.954	999.5111	2.079181	2.999788
123	939.5791	995.27	985.1432	973.3308	2.089905	2.98826
126	941.8045	917.8414	975.0246	944.8902	2.100371	2.975381
129	944.7488	927.2162	964.7208	945.5619	2.11059	2.97569
132	965.3459	988.5586	969.5805	974.495	2.120574	2.98878
135	966.4844	988.1675	973.3487	976.0002	2.130334	2.98945
138	976.8939	983.7624	1057.617	1006.091	2.139879	3.002637
141	967.0164	977.5754	1019.54	988.0438	2.149219	2.994776
144	955.8315	962.679	968.0984	962.203	2.158362	2.983267
147	973.0819	964.9675	943.9246	960.658	2.167317	2.982569
150	939.4376	945.1078	943.6176	942.721	2.176091	2.974383

Sample 193						
Image 8780		Particle O_2		Approximate Particle size - 120.3604 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1192.564	1192.564	1193.787	1192.971	0.477121	3.07663
6	1116.551	1116.769	1117.438	1116.92	0.778151	3.048022
9	1103.697	1106.49	1104.465	1104.884	0.954243	3.043317
12	1109.87	1100.163	1102.291	1104.108	1.079181	3.043012
15	1092.695	1093.327	1097.127	1094.383	1.176091	3.039169
18	1102.277	1084.967	1086.279	1091.174	1.255273	3.037894
21	1106.7	1087.614	1092.595	1095.636	1.322219	3.039666
24	1101.291	1083.667	1093.474	1092.811	1.380211	3.038545
27	1071.419	1072.116	1074.176	1072.57	1.431364	3.030426
30	1074.328	1072.453	1082.622	1076.468	1.477121	3.032001
33	1077.521	1080.132	1079.283	1078.979	1.518514	3.033013
36	1087.471	1065.995	1070.477	1074.648	1.556303	3.031266
39	1090.209	1068.34	1070.661	1076.403	1.591065	3.031975
42	1094.08	1062.639	1072.003	1076.241	1.623249	3.031909
45	1075.181	1068.518	1073.421	1072.373	1.653213	3.030346
48	1082.486	1060.337	1067.589	1070.137	1.681241	3.029439
51	1064.909	1059.688	1064.24	1062.946	1.70757	3.026511
54	1087.424	1056.939	1062.366	1068.91	1.732394	3.028941
57	1082.937	1059.371	1067.971	1070.093	1.755875	3.029422
60	1086.445	1064.502	1051.502	1067.483	1.778151	3.028361
63	1085.737	1047.571	1056.172	1063.16	1.799341	3.026599
66	1044.617	1035.338	1050.301	1043.418	1.819544	3.018459
69	1083.53	1058.991	1070.267	1070.929	1.838849	3.029761
72	1084.957	1057.745	1042.948	1061.884	1.857332	3.026077
75	1060.404	1042.724	1048.272	1050.467	1.875061	3.021382
78	1079.749	1053.288	1047.561	1060.199	1.892095	3.025387
81	1072.424	1047.312	1057.305	1059.014	1.908485	3.024902
84	1084.127	1043.219	1040.588	1055.978	1.924279	3.023655
87	1071.205	1042.713	1051.496	1055.138	1.939519	3.023309
90	1073.978	1041.315	1050.686	1055.326	1.954243	3.023387
93	1071.862	1050.904	1029.212	1050.659	1.968483	3.021462
96	1064.972	1045.338	1037.341	1049.217	1.982271	3.020865
99	1057.583	1024.99	1025.383	1035.985	1.995635	3.015354
102	1059.959	1053.427	1054.528	1055.971	2.0086	3.023652
105	1049.427	1036.784	1047.955	1044.722	2.021189	3.019001
108	1065.735	1043.24	1050.325	1053.1	2.033424	3.02247
111	1120.595	1055.239	1043.756	1073.197	2.045323	3.030679
114	1106.055	1033.445	1047.013	1062.171	2.056905	3.026194
117	1046.149	1013.787	1056.042	1038.659	2.068186	3.016473
120	1039.102	1013.659	1023.5	1025.42	2.079181	3.010902
123	1039.364	1017.905	1017.049	1024.773	2.089905	3.010628
126	1022.542	1055.837	1012.173	1030.184	2.100371	3.012915
129	1063.773	1056.231	1004.725	1041.577	2.11059	3.017691
132	1046.924	1015.927	978.0058	1013.619	2.120574	3.005875
135	1030.228	994.1549	984.5076	1002.963	2.130334	3.001285
138	1031.334	991.7268	983.6718	1002.244	2.139879	3.000974
141	1118.928	1002.718	1007.188	1042.945	2.149219	3.018261
144	1099.754	1062.899	1011.277	1057.977	2.158362	3.024476
147	1103.039	1071.771	1030.053	1068.288	2.167317	3.028688
150	1088.765	1063.754	1012.812	1055.11	2.176091	3.023298

Sample 193						
Image 8780		Particle O_3		Approximate Particle size - 117.0093 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1230.297	1226.593	1228.756	1228.548	0.477121	3.089392
6	1158.91	1154.309	1161.162	1158.127	0.778151	3.063756
9	1145.019	1143.606	1143.888	1144.171	0.954243	3.058491
12	1138.333	1140.843	1140.685	1139.954	1.079181	3.056887
15	1134.455	1133.254	1138.795	1135.501	1.176091	3.055188
18	1126.765	1123.05	1133.21	1127.675	1.255273	3.052184
21	1127.65	1138.311	1138.684	1134.882	1.322219	3.054951
24	1121.186	1120.098	1119.596	1120.293	1.380211	3.049332
27	1115.457	1124.889	1133.892	1124.746	1.431364	3.051054
30	1114.712	1123.282	1132.739	1123.578	1.477121	3.050603
33	1128.559	1116.608	1123.478	1122.881	1.518514	3.050334
36	1110.648	1115.649	1132.814	1119.704	1.556303	3.049103
39	1122.179	1110.412	1122.624	1118.405	1.591065	3.048599
42	1094.723	1102.307	1093.206	1096.745	1.623249	3.040106
45	1085.126	1103.811	1079.563	1089.5	1.653213	3.037227
48	1097.827	1081.754	1096.882	1092.154	1.681241	3.038284
51	1080.117	1089.218	1121.976	1097.104	1.70757	3.040248
54	1103.812	1062.829	1091.57	1086.07	1.732394	3.035858
57	1088.106	1062.145	1117.634	1089.295	1.755875	3.037146
60	1092.14	1069.135	1093.979	1085.085	1.778151	3.035464
63	1072.209	1078.738	1073.834	1074.927	1.799341	3.031379
66	1077.562	1086.126	1069.645	1077.777	1.819544	3.032529
69	1062.051	1076.571	1057.901	1065.508	1.838849	3.027557
72	1063.851	1076.588	1049.981	1063.474	1.857332	3.026727
75	1032.874	1048.72	1120.33	1067.308	1.875061	3.02829
78	1084.577	1063.563	1088.427	1078.856	1.892095	3.032963
81	1075.168	1085.463	1092.397	1084.343	1.908485	3.035167
84	1086.454	1093.904	1067.794	1082.717	1.924279	3.034515
87	1082.317	1070.768	1105.743	1086.276	1.939519	3.03594
90	1056.115	1071.146	1058.79	1062.017	1.954243	3.026132
93	1062.307	1088.424	1067.145	1072.625	1.968483	3.030448
96	1066.405	1112.389	1078.518	1085.771	1.982271	3.035738
99	1101.717	1116.953	1101.459	1106.71	1.995635	3.044034
102	1040.175	1053.647	1119.144	1070.989	2.0086	3.029785
105	1040.159	1062.292	1043.697	1048.716	2.021189	3.020658
108	1085.32	1096.293	1045.744	1075.785	2.033424	3.031726
111	1071.31	1056.941	1074.082	1067.444	2.045323	3.028345
114	1074.318	1064.677	1071.416	1070.137	2.056905	3.029439
117	1045.298	1040.069	1046.216	1043.861	2.068186	3.018643
120	1026.999	1036.167	1045.657	1036.274	2.079181	3.015475
123	1170.453	1037.565	1150.044	1119.354	2.089905	3.048967
126	1047.024	990.0078	1166.078	1067.704	2.100371	3.028451
129	1089.495	936.6184	1079.552	1035.222	2.11059	3.015033
132	1094.191	1118.262	1081.422	1097.958	2.120574	3.040586
135	1094.616	1124.795	1076.269	1098.56	2.130334	3.040824
138	1083.453	981.6501	1082.931	1049.345	2.139879	3.020918
141	1093.198	1043.189	1090.291	1075.56	2.149219	3.031634
144	1112.559	1089.543	1104.08	1102.061	2.158362	3.042206
147	1049.372	1032.734	1050.469	1044.192	2.167317	3.01878
150	1023.097	1043.614	1046.549	1037.753	2.176091	3.016094

Sample 193						
Image 8780		Particle O_4A		Approximate Particle size - 190.98879 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1036.587	1032.017	1033.151	1033.919	0.477121	3.014486
6	954.9417	950.2563	952.115	952.4377	0.778151	2.978837
9	951.0916	947.4699	954.2073	950.9229	0.954243	2.978145
12	943.0388	938.7159	941.7122	941.1556	1.079181	2.973661
15	950.5015	937.5135	941.6403	943.2184	1.176091	2.974612
18	933.868	947.2327	934.2648	938.4552	1.255273	2.972414
21	950.504	930.4378	941.3318	940.7579	1.322219	2.973478
24	945.3655	924.7774	931.7411	933.9613	1.380211	2.970329
27	962.1471	926.2008	927.1599	938.5026	1.431364	2.972435
30	952.2559	919.8826	932.6057	934.9147	1.477121	2.970772
33	937.7313	942.6204	924.2415	934.8644	1.518514	2.970749
36	912.8895	928.5579	925.58	922.3425	1.556303	2.964892
39	950.2457	893.9214	902.0204	915.3958	1.591065	2.961609
42	959.6857	918.2445	896.0067	924.6456	1.623249	2.965975
45	951.9135	944.2429	894.3577	930.1714	1.653213	2.968563
48	941.9104	956.5016	926.8358	941.7493	1.681241	2.973935
51	945.6985	961.0428	928.6603	945.1339	1.70757	2.975493
54	952.5979	964.0906	930.8977	949.1954	1.732394	2.977356
57	938.5058	890.225	900.6217	909.7842	1.755875	2.958938
60	953.5891	910.2606	925.7731	929.8743	1.778151	2.968424
63	888.211	900.0961	843.4218	877.243	1.799341	2.94312
66	891.2209	912.2408	861.4583	888.3067	1.819544	2.948563
69	902.4206	915.5209	848.6235	888.855	1.838849	2.948831
72	917.2833	934.2338	857.1954	902.9042	1.857332	2.955642
75	929.4911	952.4317	872.8954	918.2727	1.875061	2.962972
78	914.1574	926.9867	834.5212	891.8884	1.892095	2.950311
81	916.8438	930.5649	839.1503	895.5197	1.908485	2.952075
84	922.8816	845.3018	838.3059	868.8298	1.924279	2.938935
87	924.6855	853.8867	834.0972	870.8898	1.939519	2.939963
90	843.1813	851.3597	838.1314	844.2241	1.954243	2.926458
93	839.7653	856.8108	935.812	877.4627	1.968483	2.943229
96	829.1771	836.4219	819.1289	828.2426	1.982271	2.918158
99	838.7305	848.2014	838.2311	841.721	1.995635	2.925168
102	846.7776	856.9656	846.9576	850.2336	2.0086	2.929538
105	856.7565	863.4032	949.3376	889.8324	2.021189	2.949308
108	864.4496	876.5044	971.1907	904.0482	2.033424	2.956192
111	873.5672	888.6848	987.0103	916.4208	2.045323	2.962095
114	837.6191	848.8699	981.0397	889.1762	2.056905	2.948988
117	803.5941	820.4541	910.402	844.8167	2.068186	2.926763
120	819.2271	835.2886	915.6199	856.7119	2.079181	2.932835
123	819.1998	838.4775	808.093	821.9234	2.089905	2.914831
126	820.8173	828.9982	687.9441	779.2532	2.100371	2.891679
129	833.9171	842.6313	686.381	787.6431	2.11059	2.896329
132	850.942	853.644	697.8804	800.8221	2.120574	2.903536
135	866.3996	870.3353	707.7841	814.8397	2.130334	2.911072
138	873.8723	882.9211	797.9611	851.5848	2.139879	2.930228
141	881.0045	890.6647	806.014	859.2277	2.149219	2.934108
144	883.3002	889.6725	785.1985	852.7237	2.158362	2.930808
147	884.1735	892.6037	605.7096	794.1623	2.167317	2.899909
150	813.5948	822.4802	691.3484	775.8078	2.176091	2.889754

Sample 193						
Image 8780		Particle O_4B		Approximate Particle size - 121.3346 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1390.205	1389.304	1390.543	1390.017	0.477121	3.14302
6	1292.063	1296.28	1292.544	1293.629	0.778151	3.11181
9	1278.912	1292.564	1279.006	1283.494	0.954243	3.108394
12	1270.46	1262.052	1259.376	1263.963	1.079181	3.101734
15	1263.444	1244.677	1242.362	1250.161	1.176091	3.096966
18	1253.952	1244.044	1240.409	1246.135	1.255273	3.095565
21	1237.317	1237.751	1225.958	1233.675	1.322219	3.091201
24	1247.631	1249.172	1235.518	1244.107	1.380211	3.094858
27	1230.192	1252.734	1227.46	1236.795	1.431364	3.092298
30	1218.744	1189.306	1187.697	1198.582	1.477121	3.078668
33	1231.638	1230.888	1192.167	1218.231	1.518514	3.08573
36	1224.702	1223.788	1189.614	1212.701	1.556303	3.083754
39	1244.852	1250.899	1209.192	1234.981	1.591065	3.09166
42	1241.229	1238.841	1213.936	1231.336	1.623249	3.090376
45	1179.192	1172.984	1134.495	1162.224	1.653213	3.06529
48	1205.922	1133.461	1197.133	1178.839	1.681241	3.071454
51	1162.778	1195.687	1142.915	1167.127	1.70757	3.067118
54	1183.699	1176.097	1124.949	1161.582	1.732394	3.06505
57	1132.912	1187.801	1141.204	1153.972	1.755875	3.062195
60	1166.33	1167.97	1126.286	1153.529	1.778151	3.062028
63	1162.631	1183.759	1143.335	1163.242	1.799341	3.06567
66	1170.688	1173.51	1139.694	1161.297	1.819544	3.064943
69	1145.824	1168.342	1137.113	1150.427	1.838849	3.060859
72	1176.998	1186.175	1137.36	1166.844	1.857332	3.067013
75	1163.841	1168.92	1131.634	1154.798	1.875061	3.062506
78	1125.04	1179.206	1121.376	1141.874	1.892095	3.057618
81	1162.357	1152.856	1118.545	1144.586	1.908485	3.058648
84	1117.131	1130.735	1124.784	1124.216	1.924279	3.05085
87	1149.141	1185.179	1137.394	1157.238	1.939519	3.063423
90	1161.699	1171.81	1114.71	1149.406	1.954243	3.060474
93	1172.938	1166.709	1125.39	1155.012	1.968483	3.062587
96	1153.977	1150.9	1113.92	1139.599	1.982271	3.056752
99	1132.035	1174.959	1108.954	1138.649	1.995635	3.05639
102	1152.158	1172.327	1107.736	1144.074	2.0086	3.058454
105	1142.134	1164.491	1077.891	1128.172	2.021189	3.052375
108	1159.117	1174.551	1095.241	1142.97	2.033424	3.058035
111	1160.45	1143.491	1139.112	1147.684	2.045323	3.059822
114	1164.295	1136.404	1107.086	1135.928	2.056905	3.055351
117	1149.596	1104.809	1091.554	1115.32	2.068186	3.047399
120	1118.972	1168.297	1120.07	1135.78	2.079181	3.055294
123	1133.222	1176.824	1117.201	1142.416	2.089905	3.057824
126	1121.19	1154.209	1123.723	1133.041	2.100371	3.054246
129	1124.827	1144.403	1120.457	1129.896	2.11059	3.053038
132	1090.063	1161.539	1117.37	1122.991	2.120574	3.050376
135	1137.212	1148.575	1101.531	1129.106	2.130334	3.052735
138	1119.083	1129.005	1082.98	1110.356	2.139879	3.045462
141	1117.975	1122.849	1084.698	1108.507	2.149219	3.044738
144	1089.266	1065.083	1086.768	1080.372	2.158362	3.033573
147	1102.209	1142.787	1054.698	1099.898	2.167317	3.041352
150	1099.32	1143.803	1090.287	1111.137	2.176091	3.045767

Sample 193						
Image 8780		Particle O_5		Approximate Particle size - 68.74817 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1356.617	1355.95	1371.379	1361.315	0.477121	3.133959
6	1111.655	1116.991	1121.119	1116.588	0.778151	3.047893
9	1073.184	1058.641	1051.497	1061.107	0.954243	3.025759
12	1032.298	1026.092	1033.214	1030.535	1.079181	3.013063
15	1002.092	1004.851	1008.413	1005.118	1.176091	3.002217
18	970.4455	974.9305	977.5787	974.3182	1.255273	2.988701
21	974.1132	976.2087	977.2056	975.8425	1.322219	2.98938
24	975.6822	971.0951	968.1733	971.6502	1.380211	2.98751
27	970.7974	971.1463	967.6849	969.8762	1.431364	2.986716
30	949.0843	949.3018	951.6703	950.0188	1.477121	2.977732
33	966.0546	964.8749	961.3856	964.105	1.518514	2.984124
36	949.1939	960.0459	951.2395	953.4931	1.556303	2.979318
39	955.0506	951.779	975.0892	960.6396	1.591065	2.98256
42	953.2079	959.0424	957.251	956.5004	1.623249	2.980685
45	945.3226	944.6614	954.9752	948.3197	1.653213	2.976955
48	938.605	938.2908	938.7363	938.544	1.681241	2.972455
51	948.0421	944.012	942.3334	944.7958	1.70757	2.975338
54	954.9561	933.1475	945.3333	944.479	1.732394	2.975192
57	921.7277	927.5083	947.6793	932.3051	1.755875	2.969558
60	920.8913	918.0801	936.9332	925.3015	1.778151	2.966283
63	946.8442	933.2271	925.3073	935.1262	1.799341	2.97087
66	934.0027	907.7261	940.3533	927.3607	1.819544	2.967249
69	920.4438	950.4112	942.3845	937.7465	1.838849	2.972085
72	920.4839	939.6262	885.8752	915.3284	1.857332	2.961577
75	934.019	956.1169	908.3481	932.828	1.875061	2.969802
78	983.4673	939.6	905.7598	942.9424	1.892095	2.974485
81	914.5184	963.2767	902.6447	926.8133	1.908485	2.966992
84	900.7936	965.1031	920.6104	928.8357	1.924279	2.967939
87	903.8615	973.5425	874.1208	917.1749	1.939519	2.962452
90	910.6775	930.0543	882.0336	907.5885	1.954243	2.957889
93	875.1525	851.2577	865.1271	863.8458	1.968483	2.936436
96	873.1329	939.053	860.9601	891.0487	1.982271	2.949901
99	860.8459	913.1422	878.8856	884.2912	1.995635	2.946595
102	846.1767	866.4633	888.3885	867.0095	2.0086	2.938024
105	883.7533	938.9822	888.7099	903.8151	2.021189	2.95608
108	903.225	932.3284	899.1762	911.5765	2.033424	2.959793
111	896.9232	935.2568	871.5082	901.2294	2.045323	2.954835
114	870.8464	929.6807	854.5762	885.0344	2.056905	2.94696
117	840.8796	935.1965	816.1924	864.0895	2.068186	2.936559
120	802.3289	898.1891	817.2949	839.271	2.079181	2.923902
123	798.0987	880.4099	823.8025	834.1037	2.089905	2.92122
126	794.2907	974.2802	835.5703	868.0471	2.100371	2.938543
129	797.1332	966.1688	818.6119	860.638	2.11059	2.934821
132	812.9291	968.4146	820.3958	867.2465	2.120574	2.938143
135	820.2938	886.4711	829.5038	845.4229	2.130334	2.927074
138	819.7435	870.7938	844.0182	844.8518	2.139879	2.926781
141	824.2034	871.0647	853.3431	849.5371	2.149219	2.929182
144	838.2554	873.8877	932.2487	881.4639	2.158362	2.945205
147	867.9208	882.0417	902.1048	884.0224	2.167317	2.946463
150	874.2105	884.6404	898.7717	885.8742	2.176091	2.947372

Sample 193						
Image 8781		Particle O_1A		Approximate Particle size - 143.5265 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1332.173	1332.808	1331.616	1332.199	0.477121	3.124569
6	1149.576	1148.767	1152.296	1150.213	0.778151	3.060778
9	1121.063	1121.256	1123.8	1122.039	0.954243	3.050008
12	1121.385	1124.231	1126.398	1124.005	1.079181	3.050768
15	1115.911	1116.101	1116.743	1116.252	1.176091	3.047762
18	1105.867	1108.172	1106.807	1106.948	1.255273	3.044127
21	1100.716	1103.818	1098.418	1100.984	1.322219	3.041781
24	1099.814	1105.147	1116.216	1107.059	1.380211	3.044171
27	1090.158	1109.316	1096.243	1098.572	1.431364	3.040829
30	1088.144	1082.881	1102.894	1091.306	1.477121	3.037947
33	1099.756	1094.869	1101.922	1098.849	1.518514	3.040938
36	1087.764	1100.554	1088.131	1092.15	1.556303	3.038282
39	1086.176	1095.773	1097.724	1093.224	1.591065	3.038709
42	1087.179	1085.857	1100.228	1091.088	1.623249	3.03786
45	1078.96	1088.616	1112.211	1093.262	1.653213	3.038724
48	1081.184	1084.124	1074.642	1079.983	1.681241	3.033417
51	1052.98	1058.286	1113.015	1074.76	1.70757	3.031312
54	1064.713	1068.891	1071.081	1068.228	1.732394	3.028664
57	1064.171	1077.205	1059.567	1066.981	1.755875	3.028157
60	1075.753	1071.024	1065.495	1070.757	1.778151	3.029691
63	1090.467	1066.66	1103.368	1086.832	1.799341	3.036162
66	1038.103	1086.682	1053.629	1059.471	1.819544	3.025089
69	1049.519	1075.609	1062.943	1062.69	1.838849	3.026407
72	1047.717	1083.401	1102.712	1077.943	1.857332	3.032596
75	1082.275	1084.406	1065.441	1077.374	1.875061	3.032367
78	1071.443	1034.098	1062.244	1055.928	1.892095	3.023634
81	1088.459	1037.83	1032.616	1052.968	1.908485	3.022415
84	1087.55	1036.052	1114.09	1079.231	1.924279	3.033114
87	1033.384	1057.734	1105.689	1065.603	1.939519	3.027595
90	1032.463	1072.033	1111.506	1072.001	1.954243	3.030195
93	1055.896	1063.363	1063.972	1061.077	1.968483	3.025747
96	1029.226	1057.836	1025.242	1037.435	1.982271	3.015961
99	1017.288	1072.388	1011.748	1033.808	1.995635	3.01444
102	1066.453	1007.765	1097.646	1057.288	2.0086	3.024193
105	1051.133	1016.668	1102.183	1056.661	2.021189	3.023936
108	1064.504	1002.164	1109.02	1058.563	2.033424	3.024717
111	1041.233	1009.569	1062.668	1037.823	2.045323	3.016123
114	1077.886	1006.692	1079.037	1054.538	2.056905	3.023062
117	1072.62	1010.041	1011.851	1031.504	2.068186	3.013471
120	1071.163	1010.661	1103.991	1061.938	2.079181	3.026099
123	1085.031	1013.507	1117.316	1071.951	2.089905	3.030175
126	1079.164	1019.658	1127.764	1075.529	2.100371	3.031622
129	1000.699	1046.471	1132.207	1059.792	2.11059	3.025221
132	987.8091	1064.253	1154.929	1068.997	2.120574	3.028976
135	987.8697	1045.852	1141.236	1058.319	2.130334	3.024617
138	983.2835	1054.394	1138.353	1058.677	2.139879	3.024763
141	1044.776	1060.415	1091.379	1065.523	2.149219	3.027563
144	1027.48	1050.653	1086.559	1054.897	2.158362	3.02321
147	1014.095	1058.004	1075.309	1049.136	2.167317	3.020832
150	1000.342	983.1855	1062.967	1015.498	2.176091	3.006679

Sample 193						
Image 8781		Particle O_1B		Approximate Particle size - 108.4559 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1164.366	1167.017	1171.428	1167.603	0.477121	3.067295
6	1029.239	1028.78	1033.178	1030.399	0.778151	3.013005
9	1000.766	1000.009	1001.796	1000.857	0.954243	3.000372
12	981.3079	987.0974	985.043	984.4828	1.079181	2.993208
15	979.6042	983.7971	979.5339	980.9784	1.176091	2.991659
18	973.0947	972.7856	974.515	973.4651	1.255273	2.98832
21	974.0083	978.1901	976.666	976.2881	1.322219	2.989578
24	970.5604	971.8161	966.2756	969.5507	1.380211	2.986571
27	966.3787	964.0566	964.7516	965.0623	1.431364	2.984555
30	969.5681	966.0758	964.4209	966.6883	1.477121	2.985286
33	966.5131	972.3367	965.356	968.0686	1.518514	2.985906
36	964.4008	962.9895	951.5793	959.6565	1.556303	2.982116
39	944.6573	958.7479	951.0129	951.4727	1.591065	2.978396
42	950.2253	941.9462	931.5815	941.251	1.623249	2.973705
45	931.7695	946.1595	941.0675	939.6655	1.653213	2.972973
48	948.3856	937.6595	936.5937	940.8796	1.681241	2.973534
51	925.6683	919.6243	953.0025	932.765	1.70757	2.969772
54	931.208	908.8684	938.8684	926.3149	1.732394	2.966759
57	927.0861	909.9961	949.6225	928.9016	1.755875	2.96797
60	917.925	910.7571	920.2525	916.3115	1.778151	2.962043
63	898.6667	906.119	926.2057	910.3305	1.799341	2.959199
66	908.7217	893.3549	890.0176	897.3647	1.819544	2.952969
69	937.4373	899.6073	925.209	920.7512	1.838849	2.964142
72	871.8798	892.9832	876.5081	880.457	1.857332	2.944708
75	865.9434	898.9609	903.8408	889.5817	1.875061	2.949186
78	947.4859	888.9801	910.4232	915.6297	1.892095	2.96172
81	954.0197	887.7299	863.8387	901.8628	1.908485	2.95514
84	921.412	871.8542	882.777	892.0144	1.924279	2.950372
87	879.1255	855.7714	889.0241	874.6403	1.939519	2.94183
90	957.0888	840.9997	834.4898	877.5261	1.954243	2.94326
93	917.9717	859.9694	876.0514	884.6642	1.968483	2.946778
96	942.9643	860.3146	887.5885	896.9558	1.982271	2.952771
99	951.3495	819.9702	816.5079	862.6092	1.995635	2.935814
102	948.8541	893.4039	817.4763	886.5781	2.0086	2.947717
105	956.1267	902.8561	826.6754	895.2194	2.021189	2.951929
108	911.631	915.944	782.407	869.994	2.033424	2.939516
111	848.2372	787.2767	797.8193	811.1111	2.045323	2.90908
114	857.3972	787.8564	812.649	819.3009	2.056905	2.913443
117	862.2892	821.3125	859.1451	847.5823	2.068186	2.928182
120	889.0481	816.1756	852.598	852.6072	2.079181	2.930749
123	896.4946	683.4244	860.8579	813.5923	2.089905	2.910407
126	900.3108	664.3341	867.597	810.7473	2.100371	2.908886
129	886.0778	703.1096	872.1821	820.4565	2.11059	2.914056
132	866.8837	589.0151	876.1001	777.333	2.120574	2.890607
135	701.8111	665.6368	694.8589	687.4356	2.130334	2.837232
138	704.1651	605.5492	719.8447	676.5197	2.139879	2.83028
141	699.0564	701.0003	781.0424	727.033	2.149219	2.861554
144	707.7419	638.5549	745.9092	697.402	2.158362	2.843483
147	693.7957	641.9011	754.3906	696.6958	2.167317	2.843043
150	698.8118	656.3696	757.6011	704.2608	2.176091	2.847734

Sample 193						
Image 8781		Particle O_2		Approximate Particle size - 168.076 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1682.874	1678.737	1680.885	1680.832	0.477121	3.225524
6	1558.096	1547.574	1547.119	1550.929	0.778151	3.190592
9	1549.284	1516.952	1515.853	1527.363	0.954243	3.183942
12	1543.659	1506.813	1521.415	1523.962	1.079181	3.182974
15	1528.598	1502.303	1501.076	1510.659	1.176091	3.179166
18	1523.522	1489.33	1497.461	1503.437	1.255273	3.177085
21	1526.662	1494.358	1487.811	1502.944	1.322219	3.176943
24	1517.49	1494.559	1495.073	1502.374	1.380211	3.176778
27	1519.78	1477.691	1503.653	1500.375	1.431364	3.1762
30	1510.758	1465.378	1451.586	1475.907	1.477121	3.169059
33	1523.951	1474.786	1476.772	1491.836	1.518514	3.173721
36	1489.445	1468.365	1463.615	1473.808	1.556303	3.168441
39	1507.954	1485.349	1503.112	1498.805	1.591065	3.175745
42	1519.442	1471.505	1453.561	1481.503	1.623249	3.170703
45	1497.593	1437.304	1429.835	1454.911	1.653213	3.162836
48	1479.19	1455.491	1486.247	1473.643	1.681241	3.168392
51	1500.198	1450.728	1461.924	1470.95	1.70757	3.167598
54	1503.07	1476.769	1464.612	1481.484	1.732394	3.170697
57	1526.494	1461.227	1474.443	1487.388	1.755875	3.172424
60	1470.225	1464.303	1470.301	1468.276	1.778151	3.166808
63	1530.096	1449.502	1415.369	1464.989	1.799341	3.165834
66	1504.9	1438.589	1439.776	1461.088	1.819544	3.164676
69	1478.904	1433.471	1436.253	1449.543	1.838849	3.161231
72	1512.442	1453.416	1448.754	1471.537	1.857332	3.167771
75	1493.223	1417.342	1405.931	1438.832	1.875061	3.15801
78	1512.2	1431.784	1473.337	1472.44	1.892095	3.168038
81	1458.563	1440.891	1427.151	1442.201	1.908485	3.159026
84	1483.273	1448.945	1434.818	1455.678	1.924279	3.163065
87	1505.884	1419.366	1454.222	1459.824	1.939519	3.1643
90	1478.81	1433.9	1411.009	1441.24	1.954243	3.158736
93	1474.667	1355.735	1470.648	1433.683	1.968483	3.156453
96	1485.284	1386.353	1414.825	1428.821	1.982271	3.154978
99	1481.421	1439.533	1445.635	1455.53	1.995635	3.163021
102	1607.324	1400.492	1463.694	1490.503	2.0086	3.173333
105	1470.761	1491.012	1367.609	1443.127	2.021189	3.159305
108	1462.312	1495.308	1408.712	1455.444	2.033424	3.162995
111	1534.133	1340.751	1442.925	1439.27	2.045323	3.158142
114	1496.542	1418.123	1447.709	1454.125	2.056905	3.162602
117	1572.703	1441.628	1301.176	1438.502	2.068186	3.157911
120	1502.991	1493.974	1356.148	1451.038	2.079181	3.161679
123	1457.389	1341.784	1385.279	1394.817	2.089905	3.144517
126	1586.733	1331.283	1333.632	1417.216	2.100371	3.151436
129	1587.827	1396.4	1325.191	1436.473	2.11059	3.157297
132	1606.201	1401.167	1339.402	1448.923	2.120574	3.161045
135	1580.587	1269.481	1359.797	1403.288	2.130334	3.147147
138	1446.793	1258.667	1376.246	1360.569	2.139879	3.13372
141	1579.81	1368.064	1408.312	1452.062	2.149219	3.161985
144	1523.076	1397.289	1449.021	1456.462	2.158362	3.163299
147	1445.906	1369.404	1287.615	1367.642	2.167317	3.135972
150	1434.863	1383	1283.155	1367.006	2.176091	3.13577

Sample 193						
Image 8781		Particle O_3		Approximate Particle size - 126.2543 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1296.674	1296.11	1294.341	1295.708	0.477121	3.112507
6	1207.488	1206.924	1205.742	1206.718	0.778151	3.081606
9	1198.587	1198.023	1198.126	1198.246	0.954243	3.078546
12	1187.753	1188.039	1185.698	1187.163	1.079181	3.07451
15	1181.809	1181.245	1180.759	1181.271	1.176091	3.07235
18	1175.642	1175.078	1174.591	1175.104	1.255273	3.070076
21	1183.64	1180.905	1179.255	1181.267	1.322219	3.072348
24	1178.149	1174.275	1173.935	1175.453	1.380211	3.070205
27	1165.183	1164.433	1170.694	1166.77	1.431364	3.066985
30	1170.669	1169.824	1177.207	1172.567	1.477121	3.069138
33	1160.244	1159.4	1169.139	1162.928	1.518514	3.065553
36	1163.583	1162.945	1166.282	1164.27	1.556303	3.066054
39	1160.986	1159.996	1161.952	1160.978	1.591065	3.064824
42	1162.241	1159.458	1168.172	1163.29	1.623249	3.065688
45	1161.409	1160.567	1163.383	1161.786	1.653213	3.065126
48	1158.504	1155.485	1153.859	1155.95	1.681241	3.062939
51	1159.025	1159.264	1161.775	1160.021	1.70757	3.064466
54	1146.499	1145.677	1153.204	1148.46	1.732394	3.060116
57	1150.436	1147.627	1154.162	1150.742	1.755875	3.060978
60	1155.888	1158.868	1155.305	1156.687	1.778151	3.063216
63	1155.754	1160.042	1143.376	1153.057	1.799341	3.061851
66	1162.284	1165.41	1153.656	1160.45	1.819544	3.064626
69	1131.869	1133.645	1135.497	1133.67	1.838849	3.054487
72	1148.411	1151.744	1147.853	1149.336	1.857332	3.060447
75	1150.783	1154.366	1140.113	1148.42	1.875061	3.060101
78	1139.284	1138.77	1141.94	1139.998	1.892095	3.056904
81	1164.613	1168.394	1138.696	1157.234	1.908485	3.063421
84	1152.48	1153.241	1146.644	1150.788	1.924279	3.060995
87	1156.433	1156.968	1150.006	1154.469	1.939519	3.062382
90	1147.643	1152.093	1142.21	1147.315	1.954243	3.059683
93	1139.981	1153.438	1146.675	1146.698	1.968483	3.059449
96	1120.143	1121.589	1143.473	1128.402	1.982271	3.052464
99	1121.874	1121.218	1143.607	1128.9	1.995635	3.052655
102	1135.196	1134.16	1135.254	1134.87	2.0086	3.054946
105	1120.906	1125.341	1125.463	1123.903	2.021189	3.050729
108	1117.504	1114.972	1137.13	1123.202	2.033424	3.050458
111	1141.926	1143.458	1140.959	1142.114	2.045323	3.05771
114	1128.177	1131.751	1105.736	1121.888	2.056905	3.049949
117	1112.091	1111.498	1104.492	1109.36	2.068186	3.045073
120	1112.963	1115.438	1131.101	1119.834	2.079181	3.049154
123	1160.186	1163.636	1137.424	1153.749	2.089905	3.062111
126	1152.301	1155.941	1134.561	1147.601	2.100371	3.059791
129	1148.278	1152.348	1130.928	1143.851	2.11059	3.05837
132	1134.268	1132.537	1137.644	1134.816	2.120574	3.054926
135	1092.093	1091.76	1127.071	1103.641	2.130334	3.042828
138	1124.501	1128.168	1111.275	1121.314	2.139879	3.049727
141	1117.393	1119.051	1104.015	1113.486	2.149219	3.046685
144	1118.169	1120.744	1104.79	1114.568	2.158362	3.047106
147	1116.933	1117.324	1092.353	1108.87	2.167317	3.044881
150	1123.479	1125.053	1097.155	1115.229	2.176091	3.047364

Sample 193						
Image 8781		Particle O_4		Approximate Particle size - 226.3225 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1566.954	1568.036	1566.874	1567.288	0.477121	3.195149
6	1520.37	1517.166	1517.941	1518.492	0.778151	3.181413
9	1504.867	1505.694	1504.904	1505.155	0.954243	3.177581
12	1522.469	1498.001	1501.218	1507.23	1.079181	3.178179
15	1520.672	1493.877	1497.731	1504.093	1.176091	3.177275
18	1493.82	1494.911	1497.207	1495.313	1.255273	3.174732
21	1504.645	1493.113	1497.05	1498.269	1.322219	3.17559
24	1487.623	1487.307	1487.455	1487.462	1.380211	3.172446
27	1515.62	1488.545	1491.247	1498.471	1.431364	3.175648
30	1512.824	1484.605	1486.576	1494.668	1.477121	3.174545
33	1482.251	1476.77	1479.248	1479.423	1.518514	3.170092
36	1478.992	1478.469	1480.252	1479.238	1.556303	3.170038
39	1526.093	1485.483	1489.112	1500.229	1.591065	3.176158
42	1517.902	1481.875	1485.182	1494.986	1.623249	3.174637
45	1491.679	1464.837	1467.028	1474.515	1.653213	3.168649
48	1496.093	1464.783	1466.564	1475.814	1.681241	3.169031
51	1527.489	1451.923	1454.235	1477.882	1.70757	3.16964
54	1485.421	1462.853	1463.027	1470.434	1.732394	3.167446
57	1476.121	1457.75	1465.798	1466.556	1.755875	3.166299
60	1479.181	1451.577	1465.639	1465.465	1.778151	3.165976
63	1497.361	1467.6	1464.807	1476.589	1.799341	3.16926
66	1514.178	1470.935	1459.039	1481.384	1.819544	3.170668
69	1542.066	1473.207	1460.602	1491.958	1.838849	3.173757
72	1498.593	1457.184	1424.177	1459.985	1.857332	3.164348
75	1488.676	1418.237	1420.392	1442.435	1.875061	3.159096
78	1507.868	1469.204	1470.092	1482.388	1.892095	3.170962
81	1434.485	1466.941	1466.937	1456.121	1.908485	3.163197
84	1686.106	1438.537	1440.794	1521.812	1.924279	3.182361
87	1497.541	1458.994	1415.329	1457.288	1.939519	3.163545
90	1671.58	1396.561	1392.532	1486.891	1.954243	3.172279
93	1430.035	1427.324	1438.138	1431.832	1.968483	3.155892
96	1424.048	1382.654	1392.92	1399.874	1.982271	3.146089
99	1579.956	1412.153	1411.851	1467.987	1.995635	3.166722
102	1436.997	1387.915	1444.579	1423.163	2.0086	3.153255
105	1631.509	1390.95	1388.904	1470.454	2.021189	3.167452
108	1518.551	1436.941	1437.019	1464.17	2.033424	3.165592
111	1438.643	1371.734	1407.446	1405.941	2.045323	3.147967
114	1410.599	1426.855	1415.782	1417.745	2.056905	3.151598
117	1637.896	1437.624	1424.598	1500.039	2.068186	3.176103
120	1465.011	1463.225	1456.114	1461.45	2.079181	3.164784
123	1424.911	1403.771	1409.314	1412.665	2.089905	3.150039
126	1402.128	1415.992	1393.686	1403.935	2.100371	3.147347
129	1650.18	1442.979	1433.578	1508.913	2.11059	3.178664
132	1678.927	1449.507	1440.297	1522.91	2.120574	3.182674
135	1527.566	1418.218	1414.997	1453.594	2.130334	3.162443
138	1407.969	1416.736	1413.435	1412.713	2.139879	3.150054
141	1643.356	1406.588	1406.578	1485.507	2.149219	3.171875
144	1640.529	1380.918	1378.135	1466.527	2.158362	3.16629
147	1582.392	1338.029	1335.539	1418.653	2.167317	3.151876
150	1567.693	1386.512	1372.624	1442.276	2.176091	3.159048

Sample 193						
Image 8781		Particle O_5		Approximate Particle size - 107.9104 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1285.443	1286.542	1284.695	1285.56	0.477121	3.109092
6	1189.486	1188.76	1190.006	1189.417	0.778151	3.075334
9	1177.118	1177.047	1178.743	1177.636	0.954243	3.071011
12	1173.239	1174.939	1174.086	1174.088	1.079181	3.069701
15	1170.087	1171.798	1175.558	1172.481	1.176091	3.069106
18	1164.702	1165.183	1166.897	1165.594	1.255273	3.066547
21	1166.265	1166.487	1169.184	1167.312	1.322219	3.067187
24	1162.303	1159.484	1161.927	1161.238	1.380211	3.064921
27	1156.34	1158.088	1163.326	1159.251	1.431364	3.064178
30	1161.278	1163.843	1168.441	1164.521	1.477121	3.066147
33	1162.2	1162.526	1161.986	1162.237	1.518514	3.065295
36	1156.096	1166.264	1163.689	1162.016	1.556303	3.065212
39	1155.971	1157.094	1153.205	1155.424	1.591065	3.062741
42	1154.325	1152.917	1160.132	1155.791	1.623249	3.062879
45	1155.167	1154.276	1162.259	1157.234	1.653213	3.063421
48	1156.902	1152.259	1148.249	1152.47	1.681241	3.06163
51	1167.216	1161.997	1155.058	1161.424	1.70757	3.064991
54	1153.575	1145.032	1144.449	1147.685	1.732394	3.059823
57	1154.886	1146.606	1145.531	1149.008	1.755875	3.060323
60	1158.334	1152.75	1143.318	1151.467	1.778151	3.061252
63	1150.325	1137.765	1160.383	1149.491	1.799341	3.060506
66	1148.993	1131.72	1165.548	1148.754	1.819544	3.060227
69	1158.971	1153.182	1142.261	1151.471	1.838849	3.061253
72	1139.109	1136.626	1139.308	1138.348	1.857332	3.056275
75	1145.528	1145.646	1146.521	1145.898	1.875061	3.059146
78	1135.77	1123.093	1129.147	1129.337	1.892095	3.052823
81	1122.684	1148.78	1151.771	1141.079	1.908485	3.057316
84	1138.344	1109.337	1122.036	1123.239	1.924279	3.050472
87	1122.705	1129.095	1130.611	1127.47	1.939519	3.052105
90	1142.433	1107.952	1149.31	1133.232	1.954243	3.054319
93	1109.068	1116.829	1116.836	1114.244	1.968483	3.04698
96	1123.579	1134.06	1132.928	1130.189	1.982271	3.053151
99	1131.187	1131.739	1139.075	1134	1.995635	3.054613
102	1170.995	1103.258	1108.659	1127.637	2.0086	3.052169
105	1090.65	1115.715	1103.042	1103.136	2.021189	3.042629
108	1096.613	1141.774	1117.809	1118.732	2.033424	3.048726
111	1146.749	1084.274	1144.734	1125.252	2.045323	3.05125
114	1164.753	1094.221	1086.768	1115.248	2.056905	3.047371
117	1082.802	1121.102	1087.175	1097.026	2.068186	3.040217
120	1113.395	1123.98	1104.072	1113.816	2.079181	3.046813
123	1134.06	1120.926	1136.158	1130.381	2.089905	3.053225
126	1149.562	1076.505	1084.149	1103.405	2.100371	3.042735
129	1104.427	1080.103	1071.999	1085.509	2.11059	3.035634
132	1086.685	1088.312	1076.039	1083.679	2.120574	3.034901
135	1093.009	1106.807	1092.317	1097.378	2.130334	3.040356
138	1103.395	1072.238	1114.222	1096.618	2.139879	3.040055
141	1122.681	1053.591	1081.897	1086.056	2.149219	3.035852
144	1151.165	1053.453	1064.729	1089.783	2.158362	3.03734
147	1078.339	1058.347	1042.47	1059.719	2.167317	3.025191
150	1058.135	1072.229	1048.493	1059.619	2.176091	3.02515

Sample 193						
Image 8782		Particle O_1A		Approximate Particle size - 51.71943 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	832.6367	831.8382	832.8026	832.4258	0.477121	2.920346
6	765.831	765.2871	769.0337	766.7173	0.778151	2.884635
9	760.1823	760.3163	760.7684	760.4223	0.954243	2.881055
12	759.0864	760.211	761.2446	760.1807	1.079181	2.880917
15	756.617	752.1274	755.1165	754.6203	1.176091	2.877728
18	747.0084	748.6288	748.853	748.1634	1.255273	2.873996
21	754.5952	740.2426	749.3738	748.0705	1.322219	2.873943
24	745.9244	740.2872	739.5733	741.9283	1.380211	2.870362
27	761.4289	748.5416	737.4963	749.1556	1.431364	2.874572
30	746.3842	734.6733	738.2827	739.7801	1.477121	2.869103
33	745.3716	737.955	739.1368	740.8211	1.518514	2.869713
36	760.2772	727.6982	740.5984	742.8579	1.556303	2.870906
39	739.6967	729.8343	740.7314	736.7541	1.591065	2.867323
42	753.8012	715.1996	726.6046	731.8685	1.623249	2.864433
45	754.8909	710.4609	721.1493	728.8337	1.653213	2.862628
48	740.8643	725.8012	732.6705	733.112	1.681241	2.86517
51	728.2616	732.2729	705.975	722.1698	1.70757	2.858639
54	762.9557	708.169	711.1343	727.4197	1.732394	2.861785
57	739.7772	714.1885	708.1326	720.6994	1.755875	2.857754
60	715.5446	711.0773	708.8228	711.8149	1.778151	2.852367
63	749.4377	708.3066	701.9721	719.9055	1.799341	2.857275
66	732.3986	701.8169	702.1034	712.1063	1.819544	2.852545
69	737.939	688.5108	694.7316	707.0605	1.838849	2.849457
72	680.1426	669.9605	695.2033	681.7688	1.857332	2.833637
75	713.0479	668.8928	657.661	679.8672	1.875061	2.832424
78	729.1766	673.6366	653.1877	685.3336	1.892095	2.835902
81	714.2945	695.1823	662.0354	690.5041	1.908485	2.839166
84	698.8013	700.8947	709.1071	702.9344	1.924279	2.846915
87	697.3876	681.4908	713.5025	697.4603	1.939519	2.843519
90	699.2781	662.652	706.4182	689.4494	1.954243	2.838502
93	656.5302	671.8904	671.0388	666.4865	1.968483	2.823791
96	747.5613	684.7476	672.3496	701.5528	1.982271	2.84606
99	743.5766	678.1135	660.5497	694.0799	1.995635	2.841409
102	644.2427	650.9312	659.957	651.7103	2.0086	2.814055
105	698.0028	647.7114	644.6844	663.4662	2.021189	2.821819
108	693.8175	693.0042	647.5118	678.1112	2.033424	2.831301
111	696.7836	572.9515	656.5918	642.109	2.045323	2.807609
114	689.7902	585.3539	641.8431	638.9957	2.056905	2.805498
117	673.3608	669.6479	652.442	665.1502	2.068186	2.82292
120	672.1155	667.5588	659.9545	666.5429	2.079181	2.823828
123	660.3619	656.2225	669.3414	661.9753	2.089905	2.820842
126	659.2968	662.7867	545.1041	622.3959	2.100371	2.794067
129	649.5266	660.6797	545.3897	618.532	2.11059	2.791362
132	657.8574	653.9118	548.6146	620.1279	2.120574	2.792481
135	659.7143	658.0781	550.8596	622.884	2.130334	2.794407
138	664.4394	654.1165	573.1785	630.5781	2.139879	2.799739
141	671.491	658.199	586.0101	638.5667	2.149219	2.805206
144	681.4237	664.6464	593.2909	646.4537	2.158362	2.810537
147	686.8026	667.3498	647.3101	667.1542	2.167317	2.824226
150	692.6211	680.0656	650.9374	674.5414	2.176091	2.829009

Sample 193						
Image 8782		Particle O_1B		Approximate Particle size - 61.21773 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1145.898	1146.873	1146.921	1146.564	0.477121	3.059398
6	1028.069	1038.793	1039.57	1035.477	0.778151	3.01514
9	1016.275	1018.215	1017.457	1017.315	0.954243	3.007456
12	1011.342	1013.643	1014.294	1013.093	1.079181	3.005649
15	994.7681	999.5947	1000.949	998.4371	1.176091	2.999321
18	997.1772	998.0714	998.7629	998.0038	1.255273	2.999132
21	991.2712	994.0667	993.0294	992.7891	1.322219	2.996857
24	985.9495	988.014	993.2628	989.0754	1.380211	2.995229
27	981.1003	985.6367	984.1732	983.6367	1.431364	2.992835
30	978.1558	984.6476	989.2558	984.0197	1.477121	2.993004
33	982.5625	985.3043	982.6297	983.4988	1.518514	2.992774
36	975.3069	979.3724	981.9379	978.8724	1.556303	2.990726
39	984.7708	988.3508	978.4037	983.8418	1.591065	2.992925
42	972.733	978.9275	971.349	974.3365	1.623249	2.988709
45	967.4282	966.0674	983.263	972.2529	1.653213	2.987779
48	973.7773	978.2405	975.95	975.9893	1.681241	2.989445
51	968.2437	973.4227	978.2662	973.3109	1.70757	2.988252
54	965.0887	969.3007	968.4385	967.6093	1.732394	2.9857
57	959.6375	975.4563	976.2743	970.456	1.755875	2.986976
60	976.0318	981.5451	971.0257	976.2009	1.778151	2.989539
63	973.6382	962.5186	976.8488	971.0019	1.799341	2.98722
66	968.04	973.7199	960.1895	967.3165	1.819544	2.985569
69	966.7597	952.6487	973.0206	964.143	1.838849	2.984141
72	978.9598	966.392	972.2742	972.542	1.857332	2.987908
75	952.2291	965.0027	984.0868	967.1062	1.875061	2.985474
78	958.0153	958.731	958.4087	958.385	1.892095	2.98154
81	974.6379	966.7938	966.8504	969.4274	1.908485	2.986515
84	960.7975	962.7015	956.6878	960.0623	1.924279	2.982299
87	952.6318	963.5603	976.1342	964.1088	1.939519	2.984126
90	943.0266	944.0233	971.1619	952.7373	1.954243	2.978973
93	950.7526	948.3384	953.3707	950.8206	1.968483	2.978099
96	963.1746	938.8021	967.6898	956.5555	1.982271	2.98071
99	944.6891	939.1302	951.6061	945.1418	1.995635	2.975497
102	933.0806	947.1407	934.7987	938.34	2.0086	2.97236
105	958.0819	952.3085	952.8657	954.4187	2.021189	2.979739
108	956.2357	937.9418	956.6831	950.2869	2.033424	2.977855
111	931.2081	929.3012	961.5637	940.691	2.045323	2.973447
114	945.3889	931.0029	939.3056	938.5658	2.056905	2.972465
117	969.9379	937.6806	957.5633	955.0606	2.068186	2.980031
120	950.6013	940.4804	955.5391	948.8736	2.079181	2.977208
123	939.8978	949.1461	937.3779	942.1406	2.089905	2.974116
126	919.4858	947.2198	913.9633	926.8896	2.100371	2.967028
129	922.8405	927.2765	915.4316	921.8495	2.11059	2.96466
132	954.7125	921.8504	928.2531	934.9387	2.120574	2.970783
135	965.3466	917.773	941.5814	941.567	2.130334	2.973851
138	968.6575	924.7234	949.1536	947.5115	2.139879	2.976584
141	974.4286	913.1741	957.7336	948.4454	2.149219	2.977012
144	964.0067	912.8393	955.2537	944.0332	2.158362	2.974987
147	940.4584	915.7571	970.5446	942.2534	2.167317	2.974168
150	947.7325	926.0927	970.5139	948.113	2.176091	2.97686

Sample 193						
Image 8782		Particle O_2A		Approximate Particle size - 83.0979 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1206.211	1206.382	1205.96	1206.184	0.477121	3.081414
6	1124.346	1123.924	1122.042	1123.437	0.778151	3.050549
9	1114.207	1112.828	1111.02	1112.685	0.954243	3.046372
12	1104.038	1100.093	1098.08	1100.737	1.079181	3.041683
15	1085.899	1090.585	1087.932	1088.139	1.176091	3.036684
18	1104.305	1096.972	1095.335	1098.871	1.255273	3.040947
21	1084.887	1070.57	1073.264	1076.24	1.322219	3.031909
24	1074.8	1069.173	1063.2	1069.058	1.380211	3.029001
27	1082.281	1078.289	1075.851	1078.807	1.431364	3.032944
30	1068.045	1070.971	1068.944	1069.32	1.477121	3.029108
33	1084.314	1055.367	1051.701	1063.794	1.518514	3.026857
36	1076.499	1058.355	1056.967	1063.94	1.556303	3.026917
39	1066.681	1064.805	1068.701	1066.729	1.591065	3.028054
42	1062.848	1049.67	1052.648	1055.055	1.623249	3.023275
45	1067.207	1071.9	1058.033	1065.713	1.653213	3.02764
48	1076.584	1048.833	1041.06	1055.493	1.681241	3.023455
51	1060.919	1049.433	1042.418	1050.923	1.70757	3.021571
54	1064.992	1050.148	1059.448	1058.196	1.732394	3.024566
57	1026.641	1054.369	1024.731	1035.247	1.755875	3.015044
60	1047.836	1033.931	1056.007	1045.925	1.778151	3.0195
63	1045.219	1052.467	1060.136	1052.607	1.799341	3.022266
66	1052.451	1037.298	1030.101	1039.95	1.819544	3.017012
69	1055.205	1037.06	1019.218	1037.161	1.838849	3.015846
72	1044.804	1033.01	1030.847	1036.22	1.857332	3.015452
75	1030.461	1009.513	1041.689	1027.221	1.875061	3.011664
78	1049.207	1030.902	1028.915	1036.341	1.892095	3.015503
81	1061.772	1031.241	1033.079	1042.03	1.908485	3.01788
84	1019.611	1036.092	1025.378	1027.027	1.924279	3.011582
87	1039.249	1052.084	1012.454	1034.596	1.939519	3.014771
90	1032.973	1020.421	1040.406	1031.267	1.954243	3.013371
93	1011.837	1011.32	1046.218	1023.125	1.968483	3.009929
96	1025.383	1005.691	1013.733	1014.935	1.982271	3.006438
99	1025.641	995.7167	1001.584	1007.647	1.995635	3.003309
102	1012.032	985.0467	1025.973	1007.684	2.0086	3.003324
105	1007.949	978.0559	1034.152	1006.719	2.021189	3.002908
108	1006.199	978.0885	1003.749	996.0122	2.033424	2.998265
111	1000.119	997.4512	996.9364	998.1688	2.045323	2.999204
114	1001.108	1020.934	988.5389	1003.527	2.056905	3.001529
117	1009.142	990.2109	1010.138	1003.164	2.068186	3.001372
120	996.4365	966.3199	1030.832	997.8629	2.079181	2.999071
123	1014.226	969.8228	1042.226	1008.758	2.089905	3.003787
126	1006.44	980.2006	1027.667	1004.769	2.100371	3.002066
129	1014.663	980.4308	987.9897	994.3612	2.11059	2.997544
132	1032.201	999.4364	988.6944	1006.777	2.120574	3.002933
135	1026.018	970.7886	980.9182	992.5748	2.130334	2.996763
138	990.1393	937.944	980.5592	969.5475	2.139879	2.986569
141	980.6744	933.0976	999.5294	971.1005	2.149219	2.987264
144	981.46	932.6292	982.0178	965.369	2.158362	2.984693
147	1001.723	942.1306	946.8739	963.5757	2.167317	2.983886
150	1012.371	941.0735	937.8269	963.757	2.176091	2.983968

Sample 193						
Image 8782		Particle O_2B		Approximate Particle size - 117.4379 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	999.2474	998.8752	1002.41	1000.177	0.477121	3.000077
6	952.0678	952.2334	954.8101	953.0371	0.778151	2.97911
9	943.5826	943.8035	948.8847	945.4236	0.954243	2.975626
12	947.5938	938.5625	944.3714	943.5092	1.079181	2.974746
15	952.2277	939.3062	943.1646	944.8995	1.176091	2.975386
18	927.5672	928.1309	935.3867	930.3616	1.255273	2.968652
21	954.4154	932.0103	935.2936	940.5731	1.322219	2.973393
24	937.8767	930.6169	938.4073	935.6336	1.380211	2.971106
27	936.1157	921.4324	929.694	929.0807	1.431364	2.968053
30	944.5909	927.6798	932.0377	934.7695	1.477121	2.970705
33	927.4926	909.5986	925.7486	920.9466	1.518514	2.964234
36	915.4282	922.0095	911.6188	916.3522	1.556303	2.962062
39	949.0939	918.7397	941.1619	936.3318	1.591065	2.97143
42	927.6064	919.3099	936.7147	927.877	1.623249	2.96749
45	917.5948	911.4691	915.2135	914.7591	1.653213	2.961307
48	909.703	900.8139	906.6144	905.7104	1.681241	2.956989
51	947.4907	903.0887	933.986	928.1885	1.70757	2.967636
54	926.3964	887.0084	899.148	904.1843	1.732394	2.956257
57	912.2695	888.6977	911.7156	904.2276	1.755875	2.956278
60	891.95	890.5417	907.8701	896.7873	1.778151	2.952689
63	901.725	886.2455	890.4543	892.8083	1.799341	2.950758
66	893.1454	881.7599	893.3256	889.4103	1.819544	2.949102
69	935.6739	891.965	893.6292	907.0894	1.838849	2.95765
72	928.1094	871.4783	930.6765	910.0881	1.857332	2.959083
75	911.7879	855.9504	903.188	890.3088	1.875061	2.949541
78	941.2451	834.616	929.8276	901.8962	1.892095	2.955157
81	859.7568	854.2543	907.9464	873.9858	1.908485	2.941504
84	902.7708	857.951	878.1216	879.6145	1.924279	2.944292
87	891.8678	841.6888	876.6407	870.0658	1.939519	2.939552
90	890.8644	841.5968	848.4431	860.3014	1.954243	2.934651
93	890.3809	868.1418	874.7473	877.7567	1.968483	2.943374
96	880.9636	923.6061	867.9351	890.8349	1.982271	2.949797
99	977.4642	859.9714	819.8273	885.7543	1.995635	2.947313
102	921.9423	845.7142	843.7089	870.4551	2.0086	2.939746
105	921.1987	923.7638	858.7678	901.2434	2.021189	2.954842
108	892.4319	928.9095	864.8088	895.3834	2.033424	2.952009
111	854.3872	936.4475	878.4621	889.7656	2.045323	2.949276
114	851.2222	829.0669	878.3338	852.8743	2.056905	2.930885
117	838.4004	900.7404	881.4379	873.5262	2.068186	2.941276
120	906.0844	898.8535	847.0203	883.9861	2.079181	2.946445
123	867.0714	914.9007	840.7256	874.2326	2.089905	2.941627
126	828.6106	909.4651	836.5809	858.2189	2.100371	2.933598
129	827.3259	894.2367	845.8927	855.8184	2.11059	2.932382
132	818.3637	809.8197	792.8041	806.9958	2.120574	2.906871
135	781.147	871.0031	784.5162	812.2221	2.130334	2.909675
138	786.1255	886.4253	784.206	818.9189	2.139879	2.913241
141	788.1116	854.4773	778.0087	806.8659	2.149219	2.906801
144	785.8953	760.9867	782.5867	776.4896	2.158362	2.890136
147	782.3215	742.9071	770.2114	765.1467	2.167317	2.883745
150	800.9292	772.2144	779.2764	784.14	2.176091	2.894394

Sample 193						
Image 8782		Particle O_3		Approximate Particle size - 97.41646 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1960.02	1962.198	1960.621	1960.946	0.477121	3.292466
6	1704.248	1707.038	1705.934	1705.74	0.778151	3.231913
9	1677.05	1675.342	1674.739	1675.71	0.954243	3.224199
12	1636.248	1636.654	1635.617	1636.173	1.079181	3.213829
15	1632.506	1619.557	1617.497	1623.187	1.176091	3.210368
18	1639.163	1629.813	1627.575	1632.184	1.255273	3.212769
21	1630.04	1624.023	1617.652	1623.905	1.322219	3.210561
24	1628.287	1622.718	1615.412	1622.139	1.380211	3.210088
27	1617.897	1606.203	1603.846	1609.316	1.431364	3.206641
30	1613.218	1611.497	1605.552	1610.089	1.477121	3.20685
33	1617.493	1610.947	1601.828	1610.089	1.518514	3.20685
36	1602.192	1602.179	1587.736	1597.369	1.556303	3.203405
39	1604.433	1600.497	1600.08	1601.67	1.591065	3.204573
42	1603.491	1608.356	1603.608	1605.152	1.623249	3.205516
45	1603.696	1588.458	1589.486	1593.88	1.653213	3.202456
48	1608.702	1606.843	1593.059	1602.868	1.681241	3.204898
51	1592.629	1592.07	1586.089	1590.263	1.70757	3.201469
54	1587.899	1583.013	1577.647	1582.853	1.732394	3.19944
57	1581.28	1574.361	1584.628	1580.09	1.755875	3.198682
60	1586.392	1560.588	1581.318	1576.099	1.778151	3.197584
63	1582.661	1604.095	1577.376	1588.044	1.799341	3.200862
66	1587.573	1588.384	1586.932	1587.629	1.819544	3.200749
69	1593.845	1573.285	1565.712	1577.614	1.838849	3.198001
72	1584.473	1617.254	1564.618	1588.782	1.857332	3.201064
75	1579.303	1571.678	1560.25	1570.411	1.875061	3.196013
78	1587.631	1589.154	1588.807	1588.531	1.892095	3.200996
81	1587.187	1563.895	1566.996	1572.693	1.908485	3.196644
84	1567.857	1570.349	1561.089	1566.431	1.924279	3.194911
87	1586.07	1588.945	1581.889	1585.634	1.939519	3.200203
90	1576.779	1584.98	1559.156	1573.638	1.954243	3.196905
93	1576.203	1568.59	1565.066	1569.953	1.968483	3.195887
96	1564.681	1598.507	1569.561	1577.583	1.982271	3.197992
99	1554.813	1566.676	1553.979	1558.489	1.995635	3.192704
102	1577.945	1561.181	1550.689	1563.272	2.0086	3.194034
105	1567.305	1537.359	1539.262	1547.975	2.021189	3.189764
108	1564.089	1591.188	1568.107	1574.461	2.033424	3.197132
111	1542.215	1576.116	1535.961	1551.431	2.045323	3.190732
114	1553.042	1562.16	1542.463	1552.555	2.056905	3.191047
117	1560.621	1589.983	1573.768	1574.79	2.068186	3.197223
120	1566.743	1556.518	1561.566	1561.609	2.079181	3.193572
123	1535.386	1555.79	1526.997	1539.391	2.089905	3.187349
126	1544.972	1560.905	1557.181	1554.353	2.100371	3.19155
129	1569.703	1584.086	1550.604	1568.131	2.11059	3.195382
132	1539.739	1586.92	1530.057	1552.239	2.120574	3.190959
135	1499.143	1549.428	1515.037	1521.202	2.130334	3.182187
138	1555.147	1577.34	1518.128	1550.205	2.139879	3.190389
141	1556.836	1576.031	1520.444	1551.103	2.149219	3.190641
144	1557.638	1582.972	1535.882	1558.831	2.158362	3.192799
147	1552.314	1518.421	1524.353	1531.696	2.167317	3.185173
150	1562.541	1516.608	1536.804	1538.651	2.176091	3.18714

Sample 193						
Image 8782		Particle O_4		Approximate Particle size - 197.2918 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1862.487	1864.944	1863.545	1863.659	0.477121	3.270366
6	1634.153	1628.24	1630.034	1630.809	0.778151	3.212403
9	1600.287	1592.876	1589.896	1594.353	0.954243	3.202584
12	1588.227	1586.418	1586.352	1586.999	1.079181	3.200577
15	1580.388	1583.066	1577.037	1580.163	1.176091	3.198702
18	1584.178	1584.957	1580.578	1583.237	1.255273	3.199546
21	1588.276	1587.037	1573.059	1582.791	1.322219	3.199423
24	1588.182	1586.601	1577.997	1584.26	1.380211	3.199826
27	1588.832	1568.182	1573.897	1576.97	1.431364	3.197824
30	1576.595	1588.597	1590.2	1585.131	1.477121	3.200065
33	1580.575	1590.902	1566.531	1579.336	1.518514	3.198474
36	1573.08	1578.345	1581.344	1577.59	1.556303	3.197994
39	1580.993	1568.715	1563.021	1570.909	1.591065	3.196151
42	1576.833	1578.529	1574.069	1576.477	1.623249	3.197688
45	1566.559	1566.233	1592.09	1574.961	1.653213	3.19727
48	1600.87	1583.897	1557.679	1580.815	1.681241	3.198881
51	1578.998	1562.908	1575.417	1572.441	1.70757	3.196574
54	1577.781	1577.167	1573.058	1576.002	1.732394	3.197557
57	1573.204	1567.235	1585.287	1575.242	1.755875	3.197347
60	1558.204	1573.943	1572.418	1568.189	1.778151	3.195398
63	1593.705	1571.053	1543.413	1569.39	1.799341	3.195731
66	1552.085	1581.247	1543.469	1558.934	1.819544	3.192828
69	1559.426	1539.333	1560.56	1553.106	1.838849	3.191201
72	1545.369	1536.769	1561.02	1547.719	1.857332	3.189692
75	1544.903	1563.625	1569.909	1559.479	1.875061	3.192979
78	1562.225	1561.7	1561.221	1561.715	1.892095	3.193602
81	1603.984	1574.826	1550.966	1576.592	1.908485	3.197719
84	1596.841	1574.058	1591.958	1587.619	1.924279	3.200746
87	1517.329	1522.838	1522.465	1520.877	1.939519	3.182094
90	1557.54	1541.769	1536.328	1545.212	1.954243	3.188988
93	1516.637	1534.315	1521.578	1524.177	1.968483	3.183035
96	1559.307	1515.138	1525.482	1533.309	1.982271	3.18563
99	1562.665	1526.246	1503.148	1530.686	1.995635	3.184886
102	1529.238	1589.145	1589.681	1569.355	2.0086	3.195721
105	1497.348	1507.46	1537.148	1513.986	2.021189	3.180122
108	1466.783	1553.411	1554.678	1524.957	2.033424	3.183258
111	1480.449	1563.598	1542.58	1528.876	2.045323	3.184372
114	1503.456	1500.141	1555.183	1519.593	2.056905	3.181727
117	1603.427	1489.215	1605.213	1565.952	2.068186	3.194778
120	1472.703	1443.009	1474.166	1463.293	2.079181	3.165331
123	1548.425	1407.581	1485.914	1480.64	2.089905	3.17045
126	1584.077	1437.764	1474.304	1498.715	2.100371	3.175719
129	1478.044	1457.207	1489.878	1475.043	2.11059	3.168805
132	1507.319	1466.115	1505.399	1492.944	2.120574	3.174044
135	1361.087	1506.738	1433.03	1433.618	2.130334	3.156433
138	1387.507	1413.776	1362.33	1387.871	2.139879	3.142349
141	1405.06	1442.125	1363.658	1403.614	2.149219	3.147248
144	1432.438	1458.496	1381.026	1423.987	2.158362	3.153506
147	1458.659	1479.98	1404.949	1447.863	2.167317	3.160727
150	1487.768	1510.249	1424.117	1474.044	2.176091	3.168511

Sample 846						
Image 8753		Particle O_1		Approximate Particle size - 194.6615 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1756.612	1757.083	1756.584	1756.76	0.477121	3.244712
6	1687.223	1676.143	1674.535	1679.3	0.778151	3.225128
9	1678.945	1667.007	1668.298	1671.416	0.954243	3.223085
12	1667.5	1655.096	1657.101	1659.899	1.079181	3.220082
15	1667.731	1654.603	1654.931	1659.088	1.176091	3.21987
18	1654.914	1642.299	1643.697	1646.97	1.255273	3.216686
21	1637.96	1637.162	1636.883	1637.335	1.322219	3.214137
24	1641.644	1628.553	1631.573	1633.923	1.380211	3.213232
27	1650.566	1634.598	1636.793	1640.652	1.431364	3.215017
30	1641.569	1616.463	1626.661	1628.231	1.477121	3.211716
33	1620.31	1625.084	1619.567	1621.653	1.518514	3.209958
36	1622.067	1609.15	1611.927	1614.381	1.556303	3.208006
39	1637.745	1609.947	1607.312	1618.335	1.591065	3.209068
42	1620.966	1621.235	1607.071	1616.424	1.623249	3.208555
45	1624.899	1602.702	1592.213	1606.605	1.653213	3.205909
48	1633.8	1605.671	1607.513	1615.661	1.681241	3.20835
51	1623.175	1595.23	1589.318	1602.574	1.70757	3.204818
54	1626.628	1584.783	1605.221	1605.544	1.732394	3.205622
57	1600.002	1598.888	1580.112	1593.001	1.755875	3.202216
60	1618.744	1608.25	1587.716	1604.903	1.778151	3.205449
63	1588.018	1593.478	1599.495	1593.664	1.799341	3.202397
66	1606.644	1574.806	1577.016	1586.156	1.819544	3.200346
69	1592.534	1589.597	1583.103	1588.411	1.838849	3.200963
72	1603.287	1553.796	1595.072	1584.051	1.857332	3.199769
75	1593.297	1555.982	1562.391	1570.557	1.875061	3.196054
78	1589.283	1581.986	1558.98	1576.75	1.892095	3.197763
81	1638.229	1602.091	1574.946	1605.089	1.908485	3.205499
84	1586.718	1565.467	1583.646	1578.61	1.924279	3.198275
87	1580.123	1563.674	1574.906	1572.901	1.939519	3.196701
90	1635.662	1574.968	1563.789	1591.473	1.954243	3.201799
93	1544.041	1563.373	1555.777	1554.397	1.968483	3.191562
96	1547.156	1576.585	1550.11	1557.95	1.982271	3.192554
99	1637.019	1589.452	1561.98	1596.15	1.995635	3.203074
102	1635.447	1585.362	1569.586	1596.798	2.0086	3.20325
105	1636.176	1580.734	1589.419	1602.11	2.021189	3.204692
108	1603.307	1564.773	1571.751	1579.944	2.033424	3.198642
111	1664.178	1559.864	1549.004	1591.015	2.045323	3.201674
114	1652.303	1566.826	1557.507	1592.212	2.056905	3.202001
117	1600.91	1563.237	1555.329	1573.159	2.068186	3.196773
120	1529.758	1559.79	1538.897	1542.815	2.079181	3.188314
123	1493.144	1560.932	1541.539	1531.872	2.089905	3.185222
126	1451.024	1585.366	1560.693	1532.361	2.100371	3.185361
129	1438.164	1584.164	1558.904	1527.077	2.11059	3.183861
132	1543.851	1570.641	1543.116	1552.536	2.120574	3.191042
135	1548.445	1601.122	1550.502	1566.69	2.130334	3.194983
138	1481.167	1594.498	1553.78	1543.148	2.139879	3.188408
141	1475.193	1565.205	1576.951	1539.117	2.149219	3.187272
144	1484.556	1562.688	1572.961	1540.068	2.158362	3.18754
147	1547.091	1554.791	1537.971	1546.618	2.167317	3.189383
150	1543.858	1541.757	1590.686	1558.767	2.176091	3.192781

Sample 846						
Image 8753		Particle O_2		Approximate Particle size - 186.264 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1732.881	1735.7	1734.797	1734.459	0.477121	3.239164
6	1643.008	1642.968	1641.823	1642.6	0.778151	3.215532
9	1619.109	1625.792	1621.598	1622.166	0.954243	3.210095
12	1614.548	1621.311	1618.235	1618.031	1.079181	3.208987
15	1597.495	1609.252	1602.835	1603.194	1.176091	3.204986
18	1595.169	1602.598	1599.654	1599.14	1.255273	3.203887
21	1596.733	1598.581	1597.114	1597.476	1.322219	3.203434
24	1588.763	1597.099	1611.475	1599.112	1.380211	3.203879
27	1582.601	1615.425	1596.668	1598.231	1.431364	3.20364
30	1580.225	1600.226	1574.767	1585.073	1.477121	3.200049
33	1568.143	1614.318	1594.675	1592.379	1.518514	3.202046
36	1569.451	1606.838	1587.45	1587.913	1.556303	3.200827
39	1574.53	1564.639	1587.349	1575.506	1.591065	3.19742
42	1559.882	1609.57	1553.604	1574.352	1.623249	3.197102
45	1573.628	1573.663	1576.424	1574.572	1.653213	3.197162
48	1572.33	1554.521	1564.512	1563.787	1.681241	3.194178
51	1541.259	1606.572	1537.669	1561.833	1.70757	3.193635
54	1547.886	1587.327	1528.375	1554.529	1.732394	3.191599
57	1527.177	1575.741	1525.971	1542.963	1.755875	3.188356
60	1539.502	1553.291	1527.984	1540.259	1.778151	3.187594
63	1521.001	1519.437	1526.749	1522.395	1.799341	3.182527
66	1521.481	1516.849	1506.552	1514.961	1.819544	3.180401
69	1524.679	1634.839	1511.687	1557.068	1.838849	3.192308
72	1539.82	1608.029	1529.445	1559.098	1.857332	3.192873
75	1535.444	1584.06	1549.345	1556.283	1.875061	3.192089
78	1552.144	1555.517	1510.021	1539.227	1.892095	3.187303
81	1543.881	1586.943	1540.542	1557.122	1.908485	3.192323
84	1520.286	1536.925	1488.654	1515.288	1.924279	3.180495
87	1527.659	1546.234	1545.68	1539.857	1.939519	3.18748
90	1524.992	1489.579	1482.969	1499.18	1.954243	3.175854
93	1544.949	1521.264	1514.481	1526.898	1.968483	3.18381
96	1605.378	1510.528	1545.99	1553.965	1.982271	3.191441
99	1562.299	1507.449	1492.221	1520.656	1.995635	3.182031
102	1485.164	1614.573	1494.127	1531.288	2.0086	3.185057
105	1545.236	1618.521	1528.259	1564.005	2.021189	3.194238
108	1481.749	1443.598	1476.436	1467.261	2.033424	3.166507
111	1468.871	1583.812	1492.834	1515.172	2.045323	3.180462
114	1458.875	1570.837	1534.56	1521.424	2.056905	3.18225
117	1447.638	1600.429	1480.053	1509.373	2.068186	3.178797
120	1498.213	1595	1463.174	1518.795	2.079181	3.181499
123	1490.034	1553.55	1473.093	1505.559	2.089905	3.177698
126	1482.502	1578.287	1493.193	1517.994	2.100371	3.18127
129	1481.642	1601.418	1511.621	1531.56	2.11059	3.185134
132	1408.66	1486.781	1496.006	1463.816	2.120574	3.165486
135	1403.364	1628.308	1480.169	1503.947	2.130334	3.177233
138	1417.431	1559.043	1454.234	1476.903	2.139879	3.169352
141	1492.199	1568.961	1469.186	1510.115	2.149219	3.17901
144	1452.071	1571.26	1510.347	1511.226	2.158362	3.179329
147	1399.666	1615.162	1460.837	1491.888	2.167317	3.173736
150	1407.532	1537.903	1428.828	1458.088	2.176091	3.163784

Sample 846						
Image 8753		Particle O_3A		Approximate Particle size - 66.78032 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	450.2943	450.2943	453.5324	451.3737	0.477121	2.654536
6	415.3456	415.3456	417.5423	416.0778	0.778151	2.619175
9	407.5793	407.5793	406.1604	407.1063	0.954243	2.609708
12	413.2348	413.2348	410.4434	412.3043	1.079181	2.615218
15	391.9648	391.9648	391.5254	391.8183	1.176091	2.593085
18	401.4094	401.4094	401.2849	401.3679	1.255273	2.603543
21	392.4281	392.4281	398.471	394.4424	1.322219	2.595984
24	394.1024	394.1024	398.2652	395.49	1.380211	2.597136
27	377.5503	377.5503	390.039	381.7132	1.431364	2.581737
30	379.9469	379.9469	386.2867	382.0602	1.477121	2.582132
33	384.3628	384.3628	384.3119	384.3458	1.518514	2.584722
36	377.3519	377.3519	382.5579	379.0872	1.556303	2.578739
39	370.7949	370.7949	368.9296	370.1731	1.591065	2.568405
42	358.2094	358.2094	368.2763	361.565	1.623249	2.558186
45	370.171	370.171	364.5934	368.3118	1.653213	2.566216
48	368.9294	368.9294	358.9073	365.5887	1.681241	2.562993
51	289.5731	289.5731	339.0446	306.0636	1.70757	2.485812
54	300.4197	300.4197	340.875	313.9048	1.732394	2.496798
57	328.1397	328.1397	294.7477	317.009	1.755875	2.501072
60	335.18	335.18	322.3752	330.9117	1.778151	2.519712
63	346.3211	346.3211	330.0312	340.8911	1.799341	2.532616
66	360.87	360.87	344.5233	355.4211	1.819544	2.550743
69	351.9311	351.9311	349.7249	351.1957	1.838849	2.545549
72	299.29	299.29	344.3397	314.3066	1.857332	2.497353
75	306.8846	306.8846	342.5456	318.7716	1.875061	2.50348
78	321.3694	321.3694	330.3187	324.3525	1.892095	2.511017
81	336.8696	336.8696	326.1479	333.2957	1.908485	2.52283
84			338.5674	338.5674	1.924279	2.529645

Sample 846						
Image 8753		Particle O_3B		Approximate Particle size - 140.2046 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	962.9713	961.3016	962.5636	962.2788	0.477121	2.983301
6	928.1128	929.5027	927.7349	928.4501	0.778151	2.967759
9	924.3729	920.9285	922.5281	922.6098	0.954243	2.965018
12	918.7307	919.8826	917.9138	918.8424	1.079181	2.963241
15	913.2446	912.1208	914.3496	913.2383	1.176091	2.960584
18	916.6133	915.7869	912.4798	914.96	1.255273	2.961402
21	917.1832	913.4725	905.8844	912.18	1.322219	2.960081
24	906.1379	903.3884	901.4632	903.6632	1.380211	2.956007
27	908.3279	899.7321	898.0423	902.0341	1.431364	2.955223
30	897.8718	902.9015	890.6945	897.1559	1.477121	2.952868
33	898.8149	897.2273	889.3137	895.1186	1.518514	2.951881
36	896.0882	886.61	893.3563	892.0182	1.556303	2.950374
39	875.2829	880.9651	889.9831	882.077	1.591065	2.945507
42	891.8022	880.817	891.537	888.0521	1.623249	2.948438
45	885.041	889.374	882.1936	885.5362	1.653213	2.947206
48	879.3303	877.3828	886.6664	881.1265	1.681241	2.945038
51	870.5721	866.1788	875.6505	870.8005	1.70757	2.939919
54	896.5298	859.0644	864.6462	873.4135	1.732394	2.94122
57	878.366	846.877	872.7011	865.9814	1.755875	2.937509
60	867.7689	867.7391	876.4564	870.6548	1.778151	2.939846
63	867.3539	844.2335	864.1494	858.5789	1.799341	2.93378
66	867.7423	867.6556	877.1981	870.8653	1.819544	2.939951
69	872.0214	858.9396	862.0242	864.3284	1.838849	2.936679
72	904.4963	855.0815	837.1391	865.5723	1.857332	2.937303
75	864.8708	831.3476	852.8443	849.6876	1.875061	2.929259
78	848.7303	832.5908	813.9766	831.7659	1.892095	2.920001
81	852.0091	858.4748	826.2282	845.5707	1.908485	2.92715
84	826.1602	851.0341	851.7463	842.9802	1.924279	2.925817
87	815.6066	830.8445	825.1167	823.8559	1.939519	2.915851
90	853.6044	842.6484	852.9468	849.7332	1.954243	2.929283
93	852.77	816.7902	839.6003	836.3868	1.968483	2.922407
96	845.6387	817.3859	803.3218	822.1155	1.982271	2.914933
99	851.9722	829.6544	815.6765	832.4344	1.995635	2.92035
102	842.456	865.2294	865.2549	857.6468	2.0086	2.933308
105	914.907	813.9545	843.1293	857.3303	2.021189	2.933148
108	835.7653	784.409	776.8917	799.022	2.033424	2.902559
111	867.3759	833.7475	781.5004	827.5413	2.045323	2.91779
114	771.7076	813.1818	834.891	806.5935	2.056905	2.906655
117	772.4686	803.8867	838.9847	805.1133	2.068186	2.905857
120	776.1604	806.4139	848.5742	810.3828	2.079181	2.90869
123	775.9072	781.2532	829.6755	795.612	2.089905	2.900701
126	786.4221	816.7262	779.835	794.3278	2.100371	2.9
129	789.9644	814.4514	781.6189	795.3449	2.11059	2.900556
132	890.0357	812.9106	884.5267	862.491	2.120574	2.935755
135	866.1735	804.0502	860.7751	843.6663	2.130334	2.926171
138	829.7318	774.3339	831.0558	811.7072	2.139879	2.909399
141	767.845	762.2274	720.3799	750.1508	2.149219	2.875149
144	770.1035	766.1279	794.1152	776.7822	2.158362	2.890299
147	772.7843	765.3354	807.5002	781.8733	2.167317	2.893136
150	773.9479	748.7194	819.7011	780.7895	2.176091	2.892534

Sample 846						
Image 8753		Particle O_3C		Approximate Particle size - 99.85387 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	616.869	617.2213	615.3082	616.4662	0.477121	2.789909
6	594.1559	594.3871	593.8057	594.1162	0.778151	2.773871
9	587.6323	594.0746	586.674	589.4603	0.954243	2.770455
12	592.3768	598.5537	589.4139	593.4481	1.079181	2.773383
15	582.9905	589.4529	583.8512	585.4315	1.176091	2.767476
18	588.9291	590.4222	579.0324	586.1279	1.255273	2.767992
21	586.2753	582.8645	572.6691	580.603	1.322219	2.763879
24	581.8759	586.1639	572.5917	580.2105	1.380211	2.763586
27	575.8583	581.4215	571.2499	576.1766	1.431364	2.760556
30	578.5864	562.9286	577.9996	573.1715	1.477121	2.758285
33	570.9658	582.415	563.3222	572.2343	1.518514	2.757574
36	585.509	578.6375	561.2747	575.1404	1.556303	2.759774
39	562.8306	566.5005	568.6748	566.002	1.591065	2.752818
42	562.0797	574.957	559.448	565.4949	1.623249	2.752429
45	572.4002	559.4236	550.4363	560.7534	1.653213	2.748772
48	550.4479	578.1364	554.5494	561.0446	1.681241	2.748997
51	579.6053	555.843	566.4682	567.3055	1.70757	2.753817
54	565.3779	554.7771	553.2585	557.8045	1.732394	2.746482
57	575.6754	544.5792	530.9452	550.3999	1.755875	2.740678
60	572.5109	568.7253	540.0543	560.4302	1.778151	2.748522
63	552.567	563.7898	561.2682	559.2083	1.799341	2.747574
66	549.9732	559.9013	525.137	545.0038	1.819544	2.7364
69	544.4633	591.7421	537.7831	557.9962	1.838849	2.746631
72	536.6945	576.6747	553.0107	555.46	1.857332	2.744653
75	534.9911	538.2562	538.2836	537.177	1.875061	2.730117
78	538.4825	543.6568	528.0706	536.7366	1.892095	2.729761
81	542.9758	524.5	524.6164	530.6974	1.908485	2.724847
84	545.0533	519.3067	478.0426	514.1342	1.924279	2.711076
87	530.1276	561.9812	499.0854	530.3981	1.939519	2.724602
90	522.2645	568.9673	504.9145	532.0488	1.954243	2.725951
93	521.6167	545.6873	507.4039	524.9026	1.968483	2.720079
96	514.6159	502.6994	503.9655	507.0936	1.982271	2.705088
99	520.3427	548.6118	507.4754	525.4766	1.995635	2.720553
102	515.6673	543.0638	522.1339	526.955	2.0086	2.721774
105	613.8164	541.4632	530.8447	562.0414	2.021189	2.749768
108	616.199	549.9531	453.0338	539.7286	2.033424	2.732175
111	520.0834	559.0014	455.8256	511.6368	2.045323	2.708962
114	519.167	553.7849	464.8146	512.5888	2.056905	2.709769
117	516.2917	558.158	523.1305	532.5267	2.068186	2.726341
120	472.0544	543.4215	491.6411	502.3723	2.079181	2.701026
123	450.3298	542.603	520.9236	504.6188	2.089905	2.702963
126	452.119	543.2507	525.4252	506.9316	2.100371	2.704949
129	444.6551	539.6977	530.299	504.8839	2.11059	2.703192
132	445.4212	624.3299	532.7715	534.1742	2.120574	2.727683
135	503.9847	615.7084	542.8878	554.1936	2.130334	2.743662
138	502.3879	447.2746	543.3162	497.6596	2.139879	2.696932
141	496.7875	447.6945	501.1977	481.8932	2.149219	2.682951
144	485.1241	433.4386	463.0295	460.5307	2.158362	2.663259
147	326.0405	439	466.5886	410.543	2.167317	2.613359
150	303.7307	424.778	472.0996	400.2028	2.176091	2.60228

Sample 846						
Image 8753		Particle O_4		Approximate Particle size - 98.71407 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1927.072	1925.544	1925.544	1926.054	0.477121	3.284668
6	1733.358	1734.054	1736.962	1734.791	0.778151	3.239247
9	1717.635	1716.63	1716.628	1716.964	0.954243	3.234761
12	1698.572	1703.769	1701.583	1701.308	1.079181	3.230783
15	1695.64	1702.497	1697.867	1698.668	1.176091	3.230108
18	1690.064	1694.947	1690.514	1691.842	1.255273	3.22836
21	1720.761	1683.639	1684.237	1696.213	1.322219	3.22948
24	1731.745	1682.611	1681.228	1698.528	1.380211	3.230073
27	1671.381	1682.797	1668.667	1674.282	1.431364	3.223829
30	1670.846	1679.624	1669.427	1673.299	1.477121	3.223574
33	1665.879	1680.407	1663.511	1669.932	1.518514	3.222699
36	1740.154	1673.277	1661.529	1691.654	1.556303	3.228311
39	1661.346	1675.01	1677.856	1671.404	1.591065	3.223081
42	1698.728	1674.758	1664.757	1679.415	1.623249	3.225158
45	1655.101	1673.323	1652.718	1660.381	1.653213	3.220208
48	1750.047	1661.725	1642.418	1684.73	1.681241	3.22653
51	1739.87	1654.7	1658.651	1684.407	1.70757	3.226447
54	1728.67	1636.113	1644.296	1669.693	1.732394	3.222637
57	1714.686	1656.392	1645.68	1672.253	1.755875	3.223302
60	1639.502	1636.892	1643.114	1639.836	1.778151	3.2148
63	1729.443	1646.78	1647.329	1674.517	1.799341	3.22389
66	1743.267	1631.983	1634.147	1669.799	1.819544	3.222664
69	1704.908	1641.619	1661.01	1669.179	1.838849	3.222503
72	1683.146	1608.524	1611.821	1634.497	1.857332	3.213384
75	1732.077	1647.512	1648.384	1675.991	1.875061	3.224272
78	1730.559	1634.133	1635.367	1666.686	1.892095	3.221854
81	1641.272	1637.056	1618.351	1632.226	1.908485	3.21278
84	1638.616	1618.908	1623.381	1626.968	1.924279	3.211379
87	1595.879	1606.161	1618.037	1606.692	1.939519	3.205933
90	1666.472	1615.6	1577.145	1619.739	1.954243	3.209445
93	1663.552	1579.094	1583.298	1608.648	1.968483	3.206461
96	1683.577	1573.852	1590.95	1616.127	1.982271	3.208475
99	1651.766	1646.006	1650.56	1649.444	1.995635	3.217338
102	1609.869	1651.212	1619.416	1626.832	2.0086	3.211343
105	1741.972	1599.287	1583.982	1641.747	2.021189	3.215306
108	1621.503	1610.982	1575.651	1602.712	2.033424	3.204856
111	1697.063	1622.216	1579.049	1632.776	2.045323	3.212927
114	1686.201	1626.554	1633.478	1648.745	2.056905	3.217153
117	1622.714	1587.742	1602.18	1604.212	2.068186	3.205262
120	1697.926	1630.43	1612.022	1646.792	2.079181	3.216639
123	1711.873	1607.954	1615.972	1645.266	2.089905	3.216236
126	1662.383	1616.09	1624.097	1634.19	2.100371	3.213302
129	1650.613	1623.863	1554.915	1609.797	2.11059	3.206771
132	1667.767	1600.334	1558.602	1608.901	2.120574	3.206529
135	1670.151	1560.737	1561.468	1597.452	2.130334	3.203428
138	1672.539	1606.169	1555.281	1611.33	2.139879	3.207184
141	1732.513	1589.034	1592.407	1637.985	2.149219	3.21431
144	1682.992	1581.672	1581.866	1615.51	2.158362	3.20831
147	1634.685	1566.542	1572.273	1591.167	2.167317	3.201716
150	1661.581	1566.71	1568.129	1598.807	2.176091	3.203796

Sample 846						
Image 8753		Particle O_5		Approximate Particle size - 69.93668 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1573.027	1571.767	1570.312	1571.702	0.477121	3.19637
6	1426.364	1426.349	1425.305	1426.006	0.778151	3.154121
9	1415.871	1413.349	1411.957	1413.726	0.954243	3.150365
12	1408.382	1401.854	1402.234	1404.157	1.079181	3.147416
15	1398.349	1397.561	1401.409	1399.106	1.176091	3.145851
18	1400.157	1393.356	1397.742	1397.085	1.255273	3.145223
21	1402.741	1398.189	1400.876	1400.602	1.322219	3.146315
24	1400.681	1399.81	1399.16	1399.884	1.380211	3.146092
27	1391.449	1386.428	1384.929	1387.602	1.431364	3.142265
30	1390.944	1396.622	1385.348	1390.971	1.477121	3.143318
33	1389.252	1387.488	1389.193	1388.644	1.518514	3.142591
36	1395.086	1382.955	1386.762	1388.268	1.556303	3.142473
39	1392.787	1378.217	1385.483	1385.496	1.591065	3.141605
42	1390.838	1377.289	1377.443	1381.857	1.623249	3.140463
45	1386.576	1379.533	1382.865	1382.992	1.653213	3.14082
48	1389.206	1374.976	1374.193	1379.458	1.681241	3.139709
51	1378.385	1374.874	1374.822	1376.027	1.70757	3.138627
54	1387.823	1374.192	1372.696	1378.237	1.732394	3.139324
57	1381.964	1365.912	1365.304	1371.06	1.755875	3.137056
60	1391.731	1367.001	1360.054	1372.928	1.778151	3.137648
63	1369.434	1390.995	1378.191	1379.54	1.799341	3.139734
66	1368.724	1375.413	1368.093	1370.744	1.819544	3.136956
69	1371.577	1376.141	1361.084	1369.601	1.838849	3.136594
72	1358.191	1368.02	1382.766	1369.659	1.857332	3.136612
75	1356.824	1362.825	1374.11	1364.586	1.875061	3.135001
78	1348.428	1344.948	1379.659	1357.678	1.892095	3.132797
81	1351.878	1352.333	1350.963	1351.725	1.908485	3.130888
84	1353.249	1337.588	1336.154	1342.33	1.924279	3.127859
87	1345.091	1360.242	1354.306	1353.213	1.939519	3.131366
90	1364.612	1332.191	1369.667	1355.49	1.954243	3.132096
93	1370.149	1380.122	1353.681	1367.984	1.968483	3.136081
96	1360.957	1322.59	1353.728	1345.758	1.982271	3.128967
99	1364.064	1361.423	1347.449	1357.645	1.995635	3.132786
102	1348.066	1352.966	1348.432	1349.821	2.0086	3.130276
105	1312.794	1327.09	1338.77	1326.218	2.021189	3.122615
108	1381.358	1324.297	1340.287	1348.647	2.033424	3.129898
111	1339.13	1321.226	1328.064	1329.473	2.045323	3.12368
114	1338.608	1307.95	1313.906	1320.155	2.056905	3.120625
117	1401.463	1342.425	1316.412	1353.433	2.068186	3.131437
120	1326.744	1332.582	1303.239	1320.855	2.079181	3.120855
123	1327.279	1342.114	1298.102	1322.498	2.089905	3.121395
126	1335.657	1285.678	1301.951	1307.762	2.100371	3.116529
129	1308.232	1320.671	1318.314	1315.739	2.11059	3.11917
132	1335.384	1315.879	1332.289	1327.851	2.120574	3.123149
135	1336.802	1315.171	1345.138	1332.37	2.130334	3.124625
138	1334.104	1333.653	1256.346	1308.034	2.139879	3.116619
141	1311.702	1336.901	1306.344	1318.316	2.149219	3.120019
144	1320.763	1346.356	1307.344	1324.821	2.158362	3.122157
147	1455.573	1280.947	1322.603	1353.041	2.167317	3.131311
150	1447.595	1274.362	1321.025	1347.66	2.176091	3.12958

Sample 846							
Image 8753		Particle O_6A		Approximate Particle size - 88.11495 µm			
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)	
3	825.5915	826.2816	825.6306	825.8346	0.477121	2.916893	
6	758.2287	755.8099	759.6694	757.9027	0.778151	2.879613	
9	751.2077	753.6906	753.8956	752.9313	0.954243	2.876755	
12	748.8237	751.9917	751.2694	750.6949	1.079181	2.875463	
15	747.3588	741.81	742.496	743.8883	1.176091	2.871508	
18	746.9874	746.4721	737.1559	743.5385	1.255273	2.871303	
21	736.7325	744.7463	732.3965	737.9584	1.322219	2.868032	
24	730.1568	747.7971	744.8474	740.9338	1.380211	2.869779	
27	741.6653	729.541	745.0338	738.7467	1.431364	2.868496	
30	729.8588	750.7429	723.0314	734.5444	1.477121	2.866018	
33	727.2893	721.7248	739.8051	729.6064	1.518514	2.863089	
36	727.8942	716.9042	733.5116	726.1033	1.556303	2.860998	
39	727.1234	733.8688	724.0889	728.3604	1.591065	2.862346	
42	732.9518	722.2432	708.2355	721.1435	1.623249	2.858022	
45	736.1741	707.368	689.371	710.971	1.653213	2.851852	
48	709.9836	714.4912	715.6404	713.3717	1.681241	2.853316	
51	690.2327	720.0112	683.5909	697.9449	1.70757	2.843821	
54	701.9759	736.716	713.6441	717.4453	1.732394	2.855789	
57	697.3101	708.0857	688.3503	697.9154	1.755875	2.843803	
60	670.9705	710.6198	687.9177	689.836	1.778151	2.838746	
63	710.3856	724.3902	732.2018	722.3259	1.799341	2.858733	
66	666.2076	671.6458	697.0999	678.3178	1.819544	2.831433	
69	664.4157	722.3585	672.0841	686.2861	1.838849	2.836505	
72	672.8085	730.5765	685.8978	696.4276	1.857332	2.842876	
75	689.479	755.1993	704.4222	716.3668	1.875061	2.855135	
78	645.6677	704.36	659.5024	669.8434	1.892095	2.825973	
81	650.2349	630.1203	699.7498	660.035	1.908485	2.819567	
84	662.8601	614.0817	680.4249	652.4556	1.924279	2.814551	
87	667.0287	662.2867	657.5897	662.3017	1.939519	2.821056	
90	681.4507	663.4288	682.3432	675.7409	1.954243	2.82978	
93	677.2979	678.4305	692.4883	682.7389	1.968483	2.834255	
96	720.5212	687.7374	701.2069	703.1552	1.982271	2.847051	
99	624.7016	592.3529	671.788	629.6142	1.995635	2.799074	
102	629.1476	601.1929	676.9349	635.7585	2.0086	2.803292	
105	637.1148	611.3483	687.5574	645.3402	2.021189	2.809789	
108	643.6958	618.0114	693.2629	651.6567	2.033424	2.814019	
111	645.065	615.3663	681.8947	647.442	2.045323	2.811201	
114	635.2006	618.4937	688.091	647.2618	2.056905	2.81108	
117	657.7657	631.48	702.7583	664.0013	2.068186	2.822169	
120	670.2612	650.1088	709.316	676.562	2.079181	2.830308	
123	686.5427	516.2586	715.2257	639.3423	2.089905	2.805733	
126	561.7032	505.2076	553.5255	540.1454	2.100371	2.732511	
129	556.0686	504.5531	563.1776	541.2664	2.11059	2.733411	
132	550.2275	515.2668	565.1525	543.5489	2.120574	2.735239	
135	555.0425	531.0116	570.2434	552.0992	2.130334	2.742017	
138	648.6538	549.9568	568.0753	588.8953	2.139879	2.770038	
141	650.6349	564.232	575.6271	596.8313	2.149219	2.775852	
144	650.0981	570.9743	691.9637	637.6787	2.158362	2.804602	
147	651.567	579.0038	699.062	643.2109	2.167317	2.808353	
150	652.7771	589.1805	699.1578	647.0385	2.176091	2.81093	

Sample 846						
Image 8753		Particle O_6B		Approximate Particle size - 75.98636 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	754.9102	753.1478	756.9213	754.9931	0.477121	2.877943
6	696.9157	694.1911	695.7564	695.6211	0.778151	2.842373
9	688.6135	684.8913	689.3875	687.6308	0.954243	2.837355
12	686.9905	682.6547	685.8541	685.1664	1.079181	2.835796
15	680.372	680.7982	687.152	682.7741	1.176091	2.834277
18	679.5054	678.2029	682.0552	679.9212	1.255273	2.832459
21	678.6756	677.4673	681.2603	679.1344	1.322219	2.831956
24	675.1932	672.9062	683.8005	677.3	1.380211	2.830781
27	681.3515	673.6426	675.902	676.9654	1.431364	2.830566
30	690.227	673.6462	680.9305	681.6012	1.477121	2.83353
33	682.0208	668.8153	672.9456	674.5939	1.518514	2.829042
36	682.8237	669.4252	684.3797	678.8762	1.556303	2.831791
39	670.0204	669.9807	682.1116	674.0376	1.591065	2.828684
42	670.8353	666.0933	673.7201	670.2162	1.623249	2.826215
45	666.7095	666.2694	671.0463	668.0084	1.653213	2.824782
48	660.4917	660.6205	673.1807	664.7643	1.681241	2.822668
51	695.0665	654.9084	678.8148	676.2632	1.70757	2.830116
54	681.9515	659.0723	682.8219	674.6152	1.732394	2.829056
57	655.8306	655.2071	670.6252	660.5543	1.755875	2.819909
60	675.2274	651.7681	669.593	665.5295	1.778151	2.823167
63	655.5178	662.4404	672.1707	663.3763	1.799341	2.82176
66	662.7831	645.9517	664.8248	657.8532	1.819544	2.818129
69	659.4114	641.2054	642.5194	647.7121	1.838849	2.811382
72	684.1063	652.2371	660.606	665.6498	1.857332	2.823246
75	677.143	643.5893	653.0572	657.9298	1.875061	2.81818
78	647.4874	647.4683	642.2468	645.7342	1.892095	2.810054
81	687.8249	651.4812	664.1106	667.8056	1.908485	2.82465
84	619.8933	623.1874	661.521	634.8672	1.924279	2.802683
87	654.8995	667.7352	629.2674	650.634	1.939519	2.813337
90	648.1458	640.1354	629.2495	639.1769	1.954243	2.805621
93	656.9708	613.8768	625.4796	632.1091	1.968483	2.800792
96	663.8754	610.9502	631.0971	635.3076	1.982271	2.802984
99	662.8133	607.0299	629.6567	633.1666	1.995635	2.801518
102	651.5086	676.0574	628.4279	651.998	2.0086	2.814246
105	691.9565	617.2617	650.5012	653.2398	2.021189	2.815073
108	669.5458	620.7448	655.0663	648.4523	2.033424	2.811878
111	593.5407	609.8554	633.64	612.3454	2.045323	2.786996
114	590.9141	650.399	614.9683	618.7605	2.056905	2.791523
117	675.3527	646.9313	641.8074	654.6971	2.068186	2.81604
120	660.0579	647.7854	619.3779	642.4071	2.079181	2.80781
123	629.9775	643.2788	580.8276	618.028	2.089905	2.791008
126	623.2993	604.5995	580.4358	602.7782	2.100371	2.780158
129	621.9289	571.9526	590.6372	594.8396	2.11059	2.7744
132	626.7651	571.8297	591.8541	596.8163	2.120574	2.775841
135	614.0961	571.1712	584.7768	590.0147	2.130334	2.770863
138	605.2102	567.7217	581.2801	584.7373	2.139879	2.766961
141	597.2516	669.2131	570.163	612.2092	2.149219	2.7869
144	593.4855	667.3412	686.6514	649.1594	2.158362	2.812351
147	727.6742	648.9792	701.1724	692.6086	2.167317	2.840488
150	721.6707	633.8716	699.8819	685.1414	2.176091	2.83578

Sample 846						
Image 8753		Particle O_7A		Approximate Particle size - 253.3268 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1551.851	1549.599	1551.713	1551.054	0.477121	3.190627
6	1364.651	1360.086	1360.835	1361.857	0.778151	3.134131
9	1347.531	1344.15	1344.801	1345.494	0.954243	3.128882
12	1328.879	1354.891	1330.977	1338.249	1.079181	3.126537
15	1329.376	1343.534	1324.086	1332.332	1.176091	3.124612
18	1328.49	1332.733	1327.244	1329.489	1.255273	3.123685
21	1339.964	1322.685	1325.318	1329.322	1.322219	3.12363
24	1322.768	1324.724	1334.572	1327.355	1.380211	3.122987
27	1327.265	1336.985	1318.634	1327.628	1.431364	3.123076
30	1309.719	1335.51	1308.738	1317.989	1.477121	3.119912
33	1321.182	1337.941	1309.072	1322.732	1.518514	3.121472
36	1310.591	1300.191	1299.674	1303.486	1.556303	3.115106
39	1288.713	1301.45	1302.294	1297.486	1.591065	3.113103
42	1313.351	1301.887	1330.242	1315.16	1.623249	3.118979
45	1290.417	1326.618	1309.563	1308.866	1.653213	3.116895
48	1314.214	1316.547	1310.987	1313.916	1.681241	3.118568
51	1310.5	1331.157	1282.679	1308.112	1.70757	3.116645
54	1343.154	1315.402	1283.068	1313.875	1.732394	3.118554
57	1283.847	1366.556	1272.489	1307.631	1.755875	3.116485
60	1276.37	1341.775	1335.502	1317.882	1.778151	3.119877
63	1284.585	1307.407	1304.742	1298.911	1.799341	3.11358
66	1279.056	1384.363	1294.711	1319.377	1.819544	3.120369
69	1276.941	1328.884	1303.291	1303.039	1.838849	3.114957
72	1285.699	1265.345	1275.222	1275.422	1.857332	3.105654
75	1264.642	1259.644	1257.544	1260.61	1.875061	3.100581
78	1275.536	1294.341	1278.964	1282.947	1.892095	3.108209
81	1367.362	1291.879	1236.633	1298.624	1.908485	3.113484
84	1275.929	1251.968	1271.008	1266.302	1.924279	3.102537
87	1256.393	1358.733	1282.695	1299.274	1.939519	3.113701
90	1263.59	1338.809	1346.797	1316.399	1.954243	3.119387
93	1278.176	1349.642	1344.518	1324.112	1.968483	3.121925
96	1239.255	1283.212	1284.838	1269.102	1.982271	3.103496
99	1230.159	1244.371	1328.139	1267.557	1.995635	3.102967
102	1249.56	1374.135	1235.197	1286.297	2.0086	3.109341
105	1392.329	1391.002	1284.214	1355.849	2.021189	3.132211
108	1403.923	1272.237	1289.797	1321.985	2.033424	3.121227
111	1247.497	1357.422	1208.224	1271.047	2.045323	3.104162
114	1240.869	1338.937	1212.226	1264.011	2.056905	3.101751
117	1209.76	1280.978	1227.036	1239.258	2.068186	3.093162
120	1224.861	1256.349	1259.444	1246.885	2.079181	3.095826
123	1228.235	1281.885	1190.073	1233.398	2.089905	3.091103
126	1163.178	1416.307	1170.649	1250.045	2.100371	3.096926
129	1198.997	1425.376	1224.195	1282.856	2.11059	3.108178
132	1148.238	1366.575	1076.897	1197.237	2.120574	3.07818
135	1146.727	1223.019	1085.677	1151.808	2.130334	3.06138
138	1145.32	1331.961	1270.77	1249.351	2.139879	3.096684
141	1163.22	1171.711	1286.44	1207.124	2.149219	3.081752
144	1175.78	1174.752	1303.962	1218.165	2.158362	3.085706
147	1188.911	1186.907	1325.719	1233.846	2.167317	3.091261
150	1228.499	1184.448	1359.539	1257.495	2.176091	3.099506

Sample 846						
Image 8753		Particle O_7B		Approximate Particle size - 229.0112 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1512.428	1515.931	1512.661	1513.673	0.477121	3.180032
6	1327.639	1332.28	1328.412	1329.444	0.778151	3.12367
9	1311.319	1314.539	1310.811	1312.223	0.954243	3.118008
12	1301.162	1311.291	1302.067	1304.84	1.079181	3.115557
15	1297.615	1304.585	1301.198	1301.132	1.176091	3.114321
18	1297.392	1305.526	1303.185	1302.034	1.255273	3.114622
21	1292.551	1298.135	1297.936	1296.207	1.322219	3.112674
24	1291.388	1296.748	1299.809	1295.982	1.380211	3.112599
27	1293.505	1303.163	1298.309	1298.326	1.431364	3.113384
30	1291.436	1288.95	1292.754	1291.047	1.477121	3.110942
33	1282.45	1297.349	1280.821	1286.873	1.518514	3.109536
36	1290.212	1309.512	1293.654	1297.793	1.556303	3.113205
39	1281.479	1301.629	1289.379	1290.829	1.591065	3.110869
42	1278.369	1299.429	1288.138	1288.645	1.623249	3.110133
45	1271.913	1292.551	1289.669	1284.711	1.653213	3.108805
48	1259.715	1304.141	1275.471	1279.776	1.681241	3.107134
51	1255.771	1294.783	1270.306	1273.62	1.70757	3.10504
54	1266.533	1285.343	1267.042	1272.973	1.732394	3.104819
57	1249.784	1312.22	1270.992	1277.665	1.755875	3.106417
60	1274.994	1299.409	1260.039	1278.147	1.778151	3.106581
63	1254.751	1293.971	1272.282	1273.668	1.799341	3.105056
66	1258.553	1296.091	1252.572	1269.072	1.819544	3.103486
69	1253.086	1305.352	1258.439	1272.292	1.838849	3.104587
72	1235.728	1289.145	1262.824	1262.566	1.857332	3.101254
75	1252.173	1289.02	1268.798	1269.997	1.875061	3.103803
78	1255.382	1273.328	1249.017	1259.242	1.892095	3.100109
81	1218.867	1276.471	1240.34	1245.226	1.908485	3.095248
84	1224.24	1260.284	1238.527	1241.017	1.924279	3.093778
87	1250.077	1298.001	1232.477	1260.185	1.939519	3.100434
90	1236.148	1229.445	1204.856	1223.483	1.954243	3.087598
93	1229.863	1253.404	1253.28	1245.516	1.968483	3.095349
96	1195.276	1265.726	1258.383	1239.795	1.982271	3.09335
99	1213.15	1247.766	1227.331	1229.415	1.995635	3.089699
102	1235.653	1214.737	1210.622	1220.337	2.0086	3.08648
105	1201.024	1234.558	1221.188	1218.923	2.021189	3.085976
108	1204.65	1248.427	1240.177	1231.085	2.033424	3.090288
111	1176.554	1238.536	1248.611	1221.234	2.045323	3.086799
114	1152.265	1205.275	1257.205	1204.915	2.056905	3.080957
117	1218.934	1241.802	1222.693	1227.809	2.068186	3.089131
120	1202.895	1246.002	1198.691	1215.863	2.079181	3.084885
123	1209.399	1268.031	1160.796	1212.742	2.089905	3.083768
126	1227.753	1293.016	1167.082	1229.284	2.100371	3.089652
129	1244.024	1310.061	1183.58	1245.888	2.11059	3.095479
132	1262.671	1174.869	1191.79	1209.776	2.120574	3.082705
135	1282.315	1205.894	1208.243	1232.151	2.130334	3.090664
138	1269.473	913.6408	1222.88	1135.331	2.139879	3.055123
141	1200.416	911.7358	1240.58	1117.578	2.149219	3.048278
144	1105.865	915.7391	1245.696	1089.1	2.158362	3.037068
147	1141.656	921.2252	1217.48	1093.454	2.167317	3.0388
150	1144.683	924.3437	1100.856	1056.628	2.176091	3.023922

Sample 846						
Image 8753		Particle O_8		Approximate Particle size - 175.4798 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1875.965	1874.239	1873.682	1874.628	0.477121	3.272915
6	1562.579	1561.694	1560.283	1561.518	0.778151	3.193547
9	1522.673	1522.627	1522.362	1522.554	0.954243	3.182573
12	1510.433	1510.904	1511.359	1510.898	1.079181	3.179235
15	1494.634	1493.679	1493.926	1494.079	1.176091	3.174374
18	1498.176	1496.346	1497.283	1497.268	1.255273	3.1753
21	1479.39	1481.856	1478.942	1480.063	1.322219	3.17028
24	1467.169	1466.432	1466.729	1466.777	1.380211	3.166364
27	1459.294	1468.213	1457.654	1461.72	1.431364	3.164864
30	1466.618	1489.884	1474.246	1476.916	1.477121	3.169356
33	1446.956	1458.624	1457.705	1454.428	1.518514	3.162692
36	1474.863	1481.796	1480.715	1479.125	1.556303	3.170005
39	1451.808	1442.626	1460.127	1451.52	1.591065	3.161823
42	1436.8	1448.921	1449.288	1445.003	1.623249	3.159869
45	1444.307	1446.285	1442.154	1444.248	1.653213	3.159642
48	1414.629	1432.455	1432.724	1426.602	1.681241	3.154303
51	1463.672	1434.741	1436.192	1444.868	1.70757	3.159828
54	1419.124	1432.6	1429.258	1426.994	1.732394	3.154422
57	1394.3	1435.183	1434.187	1421.223	1.755875	3.152662
60	1403.86	1423.498	1421.799	1416.386	1.778151	3.151182
63	1416.218	1424.611	1424.764	1421.864	1.799341	3.152858
66	1421.81	1419.622	1416.078	1419.17	1.819544	3.152034
69	1410.718	1419.457	1413.831	1414.669	1.838849	3.150655
72	1398.485	1427.817	1426.288	1417.53	1.857332	3.151532
75	1401.416	1434.368	1431.048	1422.277	1.875061	3.152984
78	1408.408	1417.151	1411.525	1412.362	1.892095	3.149946
81	1406.792	1385.947	1390.313	1394.351	1.908485	3.144372
84	1391.175	1407.45	1405.188	1401.271	1.924279	3.146522
87	1409.123	1396.289	1399.365	1401.592	1.939519	3.146622
90	1376.413	1406.062	1402.906	1395.127	1.954243	3.144614
93	1387.983	1388.082	1391.365	1389.143	1.968483	3.142747
96	1369.553	1394.485	1391.676	1385.238	1.982271	3.141524
99	1385.439	1392.085	1389.351	1388.958	1.995635	3.142689
102	1361.746	1400.854	1398.285	1386.962	2.0086	3.142064
105	1386.816	1380.57	1382.162	1383.183	2.021189	3.14088
108	1382.036	1376.071	1371.186	1376.431	2.033424	3.138755
111	1374.724	1376.639	1376.494	1375.952	2.045323	3.138603
114	1401.821	1379.41	1382.048	1387.76	2.056905	3.142314
117	1355.194	1378.419	1373.335	1368.983	2.068186	3.136398
120	1358.72	1347.114	1352.493	1352.776	2.079181	3.131226
123	1396.54	1346.63	1352.376	1365.182	2.089905	3.135191
126	1397.849	1344.41	1347.631	1363.297	2.100371	3.13459
129	1402.305	1375.832	1366.687	1381.608	2.11059	3.140385
132	1375.837	1392.719	1389.637	1386.065	2.120574	3.141783
135	1333.76	1384.857	1388.223	1368.947	2.130334	3.136387
138	1350.783	1373.719	1318.788	1347.763	2.139879	3.129614
141	1364.81	1335.351	1332.394	1344.185	2.149219	3.128459
144	1360.588	1331.593	1334.203	1342.128	2.158362	3.127794
147	1362.864	1351.374	1353.207	1355.815	2.167317	3.1322
150	1362.145	1381.669	1383.481	1375.765	2.176091	3.138544

Sample 846						
Image 8754		Particle O_1A		Approximate Particle size - 145.4359 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1044.637	1042.637	1043.933	1043.736	0.477121	3.018591
6	1003.725	1005.48	1005.956	1005.053	0.778151	3.002189
9	995.9216	995.6447	998.7539	996.7734	0.954243	2.998596
12	992.7158	991.9949	991.9949	992.2352	1.079181	2.996615
15	988.2819	988.9444	996.7546	991.327	1.176091	2.996217
18	985.5443	986.7253	994.8362	989.0353	1.255273	2.995212
21	982.8619	993.8151	986.0977	987.5916	1.322219	2.994577
24	981.2715	983.7904	989.1487	984.7369	1.380211	2.99332
27	981.2083	991.9255	982.1387	985.0908	1.431364	2.993476
30	974.5817	984.0234	984.1682	980.9244	1.477121	2.991636
33	982.381	977.7301	989.7263	983.2791	1.518514	2.992677
36	973.3424	976.2252	982.2901	977.2859	1.556303	2.990022
39	968.3278	967.7596	976.4398	970.8424	1.591065	2.987149
42	963.8661	980.3614	967.4643	970.5639	1.623249	2.987024
45	967.6624	986.5643	986.5737	980.2668	1.653213	2.991344
48	964.0466	983.0784	967.5803	971.5684	1.681241	2.987473
51	959.5335	969.7582	973.0685	967.4534	1.70757	2.98563
54	962.6812	967.2872	969.9237	966.6307	1.732394	2.985261
57	971.4169	973.9683	979.5712	974.9855	1.755875	2.988998
60	962.3073	990.2511	987.2758	979.9447	1.778151	2.991202
63	950.3513	983.9957	961.915	965.4207	1.799341	2.984717
66	948.3791	969.2557	950.1577	955.9308	1.819544	2.980426
69	949.3585	955.9843	958.0772	954.4733	1.838849	2.979764
72	940.4399	962.2122	967.2833	956.6451	1.857332	2.980751
75	943.6923	958.8513	957.6089	953.3842	1.875061	2.979268
78	932.6208	948.2366	951.4434	944.1003	1.892095	2.975018
81	926.8459	940.6514	946.4597	937.9857	1.908485	2.972196
84	935.0245	967.5788	938.6353	947.0795	1.924279	2.976386
87	934.6304	964.8526	968.2401	955.9077	1.939519	2.980416
90	927.4871	950.1637	953.6341	943.7616	1.954243	2.974862
93	938.1702	970.3973	946.7775	951.7817	1.968483	2.978537
96	936.6772	909.5937	911.6995	919.3235	1.982271	2.963468
99	935.2971	931.1059	922.3425	929.5818	1.995635	2.968288
102	937.2734	921.8971	927.4616	928.8774	2.0086	2.967958
105	903.2787	929.7943	944.5029	925.8586	2.021189	2.966545
108	896.6385	935.2746	941.7506	924.5546	2.033424	2.965933
111	953.7021	943.4987	945.3005	947.5004	2.045323	2.976579
114	932.6293	941.3376	940.7964	938.2544	2.056905	2.972321
117	933.6197	920.4713	898.6073	917.5661	2.068186	2.962637
120	930.2073	885.5962	891.9738	902.5924	2.079181	2.955492
123	912.0157	892.5167	910.7072	905.0799	2.089905	2.956687
126	938.4713	936.6055	912.6417	929.2395	2.100371	2.968128
129	893.9393	942.3873	936.9576	924.4281	2.11059	2.965873
132	871.9927	943.0206	945.0883	920.0339	2.120574	2.963804
135	875.1406	915.0811	925.1158	905.1125	2.130334	2.956703
138	864.9525	912.3339	924.7462	900.6775	2.139879	2.954569
141	958.7798	915.9496	927.1716	933.967	2.149219	2.970332
144	905.245	918.1782	916.5903	913.3378	2.158362	2.960631
147	864.5306	903.7071	914.2933	894.177	2.167317	2.951423
150	869.2145	926.3489	907.7047	901.0894	2.176091	2.954768

Sample 846						
Image 8754		Particle O_1B		Approximate Particle size - 133.6774 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1164.46	1164.539	1164.539	1164.513	0.477121	3.066144
6	1133.034	1133.417	1133.417	1133.289	0.778151	3.054341
9	1123.421	1123.346	1123.346	1123.371	0.954243	3.050523
12	1128.878	1119.339	1119.339	1122.519	1.079181	3.050194
15	1120.287	1132.966	1132.966	1128.739	1.176091	3.052594
18	1118.754	1110.038	1110.038	1112.943	1.255273	3.046473
21	1123.638	1139.412	1139.412	1134.154	1.322219	3.054672
24	1136.234	1108.18	1108.18	1117.531	1.380211	3.04826
27	1111.762	1134.971	1134.971	1127.235	1.431364	3.052014
30	1142.101	1131.626	1131.626	1135.118	1.477121	3.055041
33	1159.099	1132.981	1132.981	1141.687	1.518514	3.057547
36	1143.925	1114.356	1114.356	1124.212	1.556303	3.050848
39	1119.812	1125.785	1125.785	1123.794	1.591065	3.050687
42	1156.274	1121.421	1121.421	1133.038	1.623249	3.054245
45	1150.847	1119.506	1119.506	1129.953	1.653213	3.05306
48	1082.029	1108.752	1108.752	1099.845	1.681241	3.041331
51	1145.13	1093.143	1093.143	1110.472	1.70757	3.045507
54	1127.418	1112.941	1112.941	1117.767	1.732394	3.048351
57	1131.934	1114.769	1114.769	1120.491	1.755875	3.049408
60	1103.253	1105.31	1105.31	1104.624	1.778151	3.043215
63	1142.64	1112.151	1112.151	1122.314	1.799341	3.050114
66	1107.197	1083.465	1083.465	1091.376	1.819544	3.037974
69	1117.894	1071.692	1071.692	1087.093	1.838849	3.036267
72	1104.579	1084.14	1084.14	1090.953	1.857332	3.037806
75	1162.236	1125.189	1125.189	1137.538	1.875061	3.055966
78	1048.24	1055.28	1055.28	1052.933	1.892095	3.022401
81	1142.919	1065.224	1065.224	1091.122	1.908485	3.037873
84	1130.806	1053.384	1053.384	1079.191	1.924279	3.033098
87	1075.701	1075.208	1075.208	1075.372	1.939519	3.031559
90	1108.245	1073.998	1073.998	1085.413	1.954243	3.035595
93	1044.489	1080.692	1080.692	1068.624	1.968483	3.028825
96	1094.869	1090.982	1090.982	1092.278	1.982271	3.038333
99	1071.953	1097.834	1097.834	1089.207	1.995635	3.03711
102	1162.829	1051.385	1051.385	1088.533	2.0086	3.036842
105	1139.523	1041.969	1041.969	1074.487	2.021189	3.031201
108	1135.131	1013.04	1013.04	1053.737	2.033424	3.022732
111	1087.421	1046.658	1046.658	1060.246	2.045323	3.025406
114	1073.389	1047.89	1047.89	1056.389	2.056905	3.023824
117	1059.771	1044.874	1044.874	1049.84	2.068186	3.021123
120	1036.916	1039.938	1039.938	1038.93	2.079181	3.016586
123	1026.18	1033.049	1033.049	1030.76	2.089905	3.013157
126	1169.731	1060.014	1060.014	1096.586	2.100371	3.040043
129	1131.234	1058.384	1058.384	1082.667	2.11059	3.034495
132	1116.413	1073.425	1073.425	1087.754	2.120574	3.036531
135	1082.224	1068.342	1068.342	1072.969	2.130334	3.030587
138	1046.88	1025.199	1025.199	1032.426	2.139879	3.013859
141	1032.2	1042.782	1042.782	1039.255	2.149219	3.016722
144	1046.179	1055.277	1055.277	1052.244	2.158362	3.022117
147	1215.84	1069.018	1069.018	1117.959	2.167317	3.048426
150	1235.091	1080.419	1080.419	1131.977	2.176091	3.053837

Sample 846						
Image 8754		Particle O_2A		Approximate Particle size - 156.2884 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	827.9827	830.8401	831.5659	830.1296	0.477121	2.919146
6	795.3208	797.468	796.3369	796.3752	0.778151	2.901118
9	786.5164	787.7105	786.4295	786.8855	0.954243	2.895912
12	784.5385	790.5327	783.8663	786.3125	1.079181	2.895595
15	790.2582	778.7827	778.7192	782.5867	1.176091	2.893532
18	774.3342	782.5256	773.9683	776.9427	1.255273	2.890389
21	774.7043	774.3901	778.2191	775.7712	1.322219	2.889734
24	782.7114	780.7072	773.8301	779.0829	1.380211	2.891584
27	779.0103	769.1088	765.3577	771.1589	1.431364	2.887144
30	800.2943	780.6406	773.2499	784.7283	1.477121	2.894719
33	779.8845	773.3693	768.1299	773.7946	1.518514	2.888626
36	775.6838	773.4809	756.8877	768.6841	1.556303	2.885748
39	802.6166	761.6138	763.6257	775.952	1.591065	2.889835
42	793.0314	771.5016	766.3261	776.953	1.623249	2.890395
45	774.1996	771.3936	759.4284	768.3405	1.653213	2.885554
48	777.7822	767.0714	762.4833	769.1123	1.681241	2.88599
51	789.3919	765.1426	751.5435	768.6927	1.70757	2.885753
54	781.6642	762.5914	767.4244	770.56	1.732394	2.886806
57	796.5062	763.6559	758.2732	772.8118	1.755875	2.888074
60	760.7789	760.799	761.3724	760.9834	1.778151	2.881375
63	753.6103	766.5368	743.3824	754.5098	1.799341	2.877665
66	744.7631	758.7421	743.498	749.0011	1.819544	2.874482
69	798.9384	764.6901	775.2994	779.6426	1.838849	2.891896
72	779.1071	763.9808	762.607	768.565	1.857332	2.885681
75	776.7601	763.8853	769.9286	770.1913	1.875061	2.886599
78	772.2112	720.6578	722.0051	738.2914	1.892095	2.868228
81	736.9714	760.5665	763.8655	753.8011	1.908485	2.877257
84	740.2484	748.8879	742.4517	743.8627	1.924279	2.871493
87	707.4185	756.3569	740.6608	734.8121	1.939519	2.866176
90	765.9525	761.7249	742.0534	756.5769	1.954243	2.878853
93	763.095	790.6802	799.4432	784.4061	1.968483	2.894541
96	767.3237	773.1403	772.8244	771.0961	1.982271	2.887109
99	771.3744	720.8233	750.4329	747.5435	1.995635	2.873636
102	745.214	752.77	769.5694	755.8511	2.0086	2.878436
105	742.9702	738.5276	722.8041	734.7673	2.021189	2.86615
108	738.6938	742.962	712.6505	731.4354	2.033424	2.864176
111	696.1257	749.9528	706.3778	717.4854	2.045323	2.855813
114	690.4218	751.7249	698.8575	713.6681	2.056905	2.853496
117	787.3678	746.1619	775.384	769.6379	2.068186	2.886286
120	784.1735	776.5134	775.9257	778.8709	2.079181	2.891465
123	788.6174	714.2341	779.274	760.7085	2.089905	2.881218
126	792.1923	685.8884	763.9643	747.3483	2.100371	2.873523
129	797.3517	672.5569	761.3652	743.7579	2.11059	2.871432
132	805.7055	705.1351	760.1067	756.9824	2.120574	2.879086
135	803.9746	713.9841	753.8604	757.273	2.130334	2.879252
138	755.0049	717.2681	758.3358	743.5363	2.139879	2.871302
141	777.002	718.3947	746.38	747.2589	2.149219	2.873471
144	744.6039	716.2858	812.5559	757.8152	2.158362	2.879563
147	706.7674	720.9108	746.6425	724.7736	2.167317	2.860202
150	698.3624	725.9426	717.4378	713.9143	2.176091	2.853646

Sample 846						
Image 8754		Particle O_2B		Approximate Particle size - 90.00487 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	382.7954	384.2387	384.2387	383.7576	0.477121	2.584057
6	369.2834	368.7515	368.7515	368.9288	0.778151	2.566943
9	368.6318	369.7668	369.7668	369.3885	0.954243	2.567483
12	364.6092	376.9518	376.9518	372.8376	1.079181	2.57152
15	364.2026	373.1809	373.1809	370.1881	1.176091	2.568422
18	363.9561	371.4865	371.4865	368.9764	1.255273	2.566999
21	360.1191	362.372	362.372	361.621	1.322219	2.558254
24	355.7119	348.1683	348.1683	350.6828	1.380211	2.544915
27	337.3562	347.9308	347.9308	344.4059	1.431364	2.537071
30	341.018	351.5925	351.5925	348.0677	1.477121	2.541664
33	332.2737	354.8482	354.8482	347.3234	1.518514	2.540734
36	335.24	357.8145	357.8145	350.2897	1.556303	2.544427
39	337.2979	359.9329	359.9329	352.3879	1.591065	2.547021
42	323.8288	346.4639	346.4639	338.9189	1.623249	2.530096
45	326.8118	349.2993	349.2993	341.8035	1.653213	2.533776
48	331.3451	354.4829	354.4829	346.7703	1.681241	2.540042
51	315.3486	327.4474	327.4474	323.4145	1.70757	2.509759
54	317.7997	340.9374	340.9374	333.2248	1.732394	2.522737
57	294.2417	317.8265	317.8265	309.9649	1.755875	2.491313
60	306.3922	325.1103	325.1103	318.8709	1.778151	2.503615
63	316.9421	325.9294	325.9294	322.9336	1.799341	2.509113
66	328.539	336.5261	336.5261	333.8637	1.819544	2.523569
69	318.7852	343.6312	343.6312	335.3492	1.838849	2.525497
72	251.8597	275.8728	275.8728	267.8684	1.857332	2.427922
75	249.1983	278.1543	278.1543	268.5023	1.875061	2.428948
78	269.6808	280.2824	280.2824	276.7485	1.892095	2.442085
81	282.1647	305.5907	305.5907	297.782	1.908485	2.473898
84	169.8354	309.0516	309.0516	262.6462	1.924279	2.419371
87	187.0041	319.9874	319.9874	275.6596	1.939519	2.440373
90	187.0041	183.8111	183.8111	184.8754	1.954243	2.266879
93	220.0041	203.8738	203.8738	209.2506	1.968483	2.320667
96	236.4619	208.9292	208.9292	218.1068	1.982271	2.338669
99	247.7416	207.6558	207.6558	221.0177	1.995635	2.344427
102	256.5332	207.6558	207.6558	223.9483	2.0086	2.350148
105	211.6699	238.2808	238.2808	229.4105	2.021189	2.360613
108	218.9124	250.4134	250.4134	239.9131	2.033424	2.380054
111	225.4055	227.4046	227.4046	226.7382	2.045323	2.355525
114	232.3998	277.1299	277.1299	262.2199	2.056905	2.418666
117	296.6962	279.7421	279.7421	285.3935	2.068186	2.455444
120		287.0403	287.0403	287.0403	2.079181	2.457943
123		296.6241	296.6241	296.6241	2.089905	2.472206
126		255.7548	255.7548	255.7548	2.100371	2.407824
129		313.2473	313.2473	313.2473	2.11059	2.495887

Sample 846						
Image 8754		Particle O_2C		Approximate Particle size - 151.7779 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	836.6896	835.8448	836.7524	836.4289	0.477121	2.922429
6	815.9493	818.3397	816.1326	816.8072	0.778151	2.91212
9	811.1079	808.6343	809.939	809.8937	0.954243	2.908428
12	807.0114	825.9891	809.3994	814.1333	1.079181	2.910696
15	801.2797	799.6395	803.4624	801.4605	1.176091	2.903882
18	803.7293	803.4069	800.5041	802.5468	1.255273	2.90447
21	803.7585	815.1055	801.02	806.628	1.322219	2.906673
24	805.37	826.489	807.0062	812.9551	1.380211	2.910067
27	792.7366	817.2889	794.4443	801.4899	1.431364	2.903898
30	791.4127	786.9451	792.5556	790.3045	1.477121	2.897794
33	799.1377	824.1528	795.4238	806.2381	1.518514	2.906463
36	787.5526	790.9171	790.2071	789.5589	1.556303	2.897385
39	793.6116	791.944	798.0931	794.5496	1.591065	2.900121
42	775.6345	774.9454	779.7992	776.793	1.623249	2.890305
45	774.5887	816.7795	784.9867	792.1183	1.653213	2.89879
48	804.5792	803.0577	787.9659	798.5343	1.681241	2.902294
51	801.5347	815.7927	780.671	799.3328	1.70757	2.902728
54	792.711	818.4169	789.7429	800.2903	1.732394	2.903248
57	774.0026	788.0591	779.6624	780.5747	1.755875	2.892414
60	778.4131	792.7891	773.9067	781.703	1.778151	2.893042
63	800.147	791.3422	780.1171	790.5354	1.799341	2.897921
66	774.1383	772.5637	754.0419	766.9146	1.819544	2.884747
69	784.8207	806.0134	788.8142	793.2161	1.838849	2.899392
72	739.1359	748.2748	741.4518	742.9542	1.857332	2.870962
75	773.3201	809.6462	775.2946	786.087	1.875061	2.895471
78	780.3585	808.9512	787.5427	792.2841	1.892095	2.898881
81	768.6293	793.5518	759.2471	773.8094	1.908485	2.888634
84	794.9299	822.6716	794.982	804.1945	1.924279	2.905361
87	781.5874	787.7629	784.9328	784.761	1.939519	2.894737
90	731.5151	742.8694	738.9973	737.7939	1.954243	2.867935
93	779.1464	810.7881	777.93	789.2882	1.968483	2.897236
96	786.7495	797.5816	790.6281	791.6531	1.982271	2.898535
99	784.8032	779.6508	791.2152	785.2231	1.995635	2.894993
102	781.4526	768.2422	737.751	762.4819	2.0086	2.88223
105	770.7932	818.9273	760.9128	783.5444	2.021189	2.894064
108	764.6309	811.808	773.085	783.1746	2.033424	2.893859
111	767.8427	797.7472	769.8907	778.4935	2.045323	2.891255
114	757.7285	765.2499	769.4751	764.1512	2.056905	2.883179
117	715.5399	749.9618	718.4851	727.9956	2.068186	2.862129
120	753.8589	816.1274	746.2409	772.0757	2.079181	2.88766
123	760.7529	809.6935	745.861	772.1025	2.089905	2.887675
126	759.2942	786.0703	746.6899	764.0181	2.100371	2.883104
129	737.9171	777.9568	741.0709	752.3149	2.11059	2.8764
132	739.126	781.2672	681.7192	734.0375	2.120574	2.865718
135	692.8455	773.7181	691.9617	719.5084	2.130334	2.857036
138	708.7866	755.791	699.6015	721.393	2.139879	2.858172
141	715.3846	733.6927	704.3636	717.8136	2.149219	2.856012
144	720.0908	802.655	709.5451	744.097	2.158362	2.87163
147	730.176	773.4769	725.6665	743.1065	2.167317	2.871051
150	734.2299	720.7408	738.978	731.3162	2.176091	2.864105

