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Grain Size Distribution With Geomorphology On Gypsum Dunes In The White Sands Erg, White Sands National Monument, New Mexico

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GRAIN SIZE DISTRIBUTION WITH GEOMORPHOLOGY ON GYPSUM DUNES IN THE
WHITE SANDS ERG, WHITE SANDS NATIONAL MONUMENT, NEW MEXICO

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2012

DEDICATION

This thesis is dedicated to my wife Lilia and my children Alanna, Aidan, Kai, and Anya, and to my mother Robbins and my sister Carrie, without whose love, support, and tolerance neither this work nor I would have been fulfilled.

GRAIN SIZE DISTRIBUTION WITH GEOMORPHOLOGY ON GYPSUM DUNES IN THE
WHITE SANDS ERG, WHITE SANDS NATIONAL MONUMENT, NEW MEXICO

BY

SLADE BROWNING JONES, BIS

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Without the support and assistance of all those mentioned, this work would not have been possible. The author offers his heartfelt thanks to all mentioned, and to anyone else he may have forgotten.

ABSTRACT

In order to examine grain size distribution over dunes at the White Sands dune field in New Mexico, 1214 geolocated surficial samples were collected and analyzed by laser diffraction. Local variations in dunes such as neighboring interdune types and the presence of vegetation, scour features, and granule ripples on the dunes were noted. This study indicates that recrystallization of gypsum and the generation of fresh sediments is occurring in significant quantities within vegetated and erosional interdunes, providing both high and low anomalies in grain size distribution by acting as point sources through much of the central portion of the dune field. Other local variations as previously mentioned such as scour surfaces on dunes and local topographic alteration of air movement all overprint more field-scale effects. Coarse grains ($>1.4\text{mm}$) are found in granule ripples in troughs and swales and in avalanche deposits on the slipface apron. Saltating sand samples selected by microscopy from the stoss face of dunes showed a general coarsening trend with relative elevation. Samples collected on the lee side of dune crests were generally finer-grained than those on the stoss side, and interdune samples collected within 10-60m of the slipface aprons may indicate a lee “sheltering” influence extending a substantial distance across the interdune. Patches of finer-grained sediments were found on dunes downwind of vegetated interdunes, and where it was present on dunes, vegetation was associated with deposition of comparatively finer grains in its immediate vicinity. To effectively model transport, these variations will all have to be taken into account.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	v
ABSTRACT	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	ix
LIST OF FIGURES	x
Chapter	
1. INTRODUCTION	1
2. FIELD-SCALE GRAIN SIZE ANALYSIS AND COMPLICATIONS FROM LOCAL FACTORS ON A GYPSUM DUNE FIELD, WHITE SANDS, NEW MEXICO	4
2.1 Introduction	4
2.2 Setting	6
2.3 Methods	9
2.4 Results	11
2.5 Discussion	25
2.6 Conclusions	28

3. LOCAL EFFECTS ON GRAIN SIZE OVER BARCHAN AND BARCHANOID RIDGE DUNES, WHITE SANDS, NEW MEXICO	30
3.1 Introduction	30
3.2 Setting	32
3.3 Methods.....	35
3.4 Results.....	37
3.5 Discussion.....	50
3.6 Conclusions	52
4. CONCLUSION	53
REFERENCES	56
APPENDIX A: LOCATION DATA, SIZE PARAMETERS, & TYPE.....	59
APPENDIX B: GRAIN SIZE DISTRIBUTION DATA.....	85
CURRICULUM VITA.....	108

LIST OF TABLES

	Page
Table 2.1 Survey granulometric results	14
Table 2.2 Statistical results	24
Table 3.1 Dune granulometric results.....	37-38
Table 3.2 Statistical results	48-49

LIST OF FIGURES

	Page
Figure 2.1 Location Map	6
Figure 2.2 Sub-environment locations & characteristics	13
Figure 2.3 Granule ripple population environment & photomicrographs	15
Figure 2.4 Vegetated interdune population environment & photomicrographs	17
Figure 2.5 Erosional interdune population environment & photomicrographs	19
Figure 2.6 Dune sand population environment & photomicrographs	20
Figure 2.7 Cross-plots of granulometric parameters and elevation, distance	22
Figure 2.8 Mean grain size with topography on transect	25
Figure 3.1 Location map of individual dunes	32
Figure 3.2 Dune B	39
Figure 3.3 Dune D	41
Figure 3.4 Dune E	44
Figure 3.5 Dune K	46

1. INTRODUCTION

Grain size is one of the key parameters in sedimentology, providing important information related to transport distance and mechanics. Distribution of grain size serves an equivalent role in regard to direction, magnitude, and variation of both scalars in the transporting fluid. It is for these reasons that grain size variations within an eolian environment are a critical factor in the attempt to understand the dynamic processes affecting dune geomorphology. Previous work (for example, Pye and Tsoar, 1990) has shown that grain size distributions may vary across all spatial scales in dune fields; size differentiation occurs over an individual dune, between different dune types, between different dunes and interdune areas within the same dune field, and over the full extent of a dune sea. These variations and the known and currently unknown patterns within them provide a rich opportunity for research into the relationships between the size and distribution of sand grains and the mechanics which emplaced them.

However, in order to most effectively evaluate the processes shaping dune field development, geomorphology, and dynamics, the grain size distributions on modern dune fields must first be described. Previous studies have largely been limited to either profiles across individual dunes (such as Barndorff-Nielsen *et al.*, 1982), providing little by way of larger context in which to relate the dunes to erg-scale processes, or regional studies across dune fields (e.g., Livingstone *et al.*, 1999; Jerolmack *et al.*, 2011), allowing poor capacity to account for dune-scale activities and their effects on the larger scale. This disparity of scales prevents integration of past work into a complete examination of grain-size response to systemic

variation. It is the intent of this research to begin addressing the gaps and disparities of previous work by collecting surface samples over sufficient area and in sufficient density at selected dunes to demonstrate both large and small-scale response to variations in morphology across a significant extent of a dune field, using GPS-located samples to provide grain size information across a 3 km long swath through the White Sands of New Mexico.

The White Sands dune field of New Mexico is the largest gypsum dune field in the world (McKee and Moiola, 1975; Fryberger, 2000), and is located in the Tularosa Basin within the north-south trending Tertiary Rio Grande Rift. It was chosen as the location of this study for four reasons. First, the slight solubility of gypsum and the locally high water table may allow for continuous recrystallization and erosion of gypsum sand *in situ* (personal communication, Richard P. Langford, August 2010), while the fragility of gypsum grains should result in accelerated weathering of grains (compared to, for example, quartz), potentially producing an abnormally large local variation of grain sizes, whereas in many quartz dune fields, sand grains are almost uniform in size and variation within dunes and between dunes is difficult to discern (Lancaster, 1989). Second, the nearly homogenous composition of the gypsum dune sea (Fryberger, 2000) prevents variability in density, general grain shape, and resistivity to weathering processes from complicating analysis. Third, the primary source of the sediments comprising the dune field is known (Kocurek *et al.* 2007) and thus transport distance may be easily approximated. Finally, the eolian regime in which the dunes reside is sufficiently uncomplicated (Kocurek *et al.* 2007; Jerolmack *et al.*, 2012) to allow for generalization of transport direction at the erg-scale.

It was the decision of the author and his thesis committee to write up this research in the form of two papers in appropriate format for submission to professional journals rather than as one longer work. Therefore this thesis is structured accordingly, broken up into a first paper examining results in the context of field scale phenomena including the identification of several distinct populations of grains related to subenvironment of collection and the identification of locally sourced gypsum within the survey area, and a second paper focusing more on several individual dunes and observations regarding smaller scale mechanics in relation to local features such as the immediately upwind interdune type, on-dune topography, and the presence of vegetation. Due to the common location, methods, and resulting data of the two papers, some repetition is necessary in this thesis.

2. FIELD-SCALE GRAIN SIZE ANALYSIS AND COMPLICATIONS FROM LOCAL FACTORS ON A GYPSUM DUNE FIELD, WHITE SANDS, NEW MEXICO

2.1 Introduction

Grain size variations within an eolian environment are a critical factor in the attempt to understand the dynamic processes affecting dune geomorphology. Grain size distributions may vary across all scales in dune fields; size differentiation occurs over an individual dune, between different dune types, between different dunes and interdune areas within the same dune field, and across the expanse of a dune field (Pye and Tsoar, 1990).

However, in order to most effectively evaluate the processes shaping dune field development, geomorphology, and dynamics, the grain size distributions on modern dune fields must first be described. Previous studies have largely been limited to profiles across individual dunes (such as Barndorff-Nielsen *et al.*, 1982) or regional studies across dune fields (e.g., Jerolmack, 2011; Livingstone *et al.* 1999), and have either focused almost exclusively on the relationship between grain size and dune type (Wilson, 1972; Wasson and Hyde, 1983) or provided inconsistent results. Folk (1971) and others (Lancaster, 1986; Livingstone, 1987; Ghrefat *et al.*, 2007) have noted coarser-grained dune crests as compared to finer-grained flank or interdune deposits; in contrast, Bagnold (1941), Wasson and Hyde (1983), and Thomas (1988) found the opposite tendency, while Barndorff-Nielsen *et al.* (1982) found coarsening up the windward slope to the crest and Purkait (2010) found the reverse trend. Variation has also been too erratic in other studies for significant differences to be determined (Al-Dousari *et al.*,

2008). Livingstone *et al.* (1999) described downwind fining over distances of tens of kilometers, but did not discern patterns on an individual dune. A recent study by Jerolmack *et al.*, (2011) of dune crest samples indicated little to no change in grain size but increased downwind sorting over an 8km transect.

In addition to the conflicting results of previous research, the scope of these surveys has been constrained into large or small-scale phenomena. The detailed studies of dunes have consisted of extremely concentrated sampling of individual dunes and were unable to provide context for grain size variations (Langford, 2000; Al-Dousari *et al.*, 2008), demonstrating the interaction of grain size and morphology on a particular dune, but not providing data about variability on larger scales. The larger-scale surveys have been transects across multiple dunes with relatively scattered samples (McKee, 1966; Lancaster, 1983, 1995; Livingstone *et al.*, 1999; Langford, 2003; Jerolmack *et al.*, 2011), and have shown trends over greater scales, but did not provide information about variability associated with individual dunes.

This disparity of scales prevents integration of past work into a complete examination of grain-size response to systemic variation. This study aims to begin addressing the disparity by collecting surface samples over sufficient area and in sufficient density at selected dunes to demonstrate both large and small-scale response to variations in morphology across a significant extent of a dune field, using GPS-located samples to provide grain size information across a 3 km long swath through the White Sands of New Mexico.

2.2 Setting

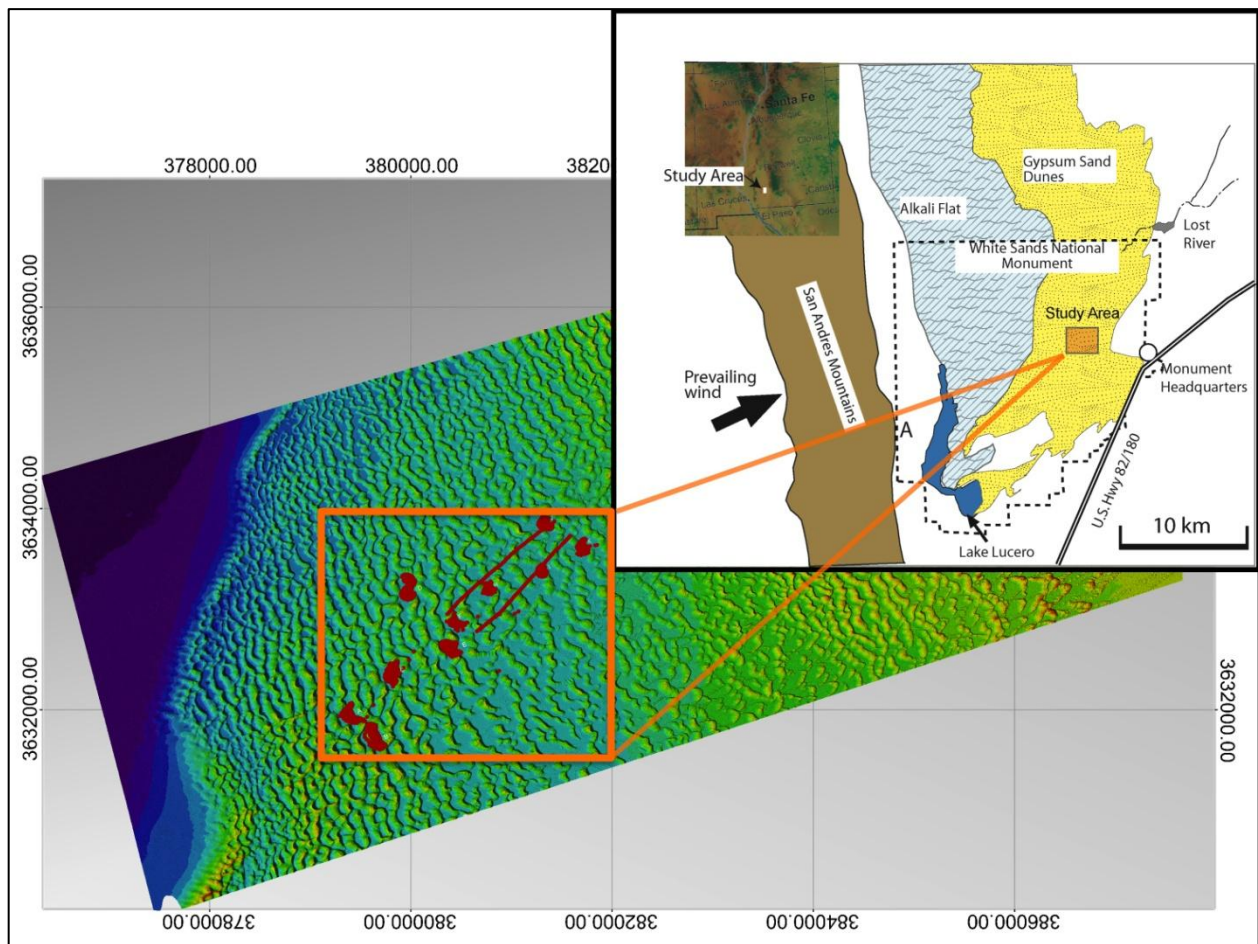


FIGURE 2.1: Location map and survey area with sample locations

The White Sands dune field of New Mexico, comprising over 400 km², is the largest gypsum dune field in the world (McKee and Moiola, 1966; Fryberger, 2000). Located in the Tularosa Basin within the north-south trending Tertiary Rio Grande Rift, the present-day dune field is composed almost entirely of gypsum originally deposited in the Late Paleozoic, primarily in the Permian Yeso formation (Allmendinger, 1971; Fryberger, 2000). The Laramide and Rio Grande Rift associated faulting, especially to the north and east, exposed and allowed leaching

of gypsum from these formations into the pluvial Pleistocene Lake Otero covering most of the basin (Kottlowski, 1958; Fryberger, 2000). Holocene retreat of the lake and deflation of these evaporite beds provided the gypsum sediments of White Sands (Kocurek *et al.*, 2007; Langford, 2003). These studies by Langford (2003) and Kocurek *et al.* (2007) have also demonstrated strong evidence through OSL dating and examination of paleoshorelines and paleoclimate proxies that this deflation has been episodic, with the first event and initiation of the dune field occurring at ~7000 years, and deflation to the modern Lake Lucero boundary at ~4000 years. Continuous limited supply of sediments through deflation of the modern playa basin margin is supposed to have occurred throughout the history of the dune field and into the present (Kocurek *et al.*, 2007; Langford, 2003, McKee and Moiola, 1975).

The modern White Sands erg occupies much of the central portion of the Tularosa Basin, beginning sharply with crescentic ridges at the edge of the Alkali Flat deflationary plain to the west (where isolated dome dunes are also present), transitioning to a central core of barchanoid dunes, and ending gradually in parabolic dunes to the north, east, and south. Recent studies have indicated that the transition from barchan to parabolic dunes is groundwater-controlled due to salinity variations in the shallow (~1m) water table creating more and less favorable environments for the vegetation which anchors the dune flanks (Langford *et al.*, 2009; Jerolmack *et al.*, 2012).

White Sands was chosen as the location of this study for four reasons. First, the slight solubility of gypsum and the locally high water table may allow for continuous recrystallization and erosion of gypsum sand *in situ*, potentially producing an abnormally large local variation of grain sizes (personal communication, Richard P. Langford, August 2010), whereas in many dune fields, sand grains are almost uniform in size and variation within dunes and between dunes is difficult to discern (Lancaster, 1999). Second, the nearly homogenous composition of the gypsum dune sea (Fryberger 2000) prevents variability in density, general grain shape, and resistivity to weathering processes from complicating analysis. Third, the primary source of the sediments comprising the dune field is known and thus transport distance can be approximated (Kocurek *et al.*, 2007). Finally, the eolian regime in which the dunes reside is sufficiently uncomplicated to allow for generalization of transport direction. Although seasonal variation in wind patterns exists, producing variations in sinuosity (Kocurek *et al.*, 2007), the resultant flow is strongly from 25-30° south of west (Fryberger, 2000; Jerolmack *et al.*, 2011).

2.3 Methods

Field Methods

The study area (figure 2.1) contains 83 total dune forms, consisting of 17 barchanoid ridge forms and 66 barchan forms. One thousand two hundred fourteen surface sand samples were collected for this study along a swath approximately 3 km by 500 m elongate in the east-northeast primary sediment transport direction. The swath extends from the barchanoid ridge area at the upwind edge of the field, through the barchan dunes, and ends in the barchan-parabolic transition zone. Ten dunes were selected (by general location within the survey area and of a size conducive to survey in one day's work, orange box in figure 2.1) and sampled with a grid of samples at a 10-20 m spacing. Two linear transects along the entire SW/NE length of the study area were sampled at a 20 m spacing. Additional samples were collected within each distinct patch containing different surface features such as erosion surfaces, granule ripples and vegetation. Samples were collected by hand using a small plastic dust pan-like scoop to a depth of approximately 0.5 to 1 cm. Where ripples were present, samples were gathered from the surface of one complete ripple to avoid small-scale phenomena. On crusted interdune flats with limited concentrations of mobile grains, a small plastic brush was used to gather a sufficient volume of sediment to sample. Precise sample location was determined at the time of collection using a Trimble XH hand-held GPS receiver and post-processed against the Apache Point (Cloudcroft, NM) CORS vectors, resulting in 5-25 cm vertical and sub-decimeter horizontal precisions. Each sample was paired with a GPS point, providing paired grain size and

morphology measurements. Collection was done during October 2010 through May 2011, November 2011, and January through February 2012.

Laboratory Methods

Volumetric grain size distribution (GSD) analysis of air-dry samples (~10 ml in volume) was performed using a Malvern Mastersizer 2000 laser diffractometer (Malvern Instruments Ltd., Worcestershire, UK), using the Scirocco 2000 accessory for sample dispersion in air. Prior to analysis, organic debris and particles >2 mm in size were removed by hand from the samples as thoroughly as possible. To quantify variation of GSDs, the Malvern proprietary software was used to measure the percent of total particle volume in $\frac{1}{2} \phi$ size classes; the resultant classes were used to calculate mean, standard deviation, skewness, and kurtosis using the Method of Moments (Folk, 1971; Krumbein and Pettijohn, 1938) in MS Excel. Since the entire grain size distribution of these sediments was obtained through the laser diffraction instrument, the method of moments is a justifiable method to depict the sorting and textural characteristics of the sediments (Mc Manus 1988) Topographic and grain size data was also gridded and plotted in Golden Software's Surfer 8, IVS Fledermaus 7, and Quantum GIS v1.7.

2.4 Results

The study area contains 83 total dune forms, consisting of 17 barchanoid ridge forms and 66 barchan forms. The crest to crest spacing (λ) in the ridge section was ~140-145m, while λ increased to 150-155m in the barchans segment, gradually reaching 155-160m in the barchans/parabolic transition zone. Dune height on surveyed dunes ranged from 5-12m measured from base to crest. Interdunes were exclusively dry or erosional in the westernmost section of the survey, transitioning to purely erosional within 170m, and then to lightly vegetated/erosional hybrid interdunes at ~1km downwind (~2.5km from the main dune ridge), and increasingly vegetated (most commonly by Indian ricegrass, *Oryzopsis hymenoides*, and jointfir ephedra, *Ephedra torreyana*) hybrid interdunes over the remainder of the study area, such that at the furthest downwind end of the study the proportion of vegetated/erosional is ~1:1.

Although all the dunes in this survey were barchanoid in general form, almost none of them were simple crescents. The most common variations were: classic sinusoidal barchanoid ridges; conjoined barchans, such that two adjoining crescents at roughly parallel orientation merged at their horns leaving an elevated trough and an overall “W” shape; coalesced dunes, where one barchan had merged with another to a point that it was not possible to precisely identify the juncture; and transitional dunes, which appeared to be in the process of converting from barchan to parabolic orientation due to vegetative anchoring on the dune flanks.

There are three other features of significance to point out. First, many of the dunes contain erosional swales, generally oriented roughly parallel to the primary transport direction. Second, erosional or scour surfaces with exposed loosely cemented and visibly cross-bedded dune substrate are common on the lower third of the stoss faces (figure 2.2b). Finally, most dunes play host to patches of granule ripples (figure 2.2a). These appear as larger irregular ripples with crests of very coarse grains. Granule ripple patches vary from ~5-15cm in height and ~1-8m in length, and tend to form either trains or wedges emanating from troughs and swales in dunes.

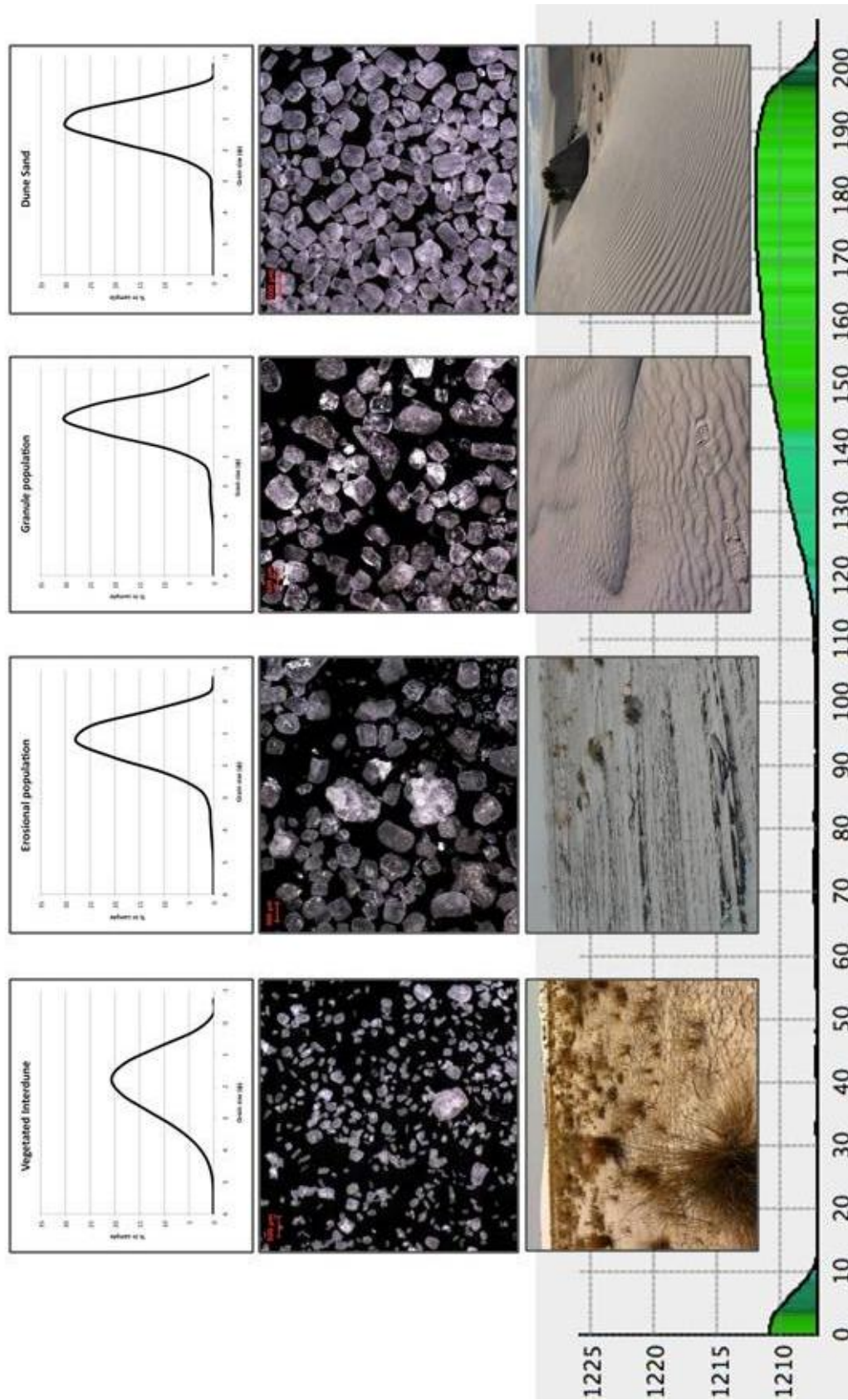


FIGURE 2.2: Dune subenvironments and their locations across a generalized transect along transport over one dune wavelength. At top are histograms of grain size distribution for the average of the populations. In the middle row can be found sample photomicrographs of the populations. Photographs in the bottom row depict field examples of these environments.