Sample 846						
Image 8754		Particle O_3A		Approximate Particle size - 148.2026 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	982.6833	981.2888	982.265	982.079	0.477121	2.992146
6	944.4049	943.4152	944.1001	943.9734	0.778151	2.97496
9	939.9692	941.1216	936.6067	939.2325	0.954243	2.972773
12	933.6237	933.5805	931.4358	932.88	1.079181	2.969826
15	933.2603	934.0062	932.2238	933.1634	1.176091	2.969958
18	928.3574	925.6508	924.7509	926.253	1.255273	2.96673
21	928.9072	932.0482	926.1107	929.022	1.322219	2.968026
24	933.3984	927.376	917.5625	926.1123	1.380211	2.966664
27	926.881	921.3311	919.2439	922.4853	1.431364	2.964959
30	917.6807	922.9264	918.5699	919.7257	1.477121	2.963658
33	929.8733	923.5792	913.8979	922.4501	1.518514	2.964943
36	916.4601	932.5703	921.8095	923.6133	1.556303	2.96549
39	910.1904	911.501	901.2501	907.6472	1.591065	2.957917
42	931.9865	918.19	906.9131	919.0299	1.623249	2.96333
45	918.633	909.9733	903.8455	910.8173	1.653213	2.959431
48	924.0429	903.1862	905.6611	910.9634	1.681241	2.959501
51	901.9722	903.8344	902.7264	902.8443	1.70757	2.955613
54	906.0048	908.2653	892.1981	902.1561	1.732394	2.955282
57	890.6614	888.8154	917.2343	898.9037	1.755875	2.953713
60	874.5307	906.2306	879.3977	886.7197	1.778151	2.947786
63	936.5916	900.6647	909.3163	915.5242	1.799341	2.96167
66	886.1004	876.1285	879.5405	880.5898	1.819544	2.944774
69	854.3045	872.0104	896.4888	874.2679	1.838849	2.941645
72	901.3553	880.7838	908.2615	896.8002	1.857332	2.952696
75	922.3073	903.0508	846.7072	890.6884	1.875061	2.949726
78	891.7108	894.5082	868.1509	884.79	1.892095	2.94684
81	851.3521	868.5644	863.2894	861.0686	1.908485	2.935038
84	892.8875	839.7249	855.9053	862.8392	1.924279	2.93593
87	898.1055	855.95	880.263	878.1062	1.939519	2.943547
90	891.8721	867.0956	891.915	883.6276	1.954243	2.946269
93	818.4968	868.2178	893.9312	860.2153	1.968483	2.934607
96	826.4153	874.9671	819.4928	840.2917	1.982271	2.92443
99	836.8639	888.3901	811.5042	845.5861	1.995635	2.927158
102	949.3571	904.9841	826.2378	893.5263	2.0086	2.951107
105	894.6844	882.4322	820.6544	865.9237	2.021189	2.93748
108	891.1321	785.502	821.436	832.69	2.033424	2.920483
111	784.2481	769.6373	811.9108	788.5987	2.045323	2.896856
114	759.6294	778.806	803.3195	780.585	2.056905	2.89242
117	758.7021	787.2777	840.0106	795.3301	2.068186	2.900547
120	763.3936	793.0588	841.0775	799.1766	2.079181	2.902643
123	765.0157	804.7322	843.0447	804.2642	2.089905	2.905399
126	771.6008	809.2366	850.7494	810.5289	2.100371	2.908769
129	790.8658	817.6874	861.4617	823.3383	2.11059	2.915578
132	957.567	827.2703	871.2601	885.3658	2.120574	2.947123
135	972.3509	841.8057	877.0785	897.0784	2.130334	2.95283
138	983.7891	846.7196	884.9478	905.1522	2.139879	2.956722
141	997.0599	875.4224	749.7015	874.0613	2.149219	2.941542
144	1011.197	889.2726	724.6418	875.037	2.158362	2.942026
147	1021.73	894.8472	738.8391	885.1387	2.167317	2.947011
150	1028.729	907.1259	701.8937	879.2495	2.176091	2.944112

Sample 846						
Image 8754		Particle O_3B		Approximate Particle size - 112.265 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	967.3229	967.3229	967.9822	967.5427	0.477121	2.98567
6	927.7783	927.7783	923.8516	926.4694	0.778151	2.966831
9	922.8096	922.8096	920.1088	921.9093	0.954243	2.964688
12	916.7888	916.7888	937.5676	923.7151	1.079181	2.965538
15	913.9174	913.9174	938.6664	922.1671	1.176091	2.96481
18	910.1374	910.1374	936.5721	918.949	1.255273	2.963291
21	920.4226	920.4226	931.3237	924.0563	1.322219	2.965698
24	901.9745	901.9745	920.2477	908.0656	1.380211	2.958117
27	898.9218	898.9218	930.8895	909.5777	1.431364	2.95884
30	904.4296	904.4296	899.4554	902.7715	1.477121	2.955578
33	917.0394	917.0394	944.6387	926.2392	1.518514	2.966723
36	889.5887	889.5887	912.1447	897.1074	1.556303	2.952844
39	900.5013	900.5013	928.8096	909.9374	1.591065	2.959012
42	884.4078	884.4078	934.3483	901.0546	1.623249	2.954751
45	917.7173	917.7173	926.8069	920.7472	1.653213	2.96414
48	912.6282	912.6282	892.0524	905.7696	1.681241	2.957018
51	907.2932	907.2932	875.2421	896.6095	1.70757	2.952603
54	931.3475	931.3475	909.2177	923.9709	1.732394	2.965658
57	947.5665	947.5665	931.8682	942.3337	1.755875	2.974205
60	904.8302	904.8302	917.9086	909.1897	1.778151	2.958654
63	920.1291	920.1291	927.1739	922.4774	1.799341	2.964956
66	846.5447	846.5447	922.0635	871.7176	1.819544	2.940376
69	890.4299	890.4299	895.288	892.0493	1.838849	2.950389
72	833.1068	833.1068	855.0532	840.4223	1.857332	2.924498
75	890.4186	890.4186	897.9749	892.9374	1.875061	2.950821
78	818.6265	818.6265	854.2314	830.4948	1.892095	2.919337
81	878.8486	878.8486	910.5184	889.4052	1.908485	2.9491
84	883.7546	883.7546	918.6891	895.3994	1.924279	2.952017
87	854.8133	854.8133	887.3884	865.6717	1.939519	2.937353
90	876.3944	876.3944	846.2578	866.3489	1.954243	2.937693
93	852.2873	852.2873	912.7482	872.4409	1.968483	2.940736
96	847.3143	847.3143	917.8033	870.8106	1.982271	2.939924
99	830.8275	830.8275	883.3151	848.3234	1.995635	2.928561
102	852.8361	852.8361	926.7774	877.4832	2.0086	2.943239
105	854.3713	854.3713	928.1428	878.9618	2.021189	2.94397
108	817.3832	817.3832	918.5326	851.0997	2.033424	2.92998
111	804.0596	804.0596	900.061	836.0601	2.045323	2.922237
114	861.571	861.571	897.4775	873.5398	2.056905	2.941283
117	860.9755	860.9755	884.092	868.681	2.068186	2.93886
120	858.9468	858.9468	857.6278	858.5071	2.079181	2.933744
123	858.6289	858.6289	990.3676	902.5418	2.089905	2.955467
126	834.2457	834.2457	970.2897	879.5937	2.100371	2.944282
129	823.9221	823.9221	967.6245	871.8229	2.11059	2.940428
132	813.2543	813.2543	954.4667	860.3251	2.120574	2.934663
135	878.9987	878.9987	937.2485	898.4153	2.130334	2.953477
138	860.3436	860.3436	858.7114	859.7995	2.139879	2.934397
141	855.9962	855.9962	816.4573	842.8166	2.149219	2.925733
144	843.6732	843.6732	803.8349	830.3938	2.158362	2.919284
147	758.5441	758.5441	767.3642	761.4841	2.167317	2.881661
150	763.6835	763.6835	757.0005	761.4558	2.176091	2.881645

Sample 846						
Image 8754		Particle O_3C		Approximate Particle size - 148.9333 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	893.957	894.238	897.4293	895.2081	0.477121	2.951924
6	872.2337	874.1873	875.006	873.809	0.778151	2.941417
9	866.9474	870.4526	868.9333	868.7778	0.954243	2.938909
12	861.5551	861.4669	864.5637	862.5286	1.079181	2.935773
15	858.4427	862.6367	861.4089	860.8294	1.176091	2.934917
18	854.8048	856.5314	857.0316	856.1226	1.255273	2.932536
21	849.7454	857.2455	855.6163	854.2024	1.322219	2.931561
24	855.0626	854.9614	858.7496	856.2579	1.380211	2.932605
27	848.9735	858.3337	851.684	852.9971	1.431364	2.930948
30	848.445	854.4484	847.0917	849.995	1.477121	2.929416
33	838.0493	849.7849	845.7252	844.5198	1.518514	2.92661
36	842.0024	847.2969	841.8832	843.7275	1.556303	2.926202
39	839.1269	853.8938	847.8237	846.9481	1.591065	2.927857
42	832.593	853.1772	845.6434	843.8045	1.623249	2.926242
45	833.188	848.4097	833.2764	838.2914	1.653213	2.923395
48	831.7108	834.7142	837.4458	834.6236	1.681241	2.921491
51	818.4525	835.7656	845.3837	833.2006	1.70757	2.92075
54	832.6943	867.5	854.7495	851.6479	1.732394	2.93026
57	829.4695	856.9937	820.8442	835.7691	1.755875	2.922086
60	831.1178	847.804	818.4986	832.4735	1.778151	2.92037
63	818.3666	855.2749	836.045	836.5622	1.799341	2.922498
66	816.9058	831.9474	819.5618	822.805	1.819544	2.915297
69	819.5372	840.3622	837.8896	832.5963	1.838849	2.920434
72	820.3803	818.4189	824.8879	821.229	1.857332	2.914464
75	822.3301	866.2368	852.3151	846.9607	1.875061	2.927863
78	803.8485	815.4044	826.6873	815.3134	1.892095	2.911325
81	814.6016	839.715	848.8025	834.373	1.908485	2.92136
84	801.3646	833.3564	787.3848	807.3686	1.924279	2.907072
87	800.7132	829.0089	802.1646	810.6289	1.939519	2.908822
90	812.8601	853.6893	831.9117	832.8204	1.954243	2.920551
93	788.7506	833.9117	823.6857	815.4493	1.968483	2.911397
96	799.0021	804.19	832.0446	811.7456	1.982271	2.90942
99	836.0021	869.2944	819.6934	841.6633	1.995635	2.925138
102	797.7114	830.1601	789.9608	805.9441	2.0086	2.906305
105	786.5355	790.9349	782.2789	786.5831	2.021189	2.895745
108	775.7923	855.6757	781.7466	804.4049	2.033424	2.905475
111	792.2833	850.3467	852.1726	831.6009	2.045323	2.919915
114	802.778	817.9421	806.0792	808.9331	2.056905	2.907913
117	814.4094	748.1327	743.0004	768.5142	2.068186	2.885652
120	828.5832	729.0384	748.4684	768.6967	2.079181	2.885755
123	813.687	823.4059	758.4744	798.5224	2.089905	2.902287
126	778.5006	817.2643	870.6354	822.1334	2.100371	2.914942
129	759.0505	795.407	847.7536	800.737	2.11059	2.90349
132	758.8673	792.5179	852.5253	801.3035	2.120574	2.903797
135	754.9005	796.3644	844.5011	798.5887	2.130334	2.902323
138	718.0969	796.8605	848.1394	787.6989	2.139879	2.89636
141	696.7173	799.4125	843.5712	779.9003	2.149219	2.892039
144	683.1865	797.4094	773.7652	751.4537	2.158362	2.875902
147	659.6761	784.8845	787.1425	743.901	2.167317	2.871515
150	656.8356	827.1062	717.8891	733.9436	2.176091	2.865663

Sample 846						
Image 8754		Particle O_4		Approximate Particle size - 214.905 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	2147.883	2139.654	2139.84	2142.459	0.477121	3.330913
6	1800.971	1797.795	1797.844	1798.87	0.778151	3.255
9	1726.336	1726.606	1721.278	1724.74	0.954243	3.236724
12	1648.4	1652.204	1648.106	1649.57	1.079181	3.217371
15	1646.474	1649.504	1646.79	1647.589	1.176091	3.216849
18	1574.524	1577.322	1582.998	1578.282	1.255273	3.198184
21	1573.119	1574.092	1583.745	1576.986	1.322219	3.197828
24	1519.446	1522.919	1518.061	1520.142	1.380211	3.181884
27	1520.615	1523.992	1530.057	1524.888	1.431364	3.183238
30	1517.436	1521.57	1526.149	1521.718	1.477121	3.182334
33	1525.855	1527.255	1516.27	1523.127	1.518514	3.182736
36	1513.196	1510.182	1507.041	1510.14	1.556303	3.179017
39	1522.106	1524.251	1523.621	1523.326	1.591065	3.182793
42	1522.735	1521.838	1519.081	1521.218	1.623249	3.182191
45	1518.637	1519.933	1508.308	1515.626	1.653213	3.180592
48	1515.769	1518.112	1505.753	1513.211	1.681241	3.1799
51	1533.567	1502.705	1505.023	1513.765	1.70757	3.180059
54	1522.132	1523.019	1499.11	1514.754	1.732394	3.180342
57	1516.025	1517.964	1520.911	1518.3	1.755875	3.181358
60	1513.8	1516.998	1524.722	1518.506	1.778151	3.181417
63	1524.842	1525.276	1518.207	1522.775	1.799341	3.182636
66	1498.75	1502.226	1519.598	1506.858	1.819544	3.178072
69	1517.623	1520.048	1498.459	1512.043	1.838849	3.179564
72	1490.69	1518.387	1510.121	1506.399	1.857332	3.17794
75	1519.06	1519.634	1485.57	1508.088	1.875061	3.178427
78	1491.512	1495.128	1511.354	1499.331	1.892095	3.175898
81	1504.346	1506.915	1498.118	1503.126	1.908485	3.176995
84	1515.141	1515.715	1503.317	1511.391	1.924279	3.179377
87	1497.908	1499.453	1509.734	1502.365	1.939519	3.176775
90	1482.956	1485.581	1504.023	1490.853	1.954243	3.173435
93	1519.691	1523.826	1492.545	1512.021	1.968483	3.179558
96	1500.5	1503.175	1496.104	1499.926	1.982271	3.17607
99	1514.57	1517.922	1454.825	1495.772	1.995635	3.174866
102	1496.967	1497.522	1531.493	1508.661	2.0086	3.178592
105	1526.571	1525.808	1513.872	1522.084	2.021189	3.182438
108	1505.898	1511.663	1506.806	1508.122	2.033424	3.178437
111	1480.914	1487.866	1506.265	1491.682	2.045323	3.173676
114	1520.37	1506.849	1514.552	1513.924	2.056905	3.180104
117	1486.151	1487.82	1472.717	1482.229	2.068186	3.170915
120	1521.009	1545.515	1492.124	1519.549	2.079181	3.181715
123	1503.821	1503.785	1497.158	1501.588	2.089905	3.176551
126	1478.347	1461.867	1493.128	1477.78	2.100371	3.16961
129	1461.471	1464.708	1469.888	1465.356	2.11059	3.165943
132	1494.44	1498.927	1473.425	1488.931	2.120574	3.172875
135	1478.21	1409.331	1478.381	1455.307	2.130334	3.162955
138	1507.574	1510.688	1418.72	1478.994	2.139879	3.169966
141	1469.058	1482.156	1436.02	1462.412	2.149219	3.16507
144	1464.438	1470.561	1459.255	1464.751	2.158362	3.165764
147	1454.636	1458.944	1465.025	1459.535	2.167317	3.164214
150	1445.968	1450.279	1456.909	1451.052	2.176091	3.161683

Sample 846						
Image 8754		Particle O_5A		Approximate Particle size - 105.7185 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	906.2233	907.0125	907.0211	906.7523	0.477121	2.957489
6	875.1189	876.4667	875.5954	875.727	0.778151	2.942369
9	871.2932	869.321	864.1208	868.245	0.954243	2.938642
12	859.9954	865.9803	861.9054	862.627	1.079181	2.935823
15	856.6899	865.7764	854.8571	859.1078	1.176091	2.934048
18	859.2382	856.1957	852.014	855.816	1.255273	2.93238
21	852.4821	854.8144	862.5814	856.626	1.322219	2.932791
24	862.3267	867.5441	852.4444	860.7717	1.380211	2.934888
27	839.4856	851.2338	836.3338	842.3511	1.431364	2.925493
30	874.7097	851.4495	844.8724	857.0105	1.477121	2.932986
33	877.3757	852.1019	855.849	861.7755	1.518514	2.935394
36	839.966	850.6401	850.081	846.8957	1.556303	2.92783
39	881.292	859.6398	853.0214	864.6511	1.591065	2.936841
42	828.8067	853.1162	864.2363	848.7197	1.623249	2.928764
45	897.3044	855.6096	845.7092	866.2077	1.653213	2.937622
48	859.8758	854.2634	865.7061	859.9484	1.681241	2.934472
51	863.7834	862.9367	837.8768	854.8656	1.70757	2.931898
54	892.954	829.9872	854.1209	859.0207	1.732394	2.934004
57	878.2469	850.2844	839.9216	856.151	1.755875	2.93255
60	866.268	828.0427	814.4724	836.261	1.778151	2.922342
63	888.5533	869.4102	859.8163	872.5933	1.799341	2.940812
66	879.0396	839.6466	812.3029	843.663	1.819544	2.926169
69	874.0403	847.845	862.8185	861.5679	1.838849	2.93529
72	870.291	829.1502	833.0964	844.1792	1.857332	2.926435
75	862.3603	843.1179	835.6093	847.0292	1.875061	2.927898
78	810.6702	827.0015	812.7258	816.7992	1.892095	2.912115
81	870.4556	843.0038	818.637	844.0321	1.908485	2.926359
84	833.1384	840.7898	802.8273	825.5852	1.924279	2.916762
87	882.0157	845.9597	797.0752	841.6835	1.939519	2.925149
90	852.7073	813.3799	838.7562	834.9478	1.954243	2.921659
93	842.4568	815.1031	837.8579	831.8059	1.968483	2.920022
96	819.697	795.6364	778.167	797.8335	1.982271	2.901912
99	886.0532	858.2745	795.6277	846.6518	1.995635	2.927705
102	874.5096	855.1293	749.9957	826.5449	2.0086	2.917266
105	819.419	833.959	756.0486	803.1422	2.021189	2.904792
108	818.1359	832.644	757.9869	802.9223	2.033424	2.904674
111	834.2721	776.5938	768.7059	793.1906	2.045323	2.899378
114	830.1624	792.2309	776.8483	799.7472	2.056905	2.902953
117	839.5726	791.6907	764.9573	798.7402	2.068186	2.902406
120	846.4928	799.1956	760.2064	801.9649	2.079181	2.904155
123	831.2406	804.0798	754.0458	796.4554	2.089905	2.901161
126	828.4579	788.4682	764.8192	793.9151	2.100371	2.899774
129	943.9563	795.7719	779.6269	839.785	2.11059	2.924168
132	867.1393	890.2943	793.7252	850.3863	2.120574	2.929616
135	779.0419	866.069	783.6071	809.5727	2.130334	2.908256
138	740.7675	757.0512	779.6117	759.1435	2.139879	2.880324
141	867.2135	820.7248	745.2874	811.0752	2.149219	2.909061
144	872.8375	804.3784	708.0474	795.0878	2.158362	2.900415
147	875.5049	804.8517	720.5623	800.3063	2.167317	2.903256
150	884.3653	809.0903	688.8463	794.1006	2.176091	2.899876

Sample 846						
Image 8754		Particle O_5B		Approximate Particle size - 129.7321 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	935.1964	932.0436	932.6541	933.298	0.477121	2.97002
6	915.0545	913.888	912.2579	913.7335	0.778151	2.96082
9	899.7294	902.0533	897.1179	899.6335	0.954243	2.954066
12	897.5609	896.8823	901.7744	898.7392	1.079181	2.953634
15	889.4344	888.5016	908.0673	895.3344	1.176091	2.951985
18	888.0289	900.638	892.8485	893.8385	1.255273	2.951259
21	885.3811	894.9666	909.7938	896.7138	1.322219	2.952654
24	895.5695	884.5518	906.2625	895.4613	1.380211	2.952047
27	886.1855	899.5952	899.4186	895.0664	1.431364	2.951855
30	889.1495	875.5644	876.4799	880.3979	1.477121	2.944679
33	895.6486	879.358	884.061	886.3559	1.518514	2.947608
36	887.3987	900.3909	884.4515	890.747	1.556303	2.949754
39	876.0832	889.0229	873.708	879.6047	1.591065	2.944288
42	890.1328	865.0214	887.9571	881.0371	1.623249	2.944994
45	864.3565	876.2966	863.1733	867.9421	1.653213	2.938491
48	906.3166	890.4013	897.3095	898.0091	1.681241	2.953281
51	894.3395	865.335	894.1642	884.6129	1.70757	2.946753
54	886.387	912.7276	892.4573	897.1906	1.732394	2.952885
57	886.6306	915.0731	902.5233	901.409	1.755875	2.954922
60	887.0422	887.222	885.7047	886.6563	1.778151	2.947755
63	917.384	882.3008	878.7764	892.8204	1.799341	2.950764
66	873.2504	901.1528	846.7867	873.73	1.819544	2.941377
69	853.85	881.2333	882.9395	872.6743	1.838849	2.940852
72	859.0535	863.6295	885.1638	869.2823	1.857332	2.939161
75	912.438	842.0558	871.4921	875.3286	1.875061	2.942171
78	905.1115	897.8174	843.338	882.089	1.892095	2.945512
81	890.7941	896.2024	881.9646	889.6537	1.908485	2.949221
84	857.6224	870.6794	882.2575	870.1864	1.924279	2.939612
87	861.8143	834.9848	879.9377	858.9123	1.939519	2.933949
90	901.1974	871.7143	862.8649	878.5922	1.954243	2.943787
93	880.4808	832.7021	871.7347	861.6392	1.968483	2.935325
96	821.2648	840.726	871.6832	844.558	1.982271	2.926629
99	893.8408	823.1967	855.184	857.4072	1.995635	2.933187
102	905.3809	904.1284	840.7524	883.4206	2.0086	2.946168
105	825.8663	846.6534	839.9301	837.4833	2.021189	2.922976
108	790.9979	865.5043	852.5023	836.3348	2.033424	2.92238
111	855.4954	872.016	867.5619	865.0244	2.045323	2.937028
114	867.6024	870.6717	861.5523	866.6088	2.056905	2.937823
117	845.888	873.6591	815.5171	845.0214	2.068186	2.926868
120	856.664	861.354	806.5768	841.5316	2.079181	2.92507
123	842.2957	849.5039	819.4994	837.0997	2.089905	2.922777
126	821.5053	841.4924	797.7904	820.2627	2.100371	2.913953
129	756.9171	776.8816	834.9886	789.5958	2.11059	2.897405
132	737.5709	757.4747	838.2728	777.7728	2.120574	2.890853
135	721.6965	763.6884	843.7141	776.3663	2.130334	2.890067
138	720.1876	697.5793	852.2098	756.6589	2.139879	2.8789
141	796.5975	811.3698	841.7578	816.575	2.149219	2.911996
144	813.6809	826.3338	765.0231	801.6793	2.158362	2.904001
147	806.5731	824.0407	678.3926	769.6688	2.167317	2.886304
150	814.8604	828.1041	674.7304	772.565	2.176091	2.887935

Sample 846						
Image 8754		Particle O_6		Approximate Particle size - 194.5348 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1609.259	1608.875	1608.445	1608.86	0.477121	3.206518
6	1509.707	1510.182	1512.556	1510.815	0.778151	3.179211
9	1485.396	1482.784	1488.716	1485.632	0.954243	3.171911
12	1482.099	1481.27	1488.143	1483.838	1.079181	3.171386
15	1478.91	1481.525	1488.357	1482.93	1.176091	3.171121
18	1464.014	1464.221	1467.868	1465.368	1.255273	3.165947
21	1443.316	1442.717	1444.104	1443.379	1.322219	3.15938
24	1457.21	1466.024	1466.707	1463.313	1.380211	3.165337
27	1458.687	1468.756	1461.141	1462.861	1.431364	3.165203
30	1439.348	1444.172	1442.117	1441.879	1.477121	3.158929
33	1428.249	1449.716	1459.457	1445.807	1.518514	3.16011
36	1433.787	1433.336	1451.438	1439.52	1.556303	3.158218
39	1427.009	1430.444	1440.072	1432.508	1.591065	3.156097
42	1419.021	1420.346	1436.949	1425.438	1.623249	3.153948
45	1419.22	1423.853	1442.004	1428.359	1.653213	3.154837
48	1423.96	1403.757	1420.58	1416.099	1.681241	3.151094
51	1409.79	1427.854	1421.243	1419.629	1.70757	3.152175
54	1407.028	1422.772	1435.546	1421.782	1.732394	3.152833
57	1411.733	1429.859	1421.478	1421.023	1.755875	3.152601
60	1401.444	1435.045	1420.993	1419.161	1.778151	3.152032
63	1400.938	1425.002	1417.323	1414.421	1.799341	3.150579
66	1388.387	1406.753	1405.067	1400.069	1.819544	3.146149
69	1398.876	1415.47	1409.459	1407.935	1.838849	3.148583
72	1410.833	1434.751	1392.117	1412.567	1.857332	3.150009
75	1374.661	1391.68	1405.36	1390.567	1.875061	3.143192
78	1372.132	1443.865	1382.013	1399.337	1.892095	3.145922
81	1373.135	1410.07	1394.278	1392.494	1.908485	3.143793
84	1391.556	1395.998	1371.473	1386.342	1.924279	3.14187
87	1390.251	1408.689	1393.838	1397.593	1.939519	3.145381
90	1376.383	1411.859	1382.58	1390.274	1.954243	3.1431
93	1370.417	1383.019	1387.924	1380.453	1.968483	3.140022
96	1371.617	1382.053	1374.601	1376.09	1.982271	3.138647
99	1363.196	1372.309	1367.861	1367.789	1.995635	3.136019
102	1390.921	1362.057	1357.925	1370.301	2.0086	3.136816
105	1377.085	1370.933	1372.771	1373.597	2.021189	3.137859
108	1353.323	1388.288	1380.455	1374.022	2.033424	3.137994
111	1356.1	1364.572	1384.381	1368.351	2.045323	3.136198
114	1335.158	1380.56	1372.339	1362.686	2.056905	3.134396
117	1338.136	1371.828	1379.815	1363.26	2.068186	3.134579
120	1345.23	1384.768	1343.239	1357.745	2.079181	3.132818
123	1335.808	1355.652	1337.323	1342.928	2.089905	3.128053
126	1328.848	1333.469	1336.065	1332.794	2.100371	3.124763
129	1335.134	1333.835	1354.562	1341.177	2.11059	3.127486
132	1327.577	1349.985	1374.509	1350.691	2.120574	3.130556
135	1323.172	1326.277	1308.116	1319.188	2.130334	3.120307
138	1318.389	1286.304	1316.404	1307.032	2.139879	3.116286
141	1338.596	1300.286	1320.945	1319.942	2.149219	3.120555
144	1348.028	1309.239	1333.118	1330.128	2.158362	3.123894
147	1317.736	1324.709	1344.992	1329.146	2.167317	3.123573
150	1262.979	1344.102	1385.515	1330.865	2.176091	3.124134

Sample 846						
Image 8754		Particle O_7A		Approximate Particle size - 200.2728 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1160.557	1159.528	1163.553	1161.212	0.477121	3.064912
6	1125.978	1123.663	1126.111	1125.251	0.778151	3.051249
9	1118.756	1117.837	1124.457	1120.35	0.954243	3.049354
12	1112.942	1112.115	1116.808	1113.955	1.079181	3.046868
15	1113.467	1108.961	1115.621	1112.683	1.176091	3.046371
18	1109.42	1106.171	1104.582	1106.724	1.255273	3.044039
21	1100.052	1098.713	1103.345	1100.703	1.322219	3.04167
24	1111.314	1103.663	1098.118	1104.365	1.380211	3.043113
27	1081.915	1106.214	1108.149	1098.759	1.431364	3.040903
30	1090.431	1099.079	1095.332	1094.947	1.477121	3.039393
33	1077.916	1069.27	1073.343	1073.51	1.518514	3.030806
36	1104.959	1090.227	1084.225	1093.137	1.556303	3.038675
39	1088.922	1084.195	1072.247	1081.788	1.591065	3.034142
42	1063.524	1062.968	1095.666	1074.053	1.623249	3.031026
45	1086.046	1072.828	1111.851	1090.242	1.653213	3.037523
48	1090.888	1088.75	1056.67	1078.769	1.681241	3.032929
51	1059.128	1070.684	1078.199	1069.337	1.70757	3.029115
54	1068.257	1085.075	1083.039	1078.79	1.732394	3.032937
57	1100.196	1062.925	1065.834	1076.318	1.755875	3.031941
60	1038.916	1037.977	1047.237	1041.377	1.778151	3.017608
63	1055.274	1082.807	1057.338	1065.14	1.799341	3.027407
66	1067.657	1085.491	1075.251	1076.133	1.819544	3.031866
69	1071.004	1006.637	1071.904	1049.849	1.838849	3.021127
72	1085.825	1029.189	1077.864	1064.293	1.857332	3.027061
75	1032.232	1073.774	1091.963	1065.989	1.875061	3.027753
78	1018.08	1075.089	1047.7	1046.956	1.892095	3.019929
81	993.0835	1057.464	1008.451	1019.666	1.908485	3.008458
84	1043.213	983.785	1028.257	1018.418	1.924279	3.007926
87	1064.678	1004.399	1039.72	1036.266	1.939519	3.015471
90	1087.189	1016.576	1038.309	1047.358	1.954243	3.020095
93	996.248	963.857	977.588	979.231	1.968483	2.990885
96	935.2833	971.7025	986.2429	964.4096	1.982271	2.984262
99	941.4524	1028.156	1005.313	991.6405	1.995635	2.996354
102	955.8292	1049.263	1027.141	1010.745	2.0086	3.004641
105	966.7751	942.4178	945.0557	951.4162	2.021189	2.978371
108	991.1998	968.8705	965.0448	975.0384	2.033424	2.989022
111	1041.833	995.0353	990.5858	1009.151	2.045323	3.003956
114	903.8988	841.0102	983.3163	909.4084	2.056905	2.958759
117	906.5464	844.3381	830.0069	860.2971	2.068186	2.934648
120	919.4503	862.4067	842.3947	874.7506	2.079181	2.941884
123	934.3524	871.6248	851.273	885.7501	2.089905	2.947311
126	952.578	888.3713	867.2081	902.7191	2.100371	2.955553
129	961.3146	974.7244	887.8593	941.2994	2.11059	2.973728
132	975.4539	1000.182	905.1894	960.2751	2.120574	2.982396
135	993.242	1016.876	918.9913	976.3698	2.130334	2.989614
138	1007.747	1034.319	936.8728	992.9794	2.139879	2.99694
141	1033.603	1047.266	958.9127	1013.26	2.149219	3.005721
144	1043.434	1070.158	981.8767	1031.823	2.158362	3.013605
147	930.2928	1098.07	989.3541	1005.906	2.167317	3.002557
150	957.6799	1104.279	749.1882	937.0491	2.176091	2.971762

Sample 846						
Image 8754		Particle O_7B		Approximate Particle size - 195.6162 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1096.594	1097.245	1097.559	1097.133	0.477121	3.040259
6	1081.345	1082.092	1081.521	1081.652	0.778151	3.034088
9	1084.769	1080.487	1079.025	1081.427	0.954243	3.033997
12	1078.139	1076.509	1076.272	1076.973	1.079181	3.032205
15	1084.459	1079.331	1077.008	1080.266	1.176091	3.033531
18	1074.309	1074.513	1070.681	1073.168	1.255273	3.030668
21	1081.756	1071.097	1070.919	1074.591	1.322219	3.031243
24	1072.737	1070.419	1070.434	1071.197	1.380211	3.029869
27	1069.388	1060.415	1057.628	1062.477	1.431364	3.02632
30	1079.802	1063.282	1048.405	1063.83	1.477121	3.026872
33	1061.303	1060.397	1063.545	1061.748	1.518514	3.026021
36	1054.824	1058.449	1060.808	1058.027	1.556303	3.024497
39	1049.695	1038.379	1034.036	1040.704	1.591065	3.017327
42	1061.819	1032.984	1032.383	1042.395	1.623249	3.018032
45	1063.6	1045.863	1041.268	1050.244	1.653213	3.02129
48	1072.926	1032.641	1056.775	1054.114	1.681241	3.022887
51	1041.076	1024.719	1060.053	1041.949	1.70757	3.017846
54	1050.802	1022.689	1015.862	1029.785	1.732394	3.012746
57	1063.764	1026.585	1013.951	1034.767	1.755875	3.014843
60	1062.733	1060.959	1006.95	1043.547	1.778151	3.018512
63	1016.258	1023.343	1005.884	1015.162	1.799341	3.006535
66	1052.027	1022.092	1023.148	1032.422	1.819544	3.013857
69	1047.604	1027.872	1013.075	1029.517	1.838849	3.012633
72	1050.854	1026.003	1002.352	1026.403	1.857332	3.011318
75	1013.867	1026.235	1004.274	1014.792	1.875061	3.006377
78	1023.088	1064.241	997.5198	1028.283	1.892095	3.012113
81	1007.784	988.6764	986.9719	994.4774	1.908485	2.997595
84	1013.618	1014.802	991.075	1006.499	1.924279	3.002813
87	1049.985	1017.574	1006.214	1024.591	1.939519	3.010551
90	1067.637	1025.429	1009.48	1034.182	1.954243	3.014597
93	1003.844	948.3115	1027.453	993.2029	1.968483	2.997038
96	1001.765	961.7315	1039.399	1000.965	1.982271	3.000419
99	1025.933	974.4952	1038.419	1012.949	1.995635	3.005588
102	984.8948	912.5506	998.9711	965.4722	2.0086	2.98474
105	995.0461	911.5944	1002.27	969.6369	2.021189	2.986609
108	935.8051	928.9196	1003.37	956.0317	2.033424	2.980472
111	942.9901	956.1239	999.6261	966.2467	2.045323	2.985088
114	944.8617	952.4968	902.6539	933.3375	2.056905	2.970039
117	957.9212	968.8578	889.0723	938.6171	2.068186	2.972488
120	992.1997	992.1599	884.6935	956.351	2.079181	2.980617
123	1002.02	873.5803	937.7995	937.8	2.089905	2.97211
126	1019.097	890.2654	933.459	947.6071	2.100371	2.976628
129	1019.976	891.4572	931.7163	947.7166	2.11059	2.976678
132	1005.858	898.7163	934.8596	946.478	2.120574	2.976111
135	1006.351	896.5357	703.8186	868.9016	2.130334	2.938971
138	964.5861	887.1321	740.2448	863.9877	2.139879	2.936508
141	982.8193	900.7402	836.7272	906.7622	2.149219	2.957493
144	991.9551	905.2677	836.4523	911.225	2.158362	2.959626
147	1010.114	672.8737	813.579	832.1889	2.167317	2.920222
150	730.1368	691.343	610.6249	677.3682	2.176091	2.830825

Sample 846						
Image 8754		Particle O_8		Approximate Particle size - 127.0044 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1476.848	1477.911	1477.414	1477.391	0.477121	3.169495
6	1222.204	1225.943	1223.729	1223.959	0.778151	3.087767
9	1189.468	1190.703	1190.296	1190.156	0.954243	3.075604
12	1180.522	1179.478	1182.446	1180.815	1.079181	3.072182
15	1179.172	1169.709	1193.094	1180.658	1.176091	3.072124
18	1180.35	1170.974	1170.979	1174.101	1.255273	3.069706
21	1170.464	1177.217	1184.131	1177.27	1.322219	3.070876
24	1174.474	1168.095	1191.3	1177.956	1.380211	3.071129
27	1169.655	1175.616	1189.977	1178.416	1.431364	3.071299
30	1166.752	1173.119	1206.89	1182.254	1.477121	3.072711
33	1157.302	1172.996	1179.705	1170.001	1.518514	3.068186
36	1165.44	1172.729	1207.379	1181.849	1.556303	3.072562
39	1174.774	1177.485	1160.946	1171.068	1.591065	3.068582
42	1152.396	1175.301	1196.286	1174.661	1.623249	3.069913
45	1158.043	1175.861	1210.502	1181.469	1.653213	3.072422
48	1149.853	1152.342	1182.095	1161.43	1.681241	3.064993
51	1144.792	1173.718	1218.218	1178.91	1.70757	3.07148
54	1153.024	1164.586	1207.433	1175.014	1.732394	3.070043
57	1192.021	1169.282	1232.555	1197.953	1.755875	3.07844
60	1178.849	1173.325	1219.867	1190.68	1.778151	3.075795
63	1220.568	1169.899	1202.221	1197.563	1.799341	3.078298
66	1204.327	1171.675	1229.611	1201.871	1.819544	3.079858
69	1138.826	1143.144	1174.09	1152.02	1.838849	3.06146
72	1151.986	1166.399	1230.992	1183.126	1.857332	3.073031
75	1209.555	1178.46	1252	1213.338	1.875061	3.083982
78	1147.701	1168.634	1191.957	1169.431	1.892095	3.067974
81	1185.152	1162.688	1258.604	1202.148	1.908485	3.079958
84	1149.445	1160.87	1197.231	1169.182	1.924279	3.067882
87	1201.184	1162.353	1160.564	1174.7	1.939519	3.069927
90	1155.768	1147.668	1189.318	1164.251	1.954243	3.066047
93	1243.479	1135.846	1169.013	1182.779	1.968483	3.072904
96	1194.195	1160.435	1254.371	1203	1.982271	3.080266
99	1119.261	1149.328	1155.924	1141.504	1.995635	3.057478
102	1210.879	1169.526	1267.108	1215.838	2.0086	3.084876
105	1199.565	1141.738	1242.014	1194.439	2.021189	3.077164
108	1156.581	1134.204	1177.159	1155.981	2.033424	3.062951
111	1236.46	1151.638	1153.203	1180.434	2.045323	3.072042
114	1243.182	1158.035	1266.935	1222.717	2.056905	3.087326
117	1154.787	1142.701	1243.393	1180.293	2.068186	3.07199
120	1128.725	1146.606	1170.357	1148.563	2.079181	3.060155
123	1256.845	1160.516	1263.277	1226.879	2.089905	3.088802
126	1249.043	1154.402	1252.65	1218.698	2.100371	3.085896
129	1192.41	1139.361	1250.938	1194.236	2.11059	3.07709
132	1140.466	1131.524	1250.869	1174.286	2.120574	3.069774
135	1243.64	1131.291	1179.824	1184.918	2.130334	3.073688
138	1231.691	1113.782	1142.901	1162.791	2.139879	3.065502
141	1222.281	1166.277	1262.132	1216.896	2.149219	3.085254
144	1210.006	1164.927	1256.498	1210.477	2.158362	3.082957
147	1171.62	1167.327	1238.508	1192.485	2.167317	3.076453
150	1071.371	1140.955	1206.564	1139.63	2.176091	3.056764

Sample 846						
Image 8754		Particle O_9		Approximate Particle size - 171.0472 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1407.491	1408.538	1407.433	1407.821	0.477121	3.148547
6	1300.431	1301.173	1299.5	1300.368	0.778151	3.114066
9	1289.352	1295.824	1292.457	1292.545	0.954243	3.111446
12	1285.849	1290.097	1287.368	1287.771	1.079181	3.109839
15	1278.376	1282.424	1285.262	1282.021	1.176091	3.107895
18	1262.94	1273.276	1264.066	1266.76	1.255273	3.102694
21	1266.538	1272.953	1262.198	1267.23	1.322219	3.102855
24	1265.653	1260.463	1274.043	1266.72	1.380211	3.10268
27	1250.408	1253.508	1250.732	1251.549	1.431364	3.097448
30	1246.87	1263.941	1248.25	1253.02	1.477121	3.097958
33	1256.56	1240.768	1261.547	1252.958	1.518514	3.097937
36	1249.469	1250.236	1244.604	1248.103	1.556303	3.09625
39	1255.935	1256.201	1237.91	1250.016	1.591065	3.096915
42	1256.191	1245.318	1243.898	1248.469	1.623249	3.096378
45	1240.45	1231.507	1237.191	1236.383	1.653213	3.092153
48	1251.135	1243.473	1254.086	1249.565	1.681241	3.096759
51	1236.551	1235.667	1236.833	1236.35	1.70757	3.092141
54	1250.931	1228.614	1249.998	1243.181	1.732394	3.094534
57	1244.358	1247.993	1240.561	1244.304	1.755875	3.094927
60	1245.244	1231.734	1244.574	1240.517	1.778151	3.093603
63	1238.07	1230.342	1251.955	1240.122	1.799341	3.093464
66	1233.044	1246.14	1268.986	1249.39	1.819544	3.096698
69	1238.646	1232.077	1232.39	1234.371	1.838849	3.091446
72	1230.351	1223.354	1227.054	1226.92	1.857332	3.088816
75	1239.379	1228.262	1245.377	1237.673	1.875061	3.092606
78	1232.305	1222.889	1254.851	1236.682	1.892095	3.092258
81	1229.066	1213.755	1247.856	1230.225	1.908485	3.089985
84	1212.714	1195.783	1194.898	1201.132	1.924279	3.079591
87	1227.445	1212.111	1208.473	1216.01	1.939519	3.084937
90	1211.274	1199.556	1243.982	1218.271	1.954243	3.085744
93	1232.151	1221.682	1233.528	1229.12	1.968483	3.089594
96	1225.083	1220.318	1205.476	1216.959	1.982271	3.085276
99	1203.507	1198.885	1233.821	1212.071	1.995635	3.083528
102	1202.024	1182.201	1231.678	1205.301	2.0086	3.081096
105	1178.647	1184.864	1184.12	1182.543	2.021189	3.072817
108	1191.431	1207.737	1257.877	1219.015	2.033424	3.086009
111	1200.185	1210.881	1253.131	1221.399	2.045323	3.086857
114	1210.177	1168.894	1224.24	1201.104	2.056905	3.079581
117	1198.889	1180.437	1223.847	1201.058	2.068186	3.079564
120	1213.037	1197.941	1241.542	1217.507	2.079181	3.085471
123	1182.143	1194.166	1236.064	1204.124	2.089905	3.080671
126	1174.392	1143.112	1238.488	1185.331	2.100371	3.07384
129	1175.996	1152.232	1219.642	1182.624	2.11059	3.072847
132	1245.436	1179.66	1260.449	1228.515	2.120574	3.08938
135	1214.031	1190.876	1255.409	1220.105	2.130334	3.086397
138	1225.93	1201.548	1171.305	1199.594	2.139879	3.079034
141	1211.165	1212.551	1144.153	1189.289	2.149219	3.075288
144	1195.514	1206.753	1196.809	1199.692	2.158362	3.07907
147	1264.939	1200.995	1186.337	1217.424	2.167317	3.085442
150	1249.838	1177.579	1171.121	1199.513	2.176091	3.079005

Sample 846						
Image 8754		Particle O_10		Approximate Particle size - 171.0472 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1461.335	1459.571	1460.05	1460.319	0.477121	3.164448
6	1288.338	1287.412	1288.86	1288.203	0.778151	3.109984
9	1261.354	1260.904	1265.041	1262.433	0.954243	3.101208
12	1254.34	1250.037	1258.585	1254.321	1.079181	3.098409
15	1249.382	1252.618	1258.571	1253.524	1.176091	3.098133
18	1248.064	1247.936	1246.635	1247.545	1.255273	3.096056
21	1256.66	1258.446	1253.128	1256.078	1.322219	3.099017
24	1242.604	1242.853	1249.096	1244.851	1.380211	3.095117
27	1239.811	1245.94	1238.008	1241.253	1.431364	3.09386
30	1242.054	1240.172	1239.185	1240.47	1.477121	3.093586
33	1231.387	1236.617	1240.798	1236.268	1.518514	3.092112
36	1240.714	1232.892	1232.839	1235.481	1.556303	3.091836
39	1233.95	1239.246	1238.21	1237.135	1.591065	3.092417
42	1247.319	1247.1	1243.122	1245.847	1.623249	3.095465
45	1240.848	1250.345	1252.887	1248.027	1.653213	3.096224
48	1236.558	1227.274	1233.028	1232.287	1.681241	3.090712
51	1241.572	1248.857	1249.757	1246.729	1.70757	3.095772
54	1227.721	1235.119	1229.122	1230.654	1.732394	3.090136
57	1252.102	1243.128	1249.276	1248.169	1.755875	3.096273
60	1219.446	1226.562	1233.806	1226.605	1.778151	3.088705
63	1224.601	1255.581	1234.235	1238.139	1.799341	3.092769
66	1228.528	1237.49	1232.808	1232.942	1.819544	3.090943
69	1230.808	1232.131	1228.182	1230.373	1.838849	3.090037
72	1252.986	1239.812	1242.074	1244.957	1.857332	3.095154
75	1257.79	1259.097	1251.685	1256.191	1.875061	3.099056
78	1239.144	1234.347	1225.292	1232.928	1.892095	3.090938
81	1262.087	1236.299	1243.193	1247.193	1.908485	3.095934
84	1208.185	1216.281	1231.025	1218.497	1.924279	3.085824
87	1236.998	1235.951	1238.661	1237.203	1.939519	3.092441
90	1208.508	1213.499	1226.834	1216.281	1.954243	3.085034
93	1246.527	1254.066	1252.918	1251.17	1.968483	3.097316
96	1233.658	1232.629	1213.386	1226.558	1.982271	3.088688
99	1196.776	1251.046	1239.276	1229.033	1.995635	3.089563
102	1247.261	1263.916	1207.668	1239.615	2.0086	3.093287
105	1255.742	1237.557	1193.876	1229.058	2.021189	3.089572
108	1214.389	1218.314	1243.241	1225.315	2.033424	3.088248
111	1211.523	1229.012	1232.591	1224.375	2.045323	3.087914
114	1203.788	1212.938	1210.367	1209.031	2.056905	3.082437
117	1200.564	1243.507	1219.447	1221.173	2.068186	3.086777
120	1215.424	1198.65	1231.341	1215.138	2.079181	3.084626
123	1181.66	1199.863	1237.036	1206.186	2.089905	3.081414
126	1177.793	1199.749	1239.863	1205.802	2.100371	3.081276
129	1177.277	1207.549	1226.342	1203.723	2.11059	3.080526
132	1273.848	1215.896	1243.316	1244.353	2.120574	3.094944
135	1264.519	1266.933	1200.308	1243.92	2.130334	3.094792
138	1259.606	1206.682	1193.137	1219.808	2.139879	3.086292
141	1177.307	1196.197	1188.149	1187.218	2.149219	3.07453
144	1170.983	1163.844	1174.607	1169.811	2.158362	3.068116
147	1234.171	1245.151	1238.697	1239.34	2.167317	3.09319
150	1243.802	1256.516	1170.432	1223.583	2.176091	3.087634

Sample 7131						
Image 8763		Particle O_1		Approximate Particle size - 150.6771 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1338.04	1338.001	1341.661	1339.234	0.477121	3.126856
6	1171.105	1171.066	1175.115	1172.428	0.778151	3.069086
9	1148.629	1149.486	1154.927	1151.014	0.954243	3.061081
12	1137.797	1138.654	1143.296	1139.916	1.079181	3.056873
15	1137.045	1138.038	1141.25	1138.777	1.176091	3.056439
18	1136.693	1137.053	1140.071	1137.939	1.255273	3.056119
21	1130.707	1131.505	1135.223	1132.478	1.322219	3.05403
24	1130.779	1130.622	1135.191	1132.197	1.380211	3.053922
27	1126.893	1127.692	1132.258	1128.948	1.431364	3.052674
30	1129.603	1130.58	1133.768	1131.317	1.477121	3.053584
33	1127.038	1125.563	1129.635	1127.412	1.518514	3.052083
36	1122.961	1125.944	1126.142	1125.016	1.556303	3.051159
39	1124.73	1127.508	1130.676	1127.638	1.591065	3.05217
42	1123.339	1128.422	1127.178	1126.313	1.623249	3.051659
45	1121.361	1126.998	1126.668	1125.009	1.653213	3.051156
48	1119.922	1121.147	1123.591	1121.553	1.681241	3.04982
51	1121.448	1120.751	1125.489	1122.562	1.70757	3.050211
54	1114.315	1115.026	1120.893	1116.745	1.732394	3.047954
57	1123.722	1111.95	1127.798	1121.157	1.755875	3.049666
60	1113.496	1120.63	1117.666	1117.264	1.778151	3.048156
63	1115.583	1124.991	1118.739	1119.771	1.799341	3.049129
66	1110.078	1115.345	1110.323	1111.915	1.819544	3.046072
69	1112.442	1122.332	1117.348	1117.374	1.838849	3.048198
72	1108.848	1112.204	1112.865	1111.305	1.857332	3.045833
75	1118.44	1109.434	1118.621	1115.498	1.875061	3.047469
78	1107.811	1107.722	1112.261	1109.265	1.892095	3.045035
81	1111.165	1103.728	1115.326	1110.073	1.908485	3.045352
84	1102.937	1111.424	1108.945	1107.769	1.924279	3.044449
87	1113.738	1098.816	1115.096	1109.217	1.939519	3.045016
90	1105.966	1105.638	1111.159	1107.588	1.954243	3.044378
93	1103.703	1107.593	1107.921	1106.406	1.968483	3.043914
96	1098.287	1103.217	1102.974	1101.493	1.982271	3.041982
99	1094.695	1105.364	1104.7	1101.586	1.995635	3.042019
102	1101.972	1086.213	1110.615	1099.6	2.0086	3.041235
105	1106.85	1090.335	1110.426	1102.537	2.021189	3.042393
108	1103.088	1101.285	1107.818	1104.064	2.033424	3.042994
111	1112.929	1117.666	1112.415	1114.337	2.045323	3.047016
114	1093.659	1107.004	1079.775	1093.479	2.056905	3.03881
117	1074.971	1101.506	1081.202	1085.893	2.068186	3.035787
120	1084.906	1117.617	1093.06	1098.528	2.079181	3.040811
123	1086.118	1090.523	1094.006	1090.215	2.089905	3.037512
126	1092.507	1091.289	1096.939	1093.578	2.100371	3.03885
129	1078.518	1085.108	1083.028	1082.218	2.11059	3.034315
132	1077.93	1093.193	1083.232	1084.785	2.120574	3.035344
135	1097.574	1088.563	1114.549	1100.229	2.130334	3.041483
138	1068.372	1135.523	1074.096	1092.664	2.139879	3.038486
141	1057.02	1115.424	1051.772	1074.739	2.149219	3.031303
144	1039.625	1107.432	1043.897	1063.651	2.158362	3.026799
147	1094.783	1074.758	1040.123	1069.888	2.167317	3.029338
150	1068.717	1103.466	1095.116	1089.099	2.176091	3.037068

Sample 7131						
Image 8763		Particle O_2A		Approximate Particle size - 164.1111 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	979.5496	980.8772	981.1271	980.518	0.477121	2.991456
6	935.457	935.1814	938.9198	936.5194	0.778151	2.971517
9	930.8888	926.9489	930.4619	929.4332	0.954243	2.968218
12	929.6754	924.985	926.5679	927.0761	1.079181	2.967115
15	924.5095	919.924	921.1573	921.8636	1.176091	2.964667
18	922.4063	917.8969	918.9579	919.7537	1.255273	2.963672
21	922.3947	916.9779	921.576	920.3162	1.322219	2.963937
24	912.365	917.6013	910.961	913.6424	1.380211	2.960776
27	901.315	911.5051	908.1212	906.9804	1.431364	2.957598
30	906.3686	904.9305	907.3867	906.2286	1.477121	2.957238
33	885.9032	907.9171	901.3874	898.4026	1.518514	2.953471
36	893.908	898.6845	891.3528	894.6484	1.556303	2.951652
39	890.4972	909.4703	907.3503	902.4393	1.591065	2.955418
42	885.7212	922.2476	901.4344	903.1344	1.623249	2.955752
45	879.2433	896.0729	879.996	885.1041	1.653213	2.946994
48	888.6409	905.5682	901.1758	898.4616	1.681241	2.9535
51	881.0006	920.4402	910.0911	903.844	1.70757	2.956093
54	883.7762	897.7377	892.0066	891.1735	1.732394	2.949962
57	891.3434	908.0613	898.9186	899.4411	1.755875	2.953973
60	878.0136	887.7264	884.1432	883.2944	1.778151	2.946105
63	876.366	876.1516	877.0844	876.534	1.799341	2.942769
66	851.5384	883.9587	874.0577	869.8516	1.819544	2.939445
69	858.1444	872.3687	885.3101	871.9411	1.838849	2.940487
72	863.6818	914.1573	870.0768	882.6386	1.857332	2.945783
75	865.3561	910.7881	859.9304	878.6915	1.875061	2.943836
78	891.9156	876.9545	873.5536	880.8079	1.892095	2.944881
81	856.5791	845.0771	851.9266	851.1943	1.908485	2.930029
84	819.9396	869.6346	829.3024	839.6255	1.924279	2.924086
87	818.6259	867.5593	800.5276	828.9043	1.939519	2.918504
90	843.3233	876.267	822.549	847.3798	1.954243	2.928078
93	853.0633	879.7684	845.0963	859.3093	1.968483	2.93415
96	902.5158	893.683	852.7592	882.986	1.982271	2.945954
99	831.2282	816.3433	864.4255	837.3323	1.995635	2.922898
102	829.4571	868.7295	865.4163	854.5343	2.0086	2.931729
105	784.8922	828.181	814.3501	809.1411	2.021189	2.908024
108	772.7152	804.1131	794.1464	790.3249	2.033424	2.897806
111	782.0754	805.1646	766.2062	784.4821	2.045323	2.894583
114	794.7014	872.4662	747.5682	804.9119	2.056905	2.905748
117	800.897	869.4888	754.0033	808.1297	2.068186	2.907481
120	818.8625	876.3966	773.2302	822.8298	2.079181	2.91531
123	831.6876	876.9747	781.2785	829.9803	2.089905	2.919068
126	835.5401	765.6891	793.9853	798.4048	2.100371	2.902223
129	851.3322	774.4728	808.2797	811.3616	2.11059	2.909214
132	733.5142	777.7738	829.775	780.3543	2.120574	2.892292
135	739.1448	789.9675	834.817	787.9764	2.130334	2.896513
138	731.5761	795.4185	853.8283	793.6076	2.139879	2.899606
141	744.0625	791.0972	854.7254	796.6284	2.149219	2.901256
144	745.705	793.207	706.947	748.6197	2.158362	2.874261
147	747.7167	779.9349	702.4531	743.3682	2.167317	2.871204
150	810.5359	771.8859	710.7269	764.3829	2.176091	2.883311

Sample 7131						
Image 8763		Particle O_2B		Approximate Particle size - 141.9191 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	845.516	846.5898	844.8259	845.6439	0.477121	2.927188
6	817.3651	811.0057	814.5396	814.3035	0.778151	2.910786
9	817.187	805.209	808.743	810.3797	0.954243	2.908689
12	808.3944	816.1138	801.6322	808.7135	1.079181	2.907795
15	804.7402	801.819	807.2794	804.6129	1.176091	2.905587
18	794.3391	792.1805	796.7919	794.4372	1.255273	2.90006
21	799.3657	827.525	793.5499	806.8135	1.322219	2.906773
24	791.4641	795.0765	808.8936	798.4781	1.380211	2.902263
27	802.4293	826.8467	828.0411	819.1057	1.431364	2.91334
30	790.8441	801.0294	808.423	800.0988	1.477121	2.903144
33	782.1072	820.0046	775.5773	792.563	1.518514	2.899034
36	796.4711	811.4226	812.6848	806.8595	1.556303	2.906798
39	785.5026	786.5989	801.1218	791.0744	1.591065	2.898217
42	776.6744	834.8639	785.4457	798.9947	1.623249	2.902544
45	780.6644	777.7808	800.5151	786.3201	1.653213	2.895599
48	772.2521	824.6127	794.3403	797.0684	1.681241	2.901496
51	765.6088	789.6818	794.5682	783.2863	1.70757	2.893921
54	757.123	789.9207	747.7429	764.9289	1.732394	2.883621
57	763.8278	803.2078	806.1064	791.0473	1.755875	2.898202
60	738.251	756.0499	760.7089	751.6699	1.778151	2.876027
63	776.5294	815.9534	810.5089	800.9972	1.799341	2.903631
66	756.5172	787.4406	780.4951	774.8176	1.819544	2.889199
69	755.309	778.5419	770.8768	768.2426	1.838849	2.885498
72	728.3025	732.6505	797.2076	752.7202	1.857332	2.876634
75	739.3538	795.6619	792.3467	775.7875	1.875061	2.889743
78	746.7525	791.6946	784.0579	774.1683	1.892095	2.888835
81	790.3382	787.333	767.2488	781.64	1.908485	2.893007
84	729.2725	772.0734	756.1653	752.5037	1.924279	2.876509
87	795.0533	764.1526	714.2195	757.8085	1.939519	2.879559
90	768.6184	791.2614	747.8526	769.2441	1.954243	2.886064
93	762.1057	739.0123	732.0879	744.402	1.968483	2.871808
96	751.2878	710.9288	729.368	730.5282	1.982271	2.863637
99	777.8174	701.1339	712.1029	730.3514	1.995635	2.863532
102	748.7253	753.0986	751.3526	751.0588	2.0086	2.875674
105	721.5707	699.7989	699.139	706.8362	2.021189	2.849319
108	721.8413	679.067	691.0649	697.3244	2.033424	2.843435
111	734.0533	815.7959	826.0022	791.9505	2.045323	2.898698
114	642.9979	821.2295	820.9944	761.7406	2.056905	2.881807
117	657.6556	794.9384	792.4474	748.3471	2.068186	2.874103
120	672.3165	771.6065	752.9652	732.2961	2.079181	2.864687
123	685.4605	785.2634	776.3602	749.028	2.089905	2.874498
126	695.7043	794.4226	784.2628	758.1299	2.100371	2.879744
129	563.2316	805.6973	796.8873	721.9387	2.11059	2.8585
132	574.0458	807.6986	811.1305	730.9583	2.120574	2.863893
135	585.3639	815.635	815.4324	738.8104	2.130334	2.868533
138	593.0468	824.6841	831.6254	749.7854	2.139879	2.874937
141	606.9874	838.7144	705.2359	716.9792	2.149219	2.855507
144	615.0367	839.0765	713.4849	722.5327	2.158362	2.858858
147	624.4935	834.8177	721.6886	726.9999	2.167317	2.861534
150	638.2725	733.3453	730.1141	700.5773	2.176091	2.845456

Sample 7131						
Image 8764		Particle O_1		Approximate Particle size - 200.2728 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1501.393	1503.728	1504.625	1503.249	0.477121	3.177031
6	1410.519	1411.269	1411.887	1411.225	0.778151	3.149596
9	1393.065	1394.895	1395.699	1394.553	0.954243	3.144435
12	1387.098	1385.617	1386.416	1386.377	1.079181	3.141881
15	1385.816	1392.414	1385.682	1387.971	1.176091	3.14238
18	1383.308	1373.349	1376.631	1377.763	1.255273	3.139174
21	1379.818	1382.662	1382.446	1381.642	1.322219	3.140396
24	1376.954	1382.68	1376.958	1378.864	1.380211	3.139521
27	1379.549	1388.184	1382.599	1383.444	1.431364	3.140962
30	1367.567	1378.414	1372.617	1372.866	1.477121	3.137628
33	1369.361	1366.367	1372.786	1369.505	1.518514	3.136564
36	1364.934	1388.375	1363.443	1372.251	1.556303	3.137433
39	1363.652	1363.512	1357.513	1361.559	1.591065	3.134036
42	1350.69	1351.476	1376.54	1359.569	1.623249	3.133401
45	1351.966	1354.214	1383.009	1363.063	1.653213	3.134516
48	1357.458	1371.977	1361.029	1363.488	1.681241	3.134651
51	1349.687	1358.297	1376.413	1361.466	1.70757	3.134007
54	1326.712	1341.514	1370.522	1346.249	1.732394	3.129125
57	1324.122	1366.325	1355.239	1348.562	1.755875	3.129871
60	1334.495	1344	1368.239	1348.911	1.778151	3.129983
63	1334.933	1380.752	1323.927	1346.537	1.799341	3.129218
66	1330.145	1370.367	1357.876	1352.796	1.819544	3.131232
69	1316.312	1348.193	1333.36	1332.622	1.838849	3.124707
72	1307.834	1356.471	1349.545	1337.95	1.857332	3.12644
75	1296.38	1344.617	1330.68	1323.892	1.875061	3.121853
78	1320.801	1340.788	1298.473	1320.021	1.892095	3.120581
81	1299.135	1345.145	1283.054	1309.111	1.908485	3.116977
84	1308.414	1329.126	1283.049	1306.863	1.924279	3.11623
87	1309.685	1306.158	1316.937	1310.927	1.939519	3.117578
90	1315.05	1298.269	1284.715	1299.345	1.954243	3.113724
93	1287.09	1314.576	1272.102	1291.256	1.968483	3.111012
96	1289.653	1284.506	1262.718	1278.959	1.982271	3.106857
99	1327.165	1306.734	1279.445	1304.448	1.995635	3.115427
102	1294.068	1294.028	1281.092	1289.73	2.0086	3.110499
105	1295.709	1273.628	1281.023	1283.453	2.021189	3.10838
108	1286.752	1294.05	1285.942	1288.914	2.033424	3.110224
111	1292.455	1289.359	1279.625	1287.147	2.045323	3.109628
114	1293.847	1258.196	1290.762	1280.935	2.056905	3.107527
117	1242.565	1246.618	1247.357	1245.514	2.068186	3.095348
120	1258.989	1199.55	1223.334	1227.291	2.079181	3.088948
123	1276.413	1219.123	1236.83	1244.122	2.089905	3.094863
126	1304.073	1262.793	1253.928	1273.598	2.100371	3.105032
129	1282.178	1282.383	1274.216	1279.593	2.11059	3.107072
132	1182.574	1273.375	1161.427	1205.792	2.120574	3.081272
135	1179.714	1165.645	1174.842	1173.4	2.130334	3.069446
138	1182.275	1161.851	1182.007	1175.378	2.139879	3.070177
141	1195.776	1150.364	1186.687	1177.609	2.149219	3.071001
144	1215.113	1179.054	1183.071	1192.413	2.158362	3.076427
147	1237.333	1188.644	1205.592	1210.523	2.167317	3.082973
150	1249.867	1200.987	1209.55	1220.135	2.176091	3.086408

Sample 7131						
Image 8764		Particle O_2		Approximate Particle size - 150.5894 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	2576.453	2576.802	2575.453	2576.236	0.477121	3.410986
6	1967.584	1970.362	1968.054	1968.667	0.778151	3.294172
9	1848.721	1851.904	1857.652	1852.759	0.954243	3.267819
12	1784.192	1794.192	1792.005	1790.13	1.079181	3.252885
15	1785.105	1784.663	1791.71	1787.159	1.176091	3.252163
18	1792.984	1797.133	1802.35	1797.489	1.255273	3.254666
21	1755.066	1756.79	1764.741	1758.866	1.322219	3.245233
24	1757.051	1768.321	1753.073	1759.482	1.380211	3.245385
27	1696.885	1715.784	1713.72	1708.796	1.431364	3.23269
30	1687.778	1710.735	1688.151	1695.555	1.477121	3.229312
33	1686.586	1707.655	1705.648	1699.963	1.518514	3.230439
36	1698.791	1710.563	1704.412	1704.589	1.556303	3.23162
39	1693.013	1699.206	1698.468	1696.896	1.591065	3.229655
42	1688.841	1692.021	1701.447	1694.103	1.623249	3.22894
45	1683.265	1688.042	1701.164	1690.823	1.653213	3.228098
48	1672.367	1696.014	1680.521	1682.967	1.681241	3.226076
51	1676.541	1671.451	1715.134	1687.708	1.70757	3.227297
54	1670.664	1702.142	1694.634	1689.147	1.732394	3.227667
57	1678.381	1670.34	1693.443	1680.721	1.755875	3.225496
60	1668.301	1670.234	1676.433	1671.656	1.778151	3.223147
63	1676.1	1676.235	1685.473	1679.269	1.799341	3.22512
66	1658.145	1699.431	1696.737	1684.771	1.819544	3.226541
69	1661.079	1675.234	1677.261	1671.191	1.838849	3.223026
72	1675.184	1685.837	1675.352	1678.791	1.857332	3.224997
75	1637.883	1690.911	1675.13	1667.975	1.875061	3.222189
78	1651.049	1680.545	1704.45	1678.681	1.892095	3.224968
81	1660.207	1662.665	1713.846	1678.906	1.908485	3.225026
84	1669.464	1664.666	1700.275	1678.135	1.924279	3.224827
87	1636.652	1667.531	1719.838	1674.674	1.939519	3.22393
90	1642.502	1673.707	1670.916	1662.375	1.954243	3.220729
93	1644.335	1677.843	1663.924	1662.034	1.968483	3.22064
96	1652.54	1676.057	1651.303	1659.967	1.982271	3.220099
99	1661.066	1655.266	1662.183	1659.505	1.995635	3.219979
102	1670.013	1686.146	1695.813	1683.991	2.0086	3.22634
105	1622.401	1623.593	1660.844	1635.613	2.021189	3.213681
108	1620.006	1694.482	1663.609	1659.366	2.033424	3.219942
111	1634.988	1694.854	1713.767	1681.203	2.045323	3.22562
114	1639.162	1654.935	1679.36	1657.819	2.056905	3.219537
117	1626.56	1686.694	1687.679	1666.978	2.068186	3.22193
120	1635.76	1662.439	1665.253	1654.484	2.079181	3.218663
123	1636.904	1636.115	1652.756	1641.925	2.089905	3.215353
126	1651.747	1698.012	1712.173	1687.311	2.100371	3.227195
129	1667.198	1717.852	1711.332	1698.794	2.11059	3.230141
132	1609.138	1669.51	1675.238	1651.295	2.120574	3.217825
135	1600.044	1654.928	1644.282	1633.085	2.130334	3.213009
138	1614.181	1640.257	1651.177	1635.205	2.139879	3.213572
141	1627.683	1641.841	1625.944	1631.823	2.149219	3.212673
144	1630.006	1682.627	1624.745	1645.792	2.158362	3.216375
147	1616.042	1692.35	1676.152	1661.514	2.167317	3.220504
150	1591.949	1665.095	1670.717	1642.587	2.176091	3.215528

Sample 7131						
Image 8764		Particle O_3		Approximate Particle size - 78.2075 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1559.317	1565.119	1566.377	1563.604	0.477121	3.194127
6	1388.741	1391.115	1390.692	1390.182	0.778151	3.143072
9	1343.962	1345.284	1343.052	1344.099	0.954243	3.128431
12	1328.156	1328.319	1329.761	1328.745	1.079181	3.123442
15	1324.824	1326.434	1325.959	1325.739	1.176091	3.122458
18	1315.43	1317.124	1313.694	1315.416	1.255273	3.119063
21	1322.334	1318.685	1318.66	1319.893	1.322219	3.120539
24	1295.951	1300.415	1306.549	1300.972	1.380211	3.114268
27	1304.571	1296.046	1299.162	1299.926	1.431364	3.113919
30	1274.103	1273.768	1274.275	1274.049	1.477121	3.105186
33	1291.303	1291.165	1303.156	1295.208	1.518514	3.112339
36	1313.572	1299.39	1286.685	1299.882	1.556303	3.113904
39	1283.498	1285.914	1285.616	1285.009	1.591065	3.108906
42	1295.209	1304.814	1305.868	1301.964	1.623249	3.114599
45	1252.011	1266.412	1281.512	1266.645	1.653213	3.102655
48	1280.476	1283.332	1276.565	1280.124	1.681241	3.107252
51	1249.451	1264.988	1282.511	1265.65	1.70757	3.102314
54	1235.622	1273.816	1278.924	1262.787	1.732394	3.10133
57	1222.47	1259.164	1305.235	1262.29	1.755875	3.101159
60	1293.479	1234.443	1293.837	1273.92	1.778151	3.105142
63	1221.251	1200.245	1231.109	1217.535	1.799341	3.085481
66	1217.336	1235.101	1250.521	1234.319	1.819544	3.091427
69	1255.488	1214.42	1259.053	1242.987	1.838849	3.094467
72	1282.085	1280.107	1259.1	1273.764	1.857332	3.105089
75	1222.35	1196.006	1222	1213.452	1.875061	3.084023
78	1187.113	1197.311	1182.939	1189.121	1.892095	3.075226
81	1193.127	1154.229	1184.511	1177.289	1.908485	3.070883
84	1224.152	1208.797	1189.168	1207.372	1.924279	3.081841
87	1145.375	1223.04	1190.336	1186.25	1.939519	3.074176
90	1219.631	1158.243	1211.379	1196.418	1.954243	3.077883
93	1256.921	1178.493	1253.632	1229.682	1.968483	3.089793
96	1297.526	1208.512	1188.827	1231.622	1.982271	3.090477
99	1171.218	1249.092	1225.613	1215.308	1.995635	3.084686
102	1191.192	1178.809	1249.914	1206.638	2.0086	3.081577
105	1198.084	1206.97	1279.933	1228.329	2.021189	3.089315
108	1137.713	1088.476	1175.606	1133.931	2.033424	3.054587
111	1151.553	1086.337	1090.905	1109.598	2.045323	3.045166
114	1173.648	1103.628	1088.204	1121.826	2.056905	3.049926
117	1184.111	1115.737	1090.302	1130.05	2.068186	3.053098
120	1203.878	1138.593	1103.987	1148.82	2.079181	3.060252
123	1092.857	1156.269	1118.127	1122.418	2.089905	3.050155
126	1101.629	1168.64	1209.312	1159.86	2.100371	3.064406
129	1117.055	1198.14	1243.012	1186.069	2.11059	3.07411
132	1126.259	1082.656	1199.724	1136.213	2.120574	3.05546
135	1138.453	1135.885	1129.072	1134.47	2.130334	3.054793
138	1129.784	1159.241	1144.105	1144.377	2.139879	3.058569
141	1148.753	1209.041	1185.928	1181.241	2.149219	3.072338
144	1172.24	1195.018	1211.05	1192.769	2.158362	3.076556
147	1203.691	1215.034	1236.173	1218.299	2.167317	3.085754
150	1221.292	1220.331	1252.163	1231.262	2.176091	3.090351

Sample 7131						
Image 8764		Particle O_4A		Approximate Particle size - 166.7608 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	990.4691	991.0405	991.2272	990.9123	0.477121	2.996035
6	952.8117	950.9867	951.5112	951.7699	0.778151	2.978532
9	946.1778	948.1297	944.1634	946.157	0.954243	2.975963
12	944.2117	943.4277	942.9368	943.5254	1.079181	2.974754
15	938.223	947.5583	937.6	941.1271	1.176091	2.973648
18	935.3857	948.9491	937.9274	940.7541	1.255273	2.973476
21	940.1701	940.439	938.4256	939.6782	1.322219	2.972979
24	932.8113	943.0106	934.9645	936.9288	1.380211	2.971707
27	930.9632	943.0864	932.8562	935.6353	1.431364	2.971107
30	928.6942	935.5648	927.1765	930.4785	1.477121	2.968706
33	924.2084	935.3349	927.4611	929.0015	1.518514	2.968016
36	925.2267	943.8812	921.5955	930.2345	1.556303	2.968592
39	926.8428	933.5282	923.6757	928.0156	1.591065	2.967555
42	923.2526	927.6362	917.4698	922.7862	1.623249	2.965101
45	922.61	924.1746	917.3578	921.3808	1.653213	2.964439
48	916.3679	931.7254	926.8154	924.9696	1.681241	2.966127
51	917.9688	919.483	921.9503	919.8007	1.70757	2.963694
54	907.7274	905.7204	912.8428	908.7635	1.732394	2.958451
57	906.1133	936.5871	903.1917	915.2974	1.755875	2.961562
60	911.324	963.8347	905.2659	926.8082	1.778151	2.96699
63	911.6454	907.6899	895.0379	904.7911	1.799341	2.956548
66	898.5604	903.8074	899.8925	900.7534	1.819544	2.954606
69	896.3356	957.3245	908.8069	920.8223	1.838849	2.964176
72	883.5364	907.7397	896.9019	896.0593	1.857332	2.952337
75	887.0693	931.0396	868.9311	895.68	1.875061	2.952153
78	897.3828	935.2269	886.1097	906.2398	1.892095	2.957243
81	907.1833	948.1053	889.1949	914.8278	1.908485	2.961339
84	885.5844	963.3122	868.3565	905.751	1.924279	2.957009
87	884.6823	952.386	873.1177	903.3953	1.939519	2.955878
90	898.764	930.3173	879.253	902.7781	1.954243	2.955581
93	913.7058	893.6748	893.9084	900.4297	1.968483	2.95445
96	894.889	929.712	905.3926	909.9979	1.982271	2.95904
99	883.9749	935.8821	893.421	904.426	1.995635	2.956373
102	865.4549	942.9844	873.555	893.9981	2.0086	2.951337
105	857.9263	946.1107	881.7784	895.2718	2.021189	2.951955
108	853.8456	933.5181	880.9079	889.4239	2.033424	2.949109
111	837.1805	929.0914	891.8763	886.0494	2.045323	2.947458
114	837.7484	928.1705	869.7057	878.5415	2.056905	2.943762
117	835.6864	905.7761	852.1548	864.5391	2.068186	2.936785
120	858.7628	859.3151	840.7316	852.9365	2.079181	2.930917
123	839.0536	904.5098	848.2757	863.9464	2.089905	2.936487
126	815.3583	916.5939	832.153	854.7017	2.100371	2.931815
129	803.4701	924.3126	802.7809	843.5212	2.11059	2.926096
132	816.973	930.0841	793.3671	846.8081	2.120574	2.927785
135	814.2861	940.5532	790.8425	848.5606	2.130334	2.928683
138	811.1222	944.719	801.685	852.5087	2.139879	2.930699
141	819.8412	940.6551	805.3406	855.279	2.149219	2.932108
144	839.9907	938.7761	817.4929	865.4199	2.158362	2.937227
147	872.7056	879.4202	850.0573	867.3944	2.167317	2.938217
150	878.5789	879.5187	853.2055	870.4344	2.176091	2.939736

Sample 7131						
Image 8764		Particle O_4B		Approximate Particle size - 141.3151 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1097.381	1097.2	1096.795	1097.125	0.477121	3.040256
6	1044.522	1045.158	1044.732	1044.804	0.778151	3.019035
9	1037.582	1041.364	1044.165	1041.037	0.954243	3.017466
12	1034.777	1036.14	1039.323	1036.746	1.079181	3.015672
15	1037.349	1034.689	1037.096	1036.378	1.176091	3.015518
18	1031.456	1032.571	1031.557	1031.861	1.255273	3.013621
21	1030.698	1037.098	1040.943	1036.246	1.322219	3.015463
24	1027.02	1036.552	1034.441	1032.671	1.380211	3.013962
27	1034.831	1039.497	1043.843	1039.39	1.431364	3.016779
30	1027.518	1044.235	1045.21	1038.987	1.477121	3.01661
33	1045.155	1041.254	1042.323	1042.911	1.518514	3.018247
36	1053.501	1036.71	1024.405	1038.206	1.556303	3.016283
39	1040.141	1047.35	1024.262	1037.251	1.591065	3.015884
42	1046.848	1037.581	1051.121	1045.183	1.623249	3.019192
45	1029.314	1051.492	1047.495	1042.767	1.653213	3.018187
48	1024.554	1055.542	1035.613	1038.57	1.681241	3.016436
51	1069.843	1038.014	1029.865	1045.907	1.70757	3.019493
54	1022.389	1037.414	1034.498	1031.434	1.732394	3.013441
57	1016.786	1024.473	1031.992	1024.417	1.755875	3.010477
60	1054.892	1041.09	1048.693	1048.225	1.778151	3.020454
63	1041.118	1025.935	1037.382	1034.812	1.799341	3.014861
66	1094.34	1053.381	1045.454	1064.392	1.819544	3.027101
69	1015.362	1037.612	1039.138	1030.704	1.838849	3.013134
72	1057.465	1041.877	1037.101	1045.481	1.857332	3.019316
75	1109.917	1027.203	1008.643	1048.588	1.875061	3.020605
78	1090.495	1045.408	1032.629	1056.177	1.892095	3.023737
81	999.8044	1020.199	1021.109	1013.704	1.908485	3.005911
84	1085.347	1061.899	1044.334	1063.86	1.924279	3.026885
87	1036.64	1031.403	1034.043	1034.029	1.939519	3.014533
90	1107.479	1063.55	1058.294	1076.441	1.954243	3.03199
93	1021.764	1037.342	1033.917	1031.008	1.968483	3.013262
96	1005.466	999.1356	1025.163	1009.921	1.982271	3.004288
99	1116.676	1049.867	1062.866	1076.47	1.995635	3.032002
102	1059.728	1059.499	1043.759	1054.329	2.0086	3.022976
105	1057.793	1009.002	1028.007	1031.601	2.021189	3.013512
108	1016.207	979.3875	1016.288	1003.961	2.033424	3.001717
111	1080.247	1044.148	1057.775	1060.723	2.045323	3.025602
114	1011.833	1041.894	1033.436	1029.054	2.056905	3.012438
117	1013.528	1028.55	1014.676	1018.918	2.068186	3.008139
120	980.5342	997.9508	990.8165	989.7672	2.079181	2.995533
123	1118.297	1031.668	1050.724	1066.896	2.089905	3.028122
126	1096.789	1021.687	1009.751	1042.742	2.100371	3.018177
129	1085.023	1024.404	1005.796	1038.408	2.11059	3.016368
132	1047.775	1026.32	987.8793	1020.658	2.120574	3.00888
135	1004.182	1025.045	974.2399	1001.156	2.130334	3.000502
138	1110.337	1010.075	1040.438	1053.617	2.139879	3.022683
141	1087.7	1010.566	1022.31	1040.192	2.149219	3.017114
144	1027.838	1020.252	971.6483	1006.58	2.158362	3.002848
147	1002.885	1010.024	958.7073	990.5387	2.167317	2.995871
150	990.0716	994.4955	955.2861	979.9511	2.176091	2.991204

Sample 7131						
Image 8764		Particle O_5A		Approximate Particle size - 105.9133 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1030.88	1031.401	1028.487	1030.256	0.477121	3.012945
6	918.42	921.8763	917.822	919.3728	0.778151	2.963492
9	887.1058	889.6215	885.5334	887.4202	0.954243	2.948129
12	880.9851	886.8746	881.9545	883.2714	1.079181	2.946094
15	877.6362	877.8114	881.5355	878.9944	1.176091	2.943986
18	873.7017	871.6384	874.4857	873.2753	1.255273	2.941151
21	873.2654	873.633	883.0706	876.6563	1.322219	2.942829
24	875.4547	870.4387	876.171	874.0215	1.380211	2.941522
27	872.5112	868.4439	871.5562	870.8371	1.431364	2.939937
30	864.1933	865.1729	863.0439	864.1367	1.477121	2.936582
33	870.3114	867.3364	871.0378	869.5619	1.518514	2.9393
36	862.4126	862.2164	863.1134	862.5808	1.556303	2.9358
39	862.3757	879.8136	861.3599	867.8497	1.591065	2.938445
42	864.636	864.4377	867.5036	865.5258	1.623249	2.93728
45	852.0368	848.6896	852.7956	851.174	1.653213	2.930018
48	851.4071	864.183	870.4349	862.0083	1.681241	2.935511
51	860.9108	869.0861	863.6608	864.5526	1.70757	2.936791
54	837.2431	839.1612	838.228	838.2108	1.732394	2.923353
57	859.0597	866.0018	855.5157	860.1924	1.755875	2.934596
60	852.9125	871.7238	853.6292	859.4218	1.778151	2.934206
63	834.188	858.0071	838.7656	843.6536	1.799341	2.926164
66	846.7419	858.7486	847.5793	851.0233	1.819544	2.929941
69	840.43	843.0507	841.223	841.5679	1.838849	2.925089
72	835.8539	837.8911	836.7197	836.8216	1.857332	2.922633
75	840.252	859.1544	841.0272	846.8112	1.875061	2.927787
78	831.0958	851.5253	830.8899	837.837	1.892095	2.92316
81	835.8195	856.0649	838.5745	843.4863	1.908485	2.926078
84	827.6797	848.6652	825.4556	833.9335	1.924279	2.921131
87	802.9863	831.1099	798.8556	810.9839	1.939519	2.909012
90	827.9694	799.9271	827.16	818.3522	1.954243	2.91294
93	848.0541	777.1819	847.4625	824.2328	1.968483	2.91605
96	812.7635	790.3636	844.3824	815.8365	1.982271	2.911603
99	793.1556	802.9067	790.9163	795.6595	1.995635	2.900727
102	784.7175	851.334	784.4989	806.8501	2.0086	2.906793
105	794.7356	837.0524	793.5408	808.4429	2.021189	2.907649
108	790.7148	806.3052	791.5724	796.1975	2.033424	2.901021
111	785.568	804.7698	789.3357	793.2245	2.045323	2.899396
114	719.657	817.4702	719.5503	752.2258	2.056905	2.876348
117	709.686	822.8289	710.8943	747.8031	2.068186	2.873787
120	738.6576	821.7779	739.975	766.8035	2.079181	2.884684
123	756.5139	818.838	746.8005	774.0508	2.089905	2.888769
126	762.6359	820.9937	765.6874	783.1057	2.100371	2.89382
129	772.3454	752.2364	769.5617	764.7145	2.11059	2.883499
132	770.5695	732.1373	771.2934	758.0001	2.120574	2.879669
135	798.017	750.425	795.3224	781.2548	2.130334	2.892793
138	791.7465	754.394	792.5767	779.5724	2.139879	2.891856
141	784.8651	757.0831	785.6103	775.8528	2.149219	2.889779
144	782.0218	766.4708	780.015	776.1692	2.158362	2.889956
147	771.857	777.8359	771.6911	773.7947	2.167317	2.888626
150	753.2589	795.9723	748.5327	765.9213	2.176091	2.884184

Sample 7131						
Image 8764		Particle O_5B		Approximate Particle size - 123.9454 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1075.838	1075.852	1079.151	1076.947	0.477121	3.032194
6	977.1025	977.1464	987.1952	980.4814	0.778151	2.991439
9	974.0103	992.8586	976.7192	981.196	0.954243	2.991756
12	952.5291	955.8654	958.1259	955.5068	1.079181	2.980234
15	960.4569	961.1128	984.3296	968.6331	1.176091	2.986159
18	946.9967	966.1335	971.1665	961.4322	1.255273	2.982919
21	948.7955	966.5132	969.3112	961.54	1.322219	2.982967
24	946.1687	947.8094	959.3406	951.1062	1.380211	2.978229
27	934.4339	938.2921	958.9085	943.8782	1.431364	2.974916
30	927.1191	959.9139	957.1945	948.0758	1.477121	2.976843
33	932.4097	951.2606	957.4671	947.0458	1.518514	2.976371
36	929.4792	961.3998	950.3608	947.0799	1.556303	2.976387
39	917.2643	952.3358	948.709	939.4364	1.591065	2.972867
42	929.6925	937.0175	948.9373	938.5491	1.623249	2.972457
45	934.714	962.2054	944.6733	947.1976	1.653213	2.976441
48	922.4839	965.767	951.2371	946.496	1.681241	2.976119
51	913.7168	948.7352	937.3896	933.2805	1.70757	2.970012
54	914.535	950.0398	942.605	935.7266	1.732394	2.971149
57	900.1138	954.3859	918.45	924.3166	1.755875	2.965821
60	911.2157	939.7949	919.5629	923.5245	1.778151	2.965448
63	917.3216	954.7178	924.2192	932.0862	1.799341	2.969456
66	907.0972	963.3879	923.472	931.319	1.819544	2.969098
69	909.4249	898.8048	931.9449	913.3915	1.838849	2.960657
72	904.2551	962.3751	922.768	929.7994	1.857332	2.968389
75	878.6161	934.2199	918.0981	910.3114	1.875061	2.95919
78	890.7252	938.9818	912.1371	913.948	1.892095	2.960922
81	913.2274	925.3439	912.6055	917.0589	1.908485	2.962397
84	911.0436	922.5782	930.7468	921.4562	1.924279	2.964475
87	890.5578	919.3521	898.9792	902.963	1.939519	2.95567
90	875.3926	898.5752	918.1194	897.3624	1.954243	2.952968
93	864.8079	1010.21	917.0686	930.6956	1.968483	2.968808
96	866.3854	960.4052	877.4697	901.4201	1.982271	2.954927
99	872.2318	928.0428	898.9683	899.7476	1.995635	2.954121
102	862.6669	877.468	885.0884	875.0744	2.0086	2.942045
105	842.371	993.0427	873.5897	903.0011	2.021189	2.955688
108	832.79	985.796	859.8969	892.8276	2.033424	2.950768
111	836.5142	961.6852	857.548	885.2491	2.045323	2.947066
114	816.4449	934.5944	868.3568	873.132	2.056905	2.94108
117	792.8487	923.127	870.1371	862.0376	2.068186	2.935526
120	790.241	933.1333	862.1661	861.8468	2.079181	2.93543
123	802.3358	860.9589	931.3979	864.8975	2.089905	2.936965
126	810.996	854.1495	798.6813	821.2756	2.100371	2.914489
129	822.709	844.3356	864.8083	843.951	2.11059	2.926317
132	823.0184	835.2933	865.9509	841.4209	2.120574	2.925013
135	823.3074	973.2449	893.5834	896.7119	2.130334	2.952653
138	820.2386	1017.768	898.1171	912.0413	2.139879	2.960015
141	769.0009	1012.851	902.3132	894.7216	2.149219	2.951688
144	777.3535	1010.263	930.4661	906.0276	2.158362	2.957141
147	781.7609	1016.874	931.9676	910.2009	2.167317	2.959137
150	798.186	1003.171	936.9874	912.7816	2.176091	2.960367

Sample 7131						
Image 8764		Particle O_5C		Approximate Particle size - 80.9547 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	777.0615	777.887	775.4512	776.7999	0.477121	2.890309
6	695.8761	696.6888	696.9816	696.5155	0.778151	2.842931
9	677.2768	683.0338	679.905	680.0719	0.954243	2.832555
12	674.1882	678.5978	672.1545	674.9802	1.079181	2.829291
15	672.1048	674.3269	674.7666	673.7328	1.176091	2.828488
18	669.426	672.4283	678.7081	673.5208	1.255273	2.828351
21	664.1716	673.3297	665.7692	667.7568	1.322219	2.824618
24	661.1685	665.8503	660.0446	662.3545	1.380211	2.82109
27	663.059	663.2866	668.5426	664.9627	1.431364	2.822797
30	664.2327	662.0128	662.8463	663.0306	1.477121	2.821534
33	660.5927	665.1155	655.6968	660.4683	1.518514	2.819852
36	651.3883	659.5046	647.5237	652.8055	1.556303	2.814784
39	637.5076	662.4353	654.5848	651.5092	1.591065	2.813921
42	626.3397	664.7435	661.4008	650.828	1.623249	2.813466
45	637.8237	667.1859	645.4274	650.1457	1.653213	2.813011
48	625.3102	644.1688	655.2392	641.5727	1.681241	2.807246
51	634.9416	638.5222	657.6271	643.697	1.70757	2.808681
54	622.1735	635.7684	628.8453	628.9291	1.732394	2.798602
57	680.7111	653.2245	641.9296	658.6217	1.755875	2.818636
60	623.0335	646.2527	641.1036	636.7966	1.778151	2.804001
63	612.2	649.193	646.3728	635.9219	1.799341	2.803404
66	614.5981	656.0192	651.239	640.6188	1.819544	2.8066
69	628.2717	654.5942	635.0322	639.2994	1.838849	2.805704
72	600.7715	658.7464	614.1379	624.5519	1.857332	2.795569
75	662.691	649.4888	613.4357	641.8718	1.875061	2.807448
78	664.6315	645.5079	600.9741	637.0378	1.892095	2.804165
81	599.2357	660.0074	593.5248	617.5893	1.908485	2.7907
84	596.7969	661.0854	598.1591	618.6805	1.924279	2.791466
87	653.3831	669.1782	612.6041	645.0551	1.939519	2.809597
90	626.4832	666.612	612.5106	635.2019	1.954243	2.802912
93	582.6784	623.8834	618.988	608.5166	1.968483	2.784272
96	587.3013	623.6569	626.1559	612.3714	1.982271	2.787015
99	638.298	621.8106	636.0632	632.0573	1.995635	2.800756
102	639.6755	648.9913	619.3461	636.0043	2.0086	2.80346
105	651.3916	649.3077	632.6317	644.4437	2.021189	2.809185
108	626.0009	630.5385	618.2502	624.9299	2.033424	2.795831
111	576.7125	592.5753	610.4147	593.2342	2.045323	2.773226
114	577.5276	609.8026	580.7004	589.3435	2.056905	2.770369
117	657.1392	612.9682	586.6633	618.9236	2.068186	2.791637
120	654.0121	612.548	596.8452	621.1351	2.079181	2.793186
123	655.1737	602.3138	598.4041	618.6305	2.089905	2.791431
126	631.4617	597.2493	595.4126	608.0412	2.100371	2.783933
129	596.1602	594.4388	589.1467	593.2486	2.11059	2.773237
132	539.4676	593.9625	589.3108	574.247	2.120574	2.759099
135	625.8206	577.0847	565.8281	589.5778	2.130334	2.770541
138	622.771	560.6356	556.8325	580.0797	2.139879	2.763488
141	611.0403	550.6027	534.8317	565.4916	2.149219	2.752426
144	613.0926	555.0298	537.1946	568.439	2.158362	2.754684
147	615.8773	549.3203	548.3681	571.1886	2.167317	2.75678
150	618.7374	545.914	556.0809	573.5774	2.176091	2.758592

Sample 7131						
Image 8764		Particle O_6		Approximate Particle size - 139.5421 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	2267.251	2268.712	2263.697	2266.553	0.477121	3.355366
6	1670.716	1673.165	1673.047	1672.309	0.778151	3.223317
9	1574.194	1573.873	1573.703	1573.923	0.954243	3.196984
12	1566.253	1567.135	1557.868	1563.752	1.079181	3.194168
15	1550.357	1544.996	1544.249	1546.534	1.176091	3.189359
18	1541.1	1540.822	1538.306	1540.076	1.255273	3.187542
21	1543.488	1529.876	1519.331	1530.898	1.322219	3.184946
24	1529.108	1514.472	1513.02	1518.867	1.380211	3.18152
27	1507.189	1508.338	1508.54	1508.022	1.431364	3.178408
30	1505.202	1512.88	1517.199	1511.76	1.477121	3.179483
33	1497.055	1494.458	1511.54	1501.018	1.518514	3.176386
36	1502.913	1505.275	1544.357	1517.515	1.556303	3.181133
39	1502.807	1506.304	1535.496	1514.869	1.591065	3.180375
42	1493.72	1460.964	1534.004	1496.229	1.623249	3.174998
45	1474.835	1467.848	1484.015	1475.566	1.653213	3.168959
48	1497.864	1485.115	1478.971	1487.317	1.681241	3.172403
51	1502.098	1482.912	1474.235	1486.415	1.70757	3.17214
54	1476.662	1467.995	1490.585	1478.414	1.732394	3.169796
57	1511.105	1480.877	1499.264	1497.082	1.755875	3.175246
60	1460.495	1459.347	1461.272	1460.372	1.778151	3.164463
63	1501.12	1504.404	1466.408	1490.644	1.799341	3.173374
66	1494.348	1484.375	1470.871	1483.198	1.819544	3.171199
69	1469.91	1456.513	1451.494	1459.305	1.838849	3.164146
72	1506.563	1491.448	1469.682	1489.231	1.857332	3.172962
75	1448.256	1459.718	1498.56	1468.845	1.875061	3.166976
78	1456.617	1441.554	1441.629	1446.6	1.892095	3.160348
81	1468.701	1452.105	1420.015	1446.94	1.908485	3.160451
84	1455.172	1445.475	1476.43	1459.026	1.924279	3.164063
87	1440.174	1427.717	1446.432	1438.107	1.939519	3.157791
90	1432.704	1452.216	1453.769	1446.23	1.954243	3.160237
93	1421.39	1437.227	1417.279	1425.299	1.968483	3.153906
96	1444.629	1428.996	1479.049	1450.891	1.982271	3.161635
99	1444.974	1427.415	1455.854	1442.748	1.995635	3.15919
102	1441.314	1428.597	1461.355	1443.755	2.0086	3.159494
105	1456.012	1425.123	1421.586	1434.24	2.021189	3.156622
108	1427.021	1419.356	1494.58	1446.986	2.033424	3.160464
111	1429.551	1429.328	1474.463	1444.447	2.045323	3.159702
114	1430.726	1423.481	1430.064	1428.091	2.056905	3.154756
117	1417.991	1413.684	1482.249	1437.975	2.068186	3.157751
120	1418.419	1417.065	1456.643	1430.709	2.079181	3.155551
123	1420.367	1413.703	1425.629	1419.9	2.089905	3.152258
126	1406.679	1400.063	1398.683	1401.809	2.100371	3.146689
129	1416.055	1420.182	1459.448	1431.895	2.11059	3.155911
132	1398.863	1392.04	1426.567	1405.823	2.120574	3.147931
135	1378.48	1378.419	1390.625	1382.508	2.130334	3.140668
138	1387.729	1367.792	1489.511	1415.011	2.139879	3.15076
141	1377.661	1398.727	1499.686	1425.358	2.149219	3.153924
144	1370.424	1393.948	1466.48	1410.284	2.158362	3.149307
147	1344.605	1350.238	1440.181	1378.341	2.167317	3.139357
150	1367.6	1351.148	1366.821	1361.857	2.176091	3.134131

Sample 7131						
Image 8764		Particle O_7A		Approximate Particle size - 213.6093 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1661.774	1662.691	1662.805	1662.424	0.477121	3.220742
6	1616.242	1615.772	1616.76	1616.258	0.778151	3.208511
9	1607.916	1604.547	1605.03	1605.831	0.954243	3.2057
12	1607.533	1601.106	1606.694	1605.111	1.079181	3.205505
15	1599.657	1600.224	1601.222	1600.368	1.176091	3.20422
18	1602.252	1597.212	1600.553	1600.006	1.255273	3.204122
21	1602.343	1597.278	1594.449	1598.023	1.322219	3.203583
24	1587.866	1589.637	1584.776	1587.426	1.380211	3.200694
27	1588.773	1594.191	1596.577	1593.18	1.431364	3.202265
30	1624.144	1579.97	1595.653	1599.922	1.477121	3.204099
33	1598.023	1584.334	1581.969	1588.109	1.518514	3.20088
36	1582.983	1577.965	1583.127	1581.358	1.556303	3.19903
39	1615.44	1567.408	1586.048	1589.632	1.591065	3.201297
42	1581.164	1573.915	1562.298	1572.459	1.623249	3.196579
45	1616.403	1582.031	1567.052	1588.495	1.653213	3.200986
48	1613.47	1571.279	1563.227	1582.659	1.681241	3.199387
51	1605.89	1566.891	1576.529	1583.103	1.70757	3.199509
54	1599.402	1561.102	1571.673	1577.392	1.732394	3.19794
57	1567.782	1626.077	1585.485	1593.115	1.755875	3.202247
60	1592.592	1547.283	1561.64	1567.172	1.778151	3.195117
63	1552.283	1588.918	1564.17	1568.457	1.799341	3.195473
66	1557.578	1543.008	1573.592	1558.059	1.819544	3.192584
69	1615.336	1567.055	1553.175	1578.522	1.838849	3.198251
72	1593.41	1555.414	1550.885	1566.57	1.857332	3.19495
75	1541.719	1550.848	1548.456	1547.008	1.875061	3.189492
78	1543.235	1575.564	1540.669	1553.156	1.892095	3.191215
81	1595.258	1558.138	1576.461	1576.619	1.908485	3.197727
84	1585.037	1544.596	1554.743	1561.459	1.924279	3.19353
87	1595.862	1528.997	1528.534	1551.131	1.939519	3.190649
90	1582.851	1622.168	1541.578	1582.199	1.954243	3.199261
93	1575.087	1505.845	1524.561	1535.164	1.968483	3.186155
96	1548.857	1612.894	1559.58	1573.777	1.982271	3.196943
99	1564.475	1593.68	1540.406	1566.187	1.995635	3.194844
102	1578.679	1494.01	1512.163	1528.284	2.0086	3.184204
105	1547.156	1486.878	1503.306	1512.447	2.021189	3.17968
108	1504.616	1557.044	1504.984	1522.215	2.033424	3.182476
111	1491.523	1569.632	1500.381	1520.512	2.045323	3.18199
114	1506.8	1596.04	1522.71	1541.85	2.056905	3.188042
117	1539.027	1511.488	1547.186	1532.567	2.068186	3.185419
120	1567.104	1516.591	1518.927	1534.207	2.079181	3.185884
123	1566.118	1508.94	1437.518	1504.192	2.089905	3.177303
126	1565.453	1517.955	1434.735	1506.048	2.100371	3.177839
129	1544.043	1527.49	1434.383	1501.972	2.11059	3.176662
132	1435.407	1560.432	1442.941	1479.594	2.120574	3.170142
135	1420.196	1559.053	1452.933	1477.394	2.130334	3.169496
138	1444.716	1571.998	1474.327	1497.014	2.139879	3.175226
141	1466.8	1590.05	1495.415	1517.422	2.149219	3.181106
144	1631.301	1555.658	1496.115	1561.025	2.158362	3.19341
147	1636.911	1541.876	1538.275	1572.354	2.167317	3.19655
150	1639.6	1419.54	1556.485	1538.542	2.176091	3.187109

Sample 7131						
Image 8764		Particle O_7B		Approximate Particle size - 167.3746 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1291.552	1290.093	1290.506	1290.717	0.477121	3.110831
6	1266.171	1259.975	1263.453	1263.2	0.778151	3.101472
9	1255.37	1248.546	1256.243	1253.386	0.954243	3.098085
12	1245.217	1245.296	1251.874	1247.462	1.079181	3.096027
15	1241.076	1248.729	1253.454	1247.753	1.176091	3.096129
18	1246.29	1238.188	1245.405	1243.294	1.255273	3.094574
21	1232.949	1234.1	1238.046	1235.031	1.322219	3.091678
24	1240.662	1234.364	1246.593	1240.54	1.380211	3.093611
27	1238.695	1223.447	1220.188	1227.443	1.431364	3.089001
30	1231.559	1239.268	1241.917	1237.581	1.477121	3.092574
33	1231.167	1237.365	1212.096	1226.876	1.518514	3.088801
36	1216.721	1216.4	1237.144	1223.421	1.556303	3.087576
39	1219.744	1211.003	1240.884	1223.877	1.591065	3.087738
42	1253.531	1221.896	1223.375	1232.934	1.623249	3.09094
45	1242.16	1216.693	1220.623	1226.492	1.653213	3.088665
48	1240.621	1206.656	1219.124	1222.133	1.681241	3.087119
51	1237.264	1198.256	1205.448	1213.656	1.70757	3.084096
54	1203.66	1227.062	1185.931	1205.551	1.732394	3.081186
57	1202.931	1213.264	1232.728	1216.308	1.755875	3.085043
60	1193.345	1161.395	1221.295	1192.011	1.778151	3.07628
63	1188.267	1203.832	1179.585	1190.561	1.799341	3.075752
66	1179.438	1159.254	1212.628	1183.773	1.819544	3.073269
69	1168.365	1199.19	1212.664	1193.406	1.838849	3.076788
72	1211.779	1187.952	1187.984	1195.905	1.857332	3.077697
75	1215.805	1188.928	1163.533	1189.422	1.875061	3.075336
78	1231.445	1216.147	1201.915	1216.502	1.892095	3.085113
81	1170.765	1153.71	1145.999	1156.825	1.908485	3.063268
84	1134.621	1104.341	1104.866	1114.609	1.924279	3.047123
87	1136.22	1110.127	1111.969	1119.439	1.939519	3.049
90	1084.014	1064.686	1065.821	1071.507	1.954243	3.029995
93	1155.217	1072.278	1077.388	1101.628	1.968483	3.042035
96	1132.679	1075.332	1078.908	1095.64	1.982271	3.039668
99	1189.619	1129.254	1150.15	1156.341	1.995635	3.063086
102	1193.489	1124.59	1152.025	1156.701	2.0086	3.063221
105	1012.925	1204.833	1096.887	1104.881	2.021189	3.043316
108	1008.776	1218.432	1098.824	1108.677	2.033424	3.044805
111	1021.394	1211.352	1097.903	1110.216	2.045323	3.045408
114	1046.443	1013.342	1050.725	1036.837	2.056905	3.01571
117	966.365	1005.628	1055.716	1009.236	2.068186	3.003993
120	1141.336	969.6971	1076.125	1062.386	2.079181	3.026282
123	1127.416	974.6293	1093.395	1065.147	2.089905	3.02741
126	1139.181	996.3241	1113.06	1082.855	2.100371	3.03457
129	1155.129	1022.888	1124.988	1101.002	2.11059	3.041788
132	1176.001	1032.422	1151.943	1120.122	2.120574	3.049265
135	1211.14	1048.24	1165.203	1141.528	2.130334	3.057486
138	1215.651	1080.494	1181.898	1159.348	2.139879	3.064214
141	1058.572	1088.048	1205.651	1117.424	2.149219	3.048218
144	1021.869	1097.202	1213.207	1110.759	2.158362	3.04562
147	1031.803	1116.44	957.0981	1035.114	2.167317	3.014988
150	1035.542	1128.569	967.2564	1043.789	2.176091	3.018613

Sample 7131						
Image 8764		Particle O_8		Approximate Particle size - 116.5514 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1619.932	1618.066	1618.621	1618.873	0.477121	3.209213
6	1525.351	1524.614	1523.864	1524.61	0.778151	3.183159
9	1502.244	1504.884	1500.624	1502.584	0.954243	3.176839
12	1498.018	1504.554	1496.93	1499.834	1.079181	3.176043
15	1494.588	1498.732	1496.929	1496.75	1.176091	3.175149
18	1494.314	1483.89	1487.938	1488.714	1.255273	3.172811
21	1496.027	1495.879	1496.905	1496.27	1.322219	3.17501
24	1490.784	1476.945	1482.216	1483.315	1.380211	3.171233
27	1482.079	1479.007	1478.39	1479.825	1.431364	3.17021
30	1481.576	1487.714	1469.311	1479.534	1.477121	3.170125
33	1474.646	1481.287	1481.518	1479.15	1.518514	3.170012
36	1468.257	1466.855	1469.351	1468.154	1.556303	3.166772
39	1460.178	1475.93	1484.159	1473.422	1.591065	3.168327
42	1468.722	1466.465	1455.585	1463.591	1.623249	3.16542
45	1461.507	1463.603	1463.79	1462.967	1.653213	3.165234
48	1485.898	1436.748	1440.918	1454.521	1.681241	3.16272
51	1471.236	1466.673	1446.813	1461.574	1.70757	3.164821
54	1470.21	1441.634	1469.793	1460.546	1.732394	3.164515
57	1428.963	1471.451	1476.676	1459.03	1.755875	3.164064
60	1451.964	1464.945	1429.297	1448.735	1.778151	3.160989
63	1462.121	1429.863	1436.503	1442.829	1.799341	3.159215
66	1415.589	1470.758	1472.638	1452.995	1.819544	3.162264
69	1438.436	1478.096	1417.554	1444.695	1.838849	3.159776
72	1428.66	1415.878	1417.82	1420.786	1.857332	3.152529
75	1414.298	1440.533	1396.353	1417.061	1.875061	3.151389
78	1452.734	1456.901	1465.752	1458.463	1.892095	3.163895
81	1415.253	1439.772	1424.419	1426.481	1.908485	3.154266
84	1382.904	1377.938	1372.089	1377.644	1.924279	3.139137
87	1393.706	1400.772	1413.592	1402.69	1.939519	3.146962
90	1380.574	1401.547	1406.429	1396.183	1.954243	3.144942
93	1366.649	1375.359	1383.803	1375.27	1.968483	3.138388
96	1367.365	1421.464	1428.428	1405.752	1.982271	3.147909
99	1403.159	1444.571	1449.511	1432.414	1.995635	3.156068
102	1425.279	1459.181	1452.285	1445.581	2.0086	3.160043
105	1423.454	1383.98	1383.302	1396.912	2.021189	3.145169
108	1359.62	1390.613	1389.63	1379.954	2.033424	3.139865
111	1351.14	1390.159	1396.348	1379.215	2.045323	3.139632
114	1350.062	1390.41	1401.035	1380.502	2.056905	3.140037
117	1338.492	1388.867	1392.391	1373.25	2.068186	3.13775
120	1344.659	1391.923	1398.577	1378.386	2.079181	3.139371
123	1356.964	1385.989	1396.026	1379.659	2.089905	3.139772
126	1351.848	1427.997	1420.939	1400.261	2.100371	3.146209
129	1300.612	1347.931	1356.82	1335.121	2.11059	3.125521
132	1303.138	1353.724	1356.437	1337.766	2.120574	3.12638
135	1331.999	1454.816	1456.036	1414.284	2.130334	3.150537
138	1348.72	1444.426	1427.792	1406.979	2.139879	3.148288
141	1367.534	1435.176	1362.097	1388.269	2.149219	3.142474
144	1370.161	1348.552	1337.862	1352.192	2.158362	3.131038
147	1394.376	1345.775	1344.233	1361.461	2.167317	3.134005
150	1396.511	1358.634	1362.811	1372.652	2.176091	3.13756

Sample 7131						
Image 8765		Particle O_1		Approximate Particle size - 1818.022 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1557.076	1560.013	1558.879	1558.656	0.477121	3.19275
6	1439.204	1439.811	1438.045	1439.02	0.778151	3.158067
9	1415.582	1414.372	1413.789	1414.581	0.954243	3.150628
12	1415.098	1413.038	1411.084	1413.073	1.079181	3.150165
15	1409.362	1408.548	1408.293	1408.735	1.176091	3.148829
18	1407.077	1408.11	1406.879	1407.355	1.255273	3.148404
21	1406.737	1406.005	1406.776	1406.506	1.322219	3.148142
24	1398.86	1396.934	1395.56	1397.118	1.380211	3.145233
27	1394.951	1393.298	1392.73	1393.66	1.431364	3.144157
30	1393.145	1391.706	1391.295	1392.049	1.477121	3.143654
33	1392.549	1393.551	1394.4	1393.5	1.518514	3.144107
36	1387.194	1386.061	1387.814	1387.023	1.556303	3.142084
39	1384.581	1382.987	1382.499	1383.356	1.591065	3.140934
42	1379.996	1382.024	1381.064	1381.028	1.623249	3.140202
45	1379.923	1380.297	1379.785	1380.001	1.653213	3.13988
48	1373.439	1372.415	1377.198	1374.35	1.681241	3.138097
51	1369.286	1369.23	1376.625	1371.714	1.70757	3.137263
54	1371.206	1380.434	1369.133	1373.591	1.732394	3.137857
57	1384.873	1384.078	1371.155	1380.035	1.755875	3.13989
60	1387.258	1383.473	1367.356	1379.362	1.778151	3.139678
63	1351.332	1372.783	1370.386	1364.834	1.799341	3.13508
66	1368.383	1340.546	1353.813	1354.247	1.819544	3.131698
69	1337.674	1337.077	1353.52	1342.757	1.838849	3.127997
72	1343.431	1357.412	1384.517	1361.787	1.857332	3.134109
75	1374.492	1357.933	1375.537	1369.321	1.875061	3.136505
78	1372.427	1320.698	1372.419	1355.181	1.892095	3.131997
81	1288.252	1330.265	1288.23	1302.249	1.908485	3.114694
84	1301.617	1332.344	1301.595	1311.852	1.924279	3.117885
87	1330.371	1366.84	1332.232	1343.148	1.939519	3.128124
90	1345.771	1331.967	1351.387	1343.042	1.954243	3.128089
93	1365.813	1299.658	1375.848	1347.107	1.968483	3.129402
96	1332.532	1303.148	1250.247	1295.309	1.982271	3.112373
99	1267.037	1334.903	1279.904	1293.948	1.995635	3.111917
102	1282.61	1357.994	1316.96	1319.188	2.0086	3.120307
105	1319.045	1279.45	1345.811	1314.769	2.021189	3.118849
108	1291.558	1226.608	1235.981	1251.382	2.033424	3.09739
111	1285.493	1252.132	1238.669	1258.765	2.045323	3.099945
114	1335.763	1266.133	1251.083	1284.326	2.056905	3.108675
117	1355.181	1289.88	1265.078	1303.38	2.068186	3.115071
120	1221.398	1305.341	1257.009	1261.25	2.079181	3.100801
123	1211.941	1295.067	1250.285	1252.431	2.089905	3.097754
126	1216.508	1302.483	1269.276	1262.756	2.100371	3.101319
129	1225.16	1317.113	1285.358	1275.877	2.11059	3.105809
132	1229.355	1197.344	1307.455	1244.718	2.120574	3.095071
135	1278.841	1212.995	1319.17	1270.335	2.130334	3.103918
138	1308.818	1180.558	1341.439	1276.938	2.139879	3.10617
141	1312.952	1183.521	1347.783	1281.419	2.149219	3.107691
144	1270.494	1182.545	1303.765	1252.268	2.158362	3.097697
147	1282.298	1183.255	1168.077	1211.21	2.167317	3.083219
150	1270.614	1200.528	1174.9	1215.347	2.176091	3.0847

Sample 7131						
Image 8765		Particle O_2		Approximate Particle size - 1006.43 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1530.938	1527.131	1529.382	1529.151	0.477121	3.18445
6	1286.257	1287.165	1285.301	1286.241	0.778151	3.109322
9	1264.129	1263.506	1268.518	1265.384	0.954243	3.102222
12	1246.87	1249.779	1246.556	1247.735	1.079181	3.096122
15	1244.855	1249	1244.027	1245.961	1.176091	3.095504
18	1237.383	1239.6	1242.281	1239.755	1.255273	3.093336
21	1231.638	1238.98	1240.484	1237.034	1.322219	3.092382
24	1233.007	1237.65	1236.637	1235.765	1.380211	3.091936
27	1223.909	1228.026	1227.172	1226.369	1.431364	3.088621
30	1229.394	1235.772	1234.737	1233.301	1.477121	3.091069
33	1223.777	1233.639	1236.198	1231.205	1.518514	3.09033
36	1225.102	1234.907	1232.577	1230.862	1.556303	3.090209
39	1219.704	1217.161	1226.725	1221.197	1.591065	3.086786
42	1210.382	1221.955	1228.851	1220.396	1.623249	3.086501
45	1210.222	1211.549	1231.305	1217.692	1.653213	3.085538
48	1207.41	1207.843	1225.504	1213.585	1.681241	3.08407
51	1211.214	1214.082	1230.432	1218.576	1.70757	3.085853
54	1198.884	1202.722	1212.138	1204.581	1.732394	3.080836
57	1203.226	1208.109	1183.033	1198.123	1.755875	3.078501
60	1176.883	1181.275	1194.987	1184.381	1.778151	3.073492
63	1192.211	1206.115	1194.286	1197.537	1.799341	3.078289
66	1207.101	1192.323	1226.894	1208.773	1.819544	3.082345
69	1206.314	1183.569	1206.591	1198.825	1.838849	3.078756
72	1175.863	1164.027	1193.278	1177.723	1.857332	3.071043
75	1141.129	1161.085	1189.341	1163.852	1.875061	3.065898
78	1186.806	1200.137	1218.298	1201.747	1.892095	3.079813
81	1188.61	1199.251	1180.405	1189.422	1.908485	3.075336
84	1199.22	1188.343	1178.436	1188.666	1.924279	3.07506
87	1176.077	1149.741	1147.015	1157.611	1.939519	3.063563
90	1176.045	1160.695	1160.709	1165.816	1.954243	3.06663
93	1158.949	1164.343	1159.133	1160.809	1.968483	3.064761
96	1172.479	1142.704	1138.098	1151.094	1.982271	3.061111
99	1138.324	1152.191	1135.728	1142.081	1.995635	3.057697
102	1126.161	1160.88	1160.559	1149.2	2.0086	3.060396
105	1123.475	1186.671	1160.439	1156.861	2.021189	3.063281
108	1124.811	1183.03	1148.071	1151.971	2.033424	3.061441
111	1119.264	1167.449	1157.321	1148.011	2.045323	3.059946
114	1128.398	1135.192	1153.304	1138.965	2.056905	3.05651
117	1117.282	1090.522	1145.266	1117.69	2.068186	3.048321
120	1128.422	1078.214	1136.798	1114.478	2.079181	3.047071
123	1158.825	1118.621	1164.399	1147.282	2.089905	3.05967
126	1166.98	1122.725	1192.699	1160.801	2.100371	3.064758
129	1210.854	1131.181	1202.467	1181.501	2.11059	3.072434
132	1200.734	1137.273	1191.464	1176.49	2.120574	3.070588
135	1096.163	1016.126	1190.674	1100.988	2.130334	3.041782
138	1108.011	1022.979	1094.435	1075.142	2.139879	3.031466
141	1134.022	1058.33	1107.223	1099.858	2.149219	3.041337
144	1110.178	1090.487	1118.467	1106.377	2.158362	3.043903
147	1099.278	1096.528	1145.746	1113.851	2.167317	3.046827
150	1042.948	1107.323	1148.729	1099.666	2.176091	3.041261

Sample 7131						
Image 8765		Particle O_3		Approximate Particle size - 1341.159 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1271.523	1273.096	1275.238	1273.286	0.477121	3.104926
6	1205.851	1208.065	1208.069	1207.328	0.778151	3.081825
9	1205.638	1203.866	1206.69	1205.398	0.954243	3.081131
12	1193.034	1193.381	1199.585	1195.333	1.079181	3.077489
15	1193.066	1197.417	1198.207	1196.23	1.176091	3.077815
18	1192.171	1194.72	1192.957	1193.283	1.255273	3.076743
21	1186.851	1178.908	1180.639	1182.133	1.322219	3.072666
24	1184.686	1185.986	1181.1	1183.924	1.380211	3.073324
27	1184.684	1187.645	1190.222	1187.517	1.431364	3.07464
30	1190.023	1194.825	1191.16	1192.002	1.477121	3.076277
33	1176.965	1179.184	1180.959	1179.036	1.518514	3.071527
36	1188.169	1170.786	1185.232	1181.396	1.556303	3.072395
39	1182.65	1188.722	1180.386	1183.919	1.591065	3.073322
42	1167.944	1166.691	1179.74	1171.458	1.623249	3.068727
45	1183.254	1185.995	1174.811	1181.353	1.653213	3.07238
48	1188.208	1185.141	1172.866	1182.071	1.681241	3.072644
51	1172.266	1177.072	1179.284	1176.207	1.70757	3.070484
54	1167.431	1169.946	1179.327	1172.235	1.732394	3.069015
57	1178.505	1182.855	1189.143	1183.501	1.755875	3.073169
60	1150.585	1154.639	1153.752	1152.992	1.778151	3.061826
63	1176.621	1178.796	1182.38	1179.266	1.799341	3.071612
66	1164.42	1171.983	1176.576	1170.993	1.819544	3.068554
69	1156.349	1162.652	1167.037	1162.012	1.838849	3.065211
72	1173.341	1173.904	1162.764	1170.003	1.857332	3.068187
75	1159.413	1163.807	1164.446	1162.555	1.875061	3.065414
78	1157.7	1160.182	1152.328	1156.737	1.892095	3.063234
81	1162.057	1162.665	1210.183	1178.302	1.908485	3.071257
84	1125.046	1127.16	1151.8	1134.669	1.924279	3.054869
87	1159.003	1160.674	1138.207	1152.628	1.939519	3.061689
90	1126.426	1129.298	1135.607	1130.443	1.954243	3.053249
93	1156.5	1164.014	1142.432	1154.315	1.968483	3.062324
96	1136.244	1144.782	1128.957	1136.661	1.982271	3.055631
99	1136.866	1143.172	1179.873	1153.304	1.995635	3.061944
102	1173.21	1181.297	1175.774	1176.76	2.0086	3.070688
105	1154.575	1161.807	1145.212	1153.865	2.021189	3.062155
108	1124.339	1127.136	1149.052	1133.509	2.033424	3.054425
111	1121.909	1129.109	1119.664	1123.56	2.045323	3.050596
114	1136.561	1144.459	1112.335	1131.118	2.056905	3.053508
117	1156.768	1154.58	1112.786	1141.378	2.068186	3.057429
120	1128.958	1131.298	1200.07	1153.442	2.079181	3.061996
123	1167.457	1172.557	1199.198	1179.737	2.089905	3.071785
126	1137.339	1130.905	1204.817	1157.687	2.100371	3.063591
129	1119.485	1125.875	1076.687	1107.349	2.11059	3.044285
132	1101.418	1105.104	1164.892	1123.805	2.120574	3.050691
135	1144.092	1147.247	1164.317	1151.885	2.130334	3.061409
138	1145.816	1150.299	1158.374	1151.497	2.139879	3.061263
141	1117.518	1122.873	1100.355	1113.582	2.149219	3.046722
144	1109.066	1112.988	1093.708	1105.254	2.158362	3.043462
147	1090.066	1092.039	1075.349	1085.818	2.167317	3.035757
150	1086.531	1096.691	1156.977	1113.4	2.176091	3.046651

Sample 7131						
Image 8765		Particle O_4		Approximate Particle size - 1280.273 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1776.903	1779.205	1776.22	1777.443	0.477121	3.249796
6	1641.872	1644.776	1644.539	1643.729	0.778151	3.21583
9	1629.86	1631.311	1629.727	1630.299	0.954243	3.212267
12	1619.423	1626.162	1619.861	1621.815	1.079181	3.210001
15	1613.665	1615.29	1616.732	1615.229	1.176091	3.208234
18	1611.504	1611.787	1612.816	1612.036	1.255273	3.207375
21	1606.075	1620.892	1613.132	1613.366	1.322219	3.207733
24	1605.297	1606.601	1630.471	1614.123	1.380211	3.207937
27	1599.613	1617.723	1602.049	1606.461	1.431364	3.20587
30	1598.767	1616.549	1634.991	1616.769	1.477121	3.208648
33	1606.773	1611.08	1623.17	1613.674	1.518514	3.207816
36	1595.631	1604.442	1598.898	1599.657	1.556303	3.204027
39	1594.649	1588.139	1627.309	1603.365	1.591065	3.205033
42	1599.663	1620.65	1627.488	1615.934	1.623249	3.208424
45	1593.935	1614.744	1618.391	1609.023	1.653213	3.206562
48	1624.714	1607.207	1593.738	1608.553	1.681241	3.206435
51	1618.948	1590.228	1599.305	1602.827	1.70757	3.204887
54	1599.56	1606.363	1573.19	1593.038	1.732394	3.202226
57	1570.436	1576.265	1605.549	1584.084	1.755875	3.199778
60	1564.007	1562.581	1627.686	1584.758	1.778151	3.199963
63	1578.437	1615.716	1617.978	1604.044	1.799341	3.205216
66	1589.016	1592.818	1609.363	1597.066	1.819544	3.203323
69	1556.369	1620.004	1632.165	1602.846	1.838849	3.204892
72	1578.8	1606.613	1608.927	1598.113	1.857332	3.203608
75	1607.987	1602.324	1614.788	1608.367	1.875061	3.206385
78	1565.06	1536.518	1613.921	1571.833	1.892095	3.196406
81	1537.065	1597.709	1569.495	1568.089	1.908485	3.195371
84	1538.459	1542.149	1593.366	1557.991	1.924279	3.192565
87	1604.003	1575.159	1556.79	1578.65	1.939519	3.198286
90	1573.897	1544.455	1600.445	1572.932	1.954243	3.19671
93	1557.357	1580.752	1566.904	1568.338	1.968483	3.19544
96	1535.249	1564.318	1633.95	1577.839	1.982271	3.198063
99	1571.112	1576.04	1578.649	1575.267	1.995635	3.197354
102	1566.46	1586.493	1567.816	1573.59	2.0086	3.196891
105	1543.338	1550.935	1576.374	1556.882	2.021189	3.192256
108	1553.131	1617.775	1514.312	1561.739	2.033424	3.193609
111	1610.216	1622.584	1546.098	1592.966	2.045323	3.202206
114	1600.847	1624.35	1548.84	1591.346	2.056905	3.201765
117	1498.299	1584.952	1538.365	1540.539	2.068186	3.187673
120	1466.121	1540.444	1529.127	1511.897	2.079181	3.179522
123	1494.522	1507.056	1550.763	1517.447	2.089905	3.181114
126	1493.248	1493.361	1565.865	1517.491	2.100371	3.181126
129	1502.748	1449.441	1541.084	1497.758	2.11059	3.175442
132	1492.197	1513.096	1566.398	1523.897	2.120574	3.182956
135	1598.363	1520.064	1535.285	1551.237	2.130334	3.190678
138	1625.642	1530.478	1608.25	1588.123	2.139879	3.200884
141	1598.192	1519.081	1608.79	1575.354	2.149219	3.197378
144	1578.67	1505.564	1594.71	1559.648	2.158362	3.193027
147	1569.611	1584.81	1569.114	1574.512	2.167317	3.197146
150	1580.373	1586.925	1562.914	1576.737	2.176091	3.197759

Sample 7131						
Image 8765		Particle O_5		Approximate Particle size - 1686.508 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1816.616	1813.414	1814.566	1814.865	0.477121	3.258844
6	1457.894	1457.884	1458.034	1457.937	0.778151	3.163739
9	1414.56	1415.954	1407.009	1412.508	0.954243	3.149991
12	1356.734	1352.661	1350.42	1353.272	1.079181	3.131385
15	1351.348	1350.717	1345.425	1349.163	1.176091	3.130065
18	1330.37	1332.62	1329.546	1330.845	1.255273	3.124128
21	1338.785	1339.036	1333.696	1337.173	1.322219	3.126188
24	1335.867	1332.796	1322.614	1330.426	1.380211	3.123991
27	1344.226	1324.669	1306.353	1325.083	1.431364	3.122243
30	1337.965	1328.195	1314.942	1327.034	1.477121	3.122882
33	1325.219	1307.002	1309.009	1313.743	1.518514	3.118511
36	1315.93	1302.257	1305.773	1307.986	1.556303	3.116603
39	1308.27	1311.25	1331.402	1316.974	1.591065	3.119577
42	1296.872	1337.863	1303.544	1312.76	1.623249	3.118185
45	1316.192	1317.114	1331.92	1321.742	1.653213	3.121147
48	1330.951	1289.699	1331.184	1317.278	1.681241	3.119677
51	1313.694	1335.038	1283.884	1310.872	1.70757	3.11756
54	1294.205	1304.692	1288.774	1295.89	1.732394	3.112568
57	1294.442	1297.92	1314.831	1302.397	1.755875	3.114744
60	1286.479	1287.509	1279.695	1284.561	1.778151	3.108755
63	1316.617	1284.553	1311.929	1304.367	1.799341	3.1154
66	1255.468	1280.726	1308.325	1281.507	1.819544	3.107721
69	1289.344	1319.373	1329.681	1312.799	1.838849	3.118198
72	1282.941	1309.874	1272.654	1288.49	1.857332	3.110081
75	1248.296	1333.827	1303.852	1295.325	1.875061	3.112379
78	1281.392	1302.856	1303.441	1295.896	1.892095	3.11257
81	1282.648	1276.33	1259.261	1272.746	1.908485	3.104742
84	1260.432	1267.105	1216.379	1247.972	1.924279	3.096205
87	1292.547	1286.722	1235.259	1271.51	1.939519	3.10432
90	1251.558	1299.036	1261.394	1270.663	1.954243	3.10403
93	1264.919	1294.884	1256.791	1272.198	1.968483	3.104555
96	1352.328	1246.226	1334.685	1311.08	1.982271	3.117629
99	1296.156	1196.382	1226.425	1239.654	1.995635	3.093301
102	1258.748	1311.355	1274.354	1281.486	2.0086	3.107714
105	1210.883	1248.879	1183.432	1214.398	2.021189	3.084361
108	1315.309	1303.151	1216.908	1278.456	2.033424	3.106686
111	1315.853	1284.35	1241.485	1280.563	2.045323	3.107401
114	1328.212	1295.308	1257.663	1293.728	2.056905	3.111843
117	1301.8	1348.976	1280.646	1310.474	2.068186	3.117428
120	1260.785	1229.29	1319.72	1269.932	2.079181	3.10378
123	1271.139	1243.159	1217.053	1243.784	2.089905	3.094745
126	1150.088	1278.256	1231.411	1219.918	2.100371	3.086331
129	1247.71	1208.26	1246.767	1234.245	2.11059	3.091402
132	1307.898	1160.836	1167.215	1211.983	2.120574	3.083497
135	1275.597	1192.562	1147.951	1205.37	2.130334	3.08112
138	1298.425	1217.204	1171.866	1229.165	2.139879	3.08961
141	1294.668	1244.321	1193.959	1244.316	2.149219	3.094931
144	1309.2	1254.262	1216.345	1259.935	2.158362	3.100348
147	1252.253	1279.969	1249.716	1260.646	2.167317	3.100593
150	1202.482	1296.998	1243.029	1247.503	2.176091	3.096042

Sample 7131						
Image 8765		Particle O_6A		Approximate Particle size - 767.17 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	804.41	803.0291	804.3069	803.9153	0.477121	2.90521
6	771.0331	771.0722	774.139	772.0814	0.778151	2.887663
9	766.0654	800.9678	767.9929	778.342	0.954243	2.89117
12	762.7168	779.1374	765.8226	769.2256	1.079181	2.886054
15	760.4699	863.8467	761.6711	795.3292	1.176091	2.900547
18	756.6364	855.1008	763.2579	791.665	1.255273	2.898541
21	756.5535	809.3199	759.3419	775.0718	1.322219	2.889342
24	757.451	792.9923	757.6907	769.378	1.380211	2.88614
27	751.0598	767.2129	748.8315	755.7014	1.431364	2.87835
30	747.4375	858.0438	751.6121	785.6978	1.477121	2.895256
33	750.6845	860.3053	751.8969	787.6289	1.518514	2.896322
36	744.6284	853.4353	746.8822	781.6486	1.556303	2.893012
39	738.9692	850.2886	736.3929	775.2169	1.591065	2.889423
42	732.4786	853.5984	731.6311	772.5694	1.623249	2.887937
45	744.2977	844.2892	738.4963	775.6944	1.653213	2.889691
48	732.9212	850.9095	728.2917	770.7075	1.681241	2.88689
51	741.5792	783.3141	736.6319	753.8417	1.70757	2.87728
54	742.4313	850.3265	744.2643	779.0074	1.732394	2.891542
57	729.6757	847.5812	730.7041	769.3203	1.755875	2.886107
60	730.0252	846.9668	721.3477	766.1132	1.778151	2.884293
63	739.601	852.1054	725.9454	772.5506	1.799341	2.887927
66	735.0415	750.249	733.6708	739.6538	1.819544	2.869028
69	729.0352	849.6078	727.827	768.8233	1.838849	2.885827
72	724.0425	834.2982	715.0268	757.7892	1.857332	2.879548
75	720.0167	835.8746	716.6031	757.4981	1.875061	2.879382
78	700.772	851.6243	729.8435	760.7466	1.892095	2.88124
81	694.6642	844.8853	723.2424	754.264	1.908485	2.877523
84	699.2101	825.4249	707.0757	743.9036	1.924279	2.871517
87	699.6913	829.6927	701.3911	743.5917	1.939519	2.871335
90	684.6671	827.8773	700.9481	737.8308	1.954243	2.867957
93	677.5785	831.1045	695.8315	734.8382	1.968483	2.866192
96	668.586	835.5952	713.5005	739.2272	1.982271	2.868778
99	691.1653	829.8771	714.5471	745.1965	1.995635	2.872271
102	697.1635	748.4519	729.8378	725.1511	2.0086	2.860428
105	698.706	838.2692	719.468	752.1477	2.021189	2.876303
108	734.9722	794.91	695.1623	741.6815	2.033424	2.870217
111	666.1022	796.1624	688.5784	716.9477	2.045323	2.855487
114	664.4393	716.0416	744.0346	708.1718	2.056905	2.850139
117	660.822	831.4804	732.8324	741.7116	2.068186	2.870235
120	660.3481	826.5925	698.3449	728.4285	2.079181	2.862387
123	658.9074	813.697	696.7136	723.106	2.089905	2.859202
126	777.4585	778.6697	649.6629	735.2637	2.100371	2.866443
129	753.5771	769.5065	758.1986	760.4274	2.11059	2.881058
132	618.8241	729.9543	760.4321	703.0702	2.120574	2.846999
135	620.511	810.7896	716.6855	715.9954	2.130334	2.85491
138	620.6973	807.039	699.3813	709.0392	2.139879	2.85067
141	616.4938	809.7605	663.0927	696.449	2.149219	2.842889
144	616.2919	808.5821	668.6371	697.837	2.158362	2.843754
147	619.1173	811.2517	669.954	700.1077	2.167317	2.845165
150	785.8609	821.1579	691.3547	766.1245	2.176091	2.884299

Sample 7131						
Image 8765		Particle O_6B		Approximate Particle size - 1376.327 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1297.523	1304.099	1298.231	1299.951	0.477121	3.113927
6	1235.364	1241.592	1245.957	1240.971	0.778151	3.093762
9	1221.936	1228.48	1220.849	1223.755	0.954243	3.087694
12	1219.801	1225.025	1216.388	1220.405	1.079181	3.086504
15	1214.265	1215.96	1213.437	1214.554	1.176091	3.084417
18	1218.982	1226.952	1233.78	1226.572	1.255273	3.088693
21	1214.262	1221.263	1245.186	1226.904	1.322219	3.088811
24	1218.898	1215.365	1209.71	1214.657	1.380211	3.084454
27	1213.42	1208.484	1235.328	1219.077	1.431364	3.086031
30	1211.444	1215.96	1227.284	1218.229	1.477121	3.085729
33	1197.395	1198.743	1237.701	1211.279	1.518514	3.083244
36	1197.136	1199.501	1230.332	1208.99	1.556303	3.082423
39	1188.245	1200.593	1228.543	1205.793	1.591065	3.081273
42	1202.61	1212.176	1226.389	1213.725	1.623249	3.08412
45	1211.016	1226.593	1241.259	1226.289	1.653213	3.088593
48	1183.785	1207.309	1205.957	1199.017	1.681241	3.078825
51	1208.998	1225.882	1232.257	1222.379	1.70757	3.087206
54	1197.527	1210.659	1217.578	1208.588	1.732394	3.082278
57	1192.91	1204.342	1202.779	1200.01	1.755875	3.079185
60	1187.946	1182.394	1172.911	1181.084	1.778151	3.072281
63	1205.631	1190.328	1226.495	1207.485	1.799341	3.081882
66	1189.402	1179.805	1213.142	1194.116	1.819544	3.077047
69	1191.716	1206.642	1217.197	1205.185	1.838849	3.081054
72	1181.044	1198.969	1235.186	1205.066	1.857332	3.081011
75	1170.976	1193.176	1225.304	1196.485	1.875061	3.077907
78	1202.578	1191.42	1224.107	1206.035	1.892095	3.08136
81	1196.432	1200.45	1218.384	1205.089	1.908485	3.081019
84	1198.784	1175.41	1194.055	1189.416	1.924279	3.075334
87	1188.176	1160.106	1170.583	1172.955	1.939519	3.069281
90	1194.257	1196.257	1215.498	1202.004	1.954243	3.079906
93	1170.144	1171.484	1182.19	1174.606	1.968483	3.069892
96	1173.559	1213.767	1223.266	1203.53	1.982271	3.080457
99	1161.72	1214.191	1226.017	1200.643	1.995635	3.079414
102	1205.832	1210.747	1215.677	1210.752	2.0086	3.083055
105	1192.585	1190.139	1233.941	1205.555	2.021189	3.081187
108	1140.914	1176.518	1219.638	1179.023	2.033424	3.071522
111	1144.022	1130.857	1190.924	1155.268	2.045323	3.062683
114	1221.97	1176.096	1264.5	1220.855	2.056905	3.086664
117	1216.837	1183.838	1177.909	1192.861	2.068186	3.07659
120	1199.599	1178.362	1167.237	1181.732	2.079181	3.072519
123	1195.005	1178.112	1167.323	1180.147	2.089905	3.071936
126	1172.232	1158.388	1273.814	1201.478	2.100371	3.079716
129	1172.063	1202.625	1237.795	1204.161	2.11059	3.080685
132	1145.916	1170.664	1215.232	1177.271	2.120574	3.070876
135	1139.201	1162.352	1146.609	1149.387	2.130334	3.060466
138	1164.642	1137.215	1123.725	1141.86	2.139879	3.057613
141	1148.01	1195.752	1262.064	1201.942	2.149219	3.079884
144	1149.238	1148.012	1257.182	1184.811	2.158362	3.073649
147	1135.048	1118.909	1216.235	1156.73	2.167317	3.063232
150	1119.025	1097.59	1212.669	1143.095	2.176091	3.058082

Sample 7131						
Image 8765		Particle O_7		Approximate Particle size - 1260.302 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1260.659	1258.895	1260.251	1259.935	0.477121	3.100348
6	1182.761	1185.371	1183.383	1183.838	0.778151	3.073292
9	1169.331	1169.628	1169.017	1169.326	0.954243	3.067935
12	1173.806	1171.217	1169.07	1171.364	1.079181	3.068692
15	1169.442	1167.159	1161.68	1166.094	1.176091	3.066733
18	1158.944	1165.047	1164.661	1162.884	1.255273	3.065536
21	1168.569	1167.865	1163.656	1166.696	1.322219	3.066958
24	1159.148	1157.704	1166.137	1160.996	1.380211	3.064831
27	1143.53	1156.017	1143.883	1147.81	1.431364	3.05987
30	1153.805	1158.439	1146.333	1152.859	1.477121	3.061776
33	1133.629	1147.158	1150.392	1143.726	1.518514	3.058322
36	1149.529	1147.123	1145.851	1147.501	1.556303	3.059753
39	1143.537	1146.629	1145.2	1145.122	1.591065	3.058852
42	1145.561	1148.868	1144.44	1146.29	1.623249	3.059294
45	1150.95	1150.236	1143.862	1148.349	1.653213	3.060074
48	1184.054	1148.169	1161.457	1164.56	1.681241	3.066162
51	1129.148	1158.474	1141.547	1143.056	1.70757	3.058068
54	1161.804	1150.699	1120.812	1144.438	1.732394	3.058592
57	1149.342	1138.2	1152.595	1146.712	1.755875	3.059454
60	1115.985	1126.539	1145.142	1129.222	1.778151	3.052779
63	1168.039	1156.469	1128.319	1150.942	1.799341	3.061054
66	1138.919	1118.673	1155.155	1137.583	1.819544	3.055983
69	1165.56	1174.975	1152.309	1164.281	1.838849	3.066058
72	1125.797	1138.264	1142.188	1135.416	1.857332	3.055155
75	1107.2	1138.415	1107.207	1117.607	1.875061	3.048289
78	1163.845	1149.289	1151.167	1154.767	1.892095	3.062494
81	1184.683	1131.196	1169.107	1161.662	1.908485	3.06508
84	1145.501	1133.184	1132.437	1137.04	1.924279	3.055776
87	1158.98	1103.708	1147.293	1136.66	1.939519	3.055631
90	1169.447	1146.067	1131.657	1149.057	1.954243	3.060342
93	1151.817	1134.006	1125.412	1137.078	1.968483	3.05579
96	1076.225	1153.022	1080.231	1103.159	1.982271	3.042638
99	1179.221	1106.336	1125.475	1137.011	1.995635	3.055765
102	1088.43	1095.705	1096.534	1093.556	2.0086	3.038841
105	1145.933	1096.343	1081.331	1107.869	2.021189	3.044488
108	1155.622	1116.659	1087.541	1119.941	2.033424	3.049195
111	1168.019	1119.141	1098.69	1128.617	2.045323	3.052546
114	1172.678	1068.416	1106.996	1116.03	2.056905	3.047676
117	1141.397	1071.398	1104.051	1105.615	2.068186	3.043604
120	1139.502	1071.801	1067.718	1093.007	2.079181	3.038623
123	1130.187	1025.096	1060.582	1071.955	2.089905	3.030177
126	1135.048	1086.153	1062.625	1094.609	2.100371	3.039259
129	1137.635	1086.691	1068.29	1097.539	2.11059	3.04042
132	1134.58	1088.963	1132.706	1118.75	2.120574	3.048733
135	1136.205	1070.516	1122.168	1109.63	2.130334	3.045178
138	1141.834	1080.507	1128.716	1117.019	2.139879	3.048061
141	1038.581	1070.377	1041.411	1050.123	2.149219	3.02124
144	1112.711	1057.957	1035.121	1068.596	2.158362	3.028814
147	1124.732	1064.416	1124.552	1104.567	2.167317	3.043192
150	1009.31	1052.79	1101.439	1054.513	2.176091	3.023052

Sample 7131						
Image 8765		Particle O_8		Approximate Particle size - 97.99318 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1419.08	1419.158	1419.902	1419.38	0.477121	3.152099
6	1323.801	1322.435	1323.461	1323.232	0.778151	3.121636
9	1299.689	1296.692	1298.133	1298.171	0.954243	3.113332
12	1289.68	1287.7	1288.014	1288.464	1.079181	3.110072
15	1284.988	1281.963	1282.473	1283.141	1.176091	3.108274
18	1278.201	1274.72	1275.843	1276.255	1.255273	3.105937
21	1274.183	1273.913	1271.853	1273.316	1.322219	3.104936
24	1257.182	1258.271	1255.466	1256.973	1.380211	3.099326
27	1274.487	1263.095	1267.568	1268.384	1.431364	3.103251
30	1269.921	1259.131	1258.789	1262.613	1.477121	3.10127
33	1266.491	1259.745	1260.356	1262.197	1.518514	3.101127
36	1240.625	1250.266	1250.632	1247.174	1.556303	3.095927
39	1248.59	1235.837	1232.903	1239.11	1.591065	3.09311
42	1241.215	1249.273	1235.921	1242.136	1.623249	3.094169
45	1232.988	1243.009	1224.905	1233.634	1.653213	3.091186
48	1231.502	1226.427	1228.883	1228.937	1.681241	3.08953
51	1208.178	1207.361	1213.498	1209.679	1.70757	3.08267
54	1232.011	1227.79	1243.485	1234.429	1.732394	3.091466
57	1198.293	1212.443	1209.292	1206.676	1.755875	3.081591
60	1248.784	1183.341	1178.685	1203.603	1.778151	3.080483
63	1203.644	1200.26	1197.454	1200.452	1.799341	3.079345
66	1205.176	1191.056	1191.678	1195.97	1.819544	3.07772
69	1165.334	1157.451	1157.945	1160.243	1.838849	3.064549
72	1191.704	1187.952	1180.232	1186.63	1.857332	3.074315
75	1184.471	1170.089	1161.311	1171.957	1.875061	3.068912
78	1198.581	1173.14	1167.044	1179.588	1.892095	3.07173
81	1229.909	1216.567	1198.382	1214.953	1.908485	3.084559
84	1179.532	1154.581	1136.431	1156.848	1.924279	3.063276
87	1195.389	1172.847	1160.297	1176.178	1.939519	3.070473
90	1144.021	1215.427	1169.314	1176.254	1.954243	3.070501
93	1165.898	1186.998	1160.888	1171.261	1.968483	3.068654
96	1117.731	1171.576	1134.963	1141.423	1.982271	3.057447
99	1125.517	1117.664	1163.416	1135.532	1.995635	3.055199
102	1155.745	1131.655	1195.277	1160.892	2.0086	3.064792
105	1207.693	1149.285	1197.949	1184.976	2.021189	3.073709
108	1168.886	1143.632	1145.439	1152.652	2.033424	3.061698
111	1139.385	1126.466	1156.745	1140.865	2.045323	3.057234
114	1170.835	1114.408	1196.107	1160.45	2.056905	3.064626
117	1159.524	1124.485	1122.826	1135.612	2.068186	3.05523
120	1140.07	1143.271	1118.836	1134.059	2.079181	3.054635
123	1141.734	1106.419	1104.81	1117.654	2.089905	3.048307
126	1160.962	1106.913	1119.667	1129.181	2.100371	3.052763
129	1143.058	1109.268	1095.399	1115.908	2.11059	3.047628
132	1082.359	1097.84	1101.679	1093.959	2.120574	3.039001
135	1110.531	1114.747	1079.415	1101.564	2.130334	3.04201
138	1096.582	1129.898	1046.928	1091.136	2.139879	3.037879
141	1097.849	1155.427	1045.174	1099.483	2.149219	3.041189
144	1107.272	1168.472	1058.201	1111.315	2.158362	3.045837
147	1140.75	1157.067	1068.67	1122.162	2.167317	3.050056
150	1144.707	1141.994	1086.951	1124.551	2.176091	3.050979

Sample 7131						
Image 8765		Particle O_9A		Approximate Particle size - 108.3585 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	861.8136	861.571	862.1278	861.8375	0.477121	2.935425
6	803.8477	802.631	803.4922	803.3236	0.778151	2.904891
9	797.3433	802.4692	807.7208	802.5111	0.954243	2.904451
12	787.3605	787.7122	798.7152	791.2626	1.079181	2.898321
15	777.1779	782.3801	786.8929	782.1503	1.176091	2.89329
18	776.4982	786.2231	781.5032	781.4082	1.255273	2.892878
21	778.1921	779.7543	785.2219	781.0561	1.322219	2.892682
24	787.554	775.7321	778.1461	780.4774	1.380211	2.89236
27	782.9707	766.3482	791.0532	780.124	1.431364	2.892164
30	761.0446	783.3939	777.3351	773.9245	1.477121	2.888699
33	773.2211	759.696	769.7654	767.5608	1.518514	2.885113
36	753.0894	758.5115	760.3905	757.3305	1.556303	2.879285
39	766.5086	789.6213	765.122	773.7506	1.591065	2.888601
42	769.343	786.7792	753.4627	769.8616	1.623249	2.886413
45	781.994	738.6086	742.3142	754.3056	1.653213	2.877547
48	764.3811	766.5609	771.0038	767.3153	1.681241	2.884974
51	759.7994	781.8698	771.0905	770.9199	1.70757	2.887009
54	748.6754	781.9756	765.3605	765.3372	1.732394	2.883853
57	773.2618	816.0264	764.7269	784.6717	1.755875	2.894688
60	753.7308	821.7945	767.7834	781.1029	1.778151	2.892708
63	747.4539	752.5265	738.4611	746.1472	1.799341	2.872824
66	744.6749	819.9761	774.5914	779.7475	1.819544	2.891954
69	721.838	756.2684	719.5746	732.5603	1.838849	2.864843
72	729.253	825.3779	771.1398	775.2569	1.857332	2.889446
75	739.4948	759.1534	764.9901	754.5461	1.875061	2.877686
78	731.061	797.5757	717.5325	748.7231	1.892095	2.874321
81	734.8441	778.7213	791.069	768.2115	1.908485	2.885481
84	701.3599	750.0733	755.9401	735.7911	1.924279	2.866755
87	733.0934	722.6627	759.1763	738.3108	1.939519	2.868239
90	732.3993	828.7296	729.2771	763.4687	1.954243	2.882791
93	743.1027	834.5046	701.1838	759.597	1.968483	2.880583
96	758.7625	845.7032	682.8956	762.4538	1.982271	2.882214
99	769.9949	777.3202	782.624	776.6464	1.995635	2.890223
102	725.1984	806.0491	783.4124	771.5533	2.0086	2.887366
105	699.7187	745.1956	776.8163	740.5769	2.021189	2.86957
108	686.0294	709.8008	766.924	720.9181	2.033424	2.857886
111	691.0491	672.4718	757.0903	706.8704	2.045323	2.84934
114	690.2434	803.8786	801.1536	765.0919	2.056905	2.883714
117	700.5866	809.897	800.3527	770.2788	2.068186	2.886648
120	700.6431	808.6412	789.5367	766.2737	2.079181	2.884384
123	616.8911	805.5687	723.1118	715.1905	2.089905	2.854422
126	624.377	809.4203	726.1974	719.9982	2.100371	2.857331
129	632.6422	817.1617	730.8915	726.8985	2.11059	2.861474
132	646.89	821.8369	739.4589	736.0619	2.120574	2.866914
135	658.57	800.1808	745.0569	734.6026	2.130334	2.866052
138	665.6936	750.7481	754.976	723.8059	2.139879	2.859622
141	683.0472	825.3643	760.2116	756.2077	2.149219	2.878641
144	680.2904	743.1419	767.2525	730.2283	2.158362	2.863459
147	677.6993	741.2626	756.9162	725.2927	2.167317	2.860513
150	659.0502	718.1266	750.6552	709.2773	2.176091	2.850816

Sample 7131						
Image 8765		Particle O_9B		Approximate Particle size - 143.9162 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1207.585	1211.044	1211.029	1209.886	0.477121	3.082744
6	1111.186	1113.349	1111.045	1111.86	0.778151	3.04605
9	1095.66	1097.7	1095.452	1096.271	0.954243	3.039918
12	1093.323	1094.975	1101.473	1096.59	1.079181	3.040044
15	1085.304	1093.922	1087.765	1088.997	1.176091	3.037027
18	1086.58	1083.024	1090.214	1086.606	1.255273	3.036072
21	1067.631	1092.406	1088.504	1082.847	1.322219	3.034567
24	1080.965	1072.598	1089.001	1080.854	1.380211	3.033767
27	1090.263	1077.452	1073.658	1080.457	1.431364	3.033608
30	1082.159	1062.383	1060.777	1068.44	1.477121	3.02875
33	1084.583	1068.955	1066.391	1073.31	1.518514	3.030725
36	1087.756	1070.345	1097.435	1085.179	1.556303	3.035501
39	1092.894	1062.28	1065.108	1073.427	1.591065	3.030773
42	1039.072	1055.786	1050.126	1048.328	1.623249	3.020497
45	1056.747	1060.135	1053.476	1056.786	1.653213	3.023987
48	1049.927	1060.365	1056.997	1055.763	1.681241	3.023566
51	1057.975	1074.785	1071.488	1068.083	1.70757	3.028605
54	1029.229	1044.938	1036.284	1036.817	1.732394	3.015702
57	1027.505	1031.806	1024.506	1027.939	1.755875	3.011967
60	1037.362	1030.55	1022.419	1030.11	1.778151	3.012884
63	1020.245	1036.848	1034.082	1030.392	1.799341	3.013002
66	1032.44	1047.762	1044.54	1041.581	1.819544	3.017693
69	1005.389	1015.014	1008.638	1009.68	1.838849	3.004184
72	1074.324	1020.008	1066.293	1053.542	1.857332	3.022652
75	1056.945	1004.035	996.6544	1019.212	1.875061	3.008264
78	1071.933	1086.9	1082.785	1080.539	1.892095	3.033641
81	1082.649	1001.743	998.6328	1027.675	1.908485	3.011856
84	1064.123	985.5551	1072.225	1040.634	1.924279	3.017298
87	1076.091	1031.299	981.5119	1029.634	1.939519	3.012683
90	1005.092	1034.853	1030.344	1023.43	1.954243	3.010058
93	940.7365	951.5298	1031.564	974.6102	1.968483	2.988831
96	1037.902	1054.863	1051.531	1048.099	1.982271	3.020402
99	1051.375	1046.149	1037	1044.841	1.995635	3.01905
102	1018.778	940.7961	936.4314	965.3353	2.0086	2.984678
105	1024.774	1033.274	1031.65	1029.899	2.021189	3.012795
108	1036.258	1046.541	1044.709	1042.503	2.033424	3.018077
111	1032.51	1051.654	1044.429	1042.864	2.045323	3.018228
114	1047.629	1061.908	1058.35	1055.962	2.056905	3.023648
117	1026.248	1010.982	1013.005	1016.745	2.068186	3.007212
120	1020.077	1004.113	1002.369	1008.853	2.079181	3.003828
123	1000.207	1008.499	1002.93	1003.879	2.089905	3.001681
126	1002.389	1013.362	1007.979	1007.91	2.100371	3.003422
129	1003.774	980.6422	977.3524	987.2561	2.11059	2.99443
132	980.6082	975.2485	968.6958	974.8508	2.120574	2.988938
135	971.235	983.9818	977.0312	977.416	2.130334	2.990079
138	971.4252	982.7655	975.9497	976.7135	2.139879	2.989767
141	966.1779	978.9469	971.2194	972.1147	2.149219	2.987718
144	983.1638	988.3397	986.6555	986.053	2.158362	2.9939
147	968.4642	985.3488	979.9711	977.928	2.167317	2.990307
150	964.1231	977.6907	973.9557	971.9232	2.176091	2.987632

Sample 7131						
Image 8766		Particle O_1		Approximate Particle size - 1019.971 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1632.468	1633.369	1632.078	1632.638	0.477121	3.21289
6	1471.256	1471.887	1472.631	1471.925	0.778151	3.167886
9	1406.711	1403.99	1401.324	1404.008	0.954243	3.14737
12	1396.77	1398.735	1392.364	1395.956	1.079181	3.144872
15	1394.582	1395.609	1391.265	1393.819	1.176091	3.144206
18	1371.413	1377.817	1370.775	1373.335	1.255273	3.137776
21	1366.084	1367.046	1379.292	1370.808	1.322219	3.136976
24	1376.178	1370.974	1382.474	1376.542	1.380211	3.138789
27	1366.09	1371.189	1368.341	1368.54	1.431364	3.136257
30	1366.331	1368.022	1366.657	1367.003	1.477121	3.13577
33	1346.172	1365.829	1359.035	1357.012	1.518514	3.132584
36	1358.832	1356.155	1354.942	1356.643	1.556303	3.132466
39	1331.311	1339.583	1349.383	1340.092	1.591065	3.127135
42	1330.915	1353.346	1351.202	1345.154	1.623249	3.128772
45	1348.779	1345.376	1361.443	1351.866	1.653213	3.130934
48	1340.707	1350.271	1350.884	1347.287	1.681241	3.12946
51	1319.05	1326.64	1324.03	1323.24	1.70757	3.121639
54	1354.056	1356.637	1349.724	1353.472	1.732394	3.131449
57	1329.427	1322.545	1318.733	1323.569	1.755875	3.121746
60	1306.465	1307.615	1302.994	1305.691	1.778151	3.11584
63	1331.771	1326.889	1321.882	1326.847	1.799341	3.122821
66	1319.6	1297.113	1356.878	1324.53	1.819544	3.122062
69	1330.621	1305.138	1303.102	1312.954	1.838849	3.118249
72	1356.74	1327.532	1302.381	1328.884	1.857332	3.123487
75	1348.22	1328.075	1325.464	1333.919	1.875061	3.12513
78	1334.445	1335.193	1326.209	1331.949	1.892095	3.124488
81	1340.613	1284.641	1279.989	1301.748	1.908485	3.114527
84	1285.801	1295.814	1288.688	1290.101	1.924279	3.110624
87	1343.797	1274.297	1280.852	1299.649	1.939519	3.113826
90	1339.259	1282.68	1271.16	1297.699	1.954243	3.113174
93	1302.789	1268.475	1255.139	1275.468	1.968483	3.10567
96	1279.198	1358.03	1349.906	1329.045	1.982271	3.12354
99	1303.549	1256.592	1356.629	1305.59	1.995635	3.115807
102	1280.068	1318.004	1314.618	1304.23	2.0086	3.115354
105	1342.552	1310.527	1301.463	1318.181	2.021189	3.119975
108	1353.662	1253.093	1257.118	1287.957	2.033424	3.109901
111	1367.713	1333.812	1333.168	1344.898	2.045323	3.128689
114	1332.906	1317.278	1311.926	1320.703	2.056905	3.120805
117	1308.157	1287.426	1286.713	1294.099	2.068186	3.111967
120	1321.842	1314.101	1301.179	1312.374	2.079181	3.118058
123	1338.322	1313.488	1307.749	1319.853	2.089905	3.120525
126	1268.1	1332.861	1325.562	1308.841	2.100371	3.116887
129	1272.59	1344.567	1338.903	1318.687	2.11059	3.120142
132	1280.025	1343.834	1351.285	1325.048	2.120574	3.122232
135	1288.725	1292.491	1289.238	1290.151	2.130334	3.110641
138	1311.028	1293.595	1291.131	1298.584	2.139879	3.11347
141	1399.203	1280.652	1280.024	1319.959	2.149219	3.120561
144	1349.863	1289.651	1282.368	1307.294	2.158362	3.116373
147	1330.024	1230.496	1256.066	1272.195	2.167317	3.104554
150	1275.584	1294.516	1287.49	1285.863	2.176091	3.109195

Sample 7131						
Image 8766		Particle O_2		Approximate Particle size - 1470.531 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1885.588	1881.854	1879.887	1882.443	0.477121	3.274722
6	1610.77	1607.78	1608.71	1609.087	0.778151	3.206579
9	1591.782	1579.736	1578.955	1583.491	0.954243	3.199616
12	1572.452	1581.182	1567.124	1573.586	1.079181	3.19689
15	1561.654	1563.678	1557.757	1561.03	1.176091	3.193411
18	1567.187	1556.057	1556.053	1559.766	1.255273	3.193059
21	1561.917	1552.079	1554.642	1556.213	1.322219	3.192069
24	1553.191	1561.95	1550.029	1555.057	1.380211	3.191746
27	1565.22	1555.28	1546.841	1555.78	1.431364	3.191948
30	1542.767	1547.809	1529.334	1539.97	1.477121	3.187512
33	1540.263	1543.55	1535.514	1539.776	1.518514	3.187457
36	1549.131	1547.471	1542.18	1546.261	1.556303	3.189283
39	1556.543	1543.409	1525.633	1541.862	1.591065	3.188045
42	1559.058	1554.691	1532.271	1548.673	1.623249	3.18996
45	1547.667	1555.078	1533.229	1545.325	1.653213	3.18902
48	1550.424	1543.382	1523.841	1539.216	1.681241	3.1873
51	1540.221	1527.204	1525.468	1530.964	1.70757	3.184965
54	1565.016	1583.269	1547.727	1565.337	1.732394	3.194608
57	1532.344	1520.802	1502.014	1518.387	1.755875	3.181382
60	1544.704	1551.153	1520.902	1538.919	1.778151	3.187216
63	1553.482	1553.31	1503.461	1536.751	1.799341	3.186603
66	1537.853	1553.755	1512.246	1534.618	1.819544	3.186
69	1526.38	1523.277	1499.178	1516.278	1.838849	3.180779
72	1540.924	1536.496	1490.377	1522.599	1.857332	3.182586
75	1521.299	1524.403	1521.192	1522.298	1.875061	3.1825
78	1522.152	1502.645	1540.345	1521.714	1.892095	3.182333
81	1495.259	1517.111	1490.565	1500.978	1.908485	3.176374
84	1498.329	1509.352	1541.114	1516.265	1.924279	3.180775
87	1548.088	1560.997	1502.962	1537.349	1.939519	3.186772
90	1525.242	1486.819	1470.855	1494.306	1.954243	3.174439
93	1516.291	1595.407	1545.949	1552.549	1.968483	3.191045
96	1522.5	1523.187	1516.996	1520.894	1.982271	3.182099
99	1554.33	1515.016	1590.788	1553.378	1.995635	3.191277
102	1502.252	1482.582	1459.404	1481.413	2.0086	3.170676
105	1531.645	1593.28	1587.374	1570.766	2.021189	3.196112
108	1501.882	1470.252	1442.295	1471.476	2.033424	3.167753
111	1512.748	1473.388	1574.432	1520.189	2.045323	3.181898
114	1518.997	1618.453	1577.844	1571.765	2.056905	3.196388
117	1584.777	1612.839	1562.982	1586.866	2.068186	3.20054
120	1503.622	1454.195	1550.222	1502.68	2.079181	3.176866
123	1541.947	1575.02	1548.297	1555.088	2.089905	3.191755
126	1538.311	1537.124	1504.145	1526.527	2.100371	3.183704
129	1534.473	1616.286	1430.836	1527.198	2.11059	3.183895
132	1517.433	1622.648	1577.994	1572.691	2.120574	3.196644
135	1516.05	1597.664	1554.092	1555.935	2.130334	3.191992
138	1510.096	1560.749	1526.541	1532.462	2.139879	3.18539
141	1497.966	1467.242	1437.376	1467.528	2.149219	3.166586
144	1475.035	1447.824	1599.962	1507.607	2.158362	3.178288
147	1523.927	1636.213	1595.477	1585.206	2.167317	3.200086
150	1509.245	1559.298	1548.202	1538.915	2.176091	3.187215

Sample 7131						
Image 8766		Particle O_3A		Approximate Particle size - 807.7935 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	750.9945	750.7027	752.2263	751.3078	0.477121	2.875818
6	698.6099	692.9572	696.8479	696.1383	0.778151	2.842696
9	696.819	687.8978	695.91	693.5423	0.954243	2.841073
12	687.574	682.7623	684.9738	685.1034	1.079181	2.835756
15	681.2088	679.5102	682.4639	681.061	1.176091	2.833186
18	678.5706	671.0876	680.5206	676.7263	1.255273	2.830413
21	675.1447	672.5771	674.5254	674.0824	1.322219	2.828713
24	687.887	680.5214	686.9671	685.1252	1.380211	2.83577
27	655.0104	653.587	664.0734	657.5569	1.431364	2.817933
30	668.6288	666.4418	685.7184	673.5963	1.477121	2.8284
33	677.9712	686.9694	649.8658	671.6021	1.518514	2.827112
36	658.3745	640.9471	663.3917	654.2378	1.556303	2.815736
39	648.1292	657.7695	664.1002	656.6663	1.591065	2.817345
42	653.4858	638.8442	648.4938	646.9413	1.623249	2.810865
45	631.3033	651.3865	642.1271	641.6056	1.653213	2.807268
48	642.9518	655.0201	647.3223	648.4314	1.681241	2.811864
51	663.4352	670.9892	635.6875	656.704	1.70757	2.81737
54	611.7137	636.785	644.8249	631.1079	1.732394	2.800104
57	618.0982	593.2148	632.8732	614.7287	1.755875	2.788684
60	627.0595	620.7847	643.3553	630.3998	1.778151	2.799616
63	641.0525	626.7473	650.8058	639.5352	1.799341	2.805864
66	602.3815	631.1329	608.8601	614.1248	1.819544	2.788257
69	607.5031	591.9086	609.7505	603.0541	1.838849	2.780356
72	592.9481	591.1008	610.4921	598.1803	1.857332	2.776832
75	604.4152	619.2509	637.6786	620.4482	1.875061	2.792706
78	612.8706	659.4829	618.7425	630.3653	1.892095	2.799592
81	615.5146	589.3459	605.0481	603.3029	1.908485	2.780535
84	623.669	653.8266	620.7404	632.7453	1.924279	2.801229
87	551.0268	660.7637	617.1682	609.6529	1.939519	2.785083
90	566.2287	667.2206	621.9872	618.4788	1.954243	2.791325
93	568.0505	666.5215	619.3605	617.9775	1.968483	2.790973
96	572.429	677.503	630.9753	626.9691	1.982271	2.797246
99	580.2982	685.6874	638.8938	634.9598	1.995635	2.802746
102	577.5154	649.7803	686.546	637.9472	2.0086	2.804785
105	579.1197	583.8627	664.0679	609.0168	2.021189	2.784629
108	585.5084	586.5631	605.9481	592.6732	2.033424	2.772815
111	573.1335	583.6228	596.9612	584.5725	2.045323	2.766838
114	586.9446	541.275	610.0114	579.4103	2.056905	2.762986
117	589.2011	540.5897	620.7669	583.5192	2.068186	2.766055
120	598.295	535.0998	690.8801	608.0916	2.079181	2.783969
123	607.334	494.9318	586.1638	562.8099	2.089905	2.750362
126	606.3382	491.6504	579.1405	559.043	2.100371	2.747445
129	615.1731	496.4164	452.9757	521.5217	2.11059	2.717272
132	488.254	503.1828	457.0095	482.8154	2.120574	2.683781
135	491.9558	513.019	465.1544	490.0431	2.130334	2.690234
138	490.4346	515.2944	477.4413	494.3901	2.139879	2.69407
141	493.1873	527.9146	476.1943	499.0987	2.149219	2.698186
144	503.0651	529.2858	489.9339	507.4283	2.158362	2.705375
147	503.7314	530.3162	489.0034	507.6837	2.167317	2.705593
150	511.2079	527.3145	485.5117	508.0114	2.176091	2.705873

Sample 7131						
Image 8766		Particle O_3B		Approximate Particle size - 1657.379 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1408.301	1400.773	1398.964	1402.68	0.477121	3.146958
6	1357.888	1352.987	1350.086	1353.654	0.778151	3.131508
9	1336.048	1326.879	1322.93	1328.619	0.954243	3.1234
12	1337.931	1326.842	1323.515	1329.429	1.079181	3.123665
15	1334.462	1316.643	1317.051	1322.719	1.176091	3.121467
18	1324.068	1317.56	1319.493	1320.374	1.255273	3.120697
21	1324.829	1312.159	1310.462	1315.817	1.322219	3.119195
24	1360.472	1315.752	1318.412	1331.545	1.380211	3.124356
27	1316.948	1296.857	1300.337	1304.714	1.431364	3.115515
30	1343.492	1299.372	1291.404	1311.423	1.477121	3.117743
33	1303.944	1294.45	1293.114	1297.169	1.518514	3.112997
36	1294.502	1294.322	1295.648	1294.824	1.556303	3.112211
39	1343.521	1305.288	1293.449	1314.086	1.591065	3.118624
42	1305.117	1293.5	1293.176	1297.264	1.623249	3.113028
45	1340.685	1302.69	1301.632	1315.002	1.653213	3.118927
48	1300.273	1288.823	1295.759	1294.952	1.681241	3.112254
51	1357.691	1294.53	1291.351	1314.524	1.70757	3.118769
54	1298.866	1294.286	1284.319	1292.49	1.732394	3.111427
57	1301.827	1283.561	1292.423	1292.604	1.755875	3.111465
60	1329.775	1284.612	1269.66	1294.682	1.778151	3.112163
63	1361.712	1287.795	1292.25	1313.919	1.799341	3.118569
66	1361.454	1277.619	1278.851	1305.975	1.819544	3.115935
69	1287.133	1285.055	1292.292	1288.16	1.838849	3.10997
72	1349.596	1284.716	1293.335	1309.216	1.857332	3.117011
75	1344.801	1290.257	1282.24	1305.766	1.875061	3.115865
78	1272.139	1293.01	1295.747	1286.966	1.892095	3.109567
81	1344.307	1293.936	1279.492	1305.911	1.908485	3.115914
84	1325.559	1273.362	1262.332	1287.085	1.924279	3.109607
87	1294.49	1265.857	1257.908	1272.752	1.939519	3.104744
90	1344.775	1278.572	1248.471	1290.606	1.954243	3.110794
93	1328.482	1262.26	1265.113	1285.285	1.968483	3.108999
96	1286.843	1250.111	1259.758	1265.571	1.982271	3.102286
99	1304.664	1218.577	1224.772	1249.338	1.995635	3.09668
102	1305.96	1249.077	1254.837	1269.958	2.0086	3.103789
105	1279.825	1247.057	1252.335	1259.739	2.021189	3.100281
108	1241.817	1244.723	1249.267	1245.269	2.033424	3.095263
111	1324.019	1220.288	1235.152	1259.82	2.045323	3.100308
114	1319.085	1230.222	1247.103	1265.47	2.056905	3.102252
117	1301.36	1246.41	1252.41	1266.727	2.068186	3.102683
120	1303.326	1232.956	1236.988	1257.757	2.079181	3.099597
123	1308.668	1273.147	1277.075	1286.297	2.089905	3.109341
126	1301.418	1265.439	1271.37	1279.409	2.100371	3.107009
129	1235.454	1264.393	1270.312	1256.72	2.11059	3.099238
132	1295.491	1211.871	1218.394	1241.919	2.120574	3.094093
135	1276.542	1229.903	1237.841	1248.096	2.130334	3.096248
138	1235.619	1242.621	1261.162	1246.467	2.139879	3.095681
141	1236.59	1259.606	1274.72	1256.972	2.149219	3.099326
144	1235.621	1261.832	1265.165	1254.206	2.158362	3.098369
147	1247.678	1296.466	1247.65	1263.931	2.167317	3.101723
150	1272.358	1269.048	1114.461	1218.622	2.176091	3.085869

Sample 7131						
Image 8766		Particle O_4A		Approximate Particle size - 1093.522 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1674.892	1673.266	1673.591	1673.916	0.477121	3.223734
6	1610.653	1615.239	1608.117	1611.336	0.778151	3.207186
9	1594.195	1599.331	1592.949	1595.492	0.954243	3.202894
12	1587.755	1586.026	1585.285	1586.355	1.079181	3.2004
15	1581.934	1587.005	1582.716	1583.885	1.176091	3.199724
18	1575.719	1585.176	1568.251	1576.382	1.255273	3.197661
21	1581.642	1599.783	1583.539	1588.321	1.322219	3.200938
24	1574.633	1580.582	1573.399	1576.205	1.380211	3.197613
27	1572.378	1613.729	1574.397	1586.834	1.431364	3.200532
30	1584.455	1568.374	1556.76	1569.863	1.477121	3.195862
33	1619.726	1589.942	1549.693	1586.454	1.518514	3.200427
36	1572.155	1611.285	1548.809	1577.416	1.556303	3.197946
39	1610.615	1574.892	1550.804	1578.77	1.591065	3.198319
42	1516.838	1606.712	1569.052	1564.201	1.623249	3.194292
45	1579.969	1555.047	1540.604	1558.54	1.653213	3.192718
48	1549.903	1573.701	1554.874	1559.493	1.681241	3.192983
51	1557.367	1517.242	1541.388	1538.666	1.70757	3.187144
54	1546.499	1648.617	1548.388	1581.168	1.732394	3.198978
57	1543.263	1518.921	1556.164	1539.449	1.755875	3.187365
60	1647.864	1618.612	1566.945	1611.14	1.778151	3.207133
63	1615.978	1638.906	1556.533	1603.805	1.799341	3.205152
66	1601.093	1584.012	1507.424	1564.176	1.819544	3.194286
69	1580.603	1551.092	1552.4	1561.365	1.838849	3.193504
72	1536.199	1619.605	1535.306	1563.703	1.857332	3.194154
75	1568.869	1602.906	1574.147	1581.974	1.875061	3.199199
78	1495.29	1658.419	1486.363	1546.691	1.892095	3.189404
81	1592.936	1582.73	1527.98	1567.882	1.908485	3.195313
84	1598.363	1551.4	1514.651	1554.804	1.924279	3.191676
87	1587.096	1565.482	1498.648	1550.409	1.939519	3.190446
90	1598.271	1561.841	1498.059	1552.724	1.954243	3.191094
93	1541.13	1630.885	1552.749	1574.922	1.968483	3.197259
96	1537.698	1653.485	1551.365	1580.849	1.982271	3.19889
99	1505.61	1586.04	1520.965	1537.538	1.995635	3.186826
102	1500.096	1482.079	1442.295	1474.823	2.0086	3.16874
105	1488.891	1460.443	1507.925	1485.753	2.021189	3.171947
108	1480.444	1443.093	1479.481	1467.673	2.033424	3.166629
111	1475.796	1590.434	1488.805	1518.345	2.045323	3.18137
114	1568.427	1545.767	1429.61	1514.601	2.056905	3.180298
117	1557.351	1500.574	1495.115	1517.68	2.068186	3.18118
120	1559.537	1498.979	1496.541	1518.352	2.079181	3.181373
123	1546.712	1664.253	1505.263	1572.076	2.089905	3.196474
126	1360.001	1466.839	1486.407	1437.749	2.100371	3.157683
129	1359.521	1661.63	1495.337	1505.496	2.11059	3.17768
132	1543.444	1526.938	1498.978	1523.12	2.120574	3.182734
135	1547.072	1522.55	1499.186	1522.936	2.130334	3.182682
138	1555.431	1520.34	1517.331	1531.034	2.139879	3.184985
141	1566.798	1531.759	1534.137	1544.232	2.149219	3.188712
144	1554.226	1528.18	1529.837	1537.415	2.158362	3.186791
147	1506.277	1489.639	1664.601	1553.506	2.167317	3.191313
150	1441.463	1407.111	1596.215	1481.596	2.176091	3.17073

Sample 7131						
Image 8766		Particle O_4B		Approximate Particle size - 42.79591 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	639.3583	639.4828	641.6911	640.1774	0.477121	2.8063
6	601.4652	599.888	603.798	601.7171	0.778151	2.779392
9	592.6393	601.6322	600.3816	598.2177	0.954243	2.776859
12	585.9323	586.9217	594.2803	589.0448	1.079181	2.770148
15	586.0031	586.2823	589.6282	587.3045	1.176091	2.768863
18	590.5302	583.0807	597.3879	590.3329	1.255273	2.771097
21	581.1353	609.6663	587.2892	592.6969	1.322219	2.772833
24	583.6727	582.4113	583.0583	583.0474	1.380211	2.765704
27	578.3727	612.0386	592.7408	594.384	1.431364	2.774067
30	587.6752	579.3423	574.461	580.4928	1.477121	2.763797
33	569.9539	609.3658	589.1837	589.5011	1.518514	2.770485
36	565.2894	599.69	575.822	580.2671	1.556303	2.763628
39	577.2316	549.4002	586.0653	570.899	1.591065	2.756559
42	564.054	602.0637	573.3525	579.8234	1.623249	2.763296
45	595.3124	592.0181	583.0013	590.1106	1.653213	2.770933
48	549.676	560.2162	555.2855	555.0592	1.681241	2.744339
51	565.0554	529.028	551.9673	548.6836	1.70757	2.739322
54	583.1724	571.7379	568.0808	574.3304	1.732394	2.759162
57	553.8046	587.4436	581.7686	574.3389	1.755875	2.759168
60	547.5509	569.1864	540.0552	552.2642	1.778151	2.742147
63	544.4877	528.6842	535.5309	536.2343	1.799341	2.729355
66	598.8172	582.9826	540.0076	573.9358	1.819544	2.758863
69	587.7981	575.6724	551.9963	571.8223	1.838849	2.757261
72	564.4287	583.5228	560.9449	569.6321	1.857332	2.755594
75	549.811	593.4793	568.0768	570.4557	1.875061	2.756222
78	538.0221	550.4125	528.218	538.8842	1.892095	2.731495
81	532.0101	549.5088	512.8414	531.4534	1.908485	2.725465
84	535.2322	510.3784	510.5766	518.7291	1.924279	2.714941
87	613.0206	602.2644	513.2981	576.1944	1.939519	2.760569
90	610.7534	608.2766	522.6523	580.5608	1.954243	2.763848
93	485.8516	621.8304	531.153	546.2783	1.968483	2.737414
96	538.2369	621.5901	544.1378	567.9883	1.982271	2.754339
99	550.3979	592.9194	547.3768	563.5647	1.995635	2.750944
102	546.4308	575.0033	534.1847	551.8729	2.0086	2.741839
105	546.1606	580.3071	539.4576	555.3084	2.021189	2.744534
108	503.6752	541.2583	545.2167	530.0501	2.033424	2.724317
111	493.3606	543.4445	537.5314	524.7788	2.045323	2.719976
114	489.034	540.769	500.0402	509.9477	2.056905	2.707526
117	495.2085	543.9023	492.7546	510.6218	2.068186	2.708099
120	540.5974	545.5193	480.4032	522.1733	2.079181	2.717815
123	506.8422	553.7428	489.5823	516.7224	2.089905	2.713257
126	501.3165	564.1308	452.8727	506.1067	2.100371	2.704242
129	502.2949	574.984	453.6924	510.3238	2.11059	2.707846
132	450.3447	487.7893	456.9691	465.0344	2.120574	2.667485
135	448.9366	476.6145	432.6109	452.7207	2.130334	2.65583
138	445.2076	465.9483	438.6811	449.9457	2.139879	2.65316
141	445.4142	465.4156	442.831	451.2203	2.149219	2.654389
144	447.713	462.4207	445.863	451.9989	2.158362	2.655137
147	451.55	460.8965	427.8732	446.7732	2.167317	2.650087
150	453.1724	461.666	430.7581	448.5322	2.176091	2.651794

Sample 7131						
Image 8766		Particle O_5A		Approximate Particle size - 174.6128 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1771.567	1771.908	1772.981	1772.152	0.477121	3.248501
6	1420.872	1417.485	1423.792	1420.716	0.778151	3.152507
9	1366.483	1365.056	1366.577	1366.039	0.954243	3.135463
12	1345.655	1344.148	1344.439	1344.748	1.079181	3.128641
15	1349.933	1349.659	1349.814	1349.802	1.176091	3.13027
18	1339.996	1337.417	1338.739	1338.717	1.255273	3.126689
21	1331.776	1329.503	1337.061	1332.78	1.322219	3.124758
24	1324.893	1327.734	1327.171	1326.599	1.380211	3.12274
27	1330.126	1336.68	1330.361	1332.389	1.431364	3.124631
30	1318.121	1329.777	1330.764	1326.221	1.477121	3.122616
33	1342.203	1329.869	1331.139	1334.404	1.518514	3.125287
36	1312.217	1316.055	1312.762	1313.678	1.556303	3.118489
39	1305.722	1297.834	1307.162	1303.573	1.591065	3.115135
42	1318.273	1297.505	1312.382	1309.387	1.623249	3.117068
45	1317.987	1296.912	1299.528	1304.809	1.653213	3.115547
48	1306.128	1295.368	1314.538	1305.345	1.681241	3.115725
51	1316.65	1298.275	1305.012	1306.646	1.70757	3.116158
54	1320.049	1314.063	1292.787	1308.967	1.732394	3.116929
57	1291.355	1303.85	1320.271	1305.159	1.755875	3.115663
60	1294.959	1296.664	1293.605	1295.076	1.778151	3.112295
63	1318.394	1291.309	1302.032	1303.911	1.799341	3.115248
66	1306.209	1281.973	1291.002	1293.061	1.819544	3.111619
69	1305.315	1287.547	1291.481	1294.781	1.838849	3.112196
72	1269.461	1292.15	1265.296	1275.636	1.857332	3.105727
75	1322.253	1283.542	1309.65	1305.148	1.875061	3.11566
78	1326.646	1289.796	1271.726	1296.056	1.892095	3.112624
81	1299.814	1261.166	1302.723	1287.901	1.908485	3.109882
84	1311.709	1276.097	1264.452	1284.086	1.924279	3.108594
87	1255.126	1295.114	1273.349	1274.53	1.939519	3.10535
90	1330.973	1297.578	1247.468	1292.006	1.954243	3.111265
93	1309.38	1279.294	1248.462	1279.045	1.968483	3.106886
96	1272.739	1265.881	1300.655	1279.758	1.982271	3.107128
99	1289.583	1263.584	1310.322	1287.83	1.995635	3.109858
102	1291.114	1275.945	1265.916	1277.658	2.0086	3.106415
105	1301.361	1251.593	1267.143	1273.366	2.021189	3.104953
108	1255.76	1244.538	1249.268	1249.855	2.033424	3.09686
111	1250.85	1257.339	1194.511	1234.233	2.045323	3.091397
114	1339.776	1303.251	1210.48	1284.502	2.056905	3.108735
117	1342.729	1317.702	1206.053	1288.828	2.068186	3.110195
120	1332.397	1224.862	1259.644	1272.301	2.079181	3.10459
123	1219.69	1228.084	1275.313	1241.029	2.089905	3.093782
126	1228.018	1208.92	1299.486	1245.474	2.100371	3.095335
129	1242.221	1184.503	1242.073	1222.933	2.11059	3.087402
132	1200.602	1233.035	1217.278	1216.972	2.120574	3.08528
135	1247.317	1233.54	1226.784	1235.88	2.130334	3.091976
138	1216.153	1185.494	1215.223	1205.623	2.139879	3.081212
141	1261.283	1182.923	1227.535	1223.914	2.149219	3.087751
144	1274.416	1193.966	1258.634	1242.339	2.158362	3.09424
147	1291.802	1217.702	1270.127	1259.877	2.167317	3.100328
150	1308.475	1245.102	1293.549	1282.375	2.176091	3.108015

Sample 7131						
Image 8766		Particle O_5B		Approximate Particle size - 83.99415 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	838.8857	841.3186	839.688	839.9641	0.477121	2.924261
6	687.8595	692.59	687.3568	689.2688	0.778151	2.838389
9	663.7939	667.4061	659.3181	663.506	0.954243	2.821845
12	653.914	661.6147	658.6357	658.0548	1.079181	2.818262
15	650.6204	654.6443	656.4108	653.8918	1.176091	2.815506
18	645.8981	654.5725	654.7713	651.7473	1.255273	2.814079
21	648.8896	644.0759	641.6141	644.8599	1.322219	2.809465
24	642.072	645.0429	645.5148	644.2099	1.380211	2.809027
27	629.7377	630.3514	637.108	632.399	1.431364	2.800991
30	629.0416	646.6479	639.1954	638.295	1.477121	2.805021
33	666.9702	644.9488	646.7047	652.8746	1.518514	2.81483
36	631.074	630.4444	640.7677	634.0954	1.556303	2.802155
39	626.9485	636.2316	623.0949	628.7583	1.591065	2.798484
42	613.1813	623.2524	633.604	623.3459	1.623249	2.794729
45	618.3445	627.8046	627.2393	624.4628	1.653213	2.795507
48	628.9531	632.8849	620.6664	627.5015	1.681241	2.797615
51	653.9487	622.3273	630.2374	635.5045	1.70757	2.803119
54	615.838	617.7169	630.6271	621.394	1.732394	2.793367
57	631.9413	651.5506	614.0513	632.5144	1.755875	2.80107
60	617.3229	624.5955	622.9449	621.6211	1.778151	2.793526
63	614.7116	630.413	657.9457	634.3568	1.799341	2.802334
66	631.3122	636.1847	627.9055	631.8008	1.819544	2.80058
69	610.6302	619.356	625.2375	618.4079	1.838849	2.791275
72	640.8104	622.2635	621.8373	628.3037	1.857332	2.79817
75	663.3324	633.1144	604.8745	633.7738	1.875061	2.801934
78	598.4783	652.4657	591.0031	613.9824	1.892095	2.788156
81	623.6637	592.8793	606.6932	607.7454	1.908485	2.783722
84	618.8004	628.7505	610.1719	619.2409	1.924279	2.79186
87	635.2936	610.6539	639.1368	628.3614	1.939519	2.79821
90	637.776	610.5818	636.2756	628.2111	1.954243	2.798106
93	625.8021	622.1736	583.1999	610.3919	1.968483	2.785609
96	632.2161	588.5593	592.6603	604.4786	1.982271	2.781381
99	632.1097	573.3071	600.0439	601.8202	1.995635	2.779467
102	601.1233	570.1113	603.8069	591.6805	2.0086	2.772087
105	602.3497	581.825	602.1067	595.4271	2.021189	2.774829
108	548.4018	583.0278	602.1219	577.8505	2.033424	2.761815
111	549.8697	580.6987	578.7877	569.7854	2.045323	2.755711
114	542.3446	619.5316	512.4603	558.1122	2.056905	2.746721
117	547.4711	612.2939	502.5817	554.1156	2.068186	2.7436
120	562.3033	623.7883	503.9251	563.3389	2.079181	2.75077
123	579.2043	543.0481	498.0267	540.093	2.089905	2.732469
126	563.3008	542.7859	522.2834	542.79	2.100371	2.734632
129	566.178	546.4962	532.321	548.3317	2.11059	2.739043
132	556.3681	542.7825	536.9075	545.3527	2.120574	2.736677
135	667.0788	532.1346	540.0775	579.7636	2.130334	2.763251
138	675.6462	530.6241	535.7366	580.669	2.139879	2.763929
141	680.483	538.6138	543.4817	587.5262	2.149219	2.769027
144	690.2347	544.5956	550.4224	595.0842	2.158362	2.774578
147	700.9066	555.2714	559.9222	605.3667	2.167317	2.782019
150	707.8526	561.3297	566.5634	611.9152	2.176091	2.786691

Sample 7131						
Image 8767		Particle O_1		Approximate Particle size - 1577.399 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1763.98	1762.006	1763.799	1763.262	0.477121	3.246317
6	1697.441	1696.812	1697.669	1697.307	0.778151	3.229761
9	1682.59	1678.582	1680.915	1680.696	0.954243	3.225489
12	1679.887	1676.638	1672.661	1676.395	1.079181	3.224376
15	1665.502	1661.361	1663.465	1663.443	1.176091	3.221008
18	1672.98	1666.324	1670.821	1670.042	1.255273	3.222727
21	1661.993	1652.243	1648.195	1654.144	1.322219	3.218573
24	1651.577	1650.537	1644.479	1648.864	1.380211	3.217185
27	1656.118	1644.496	1643.629	1648.081	1.431364	3.216979
30	1666.083	1656.218	1654.403	1658.902	1.477121	3.219821
33	1646.055	1650.063	1652.648	1649.588	1.518514	3.217376
36	1639.826	1648.679	1632.461	1640.322	1.556303	3.214929
39	1641.356	1649.463	1653.534	1648.118	1.591065	3.216988
42	1660.195	1632.145	1644.406	1645.582	1.623249	3.21632
45	1635.746	1628.242	1619.726	1627.904	1.653213	3.211629
48	1604.832	1623.273	1632.423	1620.176	1.681241	3.209562
51	1642.435	1614.214	1625.108	1627.252	1.70757	3.211455
54	1636.166	1619.644	1618.791	1624.867	1.732394	3.210818
57	1632.5	1615.792	1616.284	1621.525	1.755875	3.209924
60	1628.253	1609.256	1607.392	1614.967	1.778151	3.208164
63	1621.722	1620.812	1629.182	1623.905	1.799341	3.210561
66	1628.707	1608.335	1611.706	1616.249	1.819544	3.208508
69	1622.053	1593.086	1607.502	1607.547	1.838849	3.206164
72	1615.199	1617.031	1623.762	1618.664	1.857332	3.209157
75	1606.884	1619.361	1597.519	1607.922	1.875061	3.206265
78	1597.96	1593.363	1631.43	1607.584	1.892095	3.206174
81	1662.597	1598.281	1591.249	1617.376	1.908485	3.208811
84	1587.132	1588.2	1616.614	1597.316	1.924279	3.203391
87	1644.649	1599.945	1627.88	1624.158	1.939519	3.210628
90	1589.076	1583.992	1585.095	1586.054	1.954243	3.200318
93	1636.361	1575.268	1617.156	1609.595	1.968483	3.206717
96	1571.912	1594.329	1605.902	1590.714	1.982271	3.201592
99	1656.587	1558.917	1617.599	1611.034	1.995635	3.207105
102	1647.651	1568.38	1611.854	1609.295	2.0086	3.206636
105	1660.334	1611.136	1610.729	1627.399	2.021189	3.211494
108	1652.917	1611.208	1567.778	1610.634	2.033424	3.206997
111	1693.776	1584.293	1616.648	1631.572	2.045323	3.212606
114	1622.501	1576.793	1579.753	1593.016	2.056905	3.20222
117	1647.875	1591.557	1585.86	1608.431	2.068186	3.206402
120	1662.908	1622.737	1598.463	1628.036	2.079181	3.211664
123	1661.907	1591.546	1602.272	1618.575	2.089905	3.209133
126	1590.272	1553.773	1600.345	1581.463	2.100371	3.199059
129	1643.078	1606.189	1575.646	1608.304	2.11059	3.206368
132	1645.067	1599.822	1597.67	1614.186	2.120574	3.207954
135	1624.899	1578.169	1597.611	1600.227	2.130334	3.204181
138	1557.356	1553.88	1546.824	1552.686	2.139879	3.191084
141	1563.378	1620.223	1612.442	1598.681	2.149219	3.203762
144	1648.258	1579.968	1609.831	1612.686	2.158362	3.20755
147	1651.426	1577.19	1582.044	1603.553	2.167317	3.205083
150	1577.137	1576.534	1568.21	1573.96	2.176091	3.196994

Sample 7131						
Image 8767		Particle O_2		Approximate Particle size - 1705.504 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1600.332	1599.904	1600.227	1600.155	0.477121	3.204162
6	1467.867	1468.685	1467.762	1468.105	0.778151	3.166757
9	1457.044	1457.76	1457.869	1457.558	0.954243	3.163626
12	1450.773	1450.948	1450.334	1450.685	1.079181	3.161573
15	1445.156	1452.665	1445.886	1447.902	1.176091	3.160739
18	1442.308	1445.574	1439.167	1442.35	1.255273	3.159071
21	1434.388	1447.477	1445.872	1442.579	1.322219	3.15914
24	1435.382	1433.058	1441.24	1436.56	1.380211	3.157324
27	1436.099	1443.487	1436.739	1438.775	1.431364	3.157993
30	1436.861	1441.583	1437.833	1438.759	1.477121	3.157988
33	1440.057	1437.018	1435.509	1437.528	1.518514	3.157616
36	1430.158	1447.895	1428.354	1435.469	1.556303	3.156994
39	1432.609	1444.895	1432.216	1436.573	1.591065	3.157328
42	1417.908	1435.728	1433.298	1428.978	1.623249	3.155026
45	1447.577	1440.293	1432.317	1440.062	1.653213	3.158381
48	1418.189	1426.371	1434.873	1426.478	1.681241	3.154265
51	1423.972	1433.299	1423.376	1426.882	1.70757	3.154388
54	1445.283	1423.075	1420.107	1429.488	1.732394	3.155181
57	1459.032	1436.716	1427.623	1441.124	1.755875	3.158701
60	1428.658	1430.899	1411.147	1423.568	1.778151	3.153378
63	1443.353	1429.848	1403.664	1425.621	1.799341	3.154004
66	1410.195	1432.425	1401.631	1414.75	1.819544	3.15068
69	1438.282	1423.056	1428.291	1429.876	1.838849	3.155299
72	1449.138	1413.173	1410.287	1424.2	1.857332	3.153571
75	1407.569	1395.616	1405.05	1402.745	1.875061	3.146979
78	1430.094	1416.712	1411.381	1419.396	1.892095	3.152103
81	1435.824	1424.877	1410.994	1423.898	1.908485	3.153479
84	1394.427	1408.066	1410.781	1404.425	1.924279	3.147498
87	1439.79	1422.038	1411.19	1424.339	1.939519	3.153613
90	1385.054	1406.008	1410.406	1400.489	1.954243	3.14628
93	1428.674	1407.516	1426.603	1420.931	1.968483	3.152573
96	1393.459	1398.601	1429.302	1407.121	1.982271	3.148331
99	1436.927	1389.778	1479.314	1435.34	1.995635	3.156955
102	1379.872	1391.443	1388.792	1386.703	2.0086	3.141983
105	1420.915	1388.185	1398.638	1402.58	2.021189	3.146927
108	1363.678	1393.279	1397.39	1384.782	2.033424	3.141381
111	1432.216	1416.726	1387.835	1412.259	2.045323	3.149914
114	1424.451	1381.067	1409.412	1404.977	2.056905	3.147669
117	1392.558	1371.514	1373.877	1379.316	2.068186	3.139664
120	1344.069	1390.672	1369.409	1368.05	2.079181	3.136102
123	1388.686	1417.053	1449.892	1418.544	2.089905	3.151843
126	1387.152	1375.614	1398.494	1387.087	2.100371	3.142104
129	1379.869	1376.746	1381.939	1379.518	2.11059	3.139727
132	1361.29	1383.054	1356.228	1366.857	2.120574	3.135723
135	1445.045	1385.263	1448.087	1426.131	2.130334	3.15416
138	1412.537	1426.775	1364.881	1401.397	2.139879	3.146561
141	1393.716	1350.236	1324.246	1356.066	2.149219	3.132281
144	1336.002	1345.575	1453.837	1378.471	2.158362	3.139398
147	1339.311	1354.94	1337.881	1344.044	2.167317	3.128413
150	1399.542	1394.732	1313.65	1369.308	2.176091	3.136501

Sample 7131						
Image 8767		Particle O_3A		Approximate Particle size - 659.6201 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	648.9975	648.9975	648.1395	648.7115	0.477121	2.812052
6	621.6833	621.6833	625.2541	622.8736	0.778151	2.7944
9	614.1878	614.1878	614.0991	614.1582	0.954243	2.78828
12	612.2477	612.2477	613.1039	612.5331	1.079181	2.78713
15	612.3029	612.3029	606.8165	610.4741	1.176091	2.785667
18	604.1352	604.1352	604.053	604.1078	1.255273	2.781114
21	603.6819	603.6819	617.082	608.1486	1.322219	2.78401
24	614.8783	614.8783	619.6985	616.485	1.380211	2.789923
27	600.6543	600.6543	613.6325	604.9804	1.431364	2.781741
30	599.8334	599.8334	607.0046	602.2238	1.477121	2.779758
33	602.9675	602.9675	591.2572	599.0641	1.518514	2.777473
36	594.0468	594.0468	616.0386	601.3774	1.556303	2.779147
39	594.8788	594.8788	593.7921	594.5166	1.591065	2.774164
42	605.3815	605.3815	626.5176	612.4269	1.623249	2.787054
45	596.6191	596.6191	607.7894	600.3425	1.653213	2.778399
48	585.2944	585.2944	613.8502	594.813	1.681241	2.77438
51	578.721	578.721	619.5459	592.3293	1.70757	2.772563
54	589.5026	589.5026	617.0288	598.678	1.732394	2.777193
57	595.9106	595.9106	585.597	592.4727	1.755875	2.772668
60	587.176	587.176	589.9183	588.0901	1.778151	2.769444
63	597.5051	597.5051	607.46	600.8234	1.799341	2.778747
66	586.91	586.91	589.1073	587.6424	1.819544	2.769113
69	561.8214	561.8214	601.4361	575.0263	1.838849	2.759688
72	590.7397	590.7397	560.3143	580.5979	1.857332	2.763875
75	582.0625	582.0625	555.0561	573.0604	1.875061	2.7582
78	573.9543	573.9543	538.7424	562.217	1.892095	2.749904
81	584.0721	584.0721	533.0956	567.0799	1.908485	2.753644
84	583.2959	583.2959	538.9057	568.4992	1.924279	2.75473
87	591.8175	591.8175	539.3815	574.3388	1.939519	2.759168
90	594.3228	594.3228	563.0876	583.9111	1.954243	2.766347
93	596.9191	596.9191	574.5368	589.4583	1.968483	2.770453
96	547.9601	547.9601	598.9298	564.95	1.982271	2.75201
99	538.7411	538.7411	582.1489	553.2104	1.995635	2.74289
102	536.756	536.756	530.1591	534.557	2.0086	2.727994
105	542.1458	542.1458	535.809	540.0335	2.021189	2.732421
108	541.85	541.85	539.9062	541.2021	2.033424	2.733359
111	523.3026	523.3026	493.9911	513.5321	2.045323	2.710568
114	514.7794	514.7794	474.1586	501.2391	2.056905	2.700045
117	503.7754	503.7754	474.4127	493.9878	2.068186	2.693716
120	511.3636	511.3636	482.291	501.6727	2.079181	2.70042
123	512.3706	512.3706	480.47	501.7371	2.089905	2.700476
126	515.6596	515.6596	489.2895	506.8696	2.100371	2.704896
129	573.4904	573.4904	503.0234	550.0014	2.11059	2.740364
132	506.8256	506.8256	459.3437	490.9983	2.120574	2.69108
135	492.8051	492.8051	432.8186	472.8096	2.130334	2.674686
138	492.0574	492.0574	441.3895	475.1681	2.139879	2.676847
141	479.5217	479.5217	486.3266	481.79	2.149219	2.682858
144	472.1002	472.1002	476.1932	473.4645	2.158362	2.675287
147	483.9407	483.9407	481.1014	482.9943	2.167317	2.683942
150	476.216	476.216	478.6006	477.0109	2.176091	2.678528

Sample 7131						
Image 8767		Particle O_3B		Approximate Particle size - 1216.464 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1442.968	1444.903	1441.863	1443.245	0.477121	3.15934
6	1343.029	1342.854	1342.716	1342.866	0.778151	3.128033
9	1330.11	1331.272	1332.927	1331.436	0.954243	3.12432
12	1323.346	1322.255	1328.369	1324.656	1.079181	3.122103
15	1321.9	1319.104	1323.928	1321.644	1.176091	3.121114
18	1319.472	1323.892	1321.277	1321.547	1.255273	3.121083
21	1314.904	1317.072	1316.38	1316.119	1.322219	3.119295
24	1313.546	1312.101	1317.531	1314.392	1.380211	3.118725
27	1317.054	1308.424	1312.745	1312.741	1.431364	3.118179
30	1307.526	1304.872	1307.071	1306.49	1.477121	3.116106
33	1301.14	1311.657	1310.05	1307.616	1.518514	3.11648
36	1303.231	1315.87	1301.174	1306.758	1.556303	3.116195
39	1317.518	1304.097	1307.205	1309.607	1.591065	3.117141
42	1297.297	1315.599	1293.473	1302.123	1.623249	3.114652
45	1320.524	1310.566	1304.336	1311.808	1.653213	3.11787
48	1292.705	1304.036	1301.997	1299.579	1.681241	3.113803
51	1303.204	1292.251	1297.253	1297.569	1.70757	3.113131
54	1306.27	1289.476	1294.776	1296.84	1.732394	3.112887
57	1305.332	1299.714	1285.681	1296.909	1.755875	3.11291
60	1322.417	1289.393	1287.226	1299.678	1.778151	3.113836
63	1310.945	1287.975	1303.693	1300.871	1.799341	3.114234
66	1300.128	1278.081	1281.706	1286.638	1.819544	3.109456
69	1304.496	1274.071	1282.091	1286.886	1.838849	3.10954
72	1295.031	1285.913	1305.605	1295.516	1.857332	3.112443
75	1309.71	1293.789	1286.89	1296.796	1.875061	3.112872
78	1269.455	1283.453	1284.702	1279.203	1.892095	3.10694
81	1307.512	1255.8	1255.39	1272.9	1.908485	3.104794
84	1282.775	1265.757	1266.52	1271.684	1.924279	3.104379
87	1306.639	1275.141	1284.984	1288.921	1.939519	3.110226
90	1284.617	1292.239	1289.462	1288.773	1.954243	3.110176
93	1278.681	1278.052	1271.077	1275.937	1.968483	3.105829
96	1267.324	1296.341	1260.088	1274.584	1.982271	3.105369
99	1291.372	1252	1272.613	1271.995	1.995635	3.104485
102	1243.059	1244.734	1259.595	1249.129	2.0086	3.096607
105	1278.749	1259.495	1278.079	1272.108	2.021189	3.104524
108	1283.271	1239.217	1258.027	1260.172	2.033424	3.10043
111	1290.5	1254.791	1251.13	1265.474	2.045323	3.102253
114	1274.821	1248.781	1210.577	1244.726	2.056905	3.095074
117	1284.796	1258.815	1210.741	1251.451	2.068186	3.097414
120	1284.106	1285.796	1218.888	1262.93	2.079181	3.101379
123	1277.23	1273.319	1267.793	1272.78	2.089905	3.104753
126	1267.352	1297.274	1257.785	1274.137	2.100371	3.105216
129	1311.738	1288.178	1265.098	1288.338	2.11059	3.11003
132	1247.558	1253.154	1267.968	1256.227	2.120574	3.099068
135	1243.494	1260.404	1255.727	1253.208	2.130334	3.098023
138	1284.589	1222.057	1288.139	1264.928	2.139879	3.102066
141	1289.39	1220.677	1213.153	1241.073	2.149219	3.093797
144	1286.108	1220.125	1200.932	1235.722	2.158362	3.091921
147	1280.926	1222.471	1202.218	1235.205	2.167317	3.091739
150	1241.729	1217.982	1289.2	1249.637	2.176091	3.096784

Sample 7131						
Image 8767		Particle O_4A		Approximate Particle size - 1156.162 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	761.6829	760.7819	763.0629	761.8426	0.477121	2.881865
6	733.7668	736.7079	742.0868	737.5205	0.778151	2.867774
9	720.0157	730.8193	725.941	725.592	0.954243	2.860692
12	711.7925	718.5552	717.0798	715.8092	1.079181	2.854797
15	714.3558	723.2852	714.0735	717.2382	1.176091	2.855663
18	716.8375	728.1555	718.1039	721.0323	1.255273	2.857955
21	706.8143	713.6548	717.1653	712.5448	1.322219	2.852812
24	710.1644	721.8173	725.5464	719.176	1.380211	2.856835
27	693.2549	722.3107	723.6863	713.084	1.431364	2.853141
30	696.0491	705.3958	694.6916	698.7122	1.477121	2.844298
33	685.9446	707.1692	703.2357	698.7832	1.518514	2.844342
36	683.3832	694.2012	680.3775	685.9873	1.556303	2.836316
39	678.0029	677.2278	722.1331	692.4546	1.591065	2.840391
42	693.3818	697.5927	723.9206	704.965	1.623249	2.848168
45	691.9132	677.6324	706.8759	692.1405	1.653213	2.840194
48	671.9767	666.6398	687.8982	675.5049	1.681241	2.829629
51	686.7051	708.9186	699.0223	698.2153	1.70757	2.843989
54	673.2508	693.8127	672.1149	679.7261	1.732394	2.832334
57	698.1195	686.3429	717.9944	700.8189	1.755875	2.845606
60	706.9432	712.564	692.2664	703.9245	1.778151	2.847526
63	663.7325	670.7062	650.4359	661.6249	1.799341	2.820612
66	658.7522	670.3566	671.8088	666.9725	1.819544	2.824108
69	639.2433	639.8444	657.3141	645.4673	1.838849	2.809874
72	673.5627	694.2291	644.5301	670.774	1.857332	2.826576
75	660.0881	689.6202	619.8796	656.5293	1.875061	2.817254
78	666.1317	660.0281	649.0081	658.3893	1.892095	2.818483
81	665.776	627.8704	665.6943	653.1136	1.908485	2.814989
84	617.549	636.626	643.0783	632.4178	1.924279	2.801004
87	655.6628	640.4327	607.9966	634.6974	1.939519	2.802567
90	647.8919	583.4813	610.0707	613.8146	1.954243	2.788037
93	654.6708	568.1583	608.4234	610.4175	1.968483	2.785627
96	663.0327	633.0634	611.3813	635.8258	1.982271	2.803338
99	678.6464	639.1863	619.6291	645.8206	1.995635	2.810112
102	695.2555	653.4576	624.9587	657.8906	2.0086	2.818154
105	672.0843	666.8842	639.6031	659.5239	2.021189	2.819231
108	683.7549	682.9024	638.844	668.5004	2.033424	2.825102
111	600.9152	639.3378	582.556	607.603	2.045323	2.78362
114	595.653	578.4161	570.2075	581.4255	2.056905	2.764494
117	603.6264	578.153	581.9118	587.8971	2.068186	2.769301
120	616.7524	582.8678	594.9483	598.1895	2.079181	2.776839
123	620.9136	597.3815	604.7657	607.6869	2.089905	2.78368
126	643.0514	608.2072	618.8098	623.3561	2.100371	2.794736
129	652.3146	631.247	630.3428	637.9681	2.11059	2.804799
132	675.3098	584.7107	619.2431	626.4212	2.120574	2.796866
135	644.0333	557.337	594.3334	598.5679	2.130334	2.777113
138	674.9409	572.2982	620.1181	622.4524	2.139879	2.794106
141	663.2744	593.8672	609.116	622.0859	2.149219	2.79385
144	659.0625	593.3997	599.7803	617.4142	2.158362	2.790577
147	645.2413	585.3197	564.9352	598.4987	2.167317	2.777063
150	668.5692	562.9024	565.0732	598.8483	2.176091	2.777317

Sample 7131						
Image 8767		Particle O_4B		Approximate Particle size - 951.9727 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	464.339	465.6911	463.9668	464.6656	0.477121	2.667141
6	451.3475	450.8779	450.7947	451.0067	0.778151	2.654183
9	447.48	449.2773	447.6566	448.138	0.954243	2.651412
12	447.078	448.4274	444.9361	446.8138	1.079181	2.650127
15	443.9751	445.105	444.1088	444.3963	1.176091	2.64777
18	444.206	442.2708	440.6746	442.3838	1.255273	2.645799
21	435.6831	439.1313	439.0401	437.9515	1.322219	2.641426
24	430.8648	436.6558	432.8767	433.4658	1.380211	2.636955
27	419.4252	440.6938	427.7435	429.2875	1.431364	2.632748
30	438.171	449.0179	415.0319	434.0736	1.477121	2.637563
33	417.1709	421.8381	458.3163	432.4418	1.518514	2.635928
36	428.9103	442.6384	432.9386	434.8291	1.556303	2.638319
39	414.6324	410.9133	427.5536	417.6998	1.591065	2.620864
42	407.0848	445.0239	446.5769	432.8952	1.623249	2.636383
45	418.8881	442.5785	416.026	425.8309	1.653213	2.629237
48	392.0243	404.1219	423.7642	406.6368	1.681241	2.609207
51	391.1759	425.91	400.2941	405.7933	1.70757	2.608305
54	407.0051	442.3563	400.5814	416.6476	1.732394	2.619769
57	413.4269	380.9024	428.9128	407.7474	1.755875	2.610391
60	427.8586	385.1419	449.8293	420.9433	1.778151	2.624224
63	344.8506	384.6253	450.8742	393.45	1.799341	2.59489
66	353.953	419.6281	441.5616	405.0476	1.819544	2.607506
69	380.3284	431.1337	430.1743	413.8788	1.838849	2.616873
72	373.5893	449.2104	420.6351	414.4783	1.857332	2.617502
75	390.0167	324.9869	412.6458	375.8831	1.875061	2.575053
78	387.3072	334.3816	383.5507	368.4132	1.892095	2.566335
81	398.3541	358.1715	400.4318	385.6525	1.908485	2.586196
84	405.7026	362.5554	401.0503	389.7694	1.924279	2.590808
87	414.426	370.3173	395.8506	393.5313	1.939519	2.594979
90	423.6023	388.436	403.0962	405.0448	1.954243	2.607503
93	438.6162	392.4692	396.7623	409.2826	1.968483	2.612023
96	429.9414	396.0667	400.6147	408.8743	1.982271	2.61159
99	305.9878	404.3383	407.3646	372.5636	1.995635	2.5712
102	311.3878	418.7819	416.4073	382.1923	2.0086	2.582282
105	313.4922	430.1189	412.5926	385.4012	2.021189	2.585913
108	318.0614	246.2898	373.7303	312.6938	2.033424	2.495119
111	326.845	258.055	378.659	321.1863	2.045323	2.506757
114	332.5295	252.7629	389.0773	324.7899	2.056905	2.511603
117	336.3213	271.2246	393.2967	333.6142	2.068186	2.523245
120	340.2699	264.398	399.3802	334.6827	2.079181	2.524633
123	346.0881	271.7433	404.0384	340.6233	2.089905	2.532274
126	349.3615	277.5465	409.6974	345.5351	2.100371	2.538492
129	352.3777	283.2501		317.8139	2.11059	2.502173
132	358.1511	283.5522		320.8517	2.120574	2.506304
135	360.6628	289.481		325.0719	2.130334	2.511979
138	363.3354	295.4922		329.4138	2.139879	2.517742
141	367.2835	301.7075		334.4955	2.149219	2.52439
144	371.0527	307.8862		339.4695	2.158362	2.530801
147	377.6359	314.4087		346.0223	2.167317	2.539104
150	377.9555	320.7247		349.3401	2.176091	2.543248

Sample 7131						
Image 8767		Particle O_4C		Approximate Particle size - 1276.766 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1017.454	1016.941	1017.276	1017.223	0.477121	3.007416
6	967.6412	968.76	966.0709	967.4907	0.778151	2.985647
9	966.7426	965.3591	963.3692	965.157	0.954243	2.984598
12	964.5801	963.354	962.3308	963.4216	1.079181	2.983816
15	951.6476	952.8844	956.111	953.5477	1.176091	2.979342
18	924.1165	923.2708	927.8041	925.0638	1.255273	2.966172
21	921.4904	920.9893	925.9656	922.8151	1.322219	2.965115
24	939.8383	938.8159	951.7412	943.4651	1.380211	2.974726
27	947.319	945.8034	942.0551	945.0592	1.431364	2.975459
30	930.2489	927.7816	906.0211	921.3505	1.477121	2.964425
33	904.8713	900.6618	934.5155	913.3495	1.518514	2.960637
36	904.4921	903.8475	896.3157	901.5518	1.556303	2.954991
39	898.168	896.5007	898.9686	897.8791	1.591065	2.953218
42	916.325	915.3961	907.0812	912.9341	1.623249	2.960439
45	905.3591	906.0453	868.235	893.2131	1.653213	2.950955
48	898.3196	897.808	894.5175	896.8817	1.681241	2.952735
51	900.152	902.7509	908.9804	903.9611	1.70757	2.95615
54	887.8265	883.7693	885.9291	885.8416	1.732394	2.947356
57	882.2569	881.8488	865.5602	876.5553	1.755875	2.942779
60	872.2972	871.4655	881.4716	875.0781	1.778151	2.942047
63	898.7541	894.8186	891.9399	895.1709	1.799341	2.951906
66	872.9788	872.0549	894.4033	879.8123	1.819544	2.94439
69	836.1805	837.1558	885.4954	852.9439	1.838849	2.93092
72	866.9896	868.1274	842.3975	859.1715	1.857332	2.93408
75	851.5494	850.6992	837.697	846.6485	1.875061	2.927703
78	851.2932	850.5369	857.6033	853.1445	1.892095	2.931023
81	839.9448	837.7406	828.479	835.3881	1.908485	2.921888
84	841.1815	841.9143	846.6978	843.2645	1.924279	2.925964
87	857.7982	859.0672	846.4446	854.4367	1.939519	2.93168
90	874.415	873.0429	856.1854	867.8811	1.954243	2.93846
93	862.1031	863.6047	873.3654	866.3577	1.968483	2.937697
96	861.0353	862.603	874.7436	866.1273	1.982271	2.937582
99	865.8272	867.1238	879.0554	870.6688	1.995635	2.939853
102	794.763	797.7831	856.6536	816.3999	2.0086	2.911903
105	793.2873	791.6465	806.0643	796.9994	2.021189	2.901458
108	780.964	779.887	782.7606	781.2039	2.033424	2.892764
111	783.5935	782.1541	786.7828	784.1768	2.045323	2.894414
114	788.2756	787.9025	793.9766	790.0516	2.056905	2.897655
117	817.8742	818.4599	823.2383	819.8575	2.068186	2.913738
120	821.2991	822.9486	831.504	825.2506	2.079181	2.916586
123	816.9553	817.0613	832.4443	822.1536	2.089905	2.914953
126	812.5608	811.5903	818.298	814.1497	2.100371	2.910704
129	781.2125	780.8035	801.02	787.6787	2.11059	2.896349
132	766.4969	764.9562	781.5023	770.9851	2.120574	2.887046
135	766.3791	766.5084	774.9004	769.2626	2.130334	2.886075
138	763.8878	765.7346	782.8646	770.829	2.139879	2.886958
141	769.1968	769.0625	759.1241	765.7945	2.149219	2.884112
144	786.127	783.1967	772.1107	780.4781	2.158362	2.892361
147	804.8238	804.5605	796.7042	802.0295	2.167317	2.90419
150	815.3865	813.6414	806.0983	811.7087	2.176091	2.9094

Sample 7131						
Image 8767		Particle O_5A		Approximate Particle size - 158.5582 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1211.571	1210.781	1226.532	1216.295	0.477121	3.085039
6	1127.65	1128.436	1145.44	1133.842	0.778151	3.054553
9	1104.796	1106.196	1121.667	1110.886	0.954243	3.045669
12	1102.452	1108.641	1135.308	1115.467	1.079181	3.047457
15	1098.084	1101.492	1118.309	1105.962	1.176091	3.04374
18	1102.89	1095.141	1106.467	1101.499	1.255273	3.041984
21	1090.405	1094.447	1107.383	1097.412	1.322219	3.04037
24	1071.746	1083.95	1112.601	1089.432	1.380211	3.0372
27	1108.834	1095.779	1096.226	1100.28	1.431364	3.041503
30	1089.122	1074.205	1122.776	1095.368	1.477121	3.03956
33	1094.729	1070.414	1066.794	1077.312	1.518514	3.032342
36	1050.94	1068.789	1089.119	1069.616	1.556303	3.029228
39	1106.066	1049.04	1072.095	1075.734	1.591065	3.031705
42	1105.615	1053.694	1076.832	1078.714	1.623249	3.032906
45	1111.562	1072.957	1094.853	1093.124	1.653213	3.038669
48	1051.81	1057.223	1104.338	1071.124	1.681241	3.02984
51	1059.032	1042.038	1088.537	1063.202	1.70757	3.026616
54	1057.522	1078.76	1094.476	1076.919	1.732394	3.032183
57	1095.521	1072.298	1093.884	1087.234	1.755875	3.036323
60	1096.76	1055.002	1079.781	1077.181	1.778151	3.032289
63	1042.428	1045.914	1064.213	1050.852	1.799341	3.021541
66	1018.778	1049.097	1038.369	1035.415	1.819544	3.015114
69	1088.56	1041.354	1078.496	1069.47	1.838849	3.029169
72	1075.251	1045.702	1038.246	1053.067	1.857332	3.022456
75	1035.355	1064.236	1077.258	1058.95	1.875061	3.024875
78	1074.3	1027.239	1050.308	1050.616	1.892095	3.021444
81	1071.497	1022.834	1039.709	1044.68	1.908485	3.018983
84	1054.312	1035.669	1037.532	1042.504	1.924279	3.018078
87	1059.72	1018.089	1055.274	1044.361	1.939519	3.018851
90	1042.405	1026.309	1019.777	1029.497	1.954243	3.012625
93	1036.56	1033.61	1022.755	1030.975	1.968483	3.013248
96	1023.161	1001.655	1035.567	1020.128	1.982271	3.008654
99	1006.362	999.3355	1009.083	1004.927	1.995635	3.002134
102	1030.592	1038.204	996.4789	1021.758	2.0086	3.009348
105	985.1081	1039.695	983.9738	1002.926	2.021189	3.001269
108	1014.737	1026.848	1024.288	1021.957	2.033424	3.009433
111	1040.713	983.6116	1026.648	1016.991	2.045323	3.007317
114	1043.768	975.3182	1029.044	1016.043	2.056905	3.006912
117	1033.001	979.1953	1025.289	1012.495	2.068186	3.005393
120	978.5109	1045.917	987.5568	1003.995	2.079181	3.001732
123	1006.734	1012.151	977.5134	998.7995	2.089905	2.999478
126	983.4438	921.6443	978.4643	961.1841	2.100371	2.982807
129	925.2535	912.59	935.6228	924.4888	2.11059	2.965902
132	923.647	1021.306	957.3097	967.4208	2.120574	2.985615
135	940.7318	1041.511	967.4929	983.2453	2.130334	2.992662
138	976.4152	1002.005	966.2798	981.5667	2.139879	2.99192
141	986.2248	973.6652	977.0446	978.9782	2.149219	2.990773
144	1015.703	983.1808	1003.073	1000.653	2.158362	3.000283
147	1019.384	972.8645	995.8263	996.025	2.167317	2.99827
150	991.0862	960.4753	979.6262	977.0626	2.176091	2.989922

Sample 7131						
Image 8767		Particle O_5B		Approximate Particle size - 135.6454 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1204.742	1201.059	1206.195	1203.998	0.477121	3.080626
6	1058.959	1055.717	1060.797	1058.491	0.778151	3.024687
9	1025.009	1021.767	1026.734	1024.503	0.954243	3.010513
12	1031.049	1022.672	1022.211	1025.311	1.079181	3.010855
15	1016.541	1012.969	1017.156	1015.555	1.176091	3.006703
18	1020.049	1026.568	1014.8	1020.472	1.255273	3.008801
21	1004.166	1000.004	1006.467	1003.546	1.322219	3.001537
24	1005.316	994.0032	998.1543	999.1577	1.380211	2.999634
27	1006.729	1028.251	1004.248	1013.076	1.431364	3.005642
30	1007.266	995.1483	1001.612	1001.342	1.477121	3.000582
33	986.1658	1026.189	981.2145	997.8565	1.518514	2.999068
36	996.3623	979.049	987.4697	987.627	1.556303	2.994593
39	992.337	1034.127	988.9139	1005.126	1.591065	3.002221
42	993.8901	1037.342	1041.527	1024.253	1.623249	3.010407
45	1025.88	950.8452	955.0712	977.2655	1.653213	2.990013
48	1002.337	993.1259	1000.478	998.647	1.681241	2.999412
51	976.5236	965.3688	975.5047	972.4657	1.70757	2.987874
54	1012.828	978.5999	1002.233	997.887	1.732394	2.999081
57	959.7249	941.9001	944.1278	948.5843	1.755875	2.977076
60	965.6949	928.8123	936.0926	943.5333	1.778151	2.974757
63	919.7175	1007.542	1011.502	979.5872	1.799341	2.991043
66	982.2709	984.0823	980.4398	982.2643	1.819544	2.992228
69	991.2121	980.6166	981.4708	984.4332	1.838849	2.993186
72	949.6634	929.4745	939.7699	939.6359	1.857332	2.97296
75	976.5941	950.9489	962.1698	963.2376	1.875061	2.983733
78	921.5518	895.2245	900.8239	905.8667	1.892095	2.957064
81	927.5706	1004.863	918.236	950.2232	1.908485	2.977826
84	875.1385	1016.477	1041.684	977.7663	1.924279	2.990235
87	983.8307	940.3605	955.119	959.7701	1.939519	2.982167
90	1040.494	976.6397	1028.96	1015.365	1.954243	3.006622
93	970.5563	952.9299	966.0099	963.1654	1.968483	2.983701
96	980.2429	933.742	974.2354	962.7401	1.982271	2.983509
99	985.2622	944.632	947.3411	959.0784	1.995635	2.981854
102	974.3516	951.3652	953.822	959.8463	2.0086	2.982202
105	924.4037	903.8613	915.0232	914.4294	2.021189	2.96115
108	897.7684	884.4915	889.623	890.6276	2.033424	2.949696
111	923.3122	1017.89	908.41	949.8709	2.045323	2.977665
114	941.8419	1037.726	918.7247	966.0976	2.056905	2.985021
117	837.0693	930.2714	935.3631	900.9013	2.068186	2.954677
120	870.0483	962.923	843.9221	892.2978	2.079181	2.95051
123	888.4967	979.7498	982.8138	950.3534	2.089905	2.977885
126	863.2019	846.8107	860.4496	856.8207	2.100371	2.93289
129	846.3427	836.0609	851.7546	844.7194	2.11059	2.926712
132	876.9289	862.4933	867.6022	869.0081	2.120574	2.939024
135	883.2383	851.3243	869.2732	867.9453	2.130334	2.938492
138	892.6608	852.869	878.104	874.5446	2.139879	2.941782
141	917.7231	848.3521	894.2208	886.7653	2.149219	2.947809
144	781.5864	862.3049	767.5573	803.8162	2.158362	2.905157
147	787.9121	743.3699	767.8906	766.3909	2.167317	2.88445
150	794.8378	750.3047	770.8179	771.9868	2.176091	2.88761

Sample 7131						
Image 8767		Particle O_6		Approximate Particle size - 164.1987 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1771.174	1758.229	1757.374	1762.259	0.477121	3.24607
6	1703.484	1692.889	1690.854	1695.742	0.778151	3.22936
9	1699.909	1688.804	1689.819	1692.844	0.954243	3.228617
12	1679.145	1665.9	1666.873	1670.64	1.079181	3.222883
15	1644.883	1645.593	1643.423	1644.633	1.176091	3.216069
18	1666.626	1652.455	1651.842	1656.974	1.255273	3.219316
21	1632.974	1620.468	1618.258	1623.9	1.322219	3.210559
24	1640.304	1625.48	1631.547	1632.444	1.380211	3.212838
27	1639.704	1618.083	1623.67	1627.152	1.431364	3.211428
30	1646.311	1632.907	1640.297	1639.838	1.477121	3.214801
33	1661.386	1643.498	1655.172	1653.352	1.518514	3.218365
36	1635.58	1618.839	1628.248	1627.556	1.556303	3.211536
39	1593.526	1615.729	1578.153	1595.803	1.591065	3.202979
42	1579.352	1602.775	1575.088	1585.738	1.623249	3.200232
45	1565.932	1605.964	1562.826	1578.241	1.653213	3.198173
48	1579.186	1592.509	1558.833	1576.843	1.681241	3.197788
51	1594.695	1598.638	1573.328	1588.887	1.70757	3.201093
54	1560.43	1580.525	1549.582	1563.512	1.732394	3.194101
57	1557.881	1582.829	1547.033	1562.581	1.755875	3.193843
60	1580.107	1594.004	1570.248	1581.453	1.778151	3.199056
63	1542.655	1567.603	1531.807	1547.355	1.799341	3.18959
66	1559.503	1570.075	1549.629	1559.736	1.819544	3.193051
69	1553.085	1577.467	1541.323	1557.292	1.838849	3.19237
72	1584.617	1584.679	1584.721	1584.673	1.857332	3.19994
75	1559.542	1577.939	1548.837	1562.106	1.875061	3.19371
78	1583.259	1586.658	1520.722	1563.546	1.892095	3.194111
81	1564.473	1559.459	1560.596	1561.509	1.908485	3.193545
84	1554.286	1545.543	1551.53	1550.453	1.924279	3.190459
87	1532.031	1549.471	1524.884	1535.462	1.939519	3.186239
90	1537.802	1562.137	1537.075	1545.671	1.954243	3.189117
93	1527.435	1550.521	1519.134	1532.363	1.968483	3.185362
96	1538.76	1555.73	1537.44	1543.977	1.982271	3.188641
99	1535.968	1559.951	1529.771	1541.897	1.995635	3.188055
102	1538.568	1561.307	1531.205	1543.693	2.0086	3.188561
105	1503.838	1523.359	1493.837	1507.011	2.021189	3.178117
108	1513.702	1530.354	1537.667	1527.241	2.033424	3.183908
111	1503.834	1527.473	1498.006	1509.771	2.045323	3.178911
114	1511.779	1534.173	1504.326	1516.759	2.056905	3.180917
117	1515.939	1532.276	1508.754	1518.989	2.068186	3.181555
120	1480.71	1501.218	1471.844	1484.591	2.079181	3.171607
123	1487.298	1513.561	1488.869	1496.576	2.089905	3.175099
126	1510.054	1532.266	1502.783	1515.034	2.100371	3.180422
129	1524.113	1546.263	1517.011	1529.129	2.11059	3.184444
132	1537.301	1548.399	1531.187	1538.963	2.120574	3.187228
135	1490.774	1514.23	1485.127	1496.711	2.130334	3.175138
138	1492.088	1514.3	1484.817	1497.068	2.139879	3.175242
141	1503.779	1529.435	1501.025	1511.413	2.149219	3.179383
144	1521.678	1544.178	1515.198	1527.018	2.158362	3.183844
147	1539.954	1542.58	1536.006	1539.513	2.167317	3.187383
150	1507.015	1534.886	1505.982	1515.961	2.176091	3.180688

Sample 7131						
Image 8768		Particle O_1		Approximate Particle size - 160.8962 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1564.244	1562.85	1562.85	1563.315	0.477121	3.194046
6	1455.847	1449.602	1447.629	1451.026	0.778151	3.161675
9	1427.344	1424.116	1424.115	1425.191	0.954243	3.153873
12	1421.148	1417.477	1413.636	1417.42	1.079181	3.151499
15	1415.143	1415.256	1413.224	1414.541	1.176091	3.150615
18	1411.389	1405.964	1411.308	1409.554	1.255273	3.149082
21	1398.382	1398.471	1398.611	1398.488	1.322219	3.145659
24	1411.784	1396.678	1399.981	1402.814	1.380211	3.147
27	1404.212	1387.84	1395.428	1395.827	1.431364	3.144832
30	1397.793	1396.237	1403.415	1399.148	1.477121	3.145864
33	1406.029	1391.806	1404.95	1400.929	1.518514	3.146416
36	1406.298	1382.232	1391.209	1393.247	1.556303	3.144028
39	1412.537	1384.638	1395.225	1397.466	1.591065	3.145341
42	1380.512	1382.347	1379.792	1380.884	1.623249	3.140157
45	1393.014	1365.663	1379.715	1379.464	1.653213	3.13971
48	1378.807	1359.797	1356.86	1365.155	1.681241	3.135182
51	1338.792	1346.254	1325.854	1336.967	1.70757	3.126121
54	1391.143	1295.259	1359.743	1348.715	1.732394	3.12992
57	1347.982	1345.69	1317.958	1337.21	1.755875	3.1262
60	1268.736	1273.656	1303.883	1282.091	1.778151	3.107919
63	1346.959	1289.599	1372.164	1336.24	1.799341	3.125885
66	1399.789	1364.623	1356.959	1373.79	1.819544	3.13792
69	1388.248	1334.709	1344.999	1355.986	1.838849	3.132255
72	1339.787	1294.871	1259.378	1298.012	1.857332	3.113279
75	1294.626	1250.235	1251.112	1265.324	1.875061	3.102202
78	1380.523	1292.124	1282.804	1318.484	1.892095	3.120075
81	1347.733	1294.084	1268.186	1303.334	1.908485	3.115056
84	1351.628	1317.76	1283.392	1317.593	1.924279	3.119781
87	1275.167	1354.348	1329.48	1319.665	1.939519	3.120464
90	1319.199	1245.097	1276.181	1280.159	1.954243	3.107264
93	1307.063	1301.329	1323.978	1310.79	1.968483	3.117533
96	1288.082	1217.385	1234.449	1246.639	1.982271	3.095741
99	1351.539	1239.031	1260.524	1283.698	1.995635	3.108463
102	1308.091	1268.503	1296.04	1290.878	2.0086	3.110885
105	1326.369	1286.937	1312.417	1308.574	2.021189	3.116798
108	1227.52	1296.941	1223.267	1249.243	2.033424	3.096647
111	1287.445	1373.612	1282.154	1314.404	2.045323	3.118729
114	1315.667	1381.942	1302.654	1333.421	2.056905	3.124967
117	1331.088	1383.191	1307.813	1340.698	2.068186	3.127331
120	1235.082	1277.608	1263.785	1258.825	2.079181	3.099965
123	1254.575	1261.623	1286.84	1267.679	2.089905	3.103009
126	1277.164	1280.295	1311.27	1289.576	2.100371	3.110447
129	1295.02	1265.554	1321.824	1294.133	2.11059	3.111979
132	1297.32	1251.699	1323.844	1290.955	2.120574	3.110911
135	1222.796	1214.37	1139.518	1192.228	2.130334	3.076359
138	1234.528	1190.049	1138.941	1187.839	2.139879	3.074758
141	1258.199	1192.476	1150.289	1200.321	2.149219	3.079298
144	1270.829	1215.006	1155.903	1213.913	2.158362	3.084187
147	1271.022	1217.66	1176.052	1221.578	2.167317	3.086921
150	1300.514	1232.318	1177.548	1236.793	2.176091	3.092297

Sample 7131						
Image 8768		Particle O_2A		Approximate Particle size - 112.4306 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	810.6938	811.8068	808.733	810.4112	0.477121	2.908705
6	732.0715	733.0027	735.9315	733.6686	0.778151	2.8655
9	720.7433	721.5097	720.6205	720.9578	0.954243	2.85791
12	711.5445	710.3127	712.7605	711.5392	1.079181	2.852199
15	717.9207	718.5388	713.2914	716.5836	1.176091	2.855267
18	712.548	710.5995	709.3691	710.8389	1.255273	2.851771
21	710.6559	711.9628	708.943	710.5206	1.322219	2.851577
24	716.4219	714.9917	710.1433	713.8523	1.380211	2.853608
27	703.7072	704.1609	706.0394	704.6358	1.431364	2.847965
30	706.1224	703.4891	704.1979	704.6031	1.477121	2.847945
33	703.1976	707.6276	700.3115	703.7122	1.518514	2.847395
36	695.7499	694.5153	699.5013	696.5888	1.556303	2.842977
39	705.4753	704.4446	705.2324	705.0508	1.591065	2.84822
42	692.053	697.0055	700.3086	696.4557	1.623249	2.842893
45	686.4821	684.5082	698.5925	689.8609	1.653213	2.838762
48	677.8147	682.7582	699.8536	686.8088	1.681241	2.836836
51	694.8693	696.8849	690.4102	694.0548	1.70757	2.841394
54	688.8979	686.138	717.0751	697.3703	1.732394	2.843463
57	687.4492	684.3471	703.2995	691.6986	1.755875	2.839917
60	682.1445	683.1845	682.2783	682.5358	1.778151	2.834125
63	668.5114	666.4916	707.8508	680.9513	1.799341	2.833116
66	669.179	670.6941	676.9029	672.2587	1.819544	2.827536
69	685.8844	691.5331	695.0981	690.8385	1.838849	2.839377
72	665.7551	666.897	683.4818	672.0446	1.857332	2.827398
75	674.3614	680.4015	677.8438	677.5356	1.875061	2.830932
78	668.3252	672.7882	678.5997	673.2377	1.892095	2.828168
81	672.4401	654.4462	653.4233	660.1032	1.908485	2.819612
84	666.8704	672.4294	665.358	668.2193	1.924279	2.824919
87	670.1212	673.0951	670.8431	671.3531	1.939519	2.826951
90	673.0817	670.5029	668.892	670.8255	1.954243	2.82661
93	650.4774	656.0958	667.1918	657.9217	1.968483	2.818174
96	636.9652	642.6063	656.346	645.3058	1.982271	2.809766
99	640.3721	645.9651	634.3982	640.2451	1.995635	2.806346
102	653.2634	649.7707	633.9654	645.6665	2.0086	2.810008
105	665.5711	663.8485	646.3281	658.5826	2.021189	2.81861
108	673.7677	675.1982	666.4651	671.8103	2.033424	2.827247
111	692.609	672.8781	657.0959	674.1943	2.045323	2.828785
114	636.1528	642.8318	649.0982	642.6943	2.056905	2.808004
117	625.3171	623.3784	647.3648	632.0201	2.068186	2.800731
120	623.0983	625.5602	625.9156	624.858	2.079181	2.795781
123	660.8743	667.5667	656.1613	661.5341	2.089905	2.820552
126	607.1862	612.9111	613.9382	611.3452	2.100371	2.786286
129	589.8753	594.1755	593.3862	592.479	2.11059	2.772673
132	593.4786	602.5247	581.5356	592.513	2.120574	2.772698
135	585.3628	591.0729	572.4283	582.9547	2.130334	2.765635
138	593.6279	592.2775	572.5624	586.1559	2.139879	2.768013
141	598.516	596.0065	575.3874	589.97	2.149219	2.77083
144	611.0627	612.506	641.8521	621.8069	2.158362	2.793656
147	613.4299	615.3183	653.285	627.3444	2.167317	2.797506
150	609.1546	610.4977	651.0828	623.5784	2.176091	2.794891

Sample 7131						
Image 8768		Particle O_2B		Approximate Particle size - 176.3273 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1102.481	1102.423	1120.522	1108.475	0.477121	3.044726
6	1049.494	1050.849	1067.752	1056.032	0.778151	3.023677
9	1038.895	1038.836	1057.153	1044.961	0.954243	3.0191
12	1033.408	1038.631	1071.378	1047.806	1.079181	3.020281
15	1027.841	1029.196	1046.021	1034.353	1.176091	3.014669
18	1020.963	1026.147	1062.797	1036.636	1.255273	3.015626
21	1025.614	1030.798	1063.42	1039.944	1.322219	3.01701
24	1013.714	1015.001	1077.516	1035.411	1.380211	3.015113
27	1037.568	1016.451	1070.449	1041.489	1.431364	3.017655
30	1029.049	1008.854	1071.369	1036.424	1.477121	3.015537
33	1028.243	1001.412	1093.556	1041.07	1.518514	3.01748
36	1006.341	992.5167	1078.526	1025.795	1.556303	3.01106
39	1018.049	1012.575	1056.22	1028.948	1.591065	3.012393
42	1001.737	983.5933	1043.884	1009.738	1.623249	3.004209
45	1002.13	1000.124	1093.848	1032.034	1.653213	3.013694
48	981.3696	1044.985	1023.077	1016.477	1.681241	3.007098
51	1008.391	1025.174	1009.139	1014.235	1.70757	3.006138
54	999.6837	963.3713	1001.507	988.1874	1.732394	2.994839
57	951.4777	987.9747	1088.856	1009.436	1.755875	3.004079
60	981.17	971.3693	1069.389	1007.31	1.778151	3.003163
63	996.9073	950.6605	1048.681	998.7494	1.799341	2.999457
66	988.8543	1011.632	1029.058	1009.848	1.819544	3.004256
69	1002.541	949.4608	1051.055	1001.019	1.838849	3.000442
72	1022.164	971.0371	1067.252	1020.151	1.857332	3.008665
75	976.7301	967.5799	1022.216	988.8421	1.875061	2.995127
78	948.627	1029.089	1009.216	995.6438	1.892095	2.998104
81	960.4161	1044.156	997.4512	1000.674	1.908485	3.000293
84	960.3981	1011.903	1103.477	1025.259	1.924279	3.010834
87	936.814	1008.115	972.0366	972.3219	1.939519	2.98781
90	921.817	950.6269	1003.362	958.6019	1.954243	2.981638
93	942.645	964.5659	990.3556	965.8555	1.968483	2.984912
96	1018.341	967.4628	1003.084	996.296	1.982271	2.998388
99	1008.562	983.5414	1121.149	1037.751	1.995635	3.016093
102	980.6567	981.9574	1023.451	995.3551	2.0086	2.997978
105	1001.871	947.7817	1169.422	1039.691	2.021189	3.016904
108	993.0547	940.9591	1052.382	995.4654	2.033424	2.998026
111	899.3837	959.187	928.3294	928.9667	2.045323	2.968
114	929.0374	975.0331	1141.859	1015.31	2.056905	3.006599
117	931.672	1071.016	1154.707	1052.465	2.068186	3.022208
120	948.6317	962.8259	932.6714	948.043	2.079181	2.976828
123	934.64	924.7644	887.8342	915.7462	2.089905	2.961775
126	890.0516	929.2325	1107.859	975.7142	2.100371	2.989323
129	938.3582	870.8915	1118.039	975.7628	2.11059	2.989344
132	910.374	856.2289	1137.596	968.0662	2.120574	2.985905
135	906.6105	853.041	1152.362	970.671	2.130334	2.987072
138	919.34	870.1002	1160.008	983.1495	2.139879	2.99262
141	929.3226	878.0212	1174.56	993.9678	2.149219	2.997372
144	948.4194	893.6656	1043.147	961.7438	2.158362	2.983059
147	947.7819	1058.763	1007.964	1004.836	2.167317	3.002095
150	910.3524	907.3863	986.9611	934.8999	2.176091	2.970765

Sample 7131						
Image 8768		Particle O_3		Approximate Particle size - 153.9406 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1645.335	1644.63	1642.95	1644.305	0.477121	3.215982
6	1595.158	1594.039	1592.816	1594.004	0.778151	3.202489
9	1587.247	1586.446	1584.793	1586.162	0.954243	3.200348
12	1584.528	1581.437	1583.479	1583.148	1.079181	3.199522
15	1580.819	1581.024	1583.157	1581.667	1.176091	3.199115
18	1577.859	1573.844	1574.908	1575.537	1.255273	3.197429
21	1580.137	1572.127	1576.103	1576.122	1.322219	3.19759
24	1580.706	1572.643	1575.002	1576.117	1.380211	3.197588
27	1565.803	1567.303	1569.622	1567.576	1.431364	3.195229
30	1576.571	1562.734	1568.19	1569.165	1.477121	3.195669
33	1578.322	1578.044	1570.981	1575.782	1.518514	3.197496
36	1550.049	1568.611	1559.567	1559.409	1.556303	3.19296
39	1544.471	1561.945	1551.701	1552.706	1.591065	3.191089
42	1568.779	1553.929	1567.111	1563.273	1.623249	3.194035
45	1558.658	1554.358	1553.27	1555.428	1.653213	3.19185
48	1563.414	1555.893	1557.648	1558.985	1.681241	3.192842
51	1552.956	1577.687	1569.477	1566.707	1.70757	3.194988
54	1557.379	1571.34	1540.567	1556.429	1.732394	3.192129
57	1548.608	1572.738	1561.338	1560.895	1.755875	3.193374
60	1553.709	1537.533	1538.71	1543.317	1.778151	3.188455
63	1549.984	1522.313	1525.398	1532.565	1.799341	3.185419
66	1534.226	1562.156	1535.405	1543.929	1.819544	3.188627
69	1543.132	1525.233	1519.16	1529.175	1.838849	3.184457
72	1520.555	1538.207	1513.736	1524.166	1.857332	3.183032
75	1512.074	1537.755	1513.685	1521.171	1.875061	3.182178
78	1535.685	1521.149	1535.534	1530.789	1.892095	3.184915
81	1536.72	1504.351	1492.732	1511.268	1.908485	3.179341
84	1534.957	1529.38	1529.902	1531.413	1.924279	3.185092
87	1504.827	1531.459	1495.341	1510.542	1.939519	3.179133
90	1505.766	1516.443	1503.765	1508.658	1.954243	3.178591
93	1489.44	1498.555	1477.54	1488.511	1.968483	3.172752
96	1521.671	1501.472	1506.686	1509.943	1.982271	3.178961
99	1536.374	1572.353	1524.163	1544.297	1.995635	3.188731
102	1507.033	1531.346	1494.434	1510.938	2.0086	3.179247
105	1514.86	1537.818	1494.851	1515.843	2.021189	3.180654
108	1498.496	1511.635	1476.989	1495.707	2.033424	3.174846
111	1515.074	1511.61	1493.708	1506.797	2.045323	3.178055
114	1534.416	1499.815	1548.105	1527.445	2.056905	3.183966
117	1473.439	1502.303	1479.684	1485.142	2.068186	3.171768
120	1533.664	1488.127	1471.218	1497.67	2.079181	3.175416
123	1520.688	1512.07	1498.877	1510.545	2.089905	3.179134
126	1474.609	1515.308	1477.345	1489.087	2.100371	3.17292
129	1449.186	1482.768	1498.025	1476.66	2.11059	3.16928
132	1507.693	1515.133	1485.27	1502.699	2.120574	3.176872
135	1499.64	1521.507	1474.012	1498.387	2.130334	3.175624
138	1479.134	1450.393	1418.672	1449.399	2.139879	3.161188
141	1487.047	1489.059	1442.611	1472.905	2.149219	3.168175
144	1480.638	1494.169	1473.341	1482.716	2.158362	3.171058
147	1528.481	1477.208	1481.029	1495.573	2.167317	3.174808
150	1515.957	1465.863	1487.065	1489.628	2.176091	3.173078

Sample 1152						
Image 8743		Particle O_2		Approximate Particle size - 1775.158 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1650.05	1649.533	1649.947	1649.843	0.477121	3.217443
6	1489.64	1481.679	1481.624	1484.314	0.778151	3.171526
9	1473.771	1469.93	1467.251	1470.317	0.954243	3.167411
12	1470.586	1464.493	1462.298	1465.792	1.079181	3.166072
15	1471.728	1457.501	1457.639	1462.289	1.176091	3.165033
18	1456.276	1452.757	1449.824	1452.952	1.255273	3.162251
21	1456.502	1443.14	1442.861	1447.501	1.322219	3.160619
24	1450.48	1445.47	1443.15	1446.367	1.380211	3.160278
27	1445.192	1436.894	1434.108	1438.732	1.431364	3.15798
30	1445.345	1441.705	1439.146	1442.065	1.477121	3.158985
33	1449.529	1433.939	1433.026	1438.832	1.518514	3.15801
36	1440.803	1435.428	1438.747	1438.326	1.556303	3.157857
39	1438.701	1431.056	1425.304	1431.687	1.591065	3.155848
42	1442.054	1436.379	1437.247	1438.56	1.623249	3.157928
45	1443.878	1427.911	1427.283	1433.024	1.653213	3.156253
48	1436.819	1437.036	1433.981	1435.945	1.681241	3.157138
51	1423.64	1438.683	1436.521	1432.948	1.70757	3.15623
54	1425.51	1428.73	1426.779	1427.007	1.732394	3.154426
57	1421.985	1420.986	1420.358	1421.109	1.755875	3.152628
60	1436.33	1417.418	1416.884	1423.544	1.778151	3.153371
63	1414.205	1427.439	1426.543	1422.729	1.799341	3.153122
66	1416.326	1425.923	1424.643	1422.297	1.819544	3.15299
69	1413.323	1419.45	1418.716	1417.163	1.838849	3.15142
72	1412.069	1395.786	1392.563	1400.139	1.857332	3.146171
75	1437.409	1421.697	1418.047	1425.718	1.875061	3.154033
78	1408.551	1419.55	1419.289	1415.797	1.892095	3.151001
81	1431.435	1431.133	1421.521	1428.03	1.908485	3.154737
84	1423.653	1391.638	1389.034	1401.442	1.924279	3.146575
87	1411.56	1420.484	1419.165	1417.07	1.939519	3.151391
90	1395.73	1412.172	1409.763	1405.888	1.954243	3.147951
93	1427.139	1413.944	1416.217	1419.1	1.968483	3.152013
96	1390.217	1402.96	1401.61	1398.262	1.982271	3.145589
99	1401.666	1390.671	1385.442	1392.593	1.995635	3.143824
102	1382.665	1410.645	1411.886	1401.732	2.0086	3.146665
105	1422.827	1411.862	1407.805	1414.165	2.021189	3.1505
108	1419.169	1381.758	1380.457	1393.794	2.033424	3.144199
111	1415.365	1384.018	1386.716	1395.366	2.045323	3.144688
114	1422.53	1421.255	1421.709	1421.831	2.056905	3.152848
117	1386.162	1395.45	1397.301	1392.971	2.068186	3.143942
120	1372.73	1376.913	1373.901	1374.515	2.079181	3.138149
123	1374.75	1373.762	1373.701	1374.071	2.089905	3.138009
126	1423.532	1432.492	1431.183	1429.069	2.100371	3.155053
129	1409.26	1383.729	1348.223	1380.404	2.11059	3.140006
132	1397.985	1386.136	1380.524	1388.215	2.120574	3.142457
135	1394.793	1395.367	1393.773	1394.644	2.130334	3.144463
138	1429.616	1401.183	1397.664	1409.488	2.139879	3.149061
141	1409.608	1368.523	1363.331	1380.487	2.149219	3.140032
144	1373.925	1357.887	1358.912	1363.575	2.158362	3.134679
147	1350.514	1351.669	1352.935	1351.706	2.167317	3.130882
150	1414.069	1397.3	1393.125	1401.498	2.176091	3.146592

Sample 1152						
Image 8743		Particle O_3		Approximate Particle size - 934.4374 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1219.986	1221.713	1220.309	1220.669	0.477121	3.086598
6	1183.583	1184.246	1183.297	1183.709	0.778151	3.073245
9	1181.324	1182.999	1180.841	1181.721	0.954243	3.072515
12	1178.584	1179.07	1179.216	1178.957	1.079181	3.071498
15	1174.623	1174.068	1173.835	1174.175	1.176091	3.069733
18	1170.297	1178.831	1168.914	1172.681	1.255273	3.06918
21	1167.239	1175.167	1165.607	1169.338	1.322219	3.06794
24	1161.071	1164.201	1164.075	1163.116	1.380211	3.065623
27	1153.567	1159.834	1149.835	1154.412	1.431364	3.062361
30	1124.561	1129.169	1125.206	1126.312	1.477121	3.051659
33	1114.266	1142.553	1138.59	1131.803	1.518514	3.053771
36	1142.423	1127.605	1118.147	1129.392	1.556303	3.052845
39	1133.47	1143.355	1133.897	1136.907	1.591065	3.055725
42	1129.378	1152.976	1149.013	1143.789	1.623249	3.058346
45	1093.046	1144.145	1110.448	1115.88	1.653213	3.047617
48	1112.921	1161.223	1130.323	1134.822	1.681241	3.054928
51	1124.383	1098.673	1122.761	1115.273	1.70757	3.047381
54	1086.679	1073.329	1064.028	1074.678	1.732394	3.031278
57	1083.036	1069.149	1065.343	1072.509	1.755875	3.030401
60	1063.284	1098.762	1094.956	1085.667	1.778151	3.035697
63	1057.488	1083.934	1080.128	1073.85	1.799341	3.030944
66	1064.077	1097.777	1095.742	1085.865	1.819544	3.035776
69	1061.291	1114.707	1108.847	1094.948	1.838849	3.039394
72	1068.654	1127.861	1116.314	1104.276	1.857332	3.043078
75	1103.087	1081.529	1138.634	1107.75	1.875061	3.044442
78	1029.248	1086.581	1071.495	1062.441	1.892095	3.026305
81	1031.985	1050.003	1041.145	1041.044	1.908485	3.017469
84	1063.355	1056.48	1051.87	1057.235	1.924279	3.024172
87	1066.918	1075.069	1066.023	1069.337	1.939519	3.029114
90	1000.836	1050.87	1031.339	1027.682	1.954243	3.011859
93	1032.863	1052.704	1028.624	1038.064	1.968483	3.016224
96	1043.06	1055.763	1039.742	1046.188	1.982271	3.01961
99	1058.916	1067.642	1050.394	1058.984	1.995635	3.024889
102	1000.979	1215.753	1127.813	1114.848	2.0086	3.047216
105	988.3149	1071.133	1051.595	1037.014	2.021189	3.015785
108	1029.536	1066.812	1063.906	1053.418	2.033424	3.022601
111	956.0364	1073.697	1084.148	1037.961	2.045323	3.016181
114	962.9662	1076.032	992.0657	1010.355	2.056905	3.004474
117	974.999	1069.102	990.2387	1011.446	2.068186	3.004943
120	994.8843	1065.056	988.8321	1016.257	2.079181	3.007004
123	1026.682	1061.71	979.7504	1022.714	2.089905	3.009754
126	935.6293	1051.902	988.3699	991.9669	2.100371	2.996497
129	934.2137	1005.86	996.129	978.7344	2.11059	2.990665
132	954.7442	1032.846	1025.659	1004.416	2.120574	3.001914
135	1022.006	1010.803	995.1594	1009.323	2.130334	3.00403
138	898.0374	1080.627	995.0018	991.2221	2.139879	2.996171
141	900.6833	1087.912	999.5999	996.065	2.149219	2.998288
144	929.1883	1062.162	986.9802	992.7769	2.158362	2.996852
147	929.892	997.6481	982.559	970.033	2.167317	2.986787
150	937.889	991.1608	981.4444	970.1647	2.176091	2.986845

Sample 1152						
Image 8744		Particle O_1A		Approximate Particle size - 1661.374 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1233.002	1233.066	1232.721	1232.93	0.477121	3.090938
6	1173.04	1173.304	1175.55	1173.965	0.778151	3.069655
9	1174.399	1185.268	1176.769	1178.812	0.954243	3.071445
12	1166.883	1180.084	1179.475	1175.481	1.079181	3.070215
15	1169.386	1166.871	1170.799	1169.019	1.176091	3.067821
18	1161.045	1156.111	1156.844	1158	1.255273	3.063709
21	1152.638	1180.114	1203.839	1178.864	1.322219	3.071464
24	1156.711	1180.051	1173.035	1169.932	1.380211	3.068161
27	1158.331	1170.842	1204.113	1177.762	1.431364	3.071058
30	1157.168	1164.931	1155.275	1159.124	1.477121	3.06413
33	1156.708	1154.557	1156.958	1156.074	1.518514	3.062986
36	1150.109	1143.116	1198.556	1163.927	1.556303	3.065926
39	1146.725	1190.402	1152.78	1163.302	1.591065	3.065693
42	1151.138	1188.618	1192.935	1177.564	1.623249	3.070984
45	1152.481	1188.006	1192.838	1177.775	1.653213	3.071062
48	1139.353	1186.536	1191.328	1172.406	1.681241	3.069078
51	1151.538	1185.95	1145.502	1160.997	1.70757	3.064831
54	1137.209	1193.58	1185.198	1171.996	1.732394	3.068926
57	1152.508	1182.507	1187.842	1174.286	1.755875	3.069774
60	1152.759	1161.488	1203.125	1172.457	1.778151	3.069097
63	1136.163	1168.43	1180.765	1161.786	1.799341	3.065126
66	1127.65	1176.96	1200.473	1168.361	1.819544	3.067577
69	1131.497	1144.86	1194.809	1157.055	1.838849	3.063354
72	1157.48	1152.138	1176.742	1162.12	1.857332	3.065251
75	1146.798	1167.541	1198.358	1170.899	1.875061	3.068519
78	1131.544	1155.946	1173.435	1153.641	1.892095	3.062071
81	1158.625	1171.048	1197.372	1175.681	1.908485	3.07029
84	1134.794	1105.164	1120.163	1120.04	1.924279	3.049234
87	1138.016	1149.078	1177.852	1154.982	1.939519	3.062575
90	1134.281	1141.381	1170.157	1148.606	1.954243	3.060171
93	1114.362	1204.007	1211.844	1176.738	1.968483	3.07068
96	1125.394	1157.83	1195.08	1159.435	1.982271	3.064246
99	1131.023	1131.018	1168.96	1143.667	1.995635	3.0583
102	1132.591	1206.536	1210.935	1183.354	2.0086	3.073115
105	1142.056	1158.444	1159.021	1153.174	2.021189	3.061895
108	1153.529	1147.918	1179.858	1160.435	2.033424	3.064621
111	1111.768	1186.899	1171.768	1156.811	2.045323	3.063263
114	1114.072	1101.597	1172.217	1129.295	2.056905	3.052807
117	1117.901	1103.084	1150.681	1123.889	2.068186	3.050723
120	1113.378	1201.578	1156.145	1157.033	2.079181	3.063346
123	1091.252	1165.559	1202.933	1153.248	2.089905	3.061923
126	1073.255	1112.992	1195.975	1127.407	2.100371	3.052081
129	1070.26	1102.37	1189.683	1120.771	2.11059	3.049517
132	1076.538	1094.307	1163.743	1111.529	2.120574	3.045921
135	1080.745	1209.632	1165.881	1152.086	2.130334	3.061485
138	1083.403	1210.876	1165.248	1153.176	2.139879	3.061896
141	1091.394	1203.043	1152.614	1149.017	2.149219	3.060326
144	1096.625	1154.145	1133.812	1128.194	2.158362	3.052384
147	1099.354	1114.388	1105.61	1106.451	2.167317	3.043932
150	1100.384	1090.792	1211.276	1134.151	2.176091	3.054671

Sample 1152						
Image 8744		Particle O_1B		Approximate Particle size - 1280.175 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	829.6051	832.1556	829.8481	830.5363	0.477121	2.918871
6	792.2318	796.7714	794.7498	794.5843	0.778151	2.898852
9	783.6156	786.157	785.3319	785.0348	0.954243	2.894103
12	782.9465	787.4306	784.3853	784.9208	1.079181	2.893732
15	780.5128	781.2864	780.1335	780.6442	1.176091	2.89238
18	776.2238	791.9706	777.2182	781.8042	1.255273	2.889987
21	774.4384	787.514	776.0024	779.3183	1.322219	2.888987
24	773.9244	784.6521	775.3247	777.9671	1.380211	2.888699
27	770.4409	774.004	771.2137	771.8862	1.431364	2.886739
30	768.7919	773.3533	769.5203	770.5552	1.477121	2.885809
33	768.2657	771.9605	770.1454	770.1239	1.518514	2.885511
36	769.9622	783.9692	770.5349	774.8221	1.556303	2.886469
39	772.9025	774.2083	773.8239	773.6449	1.591065	2.888125
42	766.2038	791.5051	766.0214	774.5768	1.623249	2.884344
45	768.7791	791.393	770.8616	777.0112	1.653213	2.885802
48	766.5054	774.7102	766.7189	769.3115	1.681241	2.884515
51	764.8391	787.7319	766.1576	772.9095	1.70757	2.88357
54	758.9489	788.6508	760.5919	769.3972	1.732394	2.880213
57	762.9286	761.847	764.5401	763.1052	1.755875	2.882484
60	760.5754	772.5858	761.9038	765.0217	1.778151	2.881142
63	768.2185	784.313	769.4896	774.007	1.799341	2.885485
66	758.0945	775.0896	759.5866	764.2569	1.819544	2.879723
69	777.5455	776.837	780.9401	778.4409	1.838849	2.890726
72	759.5614	758.4551	760.2014	759.406	1.857332	2.880563
75	770.5869	780.0818	772.3846	774.3511	1.875061	2.886822
78	750.8424	776.1815	752.3328	759.7856	1.892095	2.875549
81	776.8395	764.1759	778.397	773.1375	1.908485	2.890331
84	762.7698	772.4933	763.1867	766.1499	1.924279	2.882393
87	747.0436	772.7202	747.3065	755.6901	1.939519	2.878344
90	741.7392	745.1256	744.8915	743.9188	1.954243	2.871526
93	772.5835	788.1368	773.4999	778.0734	1.968483	2.891021
96	730.8817	770.8755	734.1434	745.3002	1.982271	2.872331
99	728.6462	773.0615	729.8423	743.85	1.995635	2.871485
102	737.5815	761.1495	739.9513	746.2274	2.0086	2.872871
105	782.4678	752.3683	783.9266	772.9209	2.021189	2.888135
108	774.0425	792.3386	775.5033	780.6281	2.033424	2.892444
111	773.5919	750.062	774.3332	765.9957	2.045323	2.884226
114	759.8716	723.63	761.0791	748.1936	2.056905	2.874014
117	727.0223	809.059	728.1423	754.7412	2.068186	2.877798
120	769.4378	800.5569	770.7797	780.2581	2.079181	2.892238
123	756.1341	787.648	757.4431	767.0751	2.089905	2.884838
126	743.5982	763.8679	744.9568	750.8076	2.100371	2.875529
129	746.8677	736.9136	751.0444	744.9419	2.11059	2.872122
132	739.1576	708.6412	742.2264	730.0084	2.120574	2.863328
135	721.2507	696.5399	722.379	713.3899	2.130334	2.853327
138	767.7572	792.6279	766.0681	775.4844	2.139879	2.889573
141	734.0444	794.1	735.2041	754.4495	2.149219	2.87763
144	715.3472	772.9576	716.4294	734.9114	2.158362	2.866235
147	710.9263	756.4337	711.0093	726.1231	2.167317	2.86101
150	706.9667	751.8715	706.9676	721.9353	2.176091	2.858498

Sample 1152						
Image 8744		Particle O_2		Approximate Particle size - 1793.278 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1784.08	1791.931	1785.8	1787.27	0.477121	3.25219
6	1540.496	1539.966	1539.964	1540.142	0.778151	3.187561
9	1510.675	1507.713	1509.984	1509.458	0.954243	3.178821
12	1502.668	1501.832	1500.692	1501.731	1.079181	3.176592
15	1498.553	1501.078	1499.947	1499.859	1.176091	3.17605
18	1495.178	1494.395	1491.247	1493.607	1.255273	3.174236
21	1494.558	1493.797	1511.112	1499.822	1.322219	3.17604
24	1490.009	1511.808	1492.93	1498.249	1.380211	3.175584
27	1487.094	1509.988	1500.828	1499.303	1.431364	3.175889
30	1486.986	1483.64	1485.524	1485.383	1.477121	3.171838
33	1483.562	1508.219	1509.42	1500.401	1.518514	3.176207
36	1483.749	1537.411	1522.015	1514.392	1.556303	3.180238
39	1470.618	1471.748	1488.451	1476.939	1.591065	3.169362
42	1471.854	1537.503	1483.16	1497.505	1.623249	3.175368
45	1472.695	1497.163	1511.591	1493.816	1.653213	3.174297
48	1470.905	1562.217	1496.899	1510.007	1.681241	3.178979
51	1478.565	1503.428	1517.65	1499.881	1.70757	3.176057
54	1460.694	1459.765	1490.117	1470.192	1.732394	3.167374
57	1468.564	1558.194	1470.796	1499.185	1.755875	3.175855
60	1463.664	1462.723	1512.676	1479.688	1.778151	3.17017
63	1452.704	1457.173	1482.896	1464.257	1.799341	3.165617
66	1475.238	1550.569	1476.896	1500.901	1.819544	3.176352
69	1448.756	1453.474	1515.654	1472.628	1.838849	3.168093
72	1455.243	1542.216	1499.713	1499.057	1.857332	3.175818
75	1456.644	1483.703	1508.264	1482.87	1.875061	3.171103
78	1458.398	1471.783	1460.357	1463.513	1.892095	3.165396
81	1438.856	1534.852	1493.532	1489.08	1.908485	3.172918
84	1445.306	1508.212	1494.256	1482.591	1.924279	3.171021
87	1434.536	1532.579	1464.881	1477.332	1.939519	3.169478
90	1442.215	1503.648	1499.052	1481.638	1.954243	3.170742
93	1453.166	1456.07	1455.816	1455.017	1.968483	3.162868
96	1422.792	1575.227	1528.987	1509.002	1.982271	3.17869
99	1420.236	1536.216	1498.675	1485.042	1.995635	3.171739
102	1423.585	1524.247	1496.219	1481.35	2.0086	3.170658
105	1426.049	1527.3	1485.416	1479.588	2.021189	3.170141
108	1447.166	1444.419	1457.603	1449.729	2.033424	3.161287
111	1436.227	1578.48	1508.872	1507.86	2.045323	3.178361
114	1439.432	1525.251	1454.325	1473.003	2.056905	3.168204
117	1448.771	1515.372	1440.376	1468.173	2.068186	3.166777
120	1386.165	1504.502	1507.075	1465.914	2.079181	3.166109
123	1407.712	1501.667	1487.458	1465.612	2.089905	3.166019
126	1413.472	1437.495	1468.196	1439.721	2.100371	3.158278
129	1427.1	1566.261	1472.012	1488.458	2.11059	3.172736
132	1415.222	1542.681	1448.49	1468.798	2.120574	3.166962
135	1406.888	1489.804	1429.357	1442.017	2.130334	3.15897
138	1407.033	1437.102	1519.854	1454.663	2.139879	3.162762
141	1411.681	1568.111	1518.813	1499.535	2.149219	3.175957
144	1401.291	1530.845	1508.517	1480.218	2.158362	3.170326
147	1412.654	1408.455	1518.994	1446.701	2.167317	3.160379
150	1402.269	1403.799	1427.793	1411.287	2.176091	3.149615

Sample 1152						
Image 8745		Particle O_1		Approximate Particle size - 1606.04 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1541.713	1540.551	1541.778	1541.347	0.477121	3.187901
6	1422.002	1419.908	1422.565	1421.492	0.778151	3.152744
9	1401.444	1399.788	1398.729	1399.987	0.954243	3.146124
12	1396.126	1393.211	1396.621	1395.319	1.079181	3.144674
15	1390.911	1386.366	1390.564	1389.28	1.176091	3.14279
18	1388.7	1384.404	1387.684	1386.929	1.255273	3.142054
21	1388.874	1381.408	1384.688	1384.99	1.322219	3.141447
24	1388.496	1391.107	1388.895	1389.499	1.380211	3.142858
27	1381.382	1459.113	1382.927	1407.807	1.431364	3.148543
30	1381.645	1378.59	1384.36	1381.532	1.477121	3.140361
33	1378.68	1456.52	1380.733	1405.311	1.518514	3.147772
36	1374.91	1373.689	1377.545	1375.381	1.556303	3.138423
39	1366.059	1454.109	1376.717	1398.962	1.591065	3.145806
42	1362.408	1390.013	1367.204	1373.208	1.623249	3.137736
45	1374.195	1447.428	1373.765	1398.463	1.653213	3.145651
48	1375.634	1463.997	1371.249	1403.627	1.681241	3.147252
51	1369.464	1396.9	1390.098	1385.487	1.70757	3.141603
54	1367.931	1506.121	1366.407	1413.486	1.732394	3.150292
57	1383.857	1512.465	1376.447	1424.256	1.755875	3.153588
60	1372.766	1492.179	1366.346	1410.431	1.778151	3.149352
63	1361.661	1542.43	1356.759	1420.283	1.799341	3.152375
66	1364.242	1363.55	1373.68	1367.158	1.819544	3.135819
69	1359.014	1397.05	1380.633	1378.899	1.838849	3.139532
72	1358	1436.809	1359.387	1384.732	1.857332	3.141366
75	1346.612	1490.198	1353.666	1396.825	1.875061	3.145142
78	1342.723	1528.976	1387.066	1419.588	1.892095	3.152162
81	1358.113	1440.279	1359.243	1385.878	1.908485	3.141725
84	1366.773	1493.488	1334.343	1398.201	1.924279	3.14557
87	1337.098	1343.83	1392.831	1357.92	1.939519	3.132874
90	1369.986	1559.273	1387.048	1438.769	1.954243	3.157991
93	1332.661	1369.381	1345.915	1349.319	1.968483	3.130115
96	1355.085	1535.914	1351.391	1414.13	1.982271	3.150489
99	1350.19	1420.942	1340.536	1370.556	1.995635	3.136897
102	1328.66	1566.98	1374.757	1423.466	2.0086	3.153347
105	1327.974	1469.715	1363.987	1387.225	2.021189	3.142147
108	1358.786	1559.249	1325.076	1414.37	2.033424	3.150563
111	1329.674	1547.325	1351.356	1409.452	2.045323	3.14905
114	1320.271	1477.735	1318.944	1372.316	2.056905	3.137454
117	1312.038	1376.429	1323.716	1337.394	2.068186	3.12626
120	1339.561	1554.357	1443.053	1445.657	2.079181	3.160065
123	1335.433	1502.267	1305.899	1381.2	2.089905	3.140256
126	1308.253	1450.126	1306.502	1354.96	2.100371	3.131927
129	1342.759	1336.38	1433.683	1370.94	2.11059	3.137019
132	1338.591	1615.842	1420.994	1458.476	2.120574	3.163899
135	1330.454	1594.162	1362.896	1429.17	2.130334	3.155084
138	1330.489	1535.537	1346.021	1404.015	2.139879	3.147372
141	1331.051	1341.99	1314.183	1329.075	2.149219	3.123549
144	1320.176	1307.423	1471.62	1366.406	2.158362	3.13558
147	1333.42	1531.611	1435.289	1433.44	2.167317	3.156379
150	1299.879	1479.691	1341.65	1373.74	2.176091	3.137905

Sample 1152						
Image 8745		Particle O_2		Approximate Particle size - 2995.324 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1716.755	1716.607	1717.08	1716.814	0.477121	3.234723
6	1687.363	1689.268	1688.386	1688.339	0.778151	3.22746
9	1681.209	1682.672	1677.77	1680.55	0.954243	3.225452
12	1673.212	1670.423	1668.794	1670.809	1.079181	3.222927
15	1668.546	1667.909	1663.481	1666.645	1.176091	3.221843
18	1667.239	1682.996	1664.506	1671.58	1.255273	3.223127
21	1667.043	1664.051	1662.726	1664.607	1.322219	3.221312
24	1663.397	1680.812	1662.523	1668.911	1.380211	3.222433
27	1671.863	1660.321	1665.215	1665.799	1.431364	3.221623
30	1665.547	1678.24	1654.383	1666.057	1.477121	3.22169
33	1656.982	1652.502	1655.127	1654.87	1.518514	3.218764
36	1652.085	1675.297	1651.062	1659.482	1.556303	3.219972
39	1646.756	1676.903	1648.285	1657.315	1.591065	3.219405
42	1665.103	1664.903	1652.247	1660.751	1.623249	3.220305
45	1655.232	1655.092	1648.854	1653.059	1.653213	3.218288
48	1662.548	1663.458	1639.855	1655.287	1.681241	3.218873
51	1640.202	1681.024	1641.156	1654.127	1.70757	3.218569
54	1662.984	1644.297	1643.22	1650.167	1.732394	3.217528
57	1651.527	1662.942	1645.002	1653.157	1.755875	3.218314
60	1660.987	1670.163	1609.642	1646.93	1.778151	3.216675
63	1629.973	1629.019	1625.58	1628.191	1.799341	3.211705
66	1636.201	1646.417	1641.888	1641.502	1.819544	3.215241
69	1639.302	1725.499	1619.416	1661.406	1.838849	3.220476
72	1650.506	1701.899	1613.438	1655.281	1.857332	3.218872
75	1620.346	1622.145	1618.265	1620.252	1.875061	3.209582
78	1596.133	1670.049	1625.7	1630.627	1.892095	3.212355
81	1613.38	1624.501	1614.303	1617.394	1.908485	3.208816
84	1635.225	1614.736	1611.004	1620.322	1.924279	3.209601
87	1627.671	1639.644	1631.251	1632.855	1.939519	3.212948
90	1596.148	1639.635	1591.1	1608.961	1.954243	3.206545
93	1591.188	1628.016	1617.278	1612.16	1.968483	3.207408
96	1624.583	1574.296	1589.303	1596.061	1.982271	3.203049
99	1630.772	1690.903	1625.658	1649.111	1.995635	3.21725
102	1574.74	1633.985	1569.781	1592.836	2.0086	3.202171
105	1565.559	1728.109	1599.386	1631.018	2.021189	3.212459
108	1563.119	1701.635	1555.058	1606.604	2.033424	3.205909
111	1607.889	1649.504	1577.684	1611.692	2.045323	3.207282
114	1613.732	1639.366	1629.163	1627.42	2.056905	3.2115
117	1592.883	1593.185	1546.74	1577.603	2.068186	3.197998
120	1621.169	1667.152	1583.438	1623.92	2.079181	3.210565
123	1583.335	1585.552	1516.224	1561.704	2.089905	3.193599
126	1561.788	1579.167	1530.448	1557.134	2.100371	3.192326
129	1561.949	1733.283	1558.347	1617.86	2.11059	3.208941
132	1519.377	1671.061	1602.784	1597.741	2.120574	3.203506
135	1497.922	1576.415	1493.834	1522.724	2.130334	3.182621
138	1534.427	1574.84	1510.499	1539.922	2.139879	3.187499
141	1551.806	1568.849	1552.919	1557.858	2.149219	3.192528
144	1580.92	1490.49	1470.976	1514.129	2.158362	3.180163
147	1589.663	1663.741	1548.955	1600.786	2.167317	3.204333
150	1601.547	1664.463	1502.313	1589.441	2.176091	3.201244