Laboratory analysis

Overall, of the 1214 samples analyzed, the mean grain size was 482 μm , with a standard deviation of 79.8 μm . It was observed that grain size apparently correlated with the subenvironment within the dune field (figure 2.2), and subsequently the study was broken into analyses relating grain size not only to dune morphology but also to the sub-environment of collection. GSD and microscopic analysis show distinct populations of sand characterized by both noticeable variations in GSD and clear changes in the texture of their constituent grains, which correlate directly with different environments of collection in the survey (Table 2.1).

Table 2.1. General and sub-environment population-specific granulometric parameters

<u>Collection environment</u>	<u>Mean grain size</u>	<u>Within sample avg. phi σ (ϕ/μ)</u>	<u>Within population σ</u>	<u>skew</u>	<u># of samples</u>
<u>Survey</u>					
Average of all samples	1.05 ϕ /482 μ	0.70 ϕ /616 μ	0.28	0.56	1214
<u>Sub-environments</u>					
Granule ripple	0.81 ϕ /570 μ	0.68 ϕ /624 μ	0.19	0.70	106
Vegetated interdune	2.13 ϕ /228 μ	0.99 ϕ /503 μ	0.27	0.54	17
Erosional interdune	1.29 ϕ /409 μ	0.73 ϕ /603 μ	0.21	0.72	18
Dune sand	1.15 ϕ /451 μ	0.68 ϕ /624 μ	0.10	0.68	324

An examination of their granulometric parameters (table 2.1) shows that the interdune populations are significantly finer and less well sorted on average than those found on dunes; granule ripples are coarser than dune sands but equally well sorted. In addition, there is more variation within interdune samples than on dunes, and more within granule ripple samples than

in the saltating dune sand. Given the proximity of these environments, mixing of these populations is inevitable. However, distinctive populations remain and are evident in the grain morphologies observed in photomicrographs (Figures 2.2-2.5).

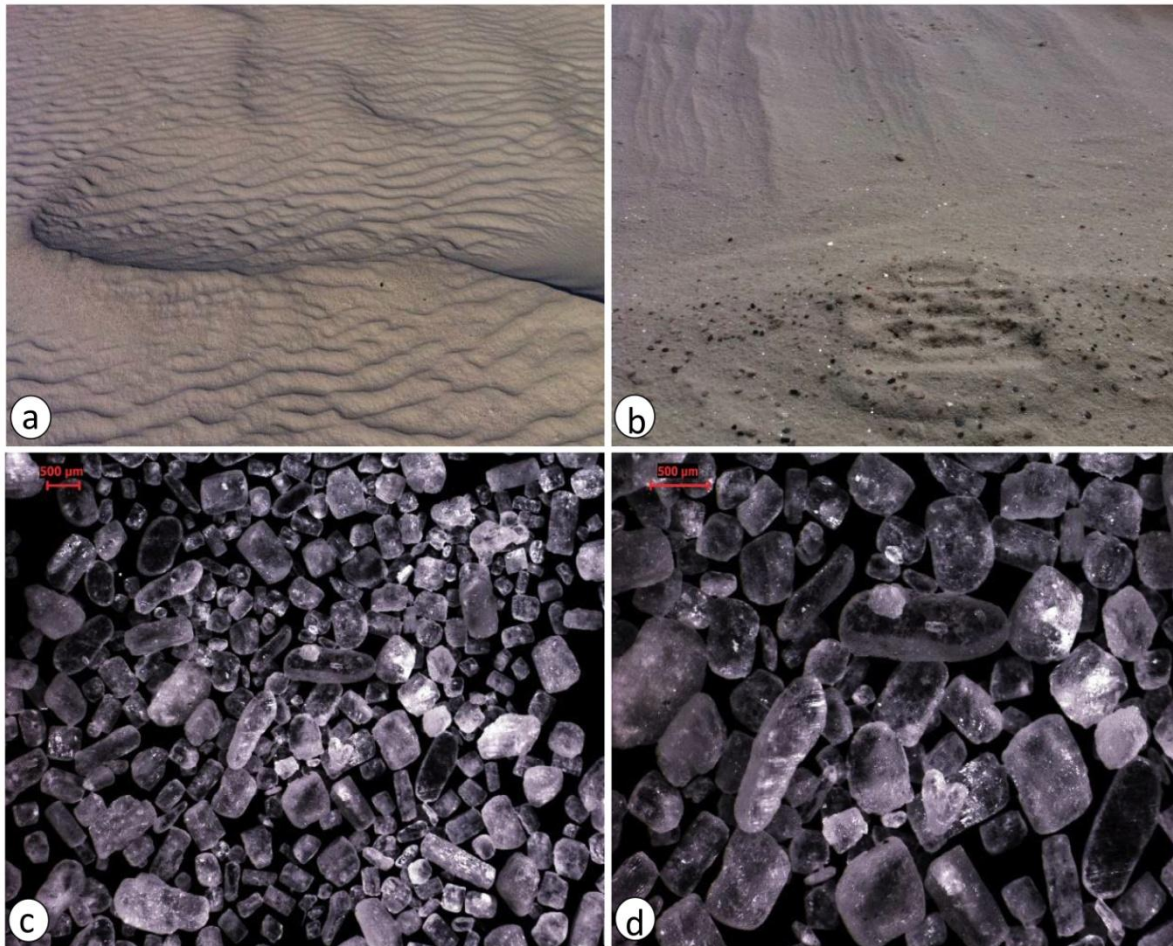


FIGURE 2.3: a) 25 cm high granule ripple with superposed 5-7 cm wind ripples. b) 10 cm high granule accumulation next to deflation surface on stoss face of dune. c, d) granule ripple grains. Note the prolate, angular crystals and the number of clear unfrosted grains.

Granule ripple population

This group is primarily medium-to-very-coarse moderately well sorted sand, with a mean grain size of 0.42-1.0 ϕ (500-750 μm). The GSD is characteristically composed of far fewer fine grains than the other populations, with less than 0.2% silt-sized particles and over 30% coarser than 0.5 ϕ (710 μm). However, the high mean grain size results in this population being fine-skewed (figure 2.2). The coarsest-grained fraction consists of subangular to angular, unfrosted very coarse sand grains up to 1998 μm in diameter, some of which are composed of multiple fused gypsum crystals, and makes up ~10-15% of the total. The bulk of this population (~60%) is medium to coarse frosted subrounded eolian sand. Less than 1% of the granule group is very fine sand or smaller in size and is nearly equal parts eolian sand, silt-sized crystalline rods and sheets, and irregular abrasion detritus. The highest concentrations of this population occur as granule ripples and accumulations in local troughs and swales on dune forms or migrating along their flanks, downwind of erosional ridges or intra-dune deflation surfaces (figure 2.3b). These granule ripples are found on dunes at all distances downrange through the study area.

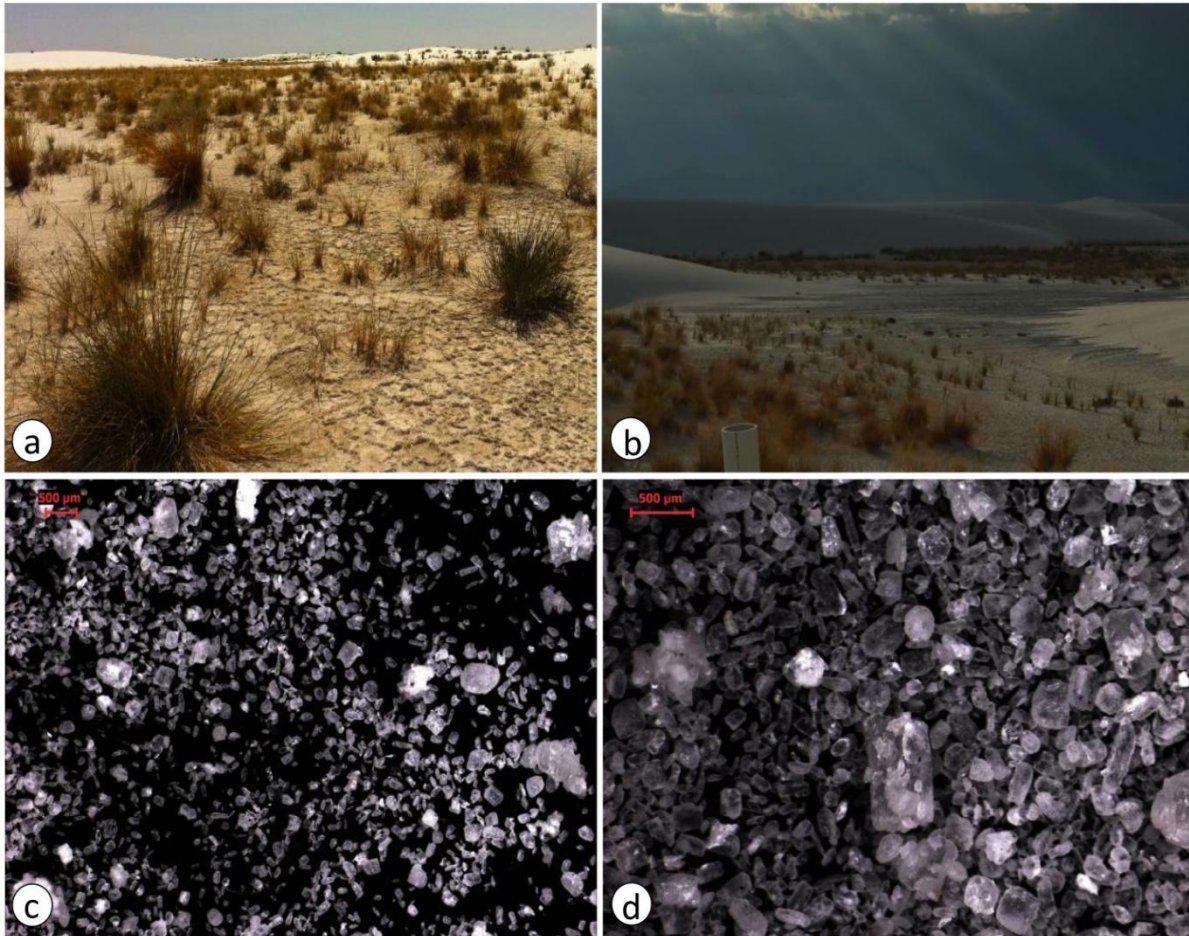


FIGURE 2.4: a) Vegetated interdune with evaporite crust. b) Vegetated/erosional interdune transition. c, d) Vegetated interdune grains.

Vegetated interdune population

Interdune vegetation in the survey area (generally Indian ricegrass, *Oryzopsis hymenoides*, and Jointfir ephedra, *Ephedra torreyana*, although peppergrass, *Lepidium densiflorum*, is not uncommon) is nearly always found collocated with a cryptobiotic or evaporite crust and concentrated in the upwind side of interdunes. The vast majority of mobile grains in vegetated areas are in clumps or mounds around plants, with some tailing to the lee, and few mobile grains scattered across the crust, ranging from 1-10% of the surface. Dune

encroachment via migration onto several linear, wind-parallel, and only lightly-vegetated piles of sand is the primary exception to this case. Sediments found on these sections of interdunes are finer-grained and less well sorted than those elsewhere in this study, with a mean grain size of 286 μm , and are only moderately to poorly sorted. Constituent grains are fine to medium eolian sands, silt-sized crystalline gypsum rods, and sparse $\sim 1-(-0.26) \phi$ ($\sim 500-1200 \mu\text{m}$) fused grains and crystalline gypsum. The GSD is slightly bimodal (figure 2.2), with an increased percentage of 200-300 μm grains in the fine tail, but otherwise noticeably flatter and more symmetric than those of other populations with kurtosis of 3.94, skew of 0.54 (20-25% less) and an average phi standard deviation of 0.98 (624 μm).

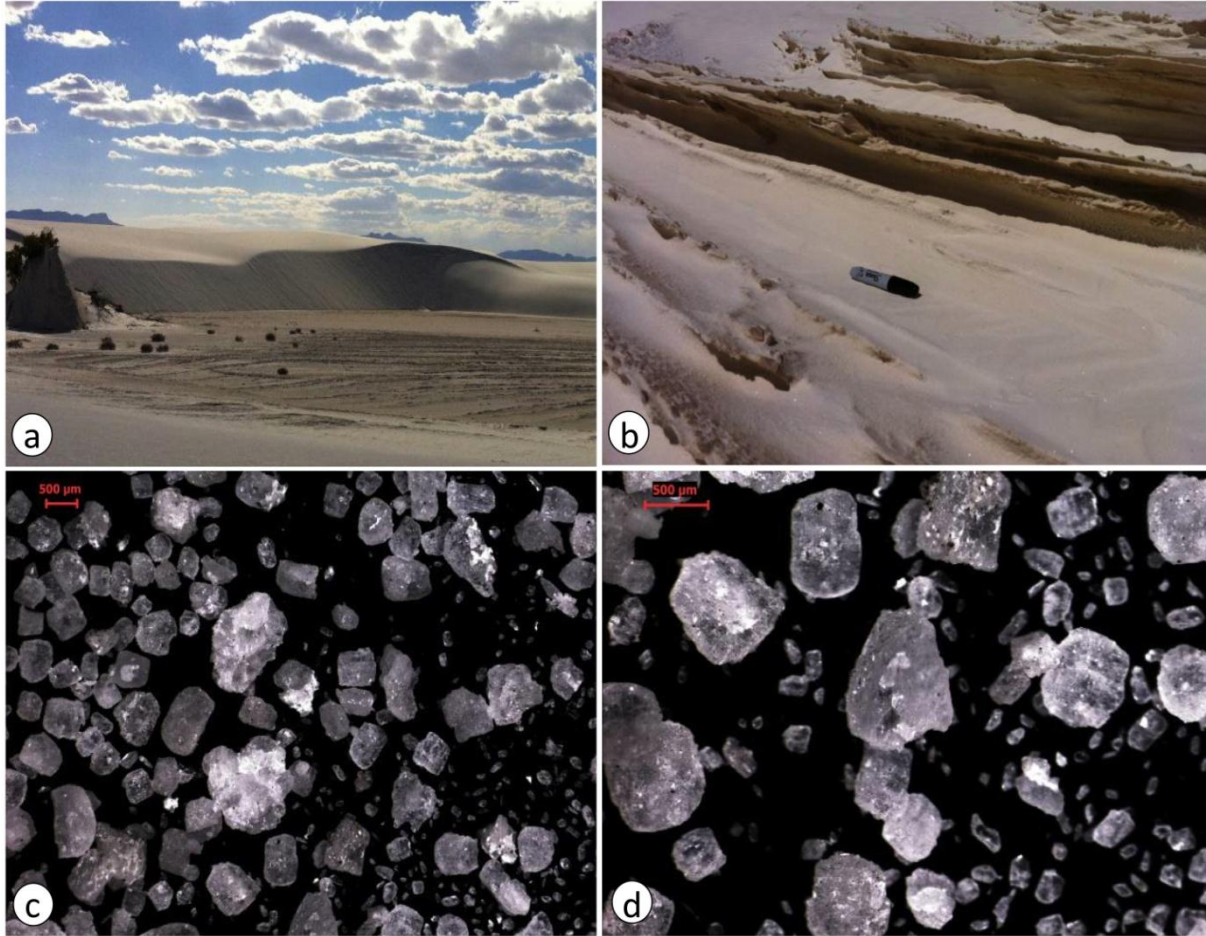


FIGURE 2.5: a) erosional interdune with remnant foreset ridges. b) detail of foreset ridges. c, d) erosional interdune grains.

Erosional interdune population

Erosional interdunes in the study area are characterized by sinuous remnant dune foreset ridges up to 25cm high and dipping roughly eastward from 5-40° with mobile sand between and sometimes atop the ridges. Sediments found in these sections of interdunes are ~25-50% medium to fine frosted subrounded to rounded eolian sands, ~30-70% medium to fine subangular to angular crystalline and fused crystalline gypsum, 1-4.5% coarse sand sized subangular to subrounded crystalline and fused crystalline gypsum, and 0-1.5% silt-sized

prolate crystals and impact debris. Mean grain size is 1.29ϕ ($409 \mu\text{m}$), and the GSD is peaked and the most strongly fine-skewed in the survey (figure 2.2).

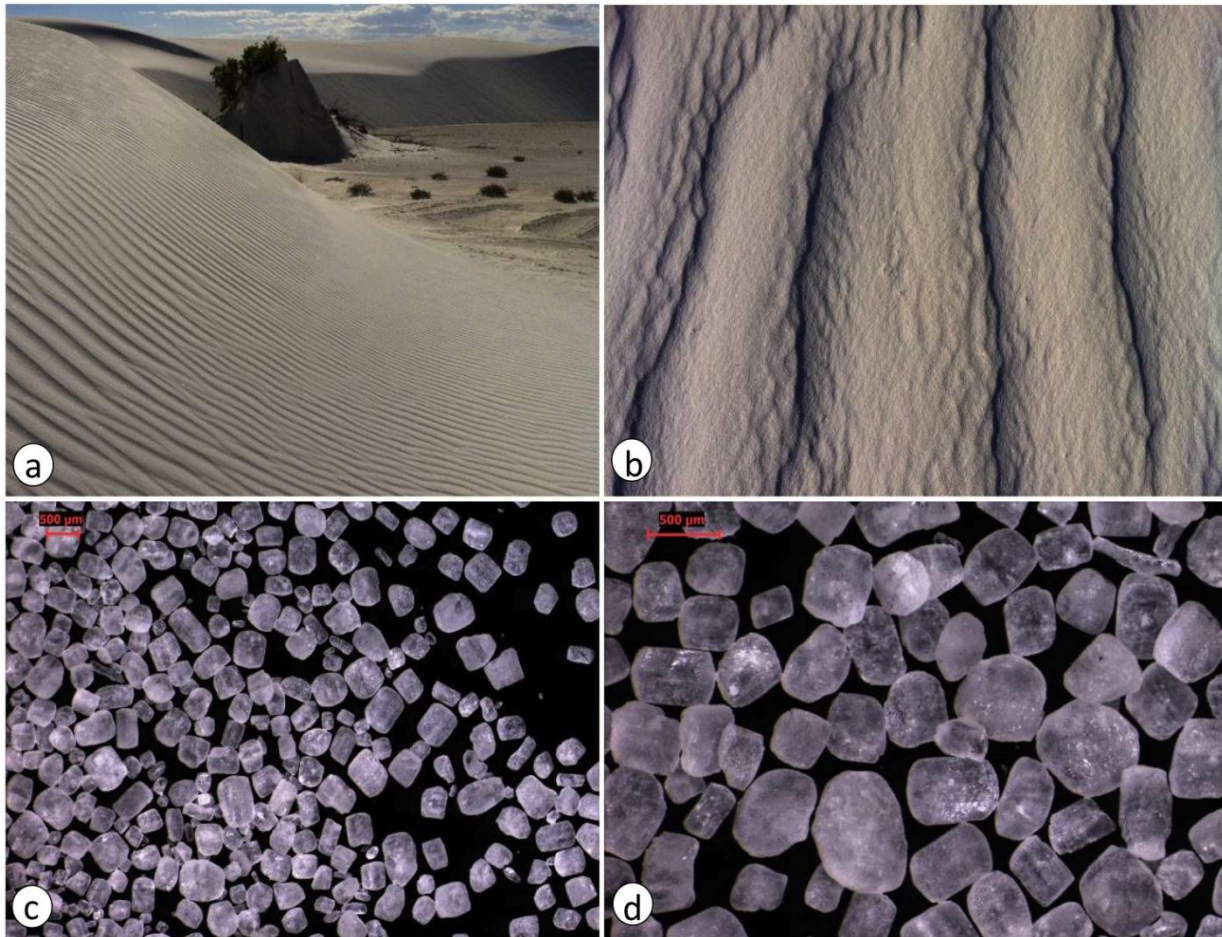


FIGURE 2.6: a) compound barchan dune with 7-10cm wind ripples. b) detail of wind ripples. c, d) dune eolian sand grains. Note the well-developed surface frosting and similarity of sediment size and texture.

Dune sands population

The vast majority of the mobile sediments present on the dunes themselves (figure 2.6a, b) are represented in this population, made up of moderately well sorted to moderately sorted,

subrounded, medium to coarse frosted eolian sands. Eolian saltating sand (figure 2.6c, d) makes up the most common grain type found in all locations and populations in the survey; this population is distinct for being almost exclusively composed of frosted sand-sized grains, by virtue of its location solely on dunes and dune encroachments into interdunes, and because these samples are the most well-sorted in the survey, having the lowest average σ both within samples and within the population itself. Mean grain size is 1.15 ϕ (451 μm), and the GSD is peaked and fine-skewed (figure 2.2), just like all other measured populations excepting only the vegetated interdune.

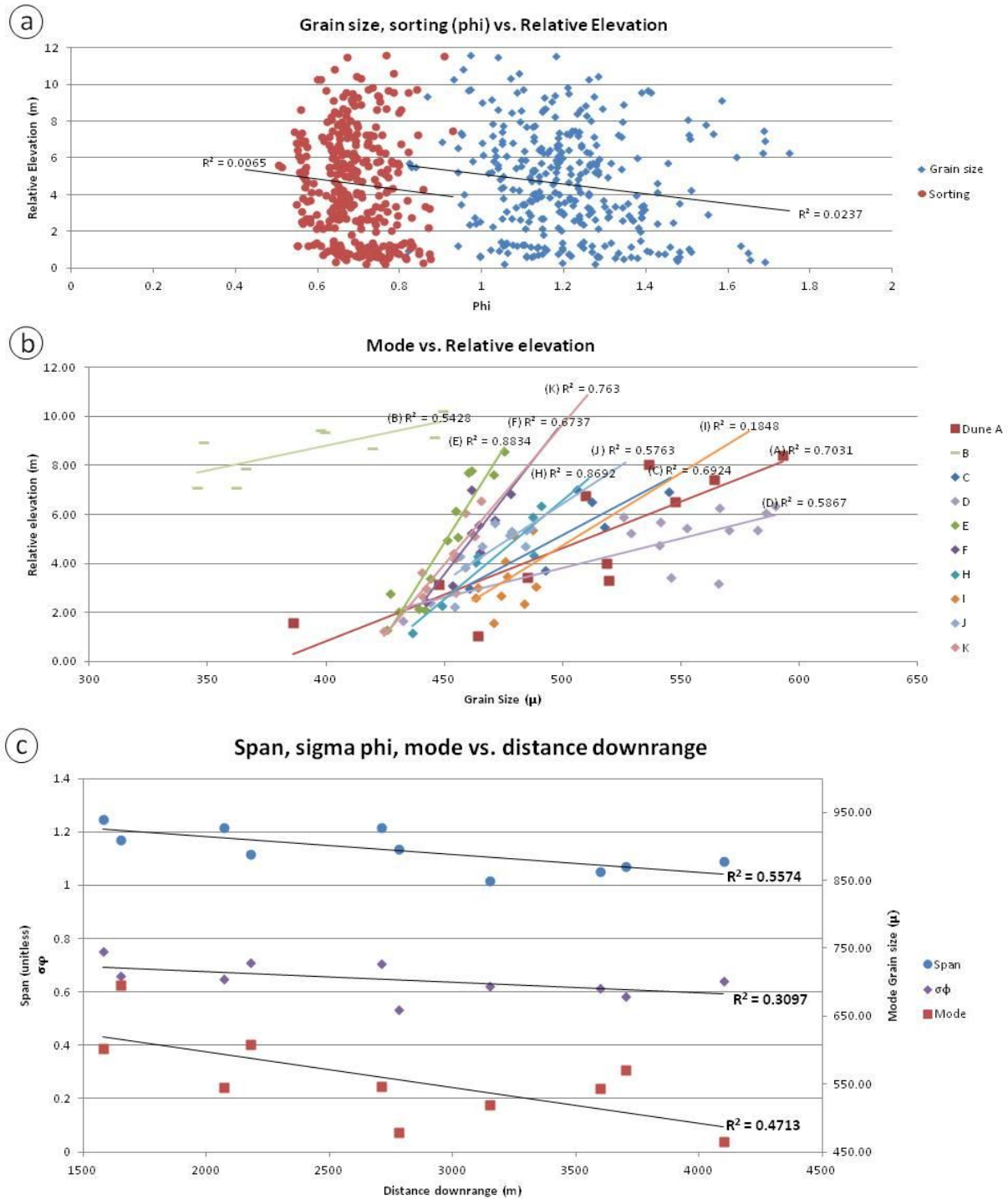


FIGURE 2.7: cross-plots of a) mean grain size and sorting vs. relative elevation on dunes; b) mode of saltating sand samples vs. relative elevation on the stoss face of dunes; c) dune crest samples span, sigma phi (sorting), and grain size mode vs. transport distance from the leading edge of the dune field. Trend lines are annotated with the R^2 value of the linear correlation, and the dune letter identifier in (b).