Sample 1152						
Image 8745		Particle O_3A		Approximate Particle size - 1797.954 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1179.812	1179.093	1182.168	1180.358	0.477121	3.072014
6	1151.278	1152.994	1151.165	1151.813	0.778151	3.061382
9	1148.178	1149.65	1148.581	1148.803	0.954243	3.060245
12	1144.959	1148.121	1172.656	1155.245	1.079181	3.062674
15	1140.825	1141.473	1159.518	1147.272	1.176091	3.059666
18	1142.934	1146.324	1168.893	1152.717	1.255273	3.061723
21	1138.522	1139.629	1169.424	1149.192	1.322219	3.060392
24	1135.994	1141.128	1138.903	1138.675	1.380211	3.0564
27	1132.347	1135.062	1192.796	1153.401	1.431364	3.06198
30	1133.986	1138.296	1192.885	1155.056	1.477121	3.062603
33	1125.219	1127.633	1190.21	1147.687	1.518514	3.059824
36	1129.228	1137.3	1173.046	1146.525	1.556303	3.059383
39	1130.125	1124.091	1188.475	1147.564	1.591065	3.059777
42	1120.27	1122.214	1154.505	1132.33	1.623249	3.053973
45	1105.79	1107.722	1195.351	1136.288	1.653213	3.055488
48	1133.048	1111.353	1123.836	1122.746	1.681241	3.050281
51	1117.975	1102.547	1210.132	1143.551	1.70757	3.058256
54	1115.814	1119.282	1112.147	1115.747	1.732394	3.047566
57	1091.448	1095.103	1204.227	1130.259	1.755875	3.053178
60	1112.482	1119.443	1228.106	1153.343	1.778151	3.061959
63	1089.124	1086.667	1112.803	1096.198	1.799341	3.039889
66	1096.656	1100.788	1200.619	1132.688	1.819544	3.05411
69	1084.278	1088.291	1213.131	1128.566	1.838849	3.052527
72	1084.245	1087.619	1179.181	1117.015	1.857332	3.048059
75	1093.861	1096.723	1150.761	1113.782	1.875061	3.0468
78	1063.778	1072.012	1138.569	1091.453	1.892095	3.038005
81	1096.023	1084.052	1129.442	1103.172	1.908485	3.042643
84	1104.639	1112.753	1227.534	1148.309	1.924279	3.060059
87	1083.91	1088.066	1107.38	1093.119	1.939519	3.038667
90	1085.949	1046.087	1241.524	1124.52	1.954243	3.050967
93	1079.018	1090.92	1232.933	1134.29	1.968483	3.054724
96	1092.222	1108.604	1170.369	1123.732	1.982271	3.050663
99	1111.639	1121.871	1157.363	1130.291	1.995635	3.05319
102	1108.64	1113.678	1142.642	1121.653	2.0086	3.049859
105	1091.492	1102.001	1071.933	1088.475	2.021189	3.036819
108	1093.992	1089.815	1153.047	1112.285	2.033424	3.046216
111	1038.589	1038.657	1116.935	1064.727	2.045323	3.027238
114	1089.242	1100.351	1083.373	1090.989	2.056905	3.03782
117	1097.007	1106.477	1262.029	1155.171	2.068186	3.062646
120	1106.351	1123.612	1162.641	1130.868	2.079181	3.053412
123	1038.937	1022.03	1052.809	1037.925	2.089905	3.016166
126	1086.607	1094.076	1196.596	1125.759	2.100371	3.051446
129	1073.343	1086.985	1144.648	1101.659	2.11059	3.042047
132	1086.678	1102.661	1127.288	1105.542	2.120574	3.043575
135	1087.6	1102.404	1140.559	1110.187	2.130334	3.045396
138	1046.075	1048.572	1133.782	1076.143	2.139879	3.03187
141	1125.838	1043.992	1205.372	1125.067	2.149219	3.051179
144	1127.693	1041.041	1208.798	1125.844	2.158362	3.051478
147	1128.036	1138.507	1192.22	1152.921	2.167317	3.061799
150	1130.664	1131.325	1144.787	1135.592	2.176091	3.055222

Sample 1152						
Image 8745		Particle O_3B		Approximate Particle size - 1653.288 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1037.799	1037.171	1037.585	1037.518	0.477121	3.015996
6	1019.873	1020.05	1020.356	1020.093	0.778151	3.00864
9	1015.063	1018.088	1015.546	1016.232	0.954243	3.006993
12	1013.603	1014.267	1014.429	1014.1	1.079181	3.006081
15	1010.977	1014.873	1011.009	1012.286	1.176091	3.005303
18	1007.304	1012.532	1019.408	1013.081	1.255273	3.005644
21	1004.536	1009.383	1016.356	1010.092	1.322219	3.004361
24	1007.284	1009.586	1028.354	1015.075	1.380211	3.006498
27	1004.224	1010.315	1020.456	1011.665	1.431364	3.005037
30	1001.905	1009.049	1037.757	1016.237	1.477121	3.006995
33	1002.583	1002.938	1030.898	1012.14	1.518514	3.00524
36	999.4178	1003.876	1034.977	1012.757	1.556303	3.005505
39	998.0551	1004.903	1032.352	1011.77	1.591065	3.005082
42	999.4604	1002.535	1030.202	1010.732	1.623249	3.004636
45	997.8621	1002.137	999.7701	999.9231	1.653213	2.999967
48	994.4562	1004.348	1047.093	1015.299	1.681241	3.006594
51	989.6166	1003.364	1044.321	1012.434	1.70757	3.005367
54	992.6891	1000.483	1040.792	1011.321	1.732394	3.004889
57	990.5309	995.2368	1029.348	1005.039	1.755875	3.002183
60	990.8535	1002.333	1014.231	1002.472	1.778151	3.001072
63	992.1009	993.7243	1045.81	1010.545	1.799341	3.004556
66	984.5786	988.0224	1000.208	990.9363	1.819544	2.996046
69	984.2308	998.2546	1001.083	994.5228	1.838849	2.997615
72	982.8928	985.5451	987.3597	985.2659	1.857332	2.993553
75	981.8084	992.8673	1040.805	1005.16	1.875061	3.002235
78	975.1637	988.2911	1041.019	1001.491	1.892095	3.000647
81	973.1387	978.5499	1039.204	996.9642	1.908485	2.99868
84	973.1423	977.8031	1037.859	996.2682	1.924279	2.998376
87	967.2513	987.3103	1035.101	996.5543	1.939519	2.998501
90	967.5449	971.6516	1032.923	990.7064	1.954243	2.995945
93	973.9965	971.377	1004.47	983.281	1.968483	2.992678
96	959.3997	989.3333	1028.794	992.5088	1.982271	2.996734
99	963.7858	983.09	1016.757	987.8775	1.995635	2.994703
102	956.9297	968.4786	1048.175	991.1944	2.0086	2.996159
105	956.4166	964.8638	1048.774	990.018	2.021189	2.995643
108	959.6765	978.5488	1046.739	994.9879	2.033424	2.997818
111	939.8422	958.6251	1010.892	969.7864	2.045323	2.986676
114	924.3768	933.981	994.0911	950.8163	2.056905	2.978097
117	928.7759	933.4633	1029.841	964.0268	2.068186	2.984089
120	935.4523	927.4779	1026.09	963.0066	2.079181	2.983629
123	943.5555	921.1563	1013.995	959.5689	2.089905	2.982076
126	959.605	931.6547	1012.081	967.7803	2.100371	2.985777
129	964.0546	928.752	978.9579	957.2548	2.11059	2.981028
132	873.4363	929.4904	964.8442	922.5903	2.120574	2.965009
135	869.8065	941.5502	1089.31	966.889	2.130334	2.985377
138	874.0654	951.1836	1075.22	966.823	2.139879	2.985347
141	886.3812	960.7207	1047.698	964.9333	2.149219	2.984497
144	904.1274	966.2288	1048.633	972.9963	2.158362	2.988111
147	910.0707	964.212	1048.401	974.2277	2.167317	2.98866
150	923.5966	965.6533	1045.606	978.2852	2.176091	2.990465

Sample 1152						
Image 8746		Particle O_1		Approximate Particle size - 134.0575 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1576.845	1576.9	1576.9	1576.881	0.477121	3.197799
6	1533.758	1533.814	1533.814	1533.795	0.778151	3.185767
9	1515.795	1515.85	1515.85	1515.832	0.954243	3.180651
12	1508.973	1509.028	1509.028	1509.01	1.079181	3.178692
15	1505.908	1505.963	1505.963	1505.944	1.176091	3.177809
18	1507.059	1507.114	1507.114	1507.096	1.255273	3.178141
21	1504.192	1504.221	1504.221	1504.211	1.322219	3.177309
24	1505.988	1506.017	1506.017	1506.008	1.380211	3.177827
27	1501.892	1501.921	1501.921	1501.911	1.431364	3.176644
30	1590.012	1495.93	1495.93	1527.291	1.477121	3.183922
33	1588.588	1493.448	1493.448	1525.161	1.518514	3.183316
36	1581.412	1487.33	1487.33	1518.691	1.556303	3.181469
39	1484.654	1484.683	1484.683	1484.673	1.591065	3.171631
42	1489.051	1489.08	1489.08	1489.07	1.623249	3.172915
45	1585.162	1490.093	1490.093	1521.783	1.653213	3.182353
48	1475.277	1475.303	1475.303	1475.294	1.681241	3.168879
51	1570.999	1476.477	1476.477	1507.984	1.70757	3.178397
54	1477.709	1477.738	1477.738	1477.728	1.732394	3.169595
57	1569.402	1469.214	1469.214	1502.61	1.755875	3.176846
60	1578.869	1478.681	1478.681	1512.077	1.778151	3.179574
63	1557.931	1459.426	1459.426	1492.261	1.799341	3.173845
66	1461.814	1461.843	1461.843	1461.834	1.819544	3.164898
69	1522.929	1473.867	1473.867	1490.221	1.838849	3.173251
72	1480.038	1482.207	1482.207	1481.484	1.857332	3.170697
75	1467.936	1470.106	1470.106	1469.382	1.875061	3.167135
78	1563.535	1468.222	1468.222	1499.993	1.892095	3.176089
81	1515.618	1466.523	1466.523	1482.888	1.908485	3.171108
84	1552.187	1458.02	1458.02	1489.409	1.924279	3.173014
87	1469.1	1471.27	1471.27	1470.547	1.939519	3.167479
90	1490.959	1441.863	1441.863	1458.228	1.954243	3.163826
93	1613.951	1451.019	1451.019	1505.33	1.968483	3.177632
96	1614.447	1476.762	1476.762	1522.657	1.982271	3.182602
99	1629.088	1448.749	1448.749	1508.862	1.995635	3.17865
102	1538.41	1444.005	1444.005	1475.473	2.0086	3.168931
105	1434.715	1439.98	1439.98	1438.225	2.021189	3.157827
108	1609.102	1438.309	1438.309	1495.24	2.033424	3.174711
111	1579.092	1444.812	1444.812	1489.572	2.045323	3.173062
114	1603.694	1451.519	1451.519	1502.244	2.056905	3.17674
117	1572.957	1432.547	1432.547	1479.35	2.068186	3.170071
120	1565.338	1426.643	1426.643	1472.874	2.079181	3.168166
123	1522.408	1435.061	1435.061	1464.177	2.089905	3.165594
126	1587.384	1434.304	1434.304	1485.331	2.100371	3.171823
129	1563.204	1431.192	1431.192	1475.196	2.11059	3.16885
132	1545.678	1412.299	1412.299	1456.759	2.120574	3.163388
135	1592.096	1383.728	1383.728	1453.184	2.130334	3.162321
138	1589.655	1385.134	1385.134	1453.308	2.139879	3.162358
141	1619.54	1382.789	1382.789	1461.706	2.149219	3.16486
144	1616.841	1394.315	1394.315	1468.49	2.158362	3.166871
147	1605.111	1418.445	1418.445	1480.667	2.167317	3.170457
150	1585.78	1478.346	1478.346	1514.157	2.176091	3.180171

Sample 1152						
Image 8746		Particle O_2		Approximate Particle size - 59.38626 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	3040.029	3040.392	3039.778	3040.066	0.477121	3.482883
6	2654.234	2655.361	2654.879	2654.825	0.778151	3.424036
9	2512.104	2499.359	2509.003	2506.822	0.954243	3.399124
12	2370.565	2378.287	2371.21	2373.354	1.079181	3.375363
15	2259.953	2267.209	2258.567	2261.91	1.176091	3.354475
18	2302.209	2303.106	2303.859	2303.058	1.255273	3.362305
21	2285.338	2283.026	2290.373	2286.246	1.322219	3.359123
24	2194.915	2183.443	2195.995	2191.451	1.380211	3.340732
27	2111.443	2148.476	2117.563	2125.827	1.431364	3.327528
30	2077.383	2085.029	2087.648	2083.353	1.477121	3.318763
33	1942.034	1945.528	1946.245	1944.602	1.518514	3.288831
36	1953.396	1992.287	1952.336	1966.006	1.556303	3.293585
39	1941.019	1931.824	1954.66	1942.501	1.591065	3.288361
42	1929.143	2002.231	1942.107	1957.827	1.623249	3.291774
45	2034.312	2038.353	2033.994	2035.553	1.653213	3.308682
48	1867.886	1969.313	1963.424	1933.541	1.681241	3.286353
51	1755.46	1830.964	1777.397	1787.941	1.70757	3.252353
54	1737.527	1837.356	1759.537	1778.14	1.732394	3.249966
57	1822.427	1924.866	1833.896	1860.396	1.755875	3.269605
60	1935.405	1942.594	1976.235	1951.411	1.778151	3.290349
63	1995.495	1938.502	1974.565	1969.521	1.799341	3.294361
66	1992.092	1976.511	1985.31	1984.638	1.819544	3.297681
69	1809.426	1683.325	1701.314	1731.355	1.838849	3.238386
72	1812.589	1725.422	1708.663	1748.892	1.857332	3.242763
75	1898.907	1795.948	1770.616	1821.824	1.875061	3.260506
78	1682.173	1837.294	1804.865	1774.777	1.892095	3.249144
81	1637.521	1859.569	1818.872	1771.988	1.908485	3.248461
84	1806.215	1895.664	1804.89	1835.59	1.924279	3.263776
87	1695.703	1898.171	1675.725	1756.533	1.939519	3.244656
90	1699.449	1704.459	1667.574	1690.494	1.954243	3.228014
93	1659.682	1900.832	1854.444	1804.986	1.968483	3.256474
96	1745.467	1754.645	1679.842	1726.652	1.982271	3.237205
99	1667.793	1671.447	1664.114	1667.785	1.995635	3.22214
102	1672.421	1737.597	1715.084	1708.367	2.0086	3.232581
105	1684.064	1757.956	1719.43	1720.483	2.021189	3.23565
108	1775.896	1723.978	1691.447	1730.44	2.033424	3.238157
111	1595.075	1500.617	1456.655	1517.449	2.045323	3.181114
114	1708.152	1763.415	1708.979	1726.849	2.056905	3.237254
117	1550.575	1488.799	1744.992	1594.788	2.068186	3.202703
120	1578.858	1702.179	1752.429	1677.822	2.079181	3.224746
123	1517.508	1706.322	1730.266	1651.365	2.089905	3.217843
126	1534.817	1727.913	1752.148	1671.626	2.100371	3.223139
129	1319.605	1498.495	1773.573	1530.558	2.11059	3.18485
132	1332.622	1502.426	1530.35	1455.133	2.120574	3.162903
135	1368.575	1515.869	1539.311	1474.585	2.130334	3.16867
138	1448.327	1498.995	1532.834	1493.385	2.139879	3.174172
141	1451.604	1505.761	1527.887	1495.084	2.149219	3.174666
144	1474.165	1513.451	1503.699	1497.105	2.158362	3.175252
147	1526.816	1545.873	1538.663	1537.117	2.167317	3.186707
150	1290.173	1533.827	1512.144	1445.381	2.176091	3.159982

Sample 1152						
Image 8746		Particle O_3		Approximate Particle size - 93.77496 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	2038.32	2037.686	2041.39	2039.132	0.477121	3.309445
6	1849.732	1853.2	1852.845	1851.926	0.778151	3.267624
9	1827.838	1837.648	1828.982	1831.489	0.954243	3.262804
12	1817.496	1826.386	1819.121	1821.001	1.079181	3.26031
15	1807.64	1813.364	1808.485	1809.829	1.176091	3.257638
18	1812.955	1817.642	1823.989	1818.195	1.255273	3.25964
21	1805.381	1816.234	1817.661	1813.092	1.322219	3.25842
24	1799.607	1818.748	1796.951	1805.102	1.380211	3.256502
27	1807.846	1808.214	1814.294	1810.118	1.431364	3.257707
30	1800.311	1804.445	1814.683	1806.48	1.477121	3.256833
33	1804.394	1819.805	1801.181	1808.46	1.518514	3.257309
36	1793.885	1809.224	1802.254	1801.788	1.556303	3.255704
39	1792.573	1795.025	1790.249	1792.615	1.591065	3.253487
42	1789.569	1797.259	1785.336	1790.721	1.623249	3.253028
45	1786.078	1793.052	1805.106	1794.745	1.653213	3.254003
48	1788.218	1786.203	1782.513	1785.644	1.681241	3.251795
51	1775.862	1794.377	1831.601	1800.613	1.70757	3.25542
54	1796.242	1810.164	1837.296	1814.567	1.732394	3.258773
57	1775.182	1799.232	1791.284	1788.566	1.755875	3.252505
60	1779.573	1807.027	1785.23	1790.61	1.778151	3.253001
63	1788.296	1778.549	1787.548	1784.797	1.799341	3.251589
66	1786.223	1819.05	1824.367	1809.88	1.819544	3.25765
69	1790.426	1790.308	1813.658	1798.131	1.838849	3.254821
72	1786.644	1755.603	1826.679	1789.642	1.857332	3.252766
75	1771.756	1758.359	1812.091	1780.736	1.875061	3.250599
78	1754.986	1766.904	1809.701	1777.197	1.892095	3.249735
81	1758.487	1828.955	1739.641	1775.694	1.908485	3.249368
84	1769.822	1796.321	1753.014	1773.052	1.924279	3.248722
87	1755.924	1786.207	1747.126	1763.085	1.939519	3.246273
90	1734.168	1735.024	1805.105	1758.099	1.954243	3.245043
93	1711.751	1717.117	1729.475	1719.447	1.968483	3.235389
96	1763.323	1751.203	1796.069	1770.198	1.982271	3.248022
99	1767.092	1753.945	1755.36	1758.799	1.995635	3.245216
102	1752.56	1819.973	1792.954	1788.496	2.0086	3.252488
105	1745.534	1807.62	1752.819	1768.658	2.021189	3.247644
108	1767.025	1804.82	1810.236	1794.027	2.033424	3.253829
111	1715.753	1807.714	1727.407	1750.292	2.045323	3.24311
114	1708.085	1782.898	1781.547	1757.51	2.056905	3.244898
117	1691.491	1731.59	1699.181	1707.42	2.068186	3.23234
120	1744.606	1735.376	1754.601	1744.861	2.079181	3.241761
123	1754.218	1815.606	1736.202	1768.675	2.089905	3.247648
126	1668.775	1648.929	1773.954	1697.219	2.100371	3.229738
129	1699.67	1765.912	1739.09	1734.891	2.11059	3.239272
132	1706.181	1777.504	1735.417	1739.701	2.120574	3.240475
135	1741.515	1770.635	1708.357	1740.169	2.130334	3.240591
138	1729.897	1767.917	1689.267	1729.027	2.139879	3.237802
141	1683.682	1660.163	1780.916	1708.254	2.149219	3.232552
144	1688.509	1668.437	1745.803	1700.916	2.158362	3.230683
147	1716.326	1680.151	1711.404	1702.627	2.167317	3.23112
150	1737.728	1695.061	1696.615	1709.801	2.176091	3.232946

Sample 1152						
Image 8747		Particle O_1		Approximate Particle size - 181.734 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1761.926	1762.402	1761.56	1761.962	0.477121	3.245997
6	1619.743	1617.739	1617.247	1618.243	0.778151	3.209044
9	1592.856	1597.721	1593.681	1594.753	0.954243	3.202693
12	1585.134	1583.331	1583.358	1583.941	1.079181	3.199739
15	1584.458	1583.044	1581.236	1582.913	1.176091	3.199457
18	1577.873	1581.314	1578.846	1579.344	1.255273	3.198477
21	1576.855	1576.518	1575.087	1576.153	1.322219	3.197599
24	1561.169	1557.595	1566.736	1561.833	1.380211	3.193635
27	1571.426	1559.995	1568.241	1566.554	1.431364	3.194945
30	1570.934	1555.217	1555.376	1560.509	1.477121	3.193266
33	1589.237	1572.138	1559.096	1573.49	1.518514	3.196864
36	1541.711	1554.598	1554.877	1550.395	1.556303	3.190442
39	1534.817	1545.757	1558.699	1546.424	1.591065	3.189329
42	1544.274	1546.015	1560.295	1550.195	1.623249	3.190386
45	1542.519	1570.817	1558.7	1557.345	1.653213	3.192385
48	1562.284	1556.868	1543.043	1554.065	1.681241	3.191469
51	1582.034	1555.463	1557.176	1564.891	1.70757	3.194484
54	1536.726	1530.623	1546.792	1538.047	1.732394	3.186969
57	1576.082	1560.955	1538.418	1558.485	1.755875	3.192703
60	1531.938	1564.761	1551.209	1549.303	1.778151	3.190136
63	1565.815	1526.06	1539.065	1543.647	1.799341	3.188548
66	1514.983	1556.924	1531.399	1534.435	1.819544	3.185948
69	1524.087	1511.968	1532.302	1522.786	1.838849	3.182639
72	1516.896	1526.552	1532.982	1525.477	1.857332	3.183406
75	1521.038	1524.159	1543.187	1529.461	1.875061	3.184538
78	1565.566	1573.818	1534.908	1558.097	1.892095	3.192595
81	1563.341	1522.015	1532.137	1539.164	1.908485	3.187285
84	1532.561	1497.902	1527.751	1519.404	1.924279	3.181673
87	1508.989	1471.207	1517.224	1499.14	1.939519	3.175842
90	1507.937	1482.327	1527.934	1506.066	1.954243	3.177844
93	1544.769	1546.269	1509.829	1533.622	1.968483	3.185718
96	1497.506	1565.701	1514.383	1525.863	1.982271	3.183516
99	1500.789	1569.444	1519.345	1529.859	1.995635	3.184651
102	1465.237	1543.034	1526.071	1511.447	2.0086	3.179393
105	1542.391	1497.757	1522.307	1520.818	2.021189	3.182077
108	1544.815	1442.821	1507.429	1498.355	2.033424	3.175615
111	1548.401	1517.258	1485.435	1517.031	2.045323	3.180995
114	1541.842	1436.518	1488.269	1488.876	2.056905	3.172859
117	1482.002	1502.441	1477.756	1487.4	2.068186	3.172428
120	1506.791	1501.583	1473.984	1494.119	2.079181	3.174385
123	1444.131	1505.269	1481.923	1477.108	2.089905	3.169412
126	1431.302	1493.005	1482.072	1468.793	2.100371	3.166961
129	1455.644	1505.969	1499.202	1486.938	2.11059	3.172293
132	1524.909	1502.198	1501.469	1509.526	2.120574	3.17884
135	1551.712	1505.428	1510.896	1522.679	2.130334	3.182608
138	1554.327	1421.466	1508.698	1494.83	2.139879	3.174592
141	1540.508	1499.577	1498.462	1512.849	2.149219	3.179796
144	1478.29	1507.501	1476.216	1487.336	2.158362	3.172409
147	1477.48	1485.75	1465.496	1476.242	2.167317	3.169158
150	1414.589	1408.937	1460.247	1427.924	2.176091	3.154705

Sample 1152						
Image 8747		Particle O_2		Approximate Particle size - 183.3609 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1711.313	1710.57	1711.674	1711.186	0.477121	3.233297
6	1434.624	1432.541	1436.802	1434.656	0.778151	3.156748
9	1395.495	1393.297	1394.793	1394.528	0.954243	3.144427
12	1363.746	1364.537	1363.255	1363.846	1.079181	3.134765
15	1356.752	1364.601	1357.413	1359.588	1.176091	3.133407
18	1354.354	1348.38	1350.947	1351.227	1.255273	3.130728
21	1316.338	1316.987	1314.439	1315.921	1.322219	3.11923
24	1310.683	1312.985	1314.066	1312.578	1.380211	3.118125
27	1319.463	1308.364	1309.578	1312.468	1.431364	3.118089
30	1294.803	1299.813	1292.64	1295.752	1.477121	3.112522
33	1296.497	1295.195	1300.017	1297.236	1.518514	3.113019
36	1276.144	1284.235	1276.354	1278.911	1.556303	3.10684
39	1299.699	1316.315	1302.998	1306.337	1.591065	3.116055
42	1297.423	1315.653	1329.043	1314.039	1.623249	3.118608
45	1282.348	1280.041	1271.759	1278.049	1.653213	3.106548
48	1285.079	1301.038	1306.971	1297.696	1.681241	3.113173
51	1295.496	1292.366	1297.959	1295.274	1.70757	3.112361
54	1266.89	1284.985	1308.627	1286.834	1.732394	3.109523
57	1270.543	1278.999	1288.921	1279.488	1.755875	3.107036
60	1288.766	1267.561	1270.071	1275.466	1.778151	3.105669
63	1274.578	1309.768	1261.898	1282.081	1.799341	3.107916
66	1294.338	1284.155	1280.44	1286.311	1.819544	3.109346
69	1293.455	1223.546	1231.892	1249.631	1.838849	3.096782
72	1292.162	1267.742	1296.395	1285.433	1.857332	3.109049
75	1275.402	1243.739	1222.193	1247.112	1.875061	3.095905
78	1272.967	1256.693	1264.708	1264.789	1.892095	3.102018
81	1223.915	1263.723	1282.629	1256.756	1.908485	3.099251
84	1245.737	1268.19	1283.902	1265.943	1.924279	3.102414
87	1210.608	1257.972	1270.992	1246.524	1.939519	3.095701
90	1210.844	1223.85	1230.554	1221.749	1.954243	3.086982
93	1240.665	1294.852	1310.236	1281.918	1.968483	3.10786
96	1262.145	1299.268	1312.422	1291.278	1.982271	3.11102
99	1275.166	1311.801	1327.955	1304.974	1.995635	3.115602
102	1233.477	1264.559	1272.048	1256.695	2.0086	3.09923
105	1245.399	1250.703	1262.821	1252.974	2.021189	3.097942
108	1254.707	1241.196	1255.857	1250.587	2.033424	3.097114
111	1233.887	1237.271	1257.907	1243.022	2.045323	3.094479
114	1174.495	1215.612	1219.302	1203.136	2.056905	3.080315
117	1228.596	1286.193	1303.514	1272.768	2.068186	3.104749
120	1109.677	1285.155	1189.078	1194.636	2.079181	3.077236
123	1142.098	1283.578	1166.793	1197.489	2.089905	3.078272
126	1146.274	1156.019	1168.416	1156.903	2.100371	3.063297
129	1155.741	1154.536	1176.555	1162.277	2.11059	3.06531
132	1172.351	1166.792	1130.554	1156.566	2.120574	3.06317
135	1176.227	1140.22	1145.4	1153.949	2.130334	3.062187
138	1192.594	1139.399	1146.517	1159.503	2.139879	3.064272
141	1219.034	1155.961	1161.291	1178.762	2.149219	3.071426
144	1231.991	1062.599	1068.056	1120.882	2.158362	3.04956
147	1132.05	1063.182	1067.963	1087.732	2.167317	3.036522
150	1143.748	1168.603	1174.304	1162.219	2.176091	3.065288

Sample 1152						
Image 8747		Particle O_3A		Approximate Particle size - 95.55772 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	781.7673	782.5689	783.7423	782.6928	0.477121	2.893591
6	733.0487	731.6292	735.0901	733.256	0.778151	2.865256
9	728.0306	732.399	730.072	730.1672	0.954243	2.863422
12	722.4078	728.162	724.653	725.0743	1.079181	2.860382
15	716.3818	730.4245	717.5594	721.4552	1.176091	2.858209
18	722.6733	724.7587	723.047	723.493	1.255273	2.859434
21	716.2875	717.1776	718.5657	717.3436	1.322219	2.855727
24	714.1644	725.2507	715.2252	718.2134	1.380211	2.856254
27	712.749	719.6639	713.2143	715.2091	1.431364	2.854433
30	709.6179	715.0061	711.8518	712.1586	1.477121	2.852577
33	708.5782	736.0342	708.4299	717.6808	1.518514	2.855931
36	710.5171	738.1581	705.9165	718.1972	1.556303	2.856244
39	707.6147	735.7274	707.4034	716.9152	1.591065	2.855468
42	702.0867	731.228	698.2435	710.5194	1.623249	2.851576
45	699.1569	718.955	704.7907	707.6342	1.653213	2.849809
48	701.1865	716.2628	703.6041	707.0178	1.681241	2.84943
51	697.5983	707.6927	697.6308	700.9739	1.70757	2.845702
54	696.9924	706.1858	704.2192	702.4658	1.732394	2.846625
57	694.736	752.9099	694.2689	713.9716	1.755875	2.853681
60	694.7549	700.5907	700.689	698.6782	1.778151	2.844277
63	696.3537	734.8122	703.6121	711.5927	1.799341	2.852231
66	688.1717	762.0372	689.4984	713.2358	1.819544	2.853233
69	695.7668	756.5655	672.9346	708.4223	1.838849	2.850292
72	698.9247	722.2266	676.1608	699.104	1.857332	2.844542
75	672.7709	761.7572	676.7253	703.7511	1.875061	2.847419
78	673.8032	718.2266	682.6732	691.5677	1.892095	2.839835
81	644.9918	710.0317	692.0152	682.3462	1.908485	2.834005
84	642.1752	763.6427	663.6737	689.8305	1.924279	2.838742
87	654.7417	764.4476	652.282	690.4904	1.939519	2.839158
90	667.9152	759.0702	656.6041	694.5298	1.954243	2.841691
93	635.0995	733.2382	626.0087	664.7821	1.968483	2.822679
96	638.6522	746.6985	623.4814	669.6107	1.982271	2.825822
99	643.2009	744.8718	629.6978	672.5902	1.995635	2.827751
102	648.294	743.4183	636.5646	676.0923	2.0086	2.830006
105	666.1037	713.6631	648.1889	675.9852	2.021189	2.829937
108	733.0775	712.7327	667.688	704.4994	2.033424	2.847881
111	696.7748	686.9084	669.3554	684.3462	2.045323	2.835276
114	626.4167	683.2834	672.7026	660.8009	2.056905	2.820071
117	621.603	658.1721	681.6766	653.8172	2.068186	2.815456
120	720.6873	643.3979	675.1854	679.7569	2.079181	2.832354
123	729.6426	647.2459	666.605	681.1645	2.089905	2.833252
126	736.5813	654.2668	668.8076	686.5519	2.100371	2.836673
129	721.3667	734.3993	685.9113	713.8924	2.11059	2.853633
132	724.4286	745.2961	568.9538	679.5595	2.120574	2.832227
135	717.371	742.6978	560.0601	673.3763	2.130334	2.828258
138	674.2986	631.7739	591.5784	632.5503	2.139879	2.801095
141	680.1648	635.5872	595.0703	636.9408	2.149219	2.804099
144	686.9636	640.8531	597.4741	641.7636	2.158362	2.807375
147	696.4706	644.9796	595.4663	645.6388	2.167317	2.80999
150	682.4834	653.1965	589.1996	641.6265	2.176091	2.807282

Sample 1152						
Image 8747		Particle O_3B		Approximate Particle size - 100.7014 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	847.0428	849.7715	850.3671	849.0605	0.477121	2.928939
6	771.0547	771.9719	772.4636	771.8301	0.778151	2.887522
9	762.9707	762.9312	763.0438	762.9819	0.954243	2.882514
12	757.6327	756.3053	763.1175	759.0185	1.079181	2.880252
15	753.3746	753.3118	760.7097	755.7987	1.176091	2.878406
18	757.2615	753.6756	763.2523	758.0631	1.255273	2.879705
21	757.1245	756.9708	762.2925	758.7959	1.322219	2.880125
24	749.6848	754.4357	758.1201	754.0802	1.380211	2.877418
27	753.0444	754.2283	759.4258	755.5662	1.431364	2.878273
30	750.731	752.3817	755.5887	752.9005	1.477121	2.876738
33	744.3842	751.661	753.3589	749.8014	1.518514	2.874946
36	751.4517	744.8293	759.1187	751.7999	1.556303	2.876102
39	748.3898	750.0657	758.7276	752.3944	1.591065	2.876446
42	742.4905	751.019	751.5095	748.3397	1.623249	2.874099
45	750.6818	747.6648	750.21	749.5189	1.653213	2.874783
48	750.371	747.8697	756.323	751.5212	1.681241	2.875941
51	748.7591	749.7273	752.4503	750.3122	1.70757	2.875242
54	740.7715	734.0167	746.5698	740.4527	1.732394	2.869497
57	729.2283	745.8832	752.2752	742.4622	1.755875	2.870674
60	749.4279	747.7268	737.2912	744.8153	1.778151	2.872049
63	731.9308	738.5262	743.0311	737.8294	1.799341	2.867956
66	745.4108	738.8727	758.0157	747.4331	1.819544	2.873572
69	733.2183	736.6577	744.5343	738.1368	1.838849	2.868137
72	741.8357	748.8098	740.7338	743.7931	1.857332	2.871452
75	734.9879	743.6918	734.6914	737.7904	1.875061	2.867933
78	737.5505	732.7912	738.2554	736.199	1.892095	2.866995
81	735.3141	745.1905	726.7784	735.761	1.908485	2.866737
84	714.1547	744.3783	724.3575	727.6302	1.924279	2.861911
87	726.332	732.8271	738.41	732.523	1.939519	2.864821
90	736.6592	734.4452	741.9587	737.6877	1.954243	2.867873
93	736.8774	735.4521	713.819	728.7162	1.968483	2.862558
96	731.3165	739.5425	712.0242	727.6277	1.982271	2.861909
99	693.7722	736.0495	711.712	713.8446	1.995635	2.853604
102	708.7036	720.0795	721.7947	716.8593	2.0086	2.855434
105	726.6785	719.757	715.0471	720.4942	2.021189	2.85763
108	727.52	715.6016	718.491	720.5375	2.033424	2.857657
111	733.6312	726.4717	727.3101	729.1377	2.045323	2.86281
114	695.0127	730.3983	731.3004	718.9038	2.056905	2.856671
117	694.8166	732.9698	717.4301	715.0722	2.068186	2.85435
120	708.9189	730.9462	684.196	708.0204	2.079181	2.850046
123	709.8156	719.7044	673.2222	700.9141	2.089905	2.845665
126	716.7601	704.2423	667.1071	696.0365	2.100371	2.842632
129	722.0806	701.0122	711.1675	711.4201	2.11059	2.852126
132	722.8483	703.0153	719.8745	715.246	2.120574	2.854455
135	732.7524	706.9813	732.3699	724.0345	2.130334	2.859759
138	688.5117	716.6527	737.0235	714.0626	2.139879	2.853736
141	661.3264	717.6357	723.6644	700.8755	2.149219	2.845641
144	655.1604	733.159	722.7458	703.6884	2.158362	2.84738
147	652.6412	681.0577	697.9334	677.2108	2.167317	2.830724
150	666.6829	672.5172	691.7302	676.9768	2.176091	2.830574

Sample 1152						
Image 8747		Particle O_4A		Approximate Particle size - 189.6931 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1096.057	1095.758	1095.587	1095.801	0.477121	3.039732
6	1065.453	1064.042	1066.628	1065.374	0.778151	3.027502
9	1059.704	1058.497	1060.085	1059.429	0.954243	3.025072
12	1058.53	1057.35	1057.97	1057.95	1.079181	3.024465
15	1050.276	1054.156	1050.955	1051.795	1.176091	3.021931
18	1057.002	1045.54	1047.988	1050.177	1.255273	3.021262
21	1043.767	1046.239	1044.082	1044.696	1.322219	3.01899
24	1056.464	1056.279	1044.725	1052.489	1.380211	3.022218
27	1045.14	1043.2	1037.055	1041.798	1.431364	3.017784
30	1036.409	1033.601	1047.111	1039.04	1.477121	3.016632
33	1057.191	1059.305	1045.563	1054.02	1.518514	3.022849
36	1054.209	1054.578	1034.492	1047.759	1.556303	3.020262
39	1053.772	1047.744	1041.506	1047.674	1.591065	3.020226
42	1054.144	1034.593	1023.254	1037.33	1.623249	3.015917
45	1036.34	1077.489	1034.074	1049.301	1.653213	3.0209
48	1040.513	1009.672	1024.466	1024.883	1.681241	3.010674
51	1039.51	1044.263	1018.524	1034.099	1.70757	3.014562
54	1013.259	1042.55	993.0771	1016.295	1.732394	3.00702
57	1021.477	1036.406	1013.143	1023.675	1.755875	3.010162
60	1010.633	1019.603	1013.967	1014.735	1.778151	3.006353
63	977.0411	1042.84	1005.886	1008.589	1.799341	3.003714
66	964.7781	1024.214	963.1679	984.0534	1.819544	2.993019
69	976.5078	1036.726	1007.388	1006.874	1.838849	3.002975
72	1156.199	1015.464	1043.58	1071.748	1.857332	3.030093
75	1106.252	943.4617	968.996	1006.237	1.875061	3.0027
78	1086.656	980.8683	995.7515	1021.092	1.892095	3.009065
81	1059.175	903.8846	1016.667	993.2424	1.908485	2.997055
84	1024.796	1178.339	1048.044	1083.726	1.924279	3.03492
87	1025.709	977.6923	974.1663	992.5224	1.939519	2.99674
90	1051.145	1177.963	996.143	1075.084	1.954243	3.031442
93	1132.955	1240.894	1022.281	1132.043	1.968483	3.053863
96	1145.537	1189.641	1020.852	1118.677	1.982271	3.048705
99	1051.553	1160.807	934.9132	1049.091	1.995635	3.020813
102	1206.345	1096.033	951.0066	1084.462	2.0086	3.035214
105	1144.348	1136.037	968.5771	1082.987	2.021189	3.034623
108	1135.474	1158.444	978.103	1090.674	2.033424	3.037695
111	1069.36	1165.96	1003.552	1079.624	2.045323	3.033272
114	1051.365	1173.531	1022.394	1082.43	2.056905	3.0344
117	1018.063	1151.842	924.1761	1031.36	2.068186	3.01341
120	1005.472	1169.078	933.3466	1035.965	2.079181	3.015345
123	1026.438	1159.457	943.7661	1043.22	2.089905	3.018376
126	1194.801	1163.104	902.162	1086.689	2.100371	3.036105
129	1125.192	1182.964	953.1136	1087.09	2.11059	3.036265
132	1067.982	1185.15	969.8192	1074.317	2.120574	3.031132
135	1046.872	1200.751	984.8313	1077.485	2.130334	3.032411
138	989.7742	1177.882	995.8608	1054.506	2.139879	3.023049
141	992.8124	1136.317	1008.837	1045.989	2.149219	3.019527
144	1030.011	1137.846	886.9562	1018.271	2.158362	3.007863
147	1034.957	1144.307	893.3809	1024.215	2.167317	3.010391
150	1222.276	1164.034	891.9471	1092.752	2.176091	3.038522

Sample 1152						
Image 8747		Particle O_4B		Approximate Particle size - 119.5226 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	754.4981	755.0998	755.113	754.9036	0.477121	2.877892
6	735.2203	735.0771	736.1051	735.4675	0.778151	2.866563
9	730.4906	730.7225	731.3862	730.8664	0.954243	2.863838
12	728.8535	727.5781	728.3082	728.2466	1.079181	2.862278
15	726.9832	727.2471	727.6944	727.3082	1.176091	2.861719
18	724.436	725.819	728.1017	726.1189	1.255273	2.861008
21	720.0094	723.8071	720.4111	721.4092	1.322219	2.858182
24	722.0119	722.4551	719.8059	721.4243	1.380211	2.858191
27	716.3586	722.6567	721.4188	720.1447	1.431364	2.85742
30	719.2271	723.2723	722.6033	721.7009	1.477121	2.858357
33	718.5737	723.0374	715.7996	719.1369	1.518514	2.856812
36	715.816	718.8918	713.3456	716.0178	1.556303	2.854924
39	718.7839	716.9244	708.2577	714.6553	1.591065	2.854097
42	710.4795	713.804	713.4995	712.5943	1.623249	2.852842
45	715.2176	718.7425	706.6798	713.5466	1.653213	2.853422
48	706.7711	709.4495	704.4022	706.8743	1.681241	2.849342
51	720.8466	700.6961	707.671	709.7379	1.70757	2.851098
54	711.1508	713.9429	701.9357	709.0098	1.732394	2.850652
57	704.1622	701.3859	690.9431	698.8304	1.755875	2.844372
60	706.7283	708.6058	694.4614	703.2652	1.778151	2.847119
63	712.9554	708.2576	705.428	708.8803	1.799341	2.850573
66	683.8182	685.3611	696.2617	688.4803	1.819544	2.837892
69	705.4541	711.4476	719.9293	712.277	1.838849	2.852649
72	711.2999	714.9631	703.9564	710.0731	1.857332	2.851303
75	722.1551	719.4373	712.622	718.0715	1.875061	2.856168
78	693.2101	694.0717	675.2037	687.4952	1.892095	2.83727
81	694.3923	685.4899	675.4964	685.1262	1.908485	2.835771
84	722.4777	709.7364	713.0413	715.0851	1.924279	2.854358
87	671.0045	676.4932	704.246	683.9146	1.939519	2.835002
90	674.7822	683.2059	675.5073	677.8318	1.954243	2.831122
93	678.007	687.7023	676.8327	680.8473	1.968483	2.83305
96	687.293	690.7899	718.145	698.7426	1.982271	2.844317
99	751.5786	757.4188	714.9431	741.3135	1.995635	2.870002
102	658.1765	662.639	713.982	678.2658	2.0086	2.8314
105	657.1835	660.3711	701.9592	673.1713	2.021189	2.828126
108	742.7632	659.4462	686.9681	696.3925	2.033424	2.842854
111	744.2811	735.7759	711.1242	730.3937	2.045323	2.863557
114	722.6817	731.5872	668.6337	707.6342	2.056905	2.849809
117	730.2966	737.0456	655.5207	707.621	2.068186	2.849801
120	726.3003	736.0236	638.2284	700.1841	2.079181	2.845212
123	712.506	686.1046	627.6052	675.4053	2.089905	2.829564
126	658.3525	662.4608	698.6167	673.1433	2.100371	2.828108
129	746.1972	747.3962	690.3695	727.9876	2.11059	2.862124
132	695.1221	712.5444	692.0825	699.9163	2.120574	2.845046
135	679.7999	682.1626	652.7929	671.5851	2.130334	2.827101
138	666.3312	681.634	634.2939	660.753	2.139879	2.820039
141	656.1974	677.4435	631.1603	654.9337	2.149219	2.816197
144	657.8281	666.3487	619.2088	647.7952	2.158362	2.811438
147	657.6945	665.8589	616.1385	646.564	2.167317	2.810611
150	663.2402	669.1516	620.756	651.0493	2.176091	2.813614

Sample 1152						
Image 8748		Particle O_1A		Approximate Particle size - 221.471 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1171.303	1172.289	1172.243	1171.945	0.477121	3.068907
6	1115.838	1116.009	1128.29	1120.046	0.778151	3.049236
9	1110.233	1107.954	1117.44	1111.875	0.954243	3.046056
12	1105.321	1099.878	1109.377	1104.858	1.079181	3.043307
15	1097.716	1098.219	1116.803	1104.246	1.176091	3.043066
18	1096.876	1095.864	1116.437	1103.059	1.255273	3.042599
21	1096.127	1089.807	1111.888	1099.274	1.322219	3.041106
24	1096.008	1089.55	1110.768	1098.775	1.380211	3.040909
27	1092.067	1087.688	1102.17	1093.975	1.431364	3.039007
30	1089.452	1090.777	1108.294	1096.174	1.477121	3.03988
33	1082.584	1081.194	1110.191	1091.323	1.518514	3.037953
36	1088.241	1079.743	1099.027	1089.004	1.556303	3.037029
39	1080.003	1085.621	1118.906	1094.843	1.591065	3.039352
42	1087.678	1084.822	1117.332	1096.61	1.623249	3.040052
45	1081.959	1072.16	1094.292	1082.804	1.653213	3.03455
48	1076.64	1075.5	1107.964	1086.701	1.681241	3.03611
51	1074.903	1069.302	1107.855	1084.02	1.70757	3.035037
54	1067.347	1065.768	1102.527	1078.547	1.732394	3.032839
57	1073.671	1062.193	1088.928	1074.931	1.755875	3.03138
60	1072.339	1055.938	1087.101	1071.793	1.778151	3.030111
63	1057.625	1068.193	1089.884	1071.901	1.799341	3.030155
66	1074.35	1079.727	1082.93	1079.002	1.819544	3.033022
69	1057.933	1062.39	1077.565	1065.963	1.838849	3.027742
72	1066.549	1045.49	1080.751	1064.263	1.857332	3.027049
75	1055.616	1065.714	1102.797	1074.709	1.875061	3.031291
78	1036.028	1058.585	1078.054	1057.556	1.892095	3.024303
81	1032.494	1044.434	1086.054	1054.328	1.908485	3.022976
84	1047.663	1015.682	1076.065	1046.47	1.924279	3.019727
87	1036.101	1027.448	1051.791	1038.447	1.939519	3.016384
90	1039.831	1040.24	1038.936	1039.669	1.954243	3.016895
93	1052.788	1047.377	1088.927	1063.031	1.968483	3.026546
96	992.7516	1017.657	1100.412	1036.94	1.982271	3.015754
99	1013.851	1012.601	1105.055	1043.836	1.995635	3.018632
102	1025.409	1062.478	1098.282	1062.056	2.0086	3.026148
105	993.1558	1049.103	1061.057	1034.438	2.021189	3.014705
108	982.8658	994.4738	1047.264	1008.201	2.033424	3.003547
111	1012.361	997.0958	1038.774	1016.077	2.045323	3.006927
114	1022.857	1019.398	1078.813	1040.356	2.056905	3.017182
117	1041.946	1039.104	1064.381	1048.477	2.068186	3.020559
120	1053.294	953.3105	1052.461	1019.689	2.079181	3.008468
123	1031.921	922.8044	1035.785	996.8366	2.089905	2.998624
126	957.4116	935.7009	1083.664	992.259	2.100371	2.996625
129	921.1117	964.0119	1074.693	986.6055	2.11059	2.994144
132	903.8831	965.3494	999.5511	956.2612	2.120574	2.980577
135	901.8801	1013.764	1021.923	979.1889	2.130334	2.990866
138	904.2888	866.7476	1019.391	930.1424	2.139879	2.968549
141	913.9814	871.1877	1025.483	936.884	2.149219	2.971686
144	931.3679	944.8998	1037.801	971.3563	2.158362	2.987379
147	952.7417	950.2365	1041.932	981.6367	2.167317	2.991951
150	959.5851	965.6018	1045.066	990.0842	2.176091	2.995672

Sample 1152						
Image 8748		Particle O_1B		Approximate Particle size - 214.6128 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1153.324	1154.088	1156.251	1154.554	0.477121	3.062414
6	1074.513	1074.242	1076.62	1075.125	0.778151	3.031459
9	1066.283	1066.314	1069.394	1067.33	0.954243	3.028299
12	1062.415	1058.793	1057.108	1059.439	1.079181	3.025076
15	1056.74	1054.423	1054.761	1055.308	1.176091	3.023379
18	1048.653	1063.353	1054.701	1055.569	1.255273	3.023487
21	1054.787	1050.979	1050.551	1052.106	1.322219	3.022059
24	1042.813	1040.419	1039.645	1040.959	1.380211	3.017434
27	1032.147	1032.523	1034.38	1033.017	1.431364	3.014107
30	1020.643	1017.676	1034.731	1024.35	1.477121	3.010448
33	1033.575	1040.36	1025.667	1033.201	1.518514	3.014185
36	1033.967	1031.4	1024.234	1029.867	1.556303	3.012781
39	1024.348	1018.633	1005.414	1016.132	1.591065	3.00695
42	1032.373	1027.3	1026.939	1028.871	1.623249	3.012361
45	1052.146	1045.417	1031.183	1042.915	1.653213	3.018249
48	1017.515	1005.243	998.7238	1007.161	1.681241	3.003099
51	1020.899	1014.788	992.446	1009.378	1.70757	3.004054
54	1033.354	1026.738	998.9599	1019.684	1.732394	3.008466
57	999.9373	995.3314	1014.356	1003.208	1.755875	3.001391
60	1007.059	1002.212	994.7136	1001.328	1.778151	3.000576
63	975.082	1001.517	972.1832	982.9273	1.799341	2.992521
66	1023.476	1017.834	964.2082	1001.839	1.819544	3.000798
69	968.8973	1012.26	972.3856	984.5142	1.838849	2.993222
72	998.7784	967.9875	966.9764	977.9141	1.857332	2.990301
75	992.4492	989.0778	973.8849	985.1373	1.875061	2.993497
78	969.3124	961.2412	985.9682	972.1739	1.892095	2.987744
81	981.5557	976.4614	982.2247	980.0806	1.908485	2.991262
84	1003.217	998.1105	979.5881	993.6385	1.924279	2.997228
87	1022.695	1017.844	997.2578	1012.599	1.939519	3.005437
90	927.9066	924.5192	1013.726	955.3839	1.954243	2.980178
93	942.2665	973.6093	959.1075	958.3278	1.968483	2.981514
96	1001.46	998.3233	981.9186	993.9008	1.982271	2.997343
99	965.5567	958.5984	917.9539	947.3697	1.995635	2.976519
102	946.8032	941.5085	958.951	949.0876	2.0086	2.977306
105	948.0029	939.3445	962.5983	949.9819	2.021189	2.977715
108	932.2023	948.4113	903.224	927.9459	2.033424	2.967523
111	955.2526	952.4019	941.5112	949.7219	2.045323	2.977596
114	974.1736	968.9565	924.9642	956.0314	2.056905	2.980472
117	1001.469	998.6204	927.415	975.8349	2.068186	2.989376
120	996.6917	995.278	950.4483	980.806	2.079181	2.991583
123	996.7781	1049.311	955.1769	1000.422	2.089905	3.000183
126	906.67	901.2537	962.2123	923.3787	2.100371	2.96538
129	961.7806	955.4354	920.6536	945.9565	2.11059	2.975871
132	981.5491	975.3694	977.3593	978.0926	2.120574	2.99038
135	970.5864	966.1614	923.797	953.5149	2.130334	2.979327
138	959.0651	966.8056	904.223	943.3646	2.139879	2.97468
141	979.2837	960.1127	911.9696	950.4553	2.149219	2.977932
144	998.0666	988.0505	937.3968	974.5046	2.158362	2.988784
147	852.8863	848.2839	944.7429	881.971	2.167317	2.945454
150	850.1733	845.0602	951.4919	882.2418	2.176091	2.945588

Sample 1152						
Image 8748		Particle O_2		Approximate Particle size - 122.5816 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	2150.554	2155.114	2151.365	2152.344	0.477121	3.332912
6	2052.286	2055.159	2052.108	2053.185	0.778151	3.312428
9	2026.25	2027.275	2046.057	2033.194	0.954243	3.308179
12	2018.677	2020.818	2038.439	2025.978	1.079181	3.306635
15	2021.793	2022.813	2039.818	2028.141	1.176091	3.307098
18	2015.697	2016.697	2021.732	2018.042	1.255273	3.30493
21	2011.041	2012.275	2031.269	2018.195	1.322219	3.304963
24	1984.95	1991.556	2008.477	1994.994	1.380211	3.299942
27	1994.668	1996.082	2012.098	2000.95	1.431364	3.301236
30	1970.225	1973.892	1990.95	1978.356	1.477121	3.296304
33	1976.345	1984.22	1994.117	1984.894	1.518514	3.297737
36	1978.237	1982.888	1998.022	1986.382	1.556303	3.298063
39	1959.829	1966.616	1981.179	1969.208	1.591065	3.294292
42	1960.11	1967.402	1982.475	1969.996	1.623249	3.294465
45	1976.407	1988.349	1999.15	1987.969	1.653213	3.298409
48	1962.491	1967.232	1985.206	1971.643	1.681241	3.294828
51	1961.428	1971.463	1987.254	1973.382	1.70757	3.295211
54	1963.125	1969.209	1965.999	1966.111	1.732394	3.293608
57	1937.506	1946.015	1958.8	1947.44	1.755875	3.289464
60	1934.154	1949.341	1969.483	1950.993	1.778151	3.290256
63	1949.137	1968.162	1989.167	1968.822	1.799341	3.294206
66	1940.854	1949.008	1962.039	1950.634	1.819544	3.290176
69	1946.96	1970.872	1961.324	1959.719	1.838849	3.292194
72	1934.043	1957.144	1977.476	1956.221	1.857332	3.291418
75	1931.177	1936.101	1957.21	1941.496	1.875061	3.288137
78	1944.915	1966.677	1977.688	1963.093	1.892095	3.292941
81	1925.205	1947.923	1946.197	1939.775	1.908485	3.287751
84	1922.497	1951.464	1943.996	1939.319	1.924279	3.287649
87	1909.149	1933.32	1929.66	1924.043	1.939519	3.284215
90	1914.376	1933.108	1935.78	1927.754	1.954243	3.285052
93	1918.65	1914.969	1961.688	1931.769	1.968483	3.285955
96	1906.865	1949.88	1914.787	1923.844	1.982271	3.28417
99	1946.391	1953.399	1966.178	1955.323	1.995635	3.291218
102	1910.162	1920.773	1945.429	1925.455	2.0086	3.284533
105	1900.862	1924.154	1958.656	1927.891	2.021189	3.285082
108	1901.939	1879.797	1921.88	1901.205	2.033424	3.279029
111	1878.698	1922.599	1930.753	1910.683	2.045323	3.281189
114	1899.56	1905.131	1951.086	1918.592	2.056905	3.282983
117	1884.936	1898.648	1968.104	1917.229	2.068186	3.282674
120	1885	1888.029	1931.308	1901.446	2.079181	3.279084
123	1902.741	1903.336	1887.577	1897.884	2.089905	3.27827
126	1915.935	1941.442	1899.144	1918.84	2.100371	3.283039
129	1906.589	1874.113	1993.024	1924.576	2.11059	3.284335
132	1913.057	1914.84	1976.265	1934.721	2.120574	3.286618
135	1867.498	1913.284	1947.986	1909.589	2.130334	3.28094
138	1846.794	1920.41	1883.427	1883.544	2.139879	3.274976
141	1864.428	1884.212	1984.337	1910.993	2.149219	3.281259
144	1877.26	1894.886	1956.279	1909.475	2.158362	3.280914
147	1817.161	1863.777	1851.877	1844.272	2.167317	3.265825
150	1852.873	1878.026	1887.8	1872.9	2.176091	3.272515

Sample 1152						
Image 8750		Particle O_1		Approximate Particle size - 140.5845 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1646.724	1652.636	1645.724	1648.361	0.477121	3.217052
6	1534.628	1540.539	1539.35	1538.172	0.778151	3.187005
9	1480.184	1486.057	1485.137	1483.793	0.954243	3.171373
12	1452.967	1459.4	1462.198	1458.188	1.079181	3.163814
15	1470.105	1476.205	1476.676	1474.328	1.176091	3.168594
18	1407.684	1415.683	1415.847	1413.071	1.255273	3.150164
21	1416.831	1423.041	1426.027	1421.966	1.322219	3.152889
24	1405.107	1411.115	1413.78	1410.001	1.380211	3.149219
27	1393.722	1404.293	1423.015	1407.01	1.431364	3.148297
30	1395.777	1406.272	1399.508	1400.519	1.477121	3.146289
33	1391.439	1400.914	1397.255	1396.536	1.518514	3.145052
36	1384.348	1403.978	1427.003	1405.109	1.556303	3.14771
39	1378.257	1393.421	1390.559	1387.412	1.591065	3.142206
42	1395.122	1404.653	1413.045	1404.273	1.623249	3.147452
45	1390.629	1445.928	1381.335	1405.964	1.653213	3.147974
48	1385.77	1442.866	1406.931	1411.855	1.681241	3.14979
51	1386.515	1439.957	1404.629	1410.367	1.70757	3.149332
54	1369.575	1381.488	1417.611	1389.558	1.732394	3.142877
57	1378.764	1362.667	1382.391	1374.608	1.755875	3.138179
60	1373.065	1448.476	1390.44	1403.994	1.778151	3.147365
63	1362.613	1514.855	1395.3	1424.256	1.799341	3.153588
66	1359.117	1382.565	1387.984	1376.555	1.819544	3.138794
69	1383.223	1442.195	1373.28	1399.566	1.838849	3.145993
72	1362.876	1377.855	1417.513	1386.081	1.857332	3.141789
75	1355.084	1430.778	1424.323	1403.395	1.875061	3.14718
78	1366.249	1379.017	1374.008	1373.091	1.892095	3.137699
81	1358.732	1366.314	1370.355	1365.134	1.908485	3.135175
84	1349.078	1490.661	1397.969	1412.569	1.924279	3.15001
87	1355.56	1369.834	1361.479	1362.291	1.939519	3.13427
90	1357.609	1510.915	1413.953	1427.492	1.954243	3.154574
93	1339.446	1536.541	1355.561	1410.516	1.968483	3.149378
96	1348.45	1484.773	1443.883	1425.702	1.982271	3.154029
99	1344.493	1405.465	1340.515	1363.491	1.995635	3.134652
102	1362.267	1502.792	1403.099	1422.719	2.0086	3.153119
105	1360.113	1395.428	1404.256	1386.599	2.021189	3.141951
108	1343.537	1351.995	1349.778	1348.437	2.033424	3.129831
111	1322.169	1360.029	1413.787	1365.328	2.045323	3.135237
114	1344.023	1512.345	1381.692	1412.687	2.056905	3.150046
117	1351.078	1360.294	1341.319	1350.897	2.068186	3.130622
120	1343.98	1520.844	1450.26	1438.361	2.079181	3.157868
123	1340.452	1482.923	1372.196	1398.524	2.089905	3.14567
126	1337.847	1438.538	1338.699	1371.695	2.100371	3.137257
129	1333.028	1542.119	1484.102	1453.083	2.11059	3.16229
132	1324.416	1528.057	1461.759	1438.077	2.120574	3.157782
135	1314.297	1502.975	1389.239	1402.17	2.130334	3.146801
138	1310.573	1416.584	1364.244	1363.8	2.139879	3.134751
141	1325.165	1397.342	1345.761	1356.089	2.149219	3.132288
144	1322.907	1547.495	1322.129	1397.51	2.158362	3.145355
147	1322.609	1523.057	1478.295	1441.32	2.167317	3.15876
150	1327.477	1527.447	1467.825	1440.916	2.176091	3.158639

Sample 1152						
Image 8750		Particle O_2		Approximate Particle size - 117.5548 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1731.587	1733.549	1732.587	1732.574	0.477121	3.238692
6	1461.936	1463.769	1461.426	1462.377	0.778151	3.165059
9	1422.233	1436.722	1416.732	1425.229	0.954243	3.153885
12	1409.897	1426.183	1418.636	1418.239	1.079181	3.151749
15	1410.75	1402.617	1416.049	1409.805	1.176091	3.149159
18	1404.387	1394.427	1407.599	1402.138	1.255273	3.146791
21	1397.314	1390.54	1397.24	1395.031	1.322219	3.144584
24	1397.907	1389.726	1395.044	1394.225	1.380211	3.144333
27	1392.511	1425.266	1388.51	1402.095	1.431364	3.146778
30	1386.144	1413.394	1380.82	1393.453	1.477121	3.144092
33	1386.074	1402.232	1400.356	1396.22	1.518514	3.144954
36	1392.333	1407.933	1384.864	1395.043	1.556303	3.144588
39	1376.283	1384.586	1390.172	1383.68	1.591065	3.141036
42	1383.85	1421.772	1388.311	1397.978	1.623249	3.1455
45	1385.859	1410.856	1396.715	1397.81	1.653213	3.145448
48	1382.581	1421.036	1400.513	1401.377	1.681241	3.146555
51	1376.786	1403.113	1400.321	1393.407	1.70757	3.144078
54	1385.745	1416.217	1393.108	1398.356	1.732394	3.145618
57	1379.388	1411.751	1384.583	1391.907	1.755875	3.14361
60	1373.298	1391.45	1370.688	1378.478	1.778151	3.1394
63	1372.873	1403.067	1398.686	1391.542	1.799341	3.143496
66	1369.228	1396.778	1375.551	1380.519	1.819544	3.140042
69	1372.225	1395.12	1373.966	1380.437	1.838849	3.140017
72	1377.11	1403.308	1393.041	1391.153	1.857332	3.143375
75	1375.247	1416.215	1387.064	1392.842	1.875061	3.143902
78	1372.453	1389.209	1400.542	1387.401	1.892095	3.142202
81	1375.057	1405.649	1380.285	1386.997	1.908485	3.142075
84	1371.38	1414.141	1401.125	1395.549	1.924279	3.144745
87	1356.674	1393.337	1382.254	1377.422	1.939519	3.139067
90	1361.497	1425.066	1423.507	1403.357	1.954243	3.147168
93	1361.541	1389.632	1377.794	1376.322	1.968483	3.13872
96	1369.115	1434.432	1412.32	1405.289	1.982271	3.147766
99	1362.777	1386.055	1386.045	1378.292	1.995635	3.139341
102	1363.365	1353.017	1390.79	1369.057	2.0086	3.136422
105	1364.738	1422.757	1390.441	1392.645	2.021189	3.14384
108	1370.296	1409.263	1370.599	1383.386	2.033424	3.140943
111	1391.886	1434.486	1392.366	1406.246	2.045323	3.148061
114	1373.423	1420.32	1362.682	1385.475	2.056905	3.141599
117	1367.815	1400.712	1357.369	1375.299	2.068186	3.138397
120	1342.26	1372.36	1402.754	1372.458	2.079181	3.137499
123	1385.936	1414.827	1360.209	1386.991	2.089905	3.142073
126	1362.678	1386.991	1345.707	1365.125	2.100371	3.135172
129	1346.003	1396.327	1336.781	1359.704	2.11059	3.133444
132	1407.155	1396.064	1411.156	1404.792	2.120574	3.147612
135	1346.605	1429.873	1415.936	1397.471	2.130334	3.145343
138	1346.756	1369.673	1396.746	1371.058	2.139879	3.137056
141	1341.447	1373.756	1390.95	1368.718	2.149219	3.136314
144	1334.232	1365.389	1369.787	1356.469	2.158362	3.13241
147	1383.651	1362.081	1355.635	1367.122	2.167317	3.135807
150	1363.728	1453.629	1411.059	1409.472	2.176091	3.149056

Sample 1152						
Image 8750		Particle O_3A		Approximate Particle size - 127.9299 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	966.1126	967.6918	967.4166	967.0737	0.477121	2.98546
6	914.8992	914.596	913.774	914.4231	0.778151	2.961147
9	902.6491	906.1379	901.6516	903.4795	0.954243	2.955918
12	898.9433	903.1176	903.1729	901.7446	1.079181	2.955084
15	893.5352	902.0552	895.0032	896.8645	1.176091	2.952727
18	895.0078	901.7653	888.5349	895.1027	1.255273	2.951873
21	884.7629	900.9026	892.7228	892.7961	1.322219	2.950752
24	887.946	894.0319	893.2169	891.7316	1.380211	2.950234
27	880.6986	892.3502	886.144	886.3976	1.431364	2.947629
30	883.9434	892.5641	886.8273	887.7783	1.477121	2.948305
33	881.6713	899.4531	879.1187	886.7477	1.518514	2.9478
36	880.9446	898.2575	877.4141	885.5387	1.556303	2.947208
39	874.5356	890.6718	883.6706	882.9593	1.591065	2.945941
42	872.8685	888.0919	885.9464	882.3023	1.623249	2.945617
45	883.7491	892.7243	877.6525	884.7086	1.653213	2.9468
48	886.0857	894.0444	883.3134	887.8145	1.681241	2.948322
51	869.4768	883.8928	869.268	874.2125	1.70757	2.941617
54	868.9869	899.8442	871.1931	880.0081	1.732394	2.944487
57	874.9986	894.6834	872.3336	880.6719	1.755875	2.944814
60	868.1246	878.5562	864.6047	870.4285	1.778151	2.939733
63	885.7444	887.9418	865.5217	879.736	1.799341	2.944352
66	875.5312	903.8536	876.7285	885.3711	1.819544	2.947125
69	871.7473	870.471	867.3535	869.8573	1.838849	2.939448
72	878.5809	902.9056	861.9766	881.1544	1.857332	2.945052
75	870.8912	890.6976	856.4065	872.6651	1.875061	2.940848
78	872.1592	883.4158	872.2344	875.9365	1.892095	2.942473
81	868.4521	866.7371	857.3892	864.1928	1.908485	2.936611
84	853.4865	913.058	870.6202	879.0549	1.924279	2.944016
87	860.3257	904.0994	856.6473	873.6908	1.939519	2.941358
90	862.3023	874.5037	857.6945	864.8335	1.954243	2.936933
93	855.6255	865.2303	853.8449	858.2336	1.968483	2.933605
96	855.0052	906.2166	850.1973	870.473	1.982271	2.939755
99	835.5635	851.3892	838.6902	841.881	1.995635	2.925251
102	834.7791	911.4117	845.4121	863.8676	2.0086	2.936447
105	837.6008	918.0535	848.2394	867.9646	2.021189	2.938502
108	838.7513	919.7097	895.3448	884.6019	2.033424	2.946748
111	848.222	868.2859	884.61	867.0393	2.045323	2.938039
114	854.8942	848.8233	854.4388	852.7188	2.056905	2.930806
117	847.4852	844.7443	892.9227	861.7174	2.068186	2.935365
120	874.7513	912.8217	876.4606	888.0112	2.079181	2.948418
123	851.395	911.0518	841.0007	867.8158	2.089905	2.938428
126	835.6749	897.3589	828.3261	853.7866	2.100371	2.931349
129	843.6562	893.5246	814.6659	850.6156	2.11059	2.929733
132	823.076	883.4968	817.7476	841.4401	2.120574	2.925023
135	865.5947	834.5573	892.3649	864.1723	2.130334	2.9366
138	853.7302	903.0762	851.6155	869.474	2.139879	2.939257
141	825.9038	905.4273	843.959	858.43	2.149219	2.933705
144	807.9915	909.7692	842.368	853.3762	2.158362	2.931141
147	806.2277	862.3216	829.4933	832.6809	2.167317	2.920479
150	817.4001	845.9749	820.8979	828.091	2.176091	2.918078

Sample 1152						
Image 8750		Particle O_3B		Approximate Particle size - 137.8471 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1019.278	1018.411	1020.323	1019.337	0.477121	3.008318
6	965.7823	962.1951	964.8007	964.2594	0.778151	2.984194
9	960.3233	953.6733	954.401	956.1325	0.954243	2.980518
12	961.6539	951.396	954.6263	955.8921	1.079181	2.980409
15	953.4754	948.1335	956.9828	952.8639	1.176091	2.979031
18	946.1992	954.3311	946.9801	949.1701	1.255273	2.977344
21	950.0233	961.5822	951.7313	954.4456	1.322219	2.979751
24	946.865	957.2277	945.5792	949.8906	1.380211	2.977674
27	939.6078	947.2535	945.916	944.2591	1.431364	2.975091
30	944.9043	955.9615	946.7592	949.2083	1.477121	2.977362
33	956.3158	951.3859	939.6348	949.1122	1.518514	2.977318
36	959.0826	945.5975	953.0778	952.586	1.556303	2.978904
39	953.7397	931.3747	937.9827	941.0324	1.591065	2.973605
42	958.8595	959.1729	930.3572	949.4632	1.623249	2.977478
45	964.3743	941.5547	933.1586	946.3625	1.653213	2.976058
48	930.7737	939.0991	936.615	935.4959	1.681241	2.971042
51	942.8292	918.88	930.6024	930.7705	1.70757	2.968843
54	953.0789	951.2864	932.1808	945.5154	1.732394	2.975669
57	952.2653	918.3028	915.0964	928.5548	1.755875	2.967808
60	921.5907	939.746	934.1828	931.8398	1.778151	2.969341
63	935.17	941.9459	926.3219	934.4793	1.799341	2.97057
66	944.8976	911.6263	896.7058	917.7432	1.819544	2.962721
69	930.4419	928.6352	923.6767	927.5846	1.838849	2.967354
72	923.9875	923.0612	934.6445	927.2311	1.857332	2.967188
75	939.7755	927.9783	888.0004	918.5847	1.875061	2.963119
78	932.3226	886.3107	880.0891	899.5741	1.892095	2.954037
81	908.0607	896.2526	897.2858	900.533	1.908485	2.9545
84	944.5498	902.3794	911.5195	919.4829	1.924279	2.963544
87	901.3753	910.5185	923.8528	911.9155	1.939519	2.959955
90	955.3176	928.0744	910.3765	931.2562	1.954243	2.969069
93	943.1683	903.6868	864.9877	903.9476	1.968483	2.956143
96	910.088	866.202	855.9084	877.3995	1.982271	2.943197
99	906.9377	845.6786	857.1498	869.922	1.995635	2.93948
102	916.7188	838.8795	858.8334	871.4772	2.0086	2.940256
105	917.9632	865.848	869.5162	884.4425	2.021189	2.94667
108	921.1736	883.4514	869.9752	891.5334	2.033424	2.950138
111	916.3348	898.6124	885.8215	900.2562	2.045323	2.954366
114	983.6039	916.8572	900.6025	933.6879	2.056905	2.970202
117	912.8384	928.8712	915.4306	919.0467	2.068186	2.963338
120	910.0641	925.0306	917.7283	917.6077	2.079181	2.962657
123	913.2988	854.4462	839.5292	869.0914	2.089905	2.939065
126	916.8058	860.1365	841.3889	872.7771	2.100371	2.940903
129	934.7679	846.892	835.4503	872.3701	2.11059	2.940701
132	930.4528	807.4614	812.2105	850.0416	2.120574	2.92944
135	927.6375	816.6265	813.624	852.6293	2.130334	2.93076
138	860.1011	819.7747	805.2332	828.3697	2.139879	2.918224
141	839.8313	824.0839	805.5527	823.156	2.149219	2.915482
144	832.7287	826.1313	810.3873	823.0824	2.158362	2.915443
147	840.348	832.9937	821.1885	831.5101	2.167317	2.919868
150	851.3217	843.9313	839.5539	844.9356	2.176091	2.926824

Sample 1152						
Image 8750		Particle O_4A		Approximate Particle size - 104.1013 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1020.323	669.5746	669.2276	786.3749	0.477121	2.89563
6	964.8007	642.7017	644.7288	750.7437	0.778151	2.875492
9	954.401	637.6534	645.2113	745.7552	0.954243	2.872596
12	954.6263	635.324	637.0169	742.3224	1.079181	2.870593
15	956.9828	628.0529	629.0944	738.0434	1.176091	2.868082
18	946.9801	625.4616	628.7316	733.7244	1.255273	2.865533
21	951.7313	621.7593	629.3222	734.2709	1.322219	2.865856
24	945.5792	619.933	626.1021	730.5381	1.380211	2.863643
27	945.916	621.7343	626.5811	731.4105	1.431364	2.864161
30	946.7592	603.0396	618.6047	722.8012	1.477121	2.859019
33	939.6348	608.1428	620.7281	722.8352	1.518514	2.859039
36	953.0778	608.0089	618.1605	726.4157	1.556303	2.861185
39	937.9827	609.8195	630.3139	726.0387	1.591065	2.86096
42	930.3572	599.9707	625.5745	718.6341	1.623249	2.856508
45	933.1586	602.6401	610.324	715.3742	1.653213	2.854533
48	936.615	601.3949	603.992	714.0006	1.681241	2.853699
51	930.6024	604.7518	605.7067	713.687	1.70757	2.853508
54	932.1808	589.3353	628.5788	716.6983	1.732394	2.855336
57	915.0964	587.2093	602.1208	701.4755	1.755875	2.846013
60	934.1828	588.6384	596.4963	706.4392	1.778151	2.849075
63	926.3219	588.6697	595.246	703.4125	1.799341	2.84721
66	896.7058	610.7686	619.3292	708.9345	1.819544	2.850606
69	923.6767	593.4249	578.3693	698.4903	1.838849	2.84416
72	934.6445	606.9185	602.92	714.8277	1.857332	2.854201
75	888.0004	607.1821	611.8156	702.3327	1.875061	2.846543
78	880.0891	587.7845	591.1586	686.3441	1.892095	2.836542
81	897.2858	585.9672	584.1881	689.147	1.908485	2.838312
84	911.5195	582.4856	615.1957	703.0669	1.924279	2.846997
87	923.8528	579.5584	600.7963	701.4025	1.939519	2.845967
90	910.3765	590.1243	594.0823	698.1944	1.954243	2.843976
93	864.9877	589.6038	576.8128	677.1348	1.968483	2.830675
96	855.9084	573.9149	555.6582	661.8272	1.982271	2.820745
99	857.1498	534.1833	560.8718	650.735	1.995635	2.813404
102	858.8334	529.2892	555.4649	647.8625	2.0086	2.811483
105	869.5162	544.5127	567.856	660.6283	2.021189	2.819957
108	869.9752	549.6556	553.037	657.5559	2.033424	2.817933
111	885.8215	551.9355	653.3656	697.0409	2.045323	2.843258
114	900.6025	554.963	637.5486	697.7047	2.056905	2.843672
117	915.4306	550.0325	618.7432	694.7354	2.068186	2.841819
120	917.7283	526.0301	612.7901	685.5162	2.079181	2.836018
123	839.5292	529.5853	561.2775	643.464	2.089905	2.808524
126	841.3889	515.6945	533.8632	630.3155	2.100371	2.799558
129	835.4503	579.757	584.7565	666.6546	2.11059	2.823901
132	812.2105	583.1321	461.4044	618.9157	2.120574	2.791631
135	813.624	583.6716	460.8598	619.3851	2.130334	2.791961
138	805.2332	583.47	483.7656	624.1563	2.139879	2.795293
141	805.5527	559.756	497.0342	620.781	2.149219	2.792938
144	810.3873	542.5714	547.6242	633.5276	2.158362	2.801766
147	821.1885	527.5332	543.9636	630.8951	2.167317	2.799957
150	839.5539	504.4045	529.4459	624.4681	2.176091	2.79551

Sample 1152						
Image 8750		Particle O_4B		Approximate Particle size - 231.0862 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1250.504	1245.908	1245.828	1247.413	0.477121	3.09601
6	1209.684	1205.125	1205.247	1206.686	0.778151	3.081594
9	1194.134	1194.089	1193.855	1194.026	0.954243	3.077014
12	1202.108	1191.752	1200.929	1198.263	1.079181	3.078552
15	1199.899	1198.509	1199.593	1199.334	1.176091	3.07894
18	1195.479	1194.361	1183.594	1191.145	1.255273	3.075964
21	1178.627	1173.664	1179.87	1177.387	1.322219	3.070919
24	1183.898	1173.089	1184.154	1180.38	1.380211	3.072022
27	1187.748	1175.489	1175.708	1179.648	1.431364	3.071753
30	1165.36	1171.309	1187.231	1174.633	1.477121	3.069902
33	1156.894	1169.119	1171.967	1165.993	1.518514	3.066696
36	1170.484	1146.459	1156.695	1157.879	1.556303	3.063663
39	1166.785	1132.992	1137.65	1145.809	1.591065	3.059112
42	1134.77	1144.375	1159.37	1146.172	1.623249	3.05925
45	1159.876	1163.39	1188.117	1170.461	1.653213	3.068357
48	1135.215	1148.238	1153.807	1145.753	1.681241	3.059091
51	1150.888	1153.066	1173.079	1159.011	1.70757	3.064088
54	1167.426	1170.608	1128.392	1155.475	1.732394	3.062761
57	1144.755	1164.775	1132.932	1147.487	1.755875	3.059748
60	1167.076	1179.331	1198.679	1181.695	1.778151	3.072506
63	1187.234	1186.096	1137.779	1170.37	1.799341	3.068323
66	1168.558	1175.683	1139.792	1161.344	1.819544	3.064961
69	1183.838	1145.418	1170.432	1166.563	1.838849	3.066908
72	1172.897	1112.577	1106.211	1130.562	1.857332	3.053294
75	1177.596	1094.825	1091.956	1121.459	1.875061	3.049783
78	1170.552	1108.75	1105.858	1128.387	1.892095	3.052458
81	1121.188	1100.665	1184.511	1135.454	1.908485	3.05517
84	1144.533	1137.596	1169.581	1150.57	1.924279	3.060913
87	1138.237	1095.843	1110.213	1114.764	1.939519	3.047183
90	1091.656	1085.055	1106.4	1094.37	1.954243	3.039164
93	1099.712	1093.126	1125.799	1106.212	1.968483	3.043838
96	1085.217	1076.207	1134.977	1098.8	1.982271	3.040919
99	1146.986	1138.096	1099.953	1128.345	1.995635	3.052442
102	1138.025	1059.985	1103.659	1100.556	2.0086	3.041612
105	1057.346	1051.45	1112.373	1073.723	2.021189	3.030892
108	1055.073	1055.607	1120.164	1076.948	2.033424	3.032195
111	1063.152	1069	1044.243	1058.798	2.045323	3.024813
114	1073.803	1073.531	1054.184	1067.173	2.056905	3.028235
117	1134.602	1126.438	1135.609	1132.216	2.068186	3.053929
120	1132.791	1136.767	979.8788	1083.146	2.079181	3.034687
123	1146.243	1125.175	1066.297	1112.572	2.089905	3.046328
126	1123.006	1026.527	1072.652	1074.062	2.100371	3.031029
129	1024.593	1021.725	1087.303	1044.54	2.11059	3.018925
132	1010.596	1014.86	1100.946	1042.134	2.120574	3.017924
135	1019.601	1018.706	1121.689	1053.332	2.130334	3.022565
138	997.1206	1008.083	1139.308	1048.171	2.139879	3.020432
141	1076.845	998.123	1027.509	1034.159	2.149219	3.014587
144	1086.615	1089.813	1022.614	1066.347	2.158362	3.027899
147	1097.71	1098.504	1028.236	1074.816	2.167317	3.031334
150	1104	1111.807	1036.705	1084.171	2.176091	3.035098

Sample 1152						
Image 8750		Particle O_5		Approximate Particle size - 184.4364 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1643.948	1643.405	1641.588	1642.98	0.477121	3.215632
6	1544.838	1544.853	1548.189	1545.96	0.778151	3.189198
9	1523.956	1528.987	1524.938	1525.96	0.954243	3.183543
12	1504.394	1511.68	1508.582	1508.219	1.079181	3.178464
15	1502.457	1513.071	1499.908	1505.145	1.176091	3.177578
18	1468.937	1492.963	1470.675	1477.525	1.255273	3.169535
21	1453.424	1479.678	1453.864	1462.322	1.322219	3.165043
24	1466.272	1476.216	1463.428	1468.638	1.380211	3.166915
27	1467.393	1460.577	1474.169	1467.38	1.431364	3.166542
30	1466.559	1467.575	1464.349	1466.161	1.477121	3.166182
33	1455.318	1413.806	1457.128	1442.084	1.518514	3.158991
36	1403.624	1417.492	1414.046	1411.72	1.556303	3.149749
39	1402.773	1413.734	1414.666	1410.391	1.591065	3.149339
42	1438.704	1438.867	1453.579	1443.717	1.623249	3.159482
45	1411.066	1436.585	1434.247	1427.299	1.653213	3.154515
48	1434.21	1425.119	1380.325	1413.218	1.681241	3.150209
51	1377.658	1369.005	1386.896	1377.853	1.70757	3.139203
54	1403.972	1389.53	1397.847	1397.116	1.732394	3.145233
57	1387.976	1411.169	1378.934	1392.693	1.755875	3.143855
60	1417.605	1376.058	1482.217	1425.293	1.778151	3.153904
63	1343.894	1374.275	1356.965	1358.378	1.799341	3.133021
66	1390.581	1359.719	1462.17	1404.157	1.819544	3.147416
69	1355.947	1362.085	1369.078	1362.37	1.838849	3.134295
72	1352.91	1366.416	1356.557	1358.628	1.857332	3.1331
75	1342.805	1369.091	1419.514	1377.137	1.875061	3.138977
78	1363.696	1401.975	1429.872	1398.514	1.892095	3.145667
81	1335.91	1364.032	1394.955	1364.966	1.908485	3.135122
84	1339.725	1374.635	1353.291	1355.883	1.924279	3.132222
87	1360.39	1362.757	1442.09	1388.412	1.939519	3.142518
90	1336.571	1361.618	1403.721	1367.304	1.954243	3.135865
93	1333.137	1316.436	1338.868	1329.48	1.968483	3.123682
96	1342.971	1315.481	1383.493	1347.315	1.982271	3.129469
99	1337.954	1380.723	1379.886	1366.188	1.995635	3.13551
102	1315.17	1341.041	1375.613	1343.941	2.0086	3.12838
105	1306.994	1289.985	1378.394	1325.125	2.021189	3.122257
108	1320.003	1258.946	1347.642	1308.864	2.033424	3.116894
111	1350.214	1260.437	1285.956	1298.869	2.045323	3.113565
114	1345.665	1405.463	1295.452	1348.86	2.056905	3.129967
117	1344.891	1387.323	1316.113	1349.442	2.068186	3.130154
120	1380.585	1354.439	1463.508	1399.511	2.079181	3.145976
123	1313.583	1306.895	1462.555	1361.011	2.089905	3.133862
126	1316.096	1292.103	1383.977	1330.725	2.100371	3.124088
129	1371.293	1371.171	1391.532	1377.999	2.11059	3.139249
132	1313.86	1338.93	1400.6	1351.13	2.120574	3.130697
135	1285.584	1280.562	1351.802	1305.983	2.130334	3.115937
138	1290.624	1278.499	1318.658	1295.927	2.139879	3.112581
141	1307.609	1300.083	1313.286	1306.993	2.149219	3.116273
144	1313.225	1314.711	1310.233	1312.723	2.158362	3.118173
147	1373.98	1471.685	1253.944	1366.536	2.167317	3.135621
150	1336.17	1379.056	1247.188	1320.804	2.176091	3.120839

Sample 1152						
Image 8751		Particle O_1		Approximate Particle size - 69.90745 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1028.977	1030.164	1026.985	1028.709	0.477121	3.012292
6	964.4373	965.8571	967.0365	965.777	0.778151	2.984877
9	940.1381	943.6823	947.3603	943.7269	0.954243	2.974846
12	939.5783	935.8347	944.4152	939.9427	1.079181	2.973101
15	925.4991	926.6979	924.1808	925.4593	1.176091	2.966357
18	923.277	949.5806	921.4638	931.4405	1.255273	2.969155
21	914.7217	930.2698	927.0093	924.0003	1.322219	2.965672
24	897.541	942.033	904.8573	914.8104	1.380211	2.961331
27	917.7155	946.1477	921.7811	928.5481	1.431364	2.967804
30	887.1856	923.3694	896.5619	902.3723	1.477121	2.955386
33	901.0156	933.108	908.8365	914.32	1.518514	2.961098
36	886.4429	917.8185	911.1198	905.1271	1.556303	2.95671
39	892.5687	899.0671	908.3702	900.002	1.591065	2.954243
42	900.2797	886.3522	900.377	895.6696	1.623249	2.952148
45	878.392	933.5239	915.2531	909.0563	1.653213	2.958591
48	871.8901	897.537	881.2768	883.568	1.681241	2.94624
51	883.2488	920.3403	910.0488	904.546	1.70757	2.956431
54	880.2604	900.5754	882.1576	887.6645	1.732394	2.948249
57	846.8004	924.2627	936.6967	902.5866	1.755875	2.955489
60	869.3672	884.2744	874.6827	876.1081	1.778151	2.942558
63	864.4675	885.6194	864.4355	871.5075	1.799341	2.940271
66	850.0535	945.3611	924.2456	906.5534	1.819544	2.957393
69	858.8418	859.3894	921.9339	880.055	1.838849	2.94451
72	842.301	909.3456	893.5183	881.7216	1.857332	2.945331
75	854.7735	897.0138	869.2651	873.6841	1.875061	2.941354
78	876.4453	951.5967	937.2713	921.7711	1.892095	2.964623
81	870.6765	945.7645	917.1334	911.1915	1.908485	2.95961
84	861.8295	917.2633	866.2233	881.772	1.924279	2.945356
87	848.6296	941.7063	915.7468	902.0276	1.939519	2.95522
90	846.1602	917.0613	892.1621	885.1279	1.954243	2.947006
93	852.5375	856.6257	862.4061	857.1898	1.968483	2.933077
96	838.7246	940.5754	937.7435	905.6812	1.982271	2.956975
99	820.5876	934.8194	924.1439	893.1836	1.995635	2.950941
102	826.6815	923.7119	906.6594	885.6843	2.0086	2.947279
105	807.682	856.946	857.4135	840.6805	2.021189	2.924631
108	830.1616	915.489	936.9457	894.1988	2.033424	2.951434
111	827.5278	894.4751	892.2184	871.4071	2.045323	2.940221
114	808.4799	880.9929	867.5699	852.3476	2.056905	2.930617
117	845.6079	872.4948	842.3618	853.4882	2.068186	2.931198
120	838.3476	939.2949	843.8643	873.8356	2.079181	2.94143
123	828.342	935.9441	918.9216	894.4026	2.089905	2.951533
126	814.7845	924.0629	905.5384	881.4619	2.100371	2.945204
129	816.9915	928.8516	916.5355	887.4595	2.11059	2.948149
132	823.7905	932.0525	904.2524	886.6985	2.120574	2.947776
135	821.9377	850.3549	879.9786	850.7571	2.130334	2.929806
138	860.6673	954.2003	942.6766	919.1814	2.139879	2.963401
141	838.8972	950.4008	939.0643	909.4541	2.149219	2.958781
144	837.2509	946.1694	937.5246	906.9816	2.158362	2.957598
147	836.246	946.967	928.6723	903.9618	2.167317	2.95615
150	827.4387	876.7961	888.071	864.1019	2.176091	2.936565

Sample 1152						
Image 8751		Particle O_2		Approximate Particle size - 105.3385 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1888.739	1887.267	1887.074	1887.693	0.477121	3.275931
6	1544.089	1542.373	1547.468	1544.643	0.778151	3.188828
9	1432.757	1434.44	1434.884	1434.027	0.954243	3.156557
12	1400.679	1400.18	1391.617	1397.492	1.079181	3.145349
15	1379.345	1388.698	1383.511	1383.851	1.176091	3.141089
18	1381.759	1378.875	1378.052	1379.562	1.255273	3.139741
21	1359.142	1364.796	1364.44	1362.792	1.322219	3.13443
24	1386.434	1378.208	1385.974	1383.538	1.380211	3.140991
27	1364.592	1358.99	1347.047	1356.876	1.431364	3.13254
30	1353.459	1359.416	1351.538	1354.804	1.477121	3.131877
33	1370.349	1355.9	1368.253	1364.834	1.518514	3.13508
36	1349.409	1358.524	1349.854	1352.596	1.556303	3.131168
39	1346.994	1355.606	1382.852	1361.817	1.591065	3.134119
42	1353.773	1339.181	1360.336	1351.096	1.623249	3.130686
45	1358.561	1334.383	1366.617	1353.187	1.653213	3.131358
48	1369.102	1343.11	1346.888	1353.033	1.681241	3.131308
51	1319.146	1323.309	1349.478	1330.644	1.70757	3.124062
54	1337.957	1346.651	1351.935	1345.515	1.732394	3.128888
57	1327.598	1321.914	1341.289	1330.267	1.755875	3.123939
60	1333.297	1350.582	1309.279	1331.053	1.778151	3.124195
63	1339.735	1344.145	1313.646	1332.509	1.799341	3.12467
66	1368.44	1315.885	1328.665	1337.663	1.819544	3.126347
69	1312.855	1315.026	1328.924	1318.935	1.838849	3.120223
72	1309.404	1313.464	1331.685	1318.184	1.857332	3.119976
75	1337.333	1321.911	1306.101	1321.781	1.875061	3.12116
78	1287.688	1293.878	1302.84	1294.802	1.892095	3.112203
81	1273.079	1283.712	1268.161	1274.984	1.908485	3.105505
84	1282.69	1296.139	1296.482	1291.77	1.924279	3.111185
87	1355.928	1328.537	1310.105	1331.523	1.939519	3.124349
90	1303	1355.998	1292.221	1317.073	1.954243	3.11961
93	1283.677	1267.952	1289.244	1280.291	1.968483	3.107309
96	1333.192	1333.856	1296.819	1321.289	1.982271	3.120998
99	1257.908	1266.341	1278.525	1267.591	1.995635	3.102979
102	1344.609	1275.527	1283.413	1301.183	2.0086	3.114338
105	1347.217	1277.166	1284	1302.794	2.021189	3.114876
108	1348.355	1242.663	1287.745	1292.921	2.033424	3.111572
111	1315.179	1246.783	1310.552	1290.838	2.045323	3.110872
114	1322.77	1314.507	1277.598	1304.958	2.056905	3.115597
117	1222.922	1232.118	1250.671	1235.237	2.068186	3.09175
120	1285.518	1225.466	1288.273	1266.419	2.079181	3.102577
123	1291.209	1303.018	1278.375	1290.867	2.089905	3.110881
126	1309.433	1306.613	1293.832	1303.293	2.100371	3.115042
129	1333.928	1331.53	1274.956	1313.471	2.11059	3.118421
132	1269.566	1222.107	1232.234	1241.302	2.120574	3.093878
135	1283.322	1285.237	1279.428	1282.663	2.130334	3.108112
138	1293.521	1301.553	1222.14	1272.404	2.139879	3.104625
141	1321.262	1151.044	1217.661	1229.989	2.149219	3.089901
144	1210.521	1191.851	1253.922	1218.765	2.158362	3.08592
147	1214.439	1208.892	1266.986	1230.106	2.167317	3.089942
150	1233.144	1230.806	1265.767	1243.239	2.176091	3.094554

Sample 1152						
Image 8751		Particle O_3		Approximate Particle size - 121.2372 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1431.506	1435.087	1430.921	1432.505	0.477121	3.156096
6	1328.709	1330.98	1351.928	1337.206	0.778151	3.126198
9	1311.337	1310.349	1332.024	1317.903	0.954243	3.119884
12	1299.641	1297.718	1335.286	1310.882	1.079181	3.117563
15	1302.415	1303.794	1322.944	1309.718	1.176091	3.117178
18	1291.038	1294.879	1344.217	1310.044	1.255273	3.117286
21	1295.433	1292.286	1345.929	1311.216	1.322219	3.117674
24	1285.138	1278.297	1337.948	1300.461	1.380211	3.114097
27	1280.107	1279.037	1330.509	1296.551	1.431364	3.11279
30	1284.795	1288.742	1305.945	1293.16	1.477121	3.111652
33	1280.005	1267.011	1317.905	1288.307	1.518514	3.110019
36	1267.396	1262.78	1314.798	1281.658	1.556303	3.107772
39	1266.789	1248.937	1312.255	1275.994	1.591065	3.105848
42	1268.022	1258.042	1337.967	1288.01	1.623249	3.109919
45	1279.416	1251.183	1299.224	1276.607	1.653213	3.106057
48	1254.202	1265.342	1335.269	1284.937	1.681241	3.108882
51	1276.786	1258.067	1351.77	1295.541	1.70757	3.112451
54	1280.178	1257.045	1292.856	1276.693	1.732394	3.106086
57	1268.091	1230.036	1319.57	1272.566	1.755875	3.10468
60	1289.813	1271.975	1371.751	1311.179	1.778151	3.117662
63	1233.5	1214.863	1373.36	1273.908	1.799341	3.105138
66	1226.317	1209.947	1310.227	1248.83	1.819544	3.096503
69	1315.44	1207.804	1266.174	1263.139	1.838849	3.101451
72	1223.848	1222.651	1323.414	1256.637	1.857332	3.09921
75	1208.42	1193.062	1293.061	1231.514	1.875061	3.090439
78	1289.112	1217.82	1197.187	1234.706	1.892095	3.091564
81	1220.316	1211.793	1318.823	1250.311	1.908485	3.097018
84	1208.755	1167.695	1304.811	1227.087	1.924279	3.088875
87	1320.935	1165.87	1225.324	1237.376	1.939519	3.092502
90	1314.937	1202.284	1325.147	1280.789	1.954243	3.107478
93	1208.907	1206.544	1295.873	1237.108	1.968483	3.092408
96	1193.836	1212.302	1278.853	1228.33	1.982271	3.089315
99	1320.414	1154.099	1199.931	1224.815	1.995635	3.08807
102	1316.04	1150.74	1401.117	1289.299	2.0086	3.110354
105	1234.91	1177.929	1241.494	1218.111	2.021189	3.085687
108	1247.908	1190.161	1288.063	1242.044	2.033424	3.094137
111	1249.841	1194.608	1278.985	1241.145	2.045323	3.093822
114	1265.197	1202.6	1343.788	1270.528	2.056905	3.103984
117	1314.933	1081.333	1356.214	1250.827	2.068186	3.097197
120	1310.797	1090.875	1377.176	1259.616	2.079181	3.100238
123	1295.359	1150.941	1372.319	1272.873	2.089905	3.104785
126	1269.496	1154.745	1361.076	1261.772	2.100371	3.100981
129	1224.341	1163.002	1125.293	1170.878	2.11059	3.068512
132	1227.201	1178.374	1249.413	1218.329	2.120574	3.085765
135	1394.899	1192.852	1272.616	1286.789	2.130334	3.109507
138	1197.316	1181.621	1266.057	1214.998	2.139879	3.084575
141	1173.201	1190.902	1287.397	1217.167	2.149219	3.08535
144	1172.637	1062.421	1339.088	1191.382	2.158362	3.076051
147	1304.084	1065.135	1341.55	1236.923	2.167317	3.092343
150	1295.238	1064.386	1339.707	1233.11	2.176091	3.091002

Sample 1152						
Image 8751		Particle O_4A		Approximate Particle size - 143.8188 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	734.6163	734.6394	735.0156	734.7571	0.477121	2.866144
6	703.615	702.7498	702.3357	702.9002	0.778151	2.846894
9	686.4182	696.8807	688.2095	690.5028	0.954243	2.839165
12	689.7452	696.5862	685.2791	690.5368	1.079181	2.839187
15	676.561	687.6309	676.1917	680.1279	1.176091	2.832591
18	674.5733	683.8636	676.607	678.348	1.255273	2.831453
21	673.712	684.6047	674.2814	677.5327	1.322219	2.83093
24	665.5345	671.7698	667.4128	668.239	1.380211	2.824932
27	675.1718	663.0723	677.9037	672.0493	1.431364	2.827401
30	657.9391	667.4424	659.5969	661.6595	1.477121	2.820635
33	653.9758	669.2484	655.6335	659.6192	1.518514	2.819293
36	648.5685	655.7742	651.3744	651.9057	1.556303	2.814185
39	653.2332	676.462	656.9764	662.2239	1.591065	2.821005
42	659.1093	649.012	660.7202	656.2805	1.623249	2.81709
45	633.0491	639.6153	634.7505	635.805	1.653213	2.803324
48	654.3437	663.9771	675.1938	664.5049	1.681241	2.822498
51	642.6261	642.6204	676.6271	653.9579	1.70757	2.81555
54	647.6639	646.434	650.5048	648.2009	1.732394	2.81171
57	660.7975	650.2588	625.2925	645.4496	1.755875	2.809862
60	641.0597	617.7866	643.6425	634.1629	1.778151	2.802201
63	581.3327	631.0797	613.6556	608.6893	1.799341	2.784396
66	641.2089	622.4146	645.1781	636.2672	1.819544	2.80364
69	656.366	614.7252	654.2413	641.7775	1.838849	2.807384
72	646.8616	610.577	649.7764	635.7383	1.857332	2.803278
75	642.5741	700.0416	646.4625	663.0261	1.875061	2.821531
78	641.5366	667.4878	643.2521	650.7588	1.892095	2.81342
81	585.4761	648.4003	581.0276	604.968	1.908485	2.781732
84	555.628	679.9465	558.5606	598.045	1.924279	2.776734
87	571.513	700.807	574.4915	615.6038	1.939519	2.789301
90	597.6678	664.4545	600.6799	620.9341	1.954243	2.793045
93	610.9925	646.6367	614.0046	623.8779	1.968483	2.7951
96	613.7842	632.6174	617.7338	621.3785	1.982271	2.793356
99	607.9339	592.7745	609.2554	603.3213	1.995635	2.780549
102	709.6714	596.3773	628.887	644.9786	2.0086	2.809545
105	709.1829	603.6859	712.2757	675.0482	2.021189	2.829335
108	628.4381	573.7911	630.5306	610.9199	2.033424	2.785984
111	733.9069	625.4595	735.7305	698.3656	2.045323	2.844083
114	463.4944	602.0135	464.2126	509.9068	2.056905	2.707491
117	478.7751	546.3682	479.4912	501.5448	2.068186	2.70031
120	565.6977	538.538	579.7079	561.3145	2.079181	2.749206
123	561.828	569.2762	573.8638	568.3227	2.089905	2.754595
126	549.6414	577.2598	575.4788	567.46	2.100371	2.753935
129	551.1803	583.1119	551.2742	561.8555	2.11059	2.749625
132	426.0039	567.3426	548.4602	513.9356	2.120574	2.710909
135	426.1344	568.8181	427.9964	474.3163	2.130334	2.676068
138	635.1265	574.0676	631.9702	613.7214	2.139879	2.787971
141	637.3339	725.0765	637.2349	666.5484	2.149219	2.823832
144	643.4287	704.4081	644.2363	664.0244	2.158362	2.822184
147	650.449	519.5523	650.6805	606.8939	2.167317	2.783113
150	656.8416	559.7017	669.5073	628.6835	2.176091	2.798432

Sample 1152						
Image 8751		Particle O_4B		Approximate Particle size - 229.9367 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1474.782	1477.648	1474.367	1475.599	0.477121	3.168968
6	1395.55	1396.072	1396.092	1395.905	0.778151	3.144856
9	1372.316	1385.745	1368.602	1375.554	0.954243	3.138478
12	1362.187	1376.415	1361.553	1366.718	1.079181	3.135679
15	1356.943	1377.077	1354.846	1362.956	1.176091	3.134482
18	1345.866	1360.781	1343.574	1350.074	1.255273	3.130357
21	1357.796	1364.151	1350.943	1357.63	1.322219	3.132781
24	1354.052	1375.246	1350.097	1359.798	1.380211	3.133475
27	1352.588	1343.686	1355.773	1350.682	1.431364	3.130553
30	1336.786	1373.696	1344.467	1351.649	1.477121	3.130864
33	1350.991	1365.226	1344.421	1353.546	1.518514	3.131473
36	1322.432	1354.469	1336.614	1337.838	1.556303	3.126404
39	1315.941	1341.402	1321.802	1326.382	1.591065	3.122668
42	1320.858	1354.283	1340.453	1338.531	1.623249	3.126629
45	1319.565	1335.038	1324.235	1326.279	1.653213	3.122635
48	1333.017	1333.542	1324.777	1330.446	1.681241	3.123997
51	1322.339	1360.703	1308.314	1330.452	1.70757	3.123999
54	1313.894	1312.551	1327.355	1317.933	1.732394	3.119893
57	1309.476	1361.175	1298.508	1323.053	1.755875	3.121577
60	1321.164	1337.597	1291.447	1316.736	1.778151	3.119499
63	1329.933	1354.945	1308.083	1330.987	1.799341	3.124174
66	1318.946	1346.476	1303.531	1322.984	1.819544	3.121555
69	1289.607	1346.44	1280.081	1305.376	1.838849	3.115736
72	1271.608	1313.559	1356.067	1313.745	1.857332	3.118511
75	1343.426	1340.062	1345.511	1343	1.875061	3.128076
78	1329.85	1322.747	1345.171	1332.589	1.892095	3.124696
81	1251.888	1311.494	1258.217	1273.866	1.908485	3.105124
84	1310.743	1312.387	1349.233	1324.121	1.924279	3.121928
87	1307.667	1283.212	1360.183	1317.021	1.939519	3.119593
90	1289.031	1342.456	1325.31	1318.932	1.954243	3.120222
93	1280.946	1285.723	1252.174	1272.948	1.968483	3.104811
96	1332.774	1265.161	1328.852	1308.929	1.982271	3.116916
99	1267.504	1250.759	1238.529	1252.264	1.995635	3.097696
102	1254.545	1240.253	1330.484	1275.094	2.0086	3.105542
105	1198.316	1218.907	1343.881	1253.701	2.021189	3.098194
108	1220.473	1224.249	1359.998	1268.24	2.033424	3.103201
111	1235.539	1344.461	1324.656	1301.552	2.045323	3.114462
114	1287.478	1241.594	1289.113	1272.728	2.056905	3.104736
117	1237.172	1217.907	1258.14	1237.74	2.068186	3.092629
120	1207.134	1304.366	1228.211	1246.57	2.079181	3.095717
123	1348.192	1236.893	1138.377	1241.154	2.089905	3.093826
126	1355.475	1237.877	1266.913	1286.755	2.100371	3.109496
129	1310.636	1245.472	1279.085	1278.398	2.11059	3.106666
132	1261.006	1252.052	1302.298	1271.785	2.120574	3.104414
135	1211.441	1249.669	1289.524	1250.211	2.130334	3.096983
138	1148.322	1356.979	1267.979	1257.76	2.139879	3.099598
141	1143.647	1247.044	1147.097	1179.262	2.149219	3.07161
144	1238.583	1201.138	1250.103	1229.942	2.158362	3.089884
147	1243.578	1328.693	1257.041	1276.437	2.167317	3.106
150	1231.837	1332.985	1260.132	1274.985	2.176091	3.105505

Sample 1152						
Image 8751		Particle O_5A		Approximate Particle size - 120.7209 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	898.1435	899.6997	898.8488	898.8973	0.477121	2.95371
6	851.3024	851.5979	852.5213	851.8072	0.778151	2.930341
9	837.9387	839.1029	838.5516	838.5311	0.954243	2.923519
12	838.7773	846.4611	837.9747	841.071	1.079181	2.924833
15	834.6281	844.3775	842.9837	840.6631	1.176091	2.924622
18	831.1932	838.4373	830.3727	833.3344	1.255273	2.920819
21	827.4678	836.5294	828.0298	830.6757	1.322219	2.919431
24	830.5374	832.1942	830.5449	831.0922	1.380211	2.919649
27	823.497	832.0915	842.1144	832.5676	1.431364	2.92042
30	823.0996	832.6884	840.5332	832.1071	1.477121	2.920179
33	821.9257	825.964	821.6396	823.1764	1.518514	2.915493
36	819.6276	842.4153	847.0847	836.3759	1.556303	2.922401
39	827.4054	837.4481	829.0602	831.3046	1.591065	2.91976
42	813.5733	840.9806	840.1366	831.5635	1.623249	2.919895
45	813.7258	818.6854	850.7399	827.717	1.653213	2.917882
48	820.8773	809.5417	835.4404	821.9531	1.681241	2.914847
51	809.4728	817.7757	824.0195	817.0893	1.70757	2.91227
54	814.2179	822.9048	866.4974	834.54	1.732394	2.921447
57	799.6655	841.5797	859.0115	833.4189	1.755875	2.920863
60	806.8393	856.6857	835.7008	833.0753	1.778151	2.920684
63	806.122	834.4468	845.6215	828.7301	1.799341	2.918413
66	819.1267	856.958	833.8917	836.6588	1.819544	2.922548
69	805.0923	844.5615	805.0729	818.2422	1.838849	2.912882
72	827.1434	827.4272	901.1369	851.9025	1.857332	2.93039
75	817.4272	820.0244	832.0326	823.1614	1.875061	2.915485
78	803.3633	806.104	898.3478	835.9384	1.892095	2.922174
81	819.5703	814.9451	852.2696	828.9283	1.908485	2.918517
84	775.8156	800.9374	786.4567	787.7366	1.924279	2.896381
87	822.3931	797.4301	892.7245	837.5159	1.939519	2.922993
90	823.8652	863.5941	825.6061	837.6885	1.954243	2.923083
93	794.198	849.8726	798.2459	814.1055	1.968483	2.910681
96	818.5579	841.0018	786.2612	815.2736	1.982271	2.911303
99	817.8184	849.4444	913.8063	860.3564	1.995635	2.934678
102	794.124	832.8267	878.9553	835.302	2.0086	2.921844
105	788.8058	816.5472	773.8904	793.0811	2.021189	2.899318
108	769.9195	889.1506	879.707	846.259	2.033424	2.927503
111	844.5999	881.0297	891.9615	872.5304	2.045323	2.940781
114	792.0941	805.5718	896.2993	831.3217	2.056905	2.919769
117	781.9365	818.1119	816.6415	805.5633	2.068186	2.9061
120	754.8051	812.384	793.8375	787.0089	2.079181	2.89598
123	827.4207	759.1471	869.6874	818.7517	2.089905	2.913152
126	814.4021	854.0552	857.9174	842.1249	2.100371	2.925377
129	807.7491	780.3376	856.2753	814.7873	2.11059	2.911044
132	810.5118	773.3552	859.443	814.4367	2.120574	2.910857
135	806.358	760.6088	848.408	805.1249	2.130334	2.905863
138	809.4372	762.2292	851.6498	807.7721	2.139879	2.907289
141	812.8436	761.2104	853.6589	809.2376	2.149219	2.908076
144	809.6505	769.9679	834.199	804.6058	2.158362	2.905583
147	804.2302	774.5703	826.1652	801.6552	2.167317	2.903988
150	790.2263	776.5513	792.1498	786.3091	2.176091	2.895593

Sample 1152						
Image 8751		Particle O_5B		Approximate Particle size - 181.9776 µm		
O_5B	Size:	181.9776				
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1413.941	1407.335	1407.907	1409.728	0.477121	3.149135
6	1320.556	1324.266	1323.054	1322.625	0.778151	3.121437
9	1309.851	1304.787	1308.556	1307.731	0.954243	3.116518
12	1304.268	1285.741	1292.094	1294.034	1.079181	3.111946
15	1304.47	1286.377	1289.077	1293.308	1.176091	3.111702
18	1284.273	1264.747	1275.601	1274.874	1.255273	3.105467
21	1265.46	1259.072	1260.399	1261.644	1.322219	3.100937
24	1277.882	1272.243	1267.44	1272.521	1.380211	3.104665
27	1271.42	1251.269	1247.108	1256.599	1.431364	3.099197
30	1266.908	1248.107	1255.94	1256.985	1.477121	3.09933
33	1256.493	1250.498	1259.627	1255.539	1.518514	3.09883
36	1278.035	1246.476	1265.215	1263.242	1.556303	3.101486
39	1239.299	1239.635	1232.698	1237.211	1.591065	3.092444
42	1240.914	1246.523	1240.583	1242.673	1.623249	3.094357
45	1253.717	1226.879	1239.93	1240.175	1.653213	3.093483
48	1235.56	1222.312	1229.9	1229.257	1.681241	3.089643
51	1224.446	1233.575	1230.285	1229.436	1.70757	3.089706
54	1244.007	1214.352	1217.036	1225.132	1.732394	3.088183
57	1253.738	1226.341	1206.121	1228.734	1.755875	3.089458
60	1218.715	1199.732	1194.924	1204.457	1.778151	3.080791
63	1245.719	1206.53	1215.388	1222.546	1.799341	3.087265
66	1166.47	1256.674	1227.967	1217.037	1.819544	3.085304
69	1205.395	1240.658	1200.829	1215.627	1.838849	3.0848
72	1207.681	1180.957	1206.879	1198.506	1.857332	3.07864
75	1186.75	1219.539	1176.517	1194.269	1.875061	3.077102
78	1222.311	1225.971	1237.606	1228.63	1.892095	3.089421
81	1208.805	1209.833	1230.468	1216.369	1.908485	3.085065
84	1173.954	1228.534	1175.832	1192.774	1.924279	3.076558
87	1181.425	1188.256	1184.424	1184.702	1.939519	3.073609
90	1203.089	1194.921	1157.512	1185.174	1.954243	3.073782
93	1151.982	1211.65	1164.731	1176.121	1.968483	3.070452
96	1222.109	1183.498	1185.455	1197.02	1.982271	3.078102
99	1229.717	1220.746	1155.613	1202.025	1.995635	3.079914
102	1145.918	1182.7	1195.088	1174.569	2.0086	3.069878
105	1181.545	1172.87	1216.465	1190.293	2.021189	3.075654
108	1189.532	1247.866	1223.414	1220.271	2.033424	3.086456
111	1197.189	1252.061	1174.423	1207.891	2.045323	3.082028
114	1136.287	1236.895	1196.794	1189.992	2.056905	3.075544
117	1149.58	1218.122	1208.755	1192.152	2.068186	3.076332
120	1159.009	1221.569	1223.079	1201.219	2.079181	3.079622
123	1156.147	1174.83	1222.828	1184.602	2.089905	3.073572
126	1157.751	1163.854	1199.291	1173.632	2.100371	3.069532
129	1220.807	1231.783	1186.285	1212.958	2.11059	3.083846
132	1111.75	1246.972	1196.327	1185.017	2.120574	3.073724
135	1102.304	1250.164	1182.105	1178.191	2.130334	3.071216
138	1223.542	1201.265	1187.059	1203.955	2.139879	3.08061
141	1229.718	1194.525	1180.78	1201.674	2.149219	3.079787
144	1220.94	1174.408	1244.026	1213.125	2.158362	3.083905
147	1204.221	1168.611	1126.275	1166.369	2.167317	3.066836
150	1213.594	1174.223	1124.689	1170.836	2.176091	3.068496

Sample 1152						
Image 8752		Particle O_1		Approximate Particle size - 105.1827 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1724.242	1722.379	1727.959	1724.86	0.477121	3.236754
6	1542.695	1539.804	1541.999	1541.5	0.778151	3.187943
9	1496.921	1500.757	1496.202	1497.96	0.954243	3.1755
12	1480.723	1477.276	1492.49	1483.496	1.079181	3.171286
15	1473.27	1472.656	1486.001	1477.309	1.176091	3.169471
18	1475.072	1475.307	1473.007	1474.462	1.255273	3.168634
21	1476.855	1470.526	1488.547	1478.643	1.322219	3.169863
24	1474.784	1467.754	1491.383	1477.974	1.380211	3.169667
27	1463.114	1467.128	1477.621	1469.288	1.431364	3.167107
30	1476.207	1461.107	1482.725	1473.346	1.477121	3.168305
33	1470.106	1453.551	1475.889	1466.515	1.518514	3.166287
36	1453.653	1455.475	1476.741	1461.956	1.556303	3.164934
39	1474.99	1452.695	1472.675	1466.787	1.591065	3.166367
42	1470.731	1451.986	1474.839	1465.852	1.623249	3.16609
45	1452.844	1439.806	1456.505	1449.718	1.653213	3.161284
48	1460.467	1445.033	1458.669	1454.723	1.681241	3.16278
51	1453.698	1434.226	1462.603	1450.176	1.70757	3.161421
54	1434.969	1434.98	1453.77	1441.24	1.732394	3.158736
57	1452.402	1436.101	1446.346	1444.95	1.755875	3.159853
60	1477.024	1438.35	1470.244	1461.873	1.778151	3.16491
63	1467.443	1415.273	1455.268	1445.995	1.799341	3.160167
66	1445.879	1409.627	1447.757	1434.421	1.819544	3.156677
69	1430.76	1421.253	1447.916	1433.309	1.838849	3.15634
72	1426.367	1420.843	1434.413	1427.208	1.857332	3.154487
75	1420.576	1413.151	1428.356	1420.694	1.875061	3.152501
78	1466.853	1411.629	1445.759	1441.414	1.892095	3.158789
81	1416.92	1410.181	1421.651	1416.251	1.908485	3.15114
84	1431.581	1395.619	1419.286	1415.495	1.924279	3.150908
87	1412.189	1392.709	1419.461	1408.12	1.939519	3.14864
90	1412.936	1408.234	1420.895	1414.022	1.954243	3.150456
93	1441.111	1385.052	1424.712	1416.958	1.968483	3.151357
96	1442.815	1403.59	1422.542	1422.982	1.982271	3.153199
99	1454.56	1413.231	1429.607	1432.466	1.995635	3.156084
102	1416.441	1372.068	1418.501	1402.337	2.0086	3.146852
105	1463.158	1400.216	1395.173	1419.515	2.021189	3.15214
108	1419.025	1345.433	1410.909	1391.789	2.033424	3.143573
111	1445.732	1358.789	1401.69	1402.07	2.045323	3.14677
114	1422.918	1373.71	1373.912	1390.18	2.056905	3.143071
117	1319.644	1312.916	1387.534	1340.032	2.068186	3.127115
120	1412.563	1337.212	1389.729	1379.834	2.079181	3.139827
123	1429.847	1336.647	1370.68	1379.058	2.089905	3.139582
126	1448.293	1287.469	1348.015	1361.259	2.100371	3.133941
129	1460.507	1291.712	1341.546	1364.588	2.11059	3.135002
132	1457.143	1298.757	1395.029	1383.643	2.120574	3.141024
135	1418.756	1317.841	1405.25	1380.616	2.130334	3.140073
138	1420.164	1336.763	1430.834	1395.92	2.139879	3.144861
141	1386.584	1363.886	1425.471	1391.98	2.149219	3.143633
144	1396.916	1376.843	1394.147	1389.302	2.158362	3.142797
147	1390.931	1351.467	1391.218	1377.872	2.167317	3.139209
150	1290.388	1303.995	1328.144	1307.509	2.176091	3.116445

Sample 1152						
Image 8752		Particle O_2		Approximate Particle size - 193.7652 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1687.546	1689.418	1690.837	1689.267	0.477121	3.227698
6	1571.406	1573.122	1567.17	1570.566	0.778151	3.196056
9	1555.647	1551.375	1545.898	1550.973	0.954243	3.190604
12	1541.457	1543.115	1534.778	1539.783	1.079181	3.18746
15	1526.214	1524.939	1529.292	1526.815	1.176091	3.183786
18	1523.772	1541.825	1525.112	1530.236	1.255273	3.184758
21	1520.578	1538.941	1519.445	1526.321	1.322219	3.183646
24	1527.335	1543.26	1517.471	1529.355	1.380211	3.184508
27	1522.763	1511.326	1501.935	1512.008	1.431364	3.179554
30	1542.384	1527.33	1513.904	1527.873	1.477121	3.184087
33	1528.717	1508.326	1509.645	1515.563	1.518514	3.180574
36	1500.325	1510.517	1495.378	1502.073	1.556303	3.176691
39	1535.252	1503.539	1489.028	1509.273	1.591065	3.178768
42	1516.165	1515.427	1492.639	1508.077	1.623249	3.178423
45	1529.872	1503.013	1497.687	1510.191	1.653213	3.179032
48	1511.46	1470.438	1495.741	1492.546	1.681241	3.173928
51	1484.039	1505.634	1476.974	1488.882	1.70757	3.17286
54	1527.375	1547.388	1483.038	1519.267	1.732394	3.181634
57	1486.777	1460.441	1481.4	1476.206	1.755875	3.169147
60	1482.606	1508.851	1467.84	1486.432	1.778151	3.172145
63	1478.552	1461.943	1481.233	1473.909	1.799341	3.168471
66	1479.363	1427.412	1465.584	1457.453	1.819544	3.163594
69	1508.126	1534.455	1514.603	1519.062	1.838849	3.181575
72	1499.347	1523.892	1462.581	1495.273	1.857332	3.174721
75	1447.831	1473.245	1470.829	1463.968	1.875061	3.165532
78	1484.798	1490.267	1424.233	1466.433	1.892095	3.166262
81	1444.143	1473.96	1398.727	1438.944	1.908485	3.158044
84	1474.552	1441.725	1402.985	1439.754	1.924279	3.158288
87	1427.132	1458.97	1465.359	1450.487	1.939519	3.161514
90	1415.56	1403.529	1396.416	1405.168	1.954243	3.147728
93	1496.615	1436.529	1421.77	1451.638	1.968483	3.161858
96	1515.936	1481.599	1388.396	1461.977	1.982271	3.164941
99	1480.289	1404.077	1402.638	1429.001	1.995635	3.155033
102	1502.944	1523.539	1483.652	1503.378	2.0086	3.177068
105	1501.838	1512.149	1411.709	1475.232	2.021189	3.16886
108	1426.579	1480.137	1455.5	1454.072	2.033424	3.162586
111	1447.852	1480.168	1402.077	1443.366	2.045323	3.159376
114	1457.416	1477.511	1392.24	1442.389	2.056905	3.159082
117	1488.646	1502.543	1448.667	1479.952	2.068186	3.170248
120	1459.952	1477.843	1375.384	1437.726	2.079181	3.157676
123	1409.909	1413.372	1442.633	1421.971	2.089905	3.152891
126	1522.273	1433.79	1403.818	1453.294	2.100371	3.162353
129	1425.235	1449.93	1341.004	1405.39	2.11059	3.147797
132	1429.108	1396.234	1330.735	1385.359	2.120574	3.141562
135	1375.91	1472.076	1293.525	1380.504	2.130334	3.140038
138	1474.544	1375.993	1270.38	1373.639	2.139879	3.137873
141	1362.966	1355.933	1286.408	1335.102	2.149219	3.125515
144	1345.164	1356.904	1385.837	1362.635	2.158362	3.13438
147	1361.77	1404.831	1393.749	1386.783	2.167317	3.142009
150	1420.239	1449.079	1399.948	1423.088	2.176091	3.153232

Sample 1152						
Image 8752		Particle O_3		Approximate Particle size - 318.5972 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1758.73	1760.024	1759.791	1759.515	0.477121	3.245393
6	1693.289	1695.58	1691.425	1693.431	0.778151	3.228768
9	1685.474	1686.046	1684.244	1685.254	0.954243	3.226665
12	1675.748	1675.023	1676.415	1675.728	1.079181	3.224204
15	1673.74	1676.411	1673.56	1674.57	1.176091	3.223903
18	1672.843	1671.942	1672.944	1672.576	1.255273	3.223386
21	1670.992	1665.521	1670.841	1669.118	1.322219	3.222487
24	1654.848	1653.838	1661.69	1656.792	1.380211	3.219268
27	1651.044	1656.645	1657.166	1654.952	1.431364	3.218785
30	1643.758	1657.369	1655.745	1652.291	1.477121	3.218086
33	1660.051	1656.144	1655.172	1657.123	1.518514	3.219355
36	1645.451	1657.257	1658.962	1653.89	1.556303	3.218507
39	1646.977	1649.871	1647.282	1648.043	1.591065	3.216969
42	1645.112	1651.919	1653.347	1650.126	1.623249	3.217517
45	1648.122	1629.209	1636.403	1637.911	1.653213	3.21429
48	1641.87	1639.926	1638.416	1640.071	1.681241	3.214863
51	1633.012	1635.849	1645.604	1638.155	1.70757	3.214355
54	1645.532	1645.104	1630.851	1640.496	1.732394	3.214975
57	1629.206	1660.887	1666.763	1652.285	1.755875	3.218085
60	1625.851	1607.055	1632.17	1621.692	1.778151	3.209968
63	1611.36	1645.583	1648.623	1635.189	1.799341	3.213568
66	1630.267	1634.757	1620.401	1628.475	1.819544	3.211781
69	1601.996	1597.923	1636.823	1612.247	1.838849	3.207432
72	1618.972	1623.266	1681.386	1641.208	1.857332	3.215164
75	1647.599	1614.707	1629.487	1630.598	1.875061	3.212347
78	1605.222	1621.881	1623.803	1616.968	1.892095	3.208702
81	1570.618	1583.265	1663.051	1605.644	1.908485	3.205649
84	1582.05	1600.48	1625.331	1602.62	1.924279	3.204831
87	1615.146	1596.863	1599.197	1603.735	1.939519	3.205133
90	1557.375	1584.338	1661.715	1601.143	1.954243	3.20443
93	1624.763	1675.675	1610.848	1637.095	1.968483	3.214074
96	1622.765	1570.046	1602.687	1598.499	1.982271	3.203712
99	1599.816	1624.492	1675.139	1633.149	1.995635	3.213026
102	1625.489	1566.391	1660.557	1617.479	2.0086	3.208839
105	1623.067	1595.503	1687.848	1635.473	2.021189	3.213643
108	1558.777	1612.179	1609.515	1593.49	2.033424	3.202349
111	1610.376	1553.761	1580.999	1581.712	2.045323	3.199127
114	1544.661	1542.82	1653.943	1580.475	2.056905	3.198788
117	1553.018	1584.001	1631.387	1589.468	2.068186	3.201252
120	1582.126	1585.964	1612.311	1593.467	2.079181	3.202343
123	1596.676	1503.955	1684.186	1594.939	2.089905	3.202744
126	1587.341	1572.2	1596.227	1585.256	2.100371	3.200099
129	1495.103	1579.192	1666.541	1580.279	2.11059	3.198734
132	1509.967	1629.461	1649.123	1596.183	2.120574	3.203083
135	1550.342	1485.848	1626.9	1554.363	2.130334	3.191552
138	1567.354	1510.897	1601.427	1559.892	2.139879	3.193095
141	1475.459	1535.283	1661.245	1557.329	2.149219	3.19238
144	1488.96	1567.281	1660.711	1572.317	2.158362	3.19654
147	1538.17	1598.536	1654.391	1597.032	2.167317	3.203314
150	1554.872	1418.068	1608.961	1527.3	2.176091	3.183924

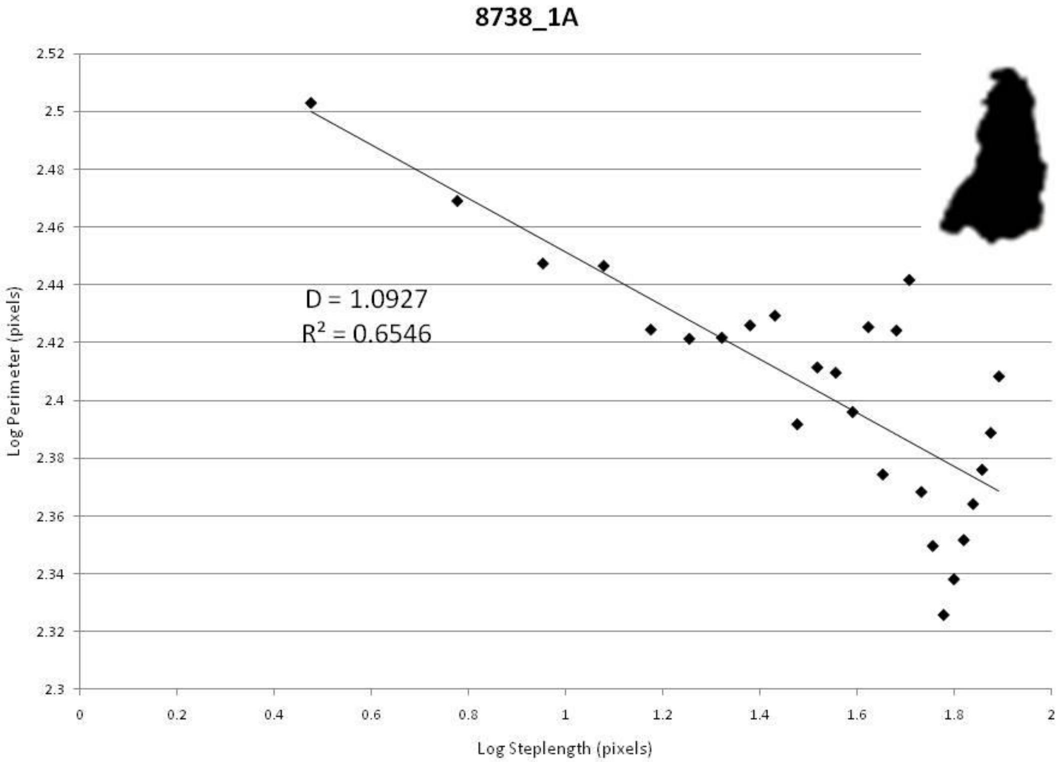
Sample 1152						
Image 8752		Particle O_4A		Approximate Particle size - 201.0326 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1009.499	1009.499	1010.473	1009.824	0.477121	3.004246
6	985.8845	991.4866	985.0286	987.4666	0.778151	2.994522
9	982.6729	980.7672	983.1393	982.1931	0.954243	2.992197
12	981.7227	981.7479	981.7649	981.7452	1.079181	2.991999
15	977.6956	981.614	975.2853	978.1983	1.176091	2.990427
18	982.8869	976.7158	977.5562	979.053	1.255273	2.990806
21	971.8011	978.4668	970.5597	973.6092	1.322219	2.988385
24	971.5194	987.1572	972.3467	977.0078	1.380211	2.989898
27	976.5014	980.4687	974.1029	977.0243	1.431364	2.989905
30	967.3398	970.2078	965.239	967.5955	1.477121	2.985694
33	967.3553	979.512	957.1866	968.018	1.518514	2.985883
36	978.3784	994.9398	969.3111	980.8764	1.556303	2.991614
39	955.1115	975.7825	968.8809	966.5916	1.591065	2.985243
42	964.3325	965.2864	957.4315	962.3501	1.623249	2.983333
45	970.7858	951.8724	948.7869	957.1484	1.653213	2.980979
48	952.3454	972.8635	957.3829	960.8639	1.681241	2.982662
51	962.8026	974.1631	956.1378	964.3678	1.70757	2.984243
54	951.6517	979.6863	947.1757	959.5046	1.732394	2.982047
57	963.07	968.4059	937.8049	956.4269	1.755875	2.980652
60	971.2225	939.881	939.2841	950.1292	1.778151	2.977783
63	928.6445	985.8785	945.8832	953.4687	1.799341	2.979306
66	974.7431	959.4999	953.3686	962.5372	1.819544	2.983418
69	935.0428	951.2982	941.4946	942.6119	1.838849	2.974333
72	947.36	957.8223	955.2576	953.48	1.857332	2.979312
75	972.6649	916.6899	927.1219	938.8256	1.875061	2.972585
78	944.452	951.2809	937.0571	944.2633	1.892095	2.975093
81	931.4197	926.0084	946.3038	934.5773	1.908485	2.970615
84	938.5843	902.6232	955.8007	932.3361	1.924279	2.969572
87	942.9163	907.0867	960.1565	936.7198	1.939519	2.97161
90	957.3311	921.798	969.7647	949.6313	1.954243	2.977555
93	979.5193	963.3334	962.5428	968.4652	1.968483	2.986084
96	941.6048	913.9739	932.1799	929.2529	1.982271	2.968134
99	918.9592	961.7178	905.5507	928.7426	1.995635	2.967895
102	959.9263	950.6437	957.2386	955.9362	2.0086	2.980429
105	972.9648	933.0181	934.5228	946.8352	2.021189	2.976274
108	919.3399	936.4077	903.2977	919.6818	2.033424	2.963638
111	939.9252	948.2275	916.2802	934.811	2.045323	2.970724
114	928.7427	952.0699	923.3049	934.7058	2.056905	2.970675
117	900.3605	920.1395	901.1201	907.2067	2.068186	2.957706
120	892.3243	890.8122	896.3971	893.1779	2.079181	2.950938
123	888.2844	945.9608	921.7366	918.6606	2.089905	2.963155
126	910.531	933.2583	912.2748	918.688	2.100371	2.963168
129	933.6331	936.2856	860.5718	910.1635	2.11059	2.959119
132	851.0588	941.2629	825.9853	872.769	2.120574	2.940899
135	843.6826	959.691	817.2274	873.5337	2.130334	2.94128
138	852.75	976.1068	833.8004	887.5524	2.139879	2.948194
141	845.2507	944.7388	841.8882	877.2926	2.149219	2.943144
144	852.8481	895.7969	856.4392	868.3614	2.158362	2.938701
147	863.205	819.7858	869.0942	850.695	2.167317	2.929774
150	870.3461	815.3892	886.2891	857.3415	2.176091	2.933154