Grain size trends

Overall grain size shows no clearly discernible trend in sorting with respect to elevation on dunes (figure 2.7a). However, an examination of the mode grain size of “dune sands population” samples identified through microscopy generally shows a moderately correlated upward-coarsening trend on the stoss face of dunes (figure 2.7b). At the field scale, a previous study by Jerolmack *et al.*(2011) used samples taken from dune crests and measured distance along transport direction to the main dune ridge, concluding that sorting increased downwind and grain size remained largely stable after an initial drop-off over the first few kilometers across the erg. Applying this method to the ten dunes sampled at the crest in this study to a cross-plot of sample mode size and downrange distance (figure 2.7c) demonstrates a weakly correlated ($r^2=0.56$) inverse relationship, and even more weakly correlated ($r^2=0.31$) inverse relations between span and distance, and phi sigma (sample sorting) and distance ($r^2=0.47$). It is thus difficult to conclude with any certainty that a clear field-scale trend of any kind exists across dune crest samples from this study.

Statistical analysis

One-way analysis of variance (ANOVA) was run on the mean grain size of vegetated interdune, erosional interdune, and granule population samples against the dune sand to establish statistical significance of the size variation between the individual populations and saltating eolian sands, presumably the “normal” population in a dune field. The results (table

2.2) indicate a p-value <0.01 for the null hypothesis in each case. It is therefore reasonable to treat these populations as statistically different, even with the small number of samples representing each.

Table 2.2 Statistical analysis of populations via one-way ANOVA (probability level=.01)

<u>Groups</u>	<u>Sample size</u>	<u>Sum</u>	<u>Mean grain size</u>	<u>Variance</u>		
Dune sand	324	156,160.674	481.977	2,664.702		
Granule ripple population	106	59,070.302	557.267	2,961.184		
Vegetated interdune	17	5,217.959	306.939	4,269.250		
Erosional interdune	18	8,307.255	461.514	1465.045		
ANOVA - Granule ripple population vs. Dune sand						
<u>Source of Variation</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p-level</u>	<u>F crit</u>
Between Groups	452,743.817	1	452743.817	165.390	0.000	6.694
Within Groups	1,171,622.997	428	2737.437			
ANOVA - Vegetated interdune vs. Dune sand						
<u>Source of Variation</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p-level</u>	<u>F crit</u>
Between Groups	494888.469	1	494888.469	180.588	0.000	6.710
Within Groups	929006.626	339	2740.433			
ANOVA - Erosional interdune vs. Dune sand						
<u>Source of Variation</u>	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p-level</u>	<u>F crit</u>
Between Groups	7140.678	1	7140.678	12.741	0.099	6.710
Within Groups	885604.398	340	2604.719			

2.5 Discussion

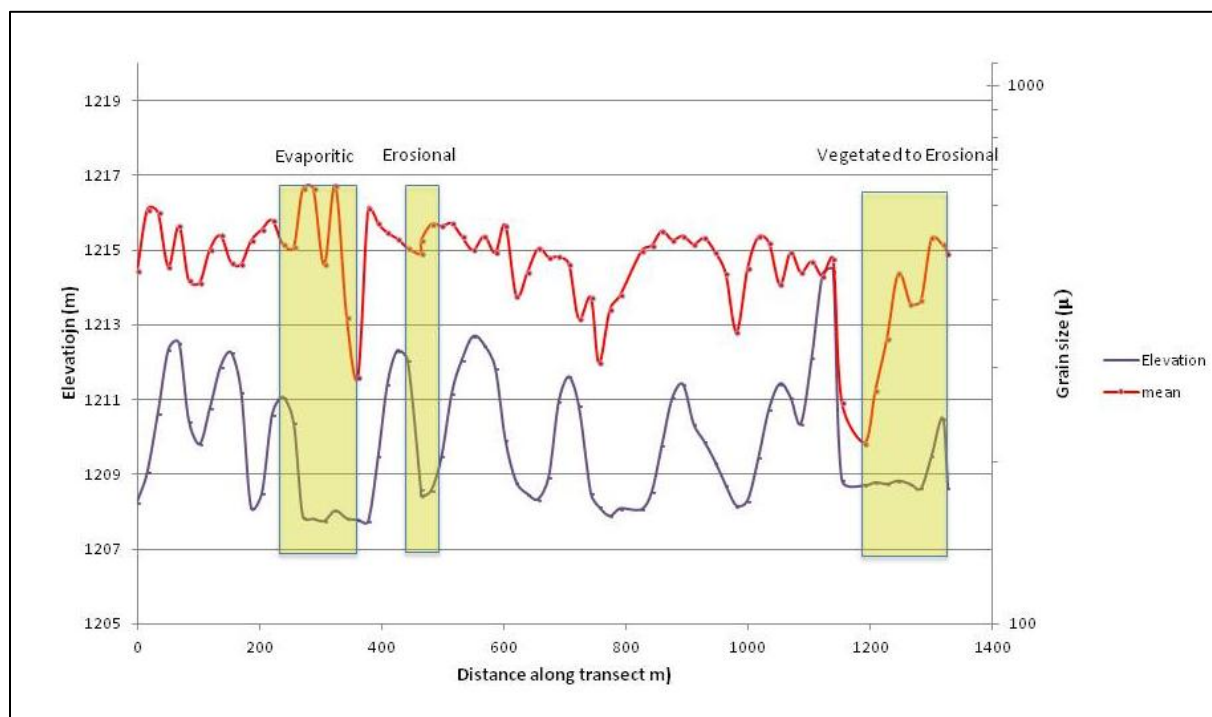


FIGURE 2.8: Grain size measurements taken along transect within the survey area.

The presence of unfrosted sand-to-silt-sized crystalline gypsum rods, poorer sorting and cemented crystals in the vegetated interdunes (figure 2.4) indicates local sourcing of these sediments, as does the presence of the same (although in larger sizes) in erosional interdunes. The prolate form, lack of frosting, crystalline appearance, and sizes ranging from 800-2000μm of the coarse population are also indicative of a local source, especially in the absence of a transport mechanism which would allow such large grains to reach the downwind end of the survey area more than 5 km from the leading edge of the dune field. The most likely explanation for local sourcing of relatively unweathered gypsum crystals in these locations is local recrystallization of gypsum. Unfortunately, this apparent local recrystallization introduces

a new factor which prevents a simplistic model from analyzing grain size trends within the dune field solely on the basis of grain size. For such a model to be effective, the known location of a single source is key, whereas the results of this study indicate that multiple sources are present at a variety of locations within at least the barchan and transition portions of the dune field. In addition, given the presence of coarse sand and granule-sized sediments as far downwind as the barchan-parabolic transition zone and the poor durability of gypsum, one can expect that even dune crest samples will be influenced by local factors as well as the overall eolian dynamic of the dune field.

If large-scale grain size trends are suspect, local trends may still be examined, and the transect shown in figure 2.8 does indicate that this can prove effective. Relatively finer sized grains (silt to fine sand) tend to diminish as one moves downwind through an interdune, while coarser grains increase. This trend fits the current models of lower energy and/or turbulent flow lee of a dune and increased energy with reattachment of airflow across an interdune as described by Ewing *et al.* (2010). It is also possible that this trend is responsible for the most heavily vegetated sections of interdunes commonly being in the upwind (and thus most lee-sheltered) portions of the total interdune area, but the evidence for this was not quantified in this study and remains speculative.

Grain size on dunes seems to vary depending on the influences of both flow change and provenance of the grains. Patches of relatively finer grains are generally present downwind of

primarily vegetated interdunes, while coarser-grained patches appear downwind of erosional areas. The persistence of this relationship regardless of the elevation seems to clearly indicate localized influence of air velocity due to frictional variation. Nonetheless, the most commonly predicted dune processes do seem to occur as well. Fine grains (from fine sand to coarse silt) settle out lee of the crest, leaving the slipface generally dominated by fine grainfall and to a lesser degree by avalanching of coarser grains. Coarser grains are found in troughs and swales on and between dunes, as well as around deflation surfaces and in granule ripples. Unfortunately, although there is a possible tendency toward better sorting, the evidence from this study is inconclusive.

2.6 Conclusions

Although the White Sands seem to be a nearly ideal location for the study of erg dynamics for a variety of reasons, this study indicates that recrystallization of gypsum and the generation of fresh sediments is occurring in significant quantities within vegetated and erosional interdunes. This recrystallization consequently will provide both high and low anomalies in grain size distribution from transport, essentially creating point sources through much of the central portion of the dune field in addition to the primary upwind linear source used for most previous modeling. Small scale distribution of these anomalous grain sizes in conjunction with the primary sediments by local variations in transport energy additionally complicates study of the “normal” processes inherent to dune fields and, unlike recrystallization, are almost certainly present in dune fields of more common mineralogy. To effectively model transport in this field, these variations will all have to be taken into account. However, at least one effect expected under accepted dune mechanics was observed in this study, and possibly extended. Samples collected on the lee side of dune crests were finer-grained than those on the stoss side, and interdune samples collected within 10-60m of the slipface aprons may indicate a lee “sheltering” influence extending a substantial distance across the interdune, although the understanding and quantification of this effect at the White Sands is complicated by the aforementioned local sourcing. Additionally, a restricted set of frosted saltating sand selected by microscopy showed a general coarsening trend with increasing relative elevation, possibly indicating that dunes are simply eolian ripples writ large.

Future work attempting to quantify grain size distribution at the White Sands should include further sampling to determine variation in sourcing and possible associations with local sourcing, such as height of water table, dune and vegetation types, estimated heights of parent dune for erosional ridges, etc., in addition to trenching or coring of interdunes and dunes to establish locations and size of fresh crystals *in situ*.

3. LOCAL EFFECTS ON GRAIN SIZE OVER BARCHAN AND BARCHANOID RIDGE DUNES, WHITE SANDS, NEW MEXICO

3.1 Introduction

Grain size variations within an eolian environment are a critical factor in the attempt to understand the dynamic processes affecting dune geomorphology. Grain size distributions may vary across all scales in dune fields; size differentiation occurs over an individual dune, between different dune types, between different dunes and interdune areas within the same dune field, and across the expanse of a dune field (Pye and Tsoar, 1990).

However, in order to effectively evaluate the processes shaping dune field development, geomorphology, and dynamics, the grain size distributions on modern dune fields should first be described. Previous studies have largely been limited to profiles across individual dunes (such as Barndorff-Nielsen *et al.*, 1982) or regional studies across dune fields (e.g., Livingstone *et al.* 1999; Jerolmack, 2011), and have provided inconsistent results. Folk (1971) and others (Livingstone, 1987; Lancaster, 1989; Ghrefat *et al.*, 2007) have noted coarser-grained dune crests as compared to finer-grained flank or interdune deposits; in contrast, Bagnold (1941), Wasson (1983), and Thomas (1988) found the opposite tendency, while Barndorff-Nielsen *et al.* (1982) found coarsening up the windward slope to the crest. Variation has also been too erratic in other studies for significant differences to be determined (Al-Dousari *et al.*, 2008). Livingstone *et al.* (1999) described downwind fining over distances of tens of kilometers, but did not discern patterns on an individual dune. A recent study by Jerolmack *et al.* (2011) of dune crest samples indicated little to no change in grain size but increased downwind sorting over an 8km transect.

In addition to the conflicting results of previous research, the scope of these surveys has been constrained into large or small-scale phenomena. The detailed studies of dunes have typically consisted of extremely concentrated sampling of individual dunes and were unable to provide context for grain size variations (Langford, 2000; Al-Dousari *et al.*, 2008), demonstrating the interaction of grain size and morphology on a particular dune, but not providing data about variability on larger scales. The larger-scale surveys have typically been transects across multiple dunes with relatively scattered samples (McKee, 1966; Lancaster, 1983, 1995; Livingstone *et al.*, 1999; Langford, 2003; Jerolmack *et al.*, 2011), and have shown trends over greater scales, but did not provide information about variability associated with individual dunes.

This disparity of scales prevents integration of past work into a complete examination of grain-size response to systemic variation. This study aims to begin addressing the disparity by collecting surface samples over sufficient area and in sufficient density at selected dunes to demonstrate both large and small-scale response to variations in morphology across a significant extent of a dune field, using GPS-located samples to provide grain size information across a 3 km long swath through the White Sands of New Mexico. General trends are difficult to determine across the study area, largely overprinted by more local features (Jones *et al.*, 2012, the first paper in this thesis). Accordingly, the focus of this paper is to examine those small-scale features in some detail on individual dunes and interdunes.

3.2 Setting

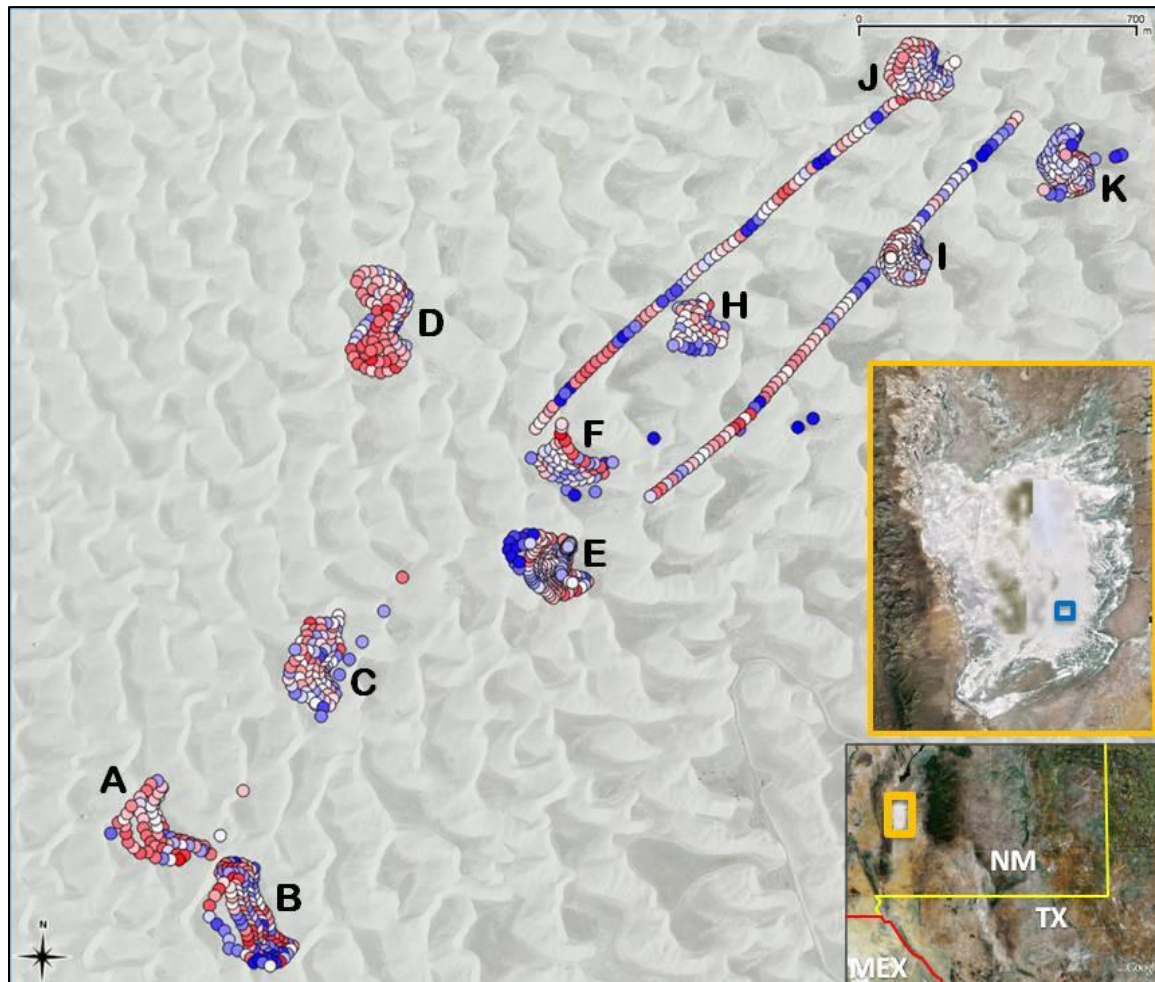


FIGURE 3.1: Location map and survey area with dunes A-K and sample locations marked.

The White Sands dune field of New Mexico, comprising over 400 km², is the largest gypsum dune field in the world (McKee and Moiola, 1975; Fryberger, 2000). Located in the Tularosa Basin within the north-south trending Tertiary Rio Grande Rift, the present-day dune field is composed almost entirely of gypsum originally deposited in the Late Paleozoic, primarily in the Permian Yeso formation (Allmendinger, 1971; Fryberger, 2000). The Laramide and Rio Grande Rift associated faulting, especially to the north and east, exposed and allowed leaching

of gypsum from these formations into the pluvial Pleistocene Lake Otero covering most of the basin (Kottlowski, 1958; Fryberger, 2000). Holocene retreat of the lake and deflation of these evaporite beds provided the gypsum sediments of White Sands (Langford, 2003; Kocurek *et al.*, 2007). These studies by Langford (2003) and Kocurek *et al.* (2007) have also demonstrated strong evidence through OSL dating and examination of paleoshorelines and paleoclimate proxies that this deflation has been episodic, with the first event and initiation of the dune field occurring at ~7000 years, and deflation to the modern Lake Lucero boundary at ~4000 years. Continuous limited supply of sediments through deflation of the modern playa basin margin is supposed to have occurred throughout the history of the dune field and into the present (McKee and Moiola, 1975; Langford, 2003; Kocurek *et al.*, 2007).

The modern White Sands erg occupies much of the central portion of the Tularosa Basin, beginning sharply with crescentic ridges at the edge of the Alkali Flat deflationary plain to the west (where isolated dome dunes are also present), transitioning to a central core of barchanoid dunes, and ending gradually in parabolic dunes to the north, east, and south. Recent studies have indicated that the transition from barchan to parabolic dunes is groundwater-controlled due to salinity variations in the shallow (~1m) water table creating more and less favorable environments for the vegetation which anchors the dune flanks (Langford *et al.*, 2009; Jerolmack *et al.*, 2012).

White Sands was chosen as the location of this study for four reasons. First, the slight solubility of gypsum and the locally high water table may allow for continuous recrystallization and erosion of gypsum sand *in situ*, potentially producing an abnormally large local variation of grain sizes (personal communication, Richard P. Langford, August 2010), whereas in many dune fields, sand grains are almost uniform in size and variation within dunes and between dunes is difficult to discern (Lancaster, 1999). Second, the nearly homogenous composition of the gypsum dune sea (Fryberger, 2000) prevents variability in density, general grain shape, and resistivity to weathering processes from complicating analysis. Third, the primary source of the sediments comprising the dune field is known and thus transport distance can be approximated (Kocurek *et al.*, 2007). Finally, the eolian regime in which the dunes reside is sufficiently uncomplicated to allow for generalization of transport direction. Although seasonal variation in wind patterns exists, producing variations in sinuosity (Kocurek *et al.*, 2007), the resultant flow is strongly from 25-30° south of west (Fryberger, 2000; Jerolmack *et al.*, 2011).

3.3 Methods

Field Methods

Surface sand samples were collected at 1214 locations (figure 3.1) for this study along a swath approximately 3 km by 500 m elongate in the east-northeast primary sediment transport direction. The swath extends from the barchanoid ridge area at the upwind edge of the field, through the barchan dunes, and ends in the barchan-parabolic transition zone. Ten dunes were selected (by general location within the survey area and of a size conducive to survey of a dune in one day's work) and sampled with a grid of samples at a 10-20 m spacing. Two linear transects along the entire SW/NE length of the study area were sampled at a 20 m spacing. Additional samples were collected within each distinct patch containing different surface features such as erosion surfaces, granule ripples and vegetation. Samples were collected by hand using a small plastic dustpan-like scoop to a depth of approximately 0.5 to 1 cm. Where ripples were present, samples were gathered from the surface of one complete ripple to avoid small-scale phenomena. On crusted interdune flats with limited concentrations of mobile grains, a small plastic brush was used to gather a sufficient volume of sediment to sample. Precise sample location was determined at the time of collection using a Trimble XH hand-held GPS receiver and post-processed against the Apache Point (Cloudcroft, NM) CORS vectors, resulting in 5-25 cm vertical and sub-decimeter horizontal precisions. Each sample was paired with a GPS point, providing paired grain size and morphology measurements.

Laboratory Methods

Volumetric grain size distribution (GSD) analysis of air-dry samples (~10 ml in volume)

was performed using a Malvern Mastersizer 2000 laser diffractometer (Malvern Instruments Ltd., Worcestershire, UK), using the Scirocco 2000 accessory for sample dispersion in air. Prior to analysis, organic debris and particles >2 mm in size were removed by hand from the samples as thoroughly as possible. To quantify variation of GSDs, the Malvern proprietary software was used to measure the percent of total particle volume in $\frac{1}{2} \phi$ size classes; the resultant classes were used to calculate mean, standard deviation, skewness, and kurtosis using the Method of Moments (Folk, 1971; Krumbein and Pettijohn, 1938) in MS Excel. Since the entire grain size distribution of these sediments was obtained through the laser diffraction instrument, the method of moments is a justifiable method to depict the sorting and textural characteristics of the sediments (Mc Manus 1988) Topographic and grain size data was also gridded and plotted in Golden Software's Surfer 8, IVS Fledermaus 7, and Quantum GIS v1.7.

3.4 Results

Out of the ten dunes surveyed, four will be examined in this paper, one from each end of the survey swath, one from the middle, and one to the north of the swath surveyed accidentally (due to navigation error) but fortuitously in the transition between barchanoid ridge and barchan dunes. These dunes were selected as covering the entire length of the survey area and displaying all of the various characteristics found across the studied swath, including dry, erosional, and vegetated interdune types immediately upwind of the surveyed dune, deflationary features such as swales and exposed patches of semi-consolidated dune foresets, and the presence of vegetation on the dune. The other dunes exhibited no significant variations from the characteristics of the dunes described hereafter. The terms “strike” and “dip” are used conventionally to describe these dunes in reference to the surface topographic gradient at any point on a dune. “Width” of a dune was measured from horn to horn roughly perpendicular to migration.

Table 3.1. Dune grain size characteristics. The letters refer to dunes on the map in figure 3.1. An asterisk (*) indicates the presence of vegetation on the dune. Superscripts (^e, ^v) denote erosional and vegetated interdunes immediately upwind, respectively.

<u>Dunes</u>	<u>Mean (μ)</u>	<u>σ (μ)</u>	<u>D(90) (μ)</u>	<u>$\sigma \phi$(sorting) mean</u>
A	526	86	851	0.74
B	487	108	796	0.72
C^e	488	56	784	0.7
D*^{e, v}	524	70	841	0.71
E^{e, v}	495	54	785	0.67

<u>Dunes</u>	<u>Mean (μ)</u>	<u>σ (μ)</u>	<u>D(90) (μ)</u>	<u>$\sigma \varphi$(sorting) mean</u>
F ^{e, v}	493	70	780	0.66
H ^{e, v}	470	58	747	0.67
I ^{*e, v}	480	55	754	0.64
J ^{*e, v}	484	52	776	0.7
K ^{*e, v}	465	54	733	0.66

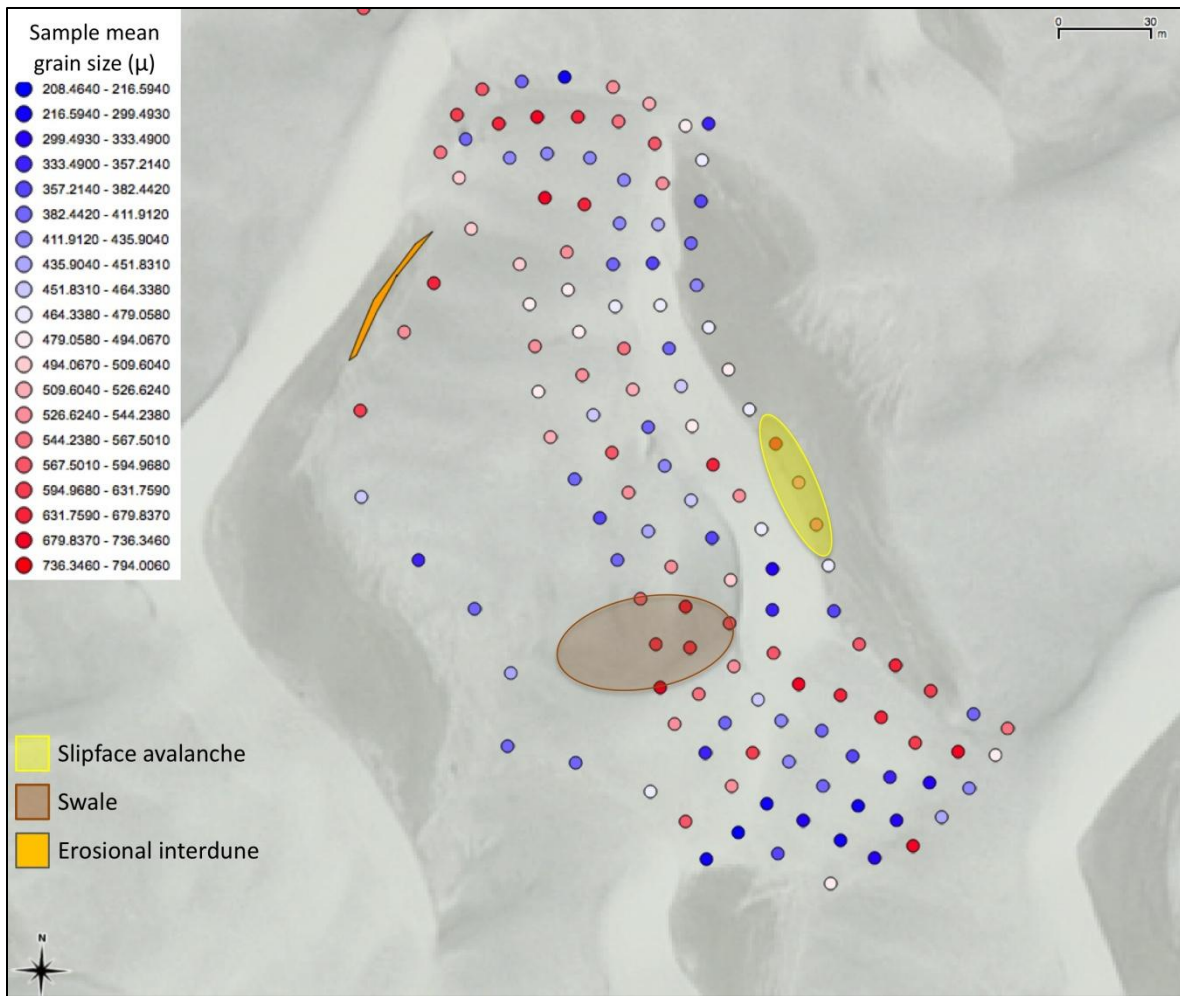


FIGURE 3.2: Dune B. The mean sample grain sizes and locations are indicated by the colored circles. Location of features of interest is marked. The photograph is courtesy of Google (2009) and provides a reasonable approximation of relative position on the present dune form.

Dune B

Located at the furthest upwind edge of the study area (figure 3.2), Dune B is an ~11.5 m high 290 m wide unvegetated barchanoid ridge dune which terminates at both ends into other dunes. The barchanoid form of dune B abruptly ends at the adjoining dune form without gradual transition. On the north end, it is being buried under the slipface of the adjoining

dune, while to the south it ends at the outer flank of the next dune. It consists primarily of moderately well sorted medium to coarse sands; 8-12 cm wavelength wind ripples were present along the northern half of the slipface and over the entire stoss surface of the dune except the southern flank, where they were slightly smaller 5-10cm ripples. Sinuous granule ripples from 8-15 cm high are present on both north and south flanks, as well as along the base of and up a swale near the center of the stoss face and extending to the dune crest. On the stoss side, the interdune is almost entirely dry and unvegetated, whereas the lee interdune has scattered erosional ridges and extremely sparse vegetation (Indian ricegrass, *Oryzopsis hymenoides*).

Average mean grain size of samples taken from this dune is 487 μm (1.04 ϕ), but samples means ranged from 287 μm to 736 μm . Finer-grained samples were collected to the lee of the dune crest and along the apron at the base of the slipface, with the exception of coarser-grained samples collected below slipface avalanches and over much of the southern flank, which may have been largely reworked by slumping, given the much less rippled surface, rounded slump geometry, and the lack of a clear slipface break. Finer-grained samples were also collected near the stoss toe, especially where the crest of the upwind dune was closer near the southern flank (20-35m, rather than ~100m for the rest of the dune). Samples tended to be coarser-grained in troughs and swales, where granule ripples were also generally present; the coarsest-grained samples collected were from just to the lee of the dune crest on the southern

flank (figure 3.2). Samples ranged from well to poorly sorted ($0.49-1.20 \phi$), with the poorest sorting largely coincident with the finest grain size and the best sorting in the flank troughs.

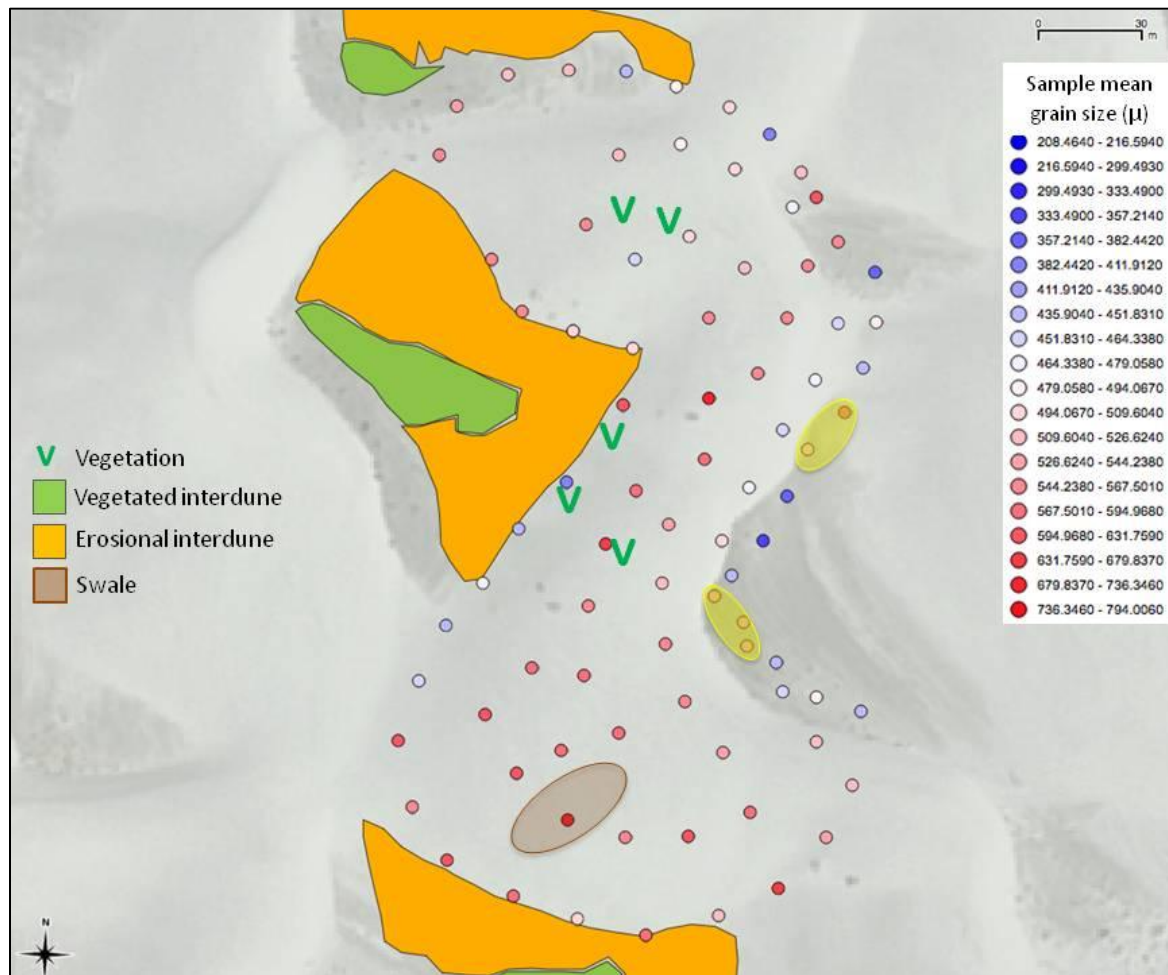


FIGURE 3.3: Dune D. The mean sample grain sizes and locations are indicated by the colored circles. Location of features of interest is marked. Photograph is courtesy of Google (2009)

Dune D

Dune D (figure 3.3) is a ~7 m high 250 m wide sparsely vegetated barchan form linked along its southern flank to another barchan and laterally coalesced into a single sinusoid with a

smaller dune form to the north, such that the south horn of the smaller dune and the north horn of the larger dune are the same body of sand. The continuous but highly sinuous nature of the dune reflects its location in the transition between barchan and barchanoid ridge dune areas in the erg; it is also ~250m north of the primary study swath. 7-10 cm wind ripples run roughly perpendicular to strike (horizontal lines on the surface) over nearly the entire dune, absent only on sections of the slipface where slope failure has reworked the surface. Deflation features (where loose sediments have been scoured away exposing consolidated dune substrate) are present at several locations on the southern and central stoss slopes. Sinuous granule ripples up to 15 cm high fan into the troughs on each flank, up a swale near the center of the stoss face, and downwind of erosional features. The wind ripples are superposed on the granule ripples in multiple places. Although most of the stoss interdune is erosional (figure 3.3), there are small sections of vegetation, and dry interdune immediately downwind of the crest of the upwind dune.

Average mean grain size of samples taken from this dune is 524 μm (0.93 ϕ), but samples ranged from means of 350 μm -708 μm . Finer grained samples were collected to the lee of the dune crest(s) and along the apron at the base of the slipface, with the exception of samples collected below slipface avalanches and slumps, which were coarser-grained. Comparatively finer-grained (350-380 μm) samples were collected along the central slipface, which due to the peculiar shape of this dune was oriented roughly transport-parallel. It was observed that at the time of sample collection, although the forecasted and general wind

direction were from the west-southwest, wind was blowing from the northwest across the central saddle of the dune above the finer samples, placing this portion of slipface in the lee of the saddle. Finer samples were also collected near the stoss toe where it adjoined dry interdunes, and was also within 10m of the immediately upwind dune in a similar sheltered location. On average, coarser-grained samples were located downwind of scour and erosional features and in troughs and swales along the stoss side of the dune, where granule ripples were also generally present; the coarsest-grained samples collected were near the top of the main transverse swale on the southern stoss slope and directly downwind of deflation surfaces (figure 3.3). Samples ranged from moderately well to moderately sorted ($0.53-0.93 \phi$), with the poorest sorting downwind of erosional interdunes and scours, and in the flank trough. The best-sorted deposits were along the base of the slipface, adjoining the dry interdune, and along the N/NW slope.

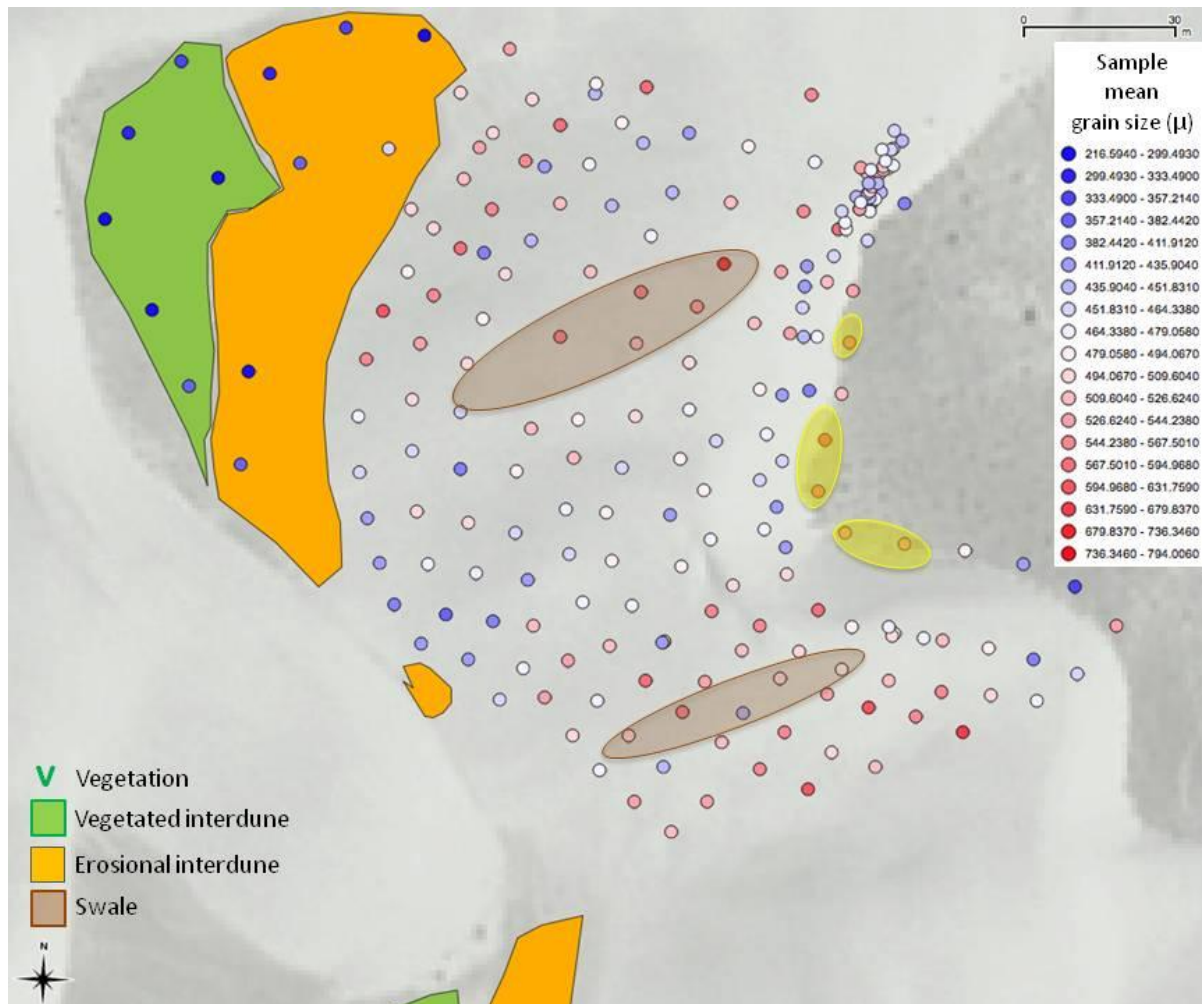


FIGURE 3.4: Dune E. The mean sample grain sizes and locations are indicated by the colored circles. Location of features of interest is marked. Photograph is courtesy of Google (2009)

Dune E

Dune E (figure 3.4) is a ~9 m high 160 m wide unvegetated barchan near the center of the study area (figure 3.1). Both horns intersect with other barchans in such a way as to constitute by conjoinment a semi-continuous sinusoid (while nonetheless possessing a clear line of demarcation in the form of linear troughs where the flanks meet), and is composed of moderately well sorted medium sands. Five to ten cm wind ripples run roughly perpendicular to

strike on almost the entire stoss side of the dune. Deflation or scour features are present near the stoss toe adjoining the erosional interdunes and on a bench in the center of the stoss face. Sinuous granule ripples up to 8 cm high fan radiate into the troughs on the southern flank, with superposed wind ripples of the same 5-10cm size as the rest of the dune. Although most of the stoss interdune is again erosional (figure 3.4), vegetated interdune makes up a significant proportion of the remainder, although there is a very small section of dry interdune near the center of the stoss slope and directly below the peak of the upwind dune. Vegetated interdune is at no point in direct contact with the stoss toe of the dune, but is present behind a buffer of erosional ridges.

Mean grain size of samples taken from Dune E averaged $495\ \mu$ ($1.15\ \phi$), with a range of means from $339\ \mu$ to $662\ \mu$. Finer-grained samples were collected to the lee of the dune crest and on the slipface apron at either horn end (339 - $380\ \mu$), while the central portion of the apron was coarser-grained (555 - $602\ \mu$). Finer-grained samples were also collected near the stoss toe where it adjoined a dry interdune and was also within 5m of the immediately upwind dune and in a swath extending from there to the lee of the crest in the primary transport direction. Additionally, a large patch of finer-grained samples was present on the northern flank of the dune downwind of the closest approach of vegetated interdune. Samples again averaged coarser-grained downwind of scour and erosional features and in troughs and swales, although granule ripples were only present in and radiating from the southern trough. Samples ranged from well to moderately sorted (0.45 - $0.91\ \phi$), with the poorest sorting

downwind of erosional interdunes and scours, and in the flank troughs. The best-sorted deposits were along the base of the slipface, adjoining the dry interdune, and along the N/NW slope; the swath from the dry interdune to the lee of the crest was also better sorted than most of the stoss face.

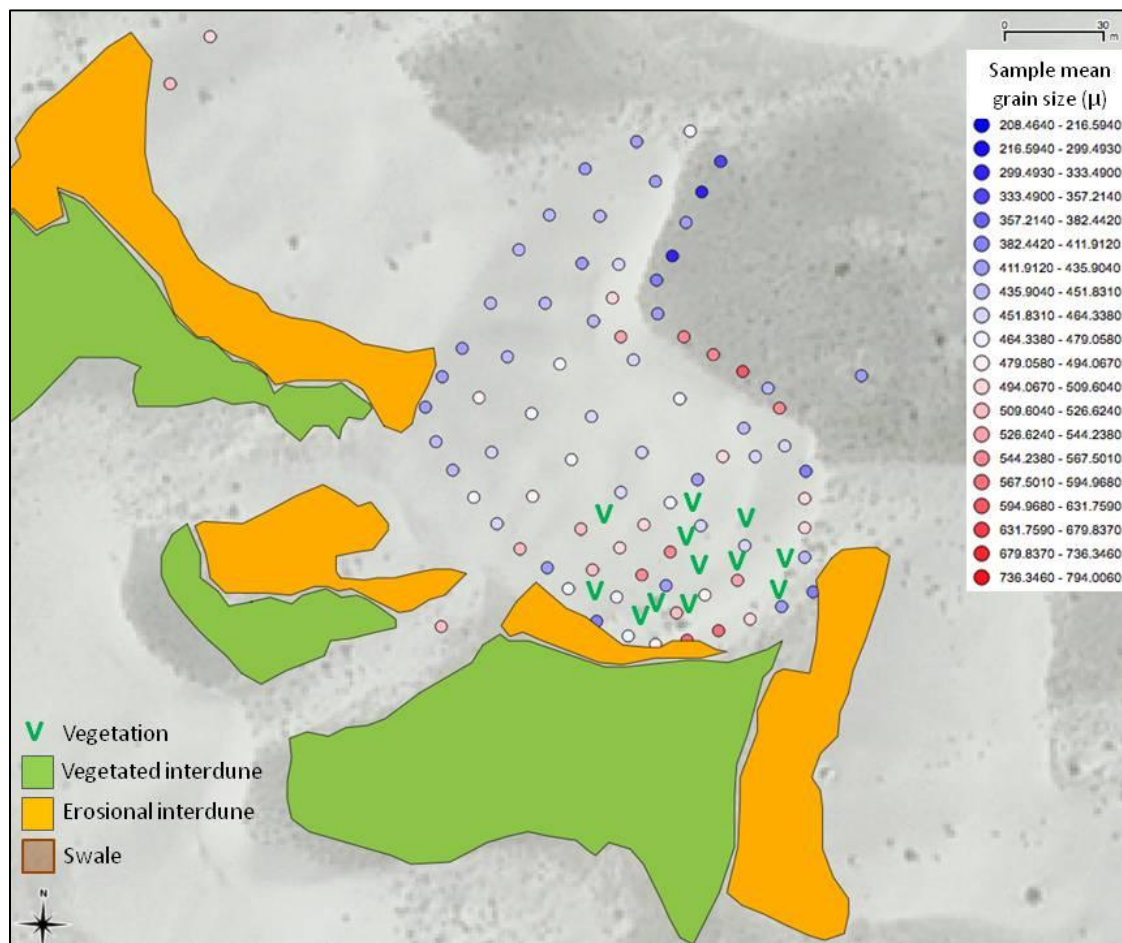


FIGURE 3.5: Dune K. The mean sample grain sizes and locations are indicated by the colored circles. Location of features of interest is marked. Photograph is courtesy of Google (2009)

Dune K

Dune K (figure 3.5), located at the furthest downwind (NE) end of the study area (figure 3.1), is a ~7.5 m high 140 m wide lightly vegetated barchan form linked along its north flank to another barchan and migrating onto a 1.2m high heavily vegetated linear wind-parallel sand body. This encroachment combined with the vegetation of the dune's southern flank may be anchoring this flank and initiating transition to a parabolic dune geometry. Several neighboring dunes exhibit mixed barchanoid and parabolic forms. Vegetation (primarily soaptree yuccas, *Yucca elata*) is concentrated on the southeast flank of the dune, but scattered plants can be found along the stoss toe. The dune is generally made up of moderately well to moderately sorted medium sands, with 5-7cm wind ripples generally transverse to strike but seemingly exhibiting greater variation in orientation than in the upwind dunes. The same 8-cm high sinuous granule ripples are present along the stoss toe and in the northwest flank trough and to a much more limited degree on the south flank, where they are both smaller (<15cm high) and less widespread.

Average mean grain size of samples taken from this dune is 465 μm (1.15 ϕ), but samples ranged from means of 325 μm -616 μm . Finer-grained samples were collected to the lee of the dune crest and along the apron at the base of the slipface, with the exception of samples collected below slipface avalanches and slumps, which were coarser-grained. Finer-grained samples were also collected near the stoss toe where it adjoined dry interdunes and was also within 10m of the immediately upwind dune. Samples averaged coarser-grained

downwind of scour and erosional features and in troughs and swales, where granule ripples were also generally present; the coarsest-grained samples collected were from the top of the main transverse swale (figure 3.5). Samples ranged from well to moderately sorted (0.48-0.78 ϕ), with the poorest sorting downwind of erosional interdunes and scours, and in the flank troughs. The best-sorted deposits were along the base of the slipface, adjoining the dry interdune, and along the N/NW slope.

Statistical analysis

One-way analysis of variance (ANOVA) was run on the mean grain size of the dunes and interdunes and amongst the dunes to establish statistical significance of the size variation between the total population, the interdune population, and the individual dunes. The results (table 3.2) indicate a p-value <0.01 for the null hypothesis in each case. It is therefore reasonable to treat the dunes individually and the interdunes population in opposition to the dunes as each being statistically different, and thus to logically examine them in isolation.

Table 3.2 Statistical analysis of populations via one-way ANOVA (probability level=.01)

	<u><i>n</i></u>	<u><i>Mean grain size(μm)</i></u>	<u><i>σ</i></u>	<u><i>Sum of squares</i></u>
Dune A	60	521.166	86.132	437708.844
Dune B	137	486.958	107.850	1581897.5
Dune C	84	488.064	56.180	261959.448
Dune D	85	523.833	70.096	412731.777
Dune E	198	492.490	51.599	524495.242

	<u><i>n</i></u>	<u><i>Mean grain size(μm)</i></u>	<u><i>σ</i></u>	<u><i>Sum of squares</i></u>	
Dune F	51	496.763	70.006	245038.862	
Dune H	47	470.263	58.126	155419.256	
Dune I	78	476.933	54.109	225441.06	
Dune J	69	485.851	51.287	178864.614	
Dune K	82	463.522	54.645	241876.475	
All Dunes	1087	492.143	68.044	5028129.06	
Interdunes	93	386.713	98.932	900448.385	

ANOVA - Individual dunes vs. total dune population

<u><i>Source of Variation</i></u>	<u><i>Variance</i></u>	<u><i>df</i></u>	<u><i>F</i></u>	<u><i>p-level</i></u>	<u><i>F-crit</i></u>
Between groups	342158.663	9	70.6708504	0	2.427
Within groups	4841.581	881			

ANOVA - Interdune population vs. dune population

<u><i>Source of Variation</i></u>	<u><i>Variance</i></u>	<u><i>df</i></u>	<u><i>F</i></u>	<u><i>p-level</i></u>	<u><i>F-crit</i></u>
Between groups	11211577	1	2340.23312	0	6.656
Within groups	4790.795	1168			

3.5 Discussion

Over all of the dunes sampled in detail, finer mean grain sizes were found in the lee of the dune crest, including both slipface and apron deposits, with the exception of avalanche deposits, which frequently had much coarser grain sizes. These finer-grained deposits are certainly in conformance with the concept of lee settling in lower energy flow, but since presumably all slipface deposits have undergone transport to reach the lee of the dune, the presence of coarse sand in significant proportion at the majority of avalanche deposits sampled so far from the main sediment source requires either frequent and vigorous creep of sands to the slipface or localized generation of the coarser-grained fraction. The sourcing of these coarse ($>1000\ \mu\text{m}$) grains in interdunes has been documented in this area by Jones *et al.* (2012), in which coarse grains derived from local crystallization in both vegetated and erosional interdunes were observed. The generation of these coarser grains in erosional remnants of dunes is at least strongly suggestive of recrystallization within dunes and thus potentially provenance for the anomalously coarse-grained slipface deposits. Coarser grains were also found on areas of the flanks farthest from the center of the dune and in the corresponding troughs at the juncture of conjoined dunes, and around deflation surfaces and granule ripples.