Sample 1152						
Image 8752		Particle O_4B		Approximate Particle size - 167.209 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	905.377	905.5103	906.9048	905.9307	0.477121	2.957095
6	886.1678	888.3947	885.2323	886.5983	0.778151	2.947727
9	885.0284	885.2998	884.1469	884.825	0.954243	2.946857
12	877.4639	875.6058	874.3879	875.8192	1.079181	2.942414
15	879.8013	880.8005	875.6465	878.7494	1.176091	2.943865
18	880.7545	872.4537	873.2907	875.4996	1.255273	2.942256
21	871.6848	869.9213	875.6291	872.4117	1.322219	2.940721
24	872.2112	867.0676	856.8707	865.3832	1.380211	2.937208
27	856.3597	855.6305	856.282	856.0907	1.431364	2.93252
30	866.6567	864.4586	871.8688	867.6614	1.477121	2.93835
33	852.4267	856.3796	872.0781	860.2948	1.518514	2.934647
36	854.8681	862.9594	839.3438	852.3904	1.556303	2.930639
39	842.3071	857.0616	862.6732	854.014	1.591065	2.931465
42	864.2258	828.5021	831.512	841.4133	1.623249	2.925009
45	837.4043	852.0549	834.2576	841.2389	1.653213	2.924919
48	861.3773	865.5943	868.7396	865.2371	1.681241	2.937135
51	858.5352	867.5635	812.3761	846.1583	1.70757	2.927452
54	832.2924	850.7876	824.183	835.7543	1.732394	2.922079
57	828.7156	874.1115	864.3943	855.7405	1.755875	2.932342
60	815.11	841.3336	837.6829	831.3755	1.778151	2.919797
63	862.0818	817.8555	802.3928	827.4434	1.799341	2.917738
66	821.6743	826.8643	810.0224	819.5203	1.819544	2.91356
69	815.0423	864.6998	833.257	837.6664	1.838849	2.923071
72	803.495	828.6221	797.7302	809.9491	1.857332	2.908458
75	782.4477	861.1195	820.4299	821.3324	1.875061	2.914519
78	797.7206	800.2756	837.0878	811.6947	1.892095	2.909393
81	843.4196	820.8228	761.1723	808.4716	1.908485	2.907665
84	789.2757	824.1691	776.8997	796.7815	1.924279	2.901339
87	730.7153	818.1857	745.4453	764.7821	1.939519	2.883538
90	746.058	815.575	742.747	768.1267	1.954243	2.885433
93	756.4685	814.774	747.7064	772.983	1.968483	2.88817
96	759.9389	816.5358	754.6119	777.0289	1.982271	2.890437
99	766.7162	734.8569	773.4955	758.3562	1.995635	2.879873
102	783.017	727.2809	786.9098	765.7359	2.0086	2.884079
105	793.42	739.2473	800.0992	777.5888	2.021189	2.89075
108	806.2698	814.9791	819.2252	813.4914	2.033424	2.910353
111	809.6953	739.7548	840.4015	796.6172	2.045323	2.90125
114	798.1442	742.0424	853.8473	798.0113	2.056905	2.902009
117	801.1493	727.1456	793.2662	773.8537	2.068186	2.888659
120	790.4488	730.902	788.9746	770.1085	2.079181	2.886552
123	794.3986	781.6076	679.4896	751.8319	2.089905	2.876121
126	793.4828	791.2662	684.8478	756.5323	2.100371	2.878827
129	665.2198	808.7122	680.9534	718.2951	2.11059	2.856303
132	665.7695	821.6677	671.2885	719.5752	2.120574	2.857076
135	664.248	795.1445	676.5368	711.9764	2.130334	2.852466
138	669.9551	799.5864	683.7594	717.767	2.139879	2.855983
141	678.8478	661.9379	682.5754	674.4537	2.149219	2.828952
144	690.4172	658.553	686.3431	678.4378	2.158362	2.83151
147	701.2354	662.5917	697.0097	686.9456	2.167317	2.836922
150	713.9527	669.8683	702.1842	695.3351	2.176091	2.842194

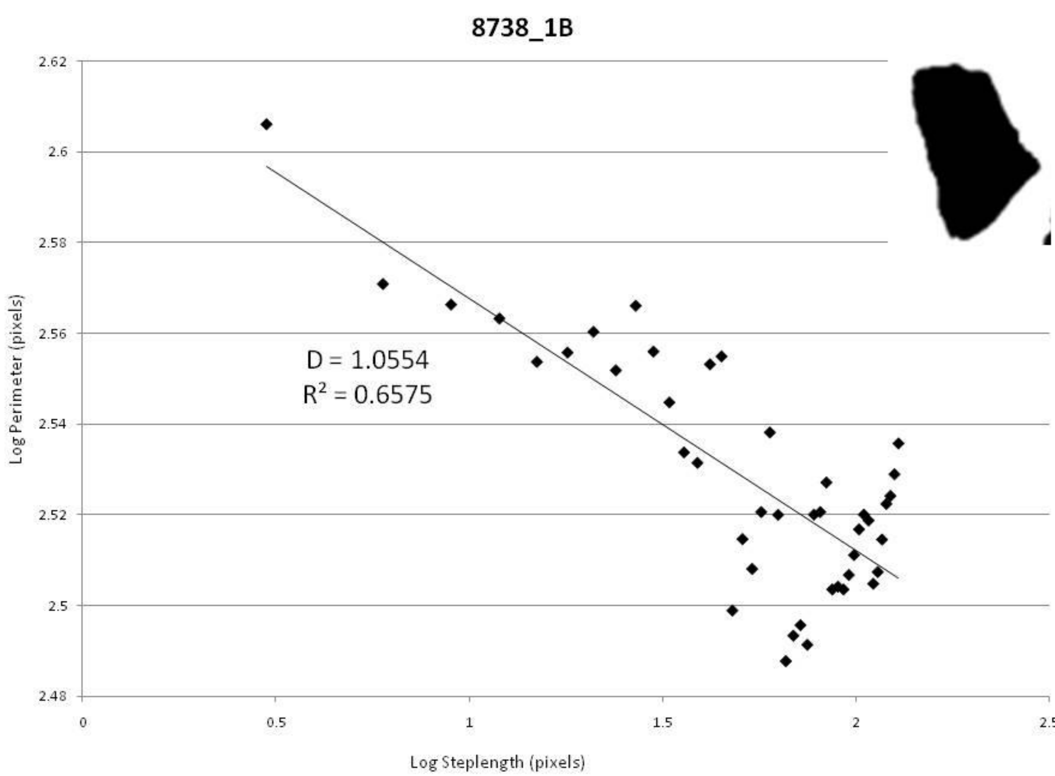
Sample 1152						
Image 8752		Particle O_5A		Approximate Particle size - 188.7579 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	938.9525	938.1058	938.1058	938.388	0.477121	2.972382
6	897.4558	895.7953	895.7953	896.3488	0.778151	2.952477
9	888.0719	889.2192	889.2192	888.8368	0.954243	2.948822
12	881.0193	882.2289	882.2289	881.8257	1.079181	2.945383
15	880.3041	881.5161	881.5161	881.1121	1.176091	2.945031
18	871.0764	875.1905	875.1905	873.8191	1.255273	2.941422
21	857.462	863.5378	863.5378	861.5125	1.322219	2.935262
24	863.4549	852.486	852.486	856.1423	1.380211	2.932546
27	839.0862	838.4707	838.4707	838.6759	1.431364	2.923594
30	861.2397	838.7971	838.7971	846.278	1.477121	2.927513
33	840.9424	865.4227	865.4227	857.2626	1.518514	2.933114
36	819.6871	829.8889	829.8889	826.4883	1.556303	2.917237
39	824.9123	830.9662	830.9662	828.9482	1.591065	2.918527
42	844.424	845.6143	845.6143	845.2175	1.623249	2.926968
45	809.7419	857.5579	857.5579	841.6192	1.653213	2.925116
48	817.4283	805.4186	805.4186	809.4218	1.681241	2.908175
51	867.8116	817.3291	817.3291	834.1566	1.70757	2.921248
54	868.7504	835.6398	835.6398	846.6767	1.732394	2.927718
57	799.5692	799.5695	799.5695	799.5694	1.755875	2.902856
60	792.3825	782.4175	782.4175	785.7392	1.778151	2.895278
63	810.4337	793.6122	793.6122	799.2194	1.799341	2.902666
66	816.8879	823.3953	823.3953	821.2262	1.819544	2.914463
69	756.6264	808.2104	808.2104	791.0157	1.838849	2.898185
72	741.6575	761.6094	761.6094	754.9588	1.857332	2.877923
75	766.2303	745.1744	745.1744	752.193	1.875061	2.876329
78	744.9263	734.4682	734.4682	737.9542	1.892095	2.868029
81	754.2306	762.1779	762.1779	759.5288	1.908485	2.880544
84	793.1733	769.25	769.25	777.2244	1.924279	2.890546
87	766.5921	744.5767	744.5767	751.9152	1.939519	2.876169
90	757.1695	738.0106	738.0106	744.3969	1.954243	2.871805
93	769.9651	741.4375	741.4375	750.9467	1.968483	2.875609
96	782.2192	749.7717	749.7717	760.5875	1.982271	2.881149
99	791.9895	765.6699	765.6699	774.4431	1.995635	2.88899
102	807.7685	779.4651	779.4651	788.8996	2.0086	2.897022
105	825.3434	796.3971	796.3971	806.0459	2.021189	2.90636
108	815.9042	812.4792	812.4792	813.6209	2.033424	2.910422
111	721.0839	827.3049	827.3049	791.8979	2.045323	2.898669
114	741.3345	728.6677	728.6677	732.89	2.056905	2.865039
117	735.5126	711.9371	711.9371	719.7956	2.068186	2.857209
120	741.673	734.9687	734.9687	737.2035	2.079181	2.867587
123	742.3874	648.4668	648.4668	679.7737	2.089905	2.832364
126	671.1342	527.1491	527.1491	575.1441	2.100371	2.759777
129	549.0385	539.0163	539.0163	542.357	2.11059	2.734285
132	623.297	550.6459	550.6459	574.8629	2.120574	2.759564
135	648.0579	565.7003	565.7003	593.1528	2.130334	2.773167
138	652.2018	576.5536	576.5536	601.7697	2.139879	2.77943
141	676.4368	587.9859	587.9859	617.4695	2.149219	2.790616
144	708.0026	603.0821	603.0821	638.0556	2.158362	2.804859
147	711.827	688.98	688.98	696.5957	2.167317	2.842981
150	731.5716	706.0612	706.0612	714.5647	2.176091	2.854042

Sample 1152						
Image 8752		Particle O_5B		Approximate Particle size - 157.5353 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	755.1518	753.1427	751.9299	753.4081	0.477121	2.87703
6	727.2812	728.6157	726.4984	727.4651	0.778151	2.861812
9	723.2723	720.7327	722.1541	722.053	0.954243	2.858569
12	718.9232	721.9551	718.8888	719.9224	1.079181	2.857286
15	720.6701	719.9553	721.7427	720.7894	1.176091	2.857808
18	716.0052	717.3977	716.0461	716.483	1.255273	2.855206
21	721.9505	723.0837	718.2435	721.0926	1.322219	2.857991
24	707.2443	710.644	711.0317	709.64	1.380211	2.851038
27	714.7862	721.2194	713.7294	716.5783	1.431364	2.855264
30	703.0034	690.4408	694.9239	696.1227	1.477121	2.842686
33	695.9637	702.8891	692.9917	697.2815	1.518514	2.843408
36	714.0295	697.7683	701.6937	704.4972	1.556303	2.847879
39	696.299	687.634	685.8097	689.9142	1.591065	2.838795
42	684.6158	676.2726	672.9525	677.947	1.623249	2.831196
45	667.9197	689.914	675.2163	677.6833	1.653213	2.831027
48	721.6816	689.6624	662.5357	691.2932	1.681241	2.839662
51	681.7368	666.7777	685.473	677.9958	1.70757	2.831227
54	665.9506	624.6313	650.88	647.154	1.732394	2.811008
57	675.8773	659.5049	671.5781	668.9868	1.755875	2.825418
60	638.3114	719.1025	637.5804	664.9981	1.778151	2.82282
63	651.6213	651.7708	651.6213	651.6711	1.799341	2.814028
66	654.0762	680.4267	649.0516	661.1848	1.819544	2.820323
69	661.1265	626.5562	631.5131	639.7319	1.838849	2.805998
72	697.4946	643.268	644.2512	661.6713	1.857332	2.820642
75	600.0166	658.7522	579.2155	612.6614	1.875061	2.787221
78	663.9486	613.5027	605.804	627.7518	1.892095	2.797788
81	673.6168	610.8719	606.1017	630.1968	1.908485	2.799476
84	703.9296	636.9948	627.8019	656.2421	1.924279	2.817064
87	704.6245	671.604	651.1324	675.787	1.939519	2.82981
90	591.0356	568.5089	587.9919	582.5121	1.954243	2.765305
93	599.2055	578.0006	593.8895	590.3652	1.968483	2.771121
96	611.2667	612.714	613.0616	612.3474	1.982271	2.786998
99	663.5904	640.3157	635.3777	646.4279	1.995635	2.81052
102	545.4268	669.245	639.9717	618.2145	2.0086	2.791139
105	542.4594	573.6115	667.8019	594.6243	2.021189	2.774243
108	552.0256	584.6391	682.2662	606.3103	2.033424	2.782695
111	577.9458	604.4219	724.4697	635.6125	2.045323	2.803192
114	594.5925	623.7228	516.4874	578.2676	2.056905	2.762129
117	615.6296	631.2281	551.5728	599.4768	2.068186	2.777772
120	623.1419	654.0226	557.3518	611.5054	2.079181	2.7864
123	650.0274	670.4176	598.1873	639.5441	2.089905	2.80587
126	588.8568	698.6739	636.7184	641.4164	2.100371	2.80714
129	593.3866	712.682	645.8337	650.6341	2.11059	2.813337
132	539.2118	498.8502	659.8715	565.9778	2.120574	2.752799
135	550.3228	506.3447	437.6029	498.0901	2.130334	2.697308
138	551.4982	508.432	449.3009	503.077	2.139879	2.701634
141	489.0555	511.7971	447.1096	482.6541	2.149219	2.683636
144	489.2513	519.0821	452.86	487.0645	2.158362	2.687586
147	480.9711	593.6098	457.3188	510.6332	2.167317	2.708109
150	484.9022	629.0735	465.341	526.4389	2.176091	2.721348

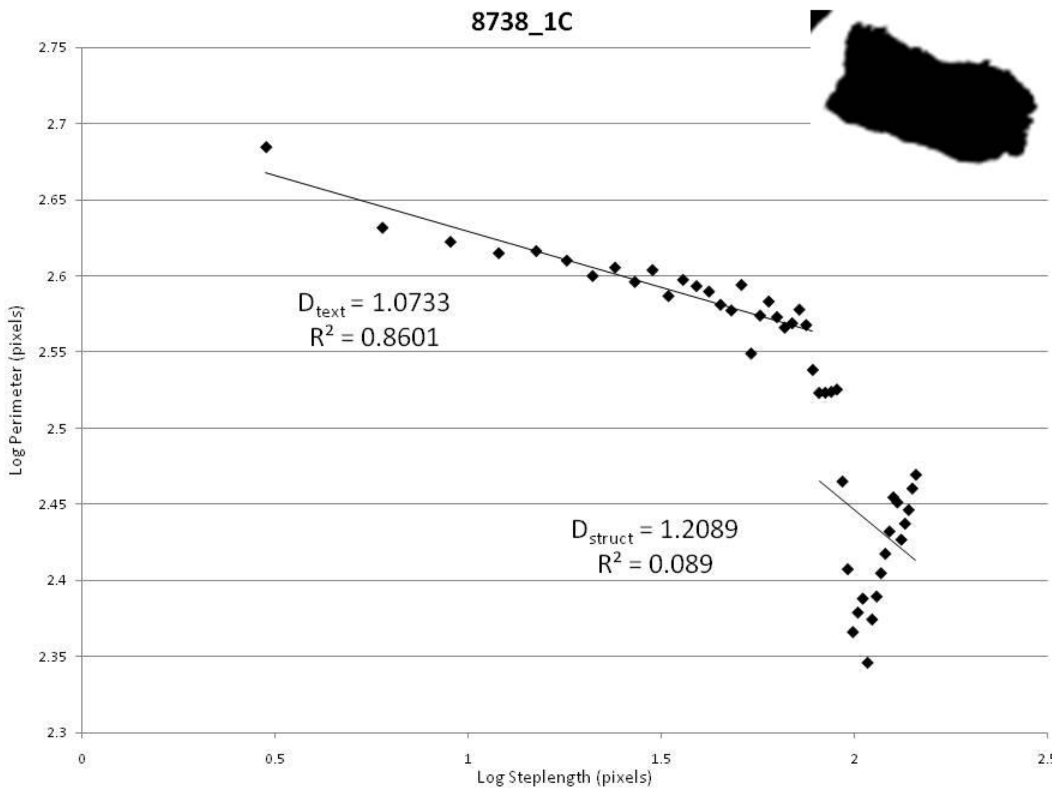
Sample 1152						
Image 8752		Particle O_6		Approximate Particle size - 134.34 µm		
(X)	(Y) 1	(Y) 2	(Y) 3	(Y)AVG	log(X)	log(Y)
3	1345.309	1344.449	1347.299	1345.685	0.477121	3.128944
6	1251.02	1252.944	1252.265	1252.076	0.778151	3.097631
9	1228.609	1222.413	1225.32	1225.447	0.954243	3.088295
12	1227.289	1220.214	1221.265	1222.923	1.079181	3.087399
15	1228.353	1216.429	1219.229	1221.337	1.176091	3.086835
18	1221.431	1211.427	1217.795	1216.884	1.255273	3.085249
21	1217.767	1211.332	1213.821	1214.307	1.322219	3.084328
24	1230.681	1212.629	1215.422	1219.577	1.380211	3.086209
27	1223.451	1200.496	1202.998	1208.982	1.431364	3.08242
30	1206.261	1202.056	1199.734	1202.683	1.477121	3.080151
33	1214.049	1197.136	1206.333	1205.839	1.518514	3.081289
36	1195.27	1193.159	1194.625	1194.351	1.556303	3.077132
39	1196.269	1165.345	1165.586	1175.733	1.591065	3.070309
42	1201.646	1194.119	1193.413	1196.393	1.623249	3.077874
45	1169.539	1157.434	1160.767	1162.58	1.653213	3.065423
48	1198.151	1185.386	1181.413	1188.316	1.681241	3.074932
51	1183.282	1181.611	1187.237	1184.043	1.70757	3.073368
54	1214.53	1158.725	1164.855	1179.37	1.732394	3.07165
57	1176.079	1150.302	1143.695	1156.692	1.755875	3.063218
60	1193.611	1178.891	1175.741	1182.748	1.778151	3.072892
63	1222.582	1159.218	1171.751	1184.517	1.799341	3.073541
66	1182.023	1104.944	1099.8	1128.922	1.819544	3.052664
69	1125.785	1100.893	1176.63	1134.436	1.838849	3.05478
72	1135.536	1111.018	1097.792	1114.782	1.857332	3.04719
75	1127.144	1130.716	1127.503	1128.454	1.875061	3.052484
78	1170.206	1068.738	1173.898	1137.614	1.892095	3.055995
81	1231.267	1079.605	1183.756	1164.876	1.908485	3.06628
84	1228.315	1159.594	1187.6	1191.836	1.924279	3.076217
87	1184.655	1149.508	1115.916	1150.026	1.939519	3.060708
90	1161.105	1050.249	1118.23	1109.861	1.954243	3.045269
93	1177.745	1055.689	1137.435	1123.623	1.968483	3.050621
96	1190.036	1081.229	1163.304	1144.856	1.982271	3.058751
99	1219.911	1138.868	1195.573	1184.784	1.995635	3.073639
102	1072.128	1190.366	1060.793	1107.762	2.0086	3.044447
105	1088.826	1149.918	1113.484	1117.409	2.021189	3.048212
108	1130.93	1082.02	1124.537	1112.496	2.033424	3.046298
111	1138.149	1069.335	1134.083	1113.856	2.045323	3.046829
114	1143.814	1110.338	1143.476	1132.543	2.056905	3.054055
117	1145.905	1106.992	1010.224	1087.707	2.068186	3.036512
120	1158.519	1120.755	1032.749	1104.008	2.079181	3.042972
123	1183.475	1180.839	1026.65	1130.322	2.089905	3.053202
126	1187.709	1185.369	1021.28	1131.452	2.100371	3.053636
129	1022.892	1166.05	1043.198	1077.38	2.11059	3.032369
132	1022.158	1000.491	1075.214	1032.621	2.120574	3.013941
135	1012.399	994.2704	1084.023	1030.231	2.130334	3.012934
138	1027.071	1065.077	1106.715	1066.288	2.139879	3.027874
141	1024.058	1064.611	1142.228	1076.966	2.149219	3.032202
144	1032.853	1072.45	1149.672	1084.991	2.158362	3.035426
147	1049.03	1088.626	979.6825	1039.113	2.167317	3.016663
150	1311.092	1078.734	960.9418	1116.923	2.176091	3.048023

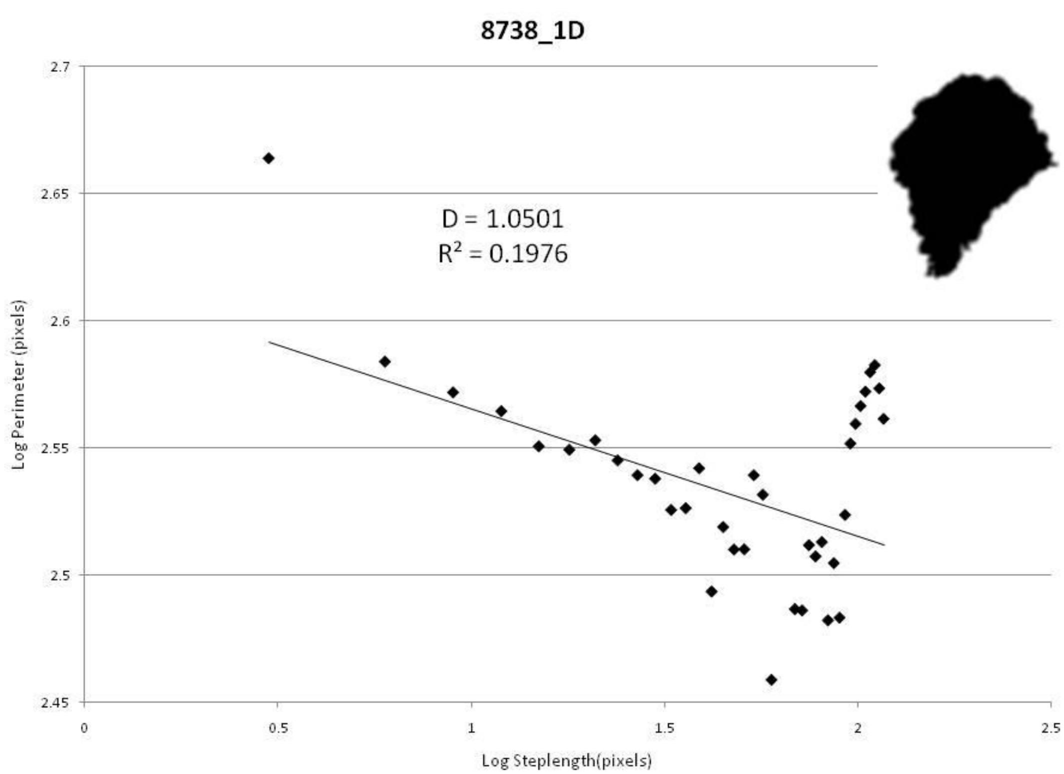


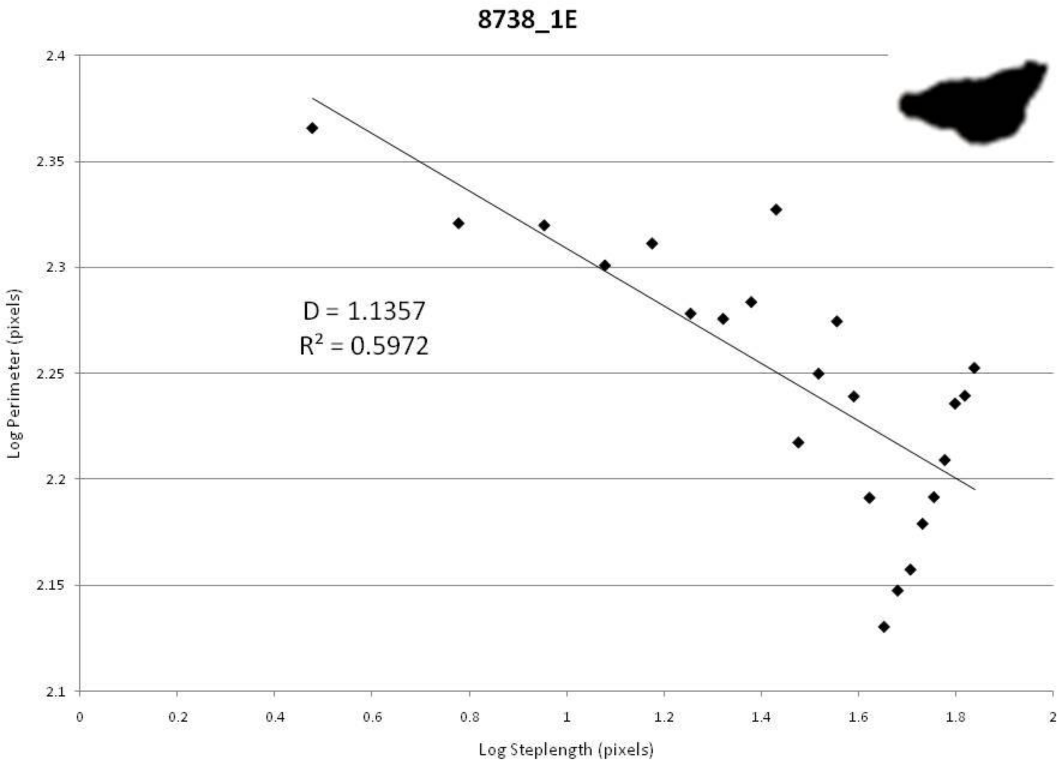
8738_1A
D = 1.0927
R² = 0.6546
Log Perimeter (pixels)
Log Steplength (pixels)
2.52
2.5
2.48
2.46
2.44
2.42
2.4
2.38
2.36
2.34
2.32
2.3
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2

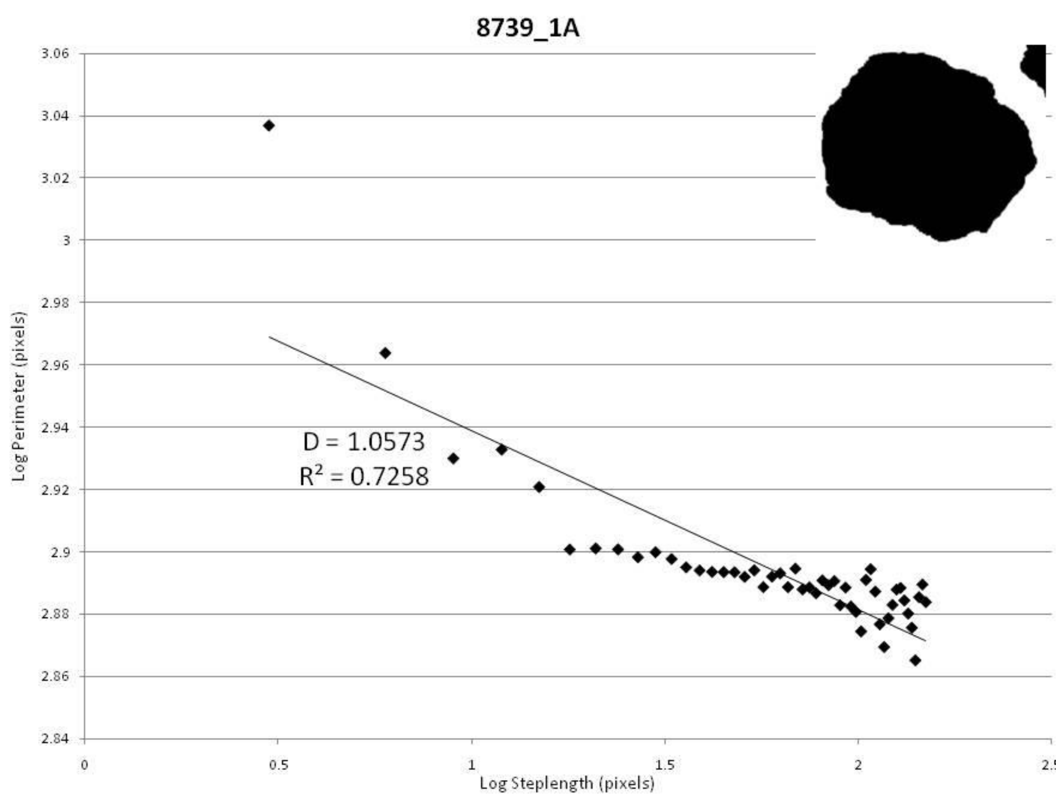


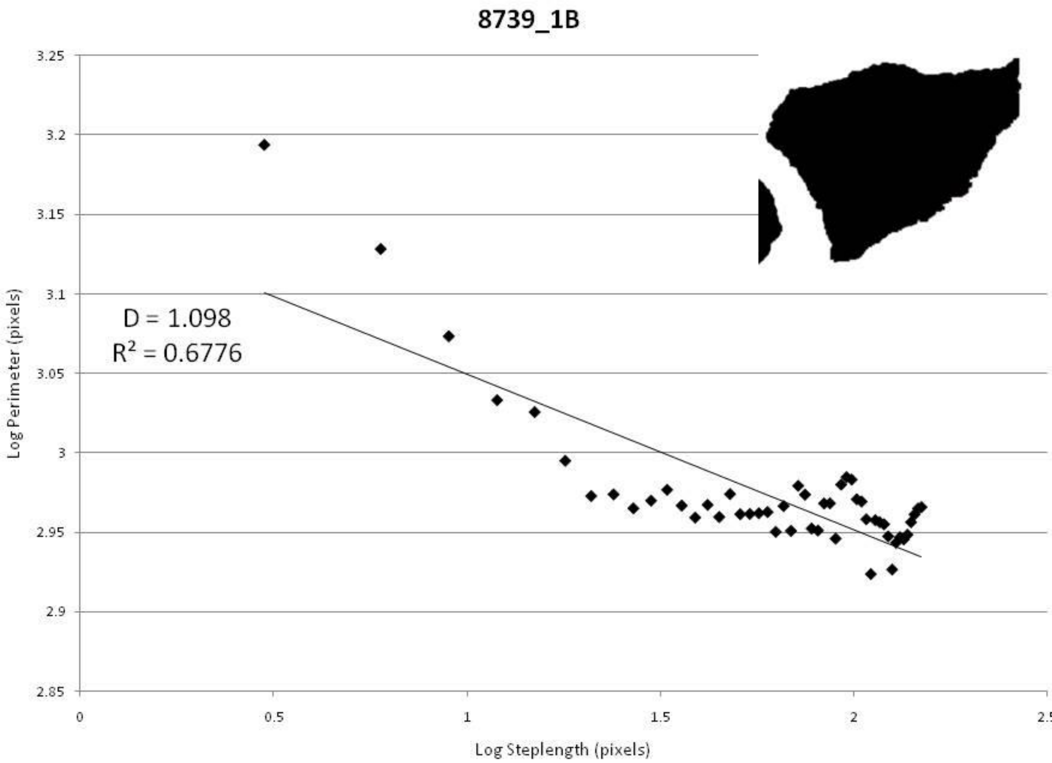
8738_1B
D = 1.0554
R² = 0.6575
Log Perimeter (pixels)
Log Steplength (pixels)
2.62
2.6
2.58
2.56
2.54
2.52
2.5
2.48
0
0.5
1
1.5
2
2.5

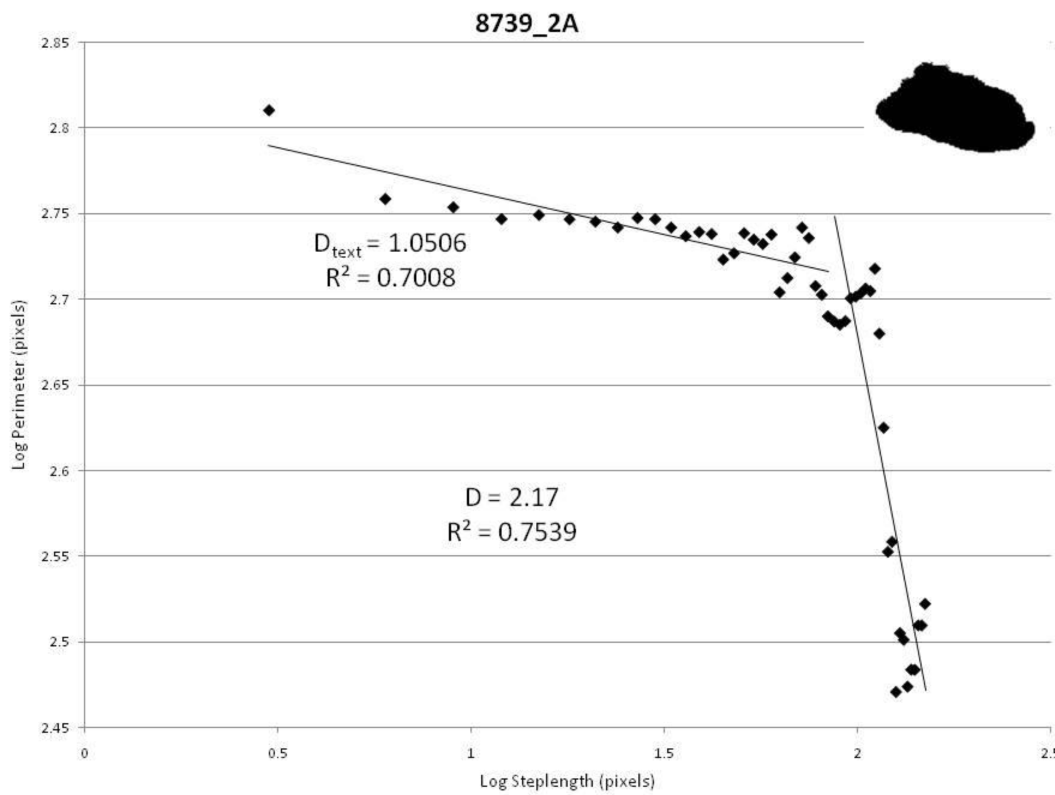

8738_1C
D_{text} = 1.0733
R^2 = 0.8601
D_{struct} = 1.2089
R^2 = 0.089
Log Perimeter (pixels)
Log Steplength (pixels)
2.75
2.7
2.65
2.6
2.55
2.5
2.45
2.4
2.35
2.3
0
0.5
1
1.5
2
2.5

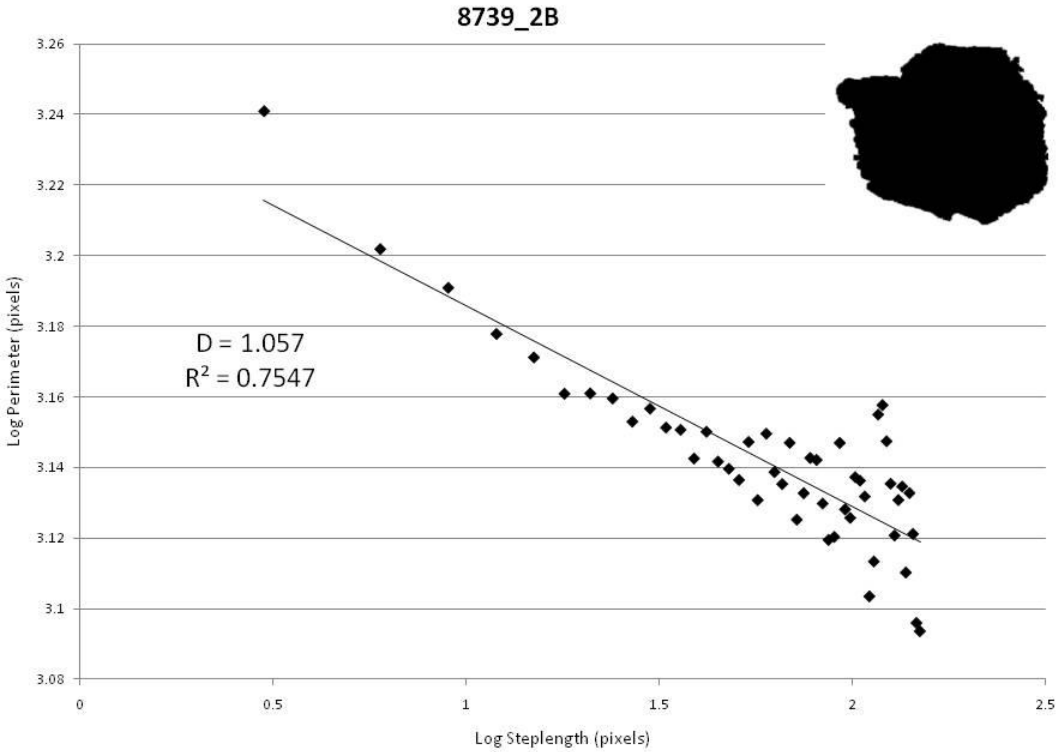

8738_1D
D = 1.0501
R^2 = 0.1976
Log Perimeter (pixels)
Log Steplength(pixels)
2.7
2.65
2.6
2.55
2.5
2.45
0
0.5
1
1.5
2
2.5

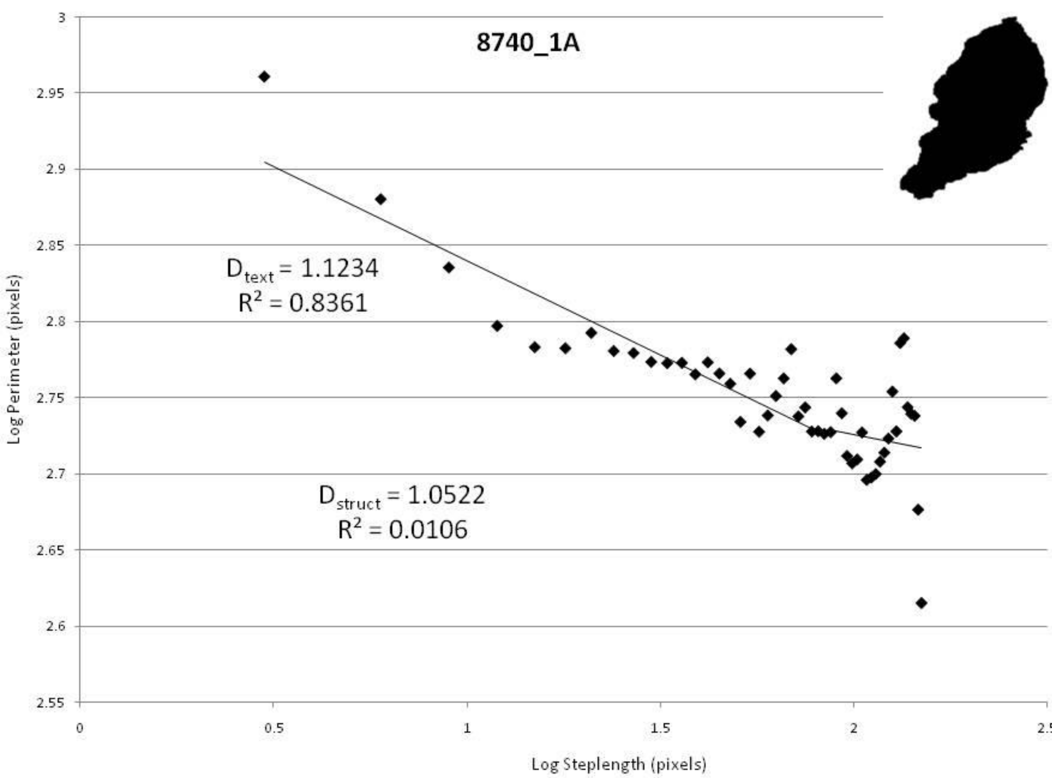

8738_1E
D = 1.1357
R^2 = 0.5972
Log Perimeter (pixels)
Log Steplength (pixels)
2.4
2.35
2.3
2.25
2.2
2.15
2.1
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2

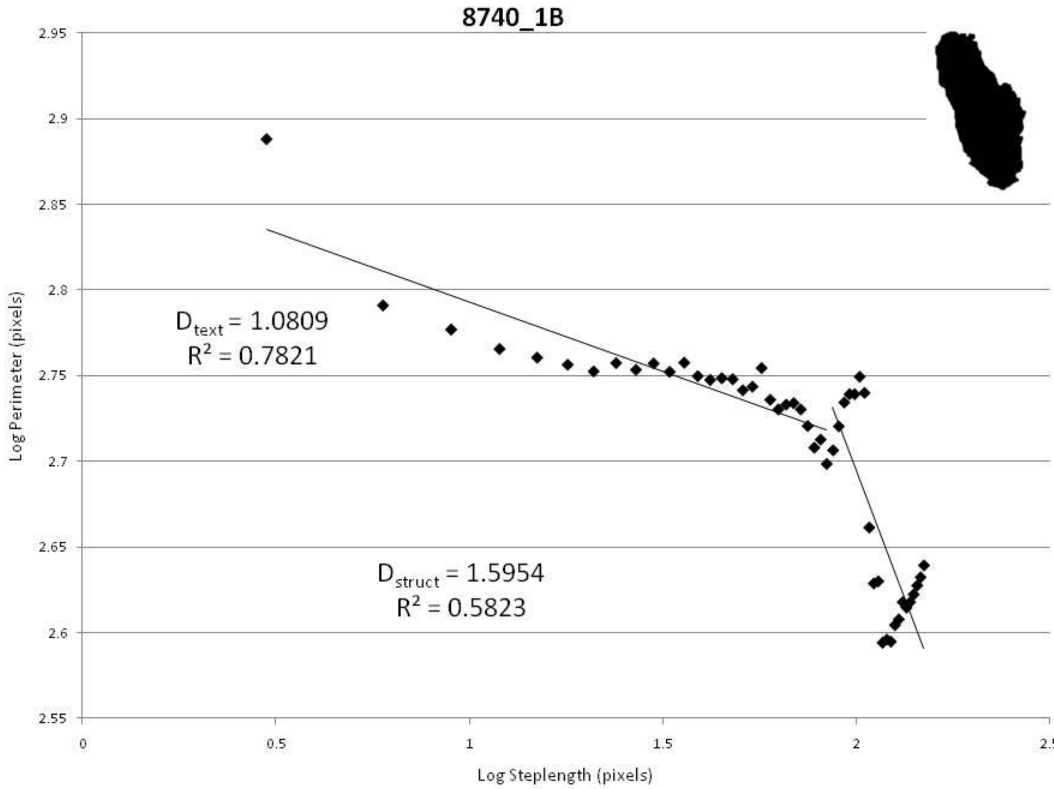

8739_1A
D = 1.0573
R^2 = 0.7258
Log Perimeter (pixels)
Log Steplength (pixels)
3.06
3.04
3.02
3
2.98
2.96
2.94
2.92
2.9
2.88
2.86
2.84
0
0.5
1
1.5
2
2.5


8739_1B
3.25
3.2
3.15
3.1
3.05
3
2.95
2.9
2.85
Log Perimeter (pixels)
D = 1.098
R^2 = 0.6776
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)

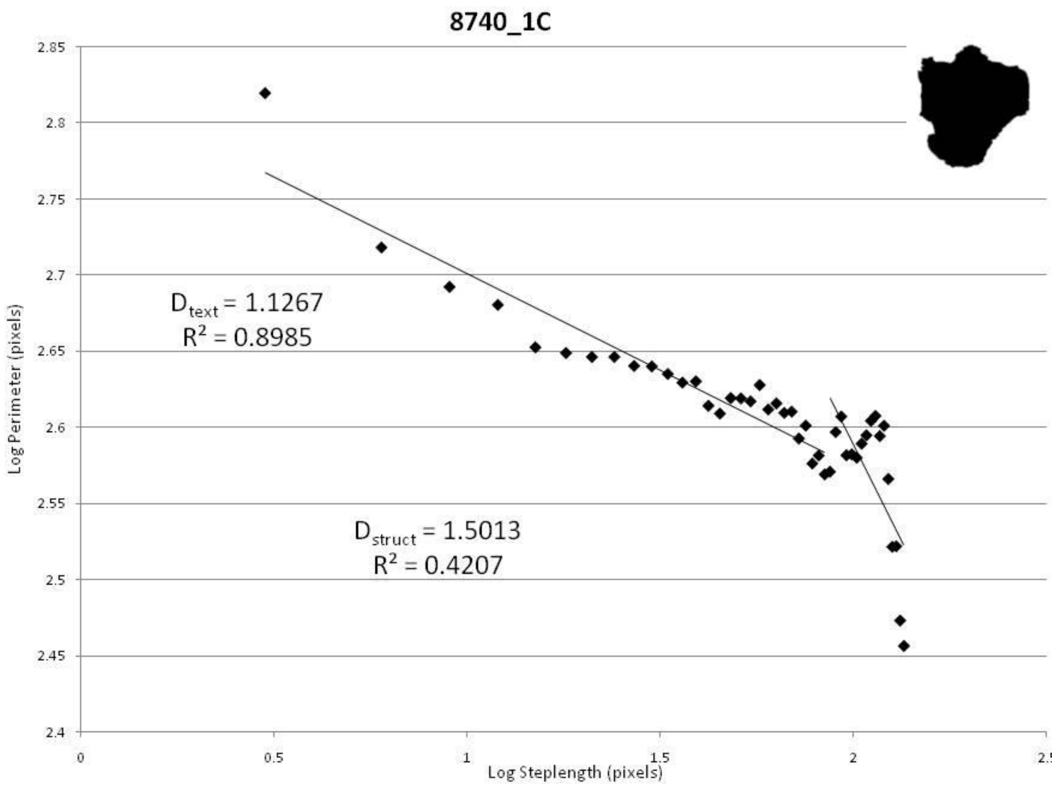

8739_2A
2.85
2.8
2.75
2.7
2.65
2.6
2.55
2.5
2.45
Log Perimeter (pixels)
D_{text} = 1.0506
R^2 = 0.7008
D = 2.17
R^2 = 0.7539
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)


8739_2B
D = 1.057
R^2 = 0.7547
Log Perimeter (pixels)
Log Steplength (pixels)

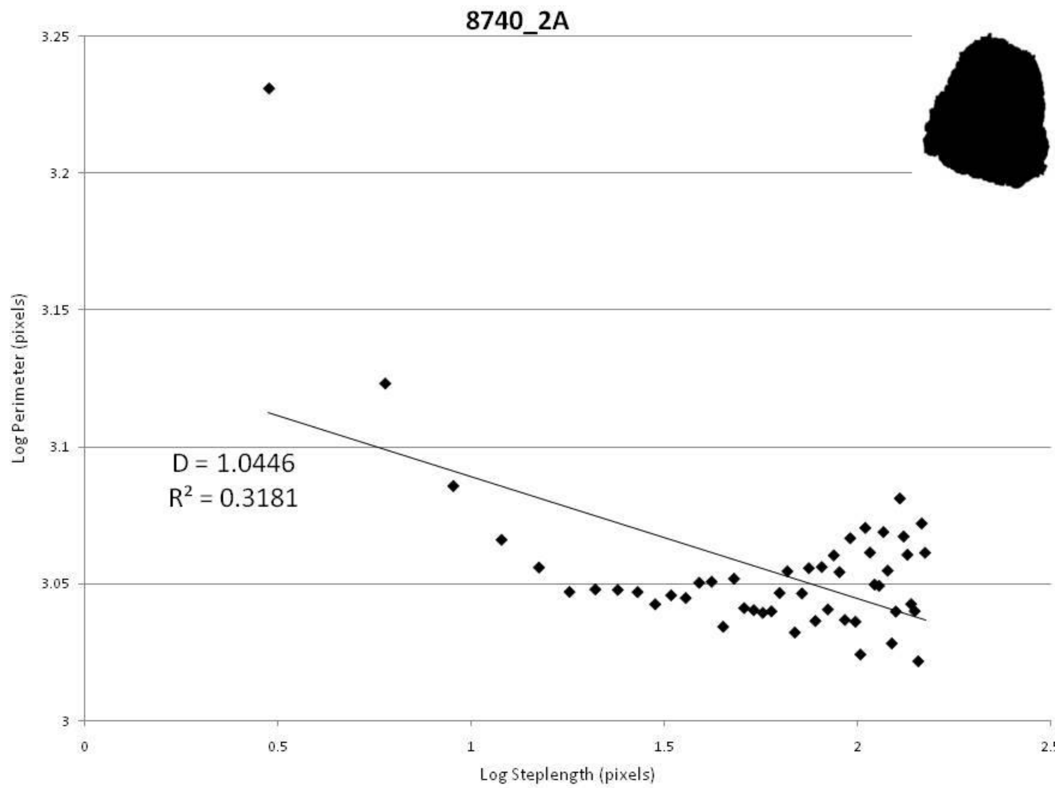

8740_1A
D_{text} = 1.1234
R^2 = 0.8361
D_{struct} = 1.0522
R^2 = 0.0106
Log Perimeter (pixels)
Log Steplength (pixels)

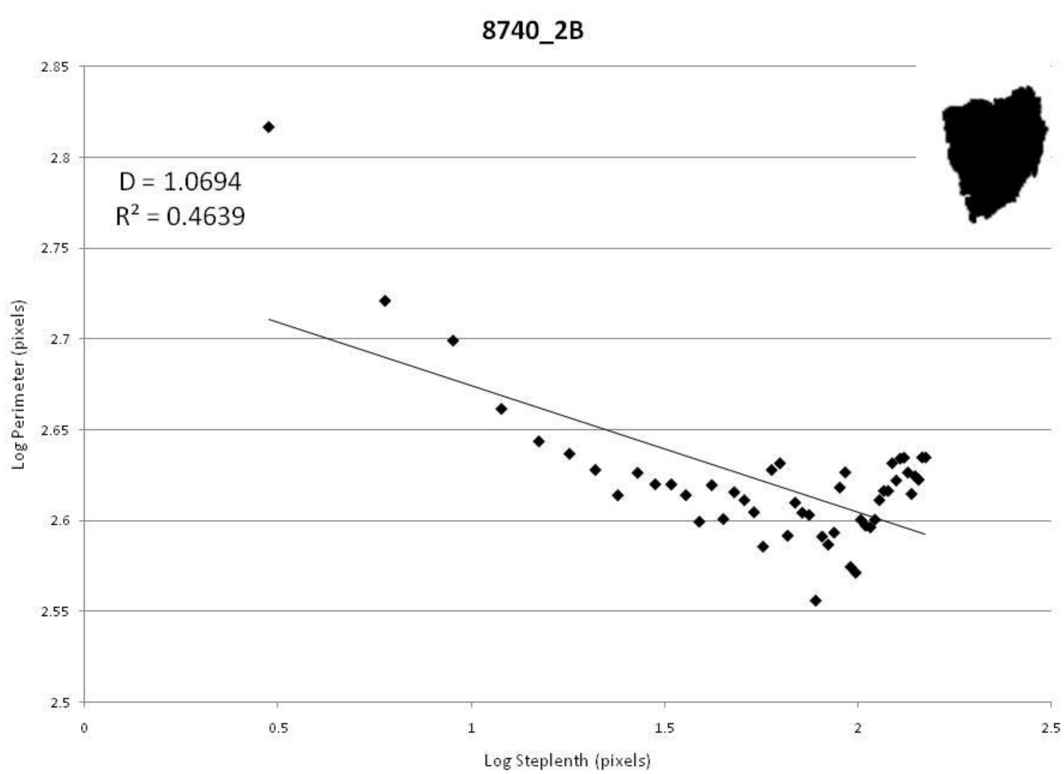


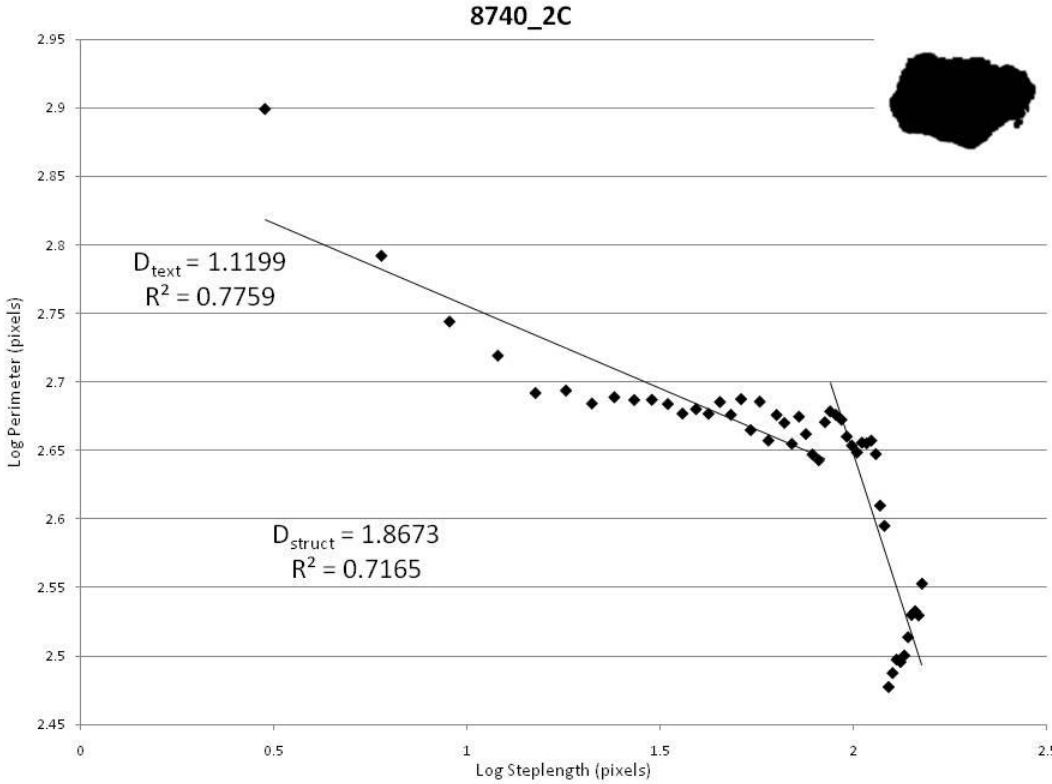
8740_1B
2.95
2.9
2.85
2.8
2.75
2.7
2.65
2.6
2.55
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0809
R^2 = 0.7821
D_{struct} = 1.5954
R^2 = 0.5823

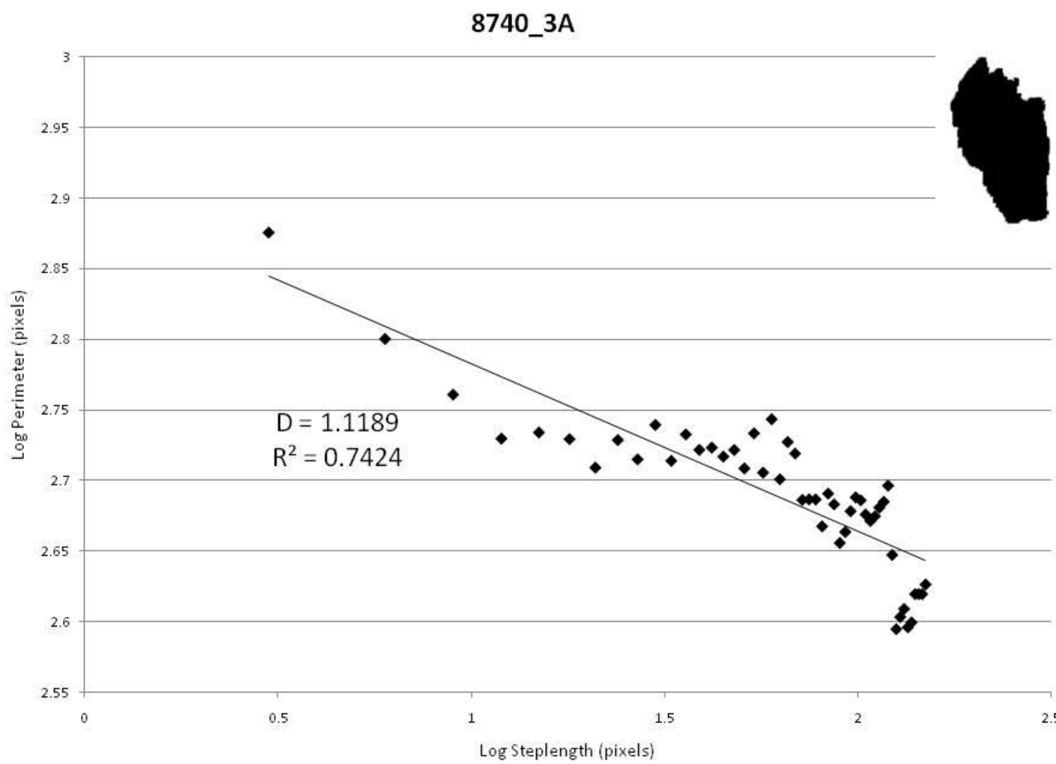


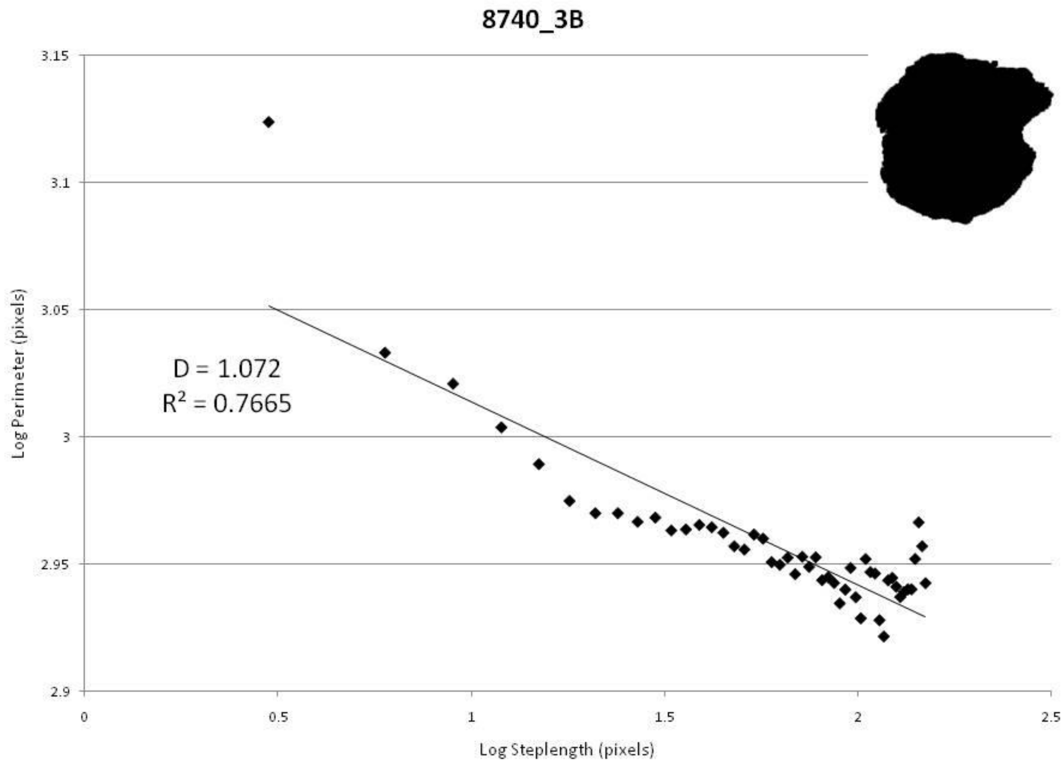
8740_1C
2.85
2.8
2.75
2.7
2.65
2.6
2.55
2.5
2.45
2.4
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.1267
R^2 = 0.8985
D_{struct} = 1.5013
R^2 = 0.4207

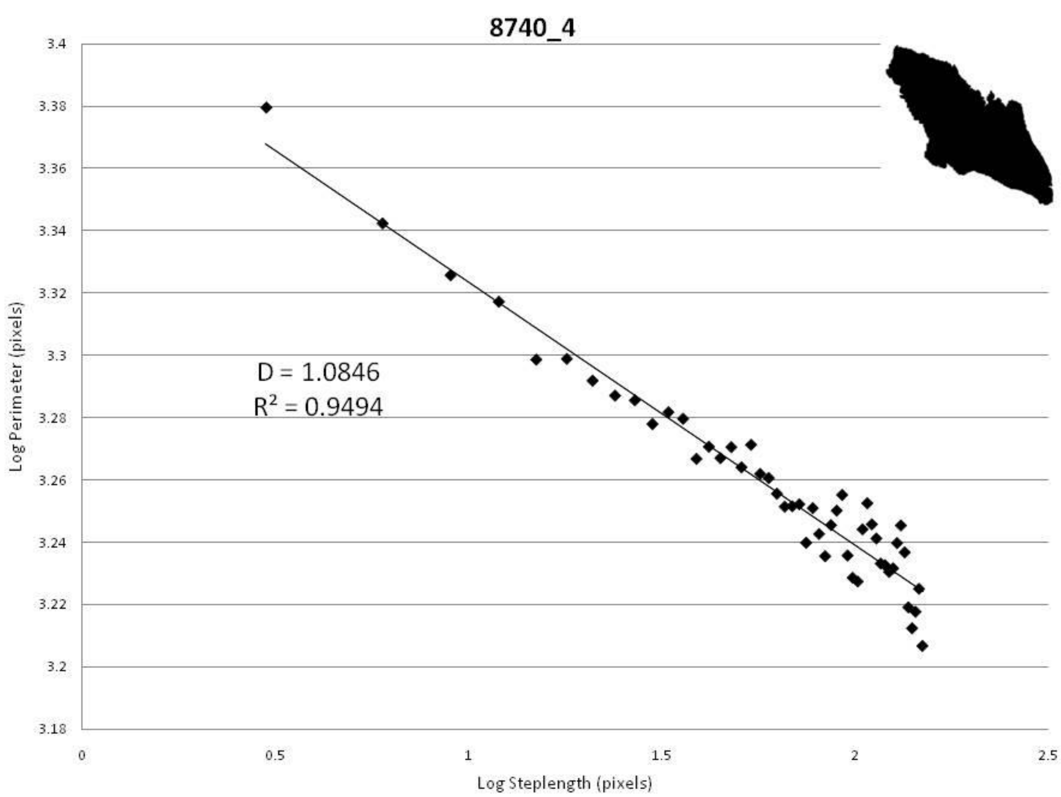

8740_2A
D = 1.0446
R^2 = 0.3181
Log Perimeter (pixels)
Log Steplength (pixels)
3.25
3.2
3.15
3.1
3.05
3
0
0.5
1
1.5
2
2.5

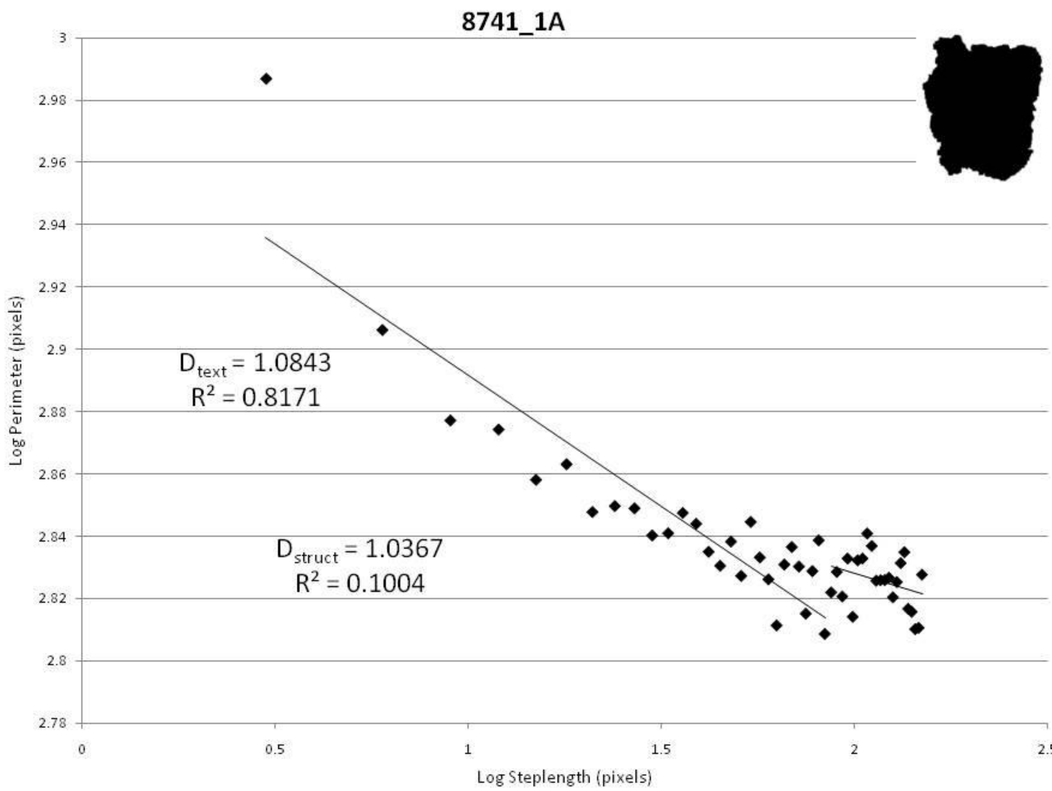

8740_2B
D = 1.0694
R^2 = 0.4639
Log Perimeter (pixels)
Log Steplenth (pixels)
2.85
2.8
2.75
2.7
2.65
2.6
2.55
2.5
0
0.5
1
1.5
2
2.5


8740_2C
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.1199
R^2 = 0.7759
D_{struct} = 1.8673
R^2 = 0.7165
2.95
2.9
2.85
2.8
2.75
2.7
2.65
2.6
2.55
2.5
2.45
0
0.5
1
1.5
2
2.5

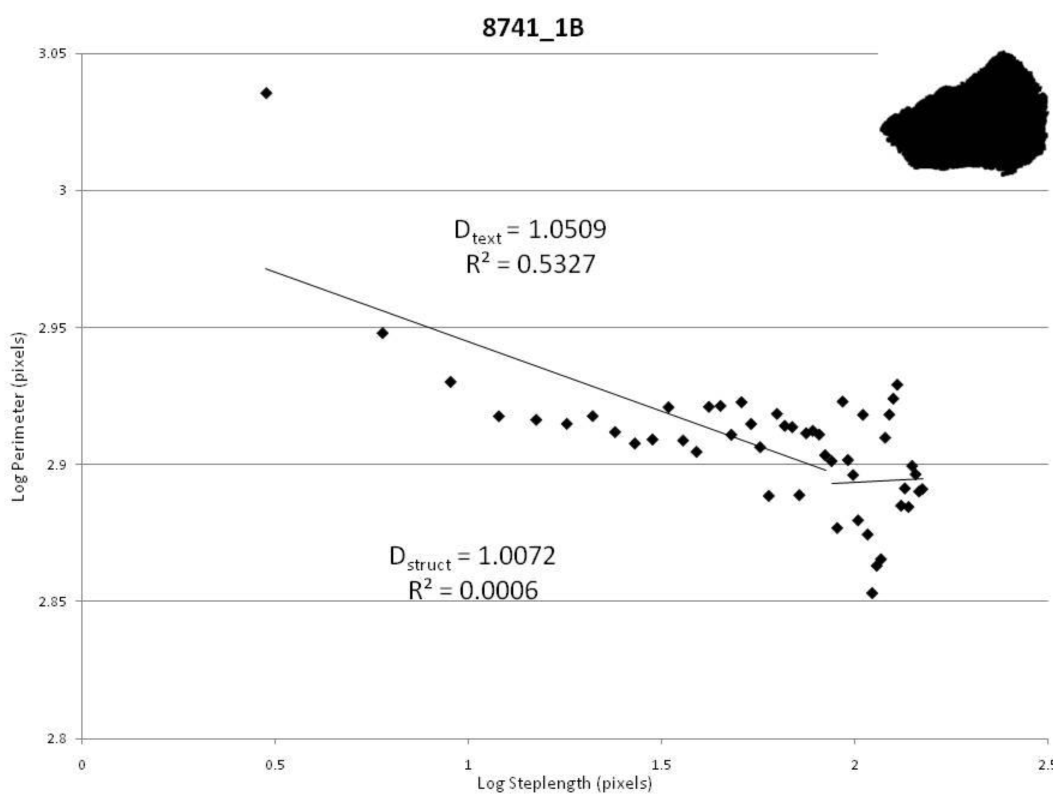

8740_3A
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.1189
R^2 = 0.7424
3
2.95
2.9
2.85
2.8
2.75
2.7
2.65
2.6
2.55
0
0.5
1
1.5
2
2.5


8740_3B
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.072
R² = 0.7665
3.15
3.1
3.05
3
2.95
2.9
0
0.5
1
1.5
2
2.5

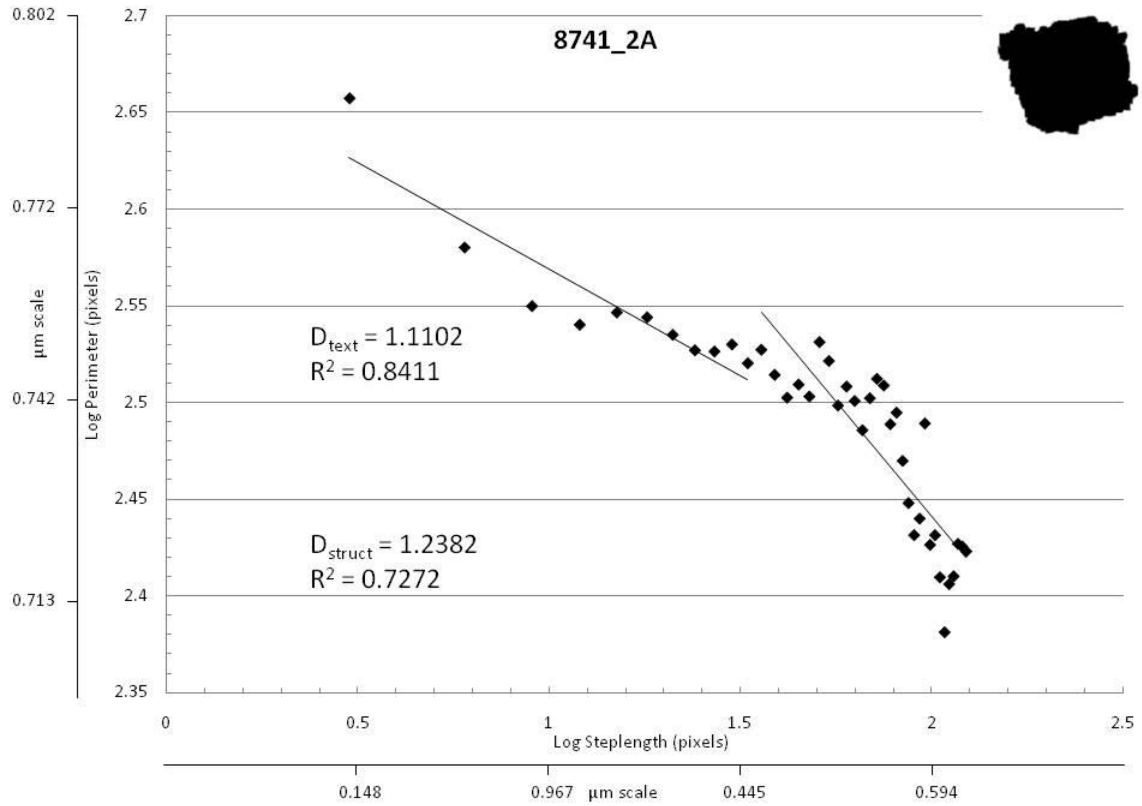

8740_4
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0846
R² = 0.9494
3.4
3.38
3.36
3.34
3.32
3.3
3.28
3.26
3.24
3.22
3.2
3.18
0
0.5
1
1.5
2
2.5

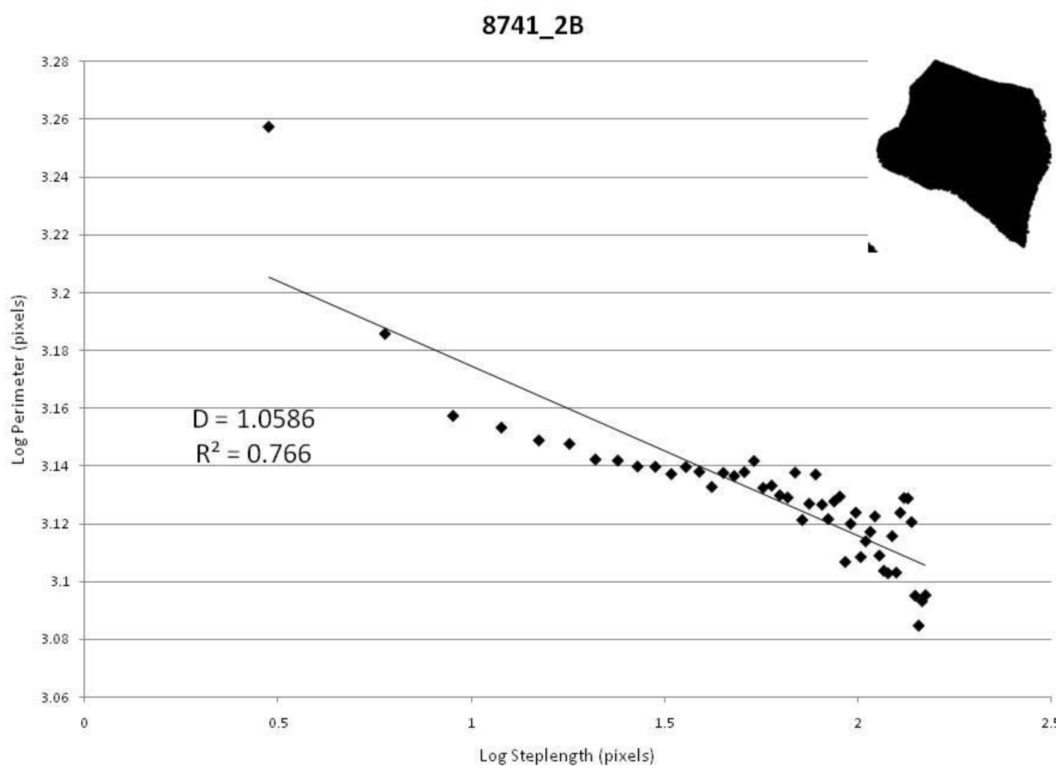


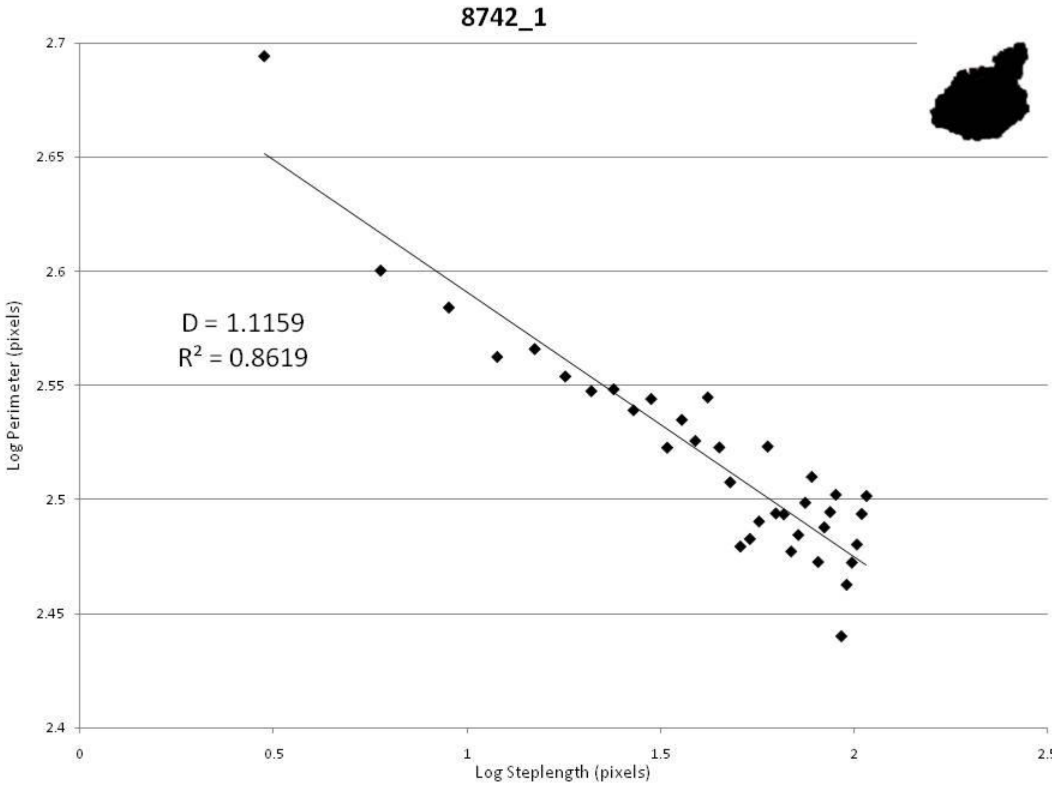
8741_1A
Log Perimeter (pixels)
Log Steplength (pixels)
D_text = 1.0843
R² = 0.8171
D_struct = 1.0367
R² = 0.1004

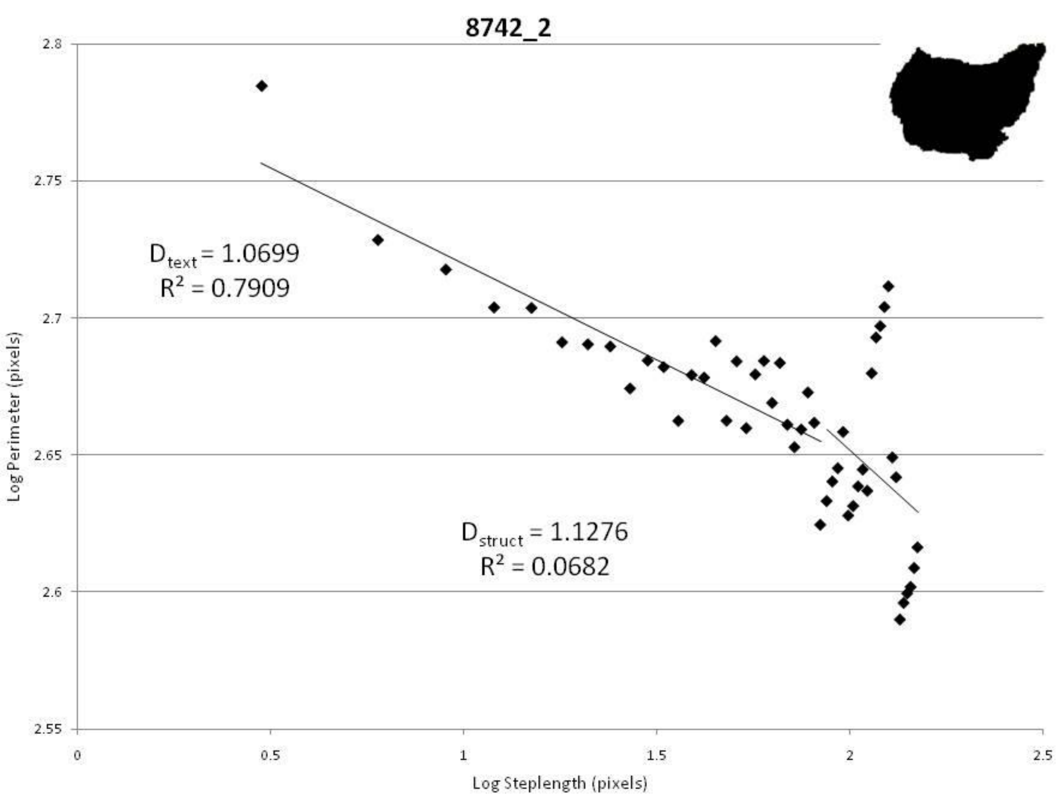


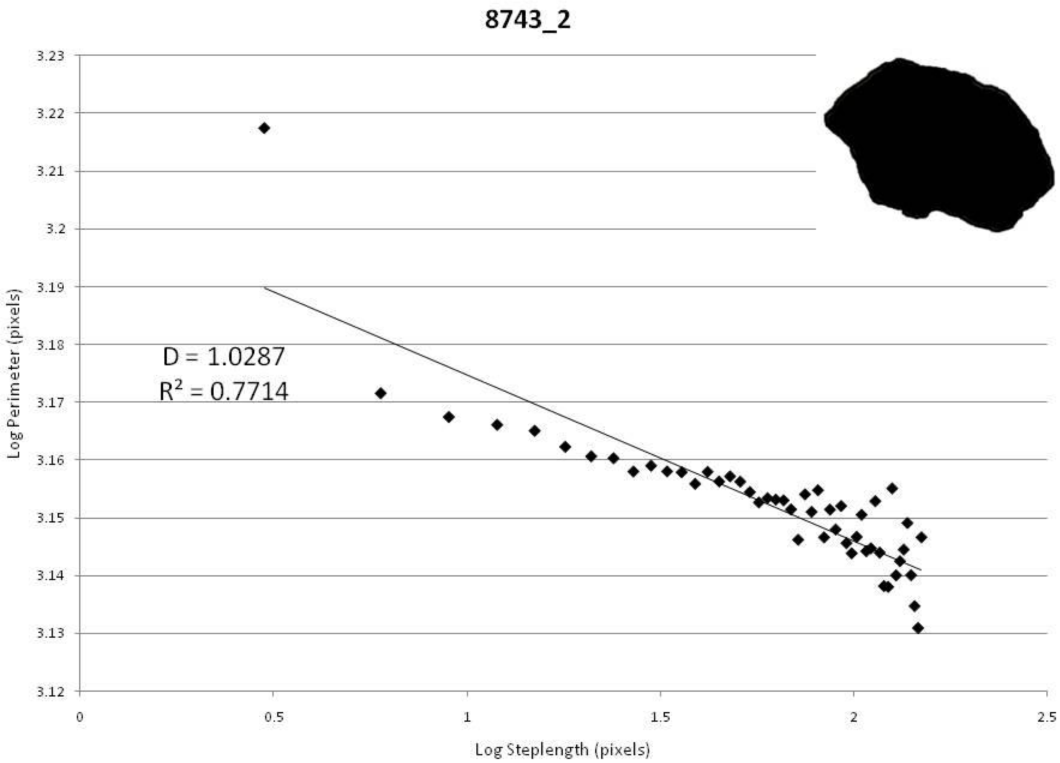
8741_1B
Log Perimeter (pixels)
Log Steplength (pixels)
D_text = 1.0509
R² = 0.5327
D_struct = 1.0072
R² = 0.0006

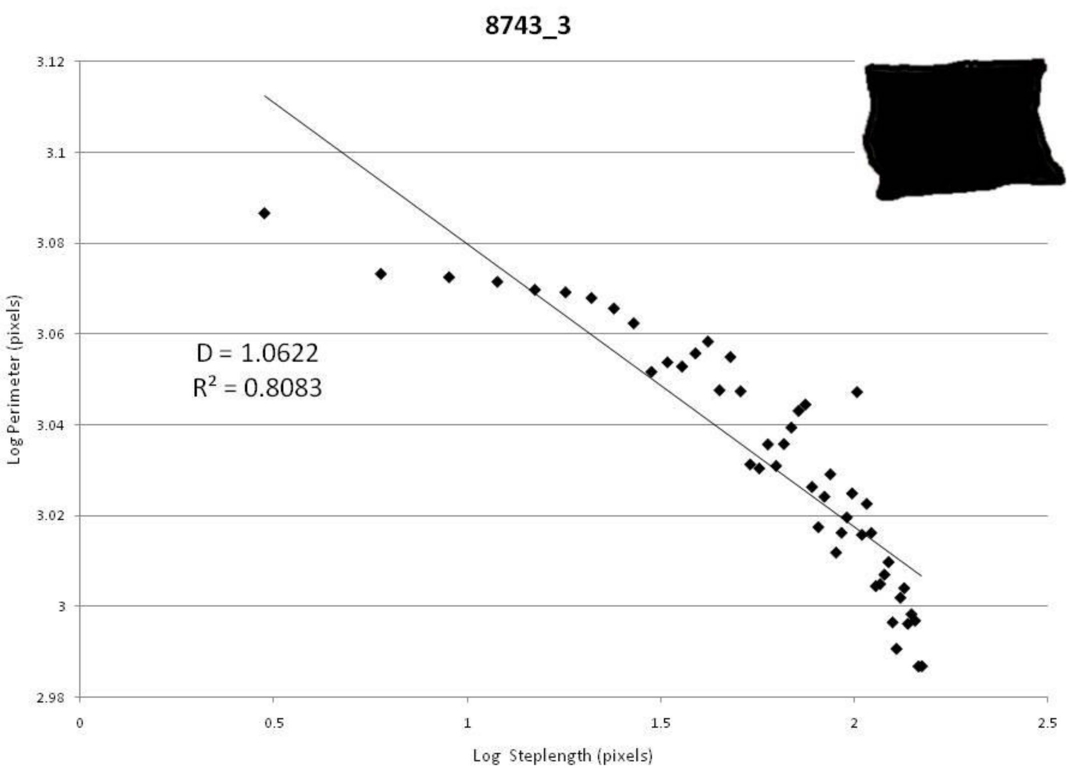

8741_2A
Log Perimeter (pixels)
µm scale
Log Steplength (pixels)
D_{text} = 1.1102
R^2 = 0.8411
D_{struct} = 1.2382
R^2 = 0.7272
0.802
0.772
0.742
0.713
0.148
0.967 µm scale
0.445
0.594

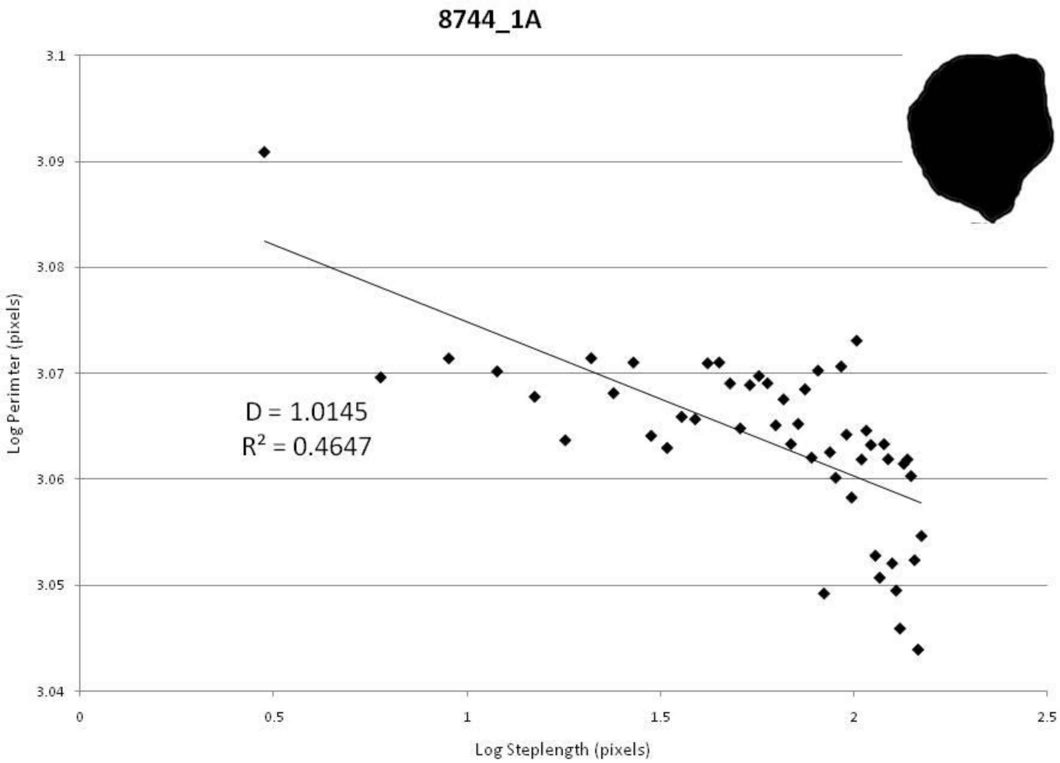

8741_2B
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0586
R^2 = 0.766

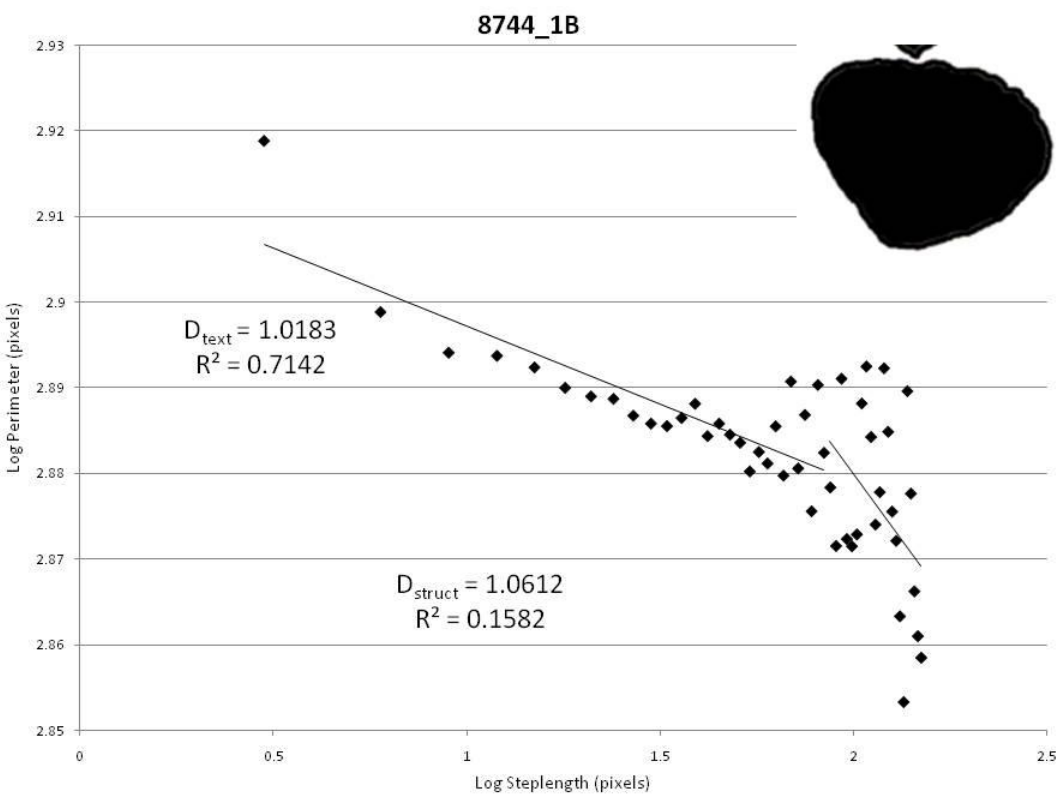

8742_1
D = 1.1159
R^2 = 0.8619
Log Perimeter (pixels)
Log Steplength (pixels)
2.7
2.65
2.6
2.55
2.5
2.45
2.4
0
0.5
1
1.5
2
2.5

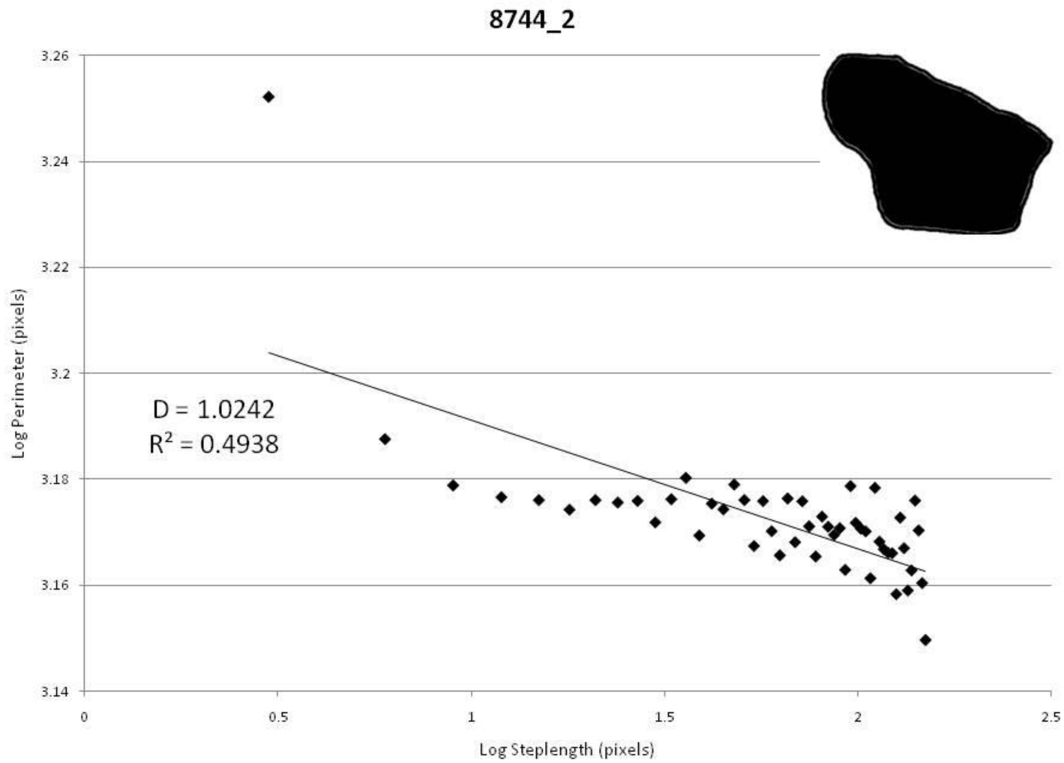

8742_2
D_{text} = 1.0699
R^2 = 0.7909
D_{struct} = 1.1276
R^2 = 0.0682
Log Perimeter (pixels)
Log Steplength (pixels)
2.8
2.75
2.7
2.65
2.6
2.55
0
0.5
1
1.5
2
2.5

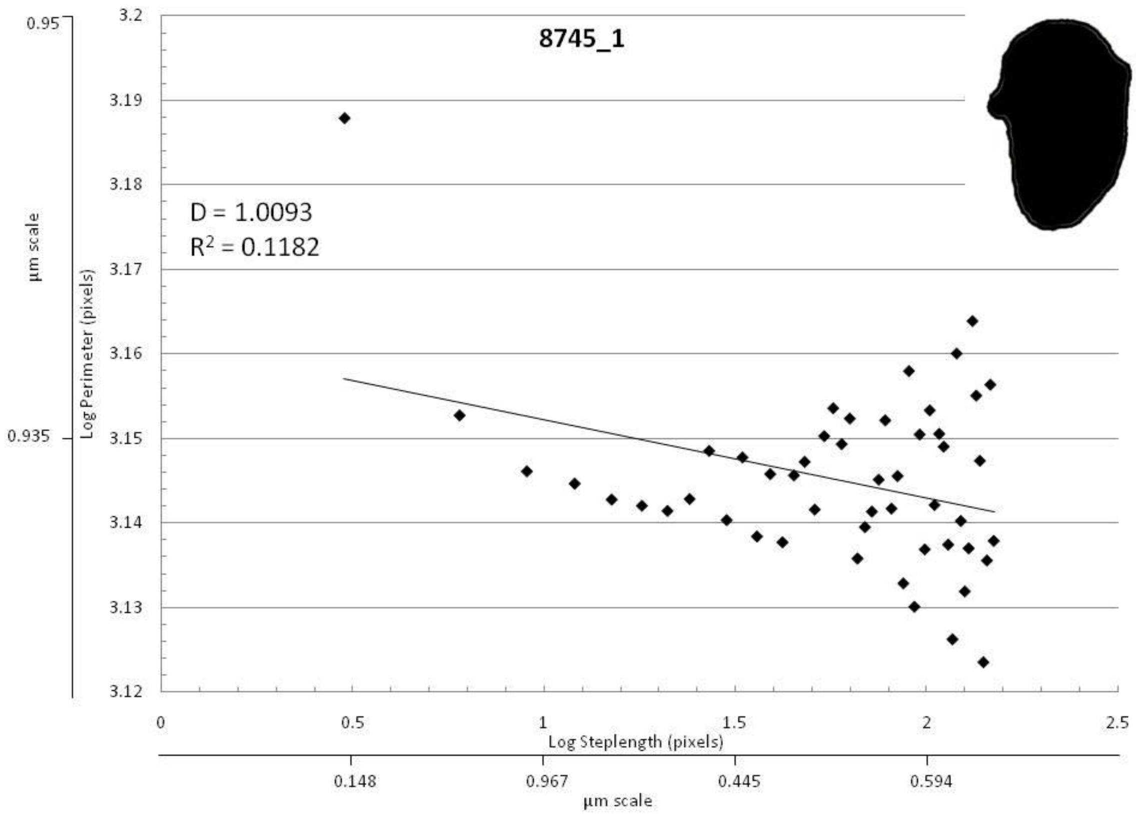

8743_2
D = 1.0287
R^2 = 0.7714
Log Perimeter (pixels)
Log Steplength (pixels)

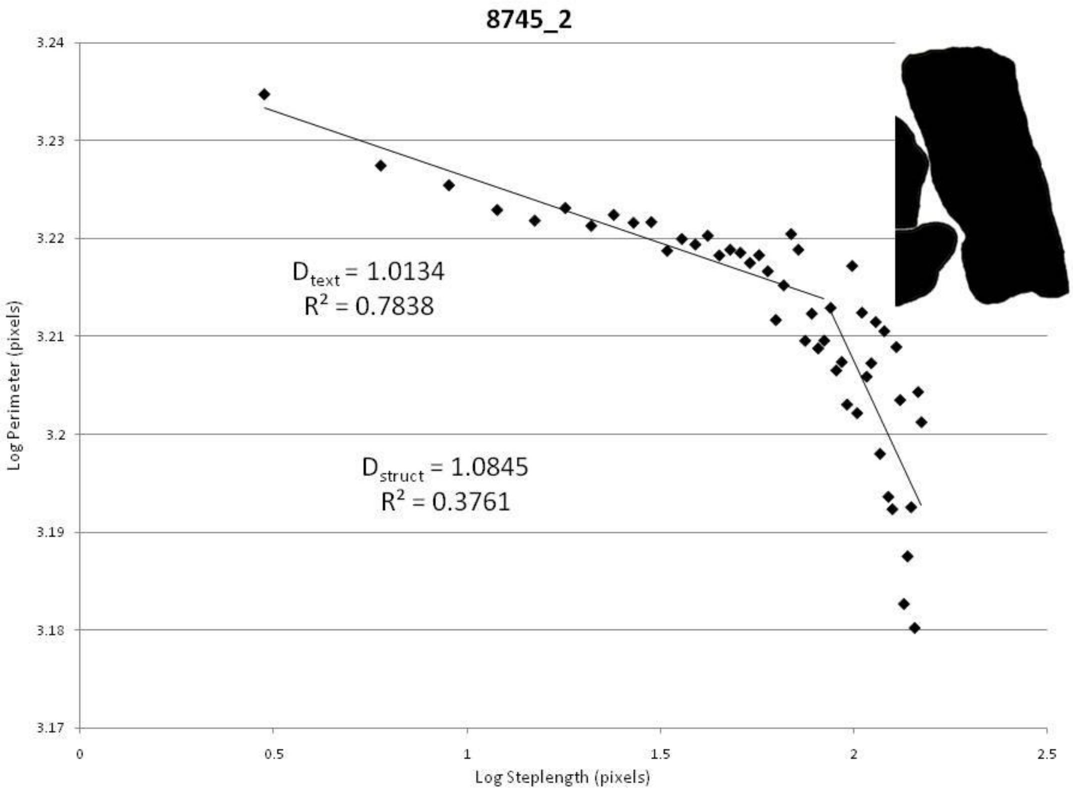

8743_3
D = 1.0622
R^2 = 0.8083
Log Perimeter (pixels)
Log Steplength (pixels)

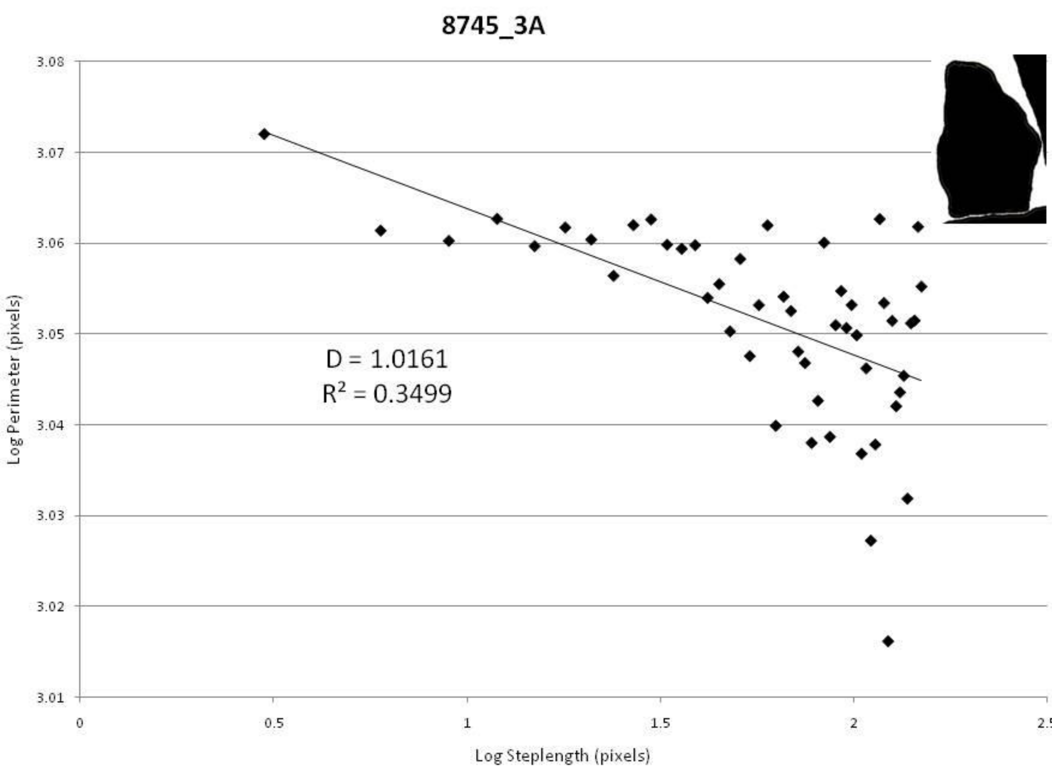

8744_1A
3.1
3.09
3.08
3.07
3.06
3.05
3.04
D = 1.0145
R² = 0.4647
Log Perimter (pixels)
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)

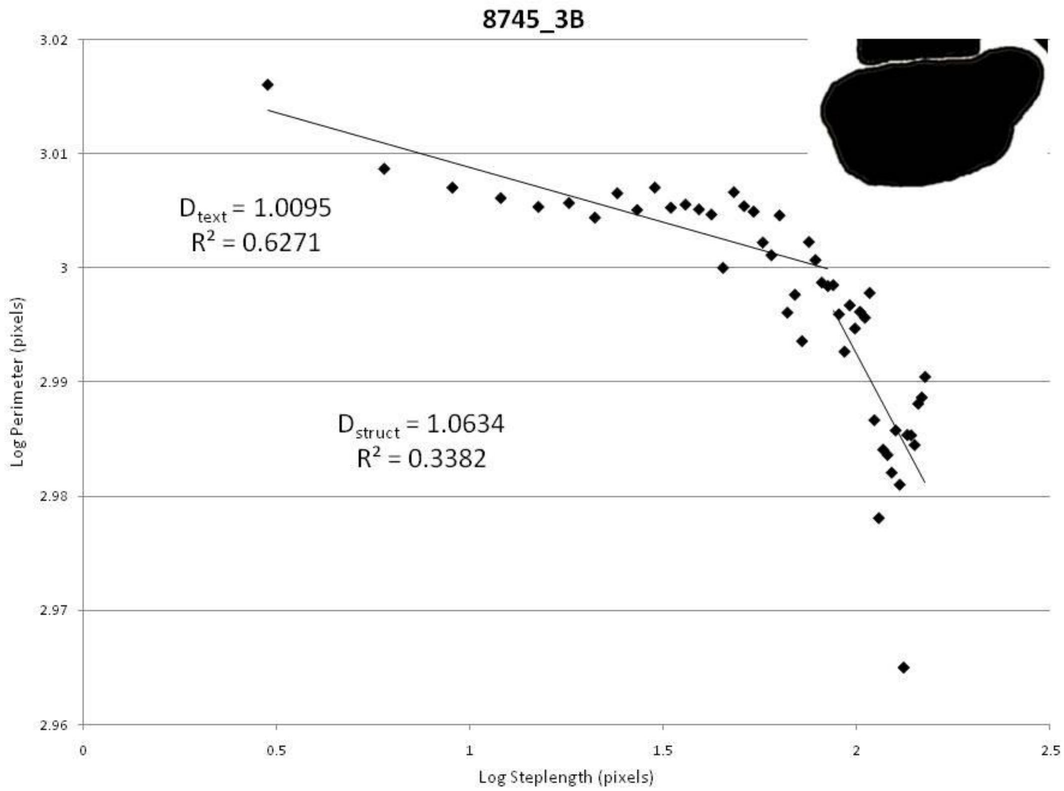

8744_1B
2.93
2.92
2.91
2.9
2.89
2.88
2.87
2.86
2.85
D_text = 1.0183
R² = 0.7142
D_struct = 1.0612
R² = 0.1582
Log Perimeter (pixels)
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)

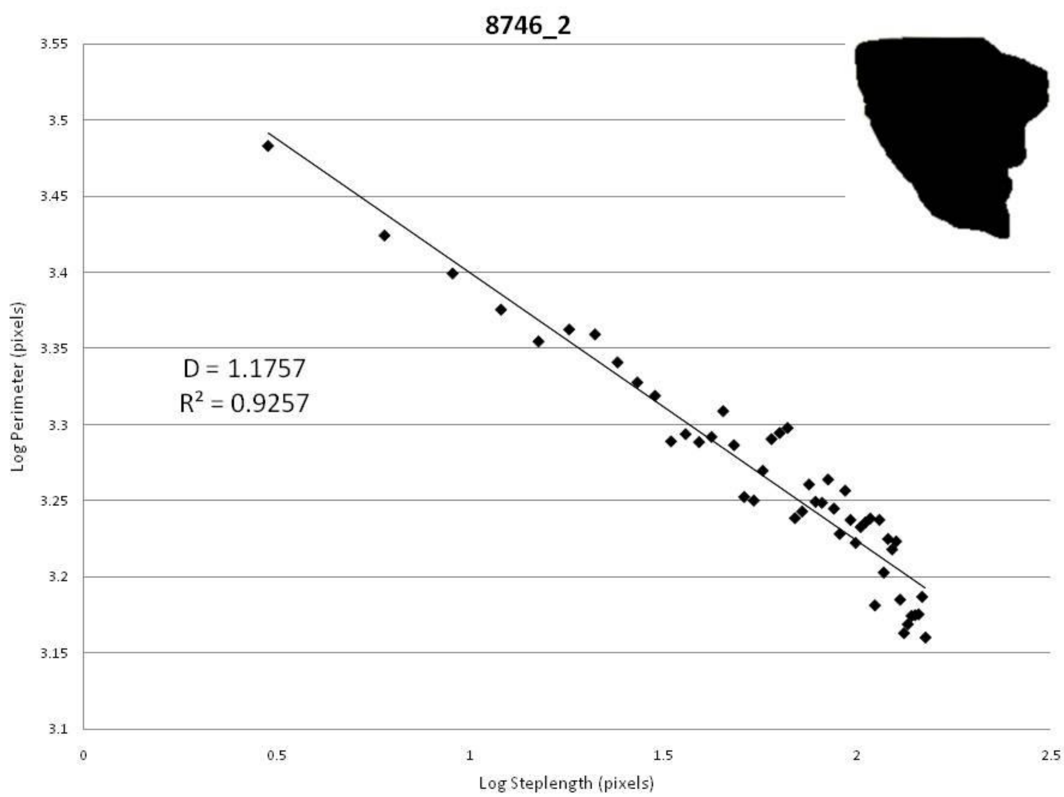

8744_2
D = 1.0242
R^2 = 0.4938
Log Perimeter (pixels)
Log Steplength (pixels)
3.26
3.24
3.22
3.2
3.18
3.16
3.14
0
0.5
1
1.5
2
2.5

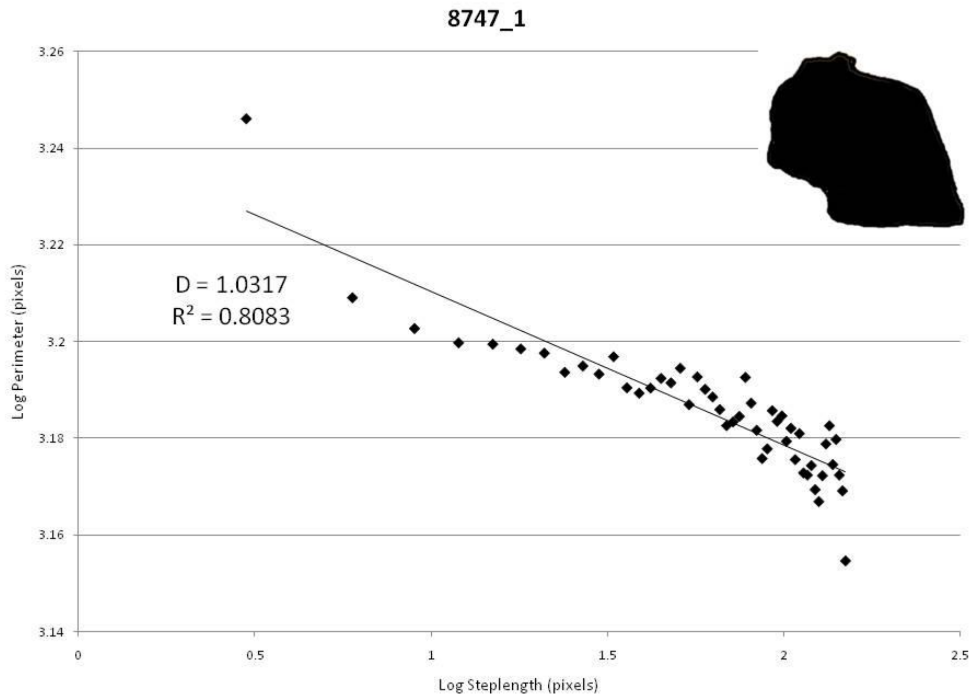

8745_1
D = 1.0093
R^2 = 0.1182
Log Perimeter (pixels)
Log Steplength (pixels)
μm scale
0.95
0.935
3.2
3.19
3.18
3.17
3.16
3.15
3.14
3.13
3.12
0
0.5
1
1.5
2
2.5
0.148
0.967
0.445
0.594
μm scale

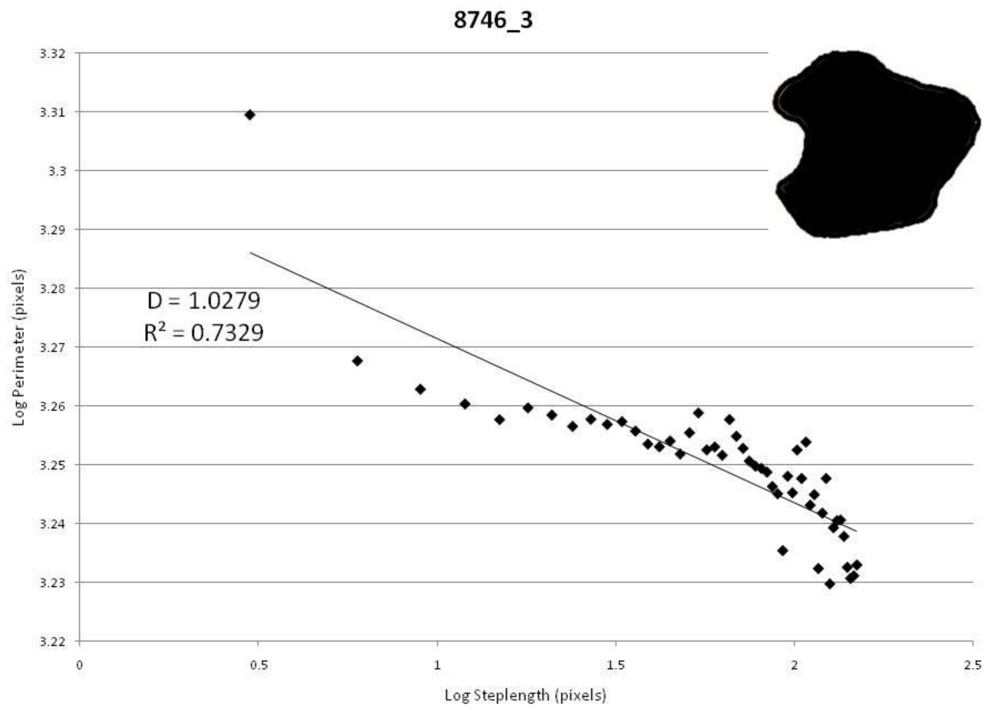

8745_2
Log Perimeter (pixels)
Log Steplength (pixels)
$D_{text} = 1.0134$
$R^2 = 0.7838$
$D_{struct} = 1.0845$
$R^2 = 0.3761$
3.24
3.23
3.22
3.21
3.2
3.19
3.18
3.17
0
0.5
1
1.5
2
2.5

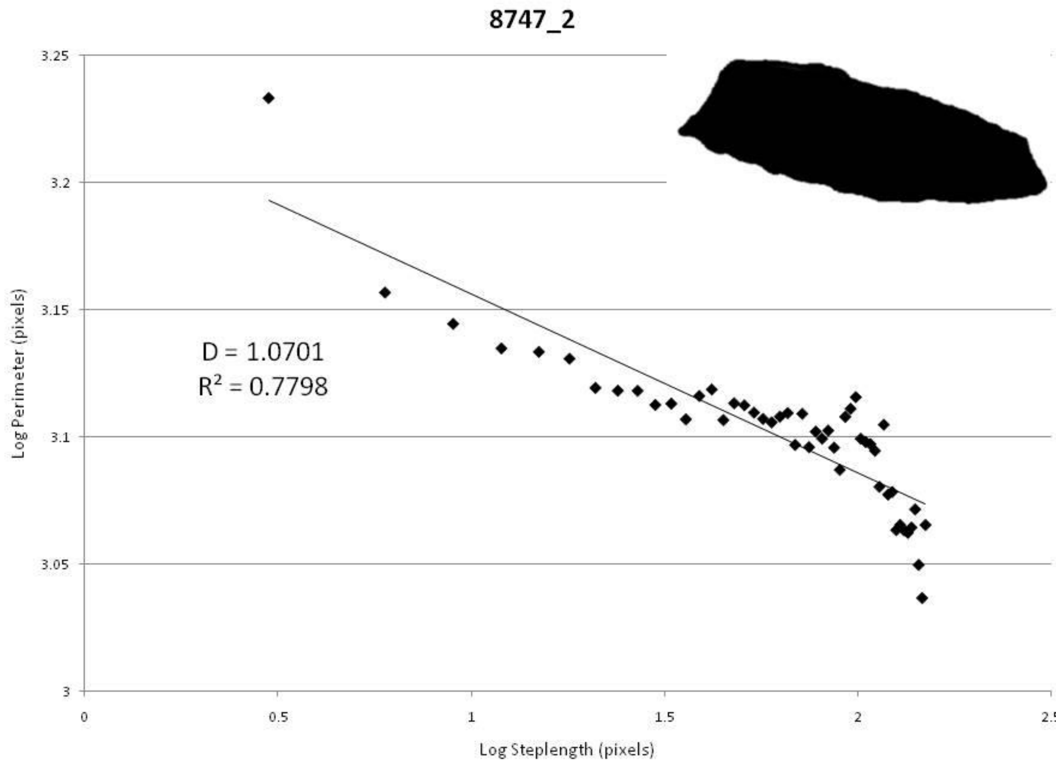

8745_3A
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0161
$R^2 = 0.3499$
3.08
3.07
3.06
3.05
3.04
3.03
3.02
3.01
0
0.5
1
1.5
2
2.5

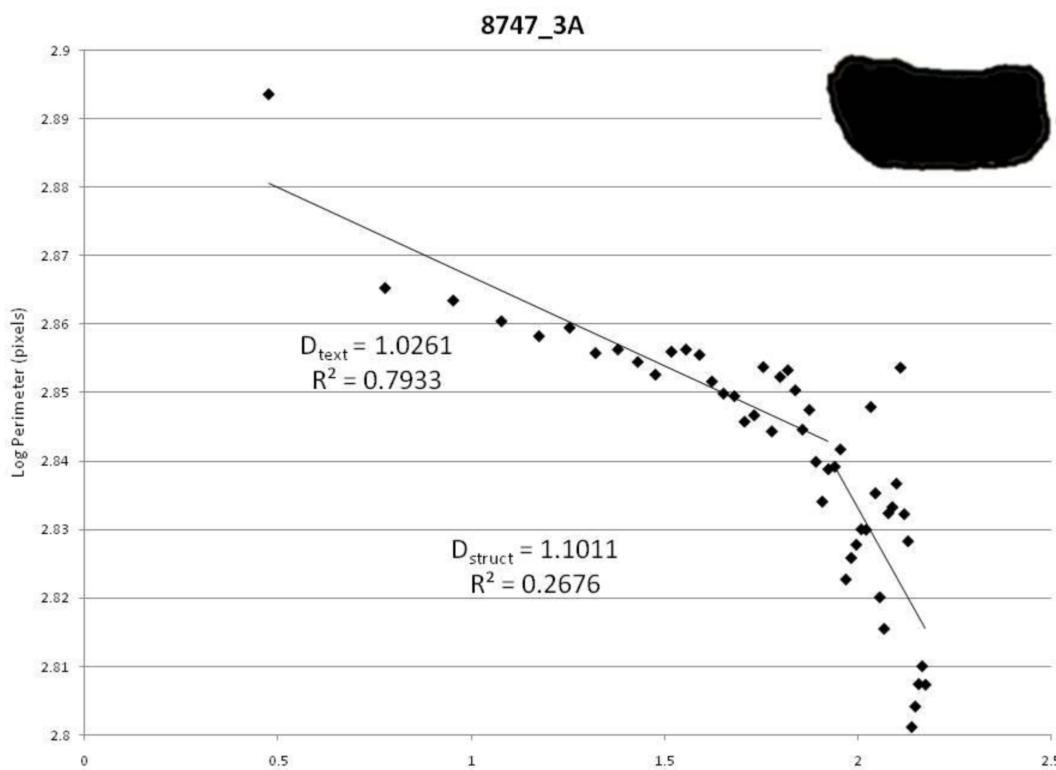

8745_3B
D_{text} = 1.0095
R^2 = 0.6271
D_{struct} = 1.0634
R^2 = 0.3382
Log Perimeter (pixels)
Log Steplength (pixels)
3.02
3.01
3
2.99
2.98
2.97
2.96
0
0.5
1
1.5
2
2.5

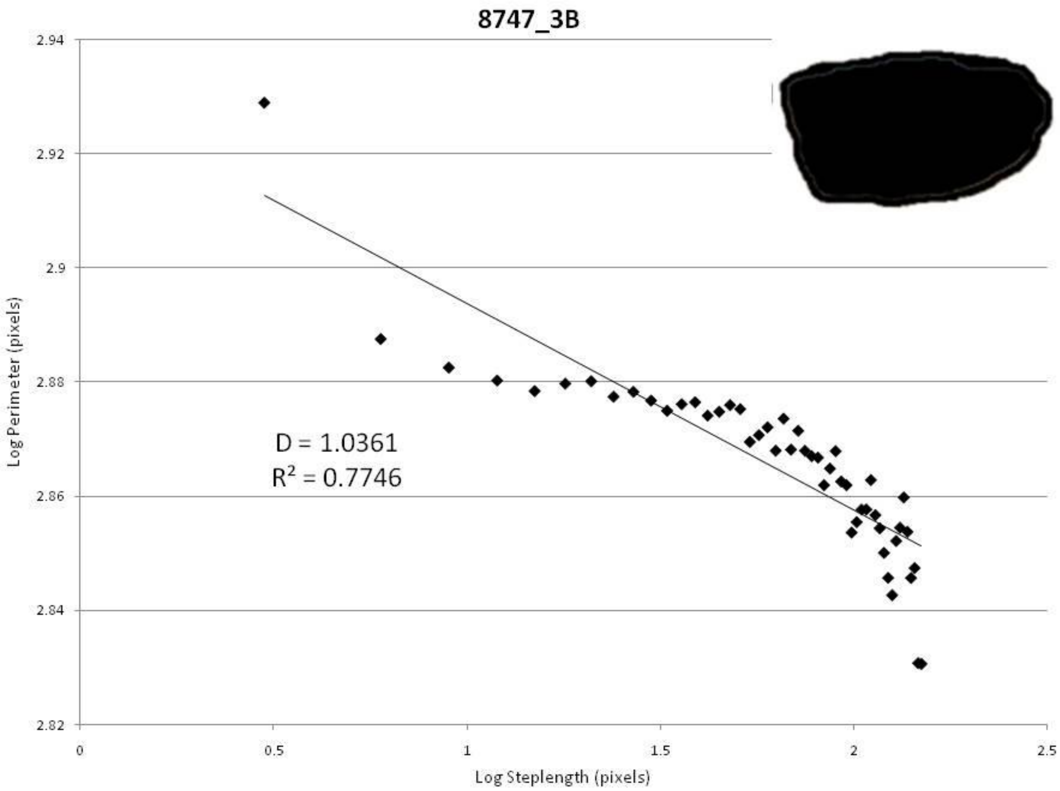

8746_2
D = 1.1757
R^2 = 0.9257
Log Perimeter (pixels)
Log Steplength (pixels)
3.55
3.5
3.45
3.4
3.35
3.3
3.25
3.2
3.15
3.1
0
0.5
1
1.5
2
2.5

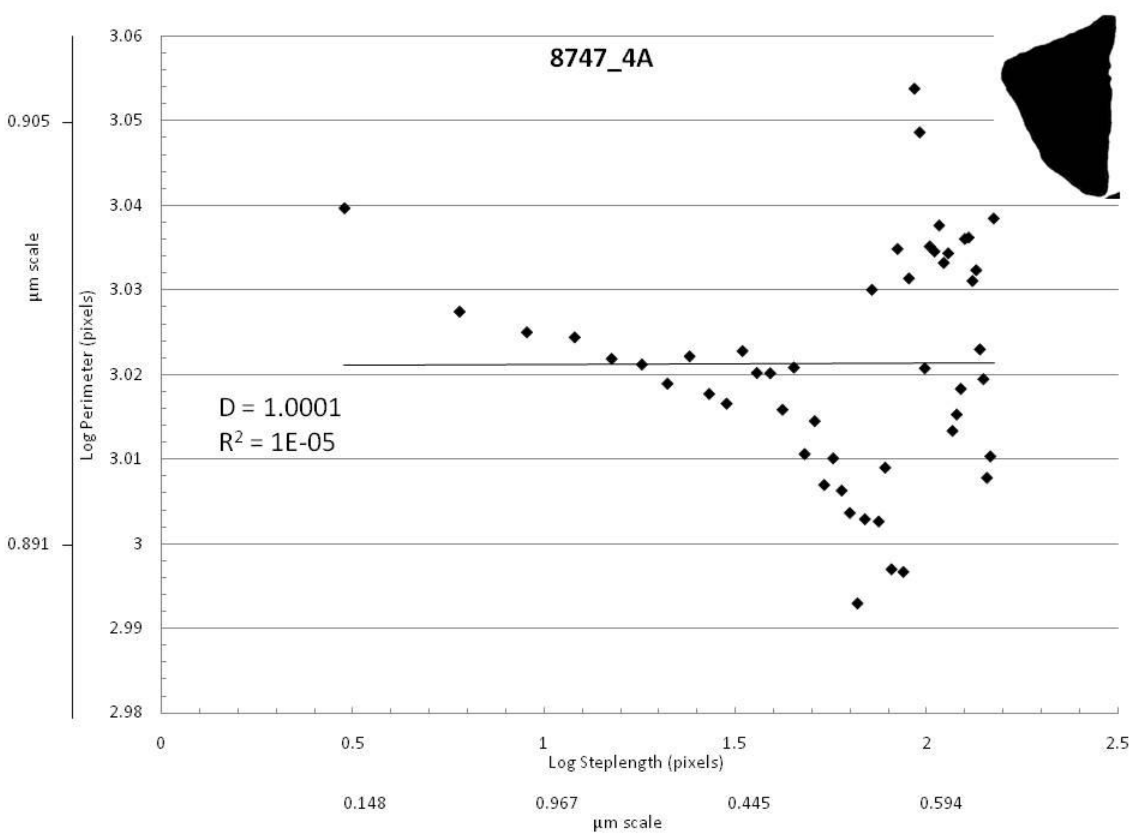

8747_1
D = 1.0317
R² = 0.8083
Log Perimeter (pixels)
Log Steplength (pixels)
3.26
3.24
3.22
3.2
3.18
3.16
3.14
0
0.5
1
1.5
2
2.5

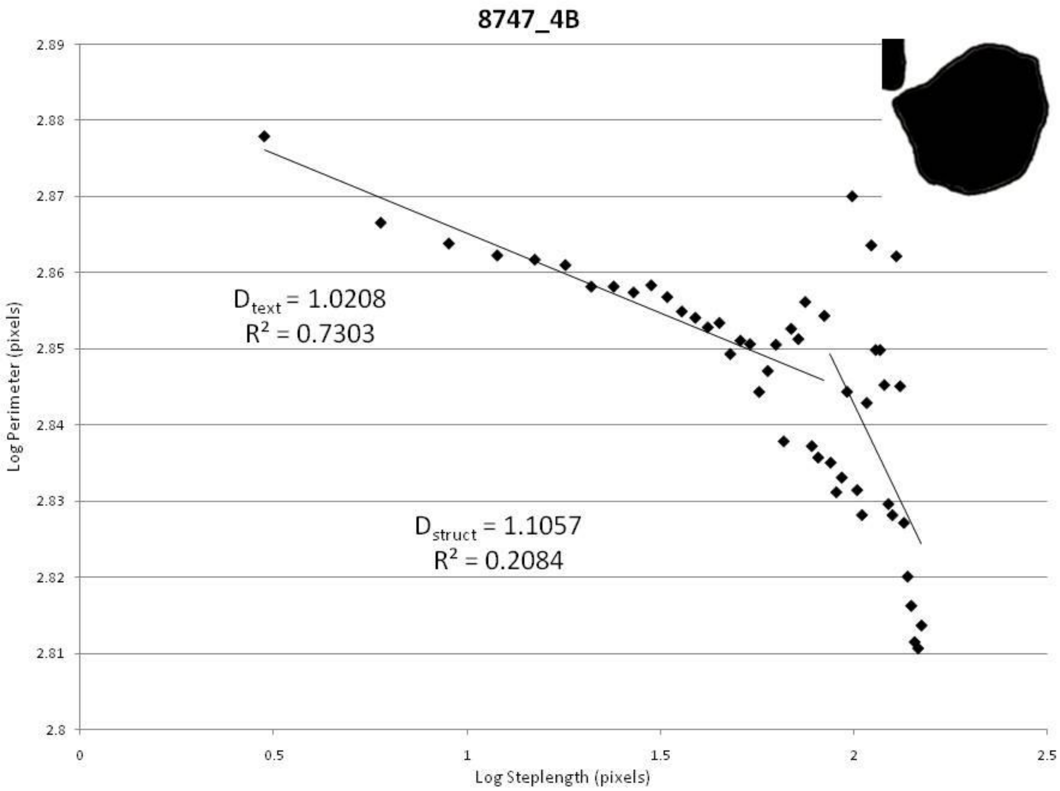

8746_3
D = 1.0279
R² = 0.7329
Log Perimeter (pixels)
Log Steplength (pixels)
3.32
3.31
3.3
3.29
3.28
3.27
3.26
3.25
3.24
3.23
3.22
0
0.5
1
1.5
2
2.5

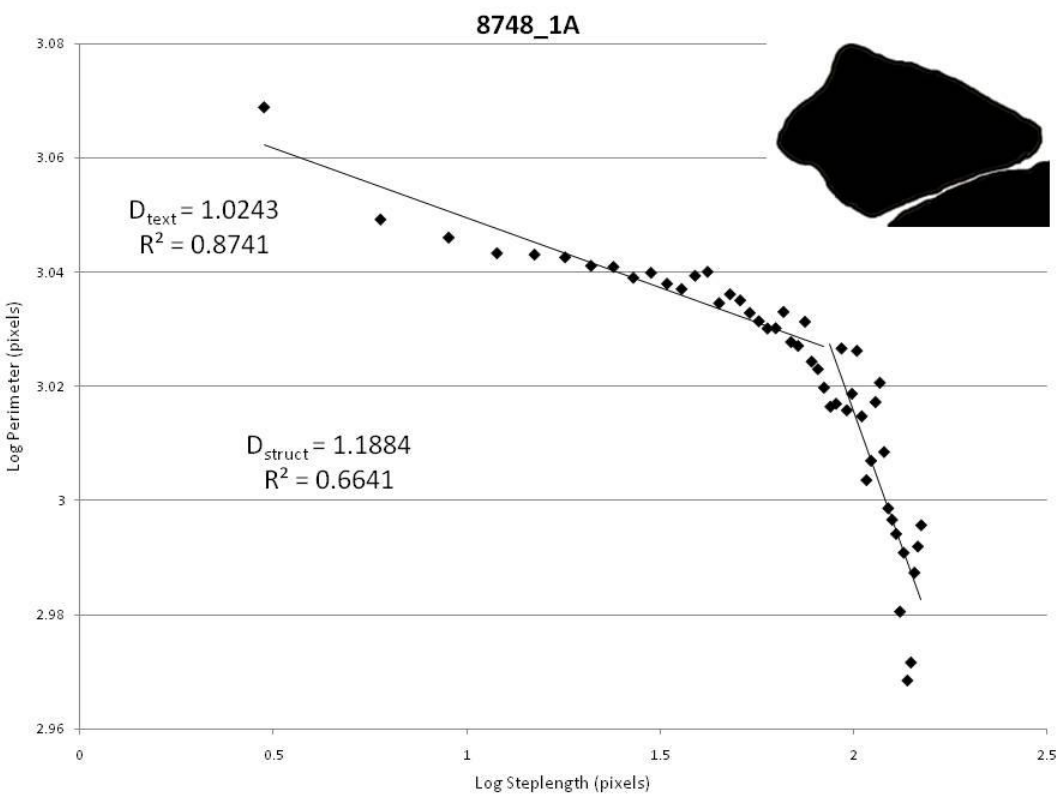

8747_2
D = 1.0701
R^2 = 0.7798
Log Perimeter (pixels)
Log Steplength (pixels)
3.25
3.2
3.15
3.1
3.05
3
0
0.5
1
1.5
2
2.5

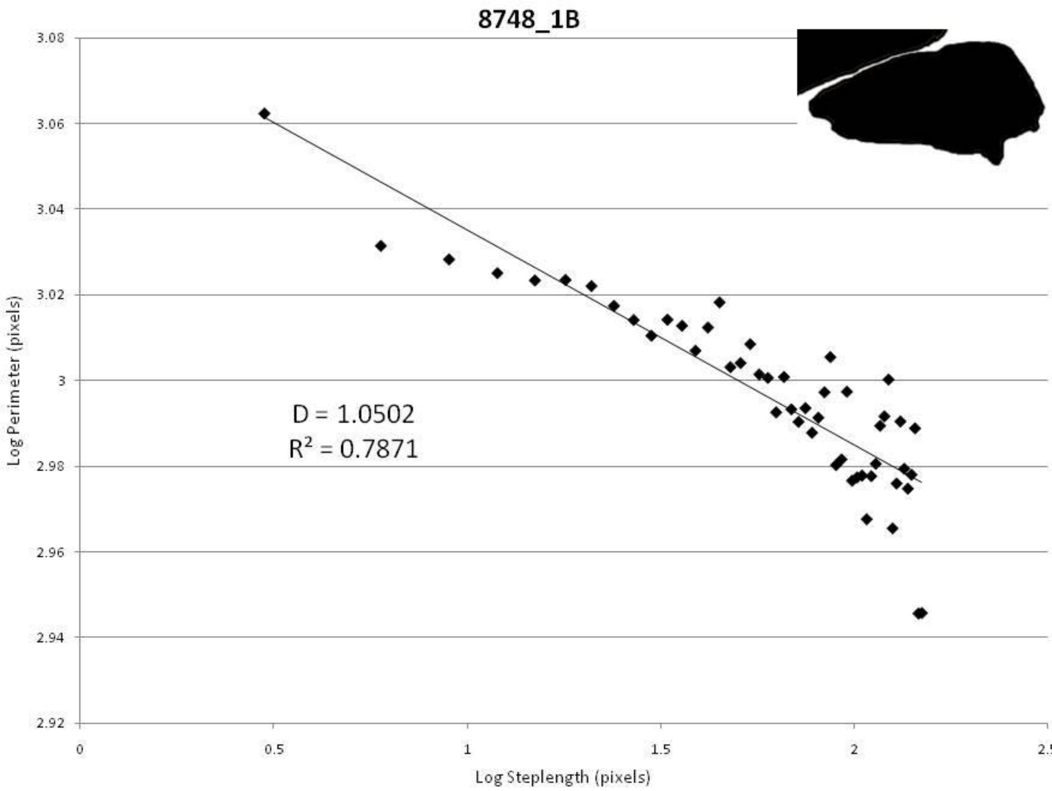

8747_3A
D_{text} = 1.0261
R^2 = 0.7933
D_{struct} = 1.1011
R^2 = 0.2676
Log Perimeter (pixels)
Log Steplength (pixels)
2.9
2.89
2.88
2.87
2.86
2.85
2.84
2.83
2.82
2.81
2.8
0
0.5
1
1.5
2
2.5

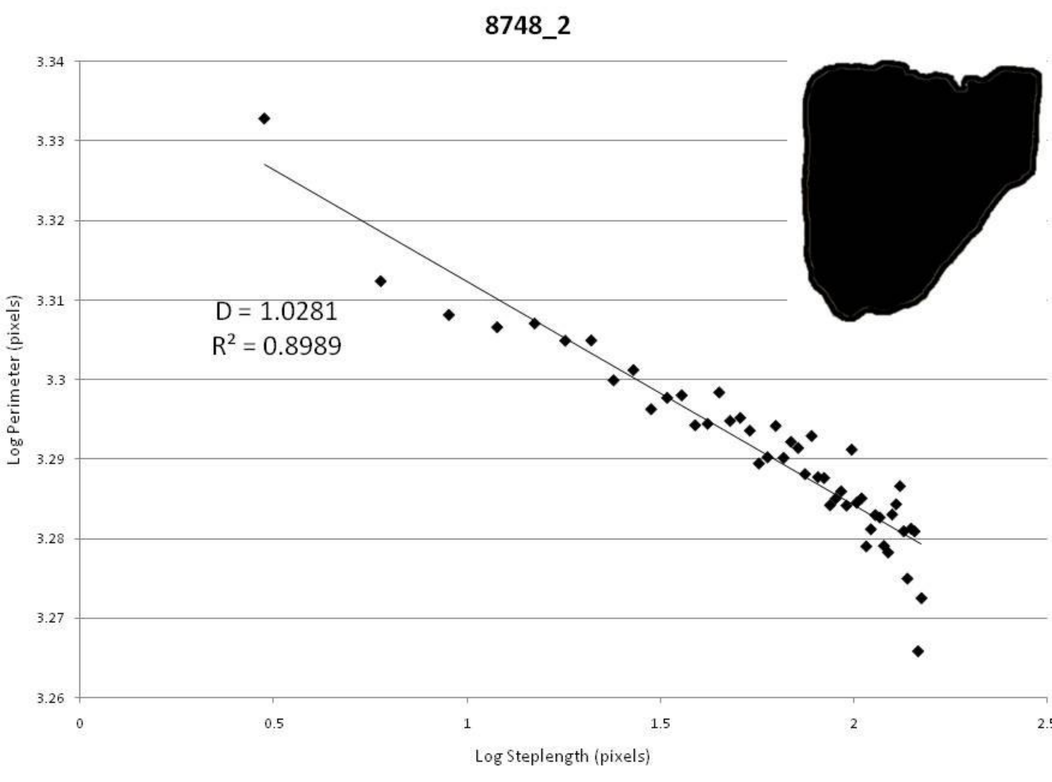

8747_3B
2.94
2.92
2.9
2.88
2.86
2.84
2.82
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0361
R^2 = 0.7746

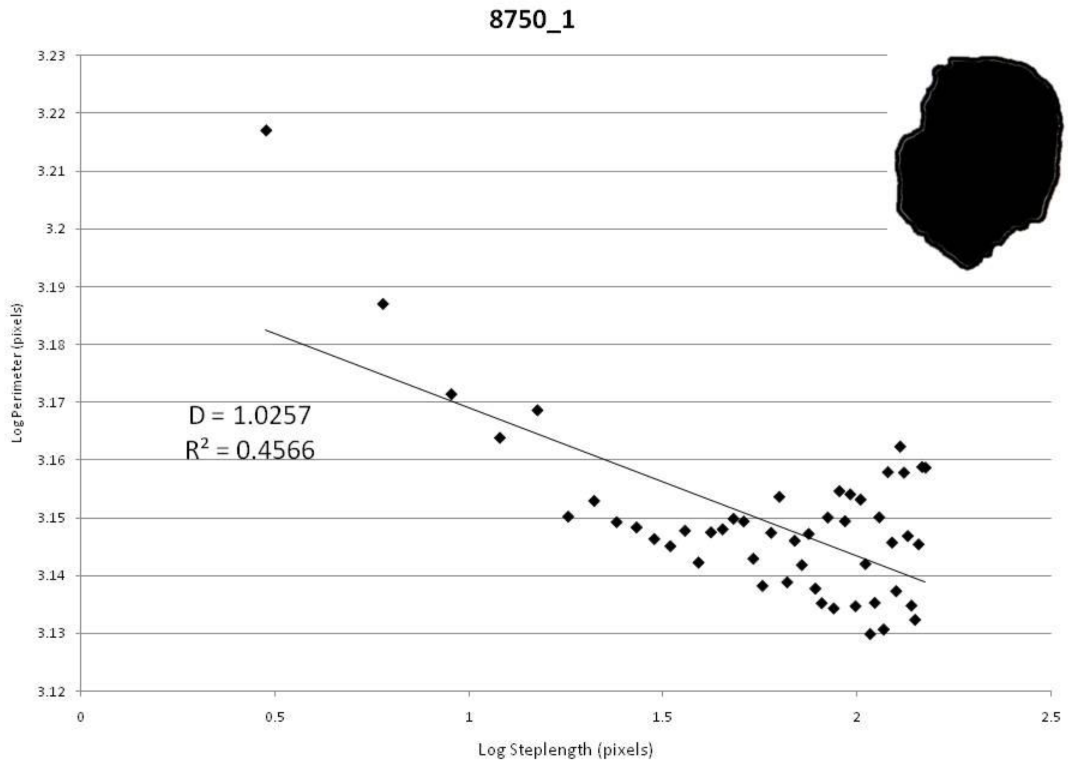

8747_4A
3.06
3.05
3.04
3.03
3.02
3.01
3
2.99
2.98
0.905
0.891
µm scale
Log Perimeter (pixels)
D = 1.0001
R^2 = 1E-05
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)
0.148
0.967
0.445
0.594
µm scale

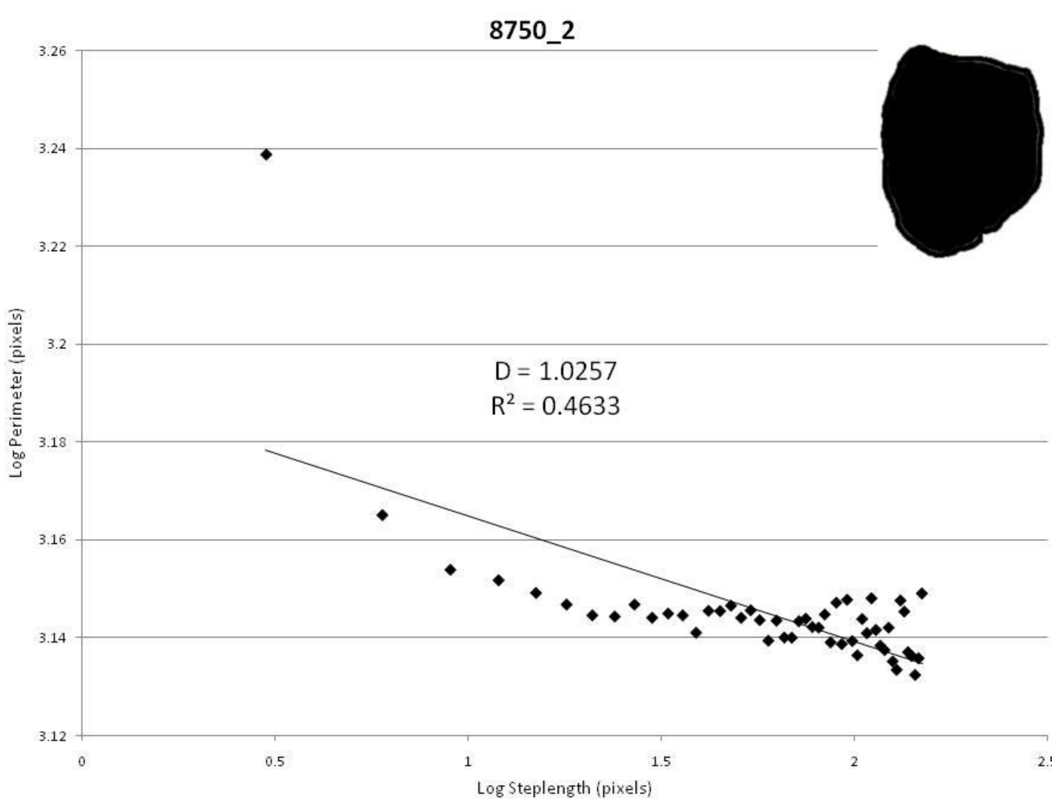

8747_4B
D_{text} = 1.0208
R^2 = 0.7303
D_{struct} = 1.1057
R^2 = 0.2084
Log Perimeter (pixels)
Log Steplength (pixels)

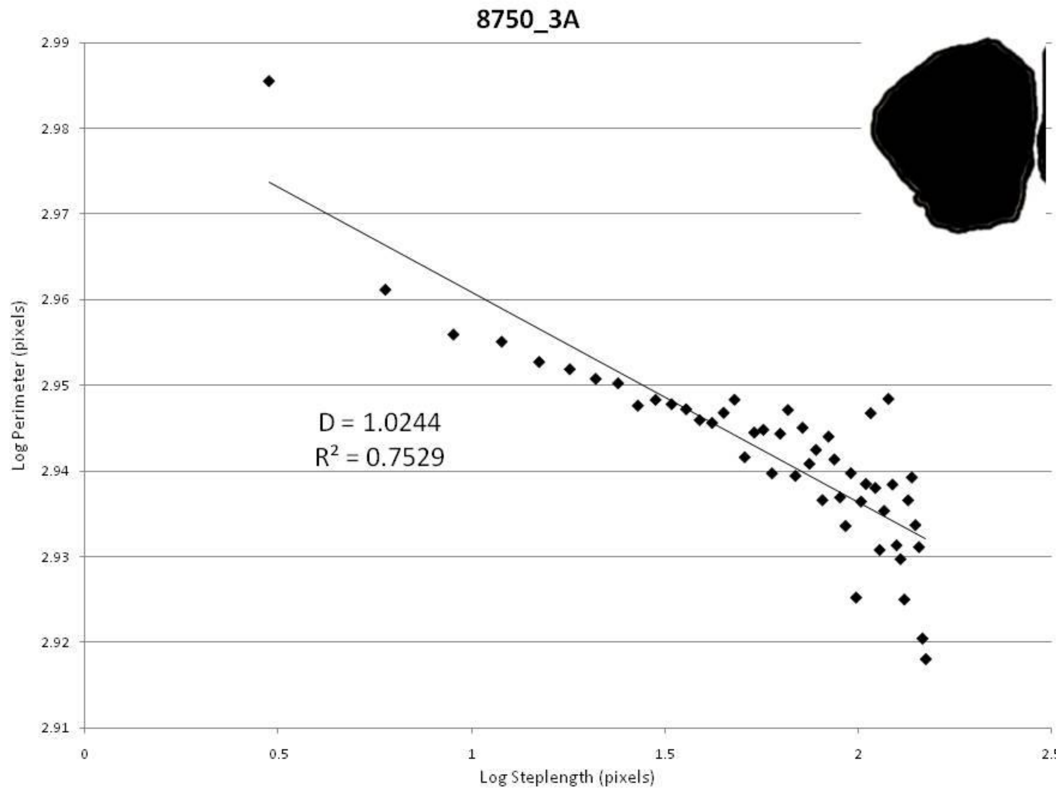

8748_1A
D_{text} = 1.0243
R^2 = 0.8741
D_{struct} = 1.1884
R^2 = 0.6641
Log Perimeter (pixels)
Log Steplength (pixels)

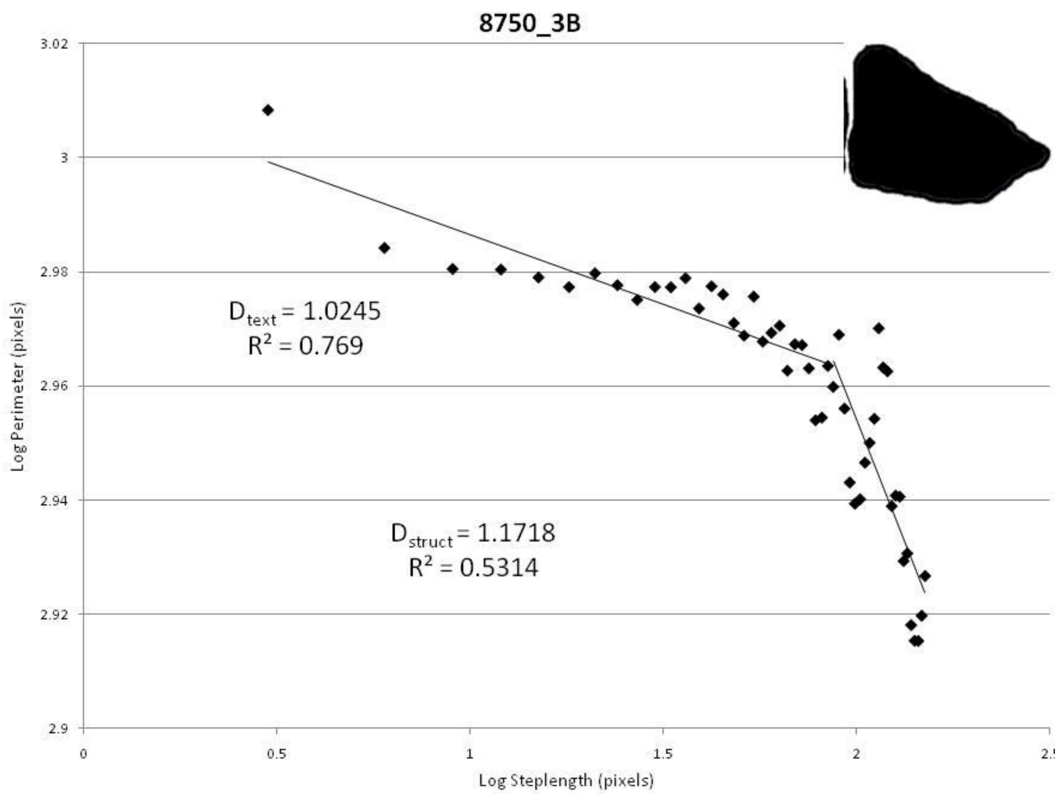

8748_1B
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0502
R² = 0.7871
3.08
3.06
3.04
3.02
3
2.98
2.96
2.94
2.92
0
0.5
1
1.5
2
2.5

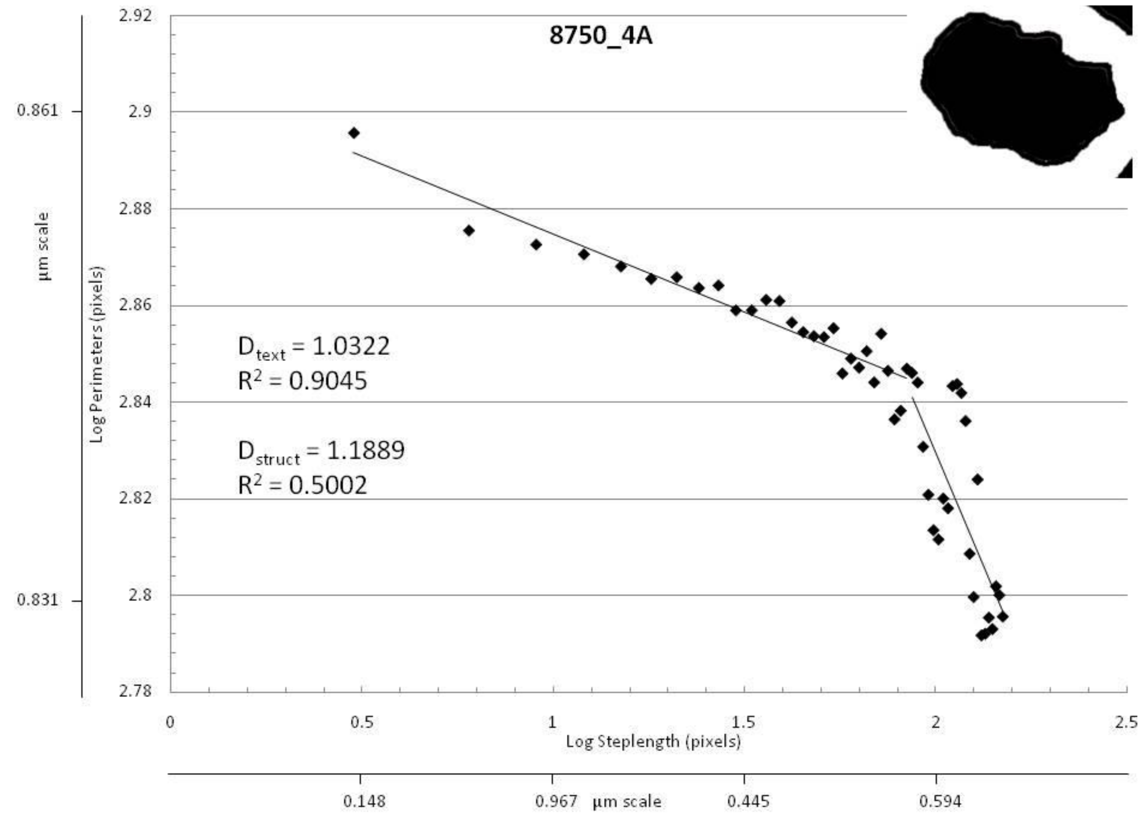

8748_2
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0281
R² = 0.8989
3.34
3.33
3.32
3.31
3.3
3.29
3.28
3.27
3.26
0
0.5
1
1.5
2
2.5

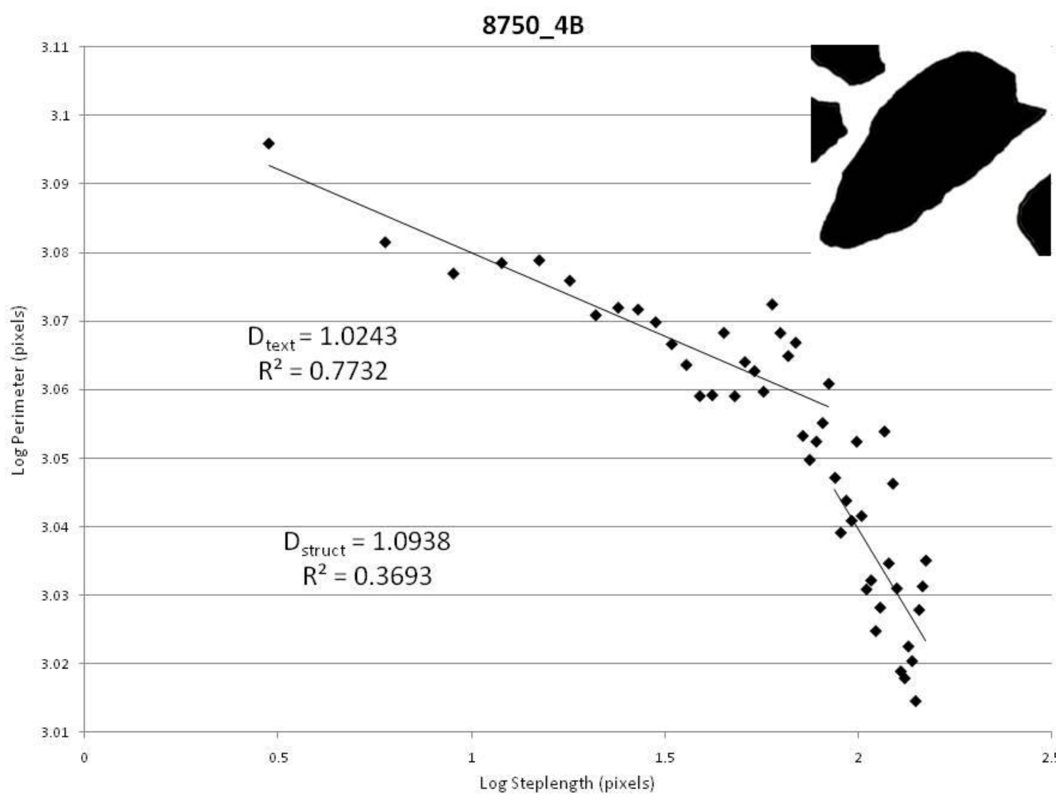

8750_1
D = 1.0257
R^2 = 0.4566
Log Perimeter (pixels)
Log Steplength (pixels)
3.23
3.22
3.21
3.2
3.19
3.18
3.17
3.16
3.15
3.14
3.13
3.12
0
0.5
1
1.5
2
2.5

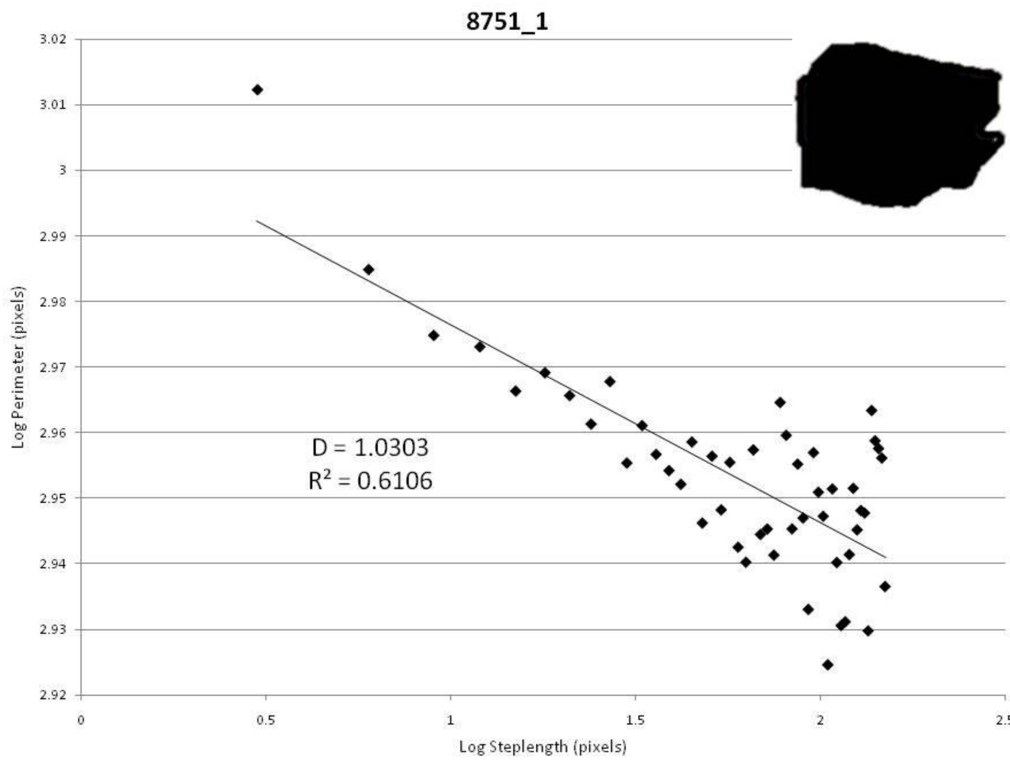

8750_2
D = 1.0257
R^2 = 0.4633
Log Perimeter (pixels)
Log Steplength (pixels)
3.26
3.24
3.22
3.2
3.18
3.16
3.14
3.12
0
0.5
1
1.5
2
2.5

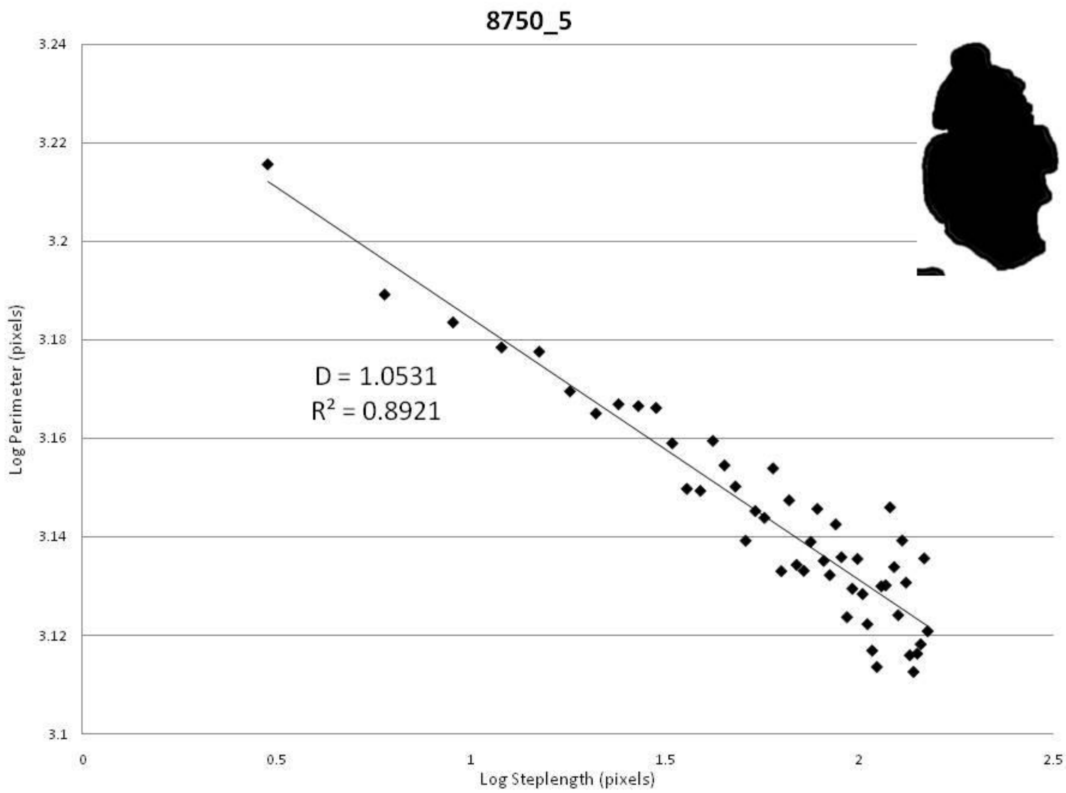

8750_3A
2.99
2.98
2.97
2.96
2.95
2.94
2.93
2.92
2.91
Log Perimeter (pixels)
D = 1.0244
R^2 = 0.7529
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)

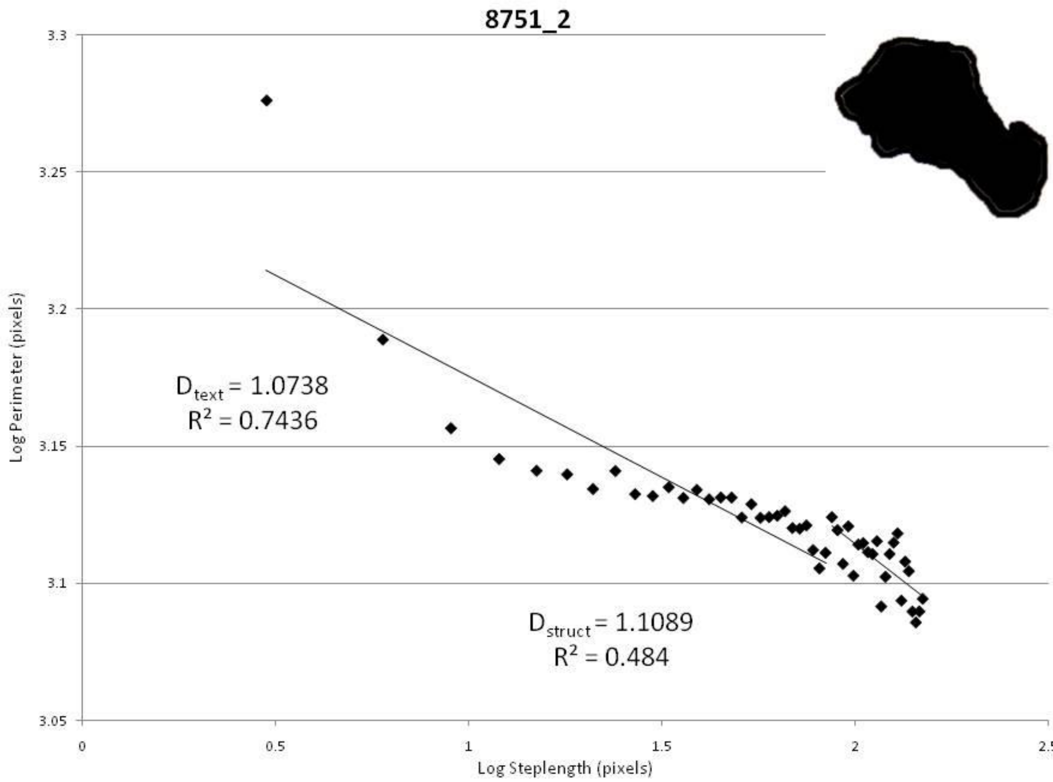

8750_3B
3.02
3
2.98
2.96
2.94
2.92
2.9
Log Perimeter (pixels)
D_{text} = 1.0245
R^2 = 0.769
D_{struct} = 1.1718
R^2 = 0.5314
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)

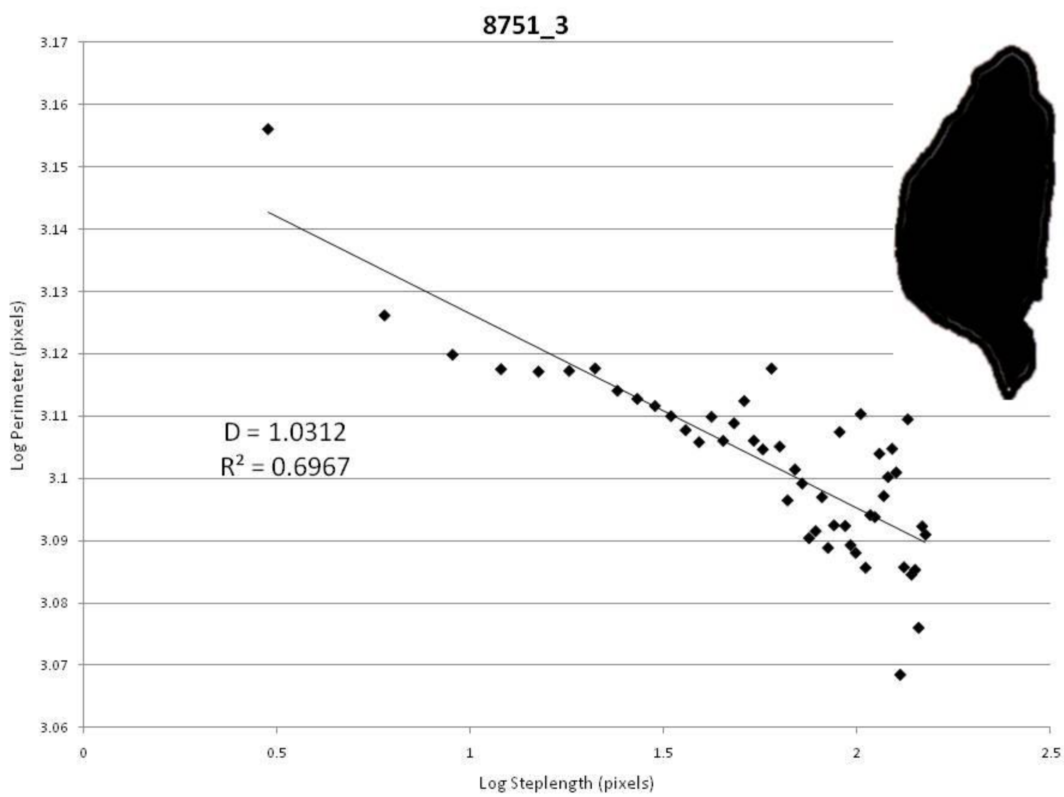

8750_4A
Dtext = 1.0322
R2 = 0.9045
Dstruct = 1.1889
R2 = 0.5002
Log Perimeters (pixels)
Log Steplength (pixels)
µm scale
0.861
0.831
0.148
0.967
0.445
0.594
2.92
2.9
2.88
2.86
2.84
2.82
2.8
2.78
0
0.5
1
1.5
2
2.5

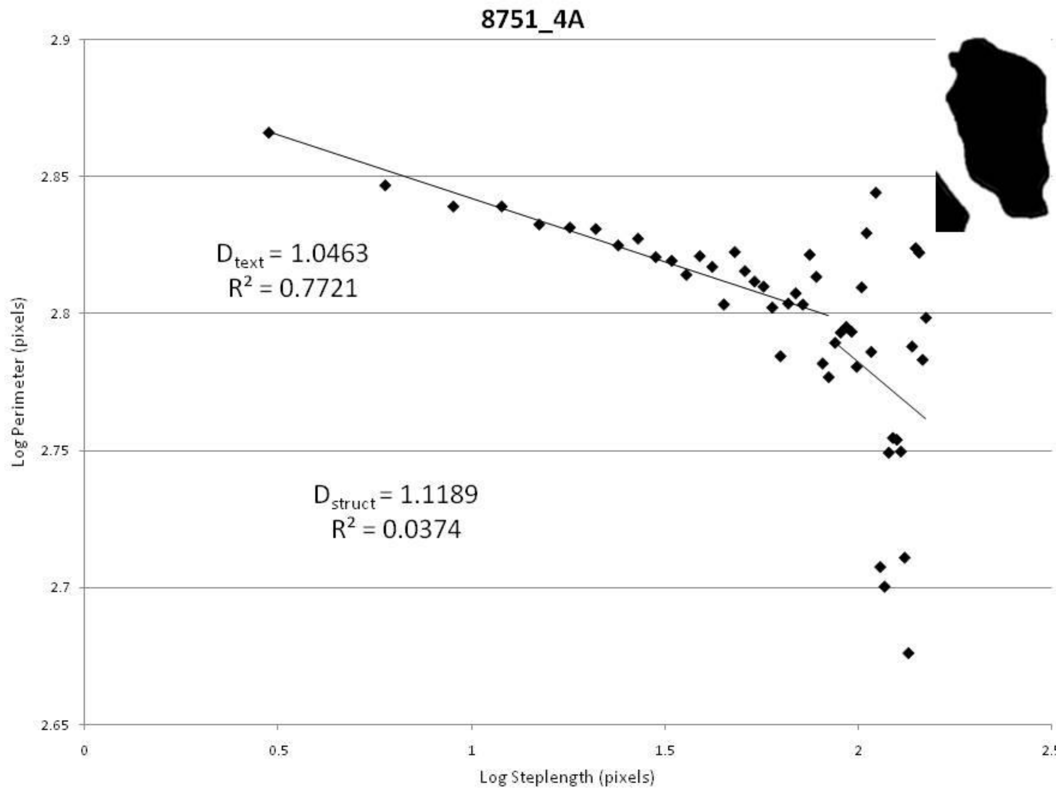

8750_4B
Dtext = 1.0243
R2 = 0.7732
Dstruct = 1.0938
R2 = 0.3693
Log Perimeter (pixels)
Log Steplength (pixels)
3.11
3.1
3.09
3.08
3.07
3.06
3.05
3.04
3.03
3.02
3.01
0
0.5
1
1.5
2
2.5

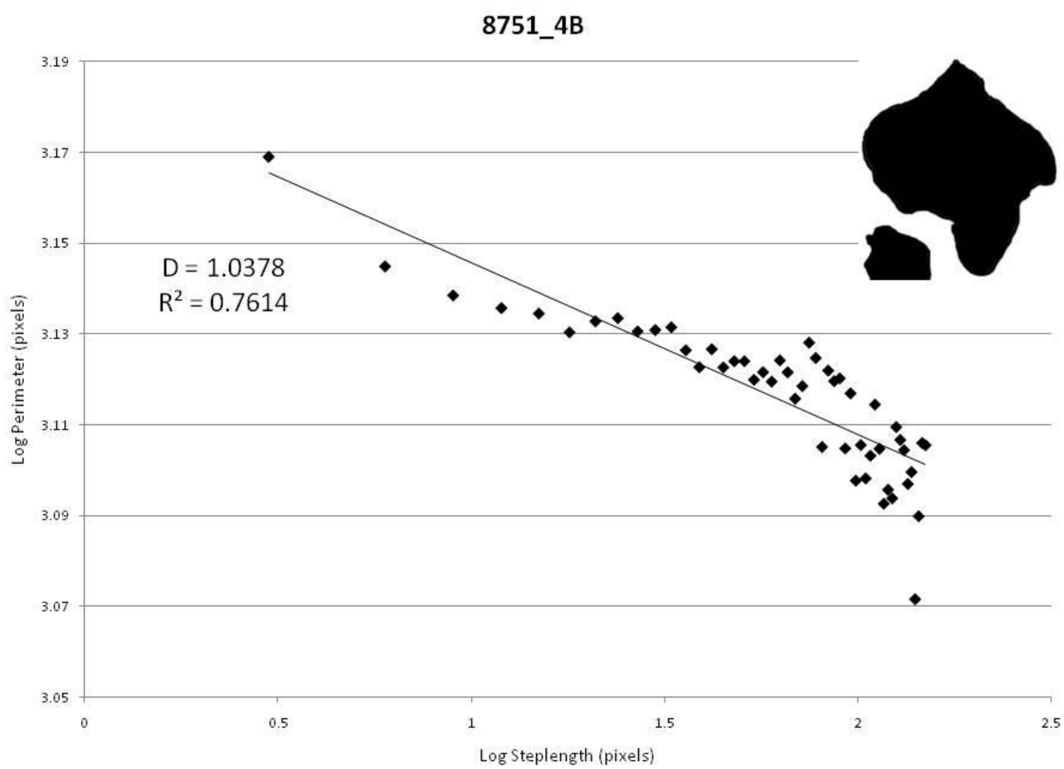

8751_1
D = 1.0303
R^2 = 0.6106
Log Perimeter (pixels)
Log Steplength (pixels)
3.02
3.01
3
2.99
2.98
2.97
2.96
2.95
2.94
2.93
2.92
0
0.5
1
1.5
2
2.5

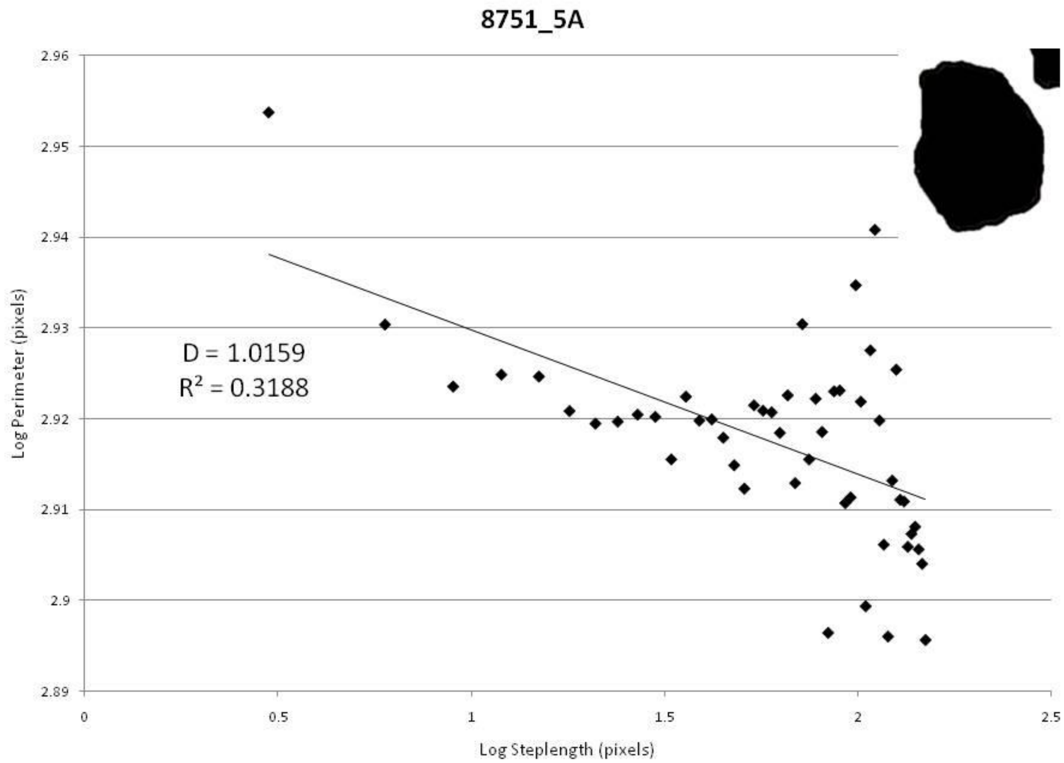

8750_5
D = 1.0531
R^2 = 0.8921
Log Perimeter (pixels)
Log Steplength (pixels)
3.24
3.22
3.2
3.18
3.16
3.14
3.12
3.1
0
0.5
1
1.5
2
2.5

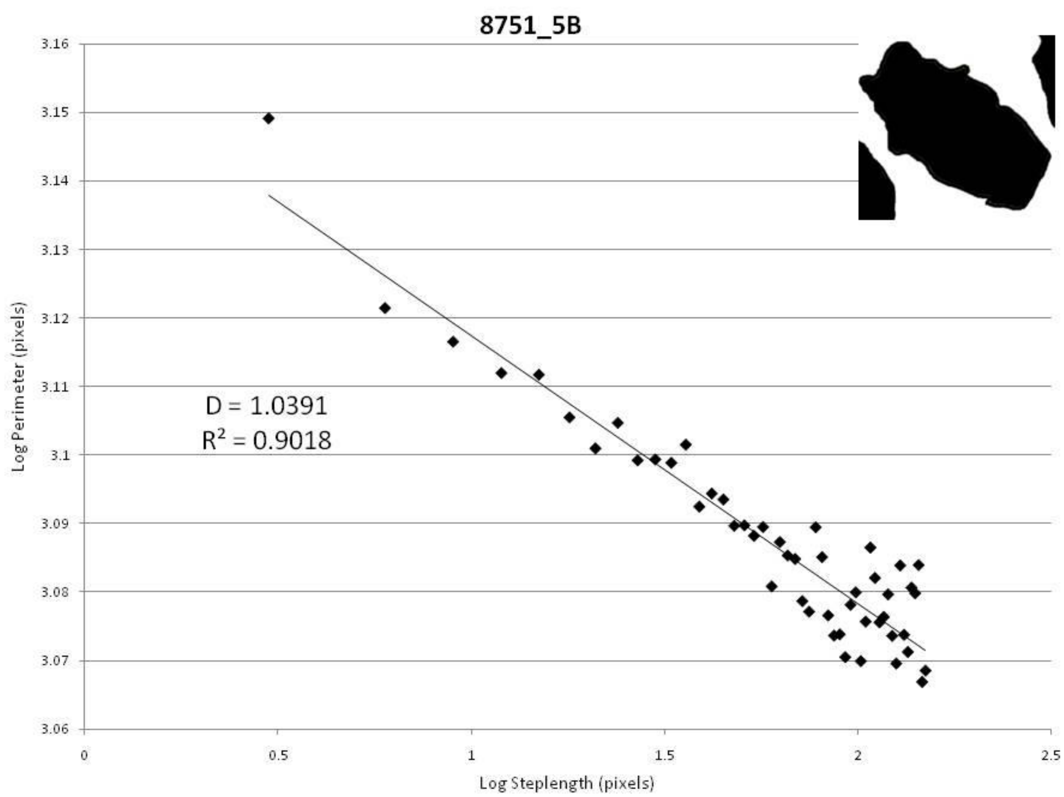

8751_2
3.3
3.25
3.2
3.15
3.1
3.05
Log Perimeter (pixels)
D_{text} = 1.0738
R^2 = 0.7436
D_{struct} = 1.1089
R^2 = 0.484
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)

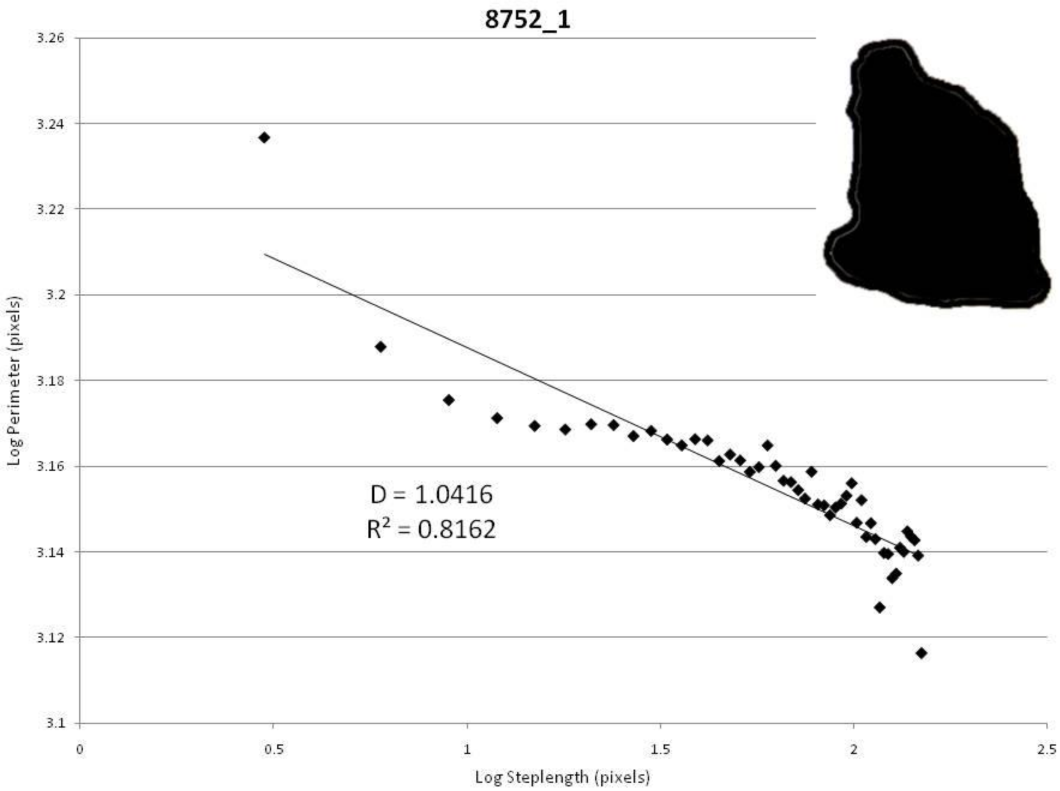

8751_3
3.17
3.16
3.15
3.14
3.13
3.12
3.11
3.1
3.09
3.08
3.07
3.06
Log Perimeter (pixels)
D = 1.0312
R^2 = 0.6967
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)

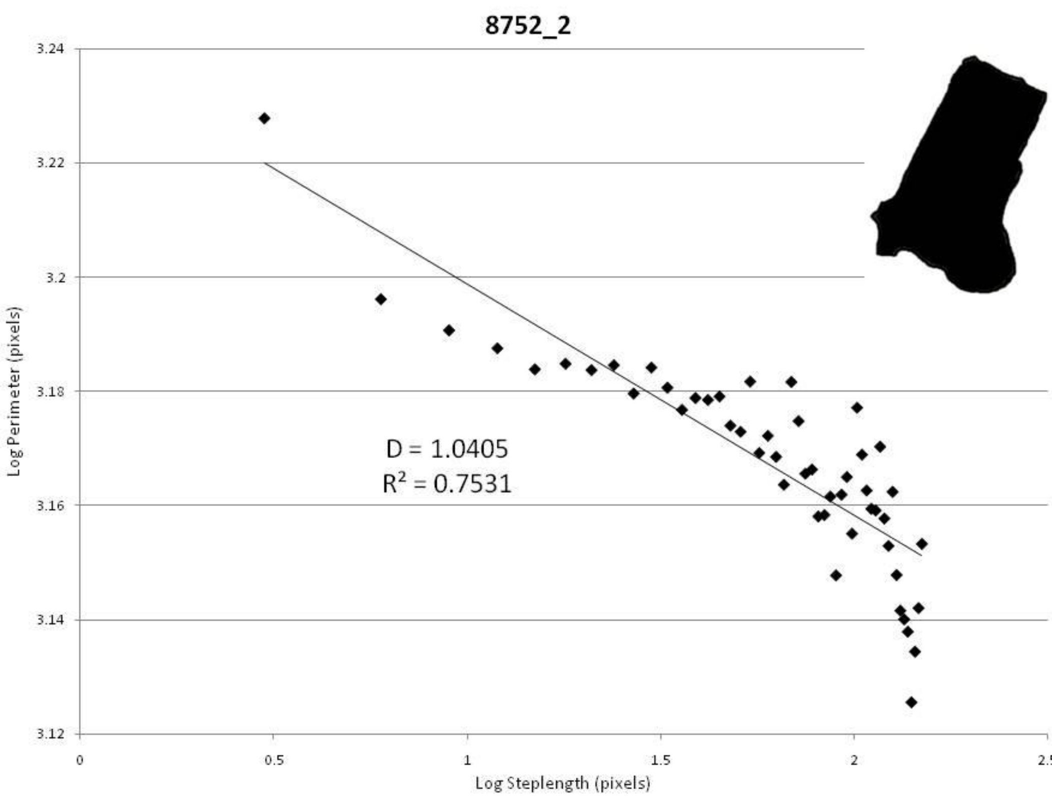

8751_4A
2.9
2.85
2.8
2.75
2.7
2.65
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0463
R^2 = 0.7721
D_{struct} = 1.1189
R^2 = 0.0374

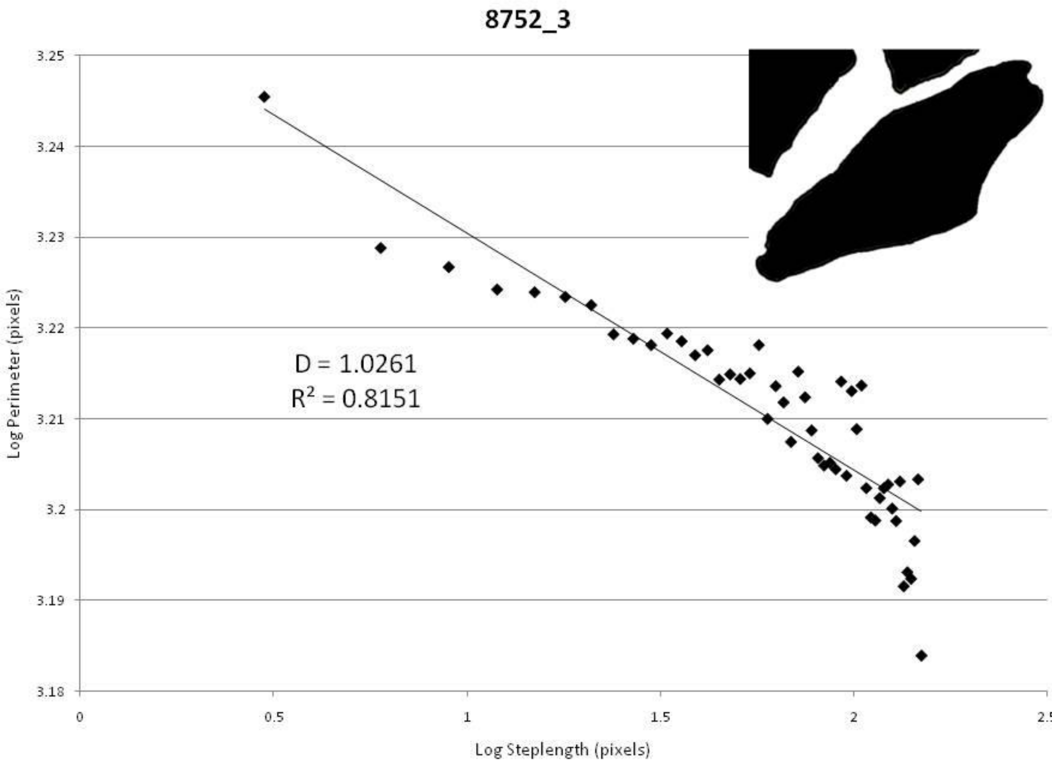

8751_4B
3.19
3.17
3.15
3.13
3.11
3.09
3.07
3.05
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0378
R^2 = 0.7614

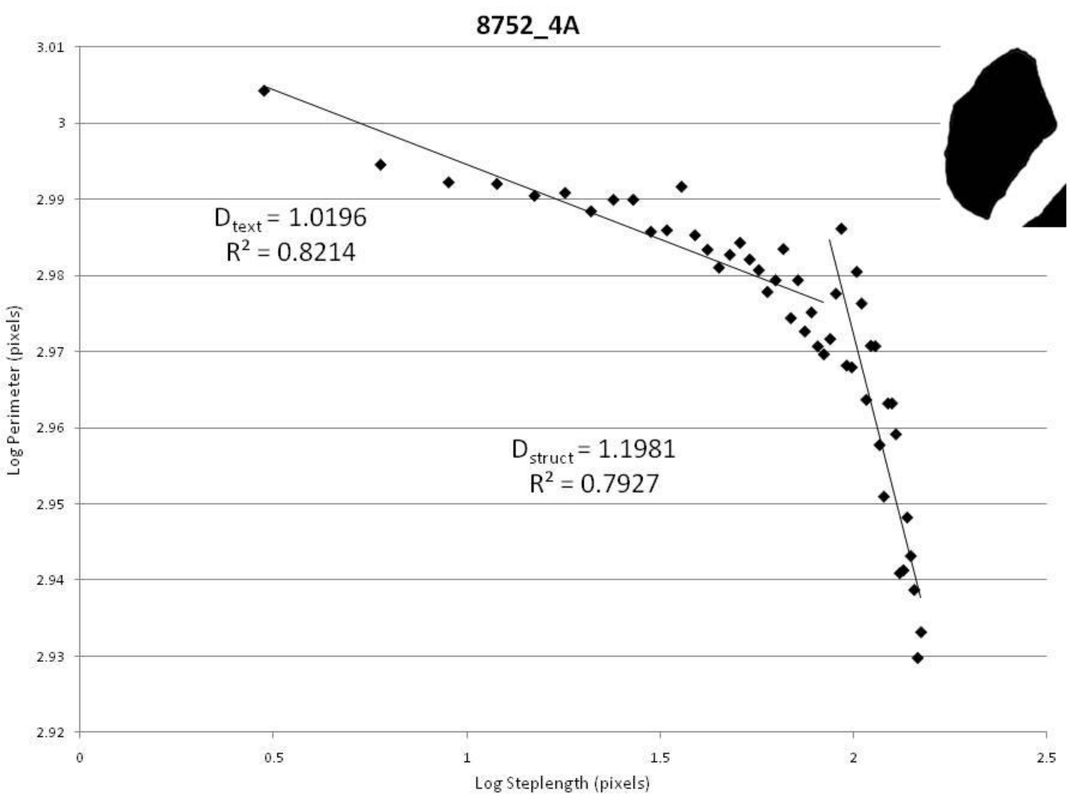

8751_5A
D = 1.0159
R² = 0.3188
Log Perimeter (pixels)
Log Steplength (pixels)
2.96
2.95
2.94
2.93
2.92
2.91
2.9
2.89
0
0.5
1
1.5
2
2.5

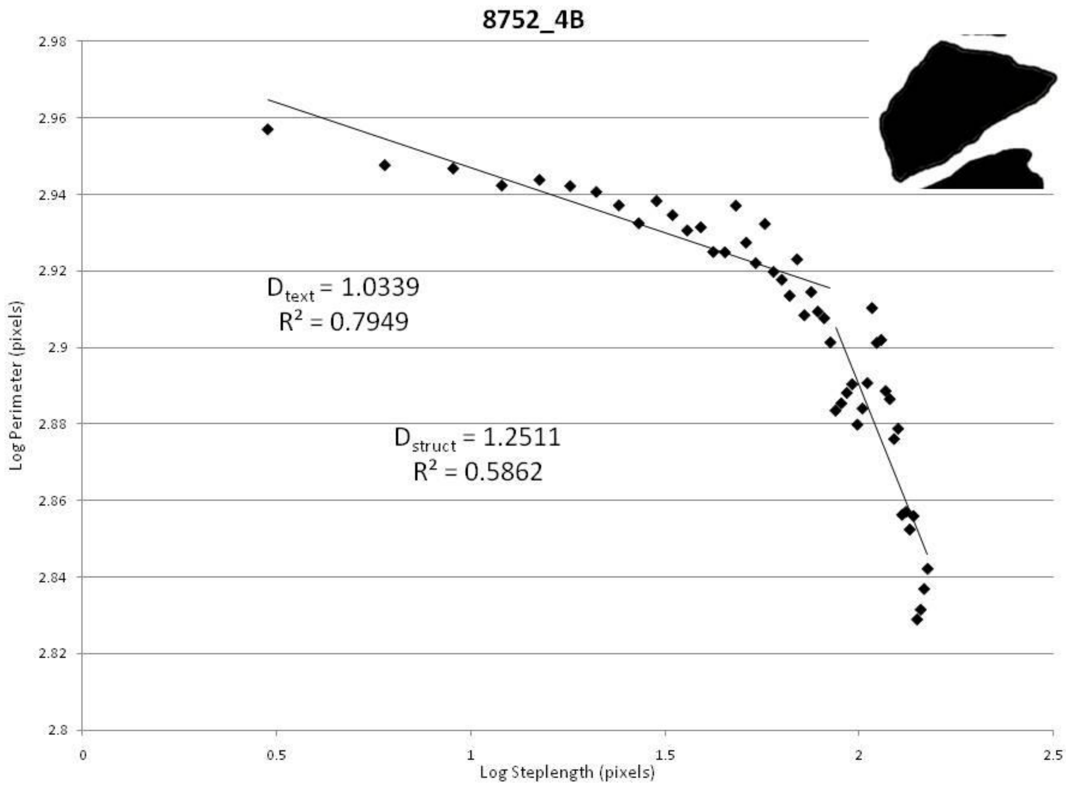

8751_5B
D = 1.0391
R² = 0.9018
Log Perimeter (pixels)
Log Steplength (pixels)
3.16
3.15
3.14
3.13
3.12
3.11
3.1
3.09
3.08
3.07
3.06
0
0.5
1
1.5
2
2.5

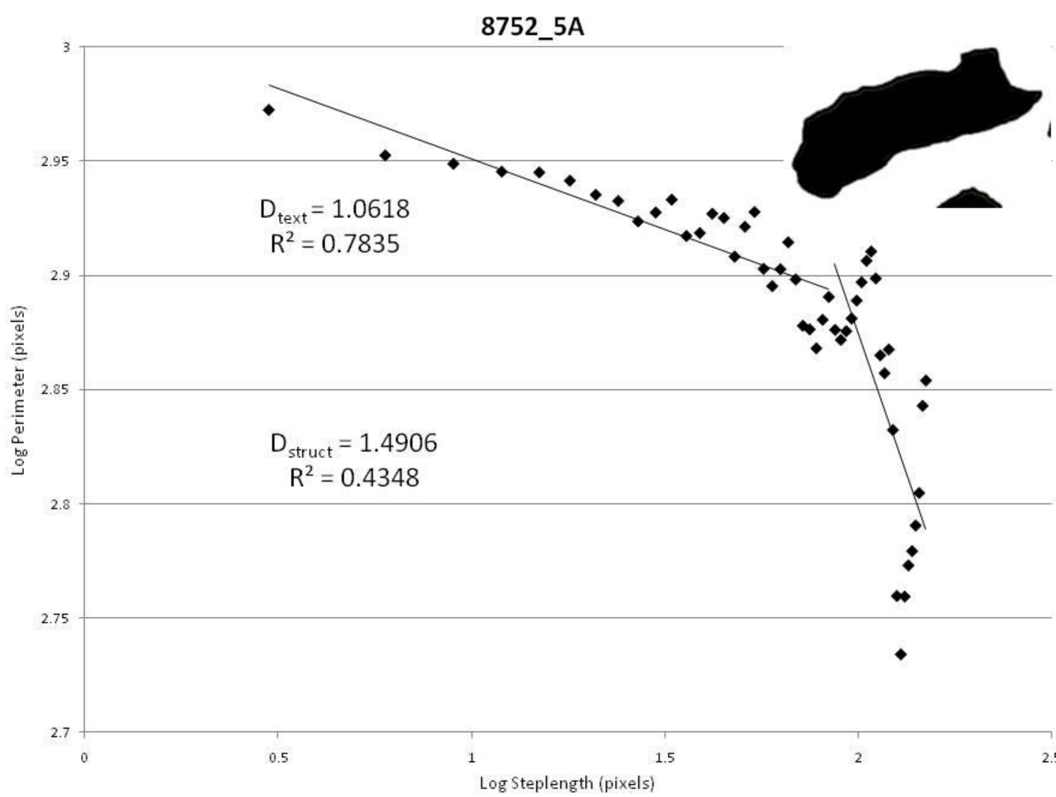

8752_1
3.26
3.24
3.22
3.2
3.18
3.16
3.14
3.12
3.1
Log Perimeter (pixels)
D = 1.0416
R^2 = 0.8162
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)

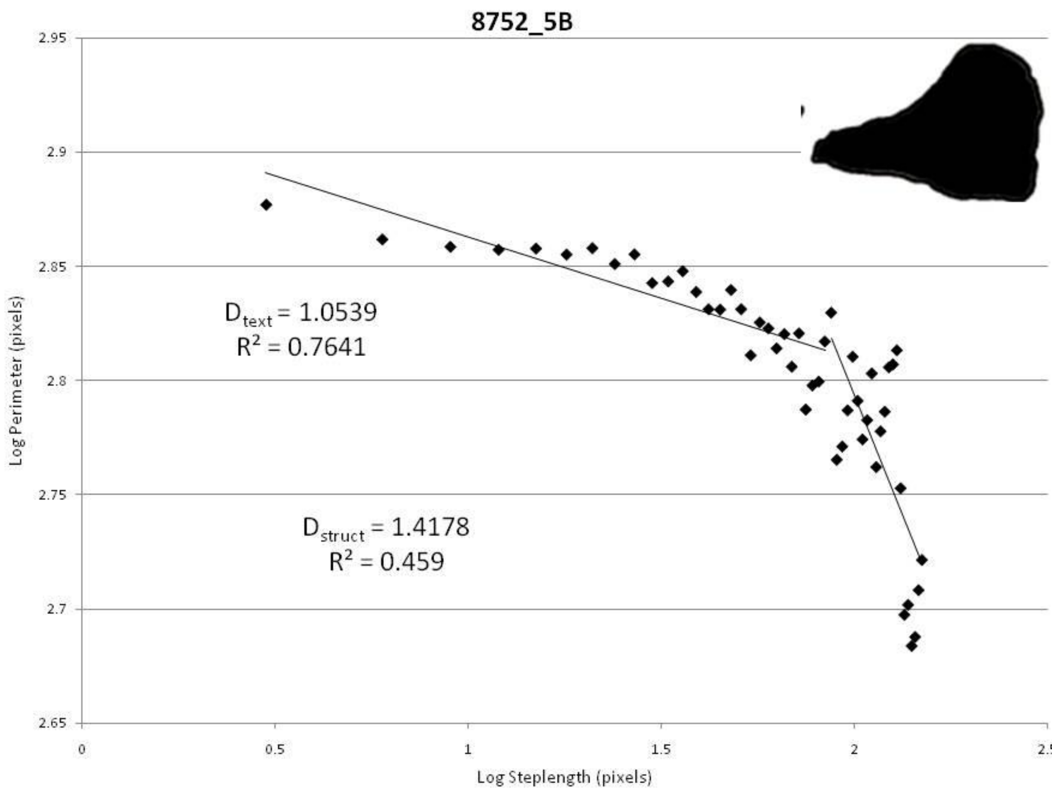

8752_2
3.24
3.22
3.2
3.18
3.16
3.14
3.12
Log Perimeter (pixels)
D = 1.0405
R^2 = 0.7531
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)

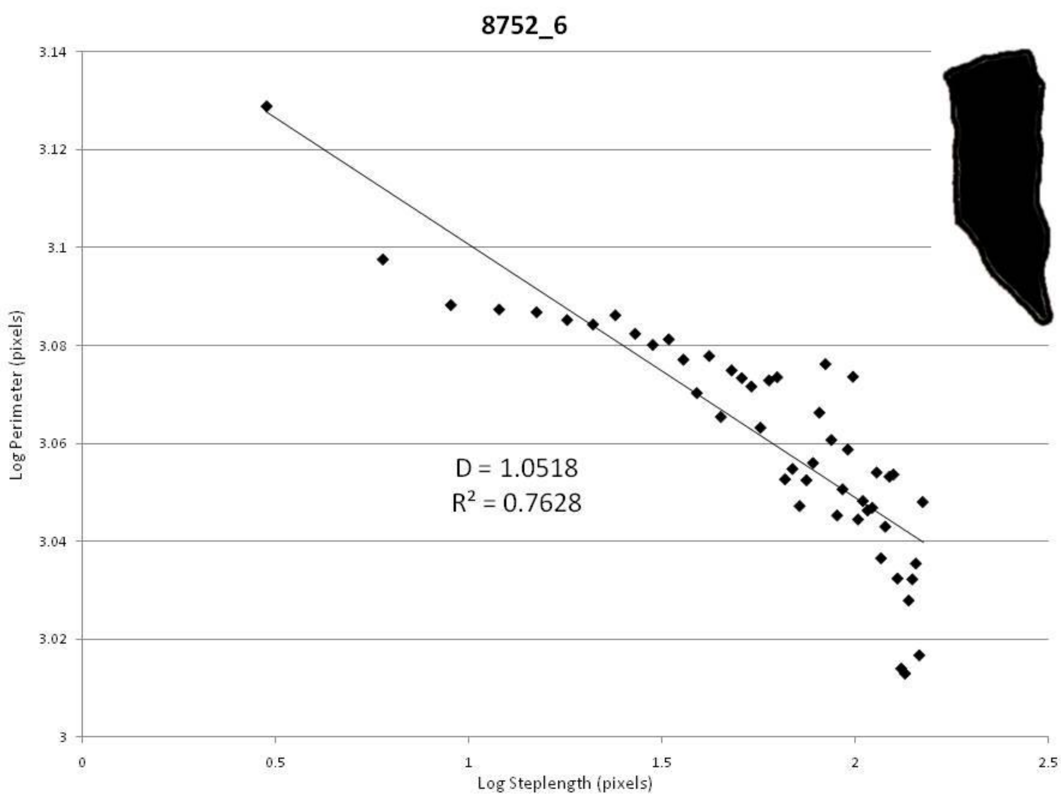

8752_3
D = 1.0261
R² = 0.8151
Log Perimeter (pixels)
Log Steplength (pixels)

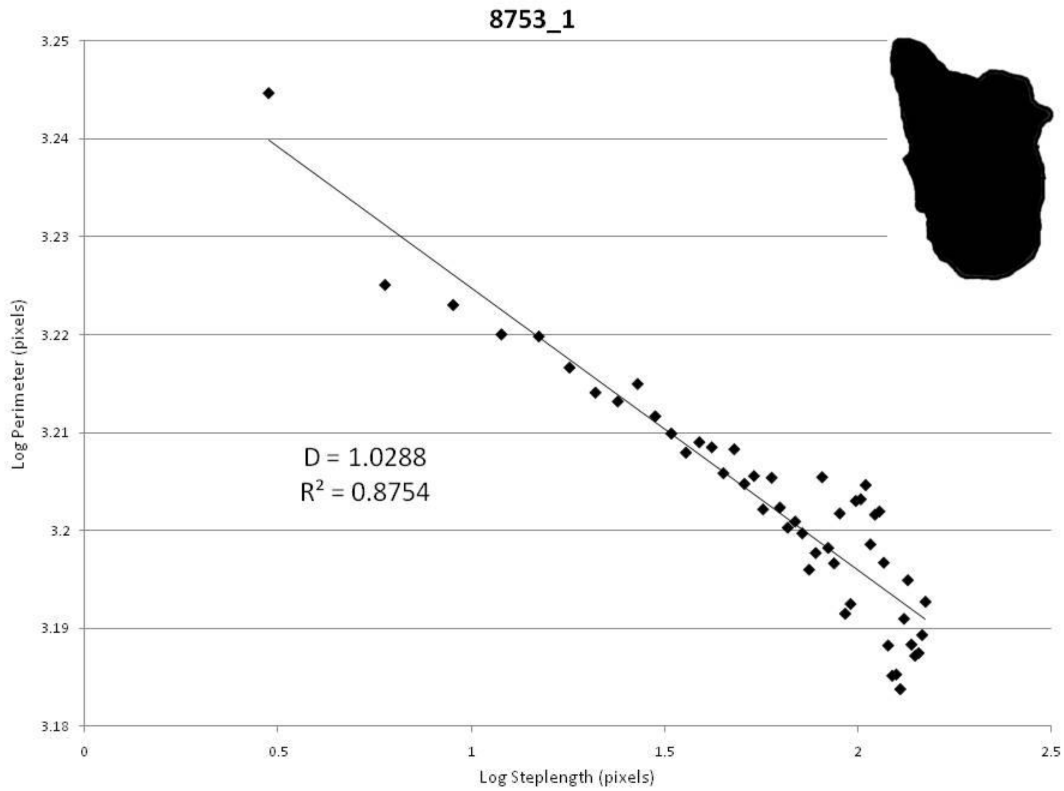

8752_4A
D_text = 1.0196
R² = 0.8214
D_struct = 1.1981
R² = 0.7927
Log Perimeter (pixels)
Log Steplength (pixels)

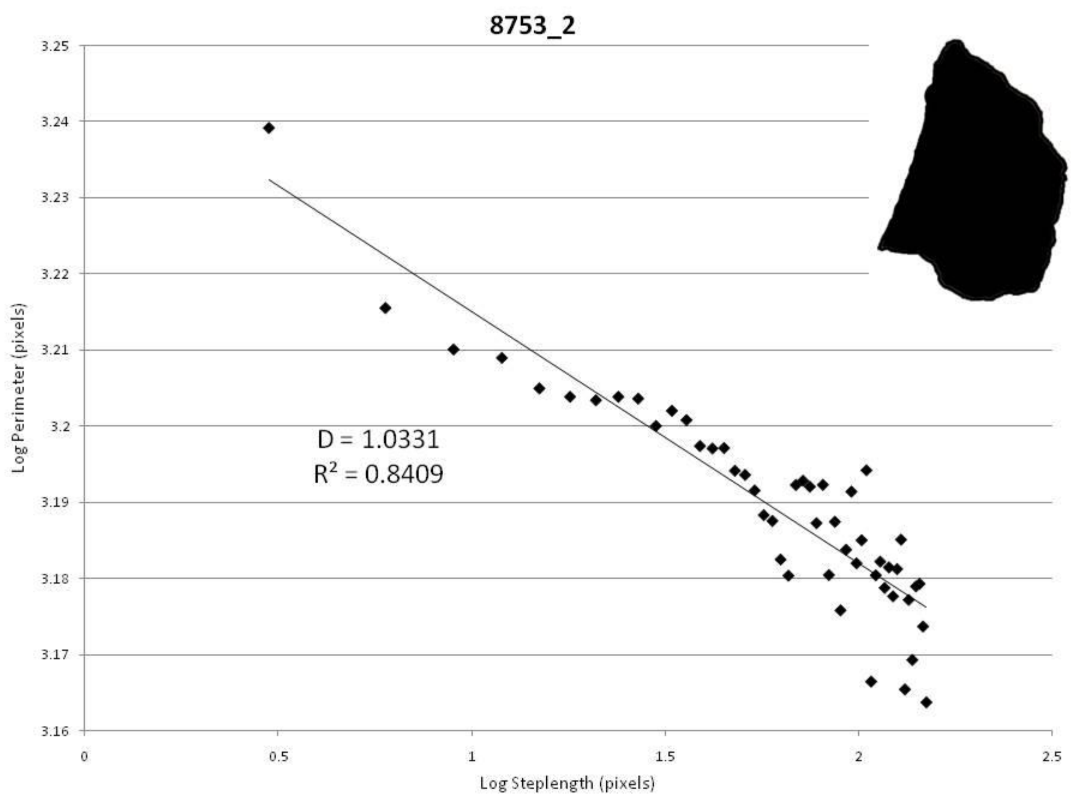

8752_4B
Log Perimeter (pixels)
Log Steplength (pixels)
2.98
2.96
2.94
2.92
2.9
2.88
2.86
2.84
2.82
2.8
0
0.5
1
1.5
2
2.5
D_{text} = 1.0339
R^2 = 0.7949
D_{struct} = 1.2511
R^2 = 0.5862

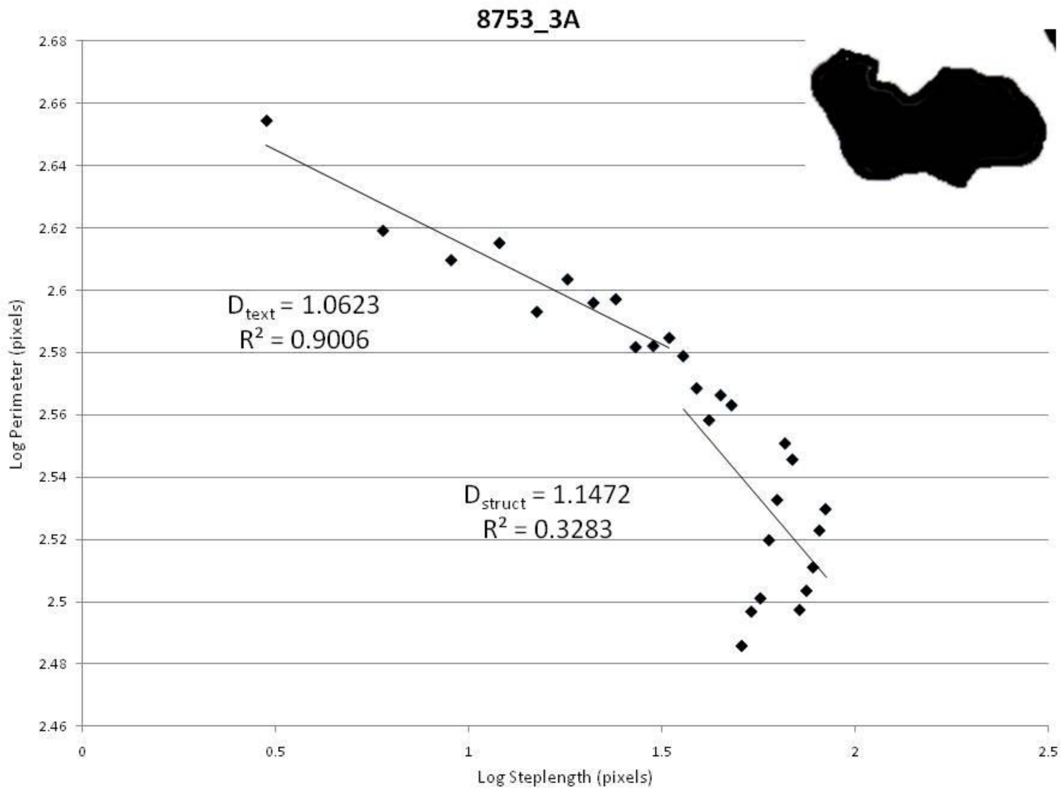

8752_5A
Log Perimeter (pixels)
Log Steplength (pixels)
3
2.95
2.9
2.85
2.8
2.75
2.7
0
0.5
1
1.5
2
2.5
D_{text} = 1.0618
R^2 = 0.7835
D_{struct} = 1.4906
R^2 = 0.4348

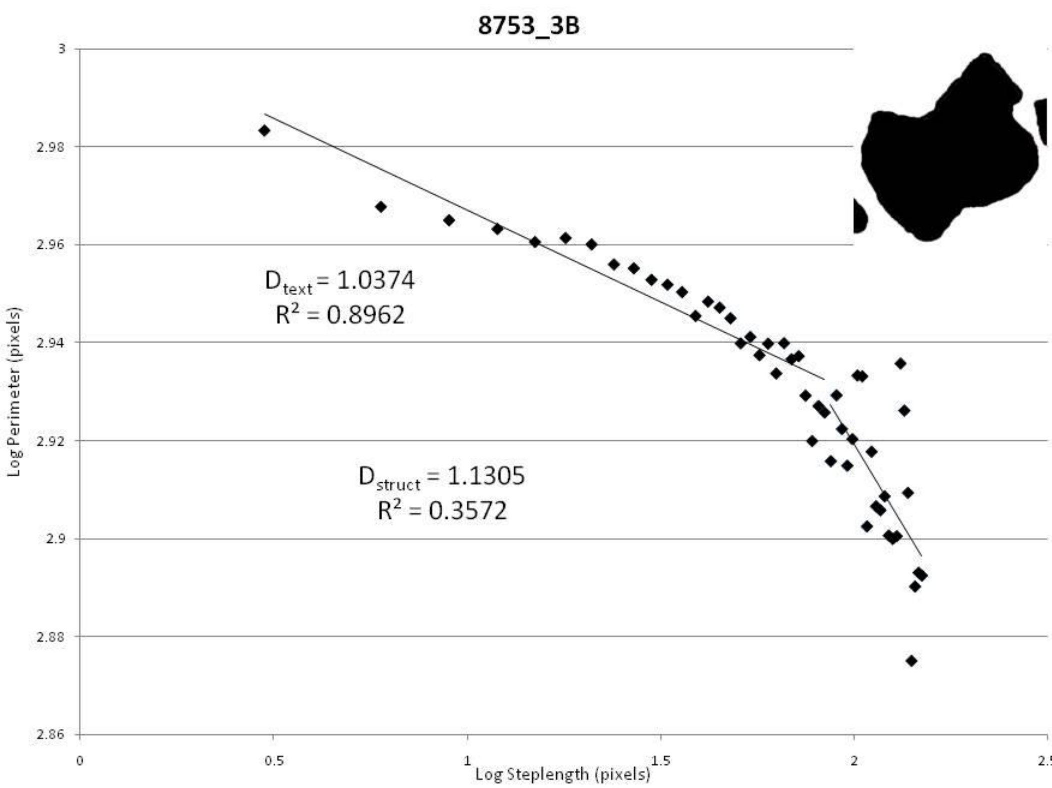

8752_5B
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0539
R^2 = 0.7641
D_{struct} = 1.4178
R^2 = 0.459
2.95
2.9
2.85
2.8
2.75
2.7
2.65
0
0.5
1
1.5
2
2.5

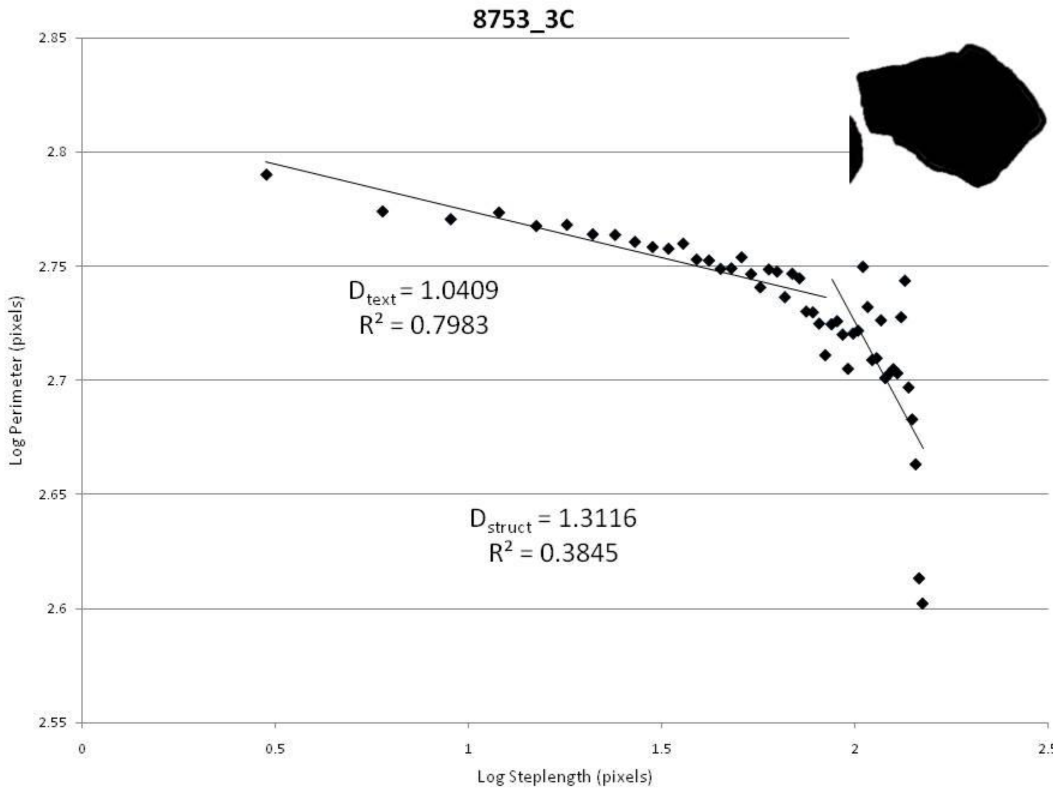

8752_6
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0518
R^2 = 0.7628
3.14
3.12
3.1
3.08
3.06
3.04
3.02
3
0
0.5
1
1.5
2
2.5


8753_1
D = 1.0288
R^2 = 0.8754
Log Perimeter (pixels)
Log Steplength (pixels)
3.25
3.24
3.23
3.22
3.21
3.2
3.19
3.18
0
0.5
1
1.5
2
2.5

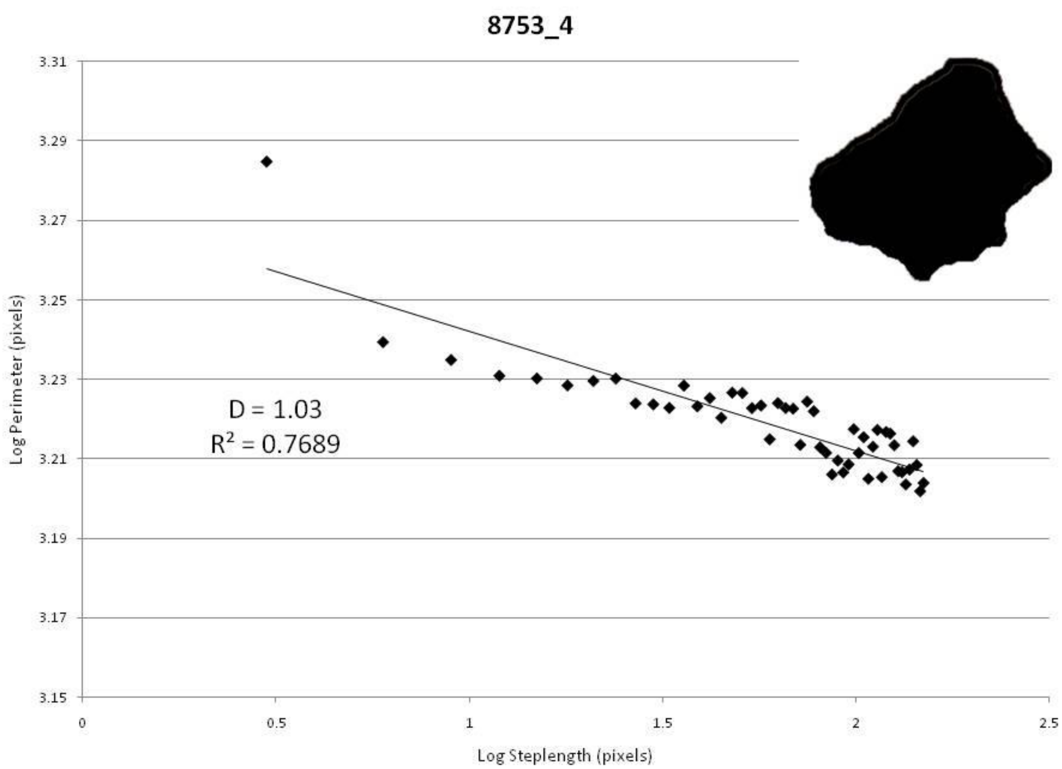

8753_2
D = 1.0331
R^2 = 0.8409
Log Perimeter (pixels)
Log Steplength (pixels)
3.25
3.24
3.23
3.22
3.21
3.2
3.19
3.18
3.17
3.16
0
0.5
1
1.5
2
2.5


8753_3A
D_{text} = 1.0623
R^2 = 0.9006
D_{struct} = 1.1472
R^2 = 0.3283
Log Perimeter (pixels)
Log Steplength (pixels)
2.68
2.66
2.64
2.62
2.6
2.58
2.56
2.54
2.52
2.5
2.48
2.46
0
0.5
1
1.5
2
2.5

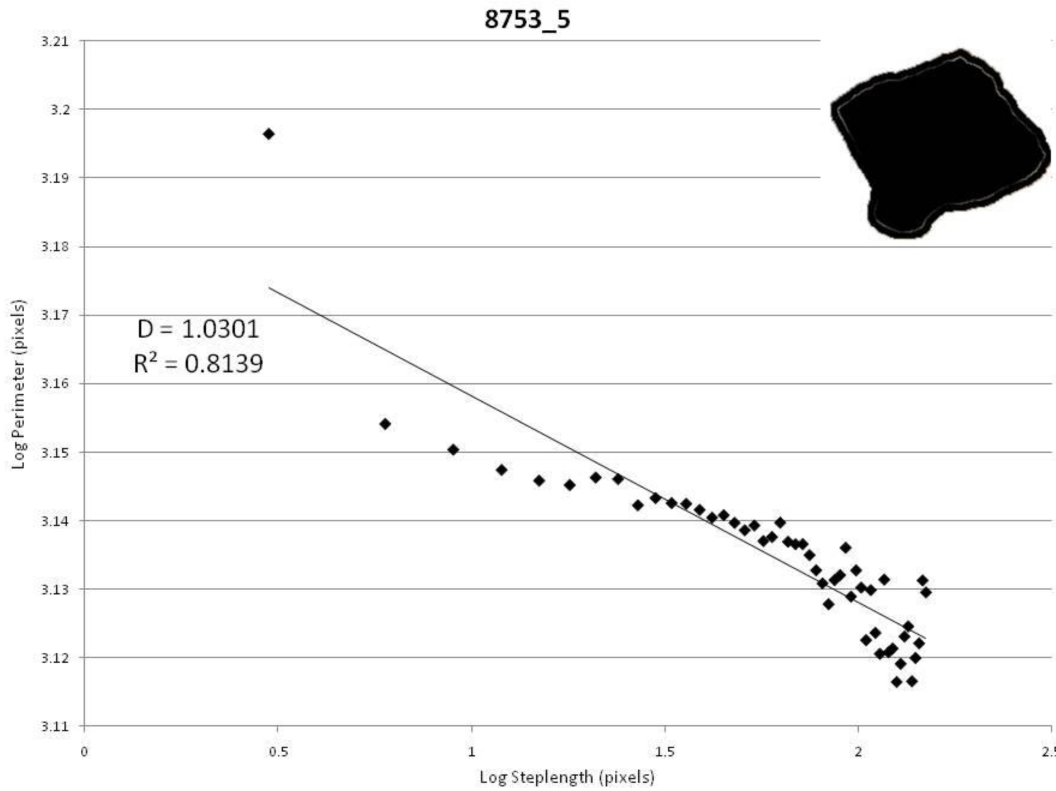

8753_3B
D_{text} = 1.0374
R^2 = 0.8962
D_{struct} = 1.1305
R^2 = 0.3572
Log Perimeter (pixels)
Log Steplength (pixels)
3
2.98
2.96
2.94
2.92
2.9
2.88
2.86
0
0.5
1
1.5
2
2.5



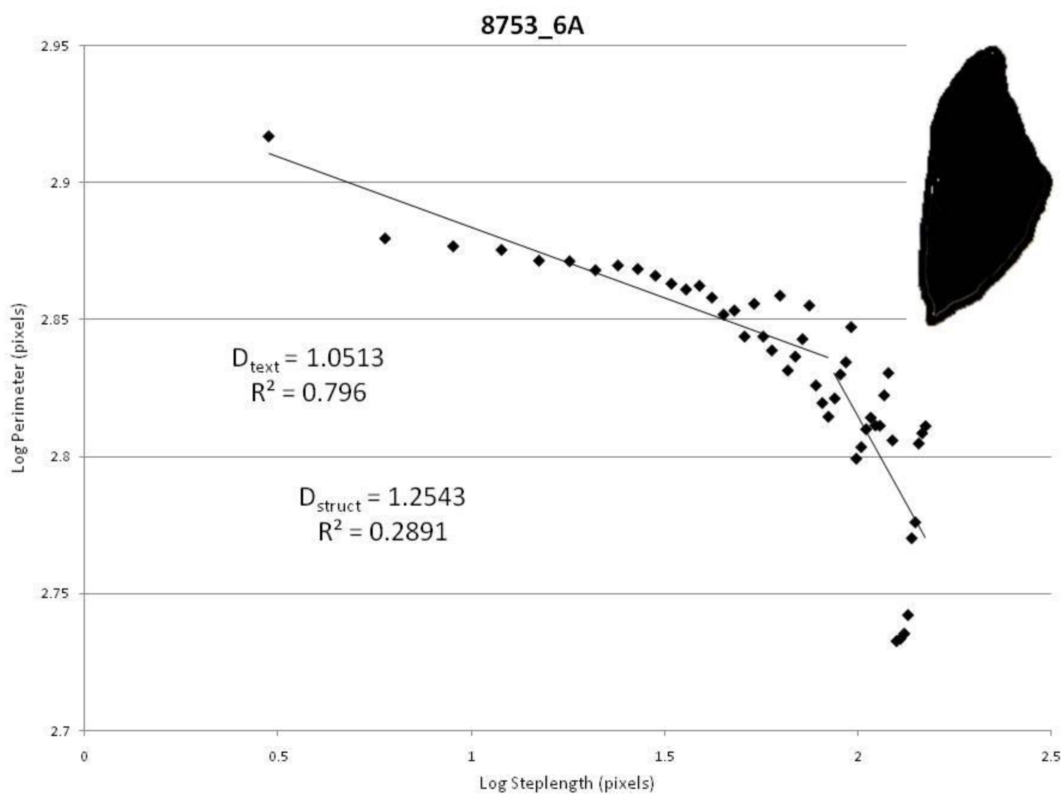
8753_3C
2.85
2.8
2.75
2.7
2.65
2.6
2.55
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0409
R^2 = 0.7983
D_{struct} = 1.3116
R^2 = 0.3845



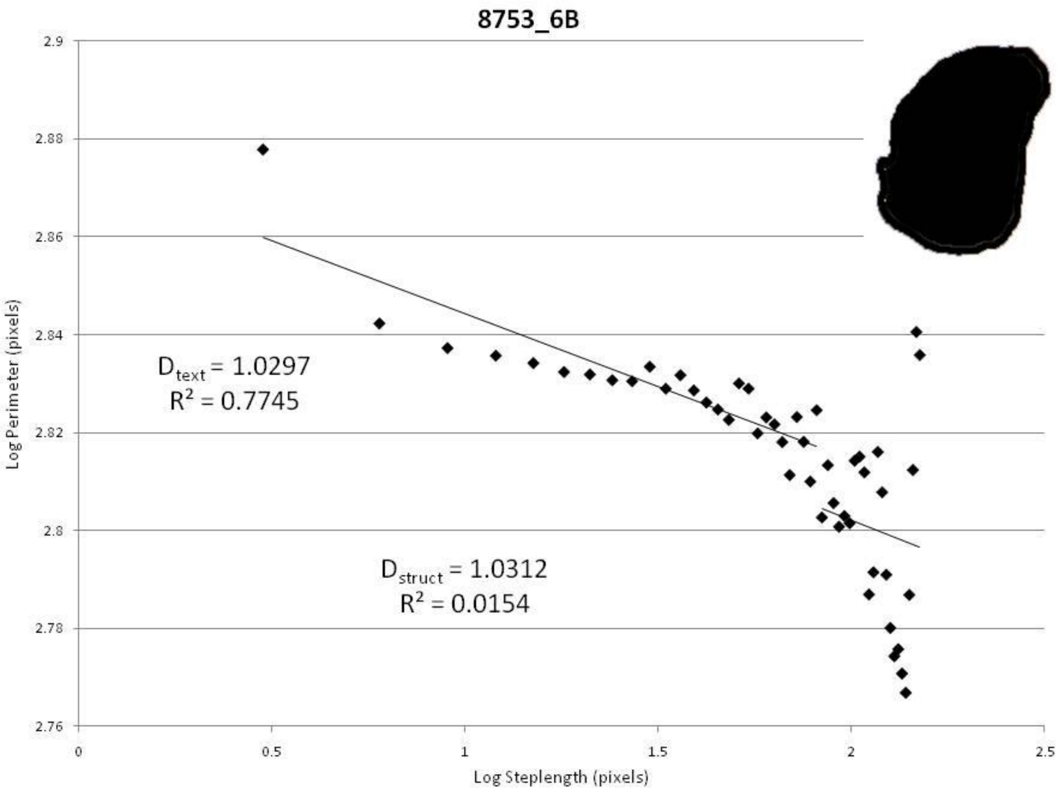
8753_4
3.31
3.29
3.27
3.25
3.23
3.21
3.19
3.17
3.15
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.03
R^2 = 0.7689



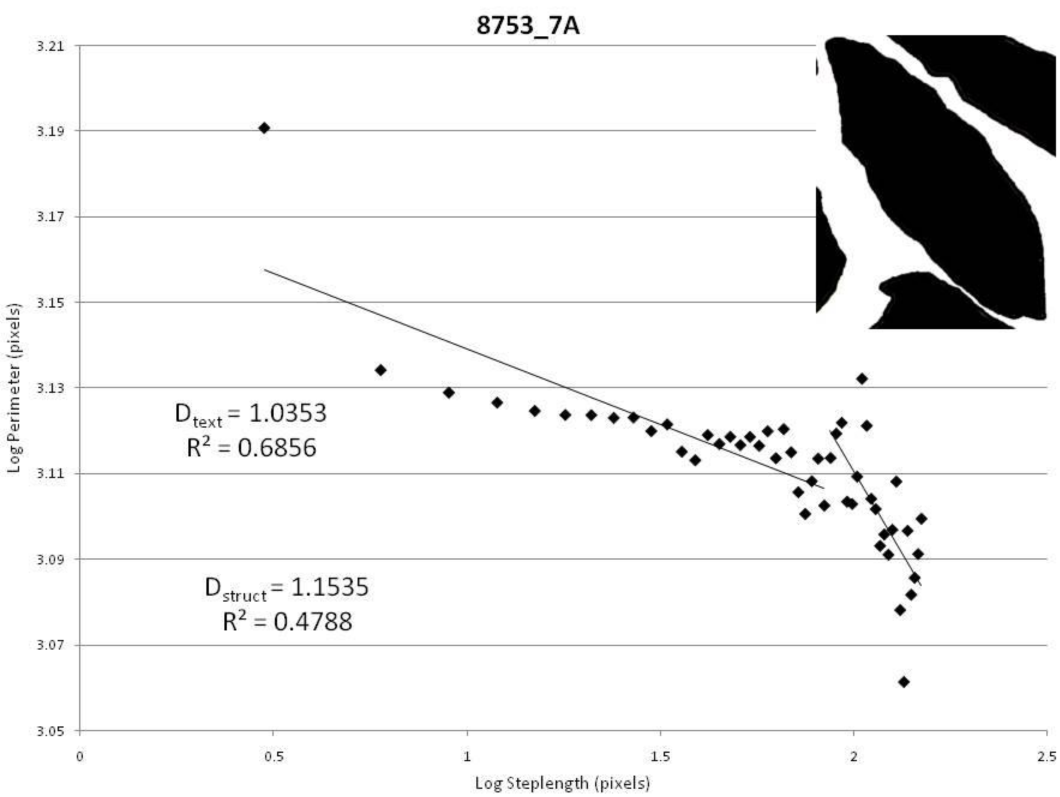
8753_5
D = 1.0301
R^2 = 0.8139
Log Perimeter (pixels)
Log Steplength (pixels)



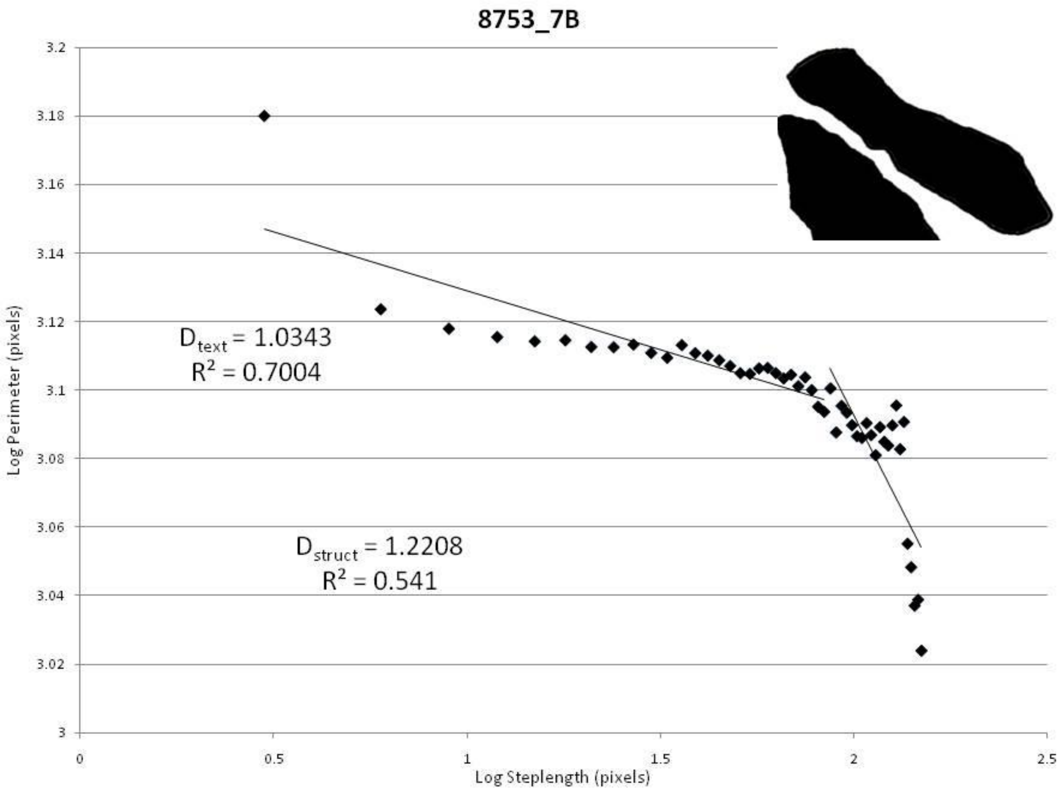
8753_6A
D_{text} = 1.0513
R^2 = 0.796
D_{struct} = 1.2543
R^2 = 0.2891
Log Perimeter (pixels)
Log Steplength (pixels)

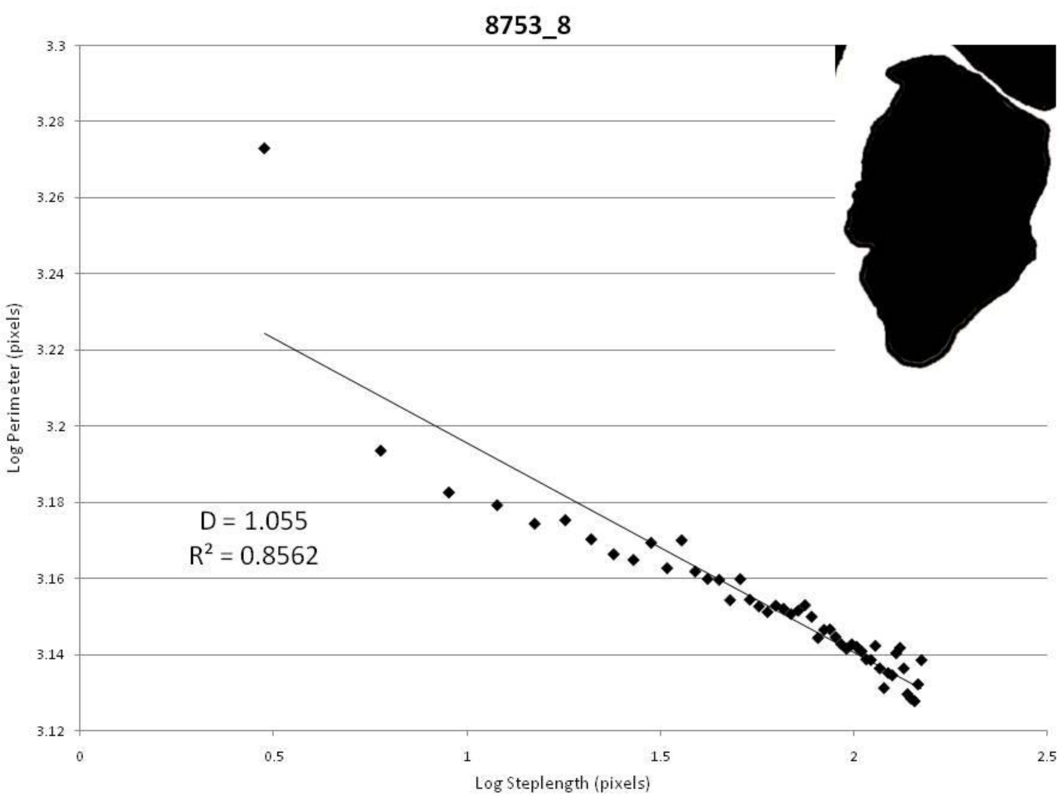


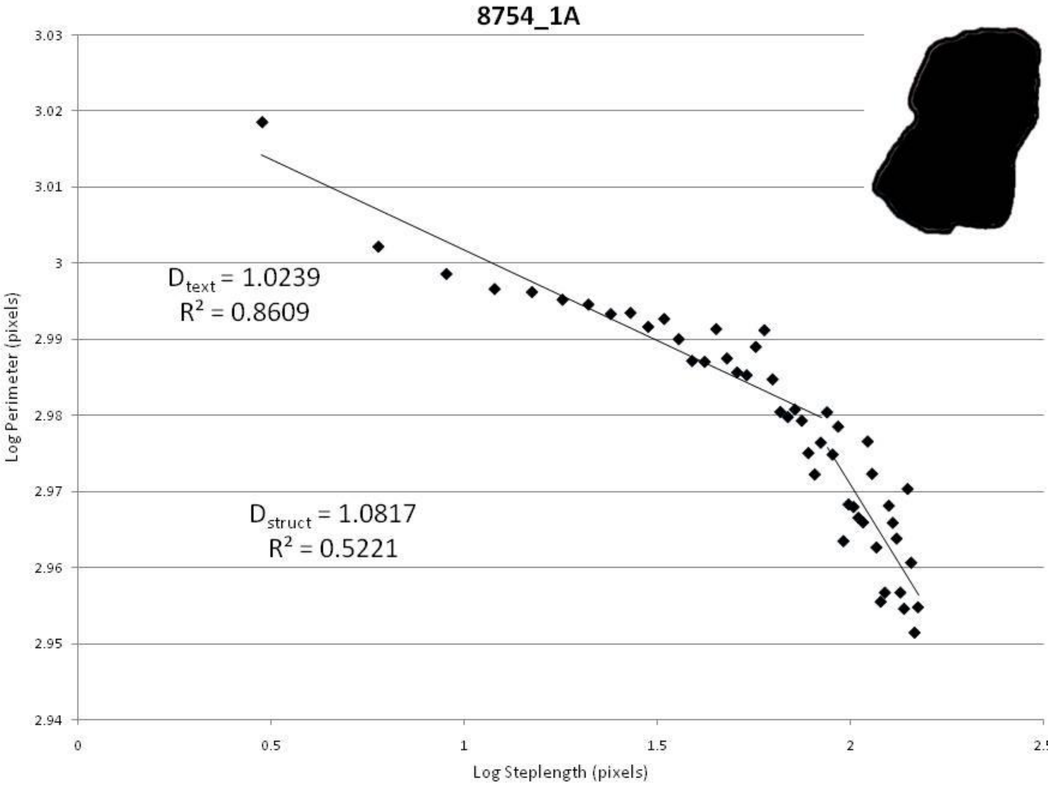
8753_6B
2.9
2.88
2.86
2.84
2.82
2.8
2.78
2.76
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0297
R^2 = 0.7745
D_{struct} = 1.0312
R^2 = 0.0154

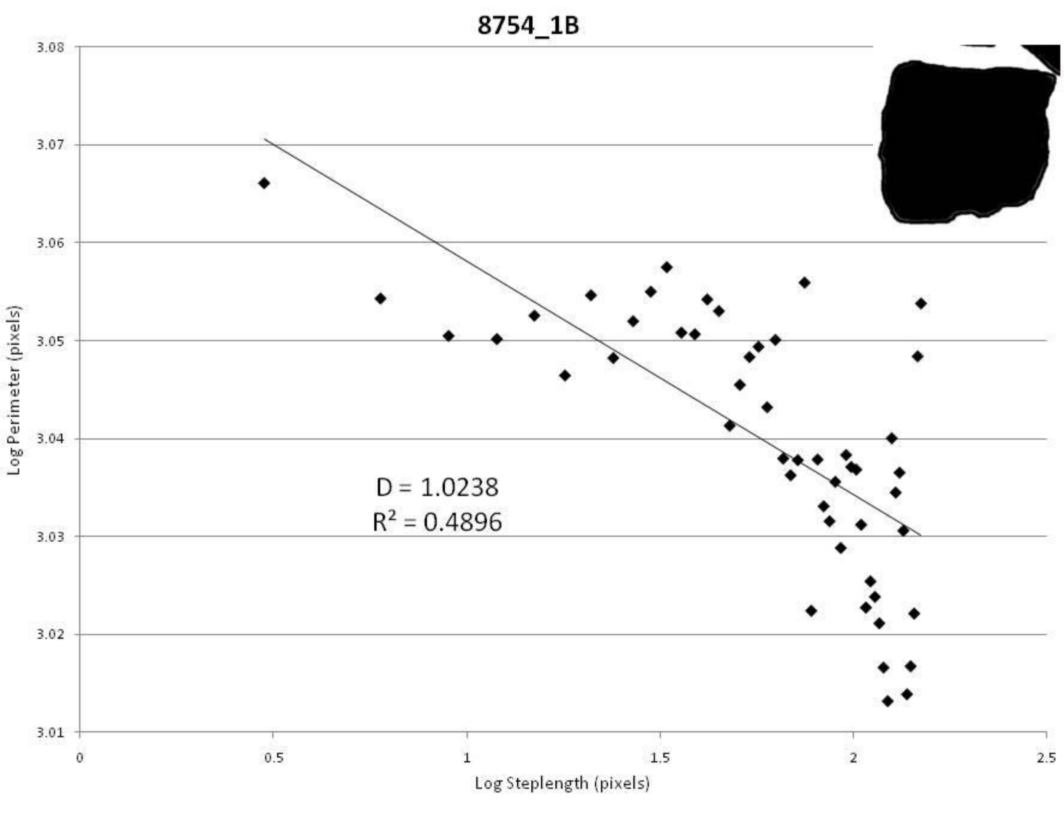


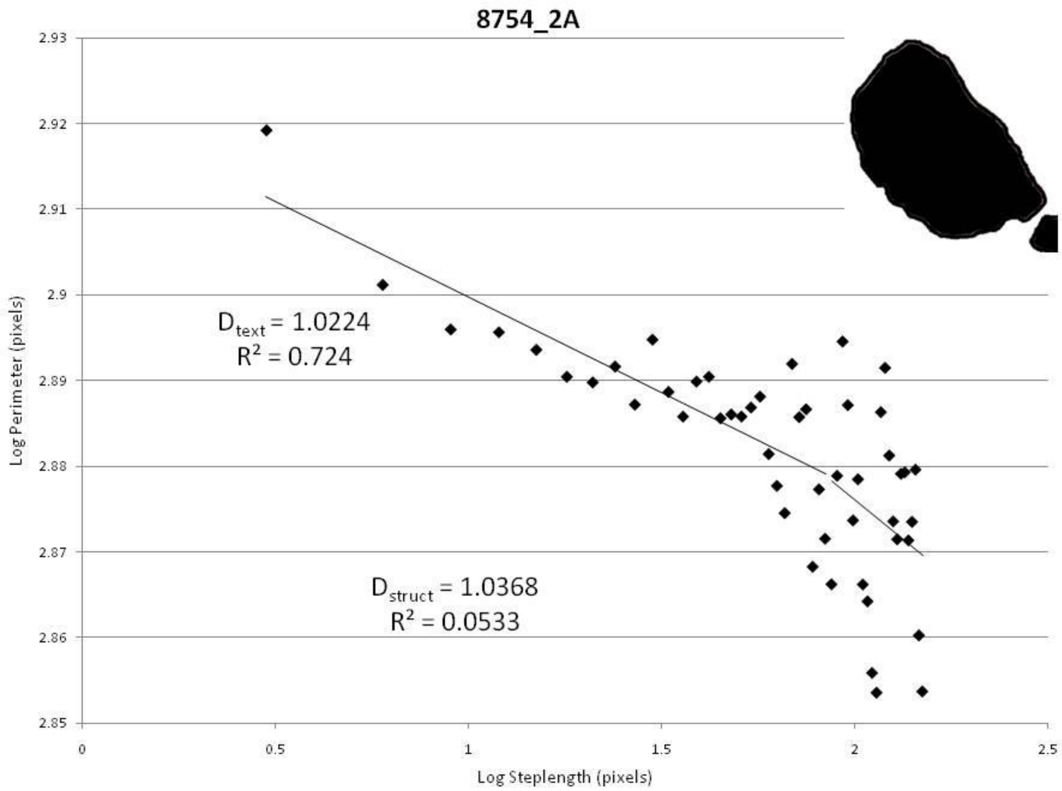
8753_7A
3.21
3.19
3.17
3.15
3.13
3.11
3.09
3.07
3.05
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0353
R^2 = 0.6856
D_{struct} = 1.1535
R^2 = 0.4788


8753_7B
D_{text} = 1.0343
R^2 = 0.7004
D_{struct} = 1.2208
R^2 = 0.541
Log Perimeter (pixels)
Log Steplength (pixels)

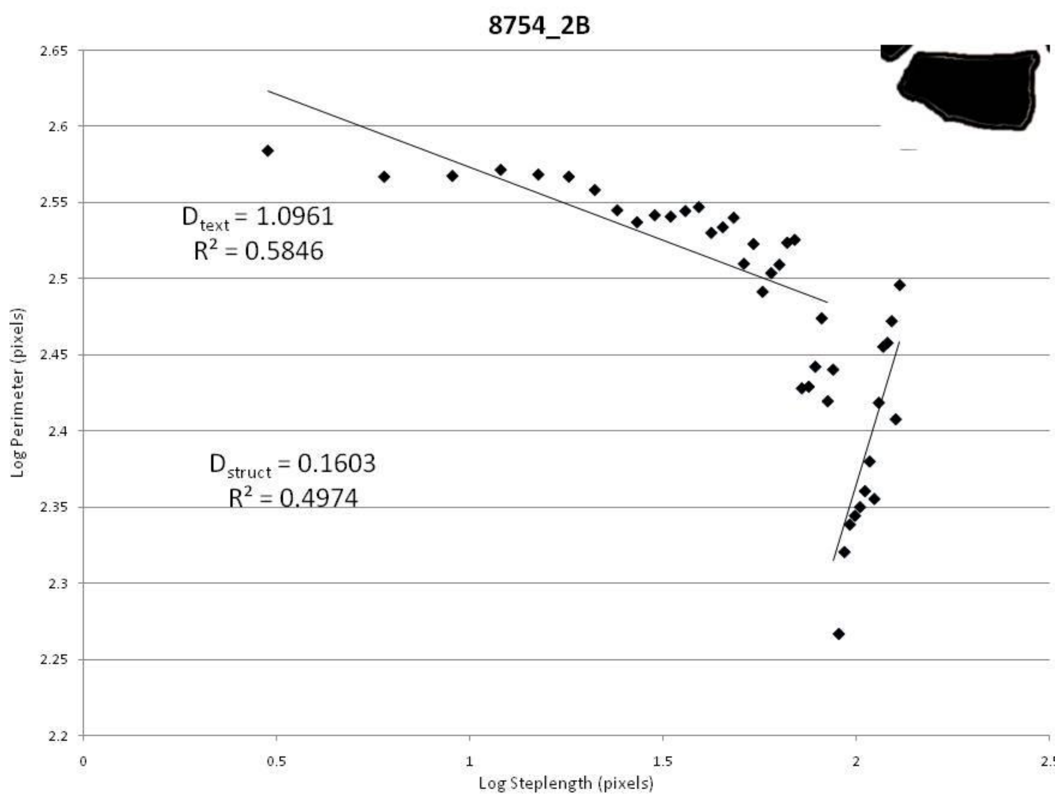

8753_8
D = 1.055
R^2 = 0.8562
Log Perimeter (pixels)
Log Steplength (pixels)


8754_1A
D_{text} = 1.0239
R^2 = 0.8609
D_{struct} = 1.0817
R^2 = 0.5221
Log Perimeter (pixels)
Log Steplength (pixels)
3.03
3.02
3.01
3
2.99
2.98
2.97
2.96
2.95
2.94
0
0.5
1
1.5
2
2.5

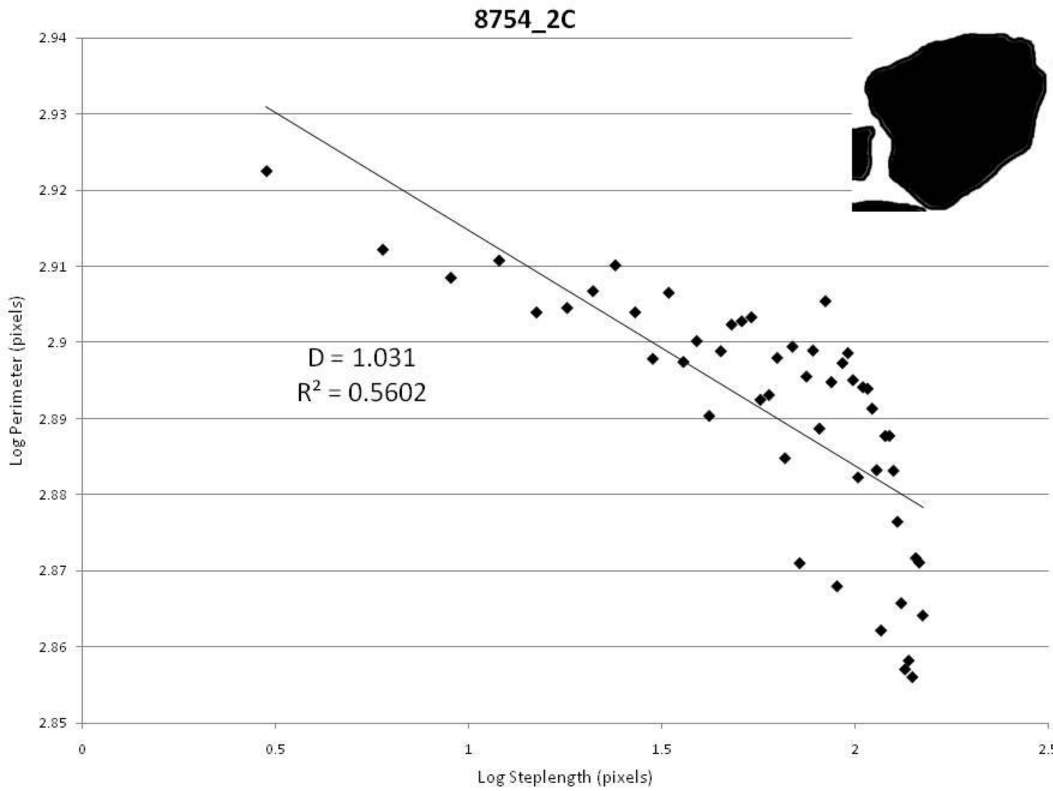

8754_1B
D = 1.0238
R^2 = 0.4896
Log Perimeter (pixels)
Log Steplength (pixels)
3.08
3.07
3.06
3.05
3.04
3.03
3.02
3.01
0
0.5
1
1.5
2
2.5

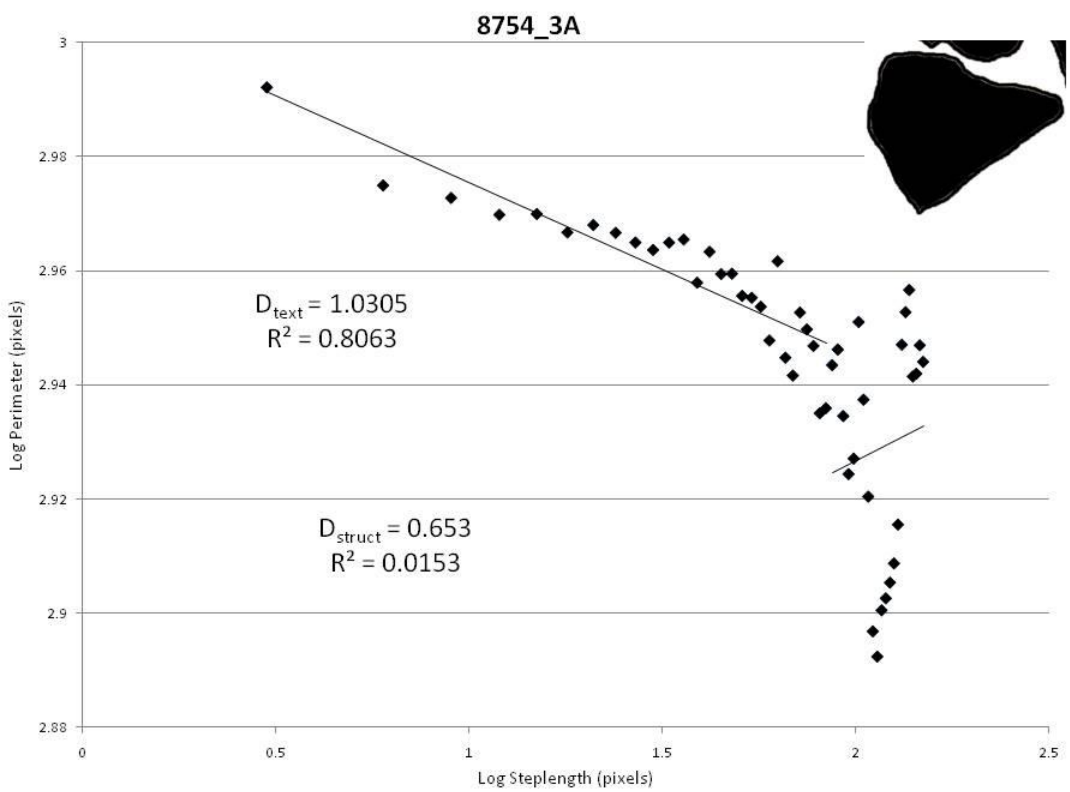


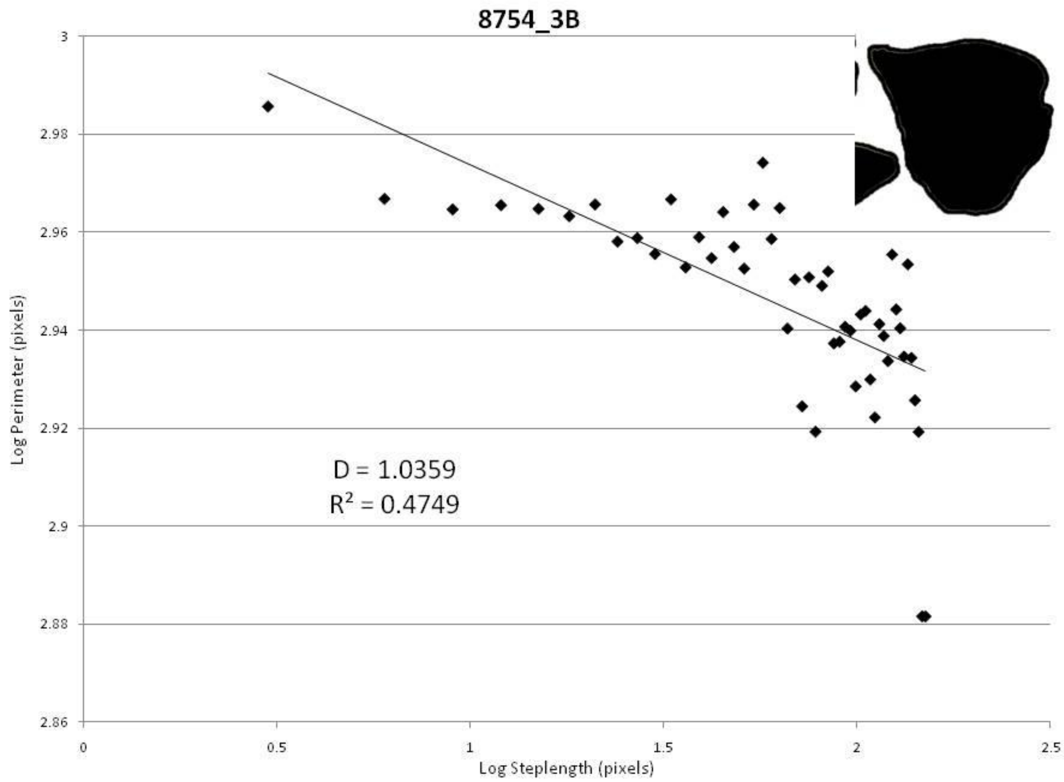
8754_2A
2.93
2.92
2.91
2.9
2.89
2.88
2.87
2.86
2.85
Log Perimeter (pixels)
D_{text} = 1.0224
R^2 = 0.724
D_{struct} = 1.0368
R^2 = 0.0533
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)

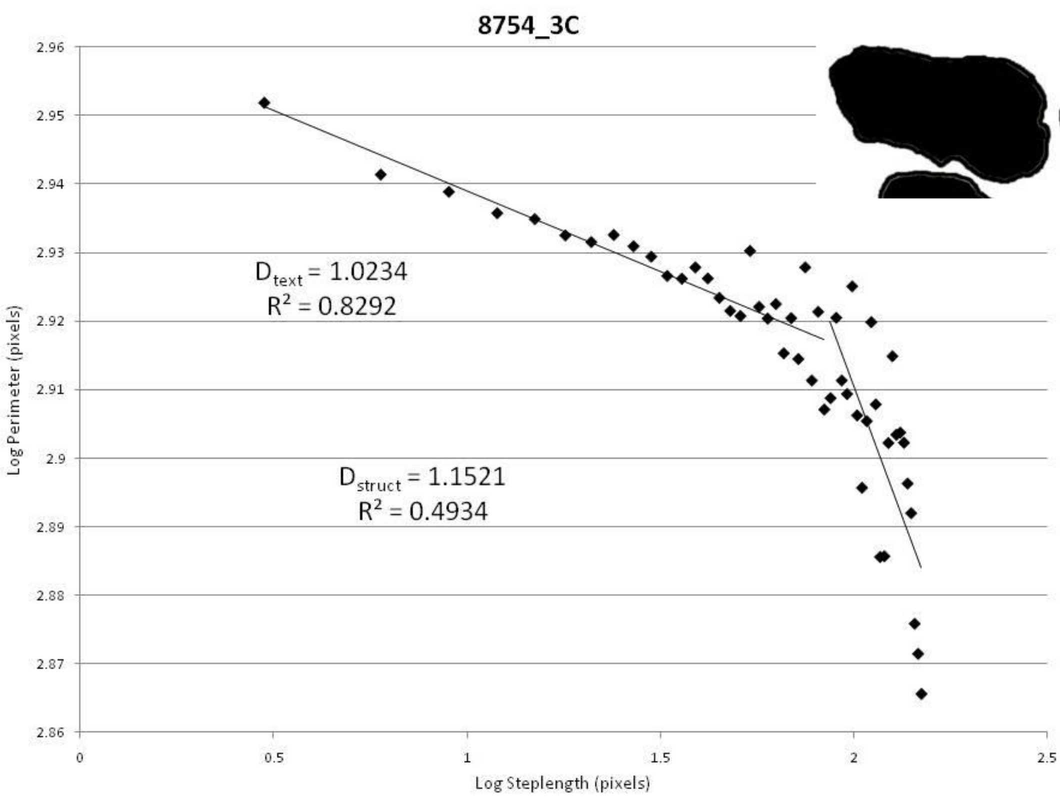


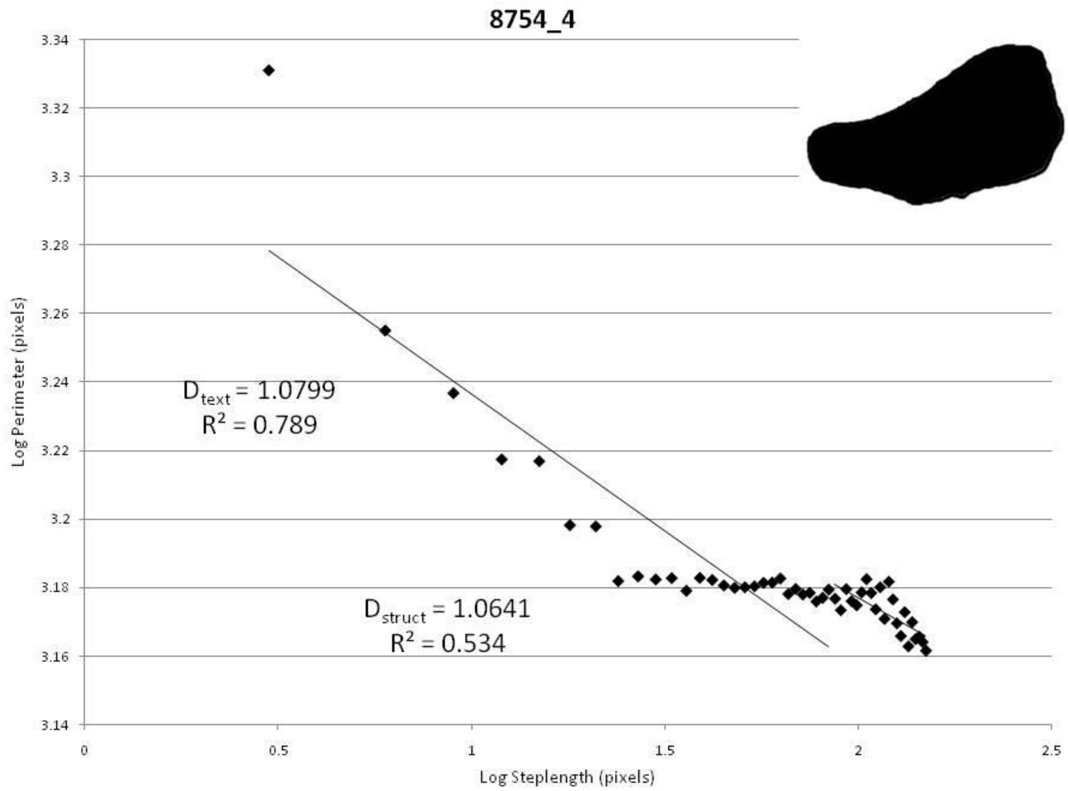
8754_2B
2.65
2.6
2.55
2.5
2.45
2.4
2.35
2.3
2.25
2.2
Log Perimeter (pixels)
D_{text} = 1.0961
R^2 = 0.5846
D_{struct} = 0.1603
R^2 = 0.4974
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)

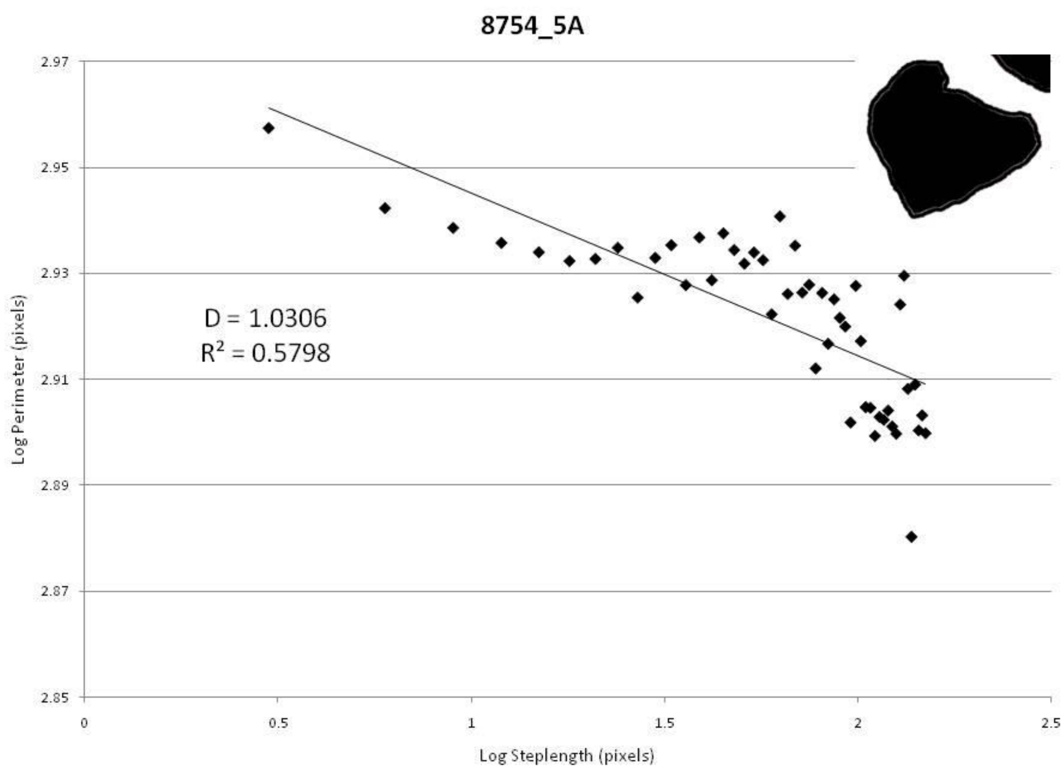

8754_2C
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.031
R² = 0.5602
2.94
2.93
2.92
2.91
2.9
2.89
2.88
2.87
2.86
2.85
0
0.5
1
1.5
2
2.5