To the lee of vegetation on dunes D and K (as well as all other dunes where vegetation was present), dune sands were generally finer-grained and less well sorted. The traditional mechanics of dune formation certainly explain the finer-grained sands as lower energy settling deposits, and would require creep as the mechanism for the presence of the coarse grains at the slipface of the dune, which presumably would be the source of the coarse-grained

avalanche deposits. Thus coarser grains are potentially transported even to the highest portions of the dune by “creep” mechanics. Clustering of finer-grained deposits where the stoss dune is closest suggests that lee-side decrease in carrying capacity continues over distances of at least 20-30m from dune crests. This was also apparent in an associated study of grain size variation along transect in the same area (Jones *et al.*, 2012, section 2 of this thesis), which identified finer-grained deposits across both erosional and vegetated interdunes, extending essentially to the stoss toe of the immediately lee dune.

3.6 Conclusions

Although many of the variations in grain size over small distances in the White Sands dune field fit neatly into standard larger scale dune processes, additional variations occur which overprint dune trends with localized effects. The dunes studied in this paper showed no clear trend of grain size variation with elevation on the stoss sides, while lee side samples were generally finer-grained than the stoss side, except where granule ripples were present or in avalanche deposits, and finest overall on the slipface apron. Coarser grains were found proximal to and downwind of erosional interdunes, scour surfaces, and granule ripples. Granule ripples were mostly located in swales and troughs on dunes, but were also found on the lee of the dune crest, if rarely. Patches of finer-grained sediments were found downwind of vegetated interdunes, and where it was present on dunes, vegetation was associated with comparatively finer-grained sediment deposition in its immediate vicinity.

Future study of these localized effects and relations between them might eventually allow for component analysis and prediction of both large-scale and dune-scale grain-size variation with much greater accuracy than is currently possible.

4. CONCLUSION

Although the White Sands seem to be a nearly ideal location for the study of erg dynamics for a variety of reasons, this study indicates that recrystallization of gypsum and the generation of fresh sediments is occurring in significant quantities within vegetated and erosional interdunes. It appears that the recrystallization of gypsum will provide both high and low anomalies in grain size distribution from transport, essentially creating point sources through much of the central portion of the dune field, in addition to the primary upwind linear source used for most previous modeling. Small scale distribution of these anomalous grain sizes in conjunction with the primary sediments by local variations in transport energy additionally complicates study of the “normal” processes inherent to dune fields. To effectively model transport in this gypsum dune field, all of these variations will all have to be taken into account, although the local effects related specifically to transport will almost certainly pertain to dunes independent of mineralogy.

However, at least one effect expected under accepted dune mechanics was observed in this study, and possibly extended. Samples collected on the lee side of dune crests were generally finer-grained than those on the stoss side, and interdune samples collected within 10-60m of the slipface aprons may indicate a lee “sheltering” influence extending a substantial distance across the interdune, although the understanding and quantification of this effect at the White Sands is complicated by the aforementioned local sourcing.

Although many of the variations in grain size over small distances in the White Sands dune field fit neatly into standard larger scale dune processes, additional variations occur which overprint dune trends with localized effects. The dunes studied in this paper showed a reasonably clear general trend of upward coarsening with relative elevation on the stoss sides only if the population was restricted to saltating sand samples selected by microscopy, while the unrestricted set of lee side samples mentioned earlier was generally finer-grained than the stoss side, except where granule ripples were present or in avalanche deposits, and finest-grained overall on the slipface apron. Coarser grains were found proximal to and downwind of erosional interdunes, deflationary scour surfaces, and granule ripples. Granule ripples were mostly located in swales and troughs on the stoss side of dunes, but were also found on the lee of the dune crest, if rarely. Patches of finer-grained sediments were found on dunes downwind of vegetated interdunes, and where it was present on dunes, vegetation was associated with deposition of comparatively finer-grained sediments in its immediate vicinity.

Future work attempting to study grain size distribution at the White Sands should include further sampling to determine variation in sourcing and possible associations with local sourcing, such as height of water table, dune and vegetation types, estimated heights of parent dune for erosional ridges, etc., in addition to trenching or coring of interdunes and dunes to establish locations and size of fresh crystals *in situ*. In addition to the issue of provenance, the localized transport effects of dune and interdune scale air movements and relations between these and the larger context of the overall prevailing wind patterns would be necessary to fully

integrate this analysis. Advanced statistical methods might be used to attempt to isolate and relate these several influences beyond the scope of this study. Quantification of these influences might eventually allow for component analysis and prediction of both large-scale and dune-scale grain-size variation with much greater accuracy than is currently possible.

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APPENDIX A: LOCATION DATA, SIZE PARAMETERS, & TYPE

Positions were measured by differential GPS for UTM Zone 13N and the North American Datum of 1983 against the GEOID99 mean sea level geoid and post-processed against the Apache Point CORS reference station (P027). The exceptions were at points 1104-114a-I, which were estimated in displacement from point 1104-114 in the field by staff and inclinometer and projected into UTM coordinates, and those points whose elevation is shaded, which were unfortunately collected without ephemeris data.

The “Mean D [4, 3]” column displays a volumetrically weighted mean grain size. Both the “Mean” and “ $\sigma\phi$ ” columns display ϕ (phi) grain size moments. The “Dune / Interdune Type” lists dunes, denoted with a “D”, vegetated interdunes (“V”), and erosional interdunes (“E”) as noted at time of collection. Finally, the “Transect / Dune Name” column shows the transect identifier (“T1” or “T2”) and dune letter designation for the corresponding sample. (Note: some of the data collected is not annotated with type due to loss of the required field notes. These data were not used for type analysis unless they had already been categorized.

Sample Name	Easting/Northing UTM Zone 13N		Elevation	Mean D [4, 3]	<u>Method of Moments</u>		Dune / Interdune Type	Transect / Dune Name
	E	N			Mean			
103-1	380509.09	3632575.00	1208.06	540.440	0.966	0.494	D	E
103-2	380500.96	3632582.68	1208.08	339.267	1.708	0.675	D	E
103-3	380490.88	3632587.22	1207.83	416.042	1.362	0.552	D	E
103-4	380479.45	3632589.76	1207.88	491.562	1.113	0.522	D	E
103-5	380467.38	3632591.27	1207.94	555.663	0.913	0.453	D	E
103-6	380455.69	3632593.45	1207.93	546.974	0.974	0.568	D	E
103-8	380450.50	3632601.65	1208.41	576.249	0.903	0.580	D	E
103-9	380451.87	3632611.65	1208.20	602.127	0.795	0.447	D	E
103-10	380454.97	3632620.80	1208.12	514.984	1.034	0.488	D	E
103-11	380456.60	3632630.85	1207.99	573.597	0.865	0.448	D	E
103-12	380457.30	3632641.16	1208.02	527.435	1.011	0.524	D	E
103-13	380460.21	3632650.93	1208.06	460.185	1.254	0.644	D	E
103-14	380467.49	3632658.42	1208.07	385.698	1.562	0.755	D	E
103-15	380460.09	3632664.34	1210.23	516.941	1.039	0.522	D	E
103-16	380449.89	3632666.53	1211.58	476.240	1.163	0.537	D	E
103-17	380447.63	3632656.79	1212.63	554.950	0.928	0.497	D	E
103-18	380454.33	3632653.18	1211.25	583.819	0.855	0.496	D	E
103-19	380452.10	3632642.79	1211.07	524.183	1.017	0.513	D	E
103-20	380443.15	3632644.77	1213.48	535.836	0.979	0.496	D	E
103-21	380431.97	3632646.42	1214.37	657.143	0.773	0.699	D	E
103-22	380433.27	3632658.45	1213.03	525.251	1.006	0.491	D	E
103-23	380436.72	3632669.50	1211.98	483.022	1.155	0.569	D	E
103-24	380424.97	3632672.21	1211.16	433.377	1.324	0.601	D	E
103-25	380421.78	3632660.42	1212.85	446.390	1.272	0.581	D	E
103-26	380417.43	3632651.83	1213.96	472.330	1.183	0.558	D	E
103-27	380415.63	3632640.83	1215.01	549.191	0.957	0.540	D	E

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
103-28	380426.65	3632637.96	1215.17	529.473	1.011	0.541	D	E
103-30	380437.95	3632634.73	1214.29	523.353	1.026	0.535	D	E
103-31	380444.81	3632632.79	1213.41	533.399	0.998	0.533	D	E
103-32	380450.15	3632632.13	1211.42	465.191	1.197	0.539	D	E
103-33	380448.72	3632621.47	1211.39	409.741	1.394	0.577	D	E
103-34	380438.89	3632621.66	1214.57	491.992	1.145	0.633	D	E
103-35	380425.14	3632626.86	1214.96	505.541	1.073	0.525	D	E
103-36	380414.59	3632630.79	1214.71	515.786	1.057	0.563	D	E
103-37	380399.70	3632632.05	1214.38	547.840	0.963	0.546	D	E
103-38	380405.54	3632644.93	1214.12	512.139	1.061	0.546	D	E
103-39	380409.88	3632657.96	1212.58	437.312	1.284	0.533	D	E
103-40	380415.95	3632670.30	1210.56	443.814	1.279	0.577	D	E
103-41	380406.57	3632680.04	1209.12	448.218	1.289	0.637	D	E
103-42	380396.63	3632665.66	1210.59	423.323	1.375	0.645	D	E
103-43	380383.66	3632669.45	1208.35	532.678	1.153	0.880	D	E
103-44	380370.31	3632657.11	1208.27	497.320	1.227	0.840	D	E
103-45	380384.64	3632648.59	1211.32	408.212	1.413	0.613	D	E
211-1	380449.20	3632679.71	1210.55	562.921	0.928	0.559	D	E
213-2	380455.92	3632653.13	1209.32	486.427	1.150	0.583	V	
213-3	380453.49	3632647.90	1209.35	455.075	1.256	0.628	V	
213-15	380044.37	3632586.54	1209.30	594.017	0.886	0.665		
213-16	379996.10	3632502.02	1210.64	435.771	1.318	0.608		
213-18	379941.78	3632424.50	1211.47	413.848	1.395	0.612		
213-19	379910.31	3632380.24	1210.84	395.565	1.490	0.696		
213-20	379884.82	3632343.93	1211.13	401.168	1.472	0.699		
213-21	379856.90	3632304.78	1210.57	460.935	1.258	0.679	D	C
213-22	379826.75	3632269.64	1209.70	465.143	1.243	0.672		
213-27	379642.02	3632055.68	1209.26	522.473	1.066	0.633		
213-29	379584.34	3631942.18	1209.54	473.186	1.212	0.640		
213-30	379559.96	3631896.86	1209.95	569.309	1.007	0.795		
227-1	380884.52	3632393.25	1209.60	467.362	1.205	0.578	D	E
227-2	380447.67	3632631.95	1214.97	445.786	1.280	0.598	D	E
227-3	380447.45	3632637.84	1214.93	462.152	1.227	0.592	D	E
227-4	380447.89	3632641.89	1214.74	435.298	1.337	0.665	D	E
227-5	380448.19	3632645.84	1214.43	426.749	1.365	0.662	D	E
227-6	380457.57	3632804.38	1209.84	396.935	1.477	0.684	V	
227-8	380528.88	3632799.45	1209.91	411.272	1.427	0.684	V	
227-42	380554.17	3632868.66	1209.38	322.899	1.835	0.814	V	
227-43	380571.77	3632872.86	1209.51	434.825	1.321	0.607	V	
408-1	380460.70	3632657.88	1211.55	453.513	1.301	0.722	D	E
408-2	380462.30	3632661.07	1211.29	431.864	1.391	0.778	D	E
408-3	380464.29	3632665.28	1210.35	485.577	1.155	0.591	D	E
408-4	380443.30	3632620.52	1214.51	421.414	1.424	0.766	D	E
408-5	380440.37	3632612.74	1215.47	473.159	1.193	0.593	D	E
408-6	380438.92	3632603.87	1216.48	459.960	1.265	0.677	D	E
408-7	380439.77	3632594.01	1216.98	474.494	1.226	0.700	D	E
408-8	380444.21	3632585.24	1217.28	504.437	1.113	0.638	D	E
408-9	380450.45	3632578.10	1217.89	587.982	0.884	0.613	D	E

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
408-10	380457.10	3632574.74	1218.18	492.869	1.165	0.686	D	E
408-11	380465.55	3632573.43	1217.97	473.755	1.207	0.658	D	E
408-12	380474.95	3632572.13	1216.92	524.619	1.043	0.591	D	E
408-13	380484.09	3632570.60	1216.09	481.564	1.188	0.654	D	E
408-14	380492.85	3632568.44	1214.58	398.512	1.464	0.660	D	E
408-15	380501.55	3632565.46	1213.21	453.040	1.260	0.602	D	E
408-17	380430.35	3632611.51	1216.36	452.529	1.291	0.690	D	E
408-18	380428.00	3632601.81	1217.08	483.111	1.208	0.733	D	E
408-19	380429.27	3632592.05	1216.72	476.948	1.210	0.684	D	E
408-20	380433.64	3632583.11	1216.63	496.209	1.179	0.746	D	E
408-21	380438.85	3632575.10	1217.04	562.463	1.008	0.771	D	E
408-22	380446.72	3632570.00	1216.30	498.607	1.170	0.752	D	E
408-23	380455.09	3632566.50	1216.74	492.799	1.234	0.849	D	E
408-24	380464.27	3632564.29	1215.85	516.038	1.097	0.678	D	E
408-25	380474.67	3632561.94	1214.92	559.512	1.002	0.724	D	E
408-26	380484.43	3632561.26	1214.33	499.518	1.192	0.795	D	E
408-27	380493.44	3632560.25	1213.64	475.974	1.229	0.725	D	E
408-28	380478.97	3632554.10	1214.37	662.402	0.797	0.813	D	E
408-29	380469.74	3632557.08	1215.72	564.186	1.052	0.867	D	E
408-30	380460.46	3632558.96	1216.18	620.188	0.843	0.709	D	E
408-31	380452.18	3632561.64	1216.80	533.998	1.096	0.796	D	E
408-32	380443.02	3632564.58	1216.85	505.012	1.142	0.720	D	E
408-33	380435.33	3632570.14	1216.94	517.960	1.102	0.724	D	E
408-34	380429.44	3632577.96	1215.87	545.628	1.040	0.745	D	E
408-35	380423.48	3632586.79	1215.87	480.884	1.239	0.802	D	E
408-36	380421.23	3632596.96	1216.79	430.031	1.412	0.822	D	E
408-37	380423.35	3632607.97	1216.39	483.529	1.168	0.624	D	E
408-38	380425.09	3632617.63	1215.62	466.456	1.231	0.652	D	E
408-39	380414.48	3632616.45	1215.19	509.028	1.093	0.623	D	E
408-40	380411.81	3632606.26	1215.54	460.737	1.255	0.668	D	E
408-41	380408.76	3632597.37	1215.76	492.153	1.148	0.642	D	E
408-42	380409.86	3632587.93	1215.46	480.948	1.179	0.632	D	E
408-43	380413.73	3632578.95	1214.42	474.366	1.236	0.737	D	E
408-44	380420.12	3632571.90	1214.46	525.944	1.026	0.555	D	E
408-44B	380419.85	3632571.77	1214.41	428.454	1.341	0.609	D	E
408-45	380428.16	3632564.04	1214.99	529.165	1.052	0.670	D	E
408-46	380435.68	3632557.87	1214.93	451.831	1.284	0.667	D	E
408-47	380443.74	3632554.02	1214.48	563.448	0.965	0.698	D	E
408-48	380453.03	3632550.02	1214.21	500.482	1.214	0.883	D	E
408-49	380461.77	3632547.33	1214.10	517.979	1.094	0.697	D	E
408-50	380448.42	3632542.89	1213.18	611.623	0.858	0.706	D	E
408-51	380438.96	3632546.81	1213.06	551.108	1.008	0.717	D	E
408-52	380431.52	3632552.17	1213.65	523.189	1.137	0.854	D	E
408-53	380423.76	3632558.01	1213.71	549.422	0.967	0.569	D	E
408-54	380416.50	3632564.22	1213.35	571.714	0.910	0.570	D	E
408-55	380409.39	3632571.04	1213.10	518.254	1.096	0.717	D	E
408-56	380404.05	3632579.73	1213.54	469.698	1.256	0.752	D	E
408-57	380401.36	3632589.27	1214.51	456.320	1.333	0.843	D	E

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
408-58	380400.78	3632598.09	1214.54	474.240	1.205	0.651	D	E
408-59	380402.40	3632608.21	1214.17	519.563	1.049	0.570	D	E
408-60	380403.07	3632615.67	1214.33	483.194	1.186	0.672	D	E
408-61	380393.91	3632614.03	1213.36	515.820	1.060	0.573	D	E
408-62	380391.01	3632605.44	1212.72	484.431	1.168	0.629	D	E
408-63	380390.85	3632593.30	1212.92	459.275	1.262	0.680	D	E
408-64	380393.30	3632584.17	1212.98	413.701	1.454	0.781	D	E
408-65	380394.34	3632575.07	1211.66	518.280	1.052	0.568	D	E
408-66	380401.11	3632568.13	1211.60	528.618	1.046	0.652	D	E
408-67	380407.00	3632560.29	1212.06	470.135	1.234	0.694	D	E
408-68	380413.12	3632553.33	1212.21	498.298	1.178	0.778	D	E
408-69	380419.99	3632547.33	1211.70	444.156	1.322	0.698	D	E
408-70	380428.51	3632540.34	1211.22	533.188	1.075	0.770	D	E
408-71	380421.54	3632534.52	1209.79	518.772	1.115	0.762	D	E
408-72	380414.24	3632540.32	1209.93	535.263	1.051	0.705	D	E
408-73	380407.43	3632546.57	1210.59	469.796	1.299	0.862	D	E
408-74	380402.07	3632553.43	1211.02	500.747	1.134	0.677	D	E
408-75	380396.66	3632560.93	1210.61	541.715	1.025	0.690	D	E
415-1	380462.77	3632660.62	1211.75	439.460	1.361	0.774	D	E
415-2	380461.66	3632659.10	1211.93	468.214	1.204	0.583	D	E
415-3	380460.60	3632656.78	1212.08	478.447	1.166	0.563	D	E
415-4	380392.28	3632566.69	1210.80	476.743	1.200	0.648	D	E
415-5	380386.46	3632575.98	1211.34	402.647	1.428	0.602	D	E
415-6	380383.04	3632585.34	1211.89	464.896	1.211	0.574	D	E
415-7	380381.45	3632595.35	1211.98	494.870	1.140	0.641	D	E
415-8	380379.96	3632605.92	1211.89	401.726	1.426	0.589	D	E
415-9	380379.95	3632617.18	1212.77	455.006	1.262	0.643	D	E
415-10	380381.24	3632626.75	1213.54	497.640	1.193	0.820	D	E
415-11	380384.47	3632635.56	1213.79	492.679	1.184	0.747	D	E
415-12	380388.74	3632644.49	1213.51	495.406	1.151	0.672	D	E
415-13	380393.93	3632650.95	1213.02	450.803	1.343	0.815	D	E
415-14	380399.56	3632658.32	1212.48	520.519	1.132	0.832	D	E
415-15	380405.31	3632666.14	1212.11	479.058	1.302	0.913	D	E
415-16	380411.86	3632674.29	1211.48	493.639	1.206	0.798	D	E
415-17	380416.70	3632681.19	1210.89	573.854	0.922	0.629	D	E
415-18	380406.74	3632681.88	1210.45	486.171	1.254	0.867	D	E
415-19	380399.75	3632673.72	1210.85	577.166	0.949	0.741	D	E
415-20	380392.88	3632666.76	1210.17	557.627	0.973	0.661	D	E
415-21	380386.21	3632657.14	1211.14	553.981	0.971	0.625	D	E
415-22	380379.93	3632649.47	1211.05	587.339	0.918	0.706	D	E
415-23	380374.75	3632640.11	1211.63	556.534	1.060	0.875	D	E
415-24	380372.12	3632630.62	1212.05	539.753	1.045	0.738	D	E
415-25	380370.41	3632619.74	1211.96	509.479	1.122	0.708	D	E
415-26	380370.47	3632609.60	1211.21	453.227	1.260	0.621	D	E
415-27	380371.48	3632597.59	1210.93	497.826	1.116	0.583	D	E
415-28	380373.53	3632587.11	1210.93	464.906	1.295	0.819	D	E
415-29	380377.10	3632577.34	1210.13	369.601	1.550	0.596	D	E
415-30	380381.45	3632568.39	1209.82	430.514	1.343	0.627	D	E

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
415-31	380387.62	3632560.58	1209.95	457.292	1.238	0.582	D	E
415-32	380372.15	3632571.59	1209.24	430.227	1.386	0.742	D	E
415-33	380366.92	3632579.17	1209.65	403.053	1.428	0.605	D	E
415-34	380363.98	3632587.52	1209.99	428.227	1.388	0.749	D	E
415-35	380361.62	3632596.25	1209.87	431.840	1.366	0.721	D	E
415-36	380360.16	3632605.41	1209.96	464.330	1.234	0.643	D	E
415-37	380359.79	3632616.29	1210.34	476.885	1.189	0.630	D	E
415-38	380361.48	3632627.65	1210.71	564.442	0.949	0.645	D	E
415-39	380364.75	3632637.19	1210.58	613.787	0.822	0.625	D	E
415-40	380369.57	3632644.83	1210.49	484.889	1.264	0.873	D	E
415-41	380374.78	3632653.37	1209.94	501.647	1.150	0.721	D	E
415-42	380380.72	3632663.13	1209.42	514.173	1.106	0.706	D	E
415-43	380386.29	3632672.32	1209.08	497.041	1.150	0.683	D	E
415-44	380394.15	3632678.82	1209.29	494.520	1.194	0.780	D	E
415-45	380389.62	3632688.77	1209.27	538.644	1.026	0.671	V	
415-47	380357.39	3632692.97	1208.99	349.510	1.698	0.773	V	
415-53	380326.49	3632622.31	1209.04	380.941	1.661	0.951	V	
415-60	380380.05	3632680.09	1209.22	504.957	1.133	0.707	V	
415-61	380443.27	3632607.54	1215.77	457.949	1.248	0.630	D	E
415-62	380442.17	3632598.54	1216.60	435.904	1.405	0.848	D	E
415-63	380443.98	3632590.57	1216.88	423.818	1.397	0.726	D	E
415-64	380464.96	3632573.07	1218.13	505.831	1.090	0.575	D	E
415-65	380464.43	3632574.91	1218.58	465.842	1.249	0.697	D	E
415-66	380471.18	3632572.56	1218.00	471.898	1.189	0.571	D	E
520-1	380460.52	3632659.31	1211.96	448.233	1.265	0.577	D	E
520-2	380458.51	3632657.23	1211.57	445.767	1.275	0.585	D	E
520-3	380455.71	3632654.54	1212.66	466.707	1.209	0.584	D	E
520-4	380455.06	3632656.88	1212.67	453.887	1.247	0.578	D	E
520-5	380457.86	3632659.71	1212.23	448.584	1.268	0.588	D	E
520-6	379439.62	3632058.61	1208.49	360.461	1.627	0.691	D	A
520-7	379429.43	3632042.08	1208.48	455.516	1.320	0.802	D	A
520-8	379418.83	3632025.96	1208.38	404.518	1.543	0.902	D	A
520-9	379417.66	3632009.53	1208.30	482.177	1.153	0.556	D	A
520-10	379423.75	3631994.17	1208.37	482.585	1.154	0.562	D	A
520-11	379432.95	3631977.38	1208.18	540.012	0.978	0.526	D	A
520-12	379440.59	3631960.43	1208.30	622.768	0.770	0.521	D	A
520-13	379447.31	3631942.34	1208.42	362.824	1.733	0.911	D	A
520-14	379463.58	3631935.91	1208.43	410.317	1.573	0.954	D	A
520-15	379481.32	3631932.75	1208.34	679.837	0.658	0.558	D	A
520-16	379495.74	3631929.44	1208.40	589.646	1.057	1.022	D	A
520-17	379513.36	3631924.92	1208.48	646.348	0.775	0.717	D	A
520-18	379528.18	3631917.61	1209.10	425.671	1.375	0.657	D	A
520-19	379545.96	3631914.26	1208.65	559.398	1.125	1.004	D	A
520-20	379541.86	3631907.58	1209.99	390.206	1.488	0.634	D	A
520-21	379537.96	3631905.64	1211.31	433.720	1.381	0.758	D	A
520-22	379522.13	3631914.53	1212.07	536.221	1.071	0.750	D	A
520-23	379505.35	3631917.46	1212.65	426.478	1.356	0.626	D	A
520-24	379487.94	3631918.89	1215.18	478.556	1.200	0.664	D	A

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
520-25	379468.96	3631922.51	1215.39	449.274	1.312	0.717	D	A
520-26	379452.55	3631920.93	1218.75	515.085	1.181	0.907	D	A
520-27	379436.48	3631928.34	1218.83	571.718	0.973	0.767	D	A
520-28	379428.81	3631944.75	1217.84	530.146	1.090	0.785	D	A
520-29	379426.67	3631964.41	1214.84	467.179	1.282	0.800	D	A
520-30	379421.72	3631982.46	1212.34	487.782	1.179	0.693	D	A
520-31	379414.17	3631998.71	1211.89	468.701	1.226	0.655	D	A
520-32	379410.70	3632015.12	1211.52	473.044	1.212	0.652	D	A
520-33	379418.16	3632031.94	1209.96	522.035	1.062	0.638	D	A
520-34	379430.14	3632047.88	1209.46	519.960	1.051	0.578	D	A
520-35	379438.46	3632064.82	1209.19	512.718	1.089	0.638	D	A
520-36	379427.15	3632078.80	1208.74	418.964	1.387	0.637	D	A
520-37	379411.70	3632069.76	1208.67	562.166	1.023	0.814	D	A
520-38	379399.48	3632053.48	1208.93	575.810	0.968	0.761	D	A
520-39	379384.99	3632038.23	1209.42	511.609	1.185	0.871	D	A
520-40	379383.18	3632020.49	1211.31	457.934	1.261	0.655	D	A
520-41	379385.08	3632001.04	1214.70	504.567	1.227	0.929	D	A
520-42	379391.00	3631983.32	1214.93	512.328	1.125	0.740	D	A
520-43	379392.04	3631962.01	1215.59	589.193	0.867	0.567	D	A
520-44	379399.19	3631943.51	1216.97	585.036	0.973	0.841	D	A
520-45	379410.12	3631927.55	1216.58	616.309	0.867	0.748	D	A
520-46	379423.42	3631914.51	1216.23	553.040	1.001	0.686	D	A
520-47	379441.23	3631909.36	1215.81	617.876	0.857	0.733	D	A
520-48	379455.50	3631903.71	1213.92	460.579	1.279	0.721	D	A
520-49	379477.04	3631896.04	1212.52	641.324	0.835	0.821	D	A
520-50	379495.02	3631892.43	1211.42	675.560	0.767	0.832	D	A
520-51	379482.88	3631882.10	1208.91	794.006	0.439	0.574	D	A
520-52	379461.23	3631882.63	1209.22	468.990	1.277	0.776	D	A
520-53	379440.84	3631884.28	1209.74	402.702	1.466	0.702	D	A
520-54	379422.46	3631887.31	1210.77	589.673	0.912	0.714	D	A
520-55	379403.85	3631901.32	1211.27	573.217	0.956	0.704	D	A
520-56	379384.46	3631900.39	1208.92	607.063	0.847	0.640	D	A
520-57	379368.45	3631912.14	1210.10	523.159	1.120	0.794	D	A
520-58	379352.85	3631927.16	1210.02	579.731	0.982	0.829	D	A
520-59	379349.41	3631948.68	1211.36	607.399	0.971	0.947	D	A
520-60	379346.70	3631968.47	1211.49	530.399	1.089	0.770	D	A
520-61	379329.70	3631975.50	1209.63	579.818	0.969	0.792	D	A
520-62	379342.92	3631984.44	1211.61	481.128	1.234	0.782	D	A
520-63	379352.14	3631998.17	1212.20	519.577	1.116	0.772	D	A
520-64	379361.57	3632015.63	1211.54	551.257	1.076	0.858	D	A
520-65	379311.31	3631948.63	1208.44	374.641	1.630	0.831	D	A
901-1	380462.48	3632664.38	1211.96	534.668	1.009	0.575	D	E
901-2	380458.51	3632657.23	1211.57	542.906	1.008	0.645	D	E
901-3	380460.21	3632660.26	1212.10	446.280	1.292	0.632	D	E
901-4	381846.08	3633636.04	1209.79	321.213	1.809	0.746	V	
901-5	381852.86	3633639.04	1209.70	357.214	1.645	0.725	V	
901-7	381784.33	3633627.06	1209.99	414.068	1.418	0.702	V	
901-8	381741.94	3633691.80	1209.84	353.943	1.665	0.733	D	K

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
901-9	381736.11	3633682.58	1209.90	333.490	1.708	0.619	D	K
901-10	381731.33	3633673.21	1209.74	415.053	1.438	0.745	D	K
901-12	381722.67	3633655.88	1209.73	400.889	1.481	0.740	D	K
901-13	381722.97	3633645.86	1209.86	426.362	1.403	0.773	D	K
901-14	381730.81	3633638.85	1209.64	563.256	0.900	0.476	D	K
901-15	381739.78	3633633.66	1209.81	560.262	0.989	0.731	D	K
901-16	381748.64	3633628.42	1209.82	615.836	0.822	0.636	D	K
901-17	381756.17	3633623.54	1210.02	449.330	1.314	0.723	D	K
901-18	381759.68	3633617.50	1210.62	563.053	0.963	0.672	D	K
901-19	381761.12	3633606.08	1209.94	456.815	1.280	0.700	D	K
901-20	381767.58	3633598.33	1211.97	386.995	1.492	0.618	D	K
901-21	381767.21	3633590.24	1211.02	494.714	1.149	0.662	D	K
901-22	381767.05	3633581.52	1211.98	501.361	1.125	0.651	D	K
901-23	381767.20	3633572.46	1211.32	450.841	1.329	0.778	D	K
901-24	381769.61	3633562.00	1209.98	401.528	1.500	0.774	D	K
901-25	381760.29	3633557.70	1210.55	429.921	1.398	0.773	D	K
901-26	381750.61	3633553.77	1210.72	503.986	1.181	0.825	D	K
901-27	381741.28	3633550.38	1210.52	571.142	0.975	0.765	D	K
901-28	381731.72	3633547.72	1210.34	574.608	0.931	0.667	D	K
901-29	381722.31	3633546.22	1210.05	485.254	1.154	0.586	D	K
901-30	381714.10	3633548.80	1210.19	477.878	1.198	0.662	D	K
901-31	381704.54	3633553.15	1210.13	390.958	1.504	0.706	D	K
901-32	381710.49	3633560.66	1211.08	478.045	1.214	0.709	D	K
901-33	381718.09	3633567.31	1212.48	544.460	1.012	0.680	D	K
901-34	381726.57	3633574.17	1213.18	545.609	0.974	0.561	D	K
901-35	381725.32	3633564.02	1212.51	420.426	1.396	0.688	D	K
901-36	381728.70	3633555.70	1212.99	512.760	1.094	0.655	D	K
901-37	381737.01	3633561.17	1213.42	483.016	1.224	0.784	D	K
901-38	381747.00	3633565.53	1212.70	530.028	1.033	0.626	D	K
901-39	381749.13	3633576.12	1213.70	454.833	1.269	0.661	D	K
901-40	381735.99	3633582.00	1213.95	460.039	1.242	0.628	D	K
901-41	381752.19	3633602.75	1213.38	462.758	1.262	0.717	D	K
901-42	381748.87	3633611.47	1213.73	445.796	1.324	0.745	D	K
901-43	381742.54	3633602.81	1213.48	496.809	1.112	0.563	D	K
901-44	381734.94	3633595.84	1214.06	422.413	1.376	0.667	D	K
901-45	381726.82	3633588.95	1214.48	478.714	1.214	0.729	D	K
901-47	381718.67	3633582.42	1213.64	507.595	1.105	0.655	D	K
901-48	381711.43	3633575.38	1212.58	505.048	1.125	0.689	D	K
901-49	381703.43	3633568.74	1210.73	512.596	1.103	0.686	D	K
901-50	381696.15	3633563.08	1209.62	470.046	1.248	0.740	D	K
901-51	381689.73	3633569.29	1209.54	433.666	1.361	0.728	D	K
901-52	381681.46	3633574.94	1209.96	520.775	1.073	0.670	D	K
901-53	381674.71	3633582.56	1210.11	463.314	1.238	0.649	D	K
901-54	381667.59	3633590.67	1210.15	475.993	1.198	0.649	D	K
901-55	381661.40	3633598.77	1210.03	439.701	1.309	0.636	D	K
901-56	381656.17	3633607.41	1210.00	442.705	1.308	0.659	D	K
901-57	381653.06	3633617.68	1210.10	427.471	1.357	0.654	D	K
901-58	381658.07	3633626.80	1210.41	416.362	1.396	0.657	D	K

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
901-59	381664.08	3633635.46	1210.79	431.315	1.355	0.676	D	K
901-60	381669.04	3633620.55	1212.28	488.326	1.157	0.634	D	K
901-61	381672.97	3633604.22	1212.33	452.472	1.284	0.683	D	K
901-62	381685.38	3633591.00	1212.48	487.056	1.180	0.695	D	K
901-63	381699.71	3633580.92	1212.25	517.870	1.051	0.563	D	K
901-64	381711.68	3633592.00	1214.41	456.099	1.273	0.685	D	K
901-65	381696.90	3633601.94	1214.74	472.039	1.220	0.675	D	K
901-66	381685.03	3633615.81	1214.64	464.473	1.238	0.661	D	K
901-67	381677.61	3633632.82	1213.19	447.992	1.287	0.644	D	K
901-68	381672.51	3633649.03	1212.18	445.548	1.307	0.676	D	K
901-69	381681.07	3633665.14	1212.50	450.391	1.284	0.655	D	K
901-70	381689.02	3633648.96	1214.41	446.199	1.276	0.590	D	K
901-71	381693.35	3633630.78	1215.60	466.322	1.224	0.637	D	K
901-72	381703.00	3633615.02	1216.09	463.082	1.252	0.689	D	K
901-73	381718.28	3633603.97	1215.13	456.502	1.265	0.666	D	K
901-74	381729.68	3633620.18	1215.66	465.286	1.235	0.669	D	K
901-75	381715.58	3633632.08	1216.97	460.140	1.252	0.667	D	K
901-76	381703.71	3633643.47	1215.95	441.767	1.287	0.586	D	K
901-77	381700.30	3633660.95	1214.37	432.440	1.336	0.644	D	K
901-78	381690.27	3633675.55	1212.27	446.471	1.326	0.739	D	K
901-79	381701.09	3633689.54	1211.00	425.198	1.367	0.657	D	K
901-80	381716.71	3633697.51	1210.91	432.534	1.318	0.585	D	K
901-81	381732.67	3633700.80	1210.66	465.462	1.212	0.582	D	K
901-82	381722.20	3633685.78	1212.10	425.784	1.343	0.592	D	K
901-83	381705.67	3633675.17	1212.96	444.571	1.290	0.628	D	K
901-84	381711.16	3633660.74	1215.20	463.187	1.234	0.634	D	K
901-85	381709.33	3633650.66	1215.64	504.440	1.078	0.532	D	K
901-86	381711.73	3633638.80	1216.77	540.634	0.976	0.526	D	K
901-87	381700.59	3633549.86	1209.77	388.901	1.547	0.782	V	
901-88	381694.65	3633536.68	1209.74	369.515	1.650	0.864	V	
901-89	381672.92	3633539.96	1209.62	360.566	1.693	0.871	V	
901-90	381657.82	3633551.76	1209.99	512.965	1.090	0.647	V	
918-2	380465.19	3632669.06	1210.76	480.081	1.197	0.674	D	E
918-3	380463.21	3632664.96	1210.63	506.033	1.101	0.622	D	E
918-4	380460.54	3632660.85	1211.03	508.964	1.080	0.571	D	E
918-5	380458.72	3632665.33	1211.93	529.642	1.013	0.547	D	E
918-6	380548.03	3632845.72	1208.15	594.968	0.844	0.543	D	F
918-7	380529.90	3632837.46	1207.90	427.168	1.407	0.774	D	F
918-8	380511.50	3632833.17	1207.96	479.651	1.237	0.780	D	F
918-9	380492.49	3632829.64	1207.89	457.911	1.281	0.708	D	F
918-10	380473.38	3632826.30	1208.01	496.741	1.148	0.676	D	F
918-11	380454.86	3632830.29	1207.85	463.723	1.281	0.748	D	F
918-12	380437.69	3632835.71	1208.00	424.734	1.430	0.797	D	F
918-13	380419.65	3632840.53	1207.87	445.695	1.364	0.813	D	F
918-14	380403.38	3632847.79	1207.84	513.329	1.123	0.744	D	F
918-15	380396.53	3632863.96	1207.92	516.529	1.127	0.773	D	F
918-16	380384.04	3632876.85	1207.92	471.063	1.305	0.847	D	F
918-17	380367.70	3632883.64	1208.10	390.492	1.480	0.620	D	F

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
918-18	380398.54	3632885.87	1210.66	517.796	1.148	0.811	D	F
918-19	380410.74	3632871.68	1210.52	529.225	1.083	0.755	D	F
918-20	380422.43	3632857.47	1210.61	452.392	1.324	0.790	D	F
918-21	380438.50	3632849.33	1210.35	451.384	1.309	0.731	D	F
918-22	380455.59	3632843.84	1209.84	434.978	1.368	0.735	D	F
918-23	380473.27	3632840.22	1209.69	456.125	1.241	0.581	D	F
918-24	380490.65	3632843.34	1209.90	443.985	1.334	0.745	D	F
918-25	380507.14	3632848.30	1209.72	513.922	1.055	0.540	D	F
918-26	380525.69	3632854.54	1208.84	578.294	0.914	0.645	D	F
918-27	380541.49	3632859.95	1208.07	604.288	0.836	0.580	D	F
918-28	380525.41	3632868.36	1207.86	449.807	1.286	0.661	D	F
918-29	380508.29	3632863.42	1209.94	560.638	0.924	0.530	D	F
918-30	380490.97	3632861.79	1210.69	510.316	1.104	0.667	D	F
918-31	380473.42	3632855.12	1211.42	409.381	1.441	0.711	D	F
918-32	380455.16	3632856.65	1212.01	393.454	1.503	0.720	D	F
918-33	380439.41	3632864.42	1212.79	480.245	1.172	0.592	D	F
918-34	380425.59	3632873.49	1212.49	463.794	1.253	0.694	D	F
918-35	380414.12	3632886.65	1212.48	464.045	1.277	0.754	D	F
918-36	380401.79	3632900.32	1212.96	455.050	1.270	0.659	D	F
918-37	380415.73	3632905.91	1213.86	454.537	1.243	0.573	D	F
918-38	380429.55	3632894.77	1214.15	491.555	1.150	0.635	D	F
918-39	380439.99	3632880.94	1214.23	465.318	1.240	0.668	D	F
918-40	380455.15	3632870.87	1213.00	487.641	1.139	0.565	D	F
918-41	380471.17	3632867.48	1211.67	481.302	1.156	0.560	D	F
918-42	380485.11	3632875.93	1209.80	570.234	0.911	0.560	D	F
918-43	380468.07	3632881.97	1211.98	524.241	1.015	0.507	D	F
918-44	380453.03	3632891.55	1214.15	493.988	1.167	0.709	D	F
918-45	380444.18	3632906.60	1214.01	473.028	1.245	0.753	D	F
918-46	380429.93	3632917.40	1214.10	496.706	1.101	0.532	D	F
918-47	380442.33	3632923.77	1212.30	531.781	0.985	0.481	D	F
923-02	380464.80	3632668.91	1209.95	461.744	1.286	0.758	D	E
923-03	380463.26	3632665.53	1210.08	517.073	1.076	0.640	D	E
923-04	380461.05	3632661.72	1210.32	524.477	1.035	0.569	D	E
923-05	380513.42	3632869.39	1207.72	416.750	1.385	0.617	D	F
923-06	380501.16	3632875.65	1207.23	609.349	0.819	0.567	D	F
923-07	380485.64	3632883.20	1207.89	415.344	1.408	0.673	D	F
923-08	380471.27	3632893.36	1207.71	621.256	0.766	0.500	D	F
923-09	380459.34	3632908.38	1207.81	560.930	0.937	0.570	D	F
923-10	380451.81	3632925.95	1207.59	658.879	0.693	0.530	D	F
923-11	380442.65	3632943.31	1207.44	748.257	0.504	0.515	D	F
923-12	380442.93	3632959.87	1207.67	487.529	1.167	0.642	D	F
923-13	380445.56	3632967.75	1207.90	495.152	1.164	0.694	D	F
923-14	380850.60	3633208.26	1208.41	389.740	1.482	0.618	D	H
923-15	380831.70	3633210.98	1208.29	453.865	1.316	0.763	D	H
923-16	380814.56	3633219.82	1208.36	391.679	1.526	0.756	D	H
923-17	380800.98	3633236.02	1208.28	433.964	1.444	0.880	D	H
923-18	380804.01	3633248.04	1208.28	408.694	1.458	0.735	D	H
923-19	380811.66	3633265.72	1208.48	609.767	0.841	0.651	D	H

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
923-20	380801.66	3633277.95	1208.25	473.291	1.207	0.644	D	H
923-21	380788.56	3633261.74	1208.23	361.322	1.642	0.756	D	H
923-22	380794.67	3633255.45	1209.37	489.890	1.134	0.570	D	H
923-23	380770.72	3633261.76	1208.19	530.716	1.042	0.654	D	H
923-24	380754.74	3633259.72	1208.14	399.010	1.509	0.775	D	H
923-25	380738.21	3633256.56	1208.07	442.290	1.332	0.702	D	H
923-26	380747.78	3633251.33	1209.50	533.734	1.025	0.624	D	H
923-27	380765.97	3633250.59	1211.16	494.956	1.145	0.660	D	H
923-28	380784.08	3633249.08	1211.58	533.799	1.025	0.629	D	H
923-29	380791.15	3633242.15	1212.14	501.359	1.126	0.660	D	H
923-30	380789.41	3633226.15	1214.27	531.178	1.011	0.554	D	H
923-31	380800.66	3633213.72	1212.43	484.303	1.165	0.626	D	H
923-32	380812.61	3633201.74	1211.00	531.335	1.010	0.550	D	H
923-33	380828.24	3633194.44	1210.65	573.462	0.920	0.628	D	H
923-34	380846.57	3633188.84	1210.33	502.332	1.106	0.591	D	H
923-35	380844.02	3633171.22	1210.77	481.942	1.187	0.657	D	H
923-36	380825.94	3633176.52	1211.05	524.801	1.052	0.636	D	H
923-37	380808.82	3633185.07	1213.01	486.403	1.188	0.711	D	H
923-38	380793.64	3633197.27	1213.33	522.409	1.035	0.552	D	H
923-39	380782.73	3633212.64	1214.91	509.604	1.109	0.697	D	H
923-40	380775.71	3633229.00	1214.05	533.953	1.001	0.548	D	H
923-41	380753.69	3633236.56	1212.40	488.968	1.154	0.629	D	H
923-42	380747.21	3633219.70	1212.34	469.676	1.217	0.645	D	H
923-43	380764.44	3633212.41	1213.94	485.641	1.184	0.693	D	H
923-44	380777.04	3633198.71	1214.37	498.033	1.126	0.629	D	H
923-45	380788.09	3633183.54	1212.75	473.386	1.184	0.571	D	H
923-46	380803.34	3633172.83	1212.08	474.052	1.180	0.568	D	H
923-47	380818.26	3633161.27	1209.20	438.145	1.353	0.731	D	H
923-48	380814.53	3633153.71	1208.13	379.631	1.567	0.730	D	H
923-49	380797.32	3633152.43	1208.18	440.380	1.401	0.846	D	H
923-50	380780.26	3633151.62	1208.08	352.513	1.648	0.669	D	H
923-51	380783.57	3633169.08	1211.49	386.703	1.511	0.662	D	H
923-52	380771.12	3633181.93	1212.60	491.055	1.129	0.566	D	H
923-53	380758.00	3633194.89	1212.36	475.159	1.241	0.764	D	H
923-54	380740.74	3633204.22	1210.60	427.359	1.390	0.741	D	H
923-55	380731.86	3633188.61	1208.21	489.407	1.196	0.746	D	H
923-56	380747.40	3633179.94	1210.28	506.675	1.113	0.662	D	H
923-57	380761.55	3633168.89	1210.32	455.454	1.268	0.657	D	H
923-58	380767.10	3633154.77	1208.04	356.387	1.652	0.726	D	H
923-59	380750.25	3633161.00	1208.28	395.356	1.504	0.734	D	H
923-60	380734.66	3633170.16	1208.26	488.605	1.156	0.635	D	H
923-61	380724.65	3633162.62	1207.96	427.780	1.393	0.743	V	
923-62	379883.21	3632491.20	1208.63	488.968	1.197	0.734	D	C
923-63	379881.92	3632473.51	1208.52	484.067	1.172	0.637	D	C
923-64	379877.07	3632456.42	1208.44	424.636	1.369	0.641	D	C
923-65	379874.78	3632438.33	1208.35	464.631	1.243	0.664	D	C
923-66	379879.38	3632421.07	1208.29	501.077	1.114	0.603	D	C
923-67	379885.98	3632406.92	1208.61	609.277	0.869	0.722	D	C

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
923-68	379878.08	3632390.14	1208.12	391.032	1.527	0.746	D	C
923-69	379865.82	3632376.02	1208.06	468.700	1.277	0.782	D	C
923-70	379852.61	3632364.05	1208.19	474.415	1.299	0.890	D	C
923-71	379847.08	3632357.47	1208.30	408.630	1.616	1.028	D	C
923-72	379845.14	3632346.82	1208.15	588.933	0.905	0.702	D	C
923-73	379845.64	3632338.24	1208.16	494.616	1.176	0.726	D	C
923-74	379850.60	3632331.15	1208.18	430.138	1.359	0.671	D	C
923-75	379854.86	3632324.18	1208.17	507.779	1.096	0.621	D	C
923-76	379858.77	3632316.36	1208.31	447.481	1.311	0.707	D	C
923-77	379870.15	3632311.53	1208.94	402.233	1.437	0.622	D	C
923-78	379875.76	3632294.62	1210.20	427.850	1.341	0.606	D	C
923-79	379861.90	3632305.37	1210.77	544.238	0.977	0.556	D	C
923-80	379849.39	3632317.85	1210.71	470.574	1.217	0.647	D	C
923-81	379837.52	3632330.59	1211.31	491.107	1.158	0.653	D	C
923-82	379833.46	3632346.89	1213.10	499.609	1.135	0.662	D	C
923-83	379834.76	3632363.40	1214.20	541.177	1.007	0.631	D	C
923-84	379843.60	3632377.75	1214.91	507.461	1.099	0.614	D	C
923-85	379853.27	3632390.27	1216.49	473.389	1.216	0.670	D	C
923-86	379862.13	3632404.47	1216.50	477.272	1.168	0.557	D	C
923-87	379864.62	3632413.06	1216.20	445.224	1.272	0.575	D	C
923-88	379861.39	3632429.22	1214.72	534.820	1.043	0.681	D	C
923-89	379862.34	3632447.26	1214.31	512.068	1.090	0.643	D	C
923-90	379867.80	3632463.88	1212.97	555.668	0.955	0.583	D	C
923-91	379870.23	3632471.25	1212.17	478.279	1.178	0.594	D	C
923-92	379853.89	3632471.45	1211.91	430.057	1.388	0.743	D	C
923-93	379836.69	3632471.78	1212.80	521.357	1.096	0.724	D	C
923-94	379813.09	3632470.52	1212.90	633.027	0.820	0.744	D	C
923-95	379804.54	3632456.13	1212.47	520.006	1.063	0.629	D	C
923-96	379821.78	3632455.45	1213.77	583.244	0.918	0.682	D	C
923-97	379839.70	3632455.56	1214.21	558.820	1.044	0.837	D	C
923-98	379842.16	3632438.11	1215.25	458.978	1.266	0.680	D	C
923-99	379825.40	3632437.98	1213.63	421.816	1.414	0.746	D	C
923-100	379804.85	3632442.21	1211.25	557.287	1.022	0.776	D	C
923-101	379789.41	3632424.52	1208.36	484.122	1.248	0.826	D	C
923-102	379805.74	3632426.20	1210.63	556.312	1.076	0.894	D	C
923-103	379820.81	3632420.57	1213.33	451.146	1.268	0.610	D	C
923-104	379838.90	3632420.58	1214.98	501.034	1.129	0.655	D	C
923-105	379849.43	3632406.88	1215.93	461.482	1.293	0.768	D	C
923-106	379839.59	3632393.91	1215.07	376.568	1.545	0.649	D	C
923-107	379834.57	3632387.34	1214.17	337.088	1.691	0.614	D	C
923-108	379823.10	3632373.71	1214.60	554.757	0.950	0.561	D	C
923-109	379819.06	3632356.50	1214.66	516.151	1.050	0.544	D	C
923-110	379820.67	3632337.04	1213.35	485.880	1.185	0.685	D	C
923-111	379829.03	3632319.61	1211.52	473.683	1.228	0.706	D	C
923-112	379841.83	3632305.55	1210.49	474.520	1.183	0.577	D	C
923-113	379855.05	3632293.48	1210.52	525.022	1.034	0.572	D	C
923-114	379869.01	3632283.17	1209.59	504.167	1.137	0.704	D	C
923-115	379860.61	3632266.86	1208.72	499.386	1.198	0.818	D	C