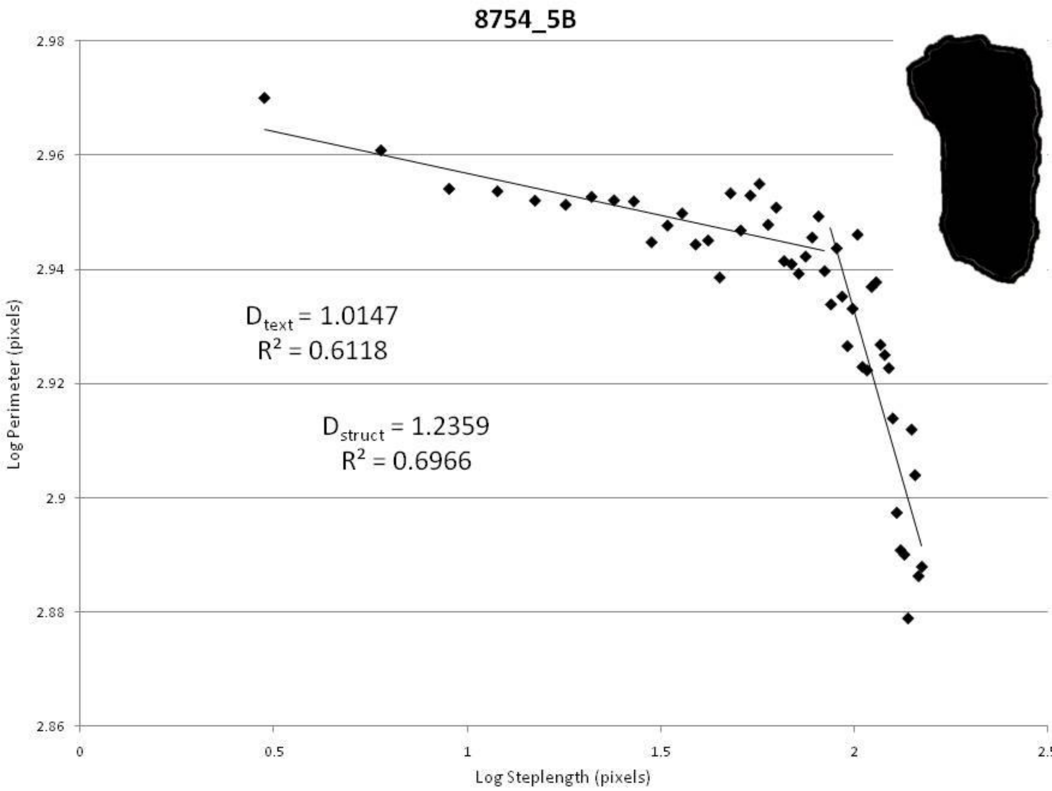

8754_3A
Log Perimeter (pixels)
Log Steplength (pixels)
D_text = 1.0305
R² = 0.8063
D_struct = 0.653
R² = 0.0153
3
2.98
2.96
2.94
2.92
2.9
2.88
0
0.5
1
1.5
2
2.5

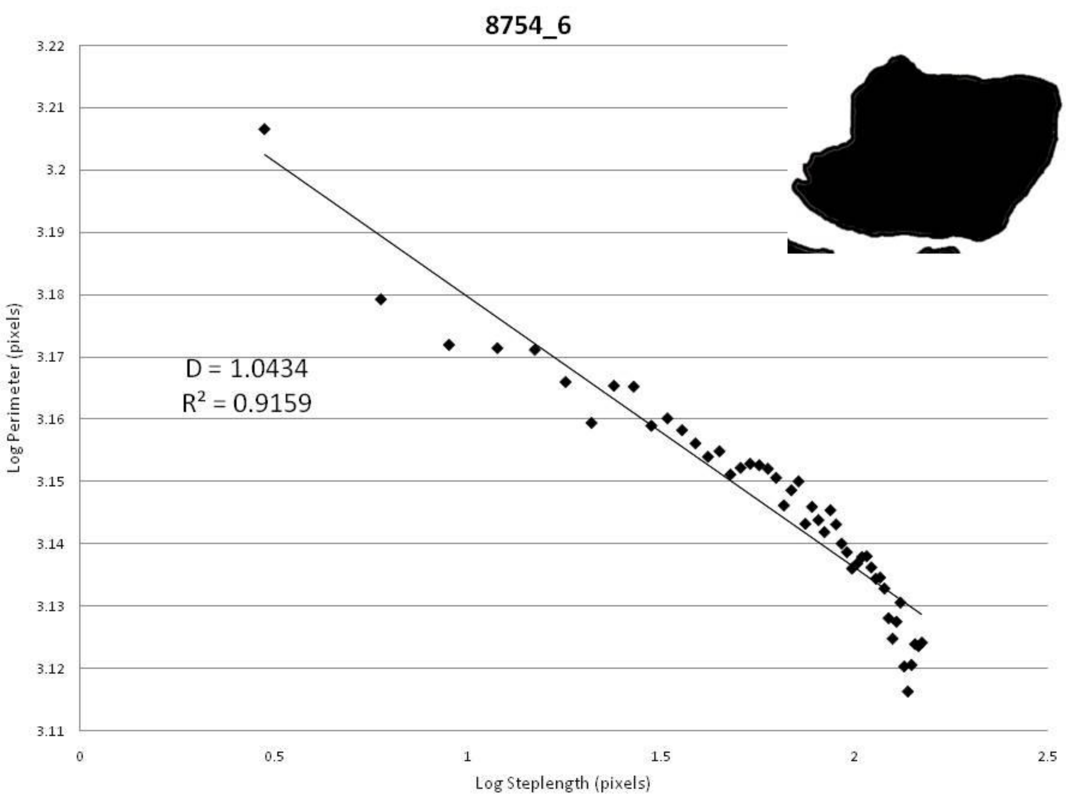

8754_3B
D = 1.0359
R^2 = 0.4749
Log Perimeter (pixels)
Log Steplength (pixels)

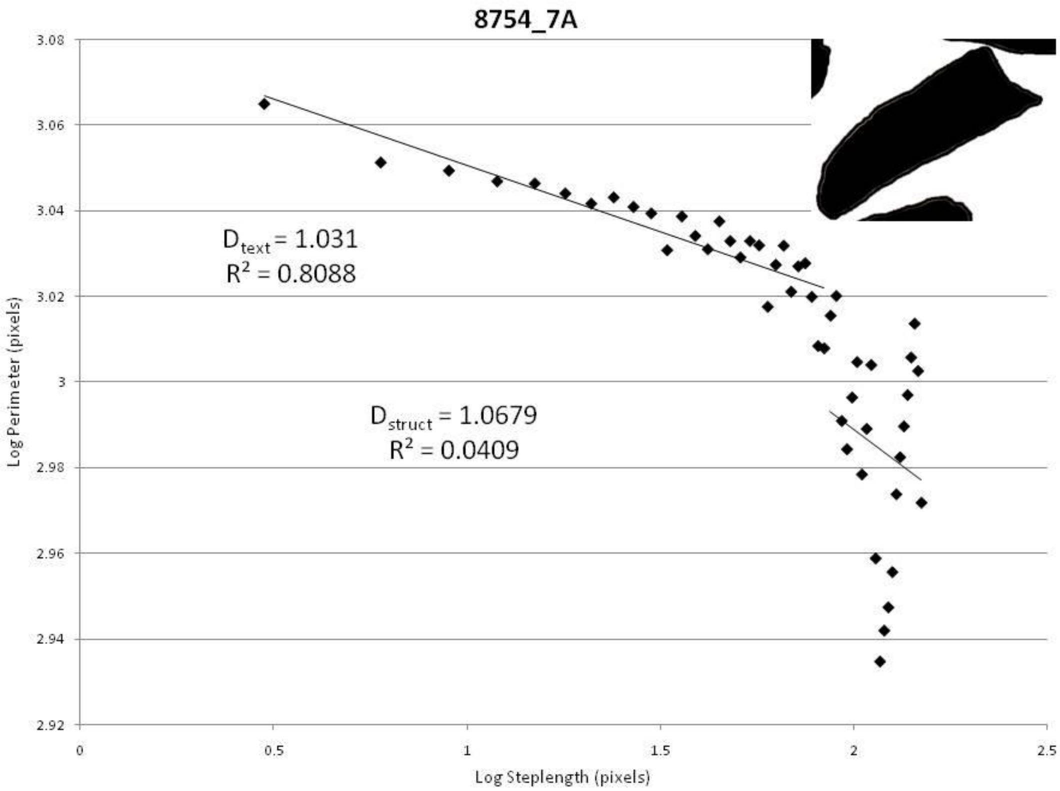

8754_3C
D_{text} = 1.0234
R^2 = 0.8292
D_{struct} = 1.1521
R^2 = 0.4934
Log Perimeter (pixels)
Log Steplength (pixels)

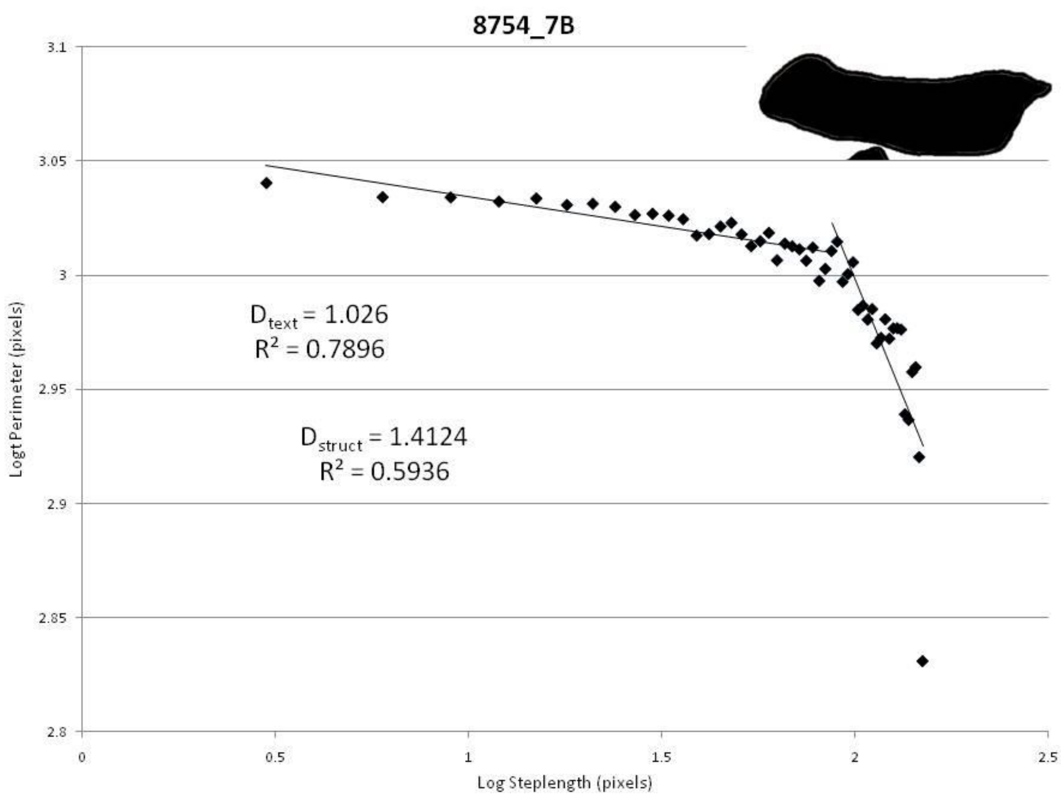

8754_4
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0799
R^2 = 0.789
D_{struct} = 1.0641
R^2 = 0.534

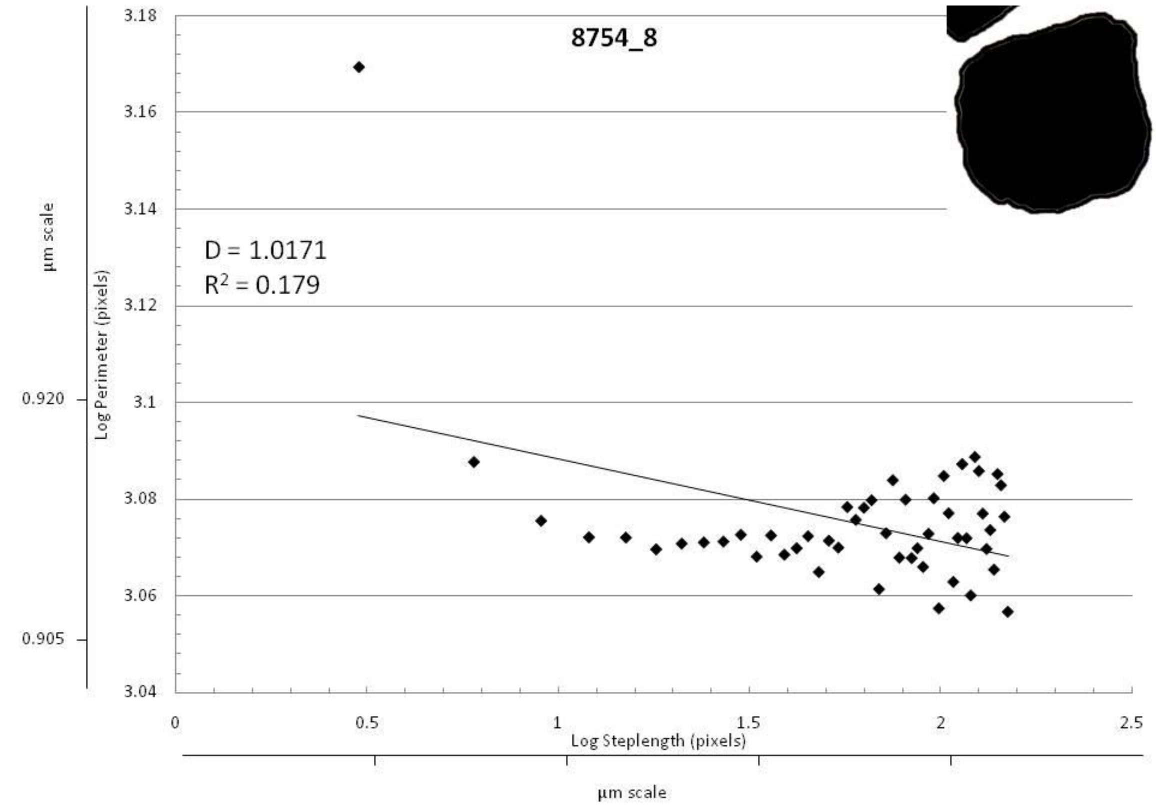

8754_5A
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0306
R^2 = 0.5798


8754_5B
D_{text} = 1.0147
R^2 = 0.6118
D_{struct} = 1.2359
R^2 = 0.6966
Log Perimeter (pixels)
Log Steplength (pixels)
2.98
2.96
2.94
2.92
2.9
2.88
2.86
0
0.5
1
1.5
2
2.5

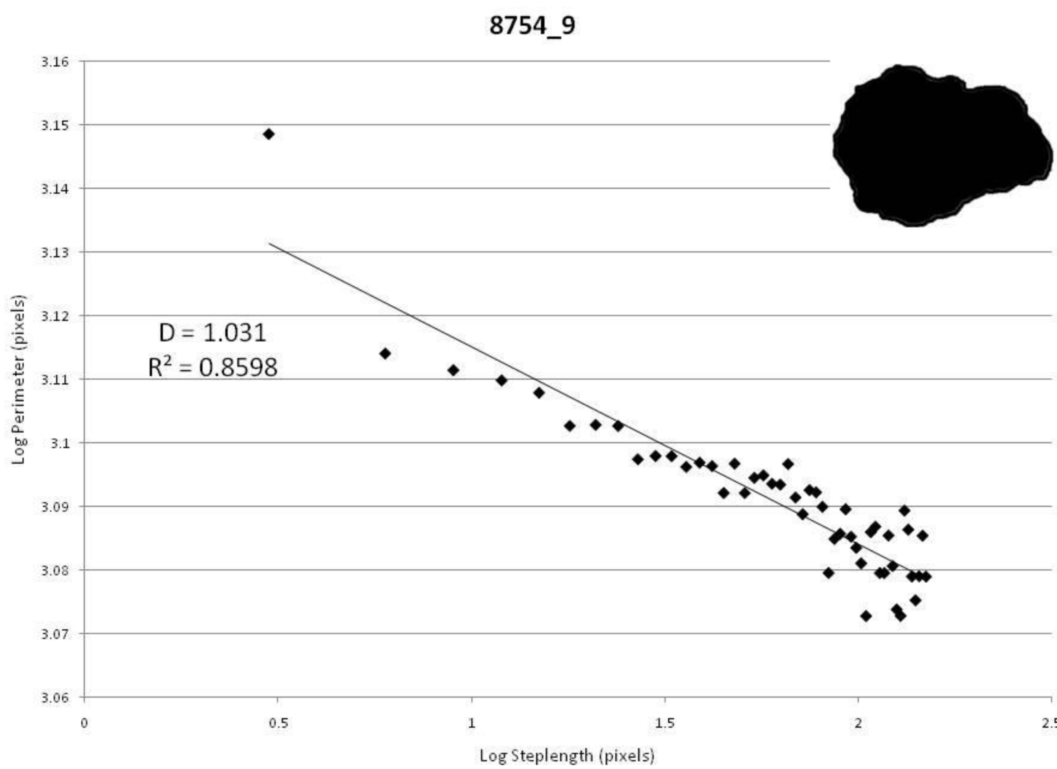

8754_6
D = 1.0434
R^2 = 0.9159
Log Perimeter (pixels)
Log Steplength (pixels)
3.22
3.21
3.2
3.19
3.18
3.17
3.16
3.15
3.14
3.13
3.12
3.11
0
0.5
1
1.5
2
2.5


8754_7A
D_{text} = 1.031
R^2 = 0.8088
D_{struct} = 1.0679
R^2 = 0.0409
Log Perimeter (pixels)
Log Steplength (pixels)
3.08
3.06
3.04
3.02
3
2.98
2.96
2.94
2.92
0
0.5
1
1.5
2
2.5

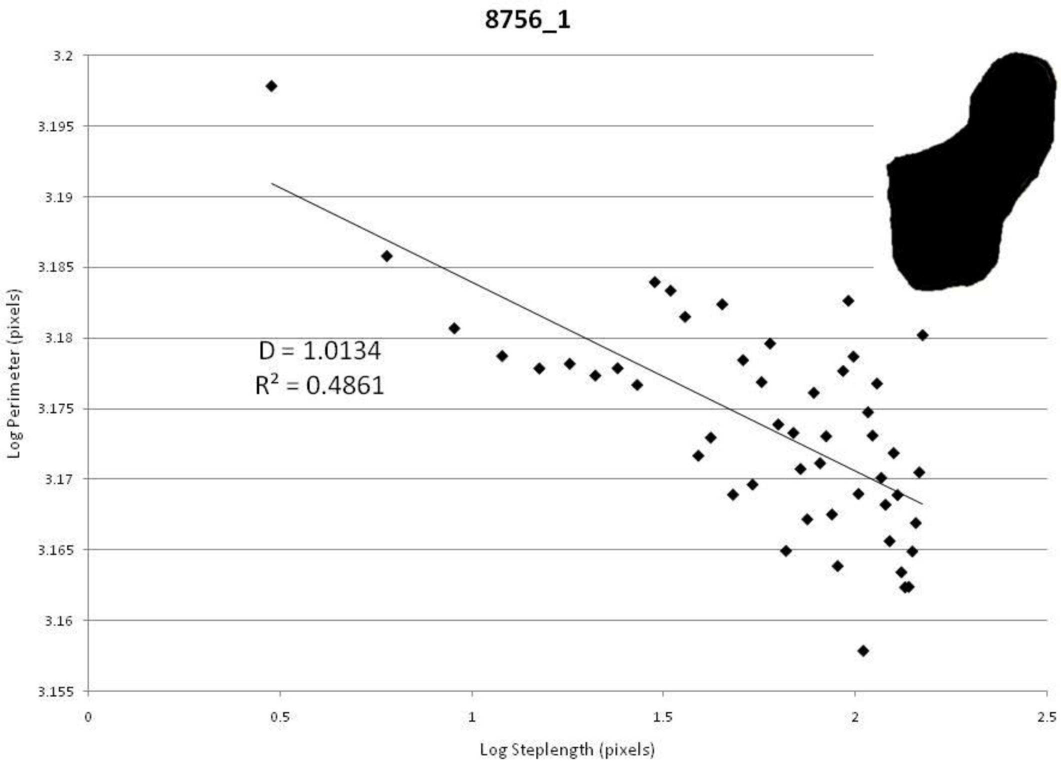

8754_7B
D_{text} = 1.026
R^2 = 0.7896
D_{struct} = 1.4124
R^2 = 0.5936
Logt Perimeter (pixels)
Log Steplength (pixels)
3.1
3.05
3
2.95
2.9
2.85
2.8
0
0.5
1
1.5
2
2.5

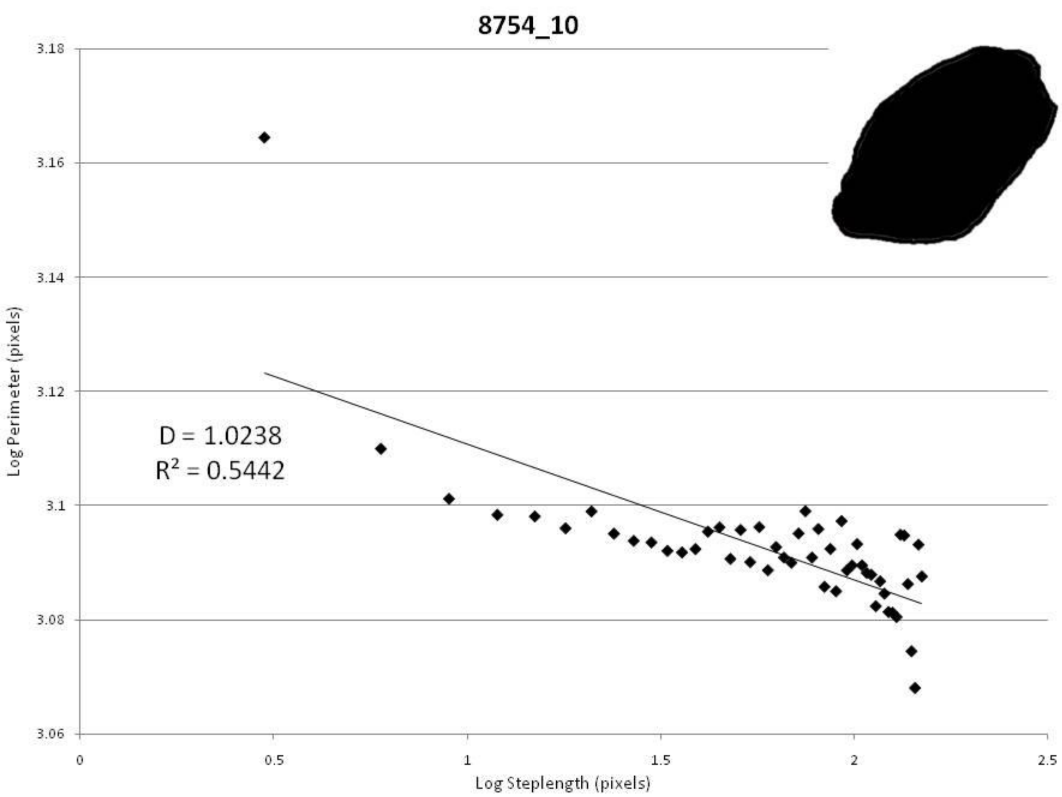


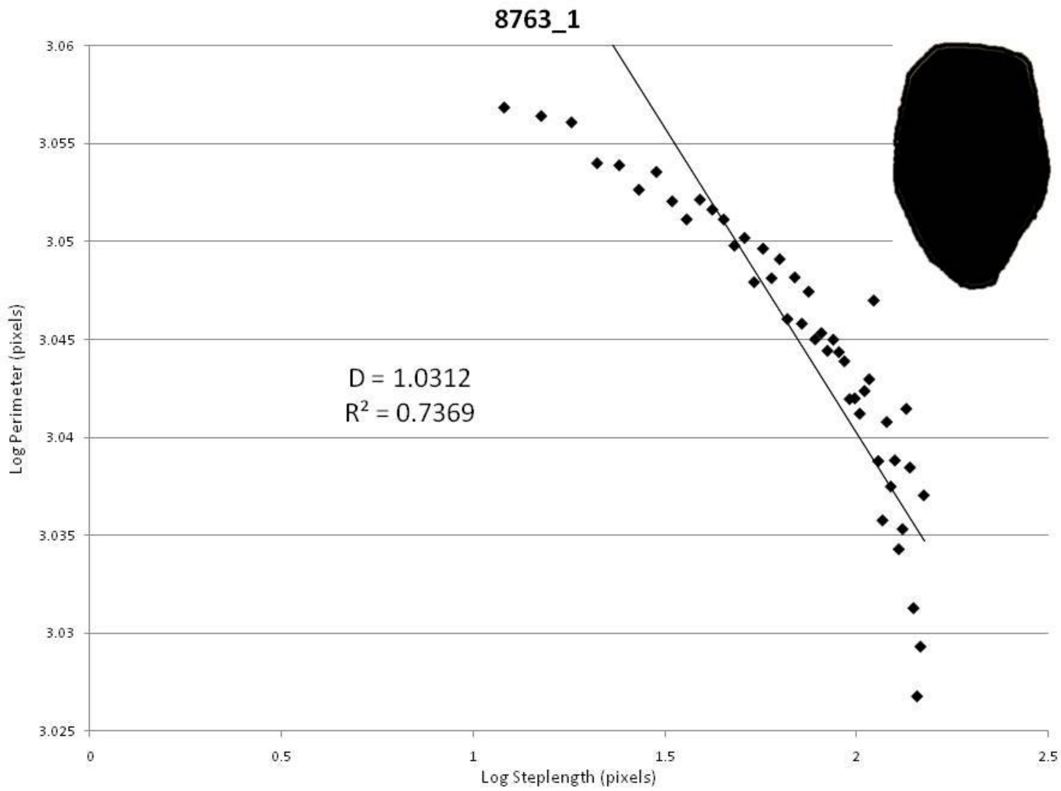
8754_8
D = 1.0171
R^2 = 0.179
Log Perimeter (pixels)
Log Steplength (pixels)
µm scale
µm scale
3.18
3.16
3.14
3.12
3.1
3.08
3.06
3.04
0.920
0.905
0
0.5
1
1.5
2
2.5

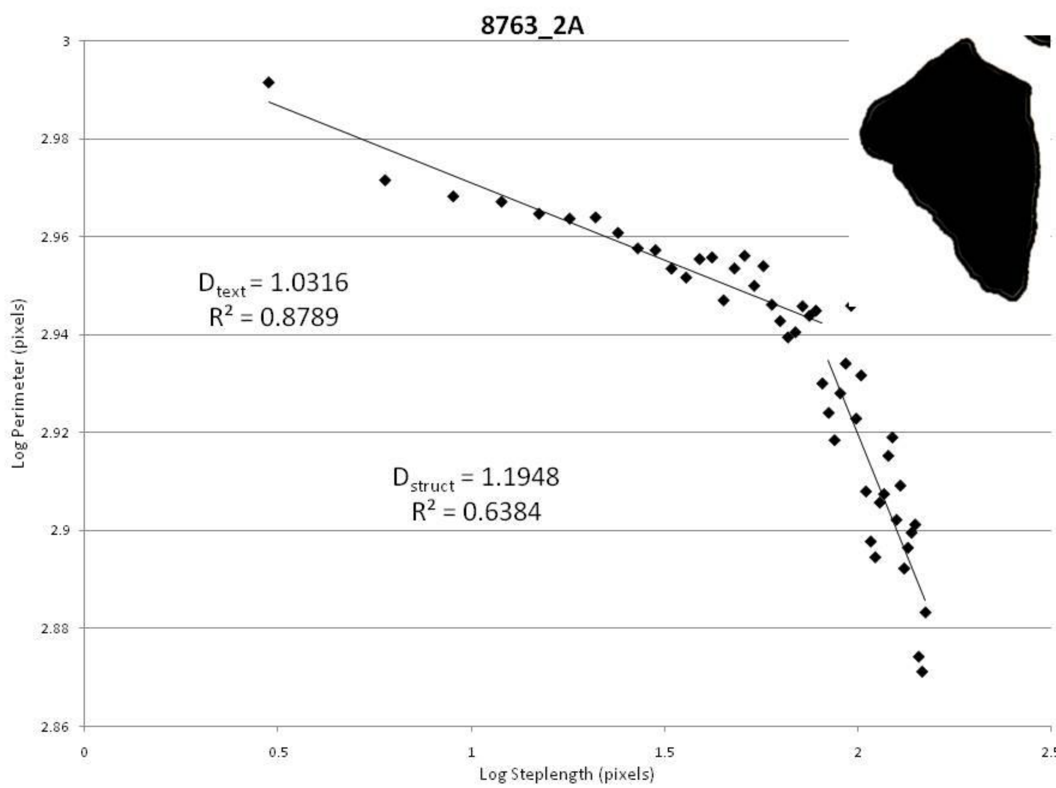


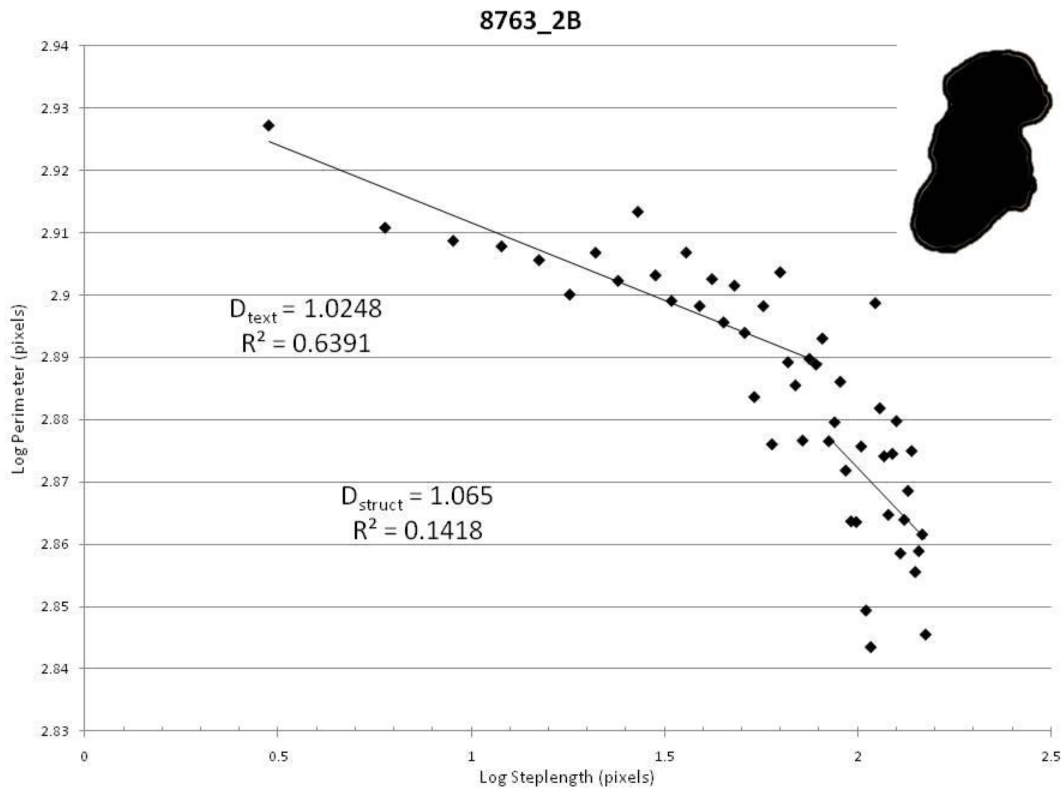
8754_9
D = 1.031
R^2 = 0.8598
Log Perimeter (pixels)
Log Steplength (pixels)
3.16
3.15
3.14
3.13
3.12
3.11
3.1
3.09
3.08
3.07
3.06
0
0.5
1
1.5
2
2.5

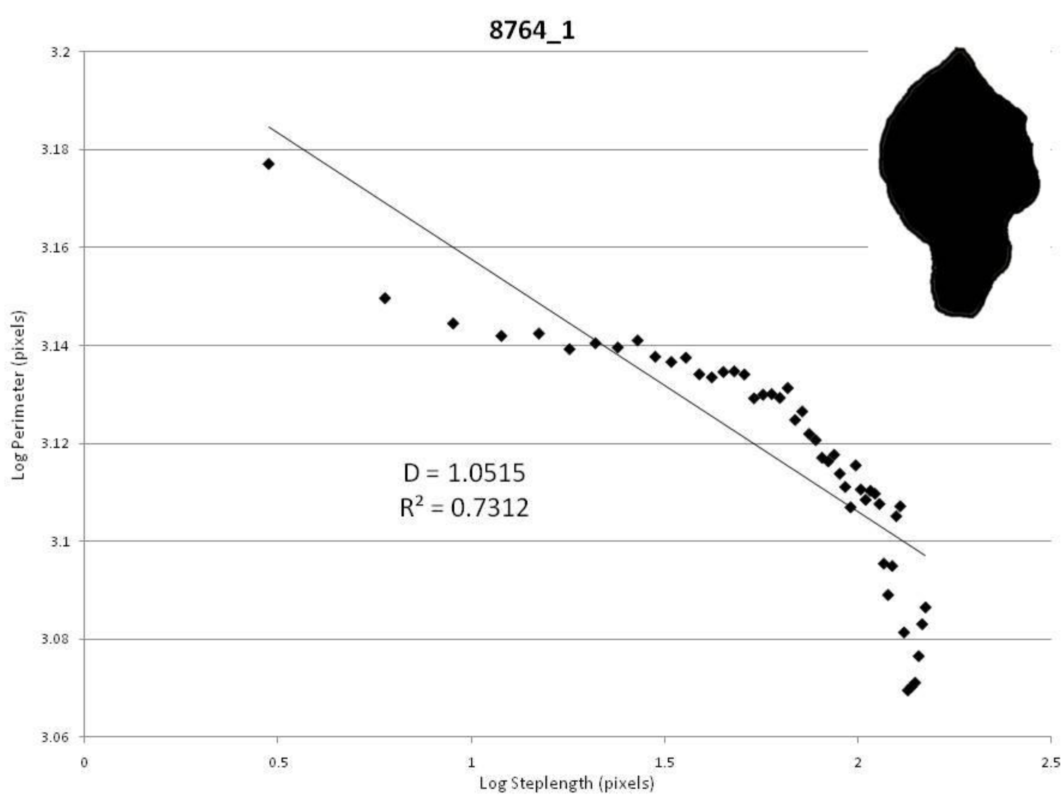

8756_1
3.2
3.195
3.19
3.185
3.18
3.175
3.17
3.165
3.16
3.155
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0134
R^2 = 0.4861

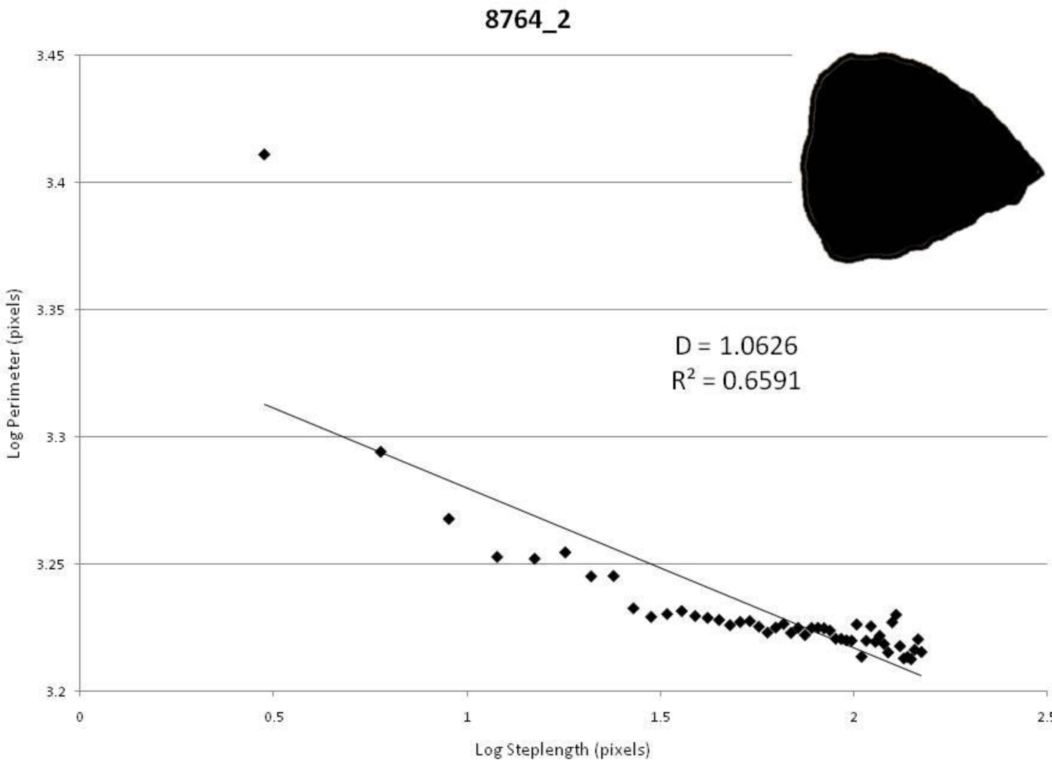

8754_10
3.18
3.16
3.14
3.12
3.1
3.08
3.06
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0238
R^2 = 0.5442

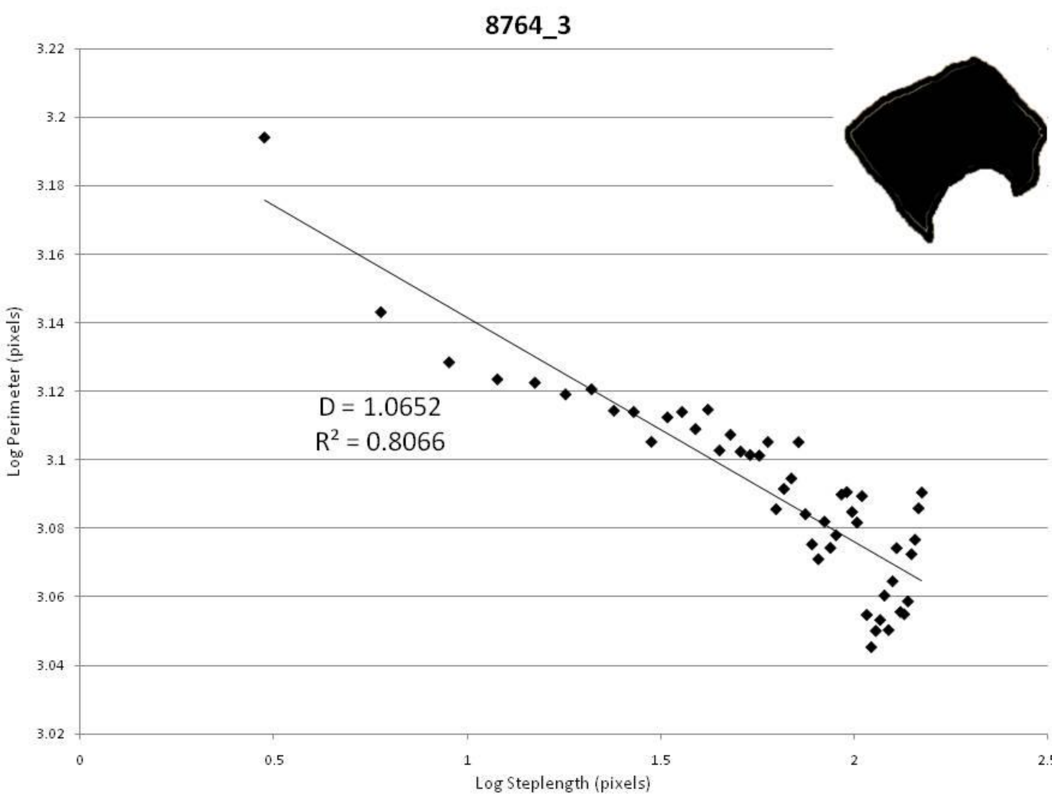

8763_1
D = 1.0312
R^2 = 0.7369
Log Perimeter (pixels)
Log Steplength (pixels)
3.06
3.055
3.05
3.045
3.04
3.035
3.03
3.025
0
0.5
1
1.5
2
2.5

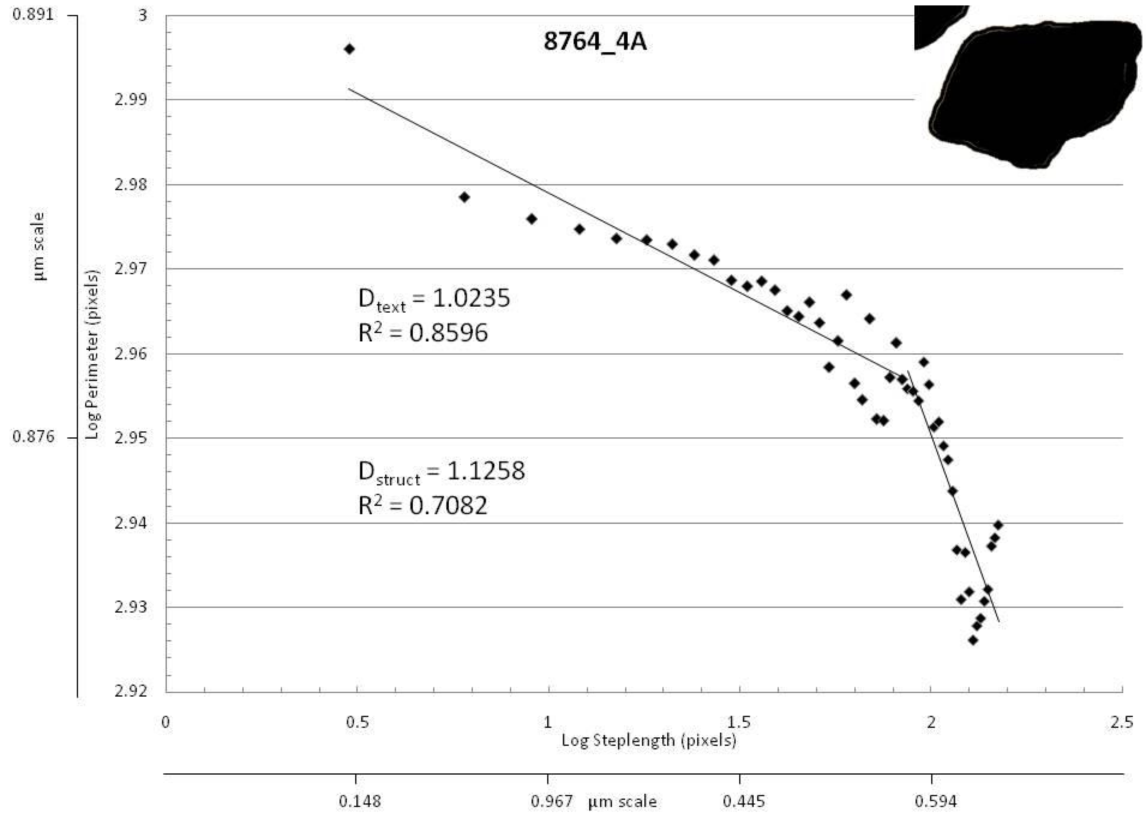

8763_2A
D_{text} = 1.0316
R^2 = 0.8789
D_{struct} = 1.1948
R^2 = 0.6384
Log Perimeter (pixels)
Log Steplength (pixels)
3
2.98
2.96
2.94
2.92
2.9
2.88
2.86
0
0.5
1
1.5
2
2.5

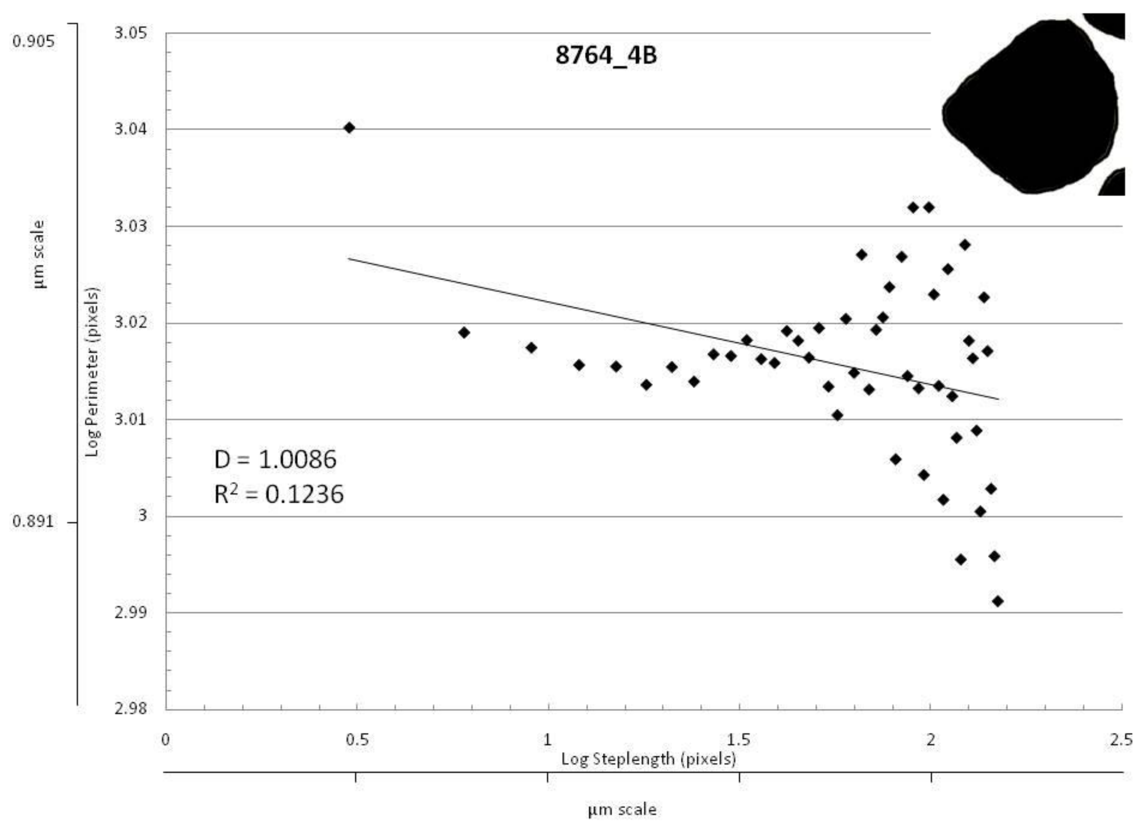

8763_2B
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0248
R^2 = 0.6391
D_{struct} = 1.065
R^2 = 0.1418
2.94
2.93
2.92
2.91
2.9
2.89
2.88
2.87
2.86
2.85
2.84
2.83
0
0.5
1
1.5
2
2.5

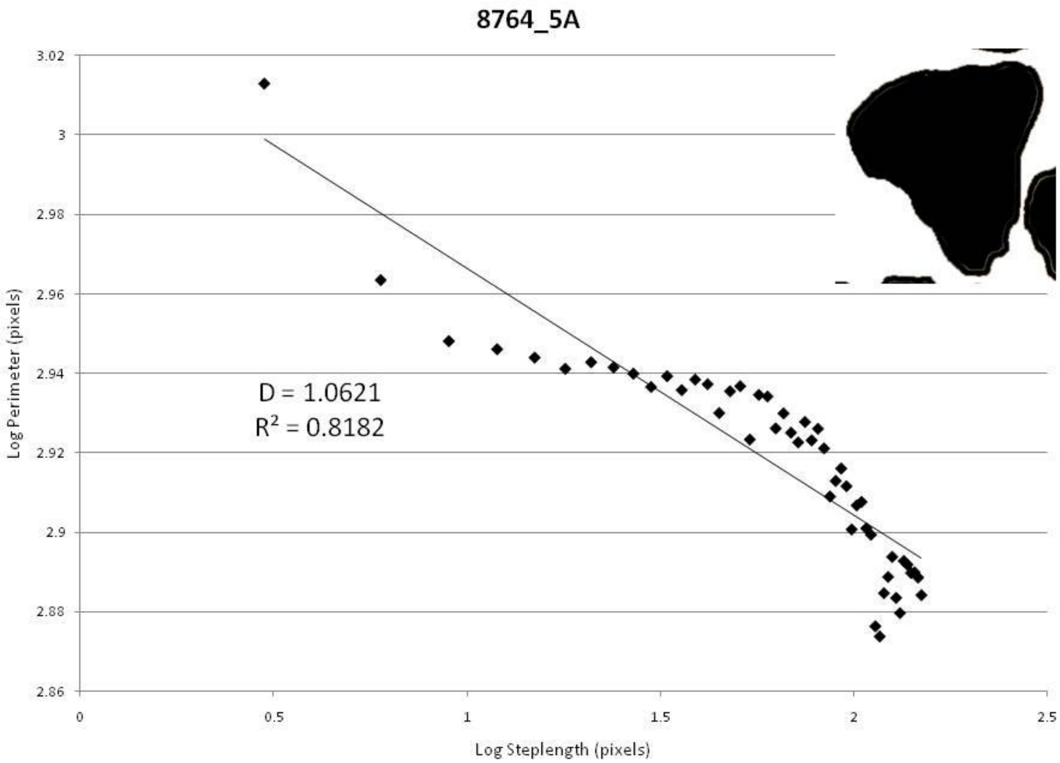

8764_1
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0515
R^2 = 0.7312
3.2
3.18
3.16
3.14
3.12
3.1
3.08
3.06
0
0.5
1
1.5
2
2.5

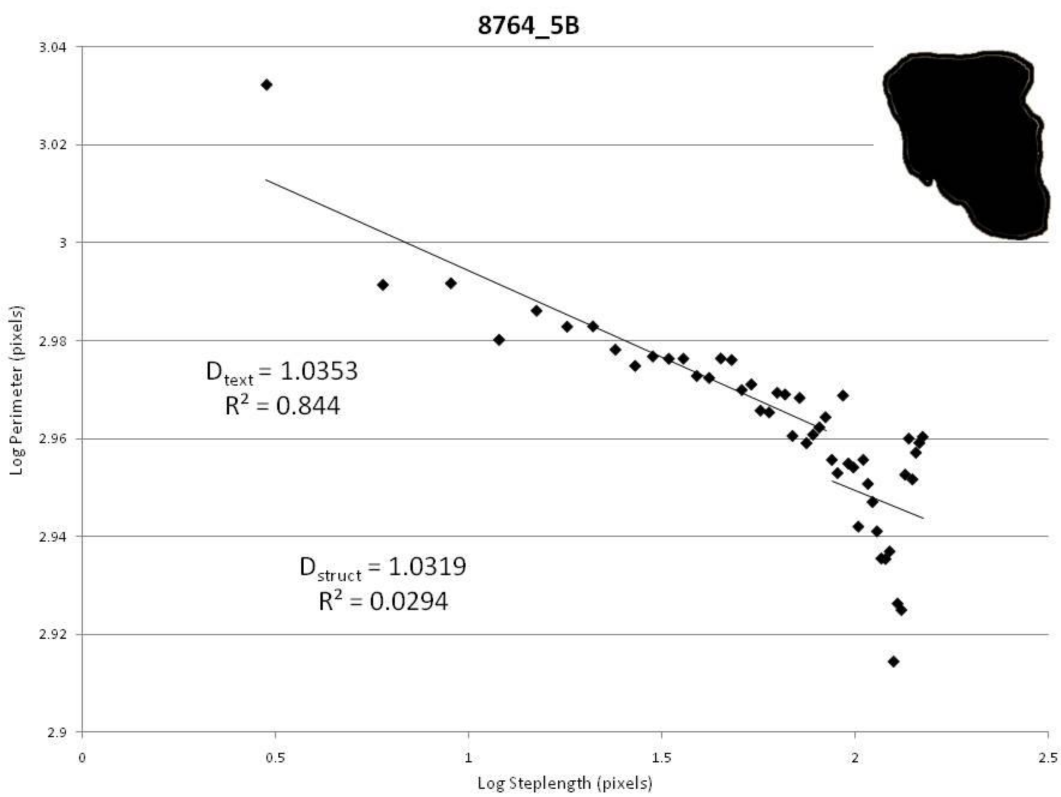

8764_2
D = 1.0626
R^2 = 0.6591
Log Perimeter (pixels)
Log Steplength (pixels)

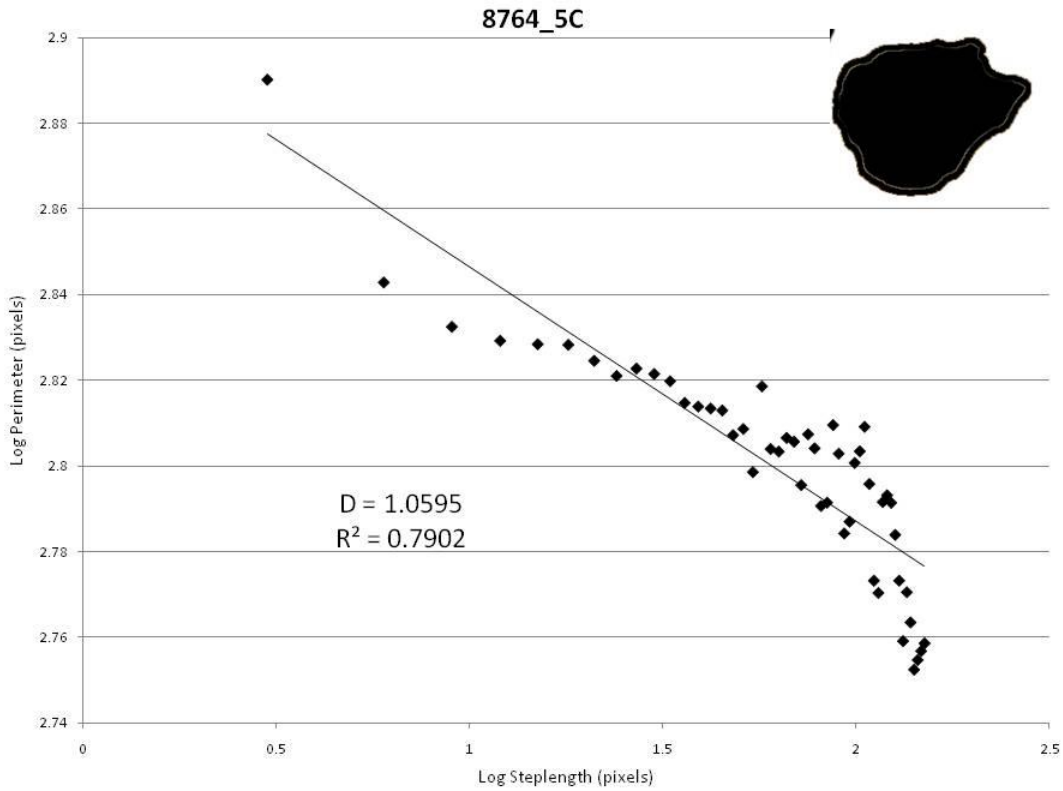

8764_3
D = 1.0652
R^2 = 0.8066
Log Perimeter (pixels)
Log Steplength (pixels)

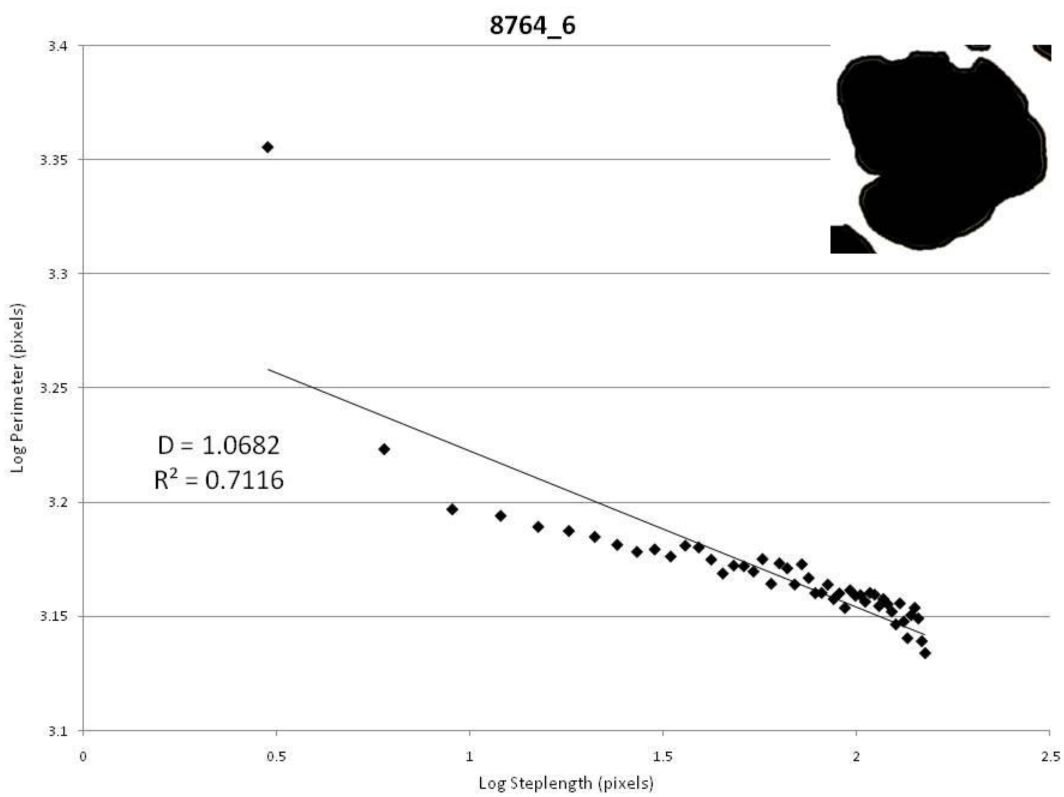

8764_4A
D_text = 1.0235
R² = 0.8596
D_struct = 1.1258
R² = 0.7082
Log Perimeter (pixels)
Log Steplength (pixels)
μm scale
0.891
0.876
3
2.99
2.98
2.97
2.96
2.95
2.94
2.93
2.92
0
0.5
1
1.5
2
2.5
0.148
0.967
0.445
0.594

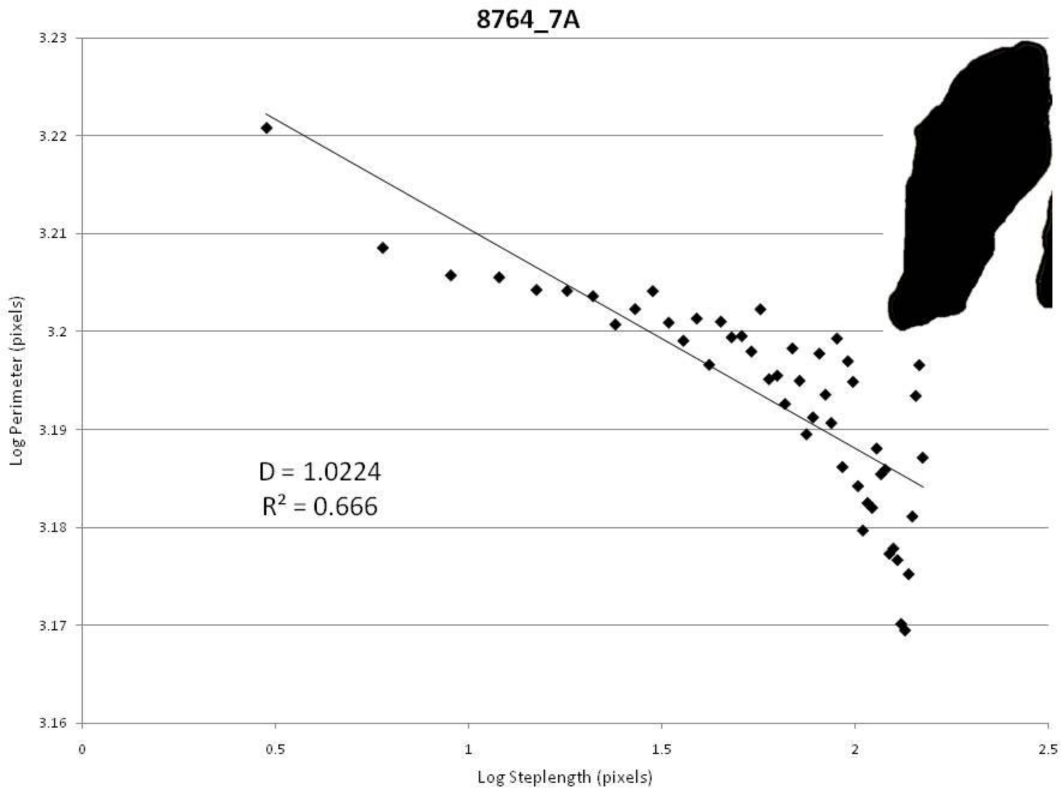

8764_4B
D = 1.0086
R² = 0.1236
Log Perimeter (pixels)
Log Steplength (pixels)
μm scale
0.905
0.891
3.05
3.04
3.03
3.02
3.01
3
2.99
2.98
0
0.5
1
1.5
2
2.5

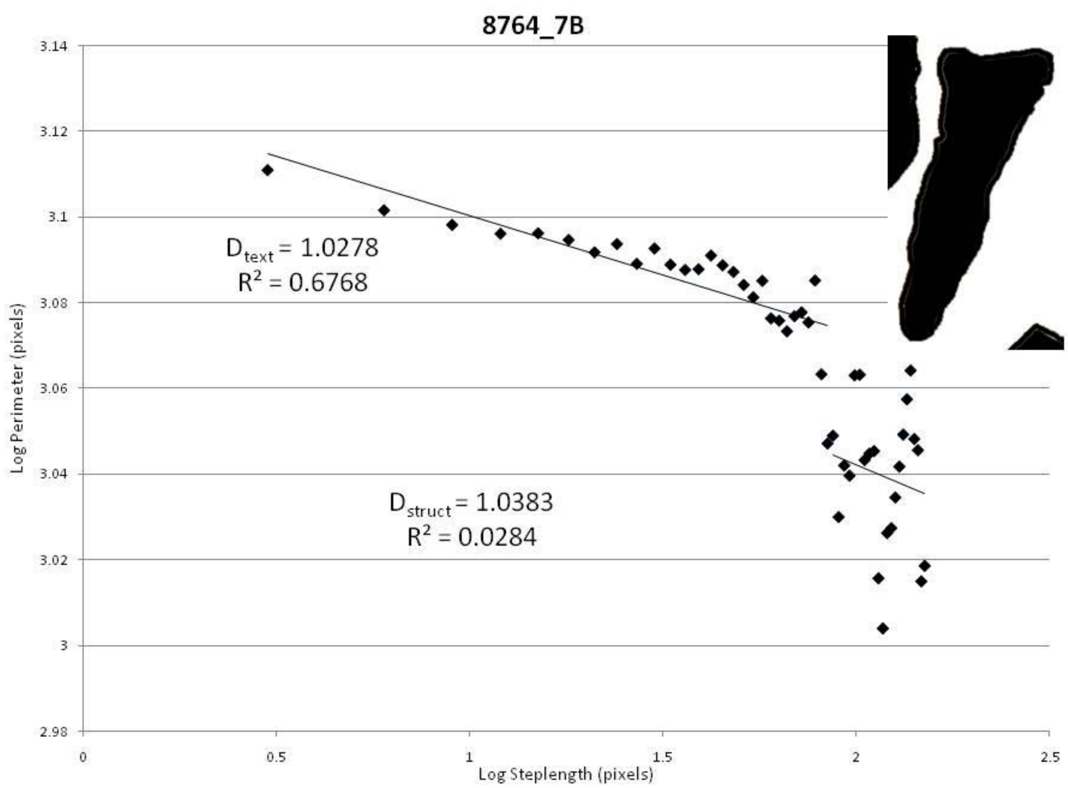

8764_5A
D = 1.0621
R^2 = 0.8182
Log Perimeter (pixels)
Log Steplength (pixels)
3.02
3
2.98
2.96
2.94
2.92
2.9
2.88
2.86
0
0.5
1
1.5
2
2.5

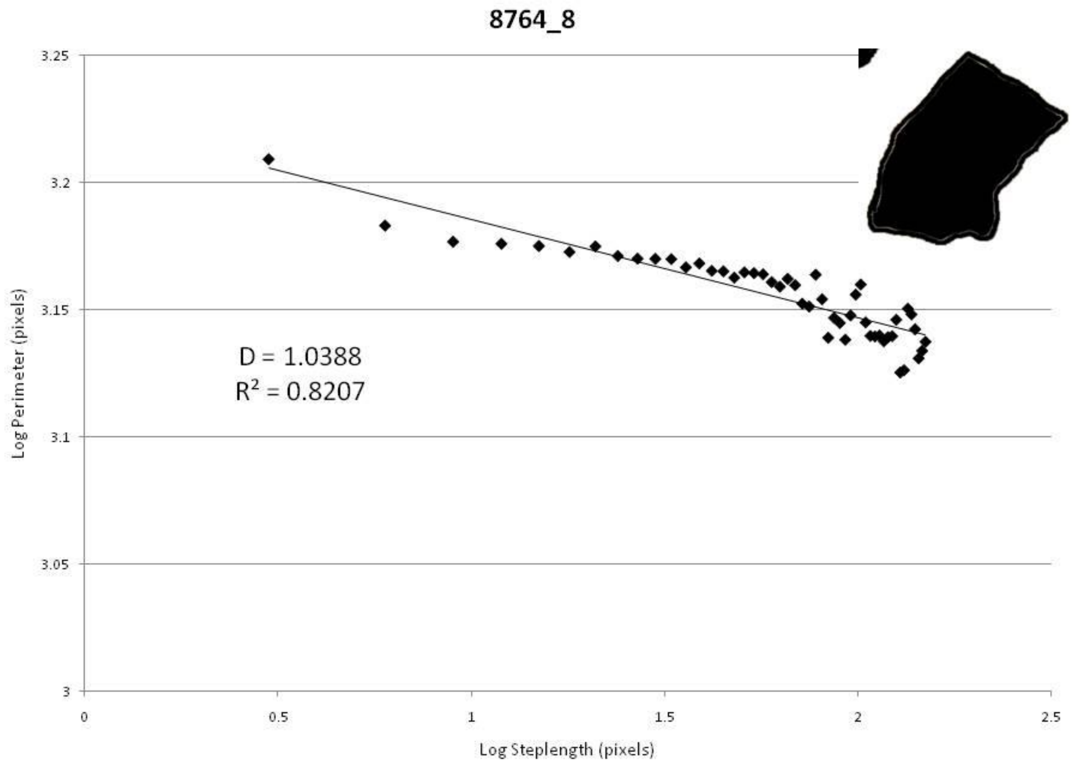

8764_5B
D_{text} = 1.0353
R^2 = 0.844
D_{struct} = 1.0319
R^2 = 0.0294
Log Perimeter (pixels)
Log Steplength (pixels)
3.04
3.02
3
2.98
2.96
2.94
2.92
2.9
0
0.5
1
1.5
2
2.5

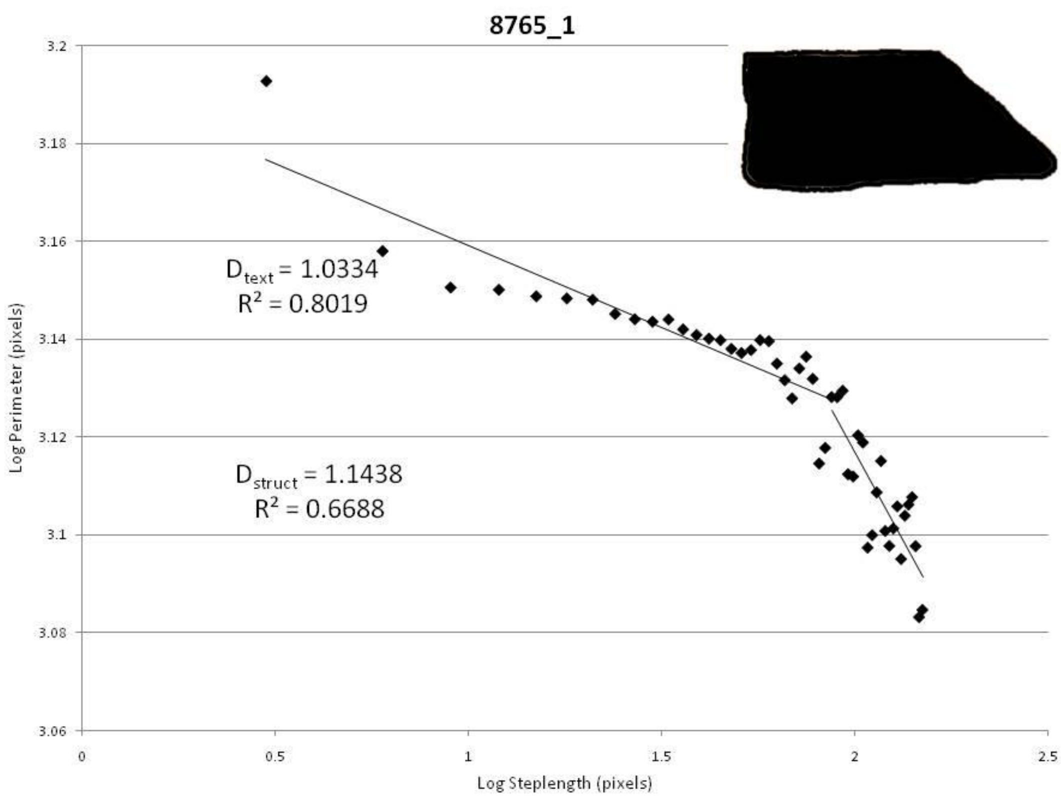

8764_5C
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0595
R^2 = 0.7902
2.9
2.88
2.86
2.84
2.82
2.8
2.78
2.76
2.74
0
0.5
1
1.5
2
2.5

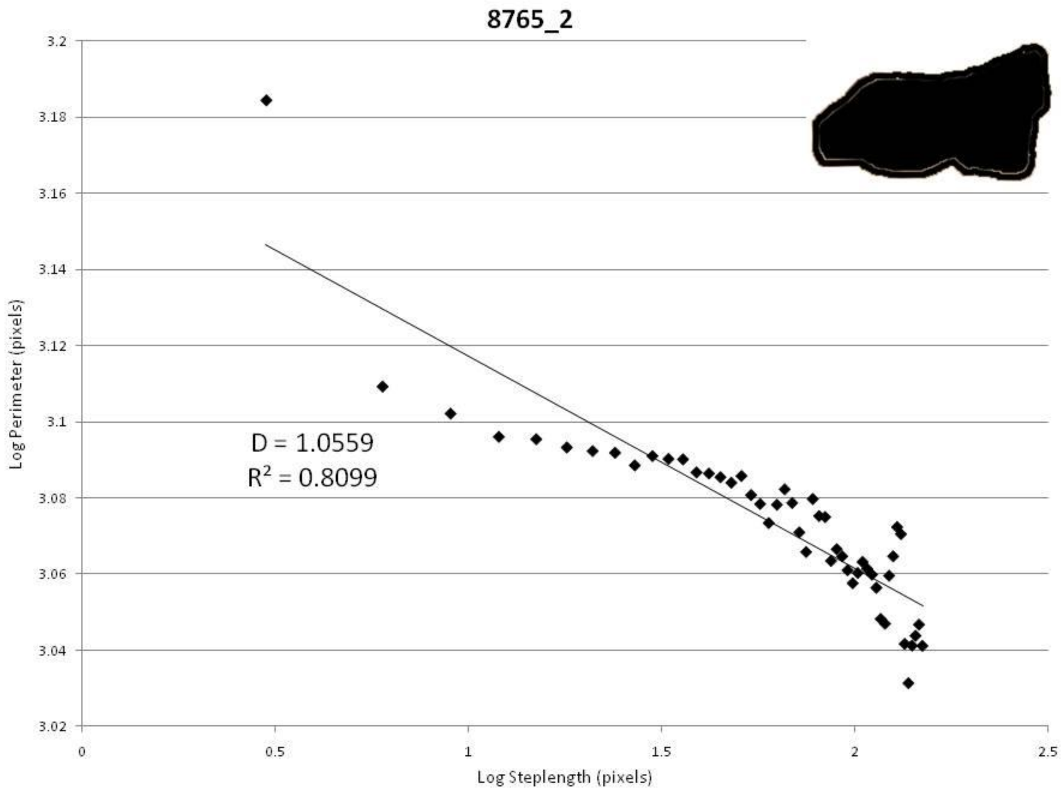

8764_6
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0682
R^2 = 0.7116
3.4
3.35
3.3
3.25
3.2
3.15
3.1
0
0.5
1
1.5
2
2.5

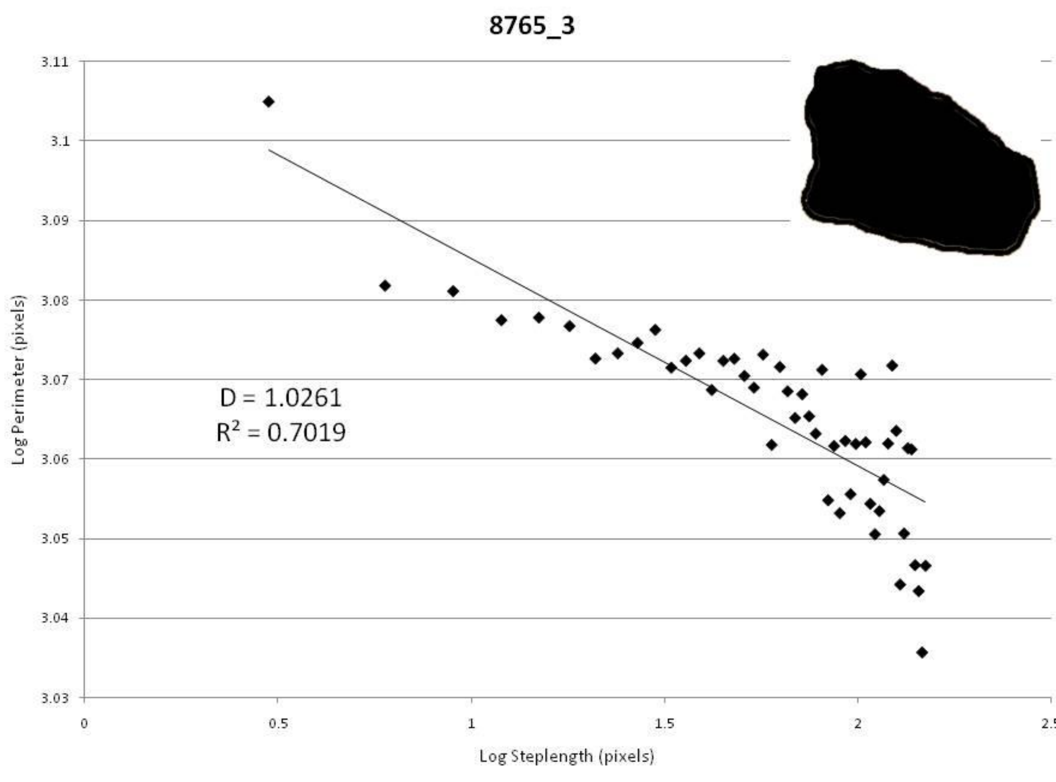

8764_7A
D = 1.0224
R² = 0.666
Log Perimeter (pixels)
Log Steplength (pixels)

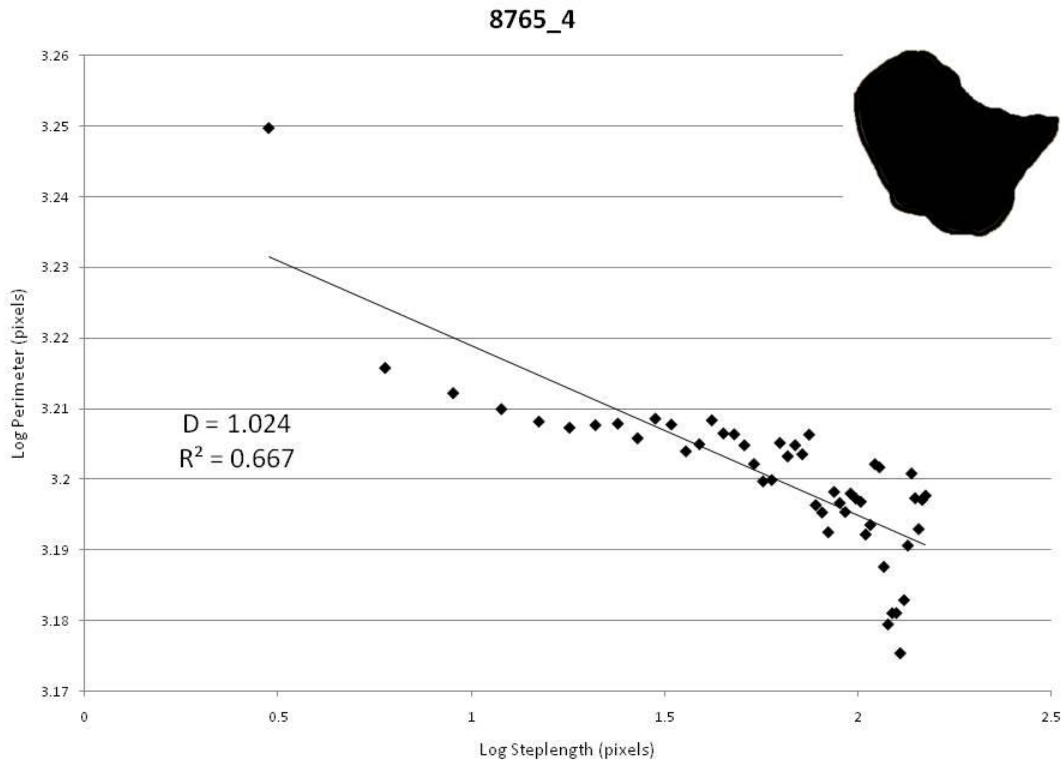

8764_7B
Dtext = 1.0278
R² = 0.6768
Dstruct = 1.0383
R² = 0.0284
Log Perimeter (pixels)
Log Steplength (pixels)

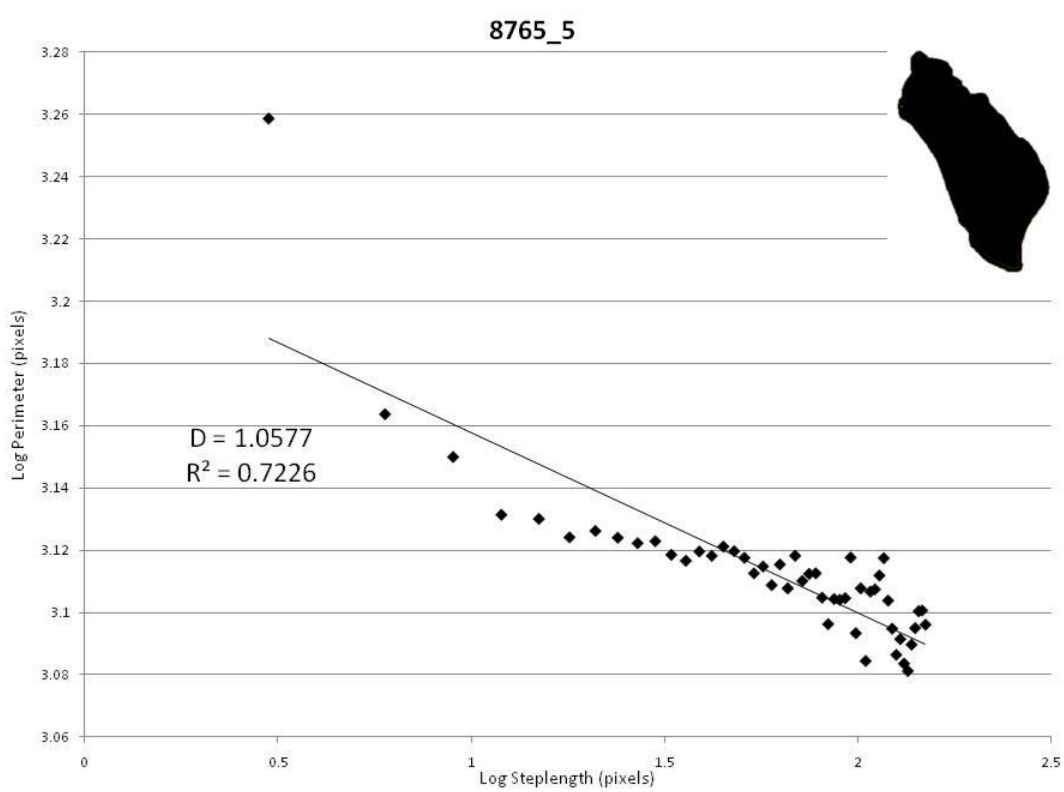

8764_8
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0388
R² = 0.8207
3.25
3.2
3.15
3.1
3.05
3
0
0.5
1
1.5
2
2.5

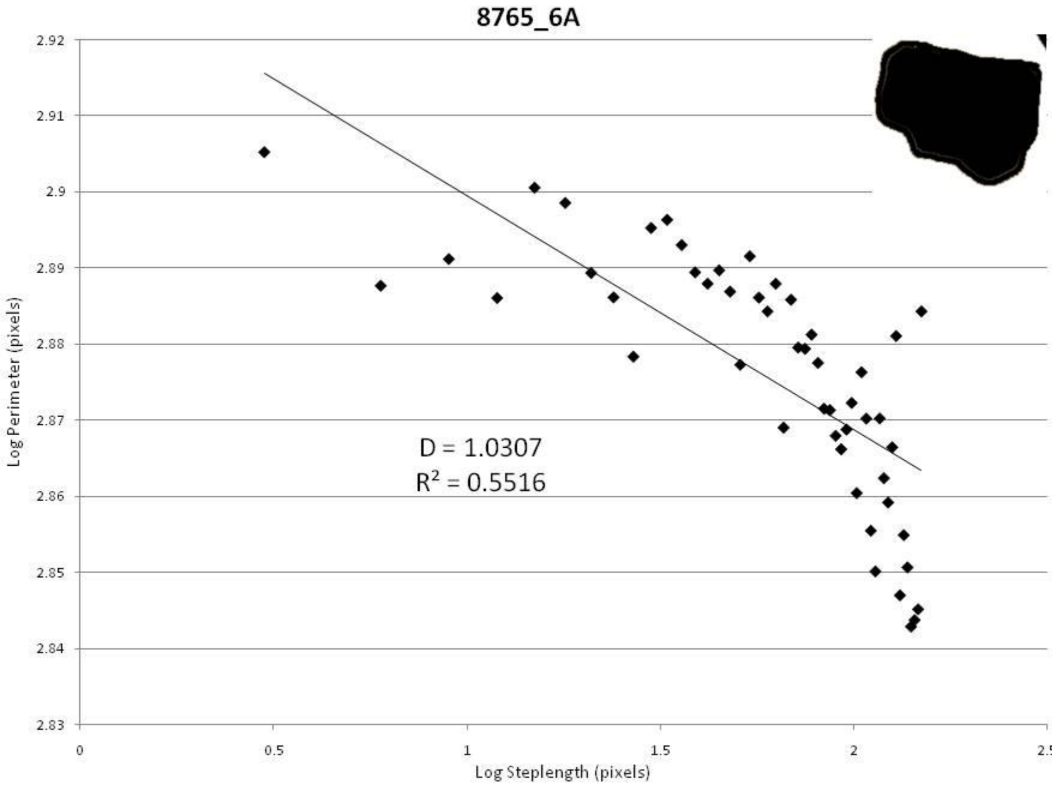

8765_1
Log Perimeter (pixels)
Log Steplength (pixels)
D_text = 1.0334
R² = 0.8019
D_struct = 1.1438
R² = 0.6688
3.2
3.18
3.16
3.14
3.12
3.1
3.08
3.06
0
0.5
1
1.5
2
2.5

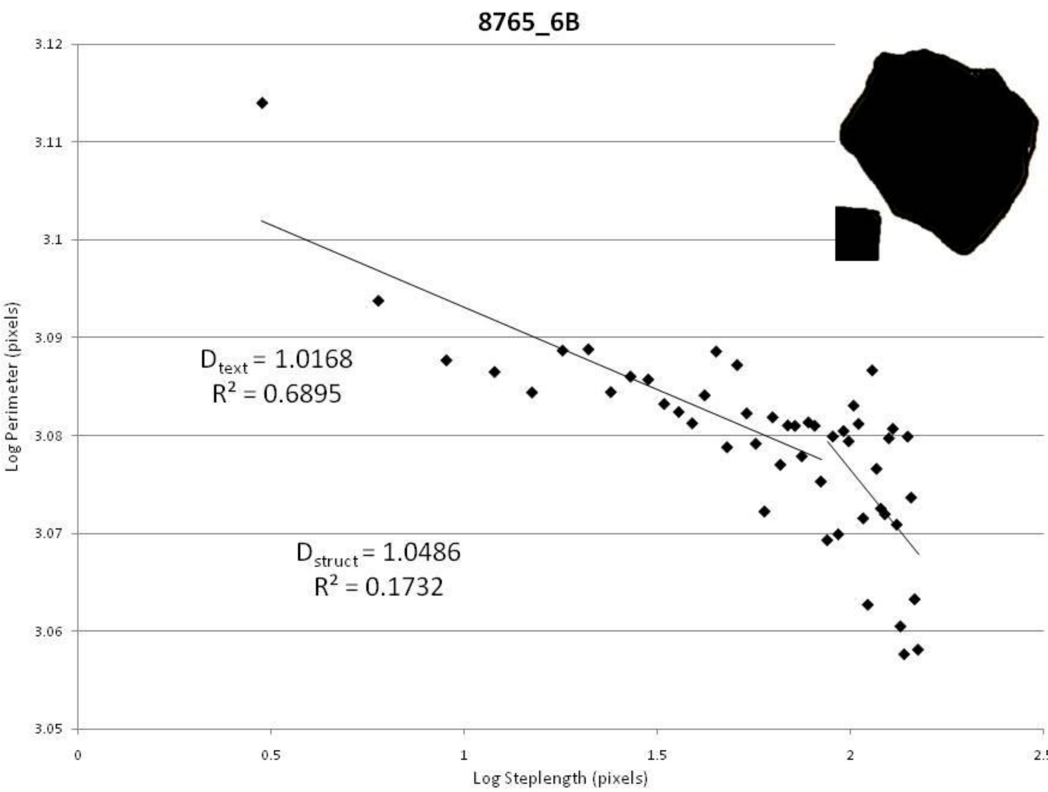

8765_2
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0559
R² = 0.8099

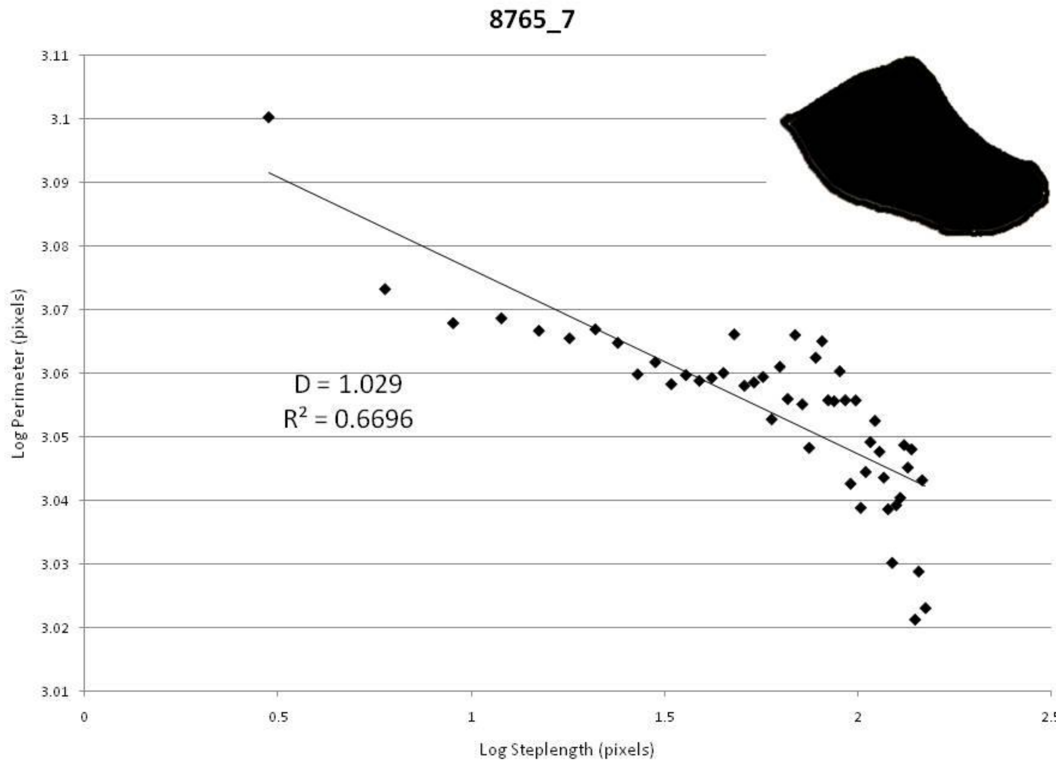

8765_3
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0261
R² = 0.7019


8765_4
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.024
R² = 0.667
3.26
3.25
3.24
3.23
3.22
3.21
3.2
3.19
3.18
3.17
0
0.5
1
1.5
2
2.5

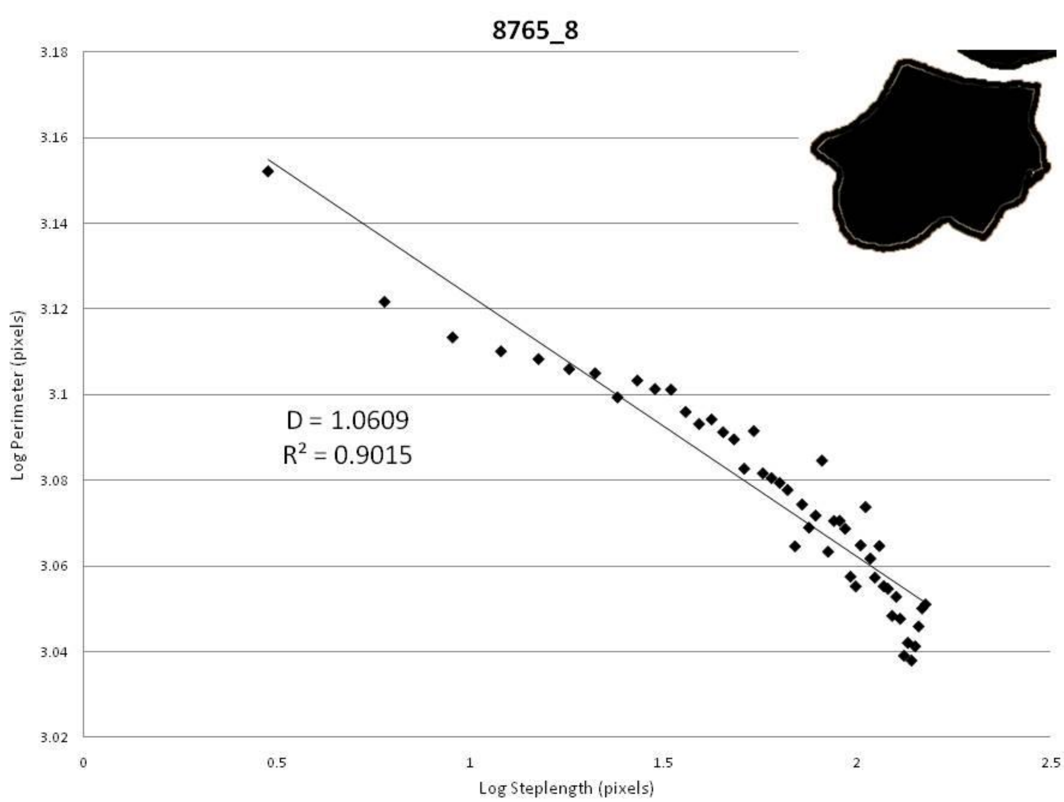

8765_5
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0577
R² = 0.7226
3.28
3.26
3.24
3.22
3.2
3.18
3.16
3.14
3.12
3.1
3.08
3.06
0
0.5
1
1.5
2
2.5


8765_6A
D = 1.0307
R^2 = 0.5516
Log Perimeter (pixels)
Log Steplength (pixels)
2.92
2.91
2.9
2.89
2.88
2.87
2.86
2.85
2.84
2.83
0
0.5
1
1.5
2
2.5

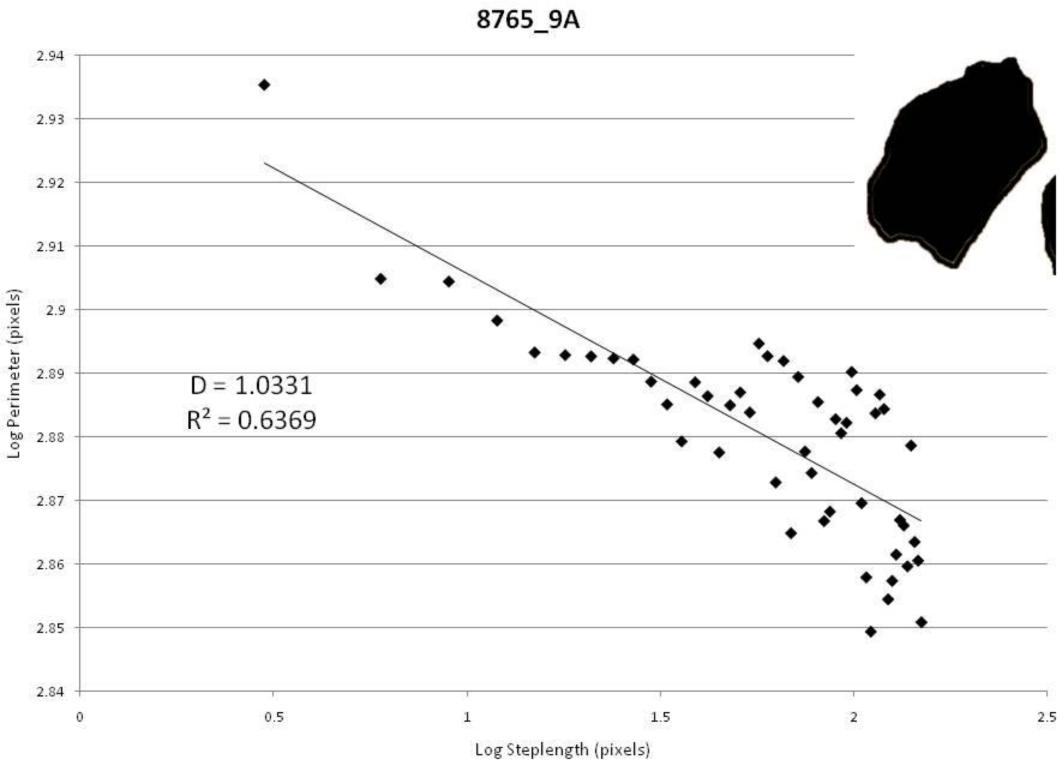

8765_6B
D_{text} = 1.0168
R^2 = 0.6895
D_{struct} = 1.0486
R^2 = 0.1732
Log Perimeter (pixels)
Log Steplength (pixels)
3.12
3.11
3.1
3.09
3.08
3.07
3.06
3.05
0
0.5
1
1.5
2
2.5

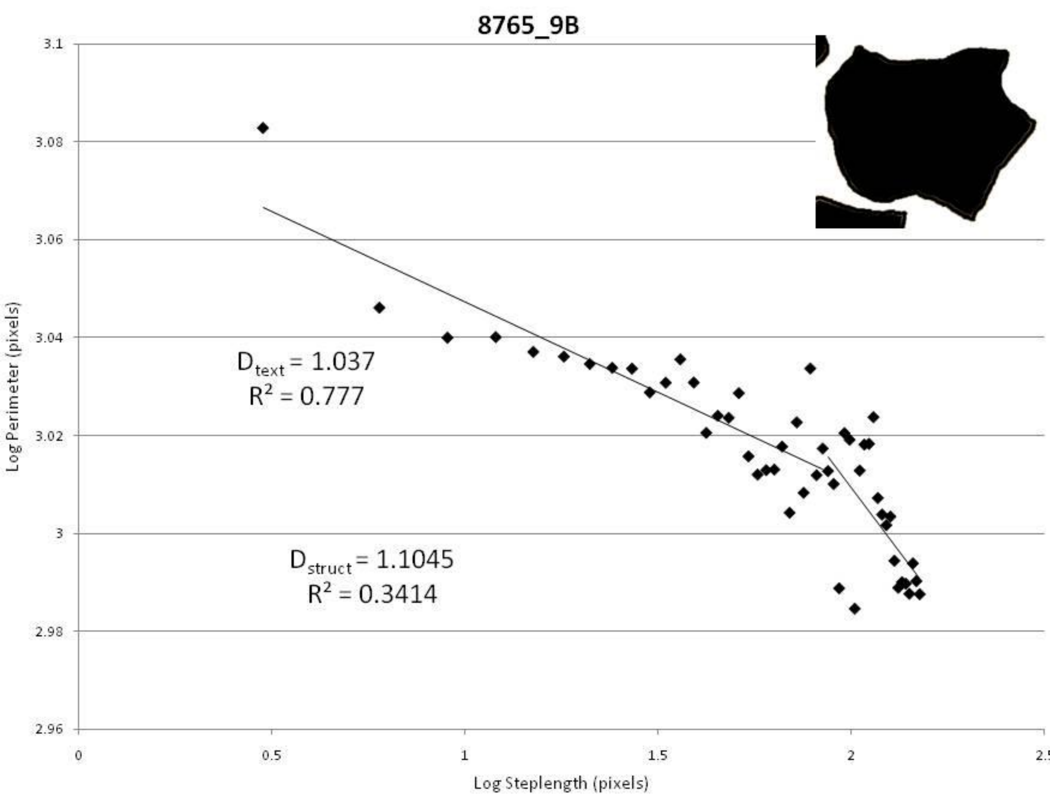


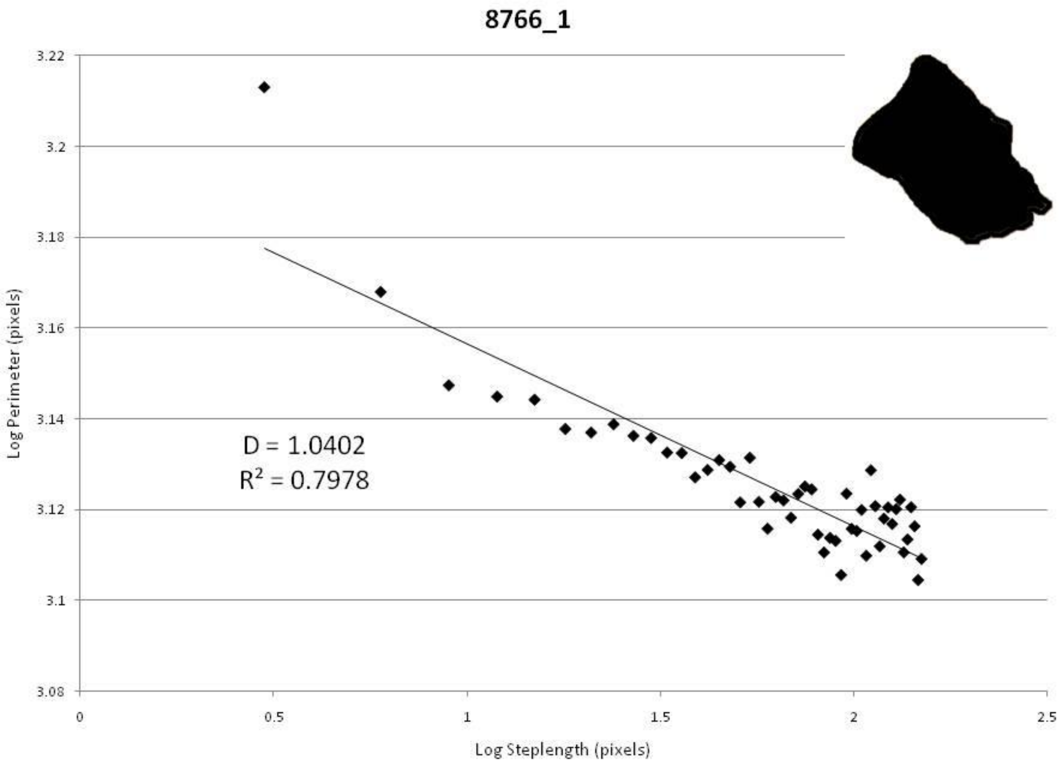
8765_7
3.11
3.1
3.09
3.08
3.07
3.06
3.05
3.04
3.03
3.02
3.01
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.029
R² = 0.6696

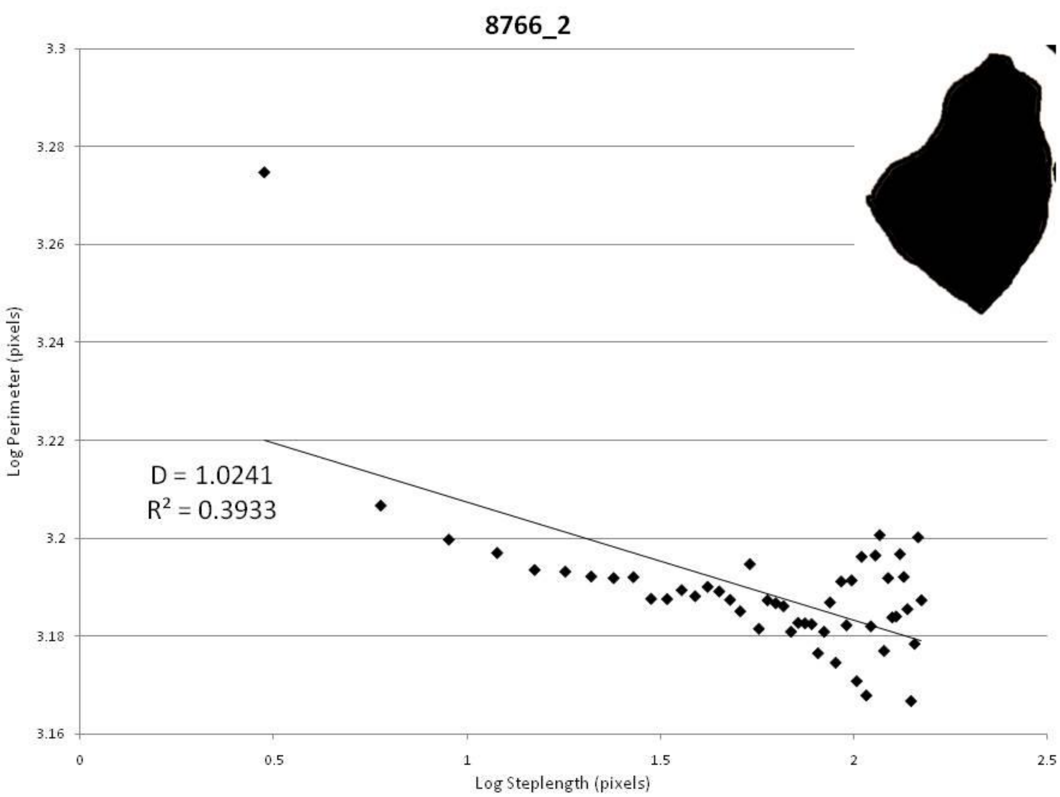


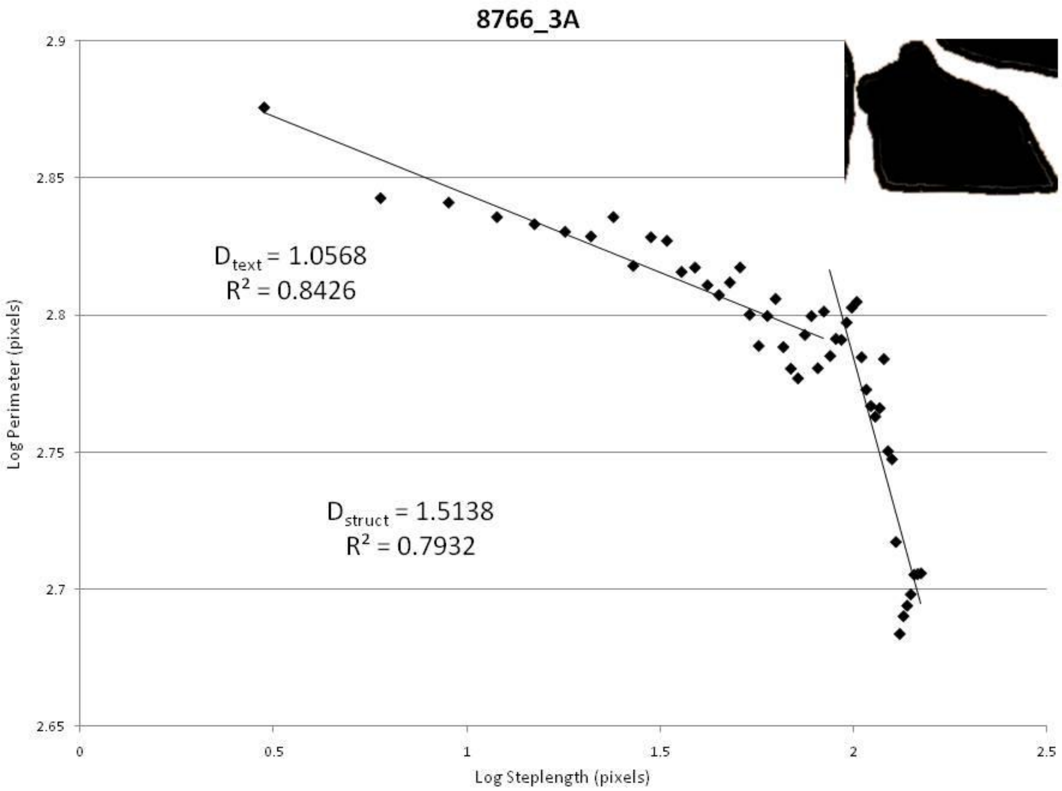
8765_8
3.18
3.16
3.14
3.12
3.1
3.08
3.06
3.04
3.02
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0609
R² = 0.9015

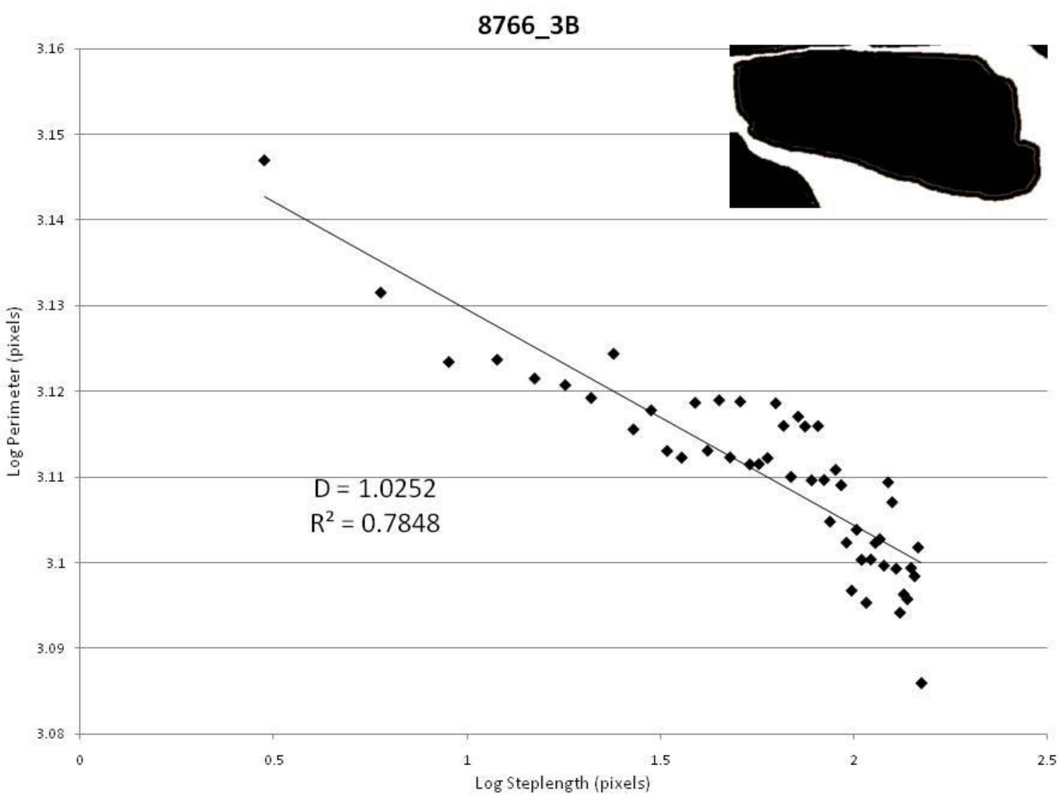

8765_9A
D = 1.0331
R^2 = 0.6369
Log Perimeter (pixels)
Log Steplength (pixels)

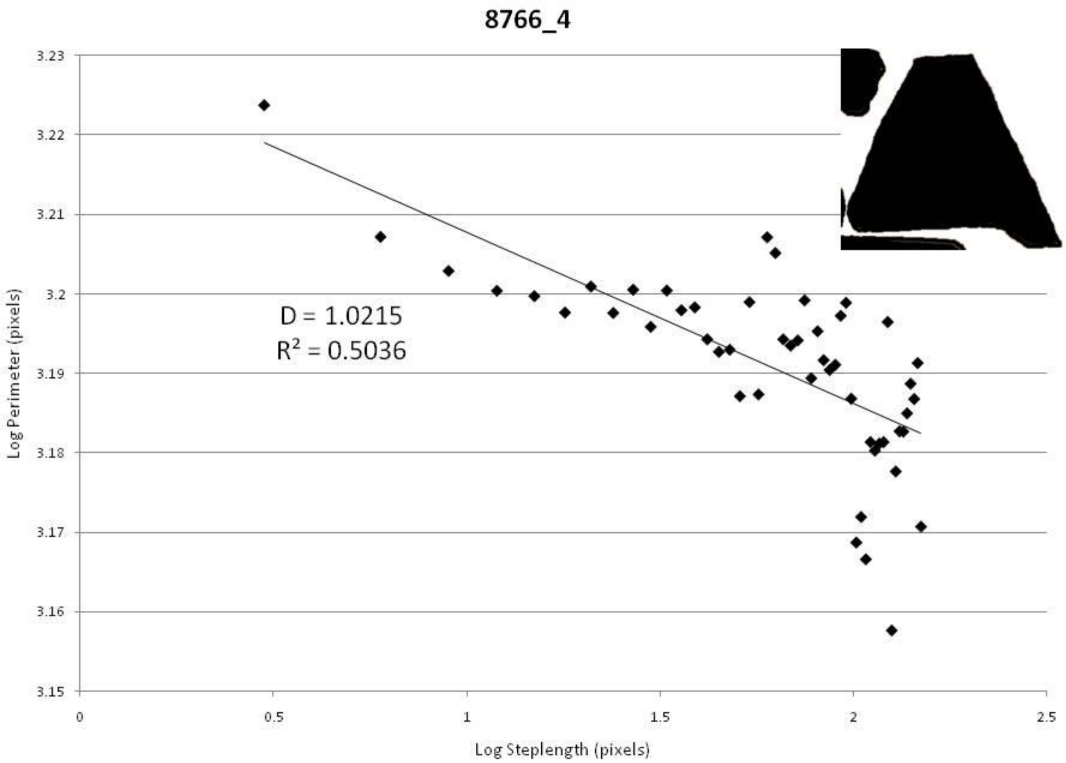

8765_9B
D_{text} = 1.037
R^2 = 0.777
D_{struct} = 1.1045
R^2 = 0.3414
Log Perimeter (pixels)
Log Steplength (pixels)


8766_1
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0402
R^2 = 0.7978
3.22
3.2
3.18
3.16
3.14
3.12
3.1
3.08
0
0.5
1
1.5
2
2.5

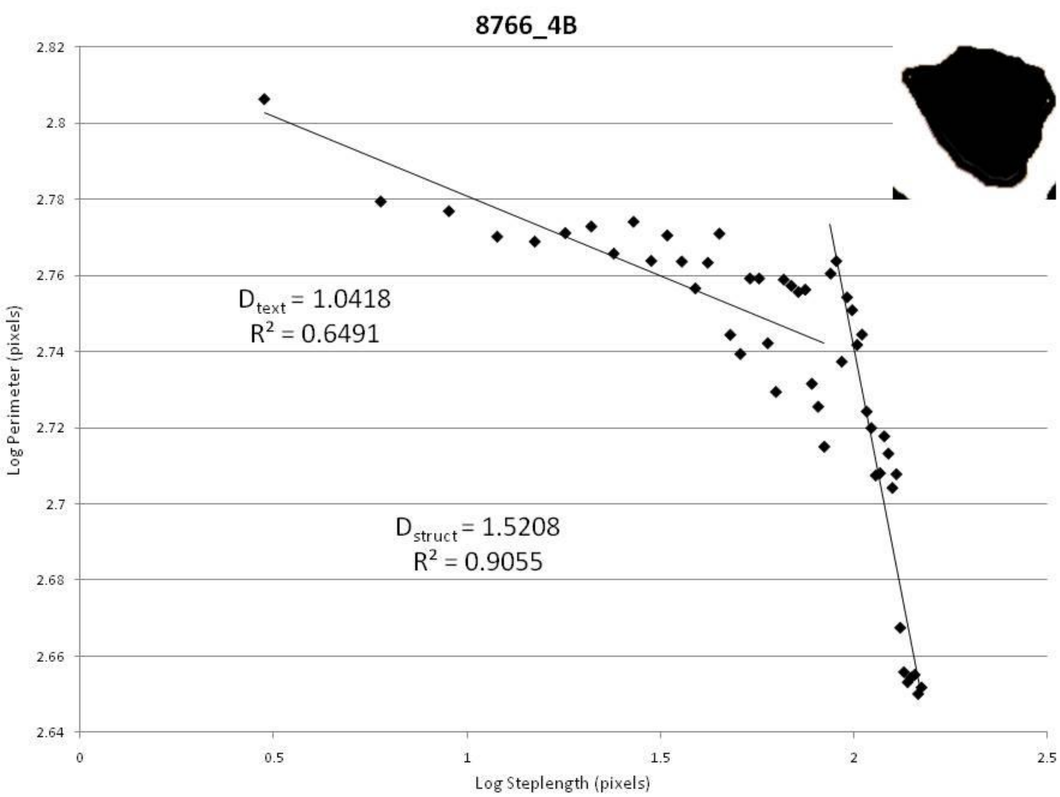

8766_2
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0241
R^2 = 0.3933
3.3
3.28
3.26
3.24
3.22
3.2
3.18
3.16
0
0.5
1
1.5
2
2.5


8766_3A
D_{text} = 1.0568
R^2 = 0.8426
D_{struct} = 1.5138
R^2 = 0.7932
Log Perimeter (pixels)
Log Steplength (pixels)
2.9
2.85
2.8
2.75
2.7
2.65
0
0.5
1
1.5
2
2.5

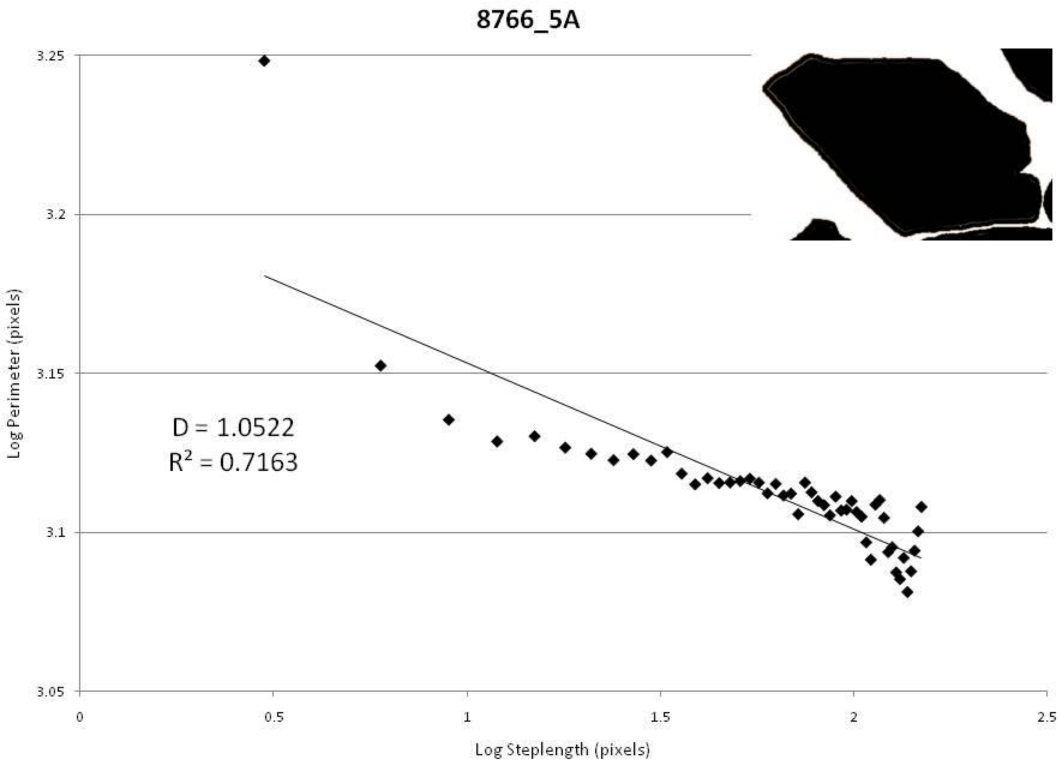

8766_3B
D = 1.0252
R^2 = 0.7848
Log Perimeter (pixels)
Log Steplength (pixels)
3.16
3.15
3.14
3.13
3.12
3.11
3.1
3.09
3.08
0
0.5
1
1.5
2
2.5



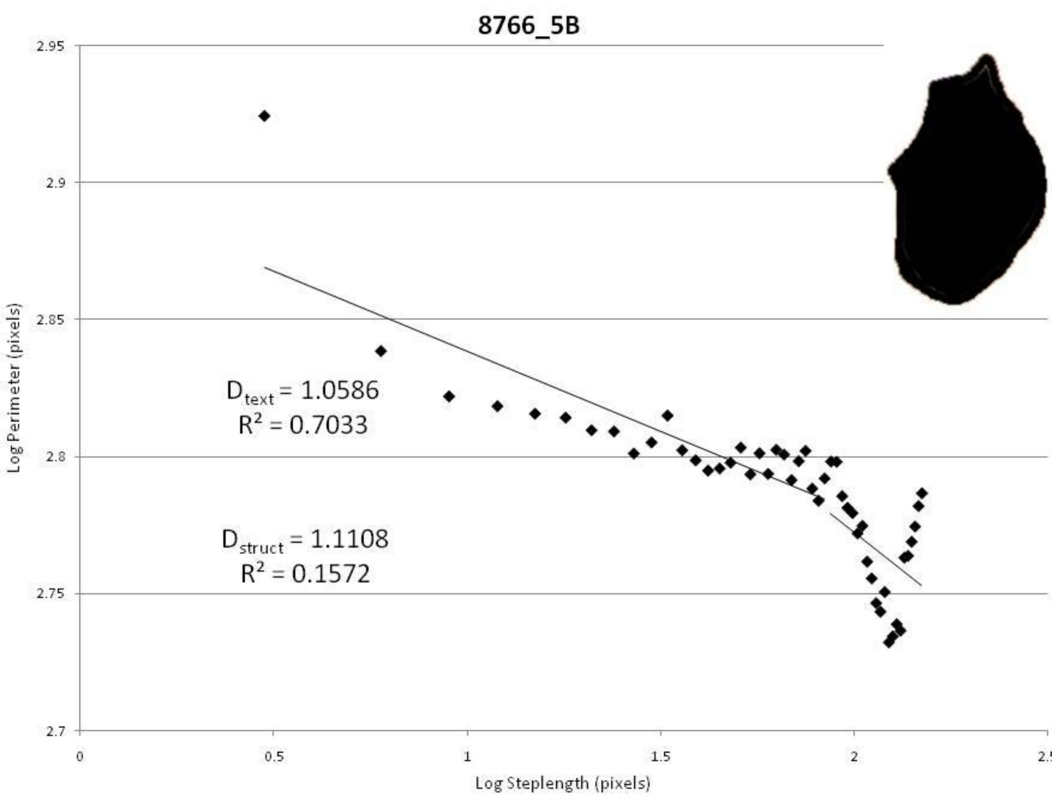
8766_4
3.23
3.22
3.21
3.2
3.19
3.18
3.17
3.16
3.15
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0215
R^2 = 0.5036



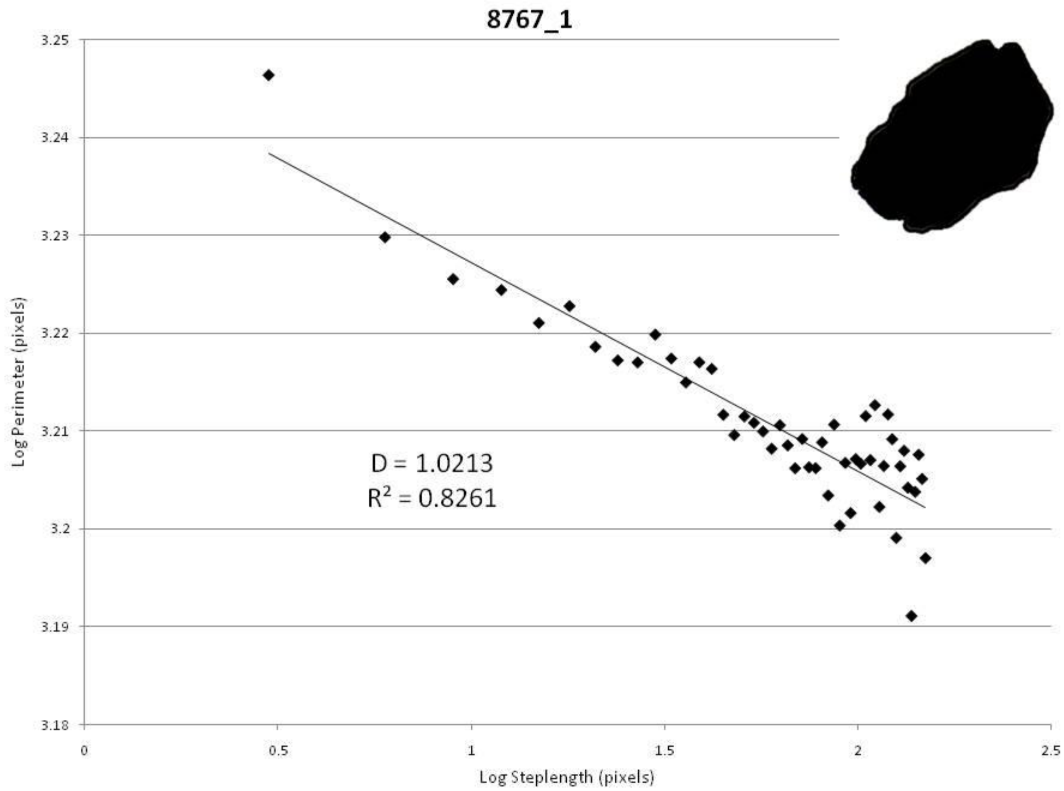
8766_4B
2.82
2.8
2.78
2.76
2.74
2.72
2.7
2.68
2.66
2.64
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0418
R^2 = 0.6491
D_{struct} = 1.5208
R^2 = 0.9055

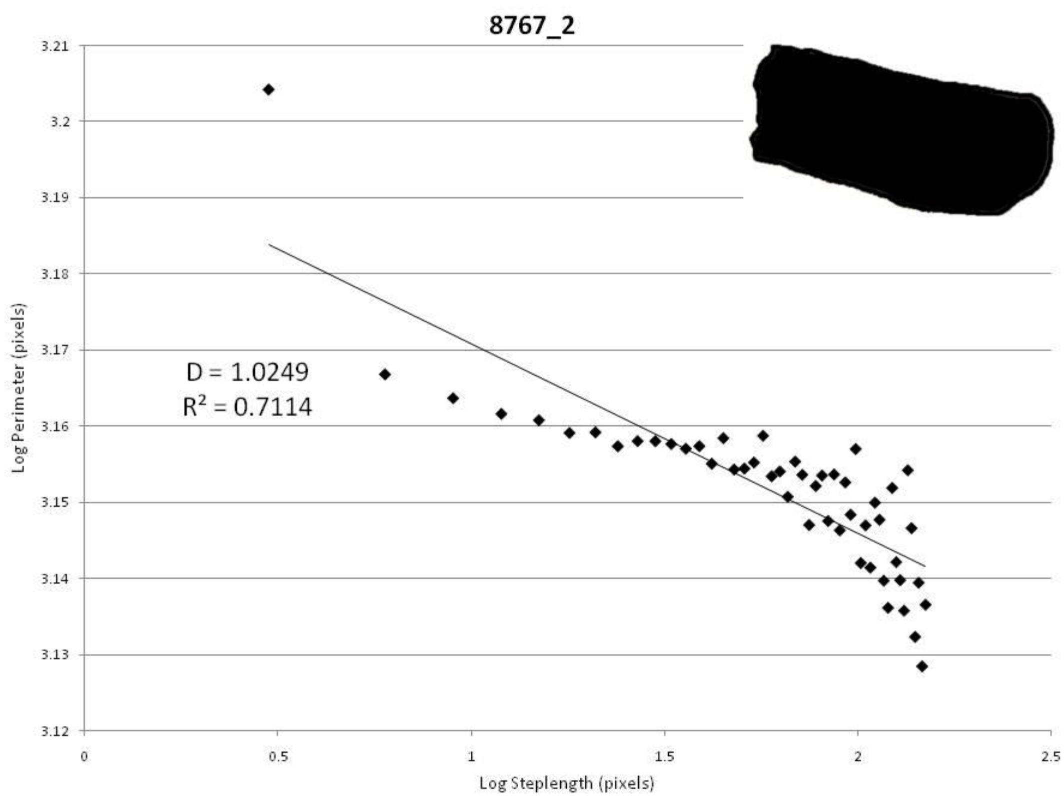


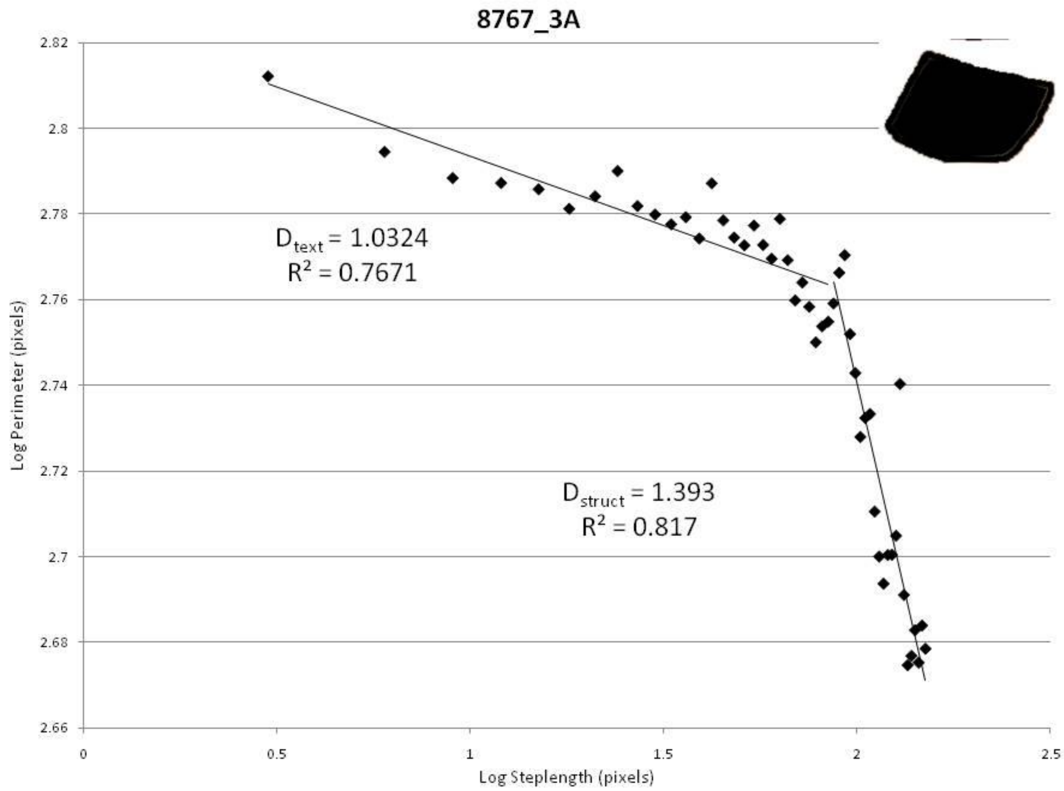
8766_5A
3.25
3.2
3.15
3.1
3.05
Log Perimeter (pixels)
D = 1.0522
R^2 = 0.7163
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)