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
923-116	379847.56	3632278.04	1210.12	506.509	1.101	0.628	D	C
923-117	379834.26	3632289.96	1209.55	448.456	1.319	0.744	D	C
923-118	379822.40	3632303.24	1210.28	426.615	1.389	0.721	D	C
923-119	379812.53	3632317.90	1212.25	498.477	1.139	0.667	D	C
923-120	379805.07	3632332.85	1213.14	512.460	1.106	0.690	D	C
923-121	379804.69	3632351.46	1214.07	509.338	1.075	0.562	D	C
923-122	379805.62	3632368.46	1214.16	504.813	1.128	0.692	D	C
923-123	379811.32	3632385.52	1211.71	554.199	1.036	0.799	D	C
923-124	379821.96	3632399.43	1212.97	450.925	1.278	0.651	D	C
923-125	379806.16	3632404.13	1210.64	469.206	1.223	0.653	D	C
923-126	379798.00	3632387.88	1209.88	602.163	0.939	0.852	D	C
923-127	379790.10	3632371.29	1211.39	488.919	1.178	0.695	D	C
923-128	379787.26	3632352.67	1212.41	539.545	1.017	0.657	D	C
923-129	379785.07	3632334.22	1210.31	492.488	1.194	0.768	D	C
923-130	379790.87	3632315.84	1211.00	538.412	1.022	0.658	D	C
923-131	379801.28	3632300.72	1209.88	452.225	1.277	0.651	D	C
923-132	379812.87	3632285.18	1207.77	471.564	1.317	0.891	D	C
923-133	379825.28	3632271.11	1207.74	481.543	1.185	0.653	D	C
923-134	379844.28	3632260.51	1207.67	351.626	1.653	0.670	D	C
923-135	379790.20	3632288.91	1207.77	453.397	1.344	0.816	D	C
923-136	379774.74	3632296.37	1208.38	406.498	1.457	0.723	D	C
923-137	379765.24	3632315.38	1208.13	453.948	1.267	0.641	D	C
923-138	379758.29	3632331.14	1207.85	507.810	1.109	0.660	D	C
923-139	379758.81	3632348.49	1208.13	419.539	1.409	0.716	D	C
923-140	379762.10	3632363.66	1207.87	554.354	1.063	0.857	D	C
923-141	379772.83	3632378.96	1207.96	560.146	1.028	0.823	D	C
923-142	379783.45	3632391.84	1207.92	481.434	1.217	0.737	D	C
923-143	379789.96	3632407.14	1208.52	543.159	1.056	0.774	D	C
923-144	379773.54	3632405.79	1207.74	425.423	1.473	0.876	D	C
923-145	379839.31	3632239.87	1208.69	397.485	1.521	0.789	E	
901-6	381835.87	3633633.64	1209.62	314.948	2.051	1.134	V	
901-6	381727.43	3633663.31	1209.70	324.840	2.004	1.135	D	K
227-7	380478.25	3632791.13	1209.65	258.870	2.288	1.051	V	
227-80	380677.08	3632931.07	1210.20	262.433	2.221	0.947	V	
227-96	380891.80	3632952.70	1210.05	362.796	1.678	0.842	V	
227-103	381039.31	3632958.80	1209.96	208.464	2.591	0.940	V	
227-104	381076.58	3632981.66	1210.03	288.138	2.061	0.926	V	
415-46	380372.82	3632691.52	1209.07	288.707	2.006	0.828	V	
415-48	380342.42	3632684.01	1208.85	309.649	1.946	0.966	V	
415-49	380325.08	3632686.34	1208.96	357.145	1.684	0.809	V	
415-50	380314.62	3632672.27	1208.89	325.824	1.817	0.815	V	
415-51	380309.99	3632655.27	1209.06	259.868	2.239	1.018	V	
415-52	380319.16	3632637.39	1209.04	226.093	2.453	1.016	V	
415-54	380336.69	3632606.92	1209.08	363.325	1.715	0.913	V	
415-55	380338.36	3632625.17	1209.08	299.493	2.094	1.099	V	
415-57	380332.23	3632663.38	1209.04	298.851	2.073	1.084	V	
415-58	380348.43	3632666.36	1209.05	368.243	1.743	1.058	V	
415-59	380365.94	3632669.11	1209.05	455.056	1.311	0.768	V	

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
1118-2	380377.98	3632956.77	1211.78	501.531	1.098	0.563	D	T1
1118-3	380389.85	3632970.19	1211.85	474.715	1.230	0.725	D	T1
1118-4	380401.96	3632984.49	1212.50	495.056	1.159	0.696	D	T1
1118-5	380414.19	3632999.50	1214.05	542.870	1.047	0.761	D	T1
1118-6	380423.50	3633011.69	1213.98	534.327	1.048	0.706	D	T1
1118-9	380466.53	3633056.75	1207.94	241.420	2.252	0.787	V	T1
1118-10	380478.38	3633072.25	1208.64	547.773	0.998	0.654	D	T1
1118-11	380492.70	3633084.39	1210.85	581.038	0.904	0.637	D	T1
1118-12	380505.57	3633097.15	1212.05	601.767	0.870	0.681	D	T1
1118-13	380517.87	3633109.57	1212.51	570.118	0.959	0.717	D	T1
1118-14	380532.63	3633122.09	1212.74	572.639	0.966	0.738	D	T1
1118-15	380547.12	3633134.31	1211.88	557.181	0.999	0.712	D	T1
1118-16	380561.44	3633147.51	1211.80	590.176	0.894	0.658	D	T1
1118-17	380573.91	3633160.09	1213.30	594.709	0.848	0.555	D	T1
1118-18	380587.14	3633172.98	1208.11	366.016	1.646	0.804	D	T1
1118-22	380643.52	3633224.66	1208.32	560.544	0.961	0.654	D	T1
1118-23	380656.99	3633236.96	1211.29	528.191	1.047	0.648	D	T1
1118-24	380670.08	3633249.05	1213.61	532.519	1.030	0.633	D	T1
1118-25	380685.59	3633262.46	1213.97	497.963	1.128	0.634	D	T1
1118-27	380719.32	3633288.95	1208.05	358.539	1.681	0.818	V	T1
1118-29	380747.12	3633313.40	1208.00	442.905	1.294	0.607	V	T1
1118-30	380759.69	3633326.12	1207.97	459.064	1.314	0.803	D	T1
1118-31	380772.76	3633339.97	1209.16	499.320	1.116	0.611	D	T1
1118-32	380785.01	3633352.80	1210.10	501.108	1.101	0.567	D	T1
1118-33	380801.94	3633363.34	1208.41	457.064	1.260	0.650	D	T1
1118-34	380818.86	3633377.84	1208.00	460.082	1.273	0.715	E	T1
1118-35	380834.07	3633389.83	1209.62	481.692	1.192	0.675	D	T1
1118-36	380848.32	3633401.55	1212.23	504.739	1.129	0.699	D	T1
1118-37	380864.57	3633411.92	1214.23	510.490	1.097	0.652	D	T1
1118-38	380878.47	3633422.52	1214.96	467.014	1.224	0.647	D	T1
1118-39	380895.13	3633435.48	1208.46	551.333	1.002	0.704	D	T1
1118-40	380910.21	3633449.22	1208.27	329.053	1.840	0.886	E	T1
1118-41	380925.00	3633464.51	1208.24	327.899	1.825	0.841	E	T1
1118-42	380940.01	3633476.87	1208.48	405.917	1.495	0.811	E	T1
1118-43	380951.33	3633491.85	1209.08	476.194	1.221	0.709	D	T1
1118-44	380962.41	3633504.92	1210.91	467.671	1.235	0.676	D	T1
1118-45	380976.53	3633516.48	1211.38	490.003	1.258	0.916	D	T1
1118-46	380990.18	3633528.23	1208.81	560.747	0.932	0.553	D	T1
1118-47	381003.48	3633541.57	1210.06	596.754	0.870	0.647	D	T1
1118-48	381017.67	3633553.49	1212.08	603.131	0.828	0.554	D	T1
1118-49	381030.96	3633565.39	1212.96	523.638	1.103	0.769	D	T1
1118-50	381044.35	3633577.87	1213.00	485.993	1.235	0.826	D	T1
1118-51	381057.14	3633591.58	1212.97	452.604	1.274	0.650	D	T1
1118-52	381074.71	3633604.59	1207.76	528.534	1.107	0.805	V	T1
1118-53	381090.42	3633616.76	1207.81	267.348	2.107	0.798	V	T1
1118-54	381105.42	3633627.74	1207.60	268.284	2.094	0.782	V	T1
1118-55	381119.89	3633639.20	1207.63	306.211	1.975	0.959	V	T1
1118-56	381134.64	3633650.17	1207.57	503.976	1.129	0.686	V	T1

Easting/Northing UTM Zone 13N					<u>Method of Moments</u>		Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
1118-57	381149.39	3633661.96	1207.66	529.195	1.024	0.575	E	T1
1118-58	381164.34	3633673.67	1208.86	501.943	1.131	0.675	D	T1
1118-59	381178.77	3633684.29	1211.48	499.176	1.150	0.710	D	T1
1118-60	381192.34	3633695.73	1213.42	484.720	1.178	0.665	D	T1
1118-61	381209.84	3633706.94	1213.66	476.235	1.171	0.558	D	T1
1118-62	381221.50	3633717.61	1211.72	436.129	1.321	0.633	D	T1
1118-64	381254.11	3633743.60	1207.78	414.551	1.490	0.870	V	T1
1118-65	381267.75	3633756.55	1207.85	526.624	1.081	0.736	D	T1
1118-66	381281.42	3633766.08	1208.82	504.407	1.144	0.738	D	T1
1118-67	381300.52	3633777.37	1208.62	612.451	0.813	0.571	V	T1
1118-68	381315.67	3633788.29	1208.48	579.100	0.928	0.685	D	T1
1118-69	381329.53	3633801.28	1209.96	540.085	0.986	0.551	D	T1, J
1118-70	381339.95	3633813.56	1212.55	503.474	1.121	0.667	D	T1, J
1118-71	381357.20	3633820.57	1213.03	473.226	1.238	0.742	D	T1, J
1118-72	381371.47	3633828.34	1212.28	490.387	1.125	0.549	D	T1, J
1118-73	381385.19	3633837.06	1210.02	426.706	1.337	0.585	D	T1, J
1118-74	381400.75	3633844.37	1208.46	355.189	1.674	0.771	V	T1
1118-75	381419.17	3633858.44	1208.62	491.040	1.242	0.876	V	T1
1118-76	381432.96	3633869.48	1208.65	488.440	1.230	0.836	V	T1
1118-77	381588.40	3633729.29	1210.50	505.599	1.080	0.547	D	T2
1118-78	381576.37	3633715.14	1209.49	520.422	1.050	0.580	D	T2
1118-79	381565.93	3633701.32	1208.63	398.927	1.441	0.599	D	T2
1118-80	381552.73	3633690.12	1208.74	393.208	1.518	0.754	V	T2
1118-81	381538.81	3633676.20	1208.83	448.236	1.385	0.899	V	T2
1118-82	381525.68	3633662.53	1208.74	338.051	1.862	0.964	V	T2
1118-83	381512.50	3633649.19	1208.79	271.452	2.173	0.941	V	T2
1118-84	381500.58	3633636.26	1208.71	216.594	2.437	0.835	V	T2
1118-86	381473.25	3633610.52	1208.85	257.842	2.160	0.803	V	T2
1118-87	381461.78	3633601.94	1214.46	475.947	1.170	0.554	D	T2
1118-88	381449.72	3633590.19	1214.37	441.774	1.301	0.635	D	T2
1118-89	381437.48	3633576.83	1212.12	471.360	1.220	0.670	D	T2
1118-90	381425.67	3633563.48	1210.36	449.739	1.285	0.662	D	T2
1118-91	381414.62	3633550.62	1211.06	489.685	1.118	0.522	D	T2
1118-92	381402.93	3633538.02	1211.42	426.540	1.374	0.695	D	T2
1118-93	381390.72	3633524.78	1210.75	510.675	1.069	0.557	D	T2
1118-94	381378.75	3633512.37	1209.45	524.622	1.061	0.671	D	T2
1118-95	381366.89	3633499.23	1208.30	458.207	1.272	0.692	D	T2
1118-96	381355.11	3633485.22	1208.16	348.624	1.665	0.681	V	T2
1118-97	381343.52	3633471.69	1208.71	447.719	1.277	0.602	D	T2
1118-98	381332.31	3633459.33	1209.32	489.683	1.145	0.614	D	T2, I
1118-99	381319.94	3633446.00	1209.88	520.558	1.063	0.637	D	T2, I
1118-100	381307.93	3633433.15	1210.35	507.671	1.096	0.605	D	T2, I
1118-101	381296.29	3633420.23	1211.41	526.052	1.022	0.546	D	T2, I
1118-102	381284.39	3633407.43	1211.05	516.986	1.080	0.654	D	T2, I
1118-103	381273.65	3633393.96	1209.77	537.446	0.997	0.561	D	T2, I
1118-104	381262.96	3633381.42	1208.53	504.516	1.099	0.590	D	T2, I
1118-105	381252.06	3633368.64	1208.07	493.402	1.143	0.644	E	T2
1118-106	381228.68	3633342.91	1208.09	408.588	1.438	0.690	V	T2

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
1118-107	381216.87	3633330.41	1207.89	383.199	1.628	0.918	V	T2
1118-108	381204.80	3633317.10	1208.13	304.758	2.014	0.985	V	T2
1118-109	381196.17	3633307.10	1208.49	403.557	1.510	0.826	V	T2
1118-110	381183.26	3633292.15	1210.83	368.438	1.540	0.555	D	T2
1118-111	381172.36	3633280.16	1211.62	466.383	1.194	0.540	D	T2
1118-112	381161.20	3633267.64	1210.95	480.861	1.202	0.698	D	T2
1118-113	381149.59	3633256.19	1208.93	479.882	1.199	0.674	D	T2
1118-114	381138.25	3633243.19	1208.34	498.828	1.149	0.694	D	T2
1118-115	381126.84	3633229.27	1208.48	449.201	1.275	0.611	E	T2
1118-116	381114.65	3633215.92	1208.79	407.165	1.450	0.714	E	T2
1118-117	381102.47	3633202.87	1209.91	550.369	1.020	0.715	E	T2
1118-118	381091.47	3633190.59	1211.83	489.055	1.169	0.662	D	T2
1118-119	381079.55	3633177.12	1212.46	525.567	1.062	0.668	D	T2
1118-120	381067.17	3633163.24	1212.69	494.931	1.161	0.706	D	T2
1118-121	381054.37	3633150.32	1212.06	524.218	1.054	0.637	D	T2
1118-122	381043.24	3633137.74	1211.17	554.660	0.957	0.578	D	T2
1118-123	381032.20	3633125.85	1209.51	548.586	1.009	0.707	D	T2
1118-124	381021.53	3633112.21	1208.58	553.135	0.952	0.554	D	T2
1118-125	381011.08	3633098.76	1208.42	515.662	1.074	0.630	E	T2
1118-126	381010.60	3633098.62	1208.60	486.819	1.188	0.705	E	T2
1118-127	380996.38	3633082.02	1212.05	499.623	1.142	0.700	D	T2
1118-128	380984.50	3633070.30	1212.31	519.536	1.077	0.661	D	T2
1118-129	380973.32	3633058.25	1211.42	532.937	1.024	0.604	D	T2
1118-130	380962.87	3633047.35	1209.49	554.146	0.951	0.556	E	T2
1118-131	380952.64	3633034.15	1207.74	590.830	0.845	0.521	D	T2
1118-132	380941.81	3633020.92	1207.79	287.871	2.028	0.863	V	T2
1118-133	380929.32	3633007.10	1207.82	371.356	1.599	0.741	V	T2
1118-134	380917.44	3632992.54	1208.03	652.606	0.809	0.806	D	T2
1118-135	380904.20	3632979.81	1207.75	464.617	1.286	0.781	d	T2
1118-136	380891.31	3632967.25	1207.81	645.007	0.730	0.549	D	T2
1118-137	380877.78	3632956.92	1207.87	644.587	0.813	0.784	d	T2
1118-138	380866.15	3632947.46	1210.38	500.611	1.139	0.683	D	T2
1118-139	380853.48	3632935.27	1211.07	506.633	1.115	0.660	D	T2
1118-140	380839.55	3632924.61	1210.61	562.279	0.966	0.668	D	T2
1118-141	380826.56	3632913.80	1208.50	540.944	1.040	0.729	D	T2
1118-142	380812.56	3632902.42	1208.12	514.736	1.111	0.711	D	T2
1118-143	380800.04	3632892.59	1211.21	465.970	1.256	0.722	D	T2
1118-144	380788.02	3632881.23	1212.26	469.070	1.280	0.807	D	T2
1118-145	380774.73	3632870.36	1211.89	526.308	1.052	0.650	D	T2
1118-146	380761.02	3632859.41	1210.77	496.695	1.136	0.648	D	T2
1118-147	380747.67	3632849.12	1209.81	429.875	1.384	0.742	D	T2
1118-148	380734.16	3632837.58	1210.44	434.058	1.298	0.541	D	T2
1118-149	380721.79	3632827.42	1212.51	549.191	0.967	0.567	D	T2
1118-150	380708.02	3632816.80	1212.34	461.307	1.291	0.771	D	T2
1118-151	380694.37	3632806.45	1210.64	581.777	0.974	0.818	D	T2
1118-152	380680.36	3632796.41	1209.06	589.397	0.888	0.646	D	T2
1118-153	380666.97	3632786.62	1208.27	453.321	1.312	0.756	D	T2
1118-07	380440.21	3633027.12	1207.83	275.569	2.184	1.028	V	T1

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
1118-08	380451.69	3633042.43	1207.82	365.920	1.731	0.966	V	T1
1118-19	380599.99	3633185.57	1207.76	227.971	2.352	0.799	V	T1
1118-20	380613.17	3633197.72	1207.88	366.931	1.687	0.888	V	T1
1118-21	380629.43	3633211.35	1208.08	390.673	1.588	0.871	E	T1
1118-26	380698.08	3633272.42	1211.92	355.428	1.754	0.922	V	T1
1118-28	380733.18	3633301.00	1207.91	336.162	1.753	0.766	V	T1
1118-63	381237.74	3633731.55	1207.65	328.297	1.902	1.001	V	T1
1111-02	380465.36	3632672.71	1210.70	454.108	1.268	0.644	D	E
1111-03	380463.07	3632668.98	1210.91	466.284	1.210	0.581	D	E
1111-04	380460.90	3632665.00	1211.06	478.363	1.178	0.593	D	E
1111-05	381410.83	3633833.33	1208.85	462.447	1.281	0.760	D	J
1111-06	381399.13	3633838.54	1208.71	508.503	1.155	0.780	D	J
1111-07	381387.91	3633844.80	1208.77	345.567	1.745	0.832	D	J
1111-08	381376.07	3633852.08	1208.73	421.398	1.442	0.812	D	J
1111-09	381369.58	3633864.91	1208.67	349.235	1.736	0.839	D	J
1111-10	381373.63	3633879.62	1208.70	347.525	1.720	0.805	D	J
1111-11	381377.33	3633895.36	1208.71	336.996	1.744	0.755	D	J
1111-12	381368.35	3633905.87	1210.71	550.185	0.960	0.553	D	J
1111-13	381355.79	3633909.58	1210.24	518.708	1.082	0.671	D	J
1111-14	381341.46	3633912.41	1209.74	567.501	0.950	0.663	D	J
1111-15	381326.13	3633916.29	1208.96	506.530	1.159	0.792	D	J
1111-16	381312.58	3633913.21	1208.58	518.475	1.086	0.678	D	J
1111-17	381304.48	3633900.75	1208.79	528.247	1.066	0.696	D	J
1111-18	381295.02	3633888.56	1208.65	491.470	1.271	0.931	D	J
1111-19	381286.52	3633877.39	1208.42	490.118	1.226	0.828	D	J
1111-20	381277.76	3633864.09	1208.33	505.649	1.135	0.718	D	J
1111-21	381273.41	3633850.09	1208.43	509.053	1.119	0.699	D	J
1111-22	381271.05	3633835.23	1208.49	509.661	1.103	0.655	D	J
1111-23	381279.53	3633821.97	1208.48	557.183	0.941	0.551	D	J
1111-24	381288.76	3633810.52	1208.39	506.956	1.138	0.739	D	J
1111-25	381300.85	3633799.15	1208.53	481.370	1.240	0.804	D	J
1111-26	381315.57	3633793.73	1208.53	514.659	1.104	0.704	D	J
1111-27	381331.13	3633793.30	1209.18	537.917	1.026	0.662	D	J
1111-28	381346.62	3633793.57	1210.13	550.276	1.003	0.693	D	J
1111-29	381360.78	3633791.84	1210.10	502.133	1.143	0.710	D	J
1111-30	381375.52	3633787.75	1208.87	536.629	1.072	0.757	D	J
1111-31	381390.78	3633791.81	1208.60	513.494	1.096	0.662	D	J
1111-32	381403.73	3633800.69	1208.81	535.922	1.029	0.654	D	J
1111-33	381415.55	3633810.00	1209.36	486.072	1.173	0.657	D	J
1111-34	381413.20	3633820.17	1210.27	428.490	1.396	0.766	D	J
1111-35	381399.24	3633824.27	1209.90	457.404	1.301	0.767	D	J
1111-36	381385.73	3633830.97	1210.65	464.749	1.282	0.768	D	J
1111-37	381374.57	3633838.76	1211.58	453.213	1.312	0.752	D	J
1111-38	381363.55	3633848.14	1213.09	464.338	1.271	0.752	D	J
1111-39	381363.50	3633862.28	1211.38	440.722	1.307	0.636	D	J
1111-40	381360.57	3633880.18	1210.86	498.672	1.129	0.640	D	J
1111-41	381361.01	3633894.17	1211.32	441.856	1.331	0.716	D	J
1111-42	381345.49	3633893.79	1212.66	551.842	0.960	0.565	D	J