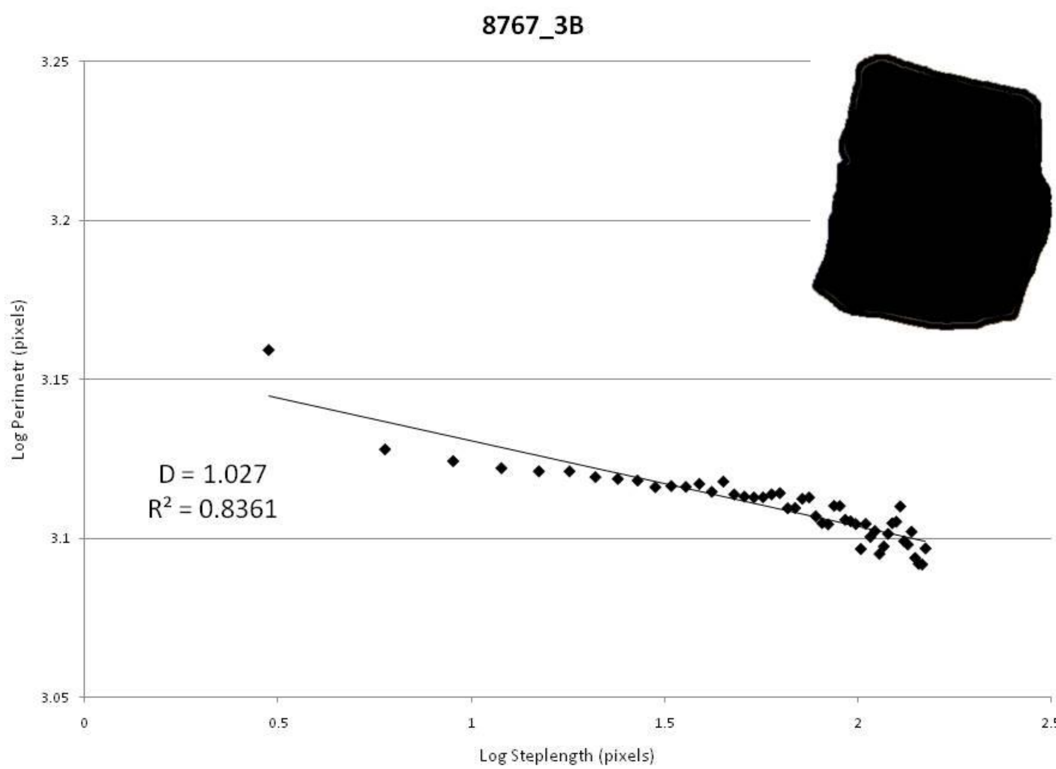


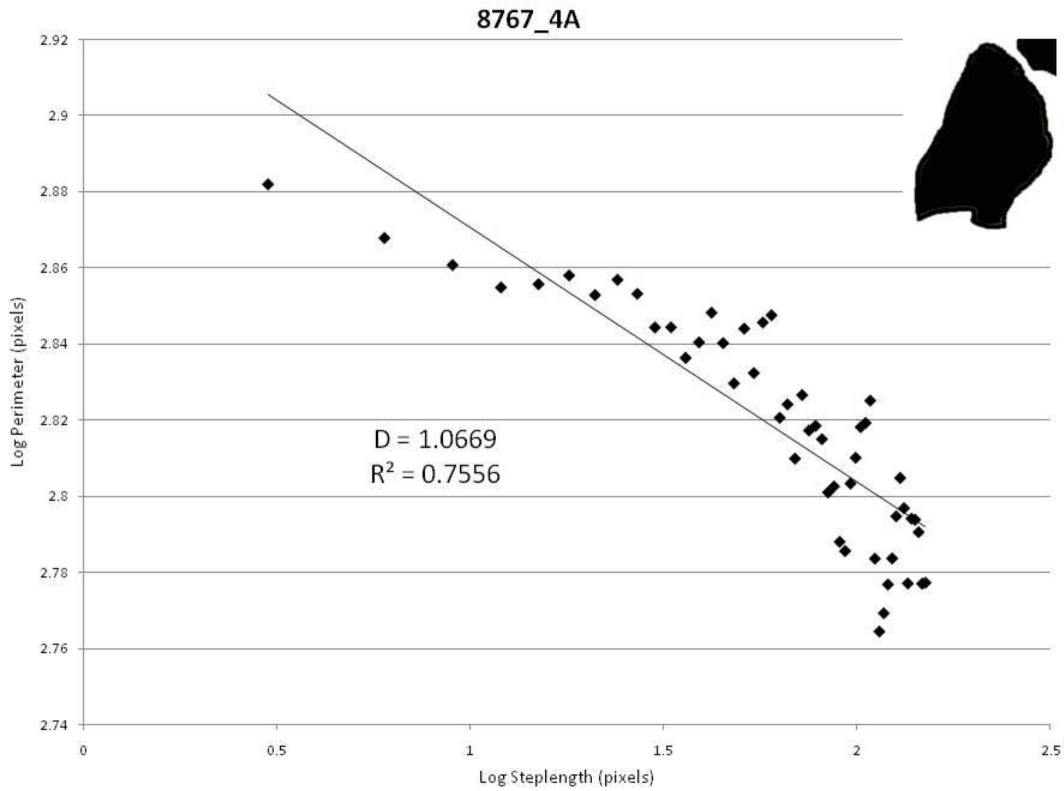
8766_5B
2.95
2.9
2.85
2.8
2.75
2.7
Log Perimeter (pixels)
D_{text} = 1.0586
R^2 = 0.7033
D_{struct} = 1.1108
R^2 = 0.1572
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)

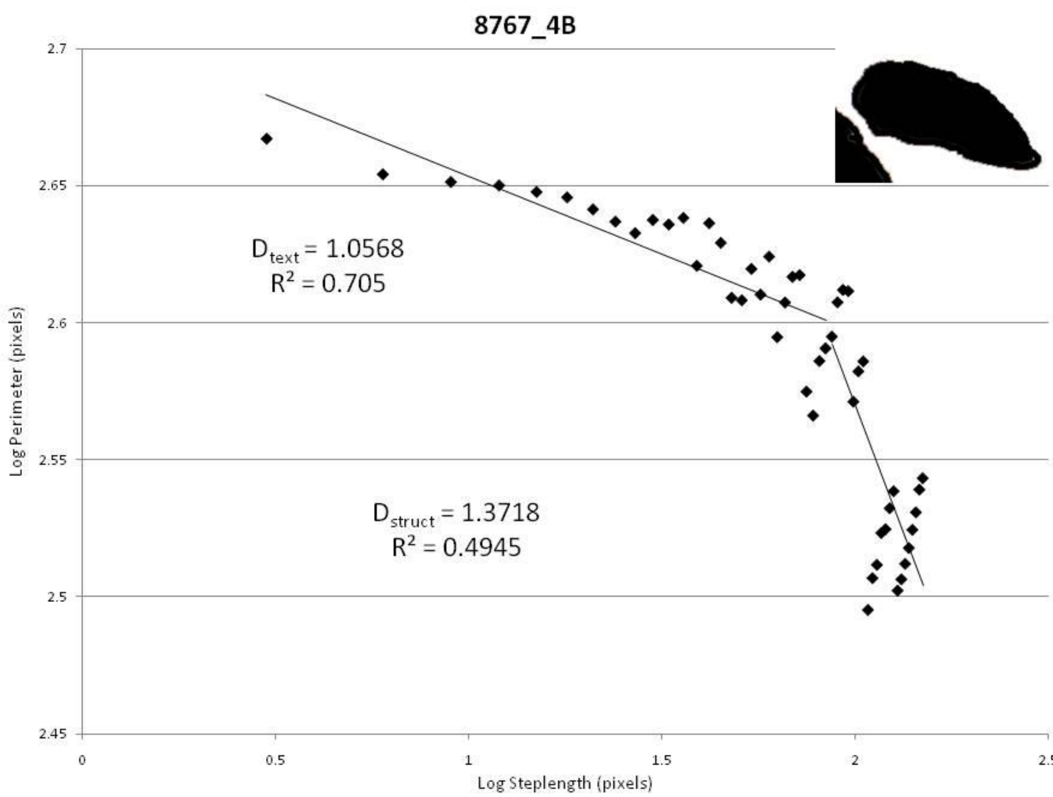

8767_1
D = 1.0213
R^2 = 0.8261
Log Perimeter (pixels)
Log Steplength (pixels)
3.25
3.24
3.23
3.22
3.21
3.2
3.19
3.18
0
0.5
1
1.5
2
2.5

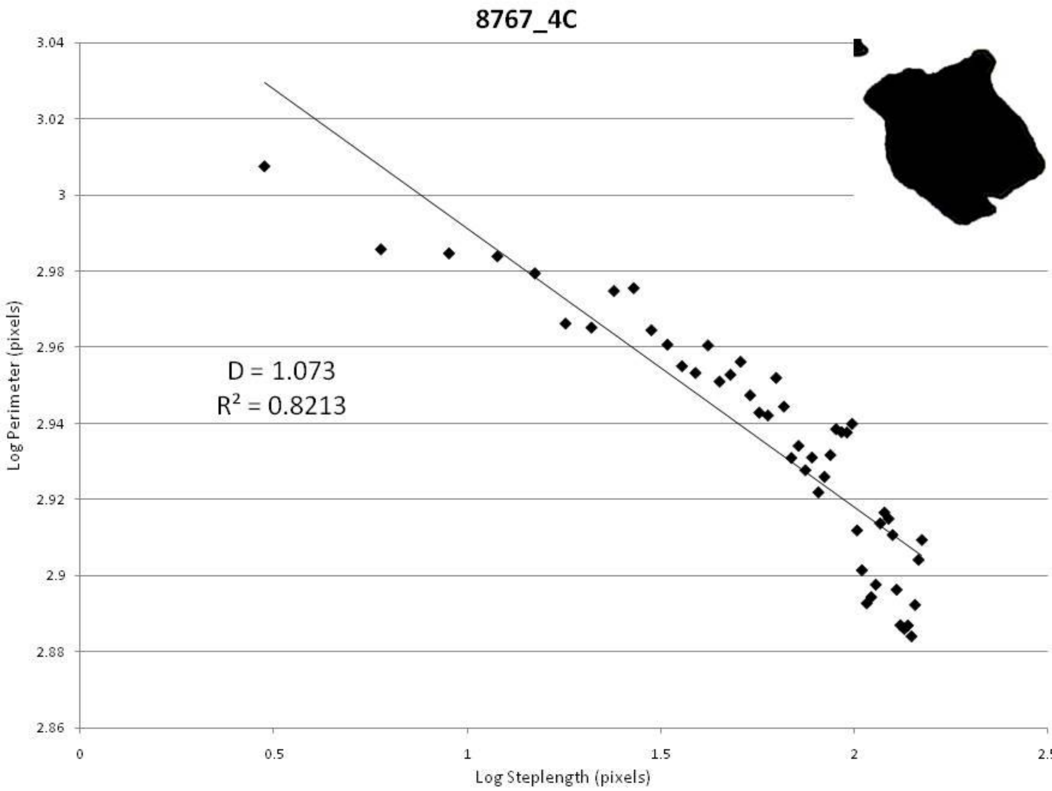

8767_2
D = 1.0249
R^2 = 0.7114
Log Perimeter (pixels)
Log Steplength (pixels)
3.21
3.2
3.19
3.18
3.17
3.16
3.15
3.14
3.13
3.12
0
0.5
1
1.5
2
2.5

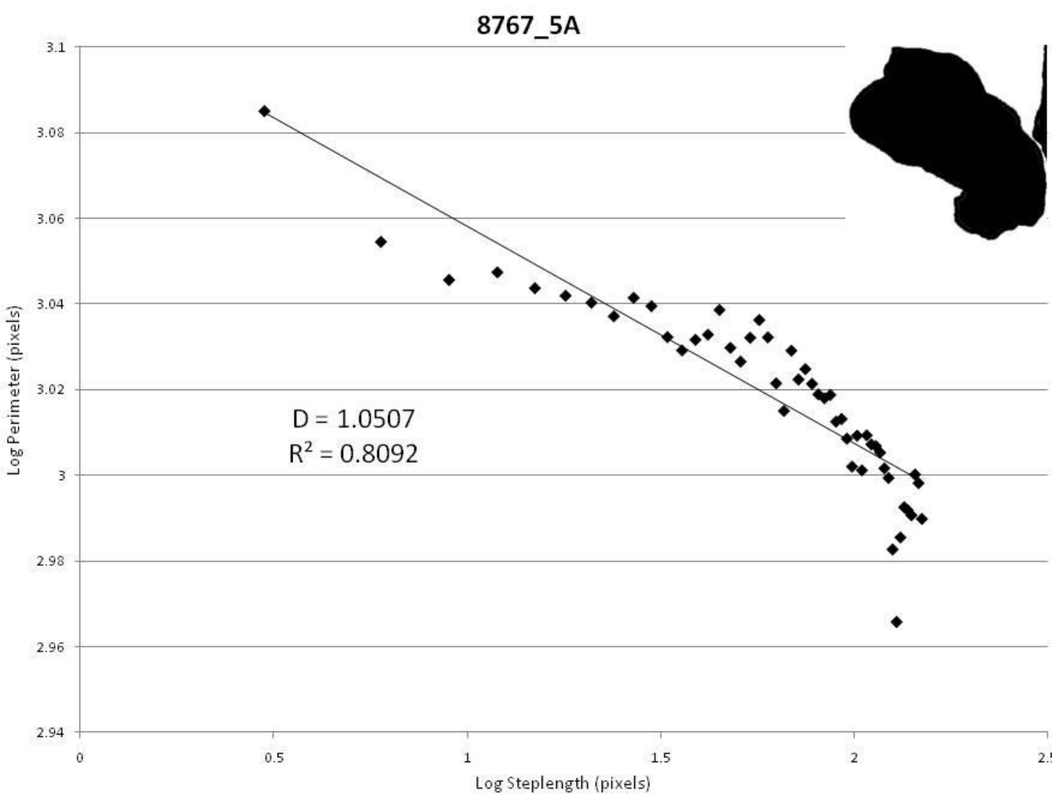

8767_3A
2.82
2.8
2.78
2.76
2.74
2.72
2.7
2.68
2.66
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0324
R^2 = 0.7671
D_{struct} = 1.393
R^2 = 0.817

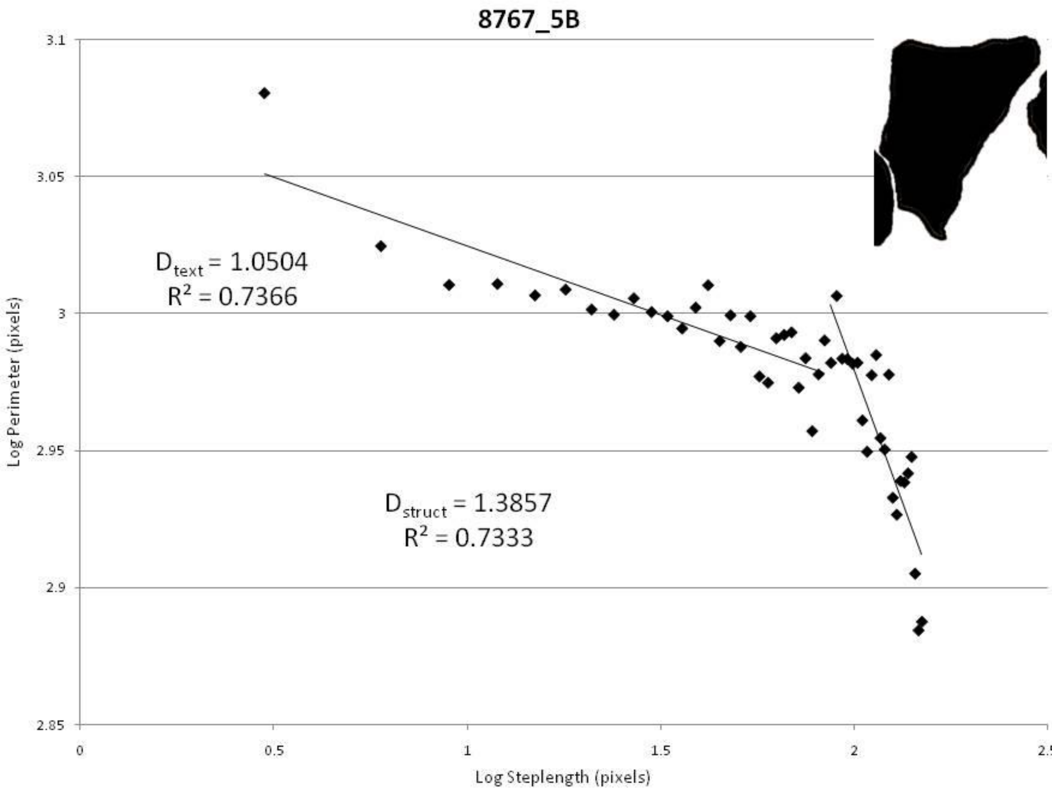

8767_3B
3.25
3.2
3.15
3.1
3.05
0
0.5
1
1.5
2
2.5
Log Perimetr (pixels)
Log Steplength (pixels)
D = 1.027
R^2 = 0.8361

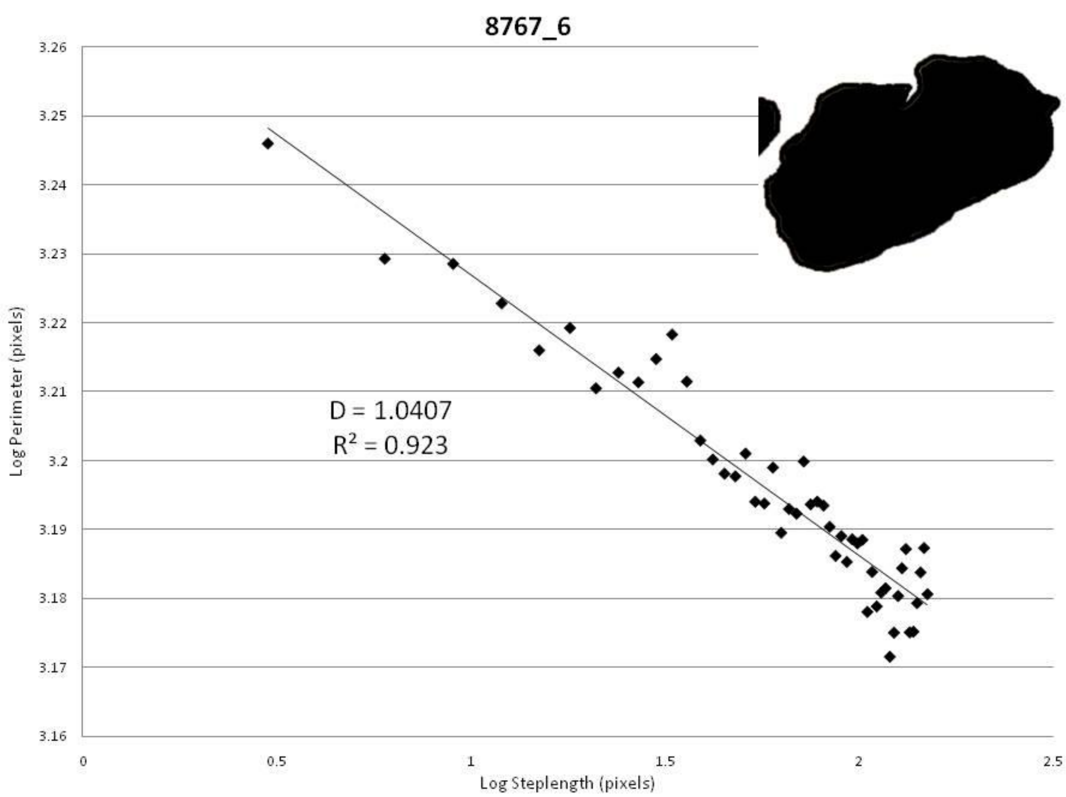

8767_4A
D = 1.0669
R^2 = 0.7556
Log Perimeter (pixels)
Log Steplength (pixels)

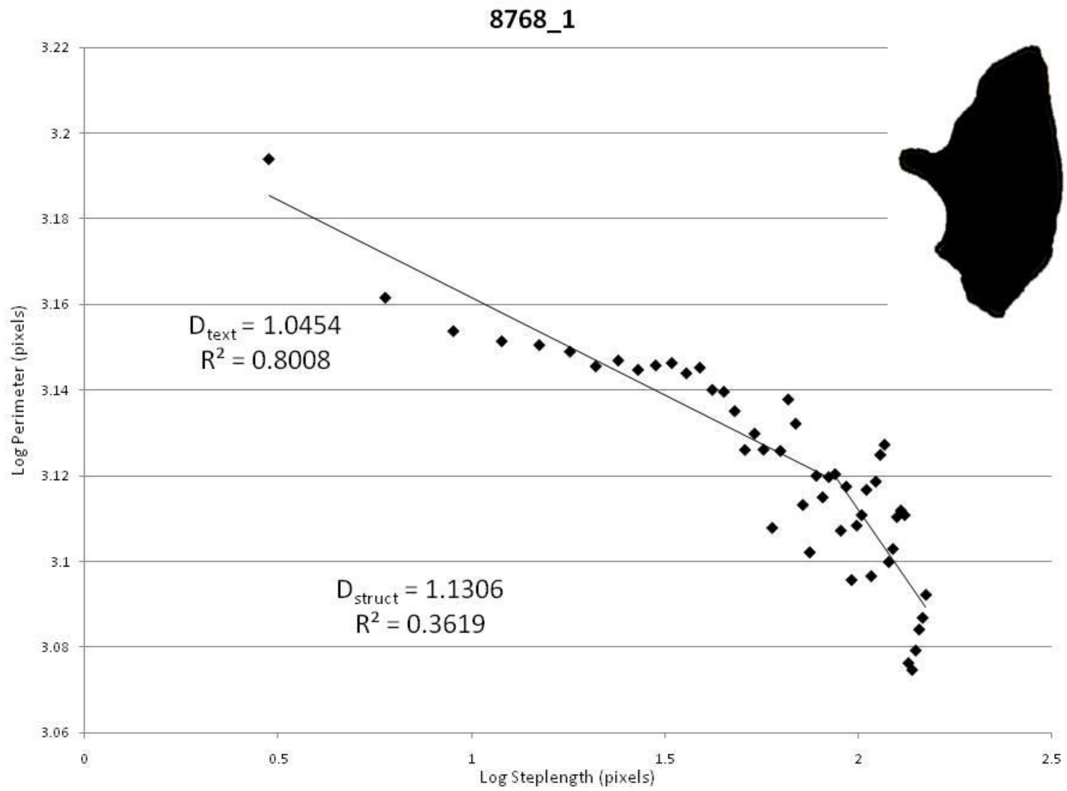

8767_4B
D_{text} = 1.0568
R^2 = 0.705
D_{struct} = 1.3718
R^2 = 0.4945
Log Perimeter (pixels)
Log Steplength (pixels)

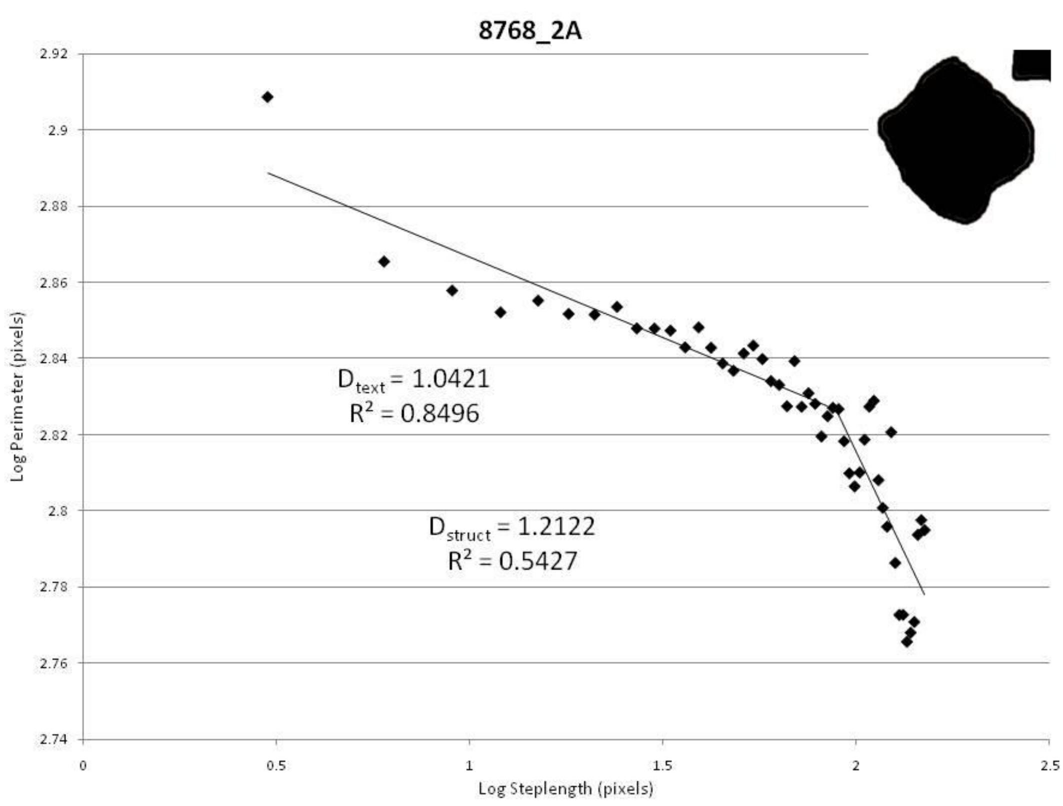

8767_4C
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.073
R² = 0.8213

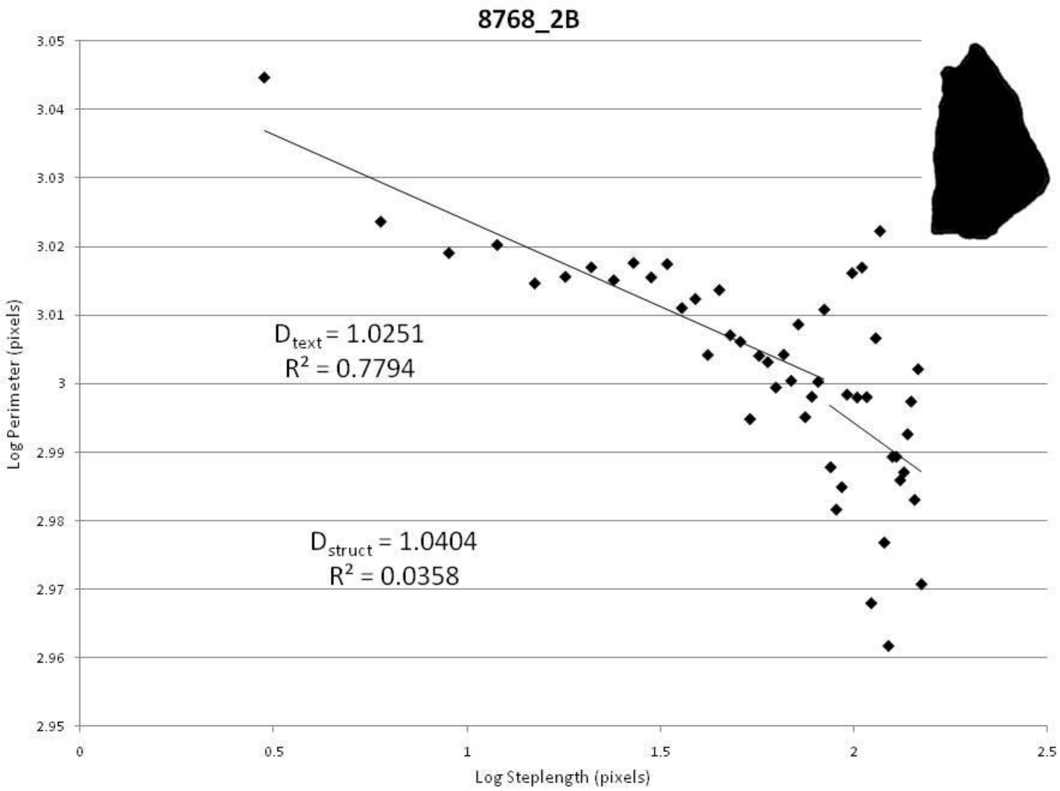

8767_5A
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0507
R² = 0.8092

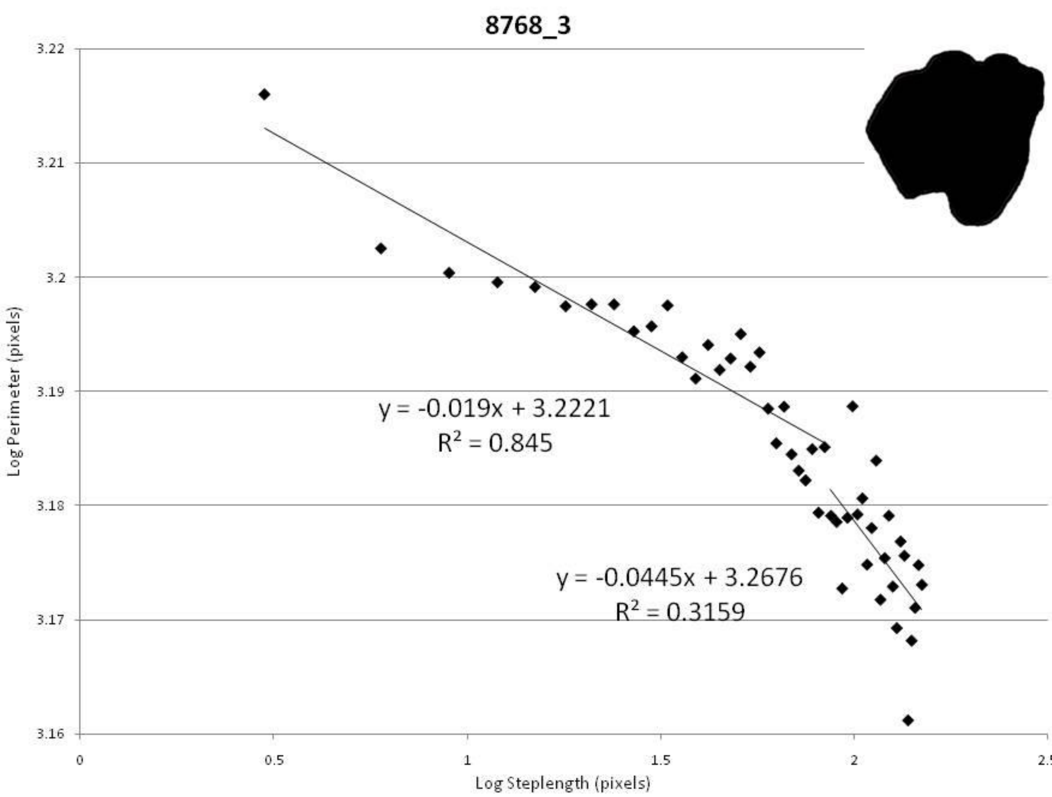

8767_5B
D_text = 1.0504
R² = 0.7366
D_struct = 1.3857
R² = 0.7333
Log Perimeter (pixels)
Log Steplength (pixels)
3.1
3.05
3
2.95
2.9
2.85
0
0.5
1
1.5
2
2.5

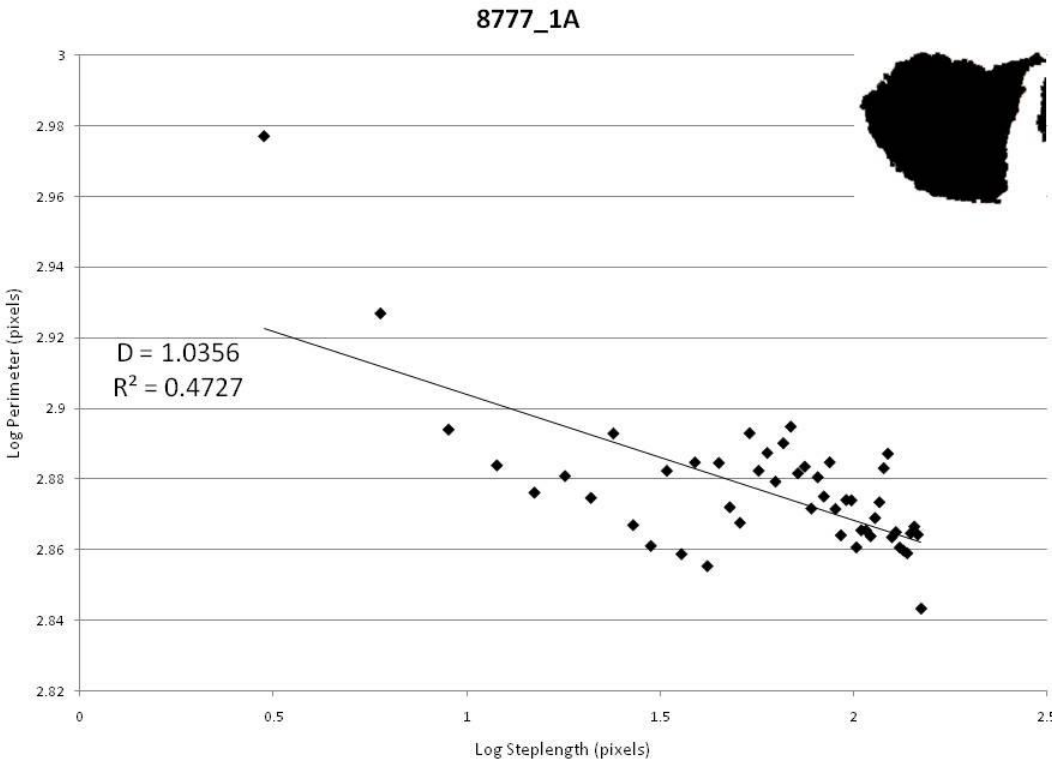

8767_6
D = 1.0407
R² = 0.923
Log Perimeter (pixels)
Log Steplength (pixels)
3.26
3.25
3.24
3.23
3.22
3.21
3.2
3.19
3.18
3.17
3.16
0
0.5
1
1.5
2
2.5

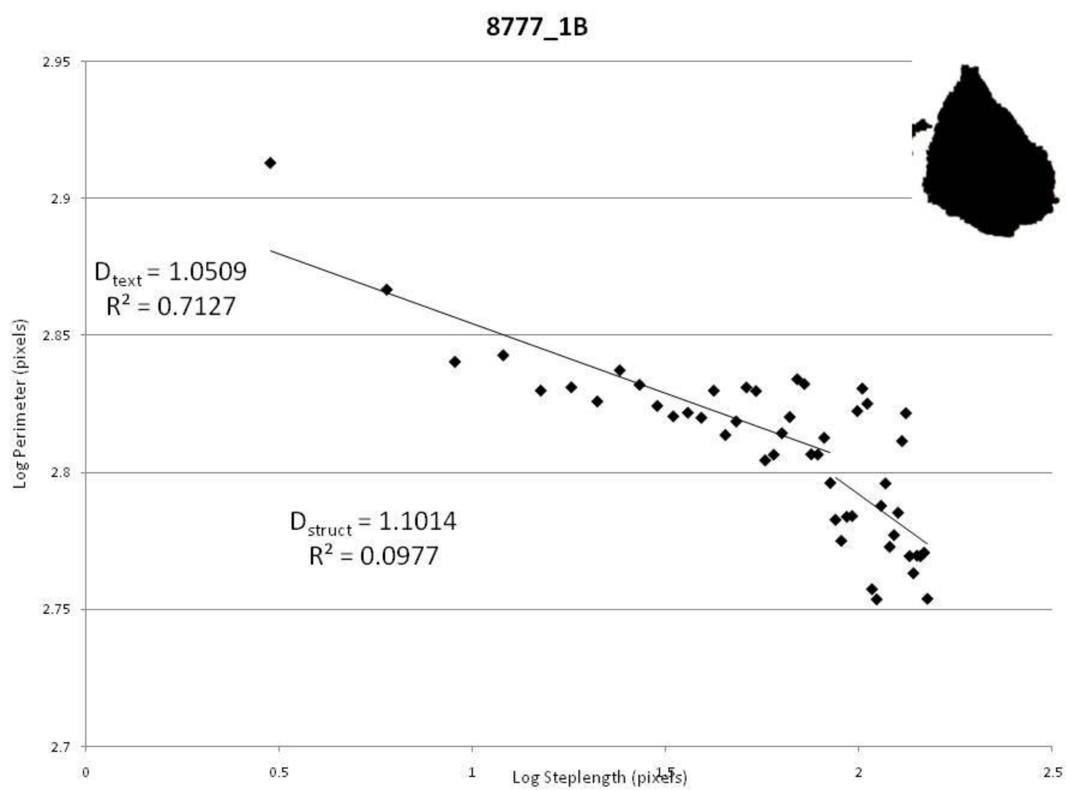

8768_1
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0454
R^2 = 0.8008
D_{struct} = 1.1306
R^2 = 0.3619
3.22
3.2
3.18
3.16
3.14
3.12
3.1
3.08
3.06
0
0.5
1
1.5
2
2.5

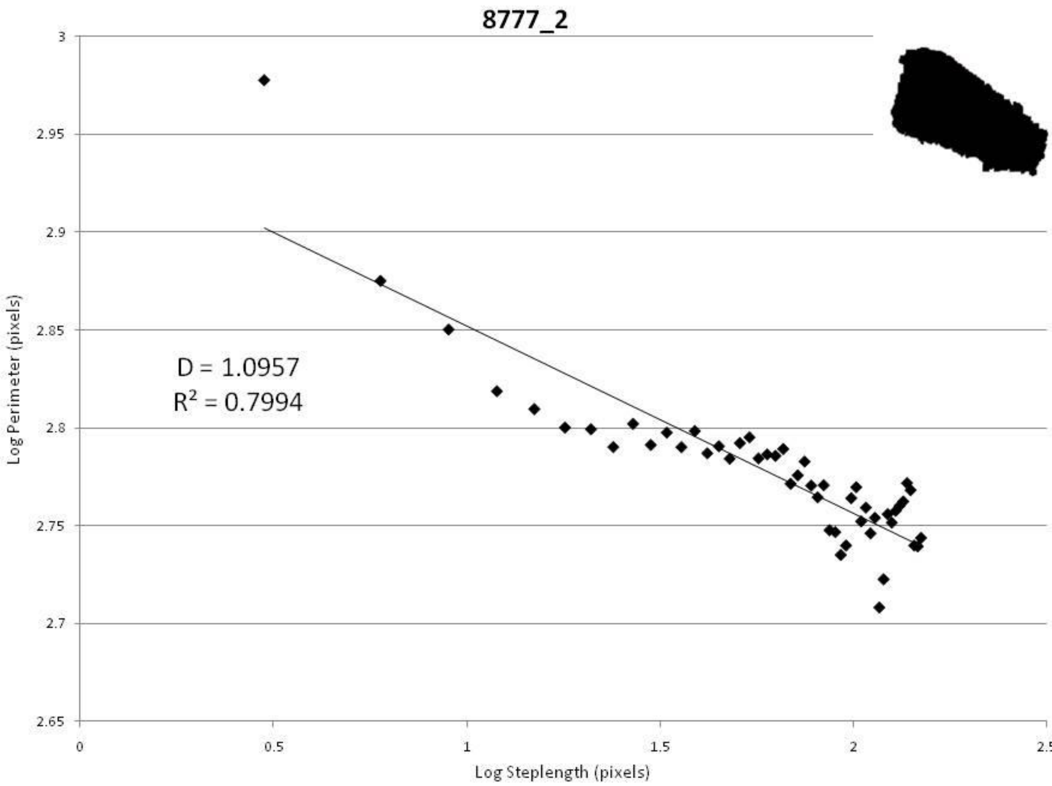

8768_2A
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0421
R^2 = 0.8496
D_{struct} = 1.2122
R^2 = 0.5427
2.92
2.9
2.88
2.86
2.84
2.82
2.8
2.78
2.76
2.74
0
0.5
1
1.5
2
2.5

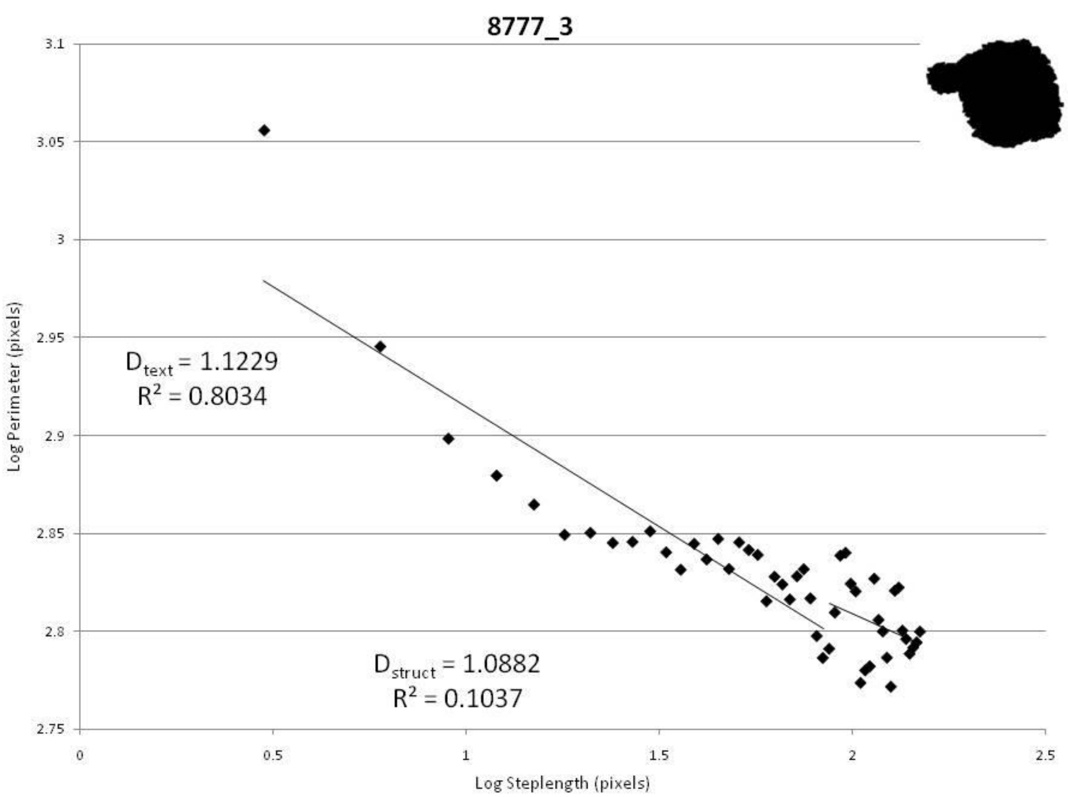

8768_2B
3.05
3.04
3.03
3.02
3.01
3
2.99
2.98
2.97
2.96
2.95
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0251
R^2 = 0.7794
D_{struct} = 1.0404
R^2 = 0.0358

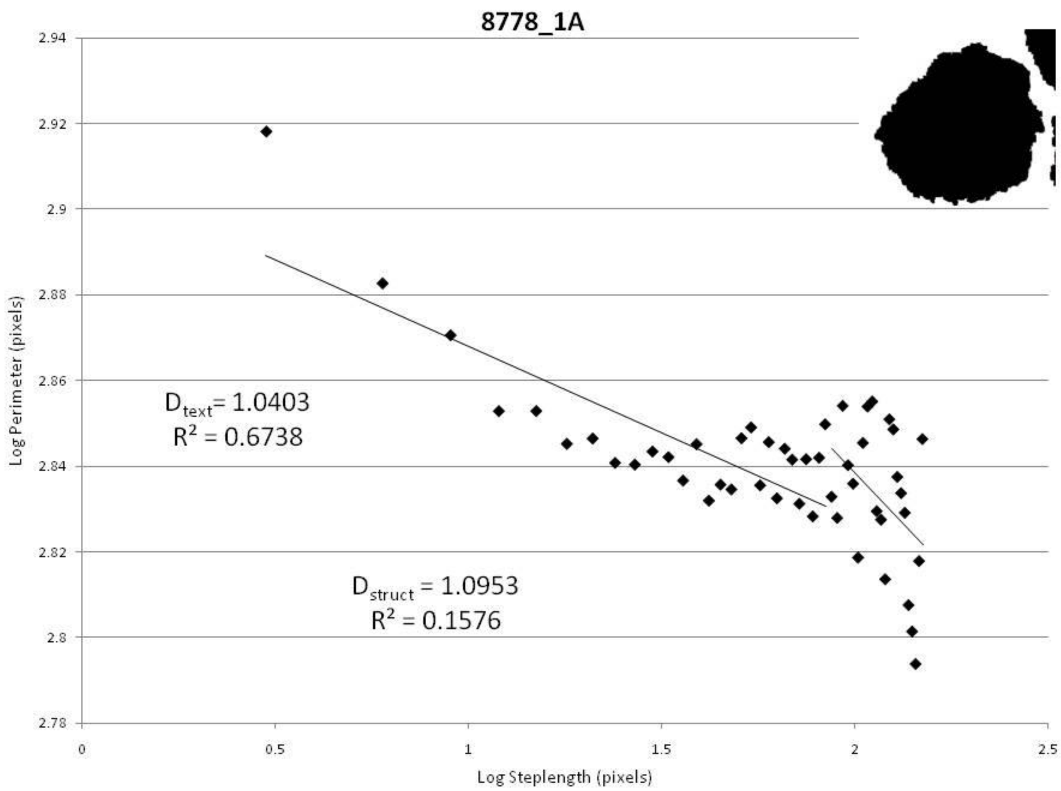

8768_3
3.22
3.21
3.2
3.19
3.18
3.17
3.16
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
y = -0.019x + 3.2221
R^2 = 0.845
y = -0.0445x + 3.2676
R^2 = 0.3159

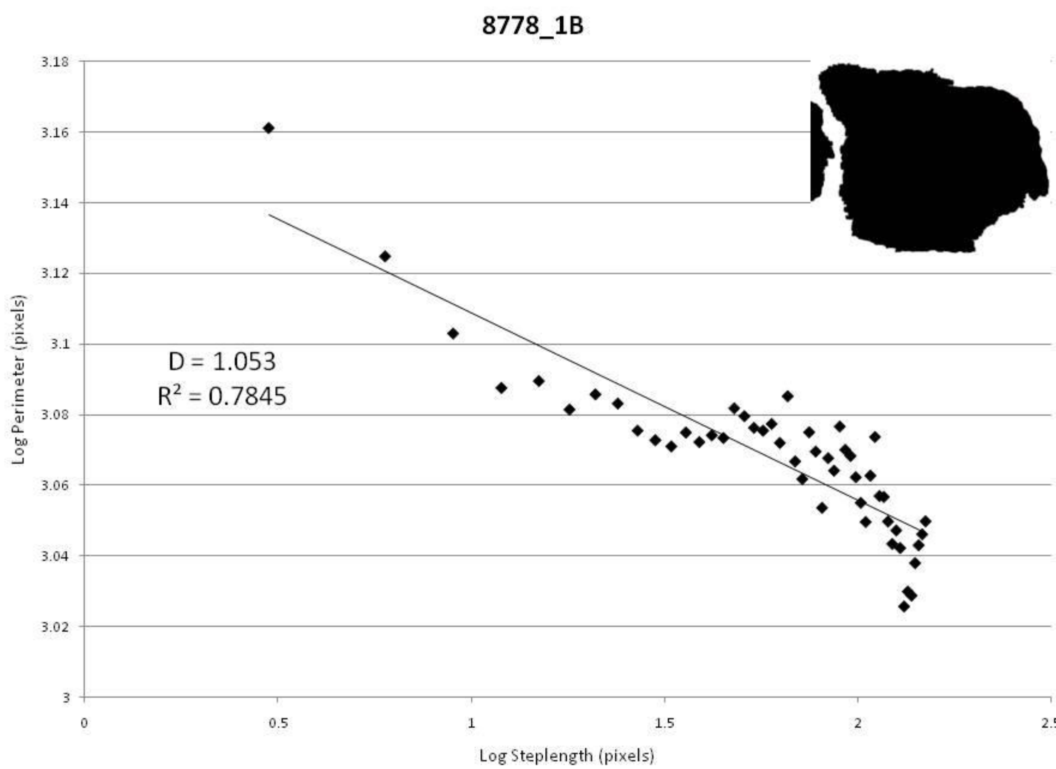

8777_1A
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0356
R² = 0.4727
3
2.98
2.96
2.94
2.92
2.9
2.88
2.86
2.84
2.82
0
0.5
1
1.5
2
2.5

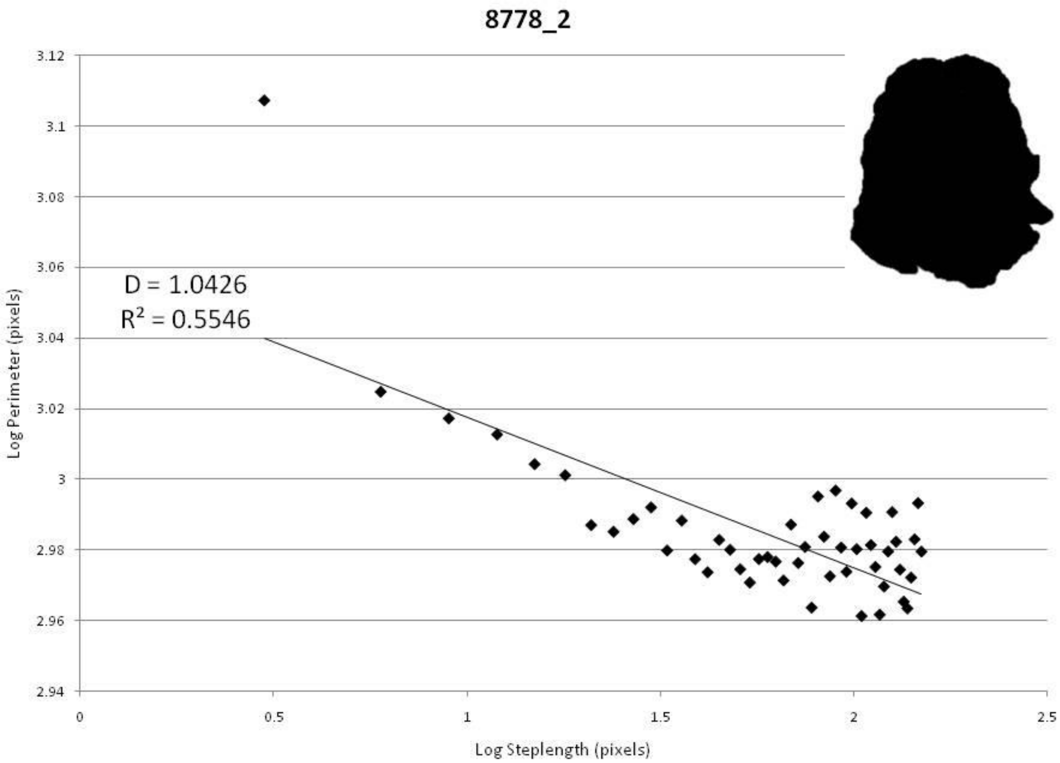

8777_1B
Log Perimeter (pixels)
Log Steplength (pixels)
D_text = 1.0509
R² = 0.7127
D_struct = 1.1014
R² = 0.0977
2.95
2.9
2.85
2.8
2.75
2.7
0
0.5
1
1.5
2
2.5

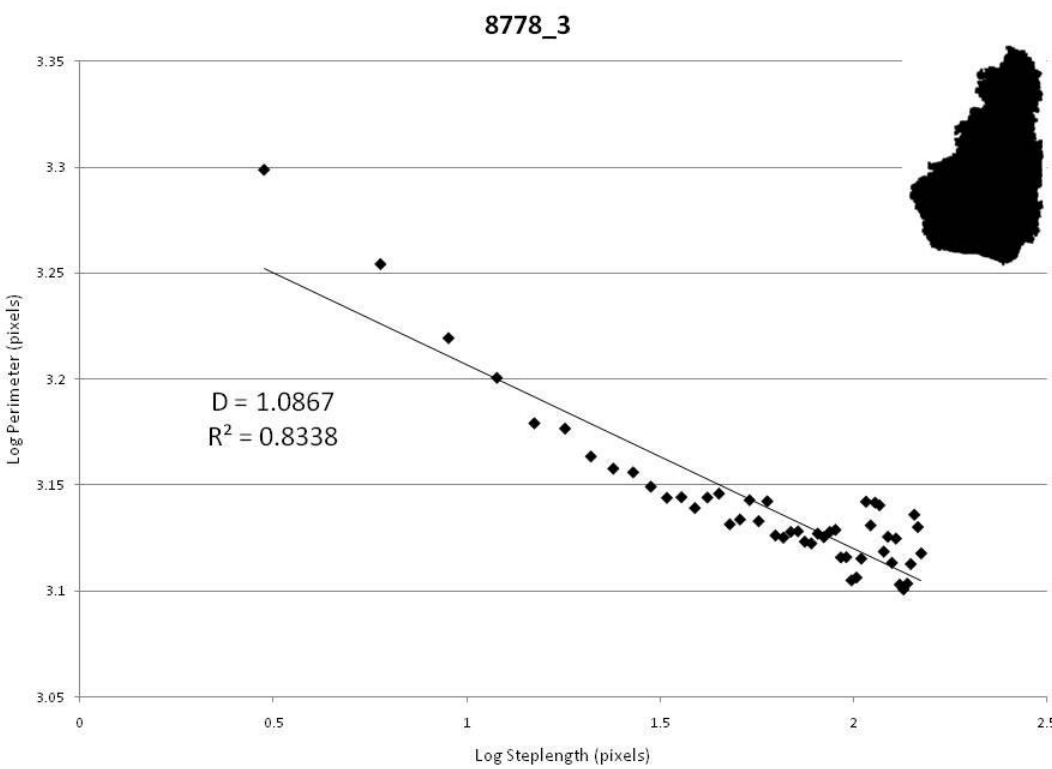

8777_2
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0957
R^2 = 0.7994
3
2.95
2.9
2.85
2.8
2.75
2.7
2.65
0
0.5
1
1.5
2
2.5

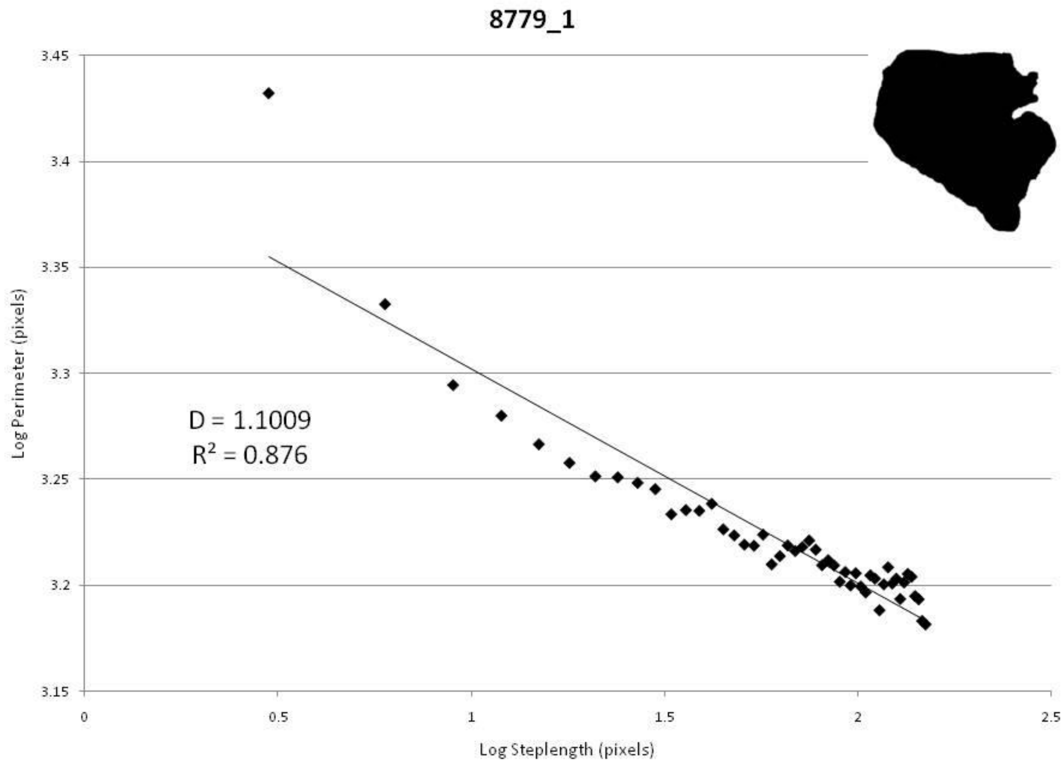

8777_3
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.1229
R^2 = 0.8034
D_{struct} = 1.0882
R^2 = 0.1037
3.1
3.05
3
2.95
2.9
2.85
2.8
2.75
0
0.5
1
1.5
2
2.5

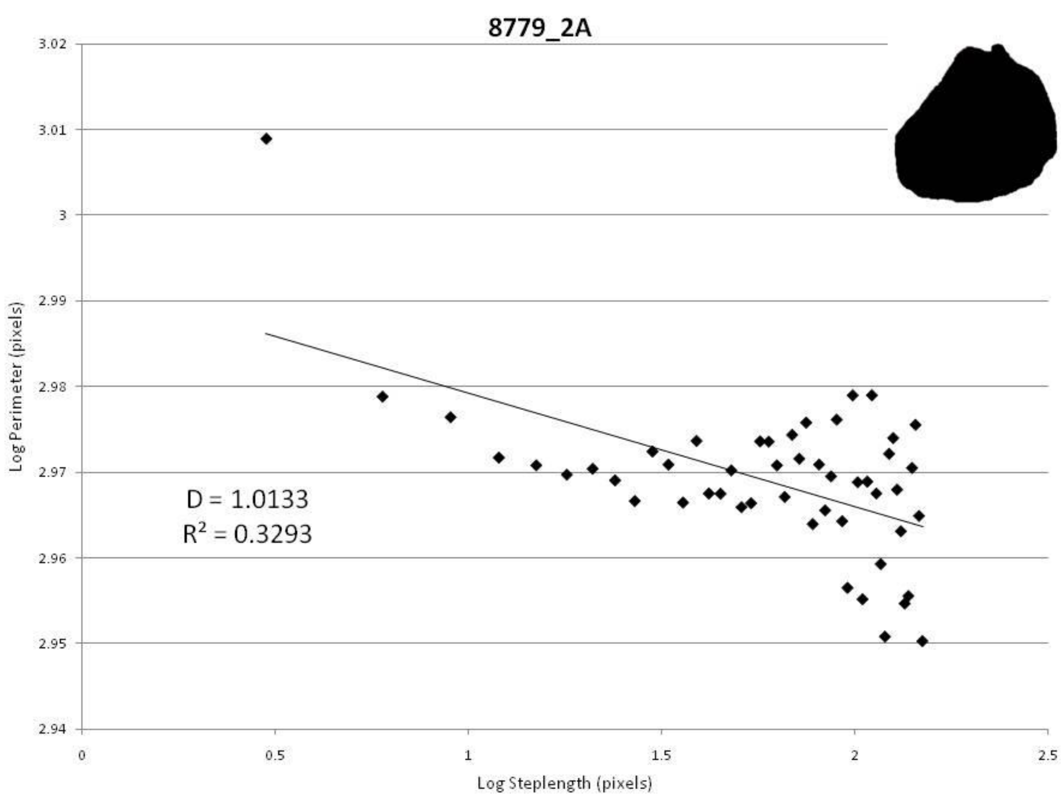

8778_1A
Log Perimeter (pixels)
Log Steplength (pixels)
D_text= 1.0403
R² = 0.6738
D_struct = 1.0953
R² = 0.1576
2.94
2.92
2.9
2.88
2.86
2.84
2.82
2.8
2.78
0
0.5
1
1.5
2
2.5

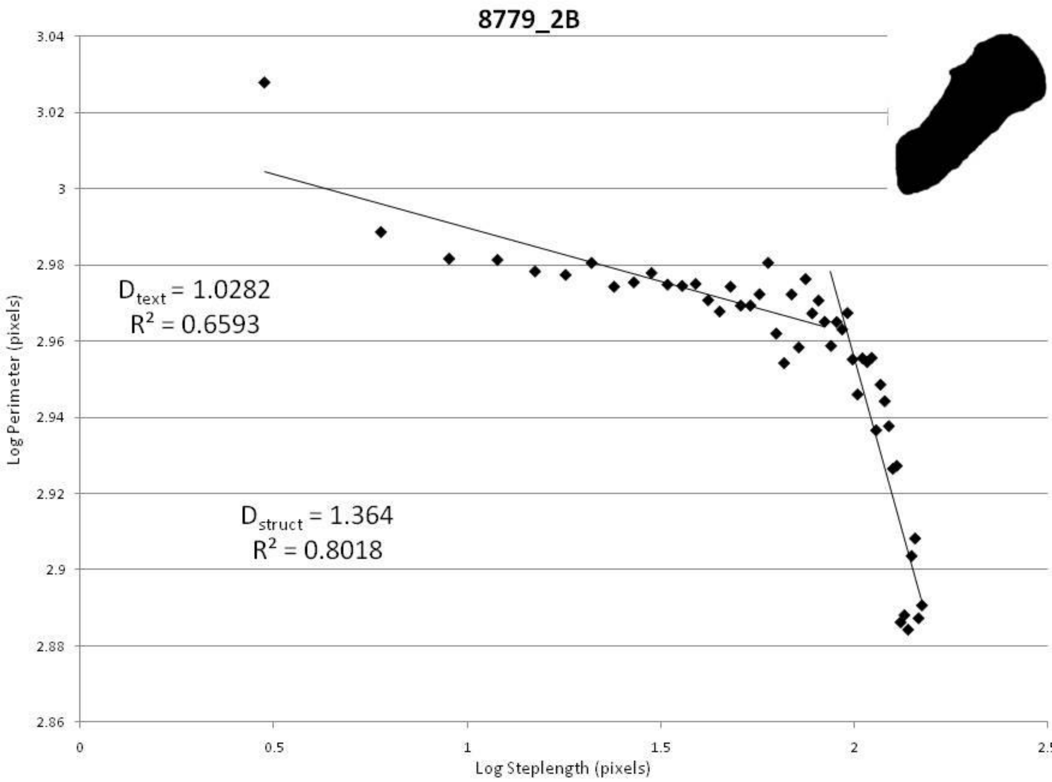

8778_1B
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.053
R² = 0.7845
3.18
3.16
3.14
3.12
3.1
3.08
3.06
3.04
3.02
3
0
0.5
1
1.5
2
2.5

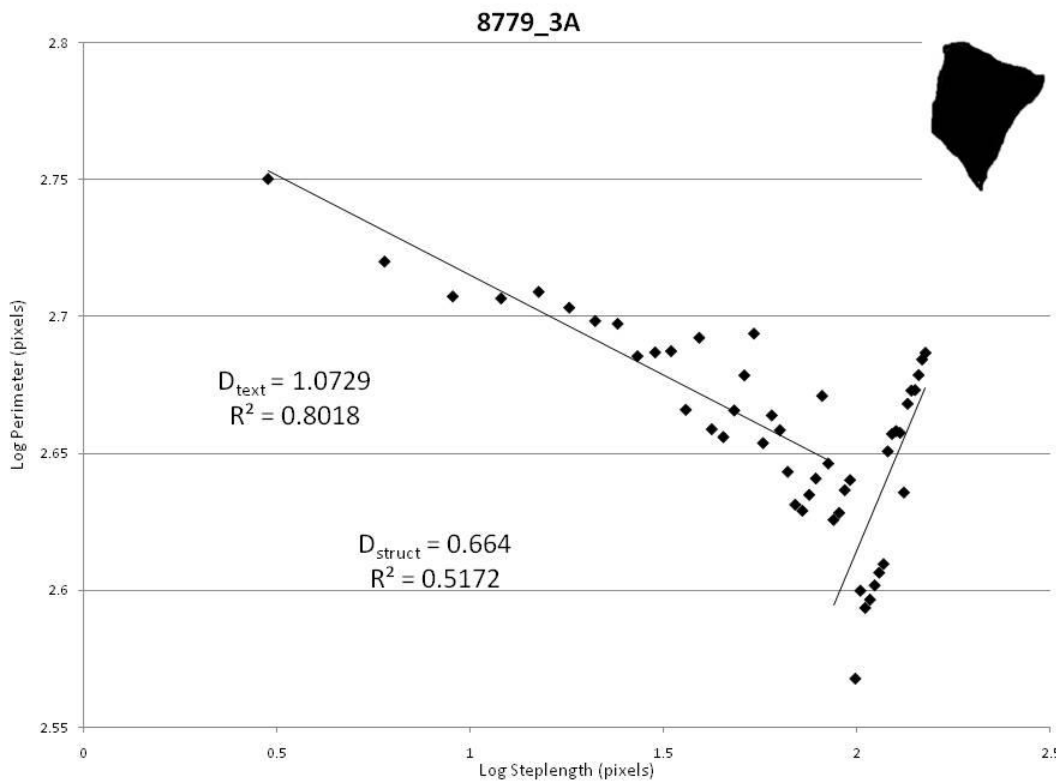

8778_2
D = 1.0426
R^2 = 0.5546
Log Perimeter (pixels)
Log Steplength (pixels)
3.12
3.1
3.08
3.06
3.04
3.02
3
2.98
2.96
2.94
0
0.5
1
1.5
2
2.5

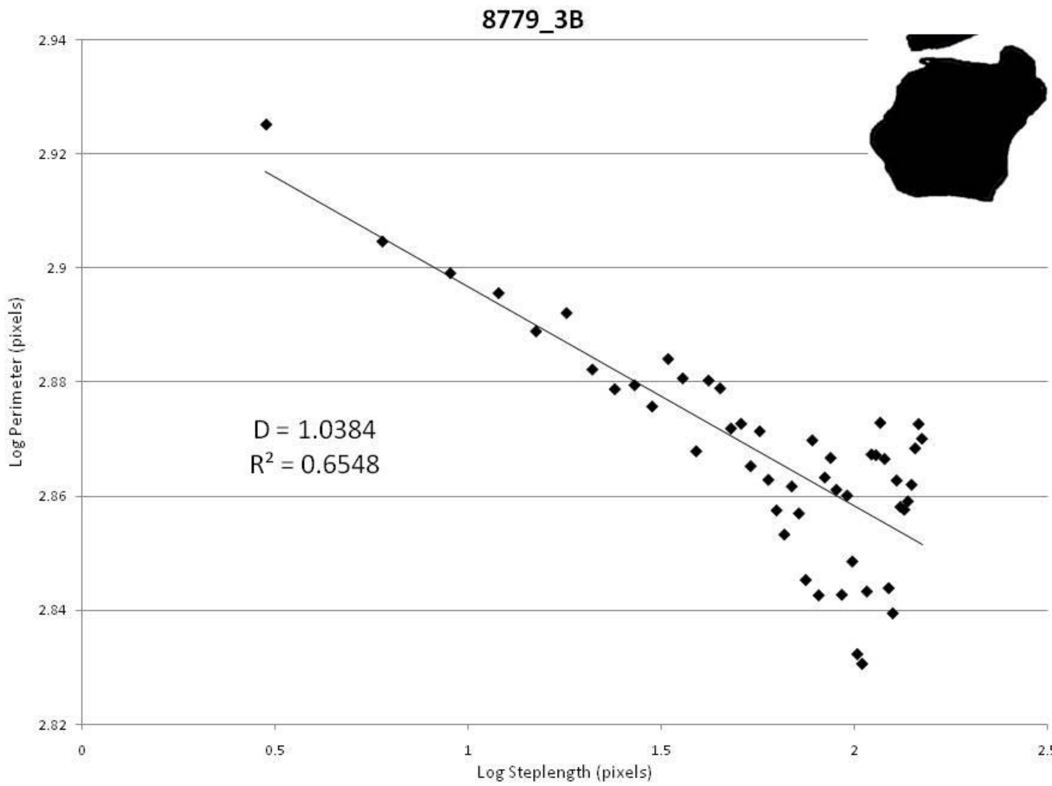

8778_3
D = 1.0867
R^2 = 0.8338
Log Perimeter (pixels)
Log Steplength (pixels)
3.35
3.3
3.25
3.2
3.15
3.1
3.05
0
0.5
1
1.5
2
2.5

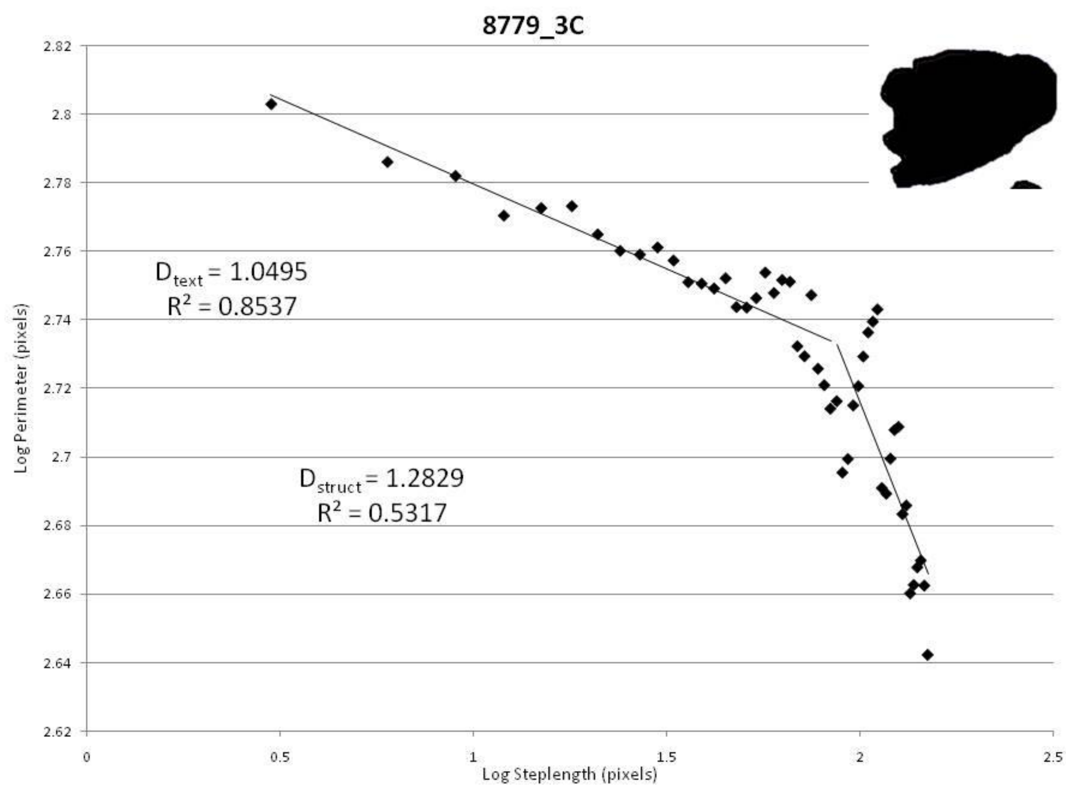

8779_1
D = 1.1009
R² = 0.876
Log Perimeter (pixels)
Log Steplength (pixels)
3.45
3.4
3.35
3.3
3.25
3.2
3.15
0
0.5
1
1.5
2
2.5

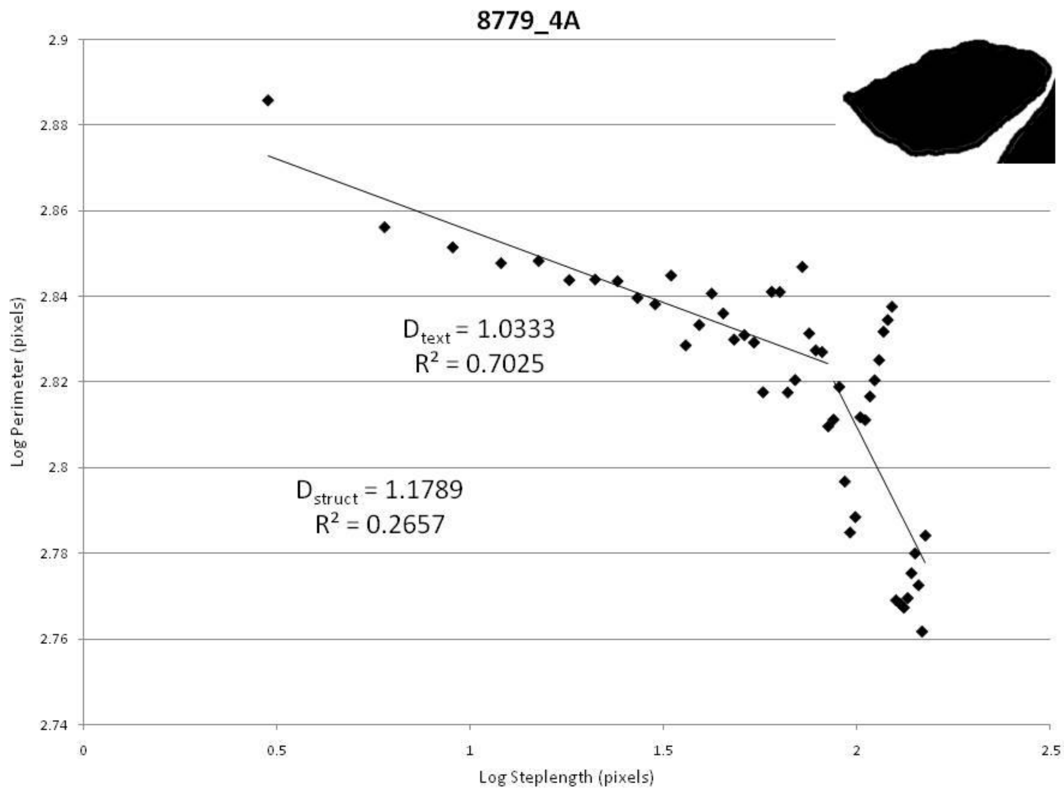

8779_2A
D = 1.0133
R² = 0.3293
Log Perimeter (pixels)
Log Steplength (pixels)
3.02
3.01
3
2.99
2.98
2.97
2.96
2.95
2.94
0
0.5
1
1.5
2
2.5

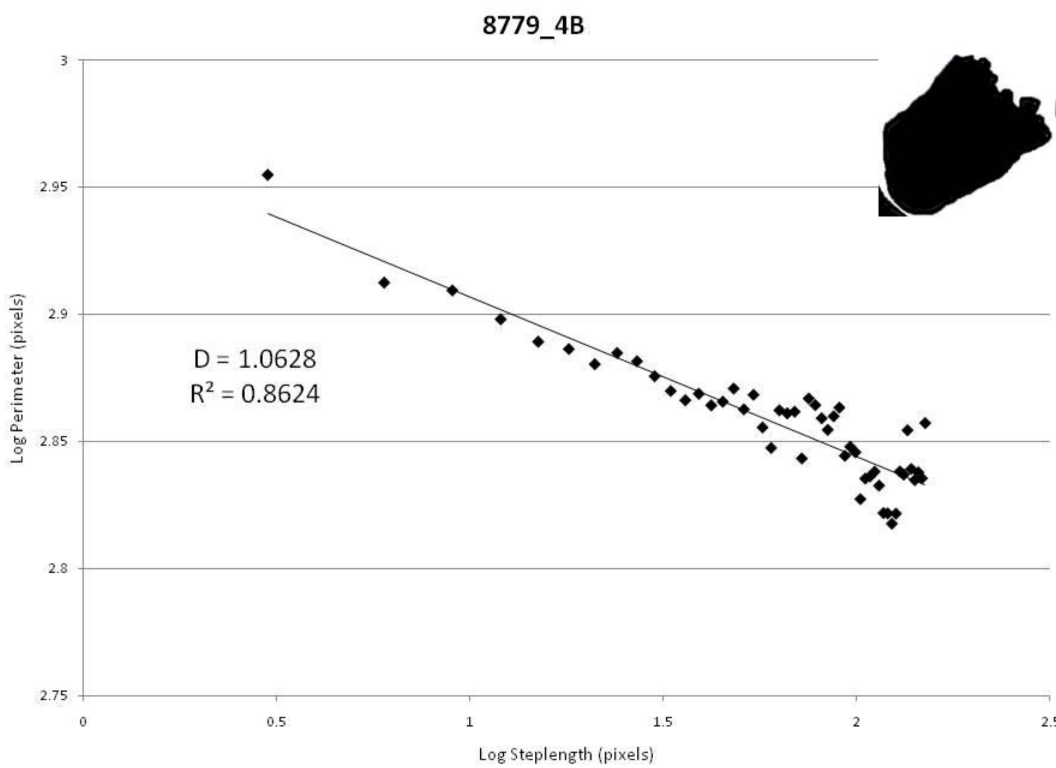

8779_2B
3.04
3.02
3
2.98
2.96
2.94
2.92
2.9
2.88
2.86
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0282
R^2 = 0.6593
D_{struct} = 1.364
R^2 = 0.8018

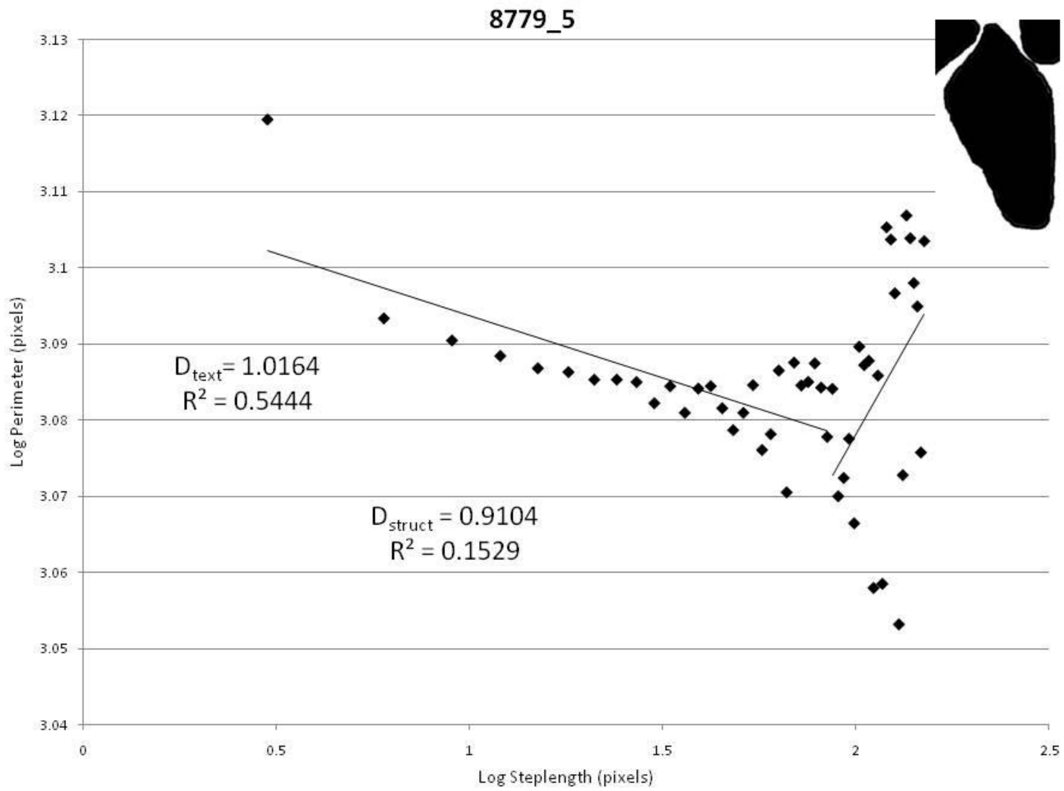

8779_3A
2.8
2.75
2.7
2.65
2.6
2.55
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0729
R^2 = 0.8018
D_{struct} = 0.664
R^2 = 0.5172

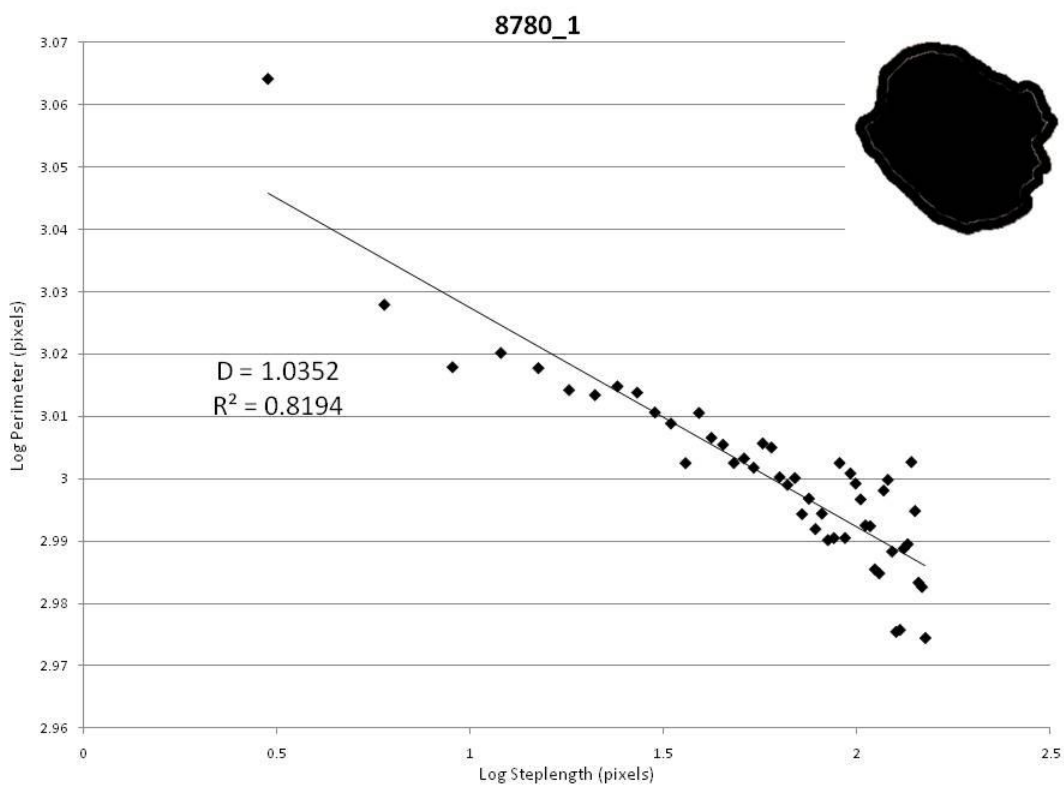

8779_3B
2.94
2.92
2.9
2.88
2.86
2.84
2.82
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0384
R² = 0.6548

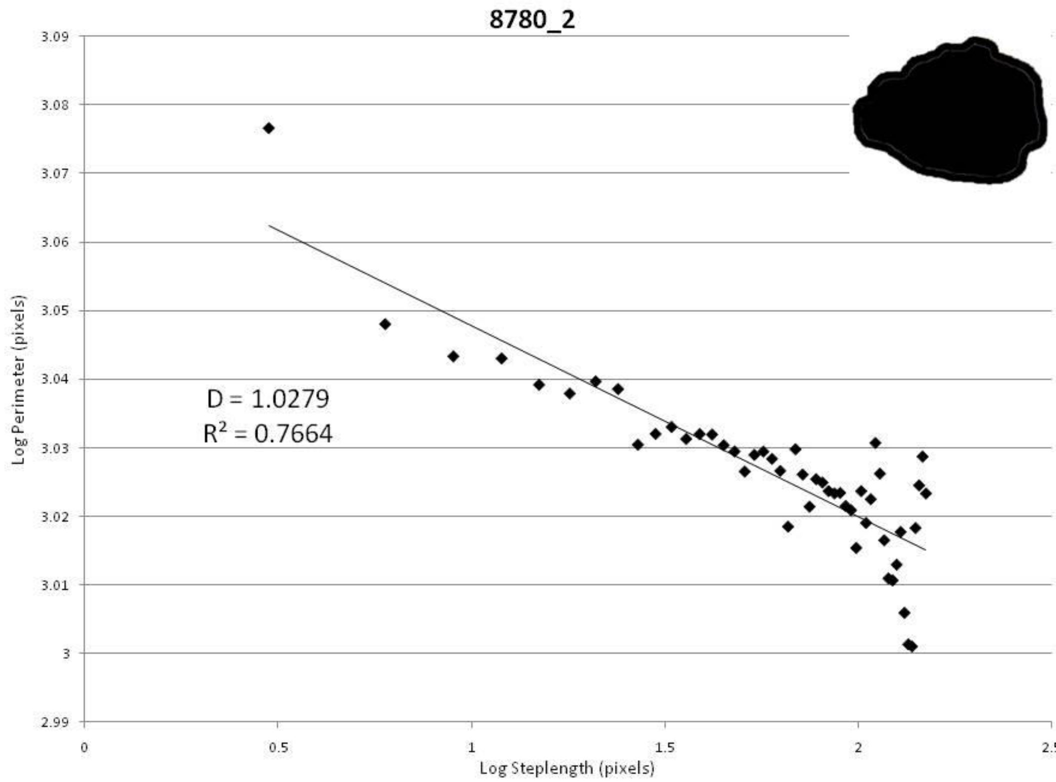

8779_3C
2.82
2.8
2.78
2.76
2.74
2.72
2.7
2.68
2.66
2.64
2.62
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D_text = 1.0495
R² = 0.8537
D_struct = 1.2829
R² = 0.5317

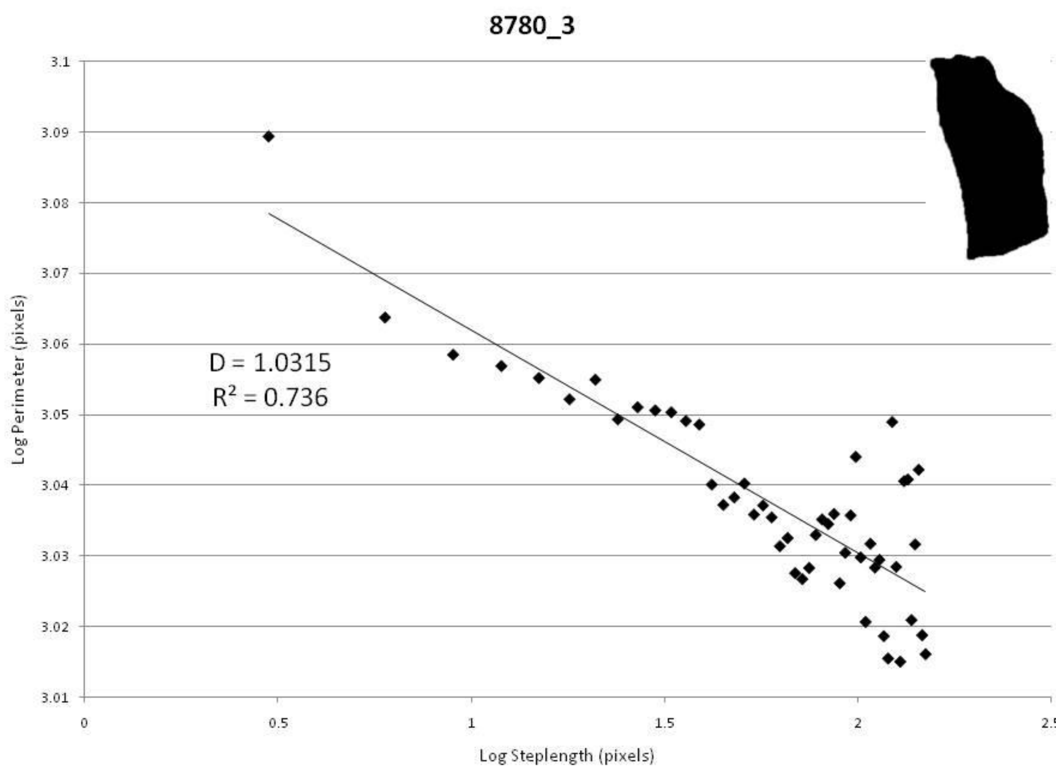

8779_4A
Log Perimeter (pixels)
Log Steplength (pixels)
D_{text} = 1.0333
R^2 = 0.7025
D_{struct} = 1.1789
R^2 = 0.2657

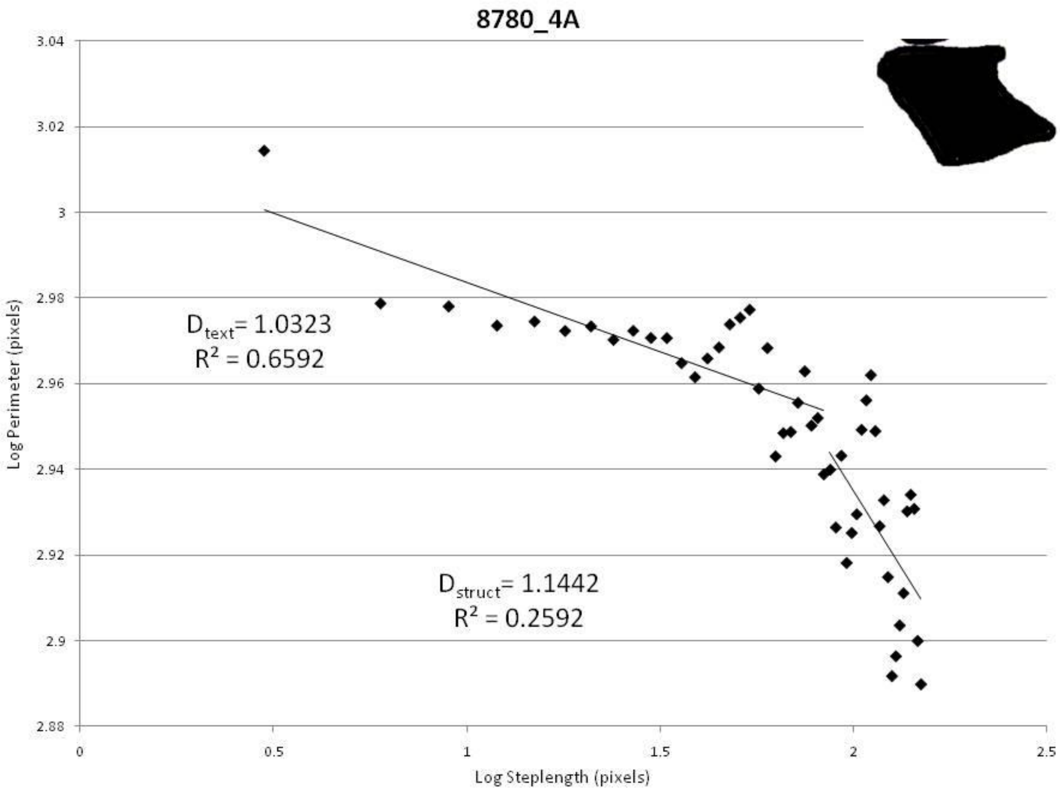

8779_4B
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0628
R^2 = 0.8624

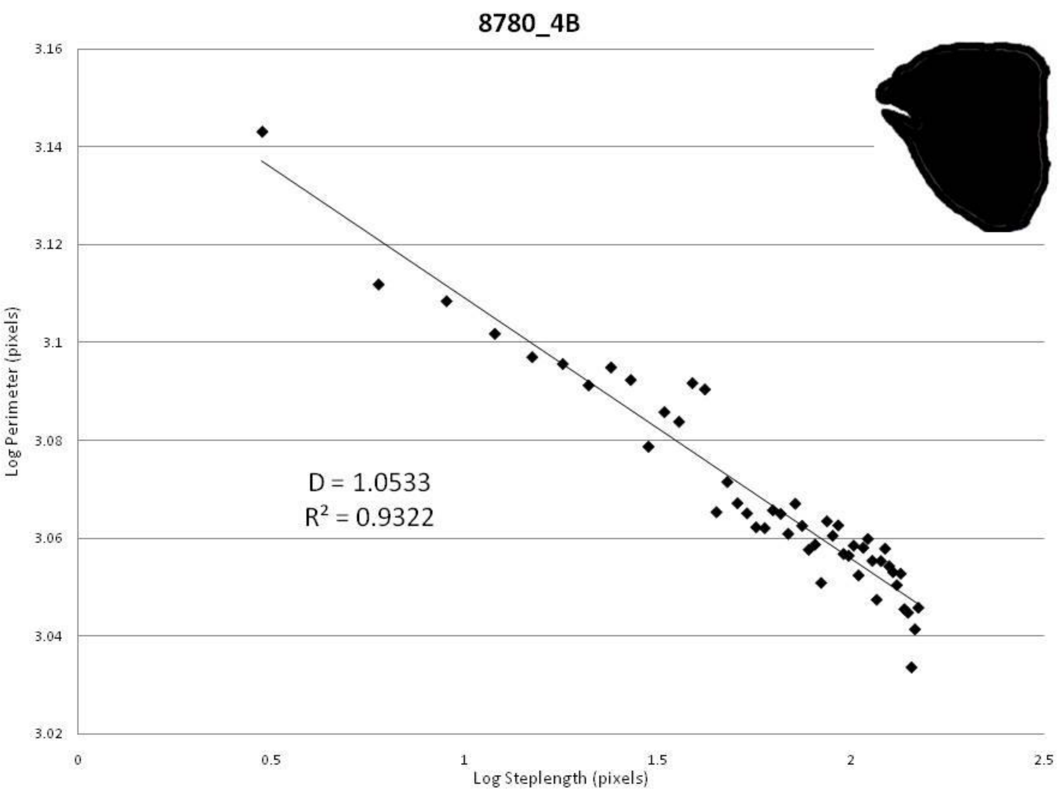

8779_5
3.13
3.12
3.11
3.1
3.09
3.08
3.07
3.06
3.05
3.04
Log Perimeter (pixels)
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)
D_{text}= 1.0164
R^2 = 0.5444
D_{struct} = 0.9104
R^2 = 0.1529

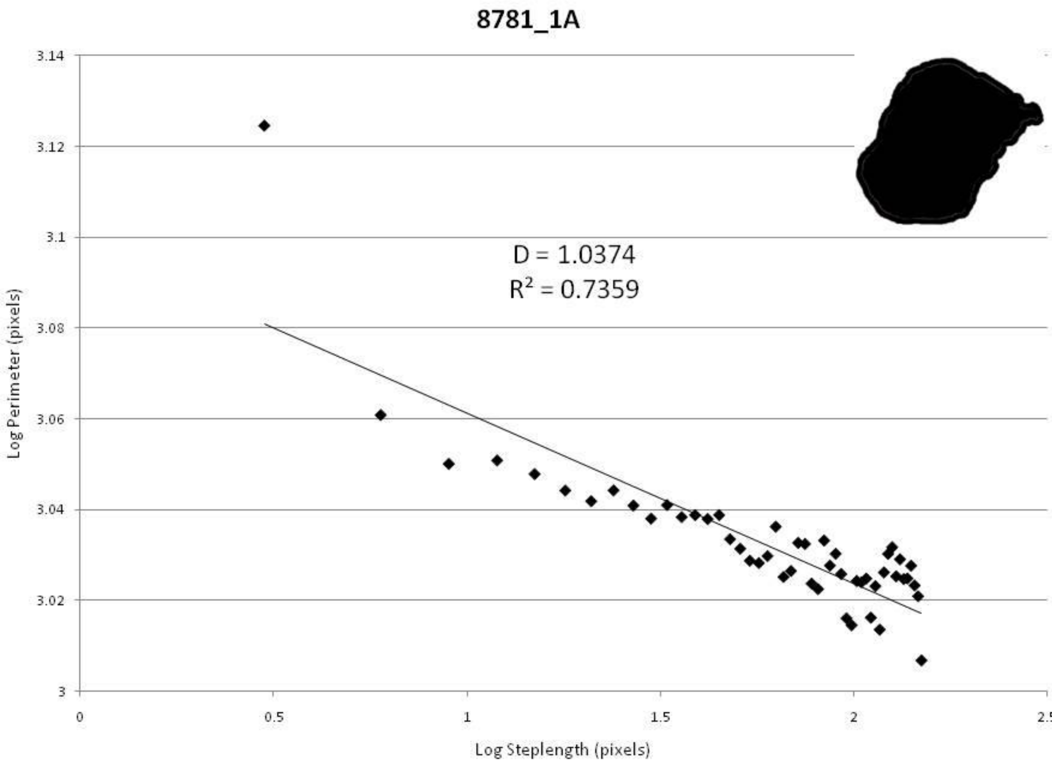

8780_1
3.07
3.06
3.05
3.04
3.03
3.02
3.01
3
2.99
2.98
2.97
2.96
Log Perimeter (pixels)
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)
D = 1.0352
R^2 = 0.8194

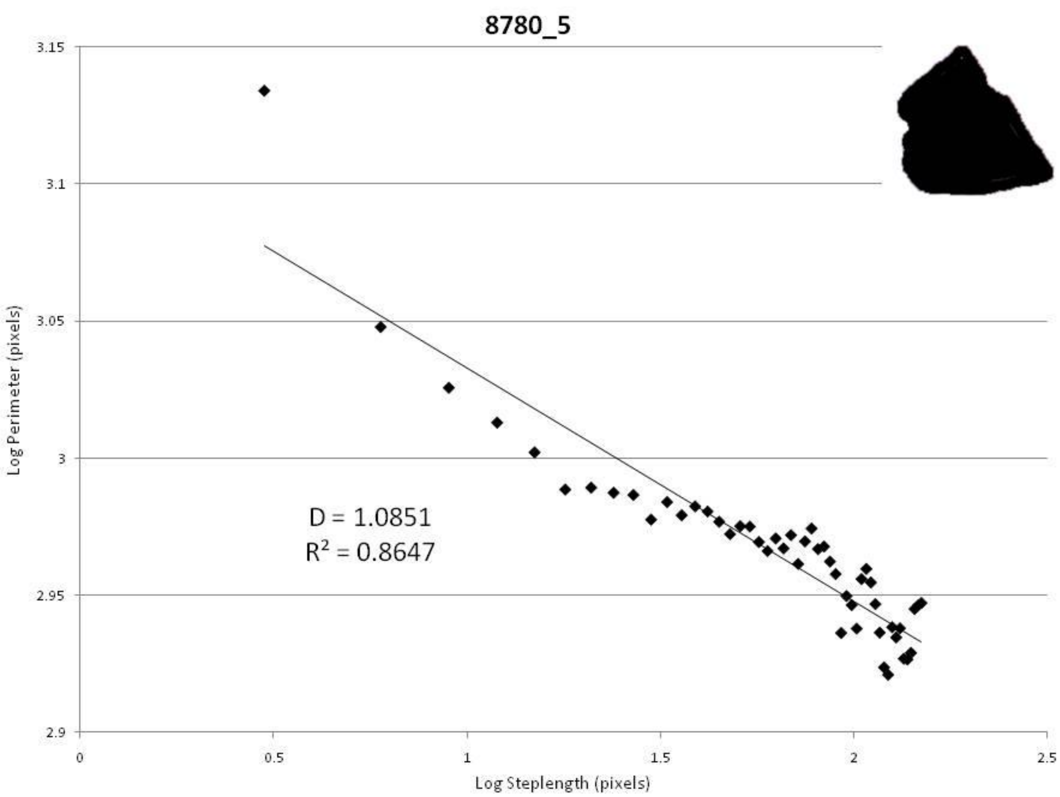

8780_2
D = 1.0279
R^2 = 0.7664
Log Perimeter (pixels)
Log Steplength (pixels)
3.09
3.08
3.07
3.06
3.05
3.04
3.03
3.02
3.01
3
2.99
0
0.5
1
1.5
2
2.5

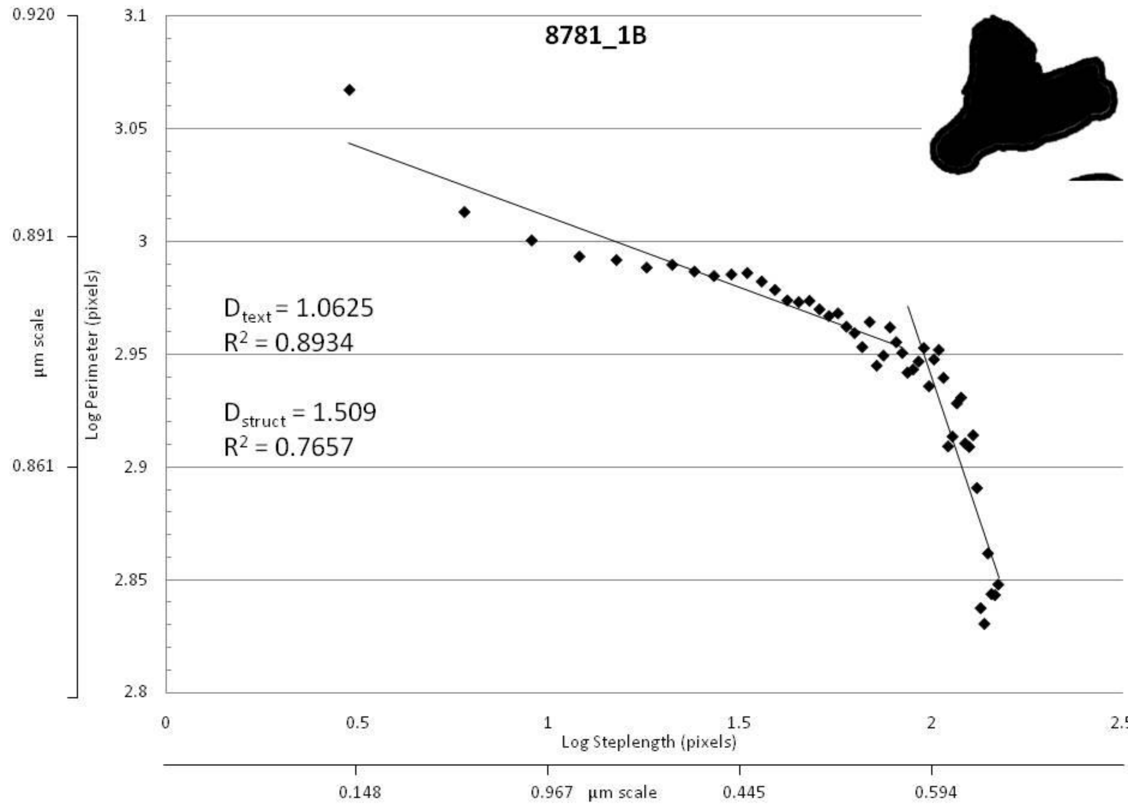

8780_3
D = 1.0315
R^2 = 0.736
Log Perimeter (pixels)
Log Steplength (pixels)
3.1
3.09
3.08
3.07
3.06
3.05
3.04
3.03
3.02
3.01
0
0.5
1
1.5
2
2.5

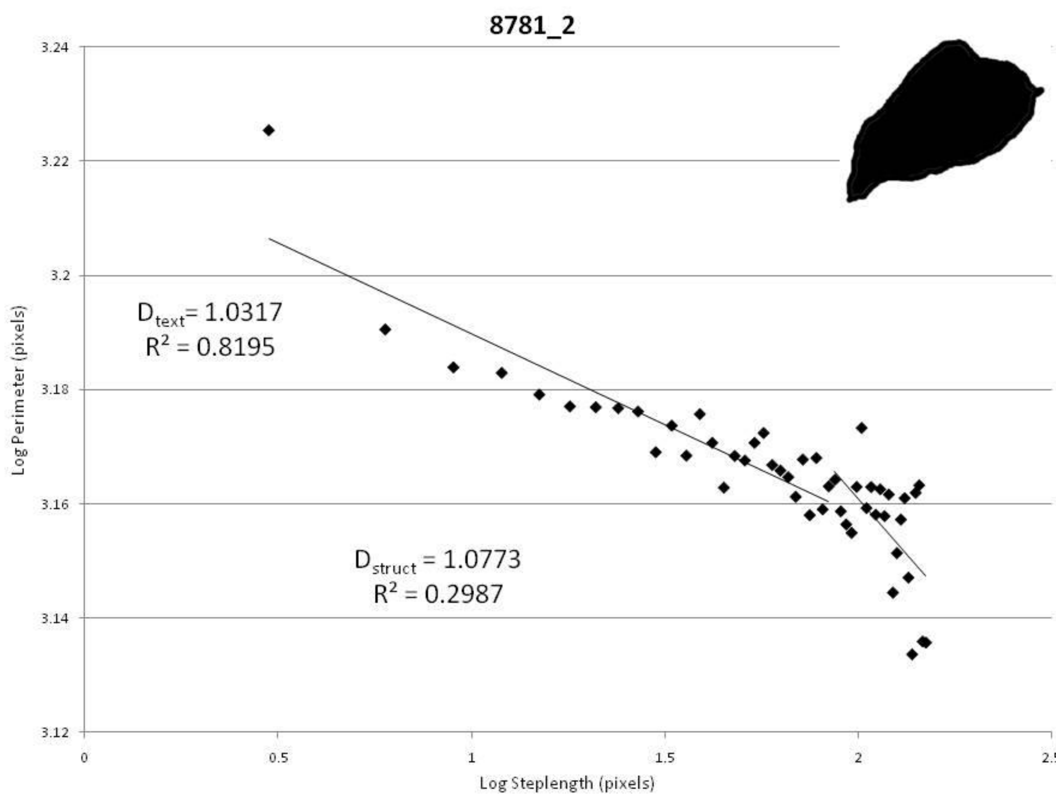

8780_4A
3.04
3.02
3
2.98
2.96
2.94
2.92
2.9
2.88
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D_text = 1.0323
R² = 0.6592
D_struct = 1.1442
R² = 0.2592

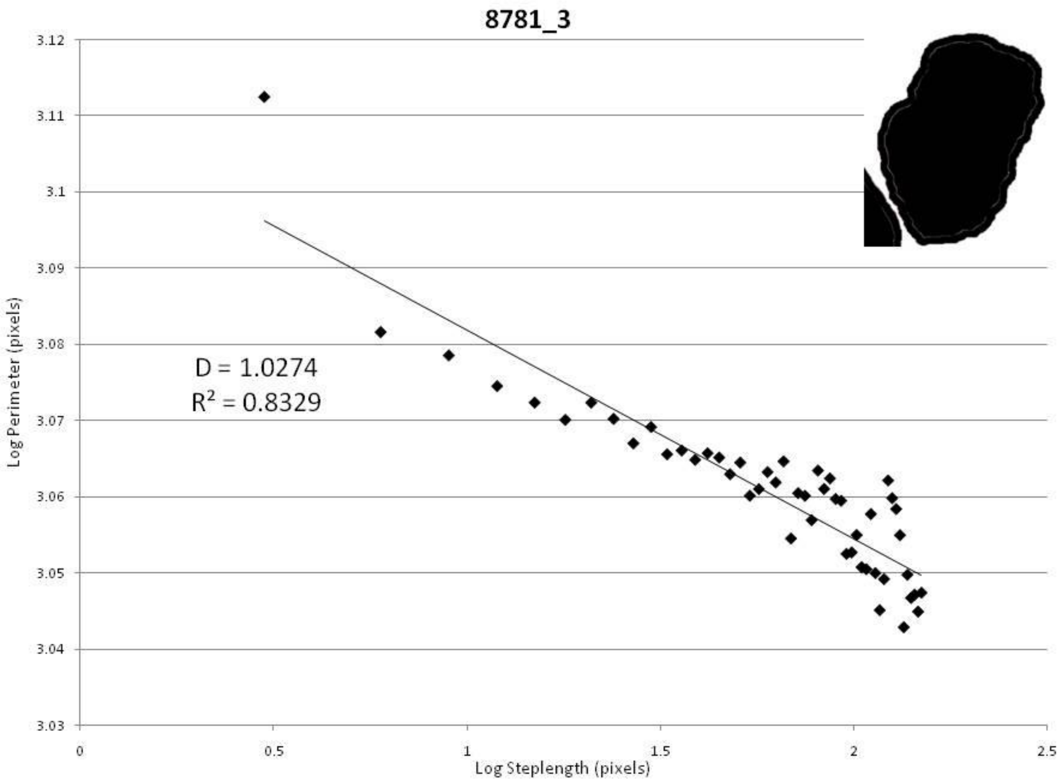

8780_4B
3.16
3.14
3.12
3.1
3.08
3.06
3.04
3.02
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0533
R² = 0.9322

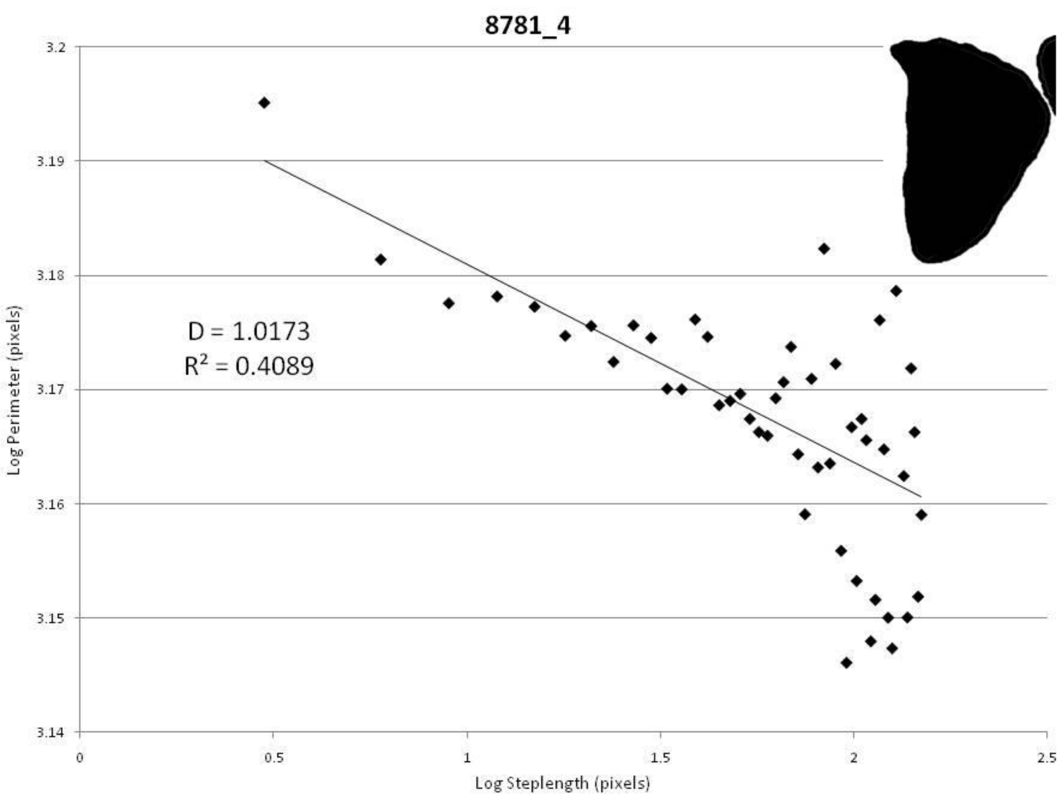

8781_1A
D = 1.0374
R^2 = 0.7359
Log Perimeter (pixels)
Log Steplength (pixels)
3.14
3.12
3.1
3.08
3.06
3.04
3.02
3
0
0.5
1
1.5
2
2.5

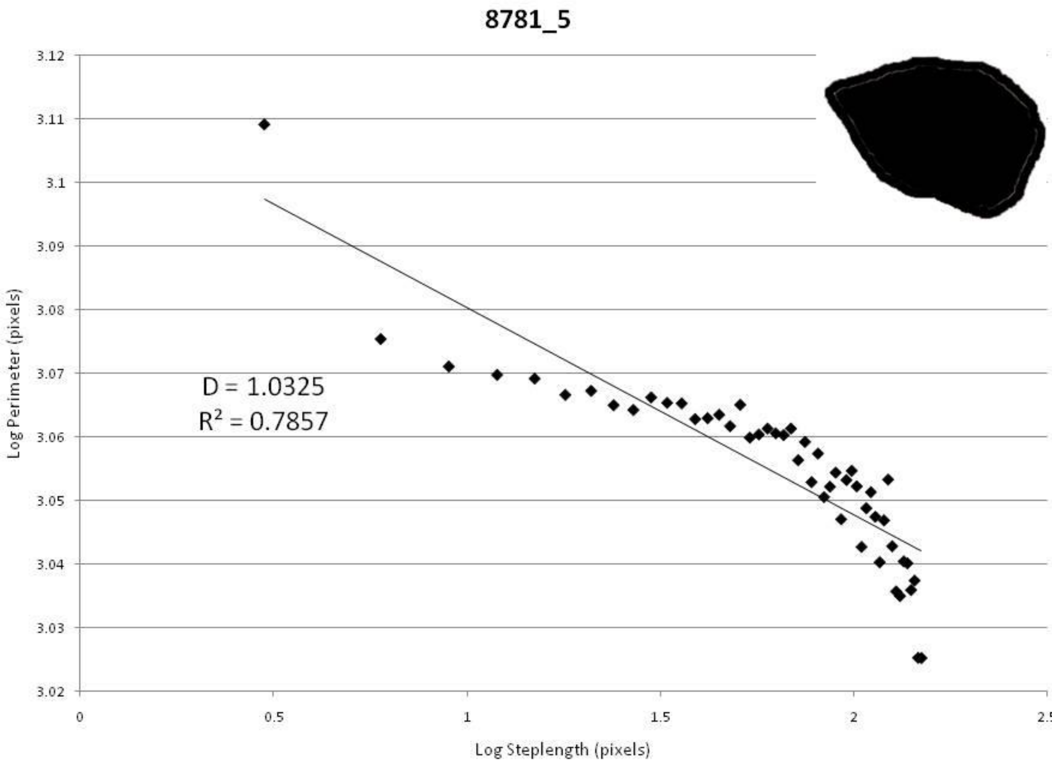

8780_5
D = 1.0851
R^2 = 0.8647
Log Perimeter (pixels)
Log Steplength (pixels)
3.15
3.1
3.05
3
2.95
2.9
0
0.5
1
1.5
2
2.5

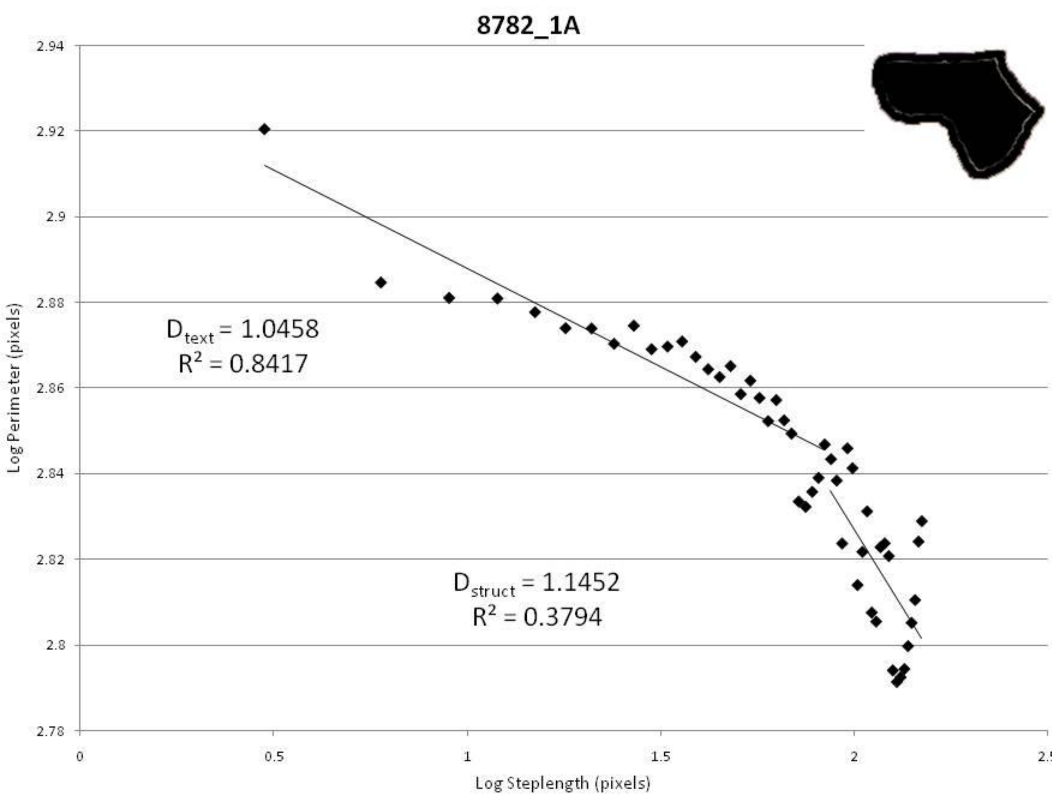

8781_1B
D_{text} = 1.0625
R^2 = 0.8934
D_{struct} = 1.509
R^2 = 0.7657
Log Perimeter (pixels)
µm scale
Log Steplength (pixels)
µm scale
0.920
0.891
0.861
3.1
3.05
3
2.95
2.9
2.85
2.8
0
0.5
1
1.5
2
2.5
0.148
0.967
0.445
0.594

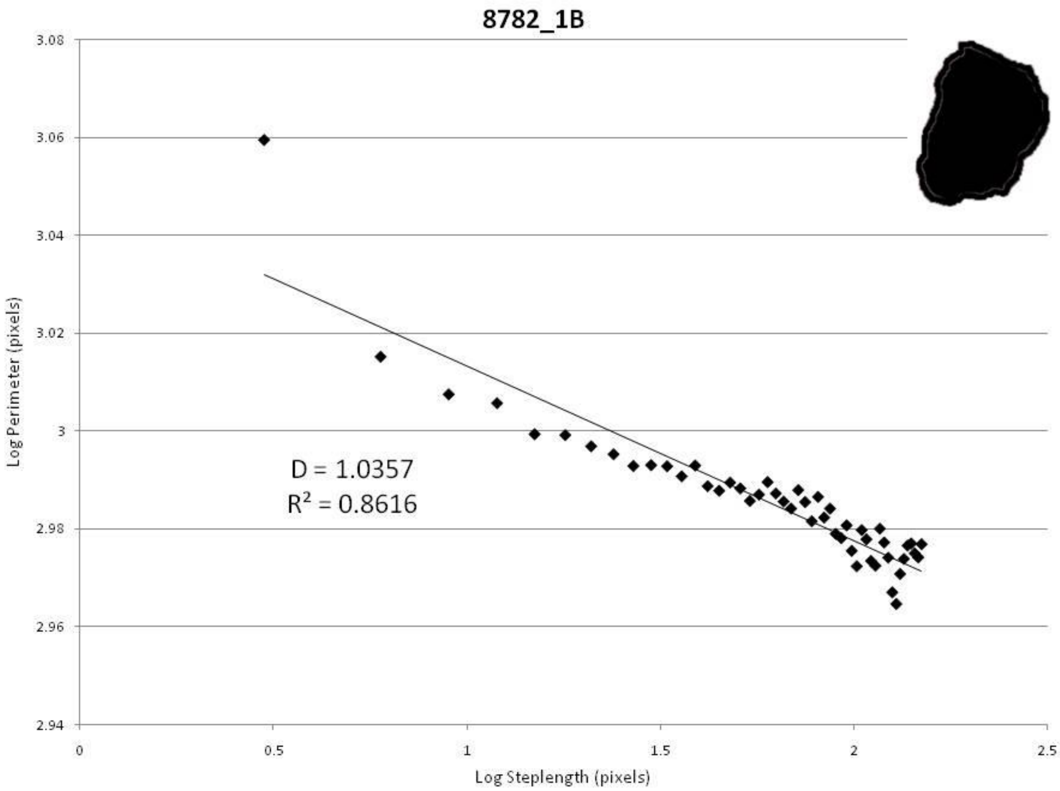

8781_2
D_{text}= 1.0317
R^2 = 0.8195
D_{struct} = 1.0773
R^2 = 0.2987
Log Perimeter (pixels)
Log Steplength (pixels)
3.24
3.22
3.2
3.18
3.16
3.14
3.12
0
0.5
1
1.5
2
2.5

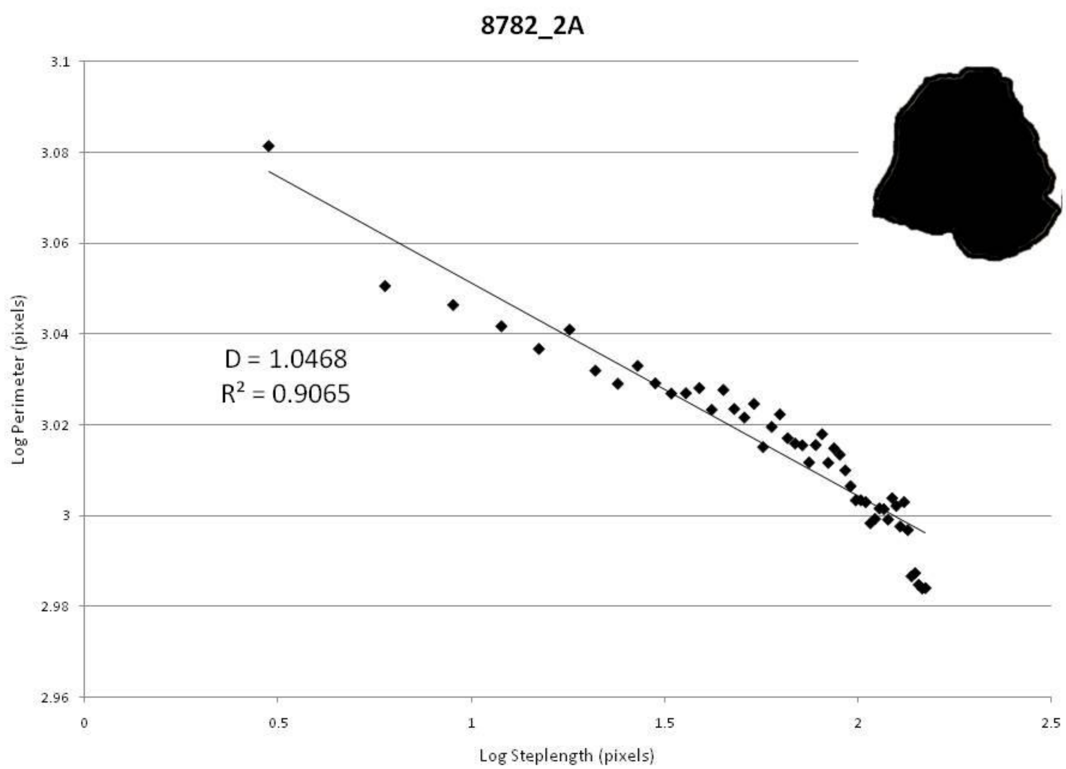

8781_3
D = 1.0274
R² = 0.8329
Log Perimeter (pixels)
Log Steplength (pixels)
3.12
3.11
3.1
3.09
3.08
3.07
3.06
3.05
3.04
3.03
0
0.5
1
1.5
2
2.5

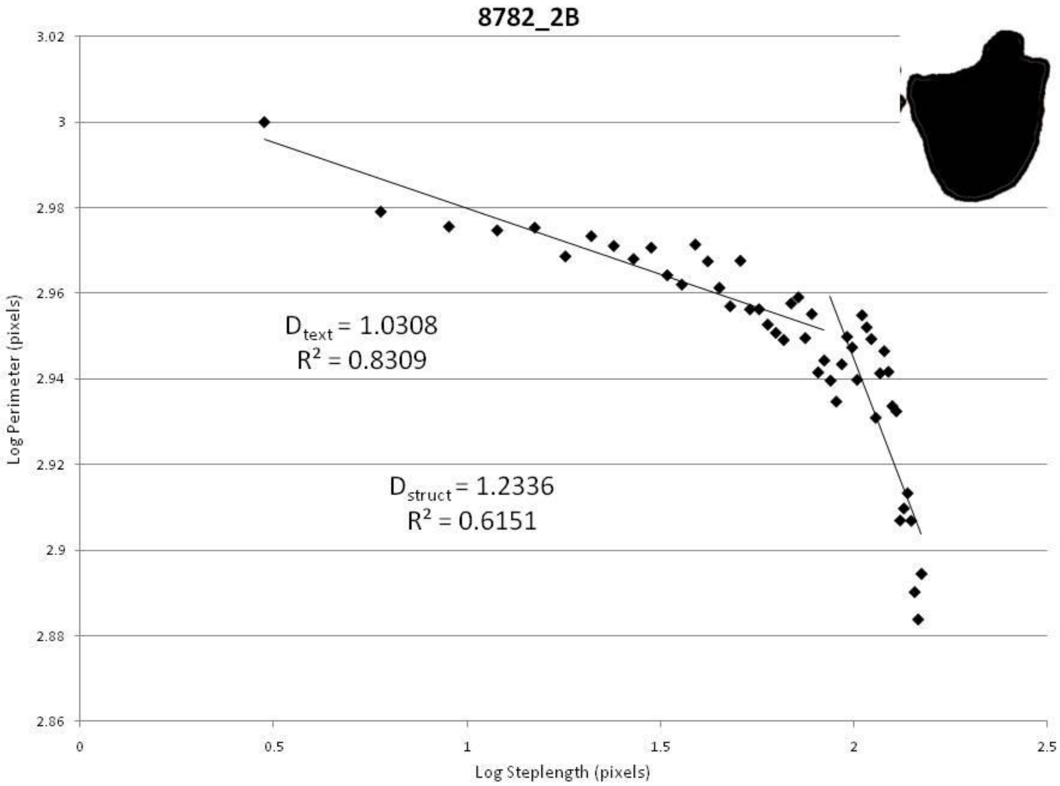

8781_4
D = 1.0173
R² = 0.4089
Log Perimeter (pixels)
Log Steplength (pixels)
3.2
3.19
3.18
3.17
3.16
3.15
3.14
0
0.5
1
1.5
2
2.5

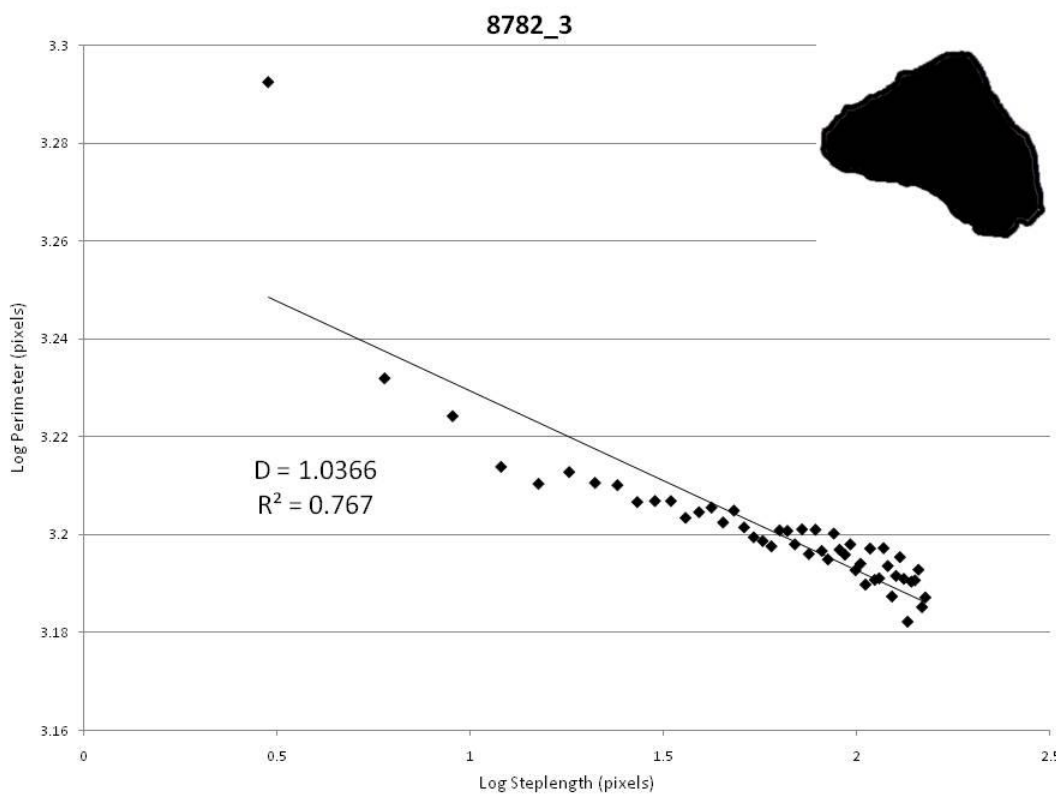

8781_5
D = 1.0325
R^2 = 0.7857
Log Perimeter (pixels)
Log Steplength (pixels)
3.12
3.11
3.1
3.09
3.08
3.07
3.06
3.05
3.04
3.03
3.02
0
0.5
1
1.5
2
2.5

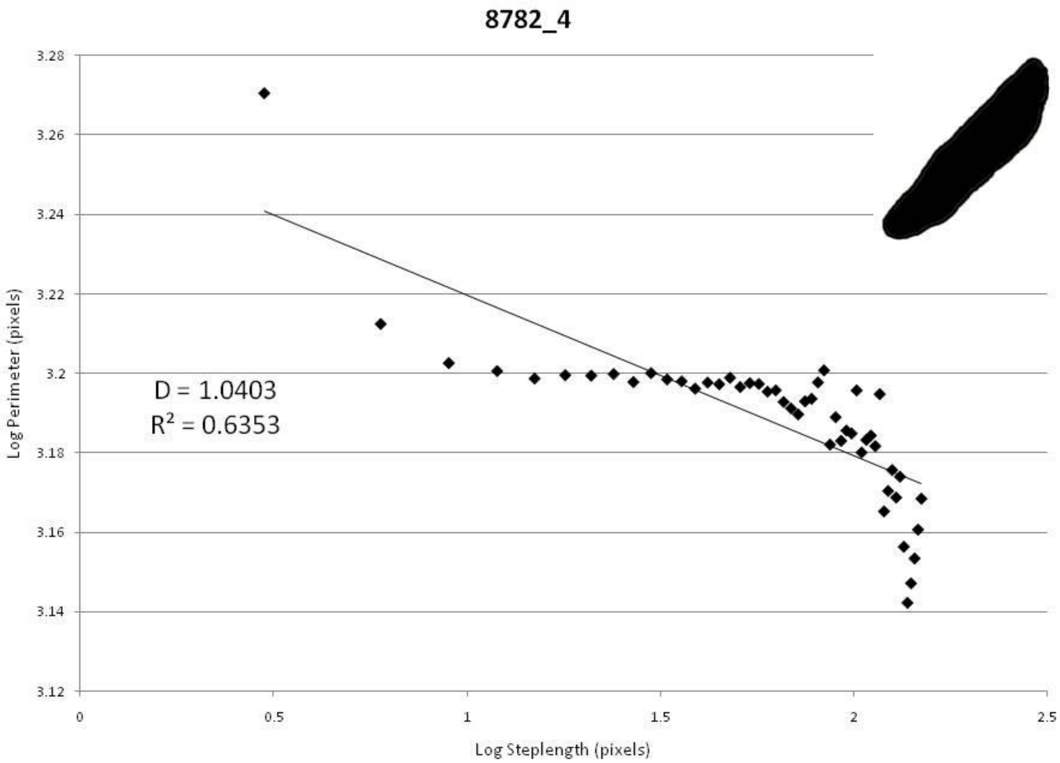

8782_1A
D_{text} = 1.0458
R^2 = 0.8417
D_{struct} = 1.1452
R^2 = 0.3794
Log Perimeter (pixels)
Log Steplength (pixels)
2.94
2.92
2.9
2.88
2.86
2.84
2.82
2.8
2.78
0
0.5
1
1.5
2
2.5


8782_1B
3.08
3.06
3.04
3.02
3
2.98
2.96
2.94
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0357
R² = 0.8616


8782_2A
3.1
3.08
3.06
3.04
3.02
3
2.98
2.96
0
0.5
1
1.5
2
2.5
Log Perimeter (pixels)
Log Steplength (pixels)
D = 1.0468
R² = 0.9065


8782_2B
Log Perimeter (pixels)
Log Steplength (pixels)
3.02
3
2.98
2.96
2.94
2.92
2.9
2.88
2.86
0
0.5
1
1.5
2
2.5
D_{text} = 1.0308
R^2 = 0.8309
D_{struct} = 1.2336
R^2 = 0.6151


8782_3
Log Perimeter (pixels)
Log Steplength (pixels)
3.3
3.28
3.26
3.24
3.22
3.2
3.18
3.16
0
0.5
1
1.5
2
2.5
D = 1.0366
R^2 = 0.767



8782_4
3.28
3.26
3.24
3.22
3.2
3.18
3.16
3.14
3.12
Log Perimeter (pixels)
D = 1.0403
R^2 = 0.6353
0
0.5
1
1.5
2
2.5
Log Steplength (pixels)