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
1111-43	381329.61	3633895.46	1211.39	558.569	0.984	0.695	D	J
1111-44	381316.85	3633886.73	1211.21	530.383	1.059	0.696	D	J
1111-45	381329.28	3633879.97	1212.90	503.511	1.092	0.563	D	J
1111-46	381343.09	3633877.11	1213.02	484.305	1.181	0.674	D	J
1111-47	381347.75	3633864.72	1212.91	446.975	1.307	0.705	D	J
1111-48	381346.30	3633847.88	1213.39	455.162	1.315	0.793	D	J
1111-49	381354.31	3633835.63	1213.61	489.012	1.136	0.567	D	J
1111-50	381365.61	3633827.82	1212.45	440.188	1.336	0.712	D	J
1111-51	381377.46	3633820.25	1211.89	429.293	1.398	0.780	D	J
1111-52	381390.51	3633813.67	1210.66	462.438	1.275	0.750	D	J
1111-53	381380.65	3633805.14	1210.63	472.182	1.238	0.726	D	J
1111-54	381364.91	3633808.77	1212.21	524.101	1.079	0.708	D	J
1111-55	381349.88	3633812.58	1212.16	456.619	1.288	0.731	D	J
1111-56	381340.75	3633823.62	1213.67	493.755	1.138	0.632	D	J
1111-57	381333.07	3633837.48	1213.64	487.593	1.165	0.654	D	J
1111-58	381331.02	3633853.07	1213.96	479.318	1.189	0.650	D	J
1111-59	381326.56	3633866.47	1213.68	523.542	1.031	0.552	D	J
1111-60	381310.36	3633869.45	1212.70	515.819	1.083	0.659	D	J
1111-61	381311.49	3633854.94	1213.76	493.309	1.145	0.646	D	J
1111-62	381315.51	3633840.59	1213.49	467.652	1.263	0.764	D	J
1111-63	381320.35	3633827.42	1213.02	458.940	1.289	0.753	D	J
1111-64	381327.64	3633814.37	1212.64	445.288	1.340	0.770	D	J
1111-65	381336.47	3633806.03	1211.27	503.014	1.123	0.670	D	J
1111-66	381317.88	3633805.53	1210.55	448.777	1.316	0.735	D	J
1111-67	381306.77	3633812.13	1210.73	482.063	1.187	0.666	D	J
1111-68	381300.52	3633825.45	1211.10	488.012	1.165	0.657	D	J
1111-69	381294.68	3633838.51	1211.77	475.430	1.233	0.745	D	J
1111-70	381292.54	3633853.90	1211.61	575.207	0.912	0.595	D	J
1111-71	381297.14	3633868.38	1211.66	528.971	1.025	0.574	D	J
1111-72	381302.89	3633879.86	1211.14	566.992	0.924	0.574	D	J
1111-73	381360.01	3633376.90	1208.67	542.557	1.015	0.667	D	I
1111-74	381349.44	3633384.11	1208.62	350.394	1.697	0.780	D	I
1111-75	381342.03	3633396.00	1208.63	309.565	1.902	0.828	D	I
1111-76	381336.99	3633408.02	1208.58	320.048	1.941	0.961	D	I
1111-77	381339.00	3633421.65	1208.63	426.586	1.391	0.742	D	I
1111-78	381331.47	3633431.98	1209.85	448.660	1.272	0.599	D	I
1111-79	381320.73	3633439.93	1210.32	470.393	1.226	0.675	D	I
1111-80	381309.26	3633443.04	1210.15	583.085	0.873	0.547	D	I
1111-81	381296.82	3633440.15	1209.17	565.355	0.964	0.671	D	I
1111-82	381286.52	3633432.88	1208.54	534.666	1.039	0.661	D	I
1111-83	381277.87	3633423.31	1208.67	580.192	0.927	0.682	D	I
1111-84	381269.16	3633412.77	1208.36	491.391	1.153	0.647	D	I
1111-85	381263.56	3633400.52	1208.47	451.206	1.268	0.608	D	I
1111-86	381260.21	3633386.93	1208.45	516.439	1.051	0.550	D	I
1111-87	381258.95	3633373.68	1208.45	507.883	1.085	0.577	D	I
1111-88	381262.27	3633361.49	1208.35	477.571	1.197	0.657	D	I
1111-89	381266.38	3633349.15	1208.40	441.278	1.363	0.788	D	I
1111-90	381274.83	3633337.96	1208.50	516.826	1.076	0.638	D	I

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
1111-91	381286.44	3633329.53	1208.48	457.202	1.300	0.758	D	I
1111-92	381300.42	3633326.66	1208.70	465.810	1.248	0.689	D	I
1111-93	381315.69	3633324.69	1208.64	518.805	1.061	0.596	D	I
1111-94	381332.03	3633326.23	1208.61	460.345	1.313	0.810	D	I
1111-95	381342.49	3633330.73	1209.46	590.452	0.872	0.588	D	I
1111-96	381347.67	3633342.19	1210.76	519.205	1.063	0.606	D	I
1111-97	381354.15	3633356.74	1211.05	444.826	1.294	0.622	D	I
1111-98	381346.70	3633366.91	1211.22	454.812	1.279	0.682	D	I
1111-99	381346.09	3633384.02	1210.01	429.918	1.351	0.656	D	I
1111-100	381341.26	3633389.44	1210.70	482.357	1.179	0.648	D	I
1111-101	381337.88	3633396.86	1210.44	413.882	1.408	0.660	D	I
1111-102	381333.77	3633404.18	1210.69	380.041	1.516	0.610	D	I
1111-103	381332.06	3633413.57	1210.75	393.875	1.470	0.627	D	I
1111-104	381332.32	3633421.82	1210.38	416.841	1.373	0.588	D	I
1111-105	381320.58	3633426.92	1211.16	491.135	1.131	0.569	D	I
1111-106	381319.85	3633417.76	1212.08	444.433	1.288	0.626	D	I
1111-107	381320.53	3633408.53	1212.53	492.262	1.120	0.548	D	I
1111-108	381323.24	3633399.46	1212.63	412.502	1.429	0.719	D	I
1111-109	381326.25	3633390.51	1212.58	439.769	1.287	0.561	D	I
1111-110	381333.32	3633379.72	1211.87	370.242	1.543	0.582	D	I
1111-111	381339.62	3633374.36	1211.23	469.565	1.262	0.751	D	I
1111-112	381337.95	3633361.07	1212.02	441.786	1.336	0.723	D	I
1111-113	381326.74	3633367.56	1213.04	535.636	1.000	0.558	D	I
1111-114	381319.15	3633379.46	1213.50	443.652	1.310	0.678	D	I
1111-115	381313.88	3633391.51	1213.35	489.192	1.122	0.530	D	I
1111-116	381310.34	3633404.40	1212.78	456.150	1.231	0.555	D	I
1111-117	381309.83	3633416.67	1212.44	492.024	1.123	0.557	D	I
1111-118	381309.82	3633428.46	1210.98	471.862	1.214	0.655	D	I
1111-119	381298.35	3633427.57	1210.54	479.796	1.202	0.692	D	I
1111-120	381297.01	3633415.02	1211.98	475.561	1.243	0.774	D	I
1111-121	381297.85	3633402.49	1212.72	596.813	0.828	0.512	D	I
1111-122	381301.66	3633389.06	1213.48	487.821	1.159	0.639	D	I
1111-123	381305.96	3633377.45	1213.70	495.288	1.142	0.653	D	I
1111-124	381311.78	3633365.91	1213.65	471.829	1.213	0.653	D	I
1111-125	381321.79	3633357.13	1213.12	473.105	1.180	0.558	D	I
1111-126	381333.06	3633350.25	1212.06	497.742	1.123	0.602	D	I
1111-127	381333.40	3633339.61	1210.91	482.770	1.183	0.656	D	I
1111-128	381320.67	3633343.93	1211.72	505.621	1.126	0.687	D	I
1111-129	381311.05	3633350.62	1212.93	481.957	1.184	0.652	D	I
1111-130	381300.15	3633359.97	1212.84	514.965	1.039	0.505	D	I
1111-131	381294.54	3633372.03	1212.70	474.147	1.214	0.681	D	I
1111-132	381290.04	3633385.53	1212.84	466.839	1.279	0.797	D	I
1111-133	381286.61	3633399.00	1211.82	483.968	1.174	0.650	D	I
1111-134	381285.98	3633411.40	1211.24	483.942	1.189	0.694	D	I
1111-135	381276.15	3633400.92	1210.34	565.190	0.925	0.565	D	I
1111-136	381275.82	3633387.98	1210.88	494.968	1.122	0.575	D	I
1111-137	381276.72	3633375.53	1211.19	432.474	1.375	0.749	D	I
1111-138	381280.92	3633363.21	1210.94	469.839	1.227	0.675	D	I

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
1111-139	381287.80	3633351.54	1211.35	477.011	1.178	0.584	D	I
1111-140	381295.84	3633342.16	1211.42	495.364	1.138	0.642	D	I
1111-141	381308.06	3633336.82	1210.99	534.961	1.031	0.655	D	I
1111-142	381319.31	3633334.26	1210.13	448.127	1.307	0.692	D	I
1111-143	381278.30	3633346.92	1209.86	505.426	1.093	0.579	D	I
1111-144	381272.04	3633357.87	1209.41	488.986	1.147	0.596	D	I
1111-145	381269.20	3633369.80	1209.84	472.855	1.224	0.693	D	I
1111-146	381268.12	3633380.92	1209.93	486.216	1.145	0.570	D	I
1111-147	381269.02	3633393.39	1209.65	541.704	0.986	0.565	D	I
1111-148	381271.02	3633385.63	1210.35	514.555	1.061	0.562	D	I
1111-149	381271.63	3633382.53	1210.70	499.695	1.098	0.549	D	I
1111-150	381273.63	3633382.96	1211.03	488.582	1.136	0.563	D	I
1111-151	381357.17	3633364.73	1210.63	446.153	1.306	0.680	D	I
1104-02	380465.18	3632665.83	1210.47	475.180	1.208	0.664	D	E
1104-03	380462.09	3632662.22	1210.83	445.739	1.371	0.847	D	E
1104-04	380458.89	3632658.61	1211.33	470.770	1.258	0.768	D	E
1104-05	379767.08	3631667.24	1209.95	562.714	1.000	0.756	D	B
1104-06	379755.97	3631671.63	1207.85	396.514	1.818	1.206	D	B
1104-07	379742.20	3631678.99	1207.72	610.211	0.937	0.893	D	B
1104-08	379731.05	3631687.08	1207.54	640.439	0.948	1.049	D	B
1104-09	379719.19	3631693.98	1207.56	572.695	1.160	1.117	D	B
1104-10	379711.18	3631704.50	1207.48	379.354	1.602	0.793	D	B
1104-11	379709.25	3631718.94	1207.45	470.418	1.270	0.776	D	B
1104-12	379705.50	3631731.97	1207.50	550.796	1.037	0.778	D	B
1104-13	379699.72	3631745.65	1207.68	535.260	1.160	0.953	D	B
1104-14	379692.50	3631757.81	1207.67	655.263	0.873	0.979	D	B
1104-15	379684.01	3631768.68	1207.57	470.032	1.312	0.876	D	B
1104-16	379677.10	3631781.52	1207.57	491.475	1.217	0.808	D	B
1104-17	379670.96	3631795.05	1207.55	464.387	1.281	0.764	D	B
1104-18	379667.12	3631808.57	1207.50	414.639	1.426	0.712	D	B
1104-19	379665.02	3631821.80	1207.68	393.165	1.508	0.706	D	B
1104-20	379668.43	3631835.27	1207.77	372.815	1.574	0.703	D	B
1104-21	379668.77	3631848.49	1207.74	478.780	1.257	0.824	D	B
1104-22	379670.77	3631859.91	1207.93	353.834	1.749	0.877	D	B
1104-23	379663.29	3631859.21	1208.40	490.610	1.339	1.027	D	B
1104-24	379651.77	3631866.20	1209.02	520.988	1.129	0.820	D	B
1104-25	379640.10	3631871.71	1208.62	530.274	1.058	0.696	D	B
1104-26	379624.53	3631874.92	1207.81	292.008	1.987	0.798	D	B
1104-27	379610.81	3631873.53	1207.83	402.755	1.527	0.850	D	B
1104-28	379598.15	3631871.09	1208.51	583.953	0.918	0.702	D	B
1104-29	379590.03	3631862.70	1209.85	618.193	0.813	0.605	D	B
1104-30	379584.55	3631850.96	1209.87	555.698	1.062	0.864	D	B
1104-31	379590.47	3631842.70	1208.30	498.214	1.221	0.856	D	B
1104-32	379592.58	3631855.09	1210.80	397.262	1.480	0.687	D	B
1104-33	379603.49	3631859.93	1211.13	638.471	0.810	0.759	D	B
1104-34	379615.86	3631862.04	1211.10	720.164	0.575	0.556	D	B
1104-35	379628.89	3631862.24	1211.38	650.389	0.763	0.684	D	B
1104-36	379641.91	3631860.54	1211.64	565.929	0.975	0.715	D	B

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
1104-37	379653.50	3631853.53	1211.32	590.481	0.894	0.664	D	B
1104-38	379656.17	3631841.04	1211.21	536.304	1.006	0.578	D	B
1104-39	379654.61	3631827.73	1212.11	439.902	1.336	0.706	D	B
1104-40	379653.00	3631815.42	1213.45	382.442	1.511	0.623	D	B
1104-41	379655.34	3631802.05	1214.00	465.827	1.226	0.619	D	B
1104-42	379658.08	3631788.39	1214.51	407.076	1.407	0.588	D	B
1104-43	379661.93	3631776.21	1215.67	454.326	1.261	0.616	D	B
1104-44	379665.41	3631763.37	1216.66	484.313	1.193	0.692	D	B
1104-45	379672.13	3631751.26	1217.25	663.364	0.726	0.658	D	B
1104-46	379680.57	3631741.34	1217.19	537.926	1.017	0.635	D	B
1104-47	379687.90	3631730.57	1216.47	469.808	1.233	0.687	D	B
1104-48	379691.47	3631717.94	1216.94	326.263	1.749	0.641	D	B
1104-49	379691.27	3631704.89	1217.59	352.114	1.646	0.657	D	B
1104-50	379691.78	3631691.27	1218.41	577.859	0.910	0.603	D	B
1104-51	379699.64	3631681.03	1217.28	736.346	0.520	0.494	D	B
1104-52	379713.11	3631677.61	1215.05	676.916	0.650	0.519	D	B
1104-53	379726.20	3631670.67	1214.55	645.999	0.757	0.644	D	B
1104-54	379737.25	3631662.46	1214.56	626.693	0.776	0.560	D	B
1104-55	379750.99	3631659.56	1212.94	722.695	0.564	0.537	D	B
1104-56	379762.91	3631658.54	1212.42	493.758	1.187	0.750	D	B
1104-57	379754.75	3631648.08	1213.25	420.621	1.380	0.635	D	B
1104-58	379741.85	3631649.90	1213.49	330.570	1.749	0.687	D	B
1104-59	379729.02	3631651.58	1213.49	342.507	1.686	0.658	D	B
1104-60	379717.15	3631658.13	1213.27	361.473	1.622	0.693	D	B
1104-61	379707.11	3631666.34	1214.29	386.843	1.506	0.654	D	B
1104-62	379694.30	3631669.39	1215.18	432.504	1.344	0.658	D	B
1104-63	379686.66	3631676.22	1217.51	452.275	1.261	0.600	D	B
1104-64	379678.80	3631686.84	1218.71	534.473	1.038	0.670	D	B
1104-65	379677.56	3631700.54	1217.52	569.292	0.932	0.607	D	B
1104-66	379677.82	3631714.39	1216.53	498.618	1.153	0.699	D	B
1104-67	379672.05	3631727.68	1216.38	365.284	1.584	0.639	D	B
1104-68	379665.19	3631739.70	1216.59	454.549	1.274	0.662	D	B
1104-69	379656.72	3631750.82	1216.79	421.569	1.388	0.670	D	B
1104-70	379651.36	3631763.16	1216.88	399.273	1.446	0.612	D	B
1104-71	379646.46	3631775.26	1217.36	526.265	1.056	0.654	D	B
1104-72	379643.58	3631788.34	1216.27	562.239	0.959	0.629	D	B
1104-73	379640.93	3631801.56	1214.92	466.077	1.251	0.707	D	B
1104-74	379640.22	3631815.16	1213.08	410.050	1.405	0.609	D	B
1104-75	379642.11	3631828.11	1212.20	416.461	1.461	0.813	D	B
1104-76	379643.62	3631842.11	1210.65	417.683	1.394	0.657	D	B
1104-77	379632.63	3631849.13	1210.54	430.351	1.342	0.638	D	B
1104-78	379618.99	3631850.36	1210.02	418.094	1.388	0.651	D	B
1104-79	379606.73	3631849.16	1209.44	418.776	1.382	0.642	D	B
1104-81	379618.22	3631836.42	1210.24	707.864	0.640	0.674	D	B
1104-82	379630.86	3631834.24	1211.35	651.315	0.749	0.645	D	B
1104-83	379625.15	3631819.17	1212.67	534.001	1.040	0.670	D	B
1104-84	379625.67	3631806.97	1214.61	482.234	1.190	0.671	D	B
1104-85	379629.24	3631793.71	1215.85	483.922	1.149	0.560	D	B

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
1104-86	379630.29	3631779.64	1217.56	526.911	1.071	0.706	D	B
1104-87	379633.86	3631767.01	1217.68	454.492	1.283	0.695	D	B
1104-88	379639.69	3631754.96	1216.90	578.465	0.968	0.771	D	B
1104-89	379645.18	3631742.33	1216.77	532.993	1.085	0.786	D	B
1104-90	379651.50	3631729.99	1216.13	439.610	1.345	0.705	D	B
1104-91	379658.76	3631718.53	1215.71	542.330	1.072	0.798	D	B
1104-92	379663.40	3631705.82	1216.43	652.924	0.774	0.728	D	B
1104-93	379664.88	3631692.71	1217.17	625.250	0.815	0.681	D	B
1104-94	379667.63	3631678.11	1218.05	561.040	0.955	0.640	D	B
1104-95	379676.03	3631668.71	1216.90	411.009	1.405	0.620	D	B
1104-96	379685.12	3631659.42	1214.58	605.762	1.023	0.995	D	B
1104-97	379696.76	3631656.50	1213.20	420.733	1.394	0.684	D	B
1104-98	379707.71	3631648.86	1211.96	391.366	1.549	0.783	D	B
1104-99	379718.93	3631642.50	1212.07	288.716	1.923	0.629	D	B
1104-100	379731.18	3631637.87	1212.26	316.702	1.809	0.678	D	B
1104-101	379745.80	3631638.64	1213.24	444.339	1.424	0.897	D	B
1104-102	379736.51	3631629.47	1212.09	724.835	0.615	0.706	D	B
1104-103	379724.29	3631625.85	1210.50	324.274	1.853	0.824	D	B
1104-104	379713.15	3631631.32	1209.95	286.724	1.929	0.622	D	B
1104-105	379701.33	3631637.57	1209.82	320.606	1.787	0.669	D	B
1104-106	379689.43	3631643.10	1210.84	288.750	1.945	0.682	D	B
1104-107	379678.14	3631648.58	1212.75	540.656	1.240	1.076	D	B
1104-108	379669.91	3631659.13	1214.70	339.708	1.688	0.635	D	B
1104-109	379659.91	3631668.52	1216.40	541.583	1.024	0.681	D	B
1104-110	379655.20	3631680.02	1216.77	694.832	0.666	0.671	D	B
1104-111	379653.73	3631693.86	1215.51	624.661	0.790	0.586	D	B
1104-112	379648.91	3631708.49	1214.47	557.454	1.068	0.870	D	B
1104-113	379641.55	3631720.90	1214.51	396.094	1.504	0.717	D	B
1104-114	379635.88	3631734.27	1214.54	377.520	1.563	0.694	D	B
1104-114a	379634.30	3631733.47	1213.86	314.118	1.787	0.597	D	B
1104-114b	379635.38	3631733.97	1214.51	582.002	0.972	0.804	D	B
1104-114c	379636.04	3631733.67	1214.55	490.741	1.233	0.837	D	B
1104-114d	379636.31	3631733.04	1214.59	356.715	1.619	0.638	D	B
1104-114e	379635.77	3631733.31	1214.15	342.223	1.717	0.729	D	B
1104-114f	379637.78	3631734.04	1214.13	520.877	1.146	0.826	D	B
1104-114g	379634.65	3631734.66	1214.11	384.534	1.601	0.836	D	B
1104-114h	379635.36	3631735.78	1214.50	459.637	1.330	0.819	D	B
1104-114i	379636.58	3631734.55	1215.04	457.144	1.317	0.788	D	B
1104-115	379627.87	3631746.70	1215.30	385.683	1.503	0.632	D	B
1104-116	379620.13	3631760.02	1215.80	514.367	1.096	0.671	D	B
1104-117	379616.18	3631774.63	1215.91	492.249	1.156	0.661	D	B
1104-118	379615.01	3631788.89	1215.09	543.332	1.027	0.694	D	B
1104-119	379613.21	3631802.30	1213.22	482.978	1.196	0.694	D	B
1104-120	379610.07	3631815.27	1211.33	505.404	1.130	0.704	D	B
1104-121	379594.37	3631826.47	1207.51	505.586	1.196	0.858	D	B
1104-122	379582.42	3631809.06	1207.52	646.535	0.825	0.837	D	B
1104-123	379572.85	3631793.41	1207.48	541.415	1.055	0.765	D	B
1104-124	379558.94	3631768.38	1207.72	619.487	0.875	0.792	D	B

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
1104-125	379559.25	3631740.84	1207.48	459.671	1.276	0.718	D	B
1104-126	379577.39	3631720.71	1207.59	340.277	1.689	0.645	D	B
1104-127	379595.73	3631705.19	1207.61	406.375	1.477	0.760	D	B
1104-128	379607.14	3631684.81	1207.78	436.130	1.377	0.772	D	B
1104-129	379606.29	3631661.40	1207.83	404.660	1.482	0.757	D	B
1104-130	379628.06	3631656.12	1210.77	406.366	1.480	0.765	D	B
1104-131	379652.14	3631646.82	1211.39	477.633	1.239	0.766	D	B
1104-132	379663.34	3631637.37	1210.60	570.323	1.022	0.861	D	B
1104-133	379670.06	3631625.37	1207.82	235.603	2.346	0.846	E	
1104-134	379680.24	3631633.96	1208.95	211.004	2.353	0.576	E	
1104-135	379693.01	3631627.24	1207.86	364.607	1.613	0.701	E	
1104-136	379710.12	3631617.54	1208.34	493.148	1.226	0.831	D	B
1113-2	380466.95	3632670.58	1210.54	444.536	1.267	0.555	D	E
1113-3	380463.68	3632666.72	1210.88	477.934	1.176	0.586	D	E
1113-4	380460.43	3632662.26	1211.21	441.528	1.292	0.592	D	E
1113-6	380050.79	3633160.43	1207.92	446.714	1.317	0.715	D	D
1113-7	380037.91	3633164.60	1207.89	493.813	1.134	0.600	D	D
1113-8	380026.34	3633174.56	1207.83	443.916	1.294	0.613	D	D
1113-9	380016.60	3633186.36	1207.73	534.741	1.020	0.603	D	D
1113-10	380013.22	3633199.82	1207.76	448.416	1.409	0.928	D	D
1113-11	380022.28	3633210.08	1207.88	350.433	1.697	0.766	D	D
1113-12	380029.42	3633222.88	1207.98	379.106	1.500	0.560	D	D
1113-13	380035.28	3633236.56	1207.94	519.810	1.105	0.737	D	D
1113-14	380046.18	3633247.38	1207.96	593.571	0.988	0.920	D	D
1113-15	380051.51	3633260.23	1207.93	442.703	1.285	0.583	D	D
1113-16	380055.31	3633273.45	1208.20	480.092	1.266	0.846	D	D
1113-17	380055.04	3633288.09	1207.98	360.192	1.693	0.846	D	D
1113-18	380044.18	3633296.79	1207.85	550.349	1.056	0.832	D	D
1113-19	380037.78	3633309.71	1207.95	631.759	0.834	0.776	D	D
1113-20	380033.38	3633316.87	1207.89	521.349	1.123	0.780	D	D
1113-21	380024.23	3633328.14	1209.55	404.184	1.433	0.627	D	D
1113-22	380012.69	3633335.82	1209.32	505.456	1.117	0.658	D	D
1113-23	379997.23	3633341.80	1207.93	494.067	1.169	0.700	D	D
1113-24	379982.57	3633346.35	1207.86	438.195	1.324	0.659	D	D
1113-25	379966.01	3633346.72	1207.87	517.684	1.084	0.667	D	D
1113-26	379948.43	3633345.26	1207.89	511.562	1.108	0.692	D	D
1113-27	379933.31	3633336.21	1208.05	540.588	1.062	0.792	D	D
1113-28	379928.26	3633321.86	1208.25	554.426	1.021	0.775	D	D
1113-29	379943.49	3633291.62	1207.87	555.033	0.995	0.701	D	D
1113-30	379952.38	3633276.67	1207.93	562.858	0.995	0.750	D	D
1113-31	379967.11	3633270.82	1208.00	411.912	1.446	0.734	D	D
1113-32	379967.23	3633270.91	1208.02	506.997	1.186	0.847	D	D
1113-33	379984.56	3633265.80	1207.98	494.287	1.137	0.612	D	D
1113-34	379981.85	3633249.33	1208.23	605.389	0.849	0.636	D	D
1113-35	379965.26	3633226.92	1208.04	385.760	1.508	0.645	D	D
1113-36	379951.40	3633213.61	1207.79	446.618	1.325	0.725	D	D
1113-37	379940.98	3633197.86	1207.98	473.004	1.215	0.649	D	D
1113-38	379930.16	3633185.57	1209.41	446.767	1.283	0.613	D	D

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
1113-39	379922.42	3633169.33	1210.14	456.548	1.259	0.644	D	D
1113-40	379916.38	3633152.14	1209.49	616.788	0.836	0.682	D	D
1113-41	379920.43	3633132.65	1208.69	552.787	1.047	0.826	D	D
1113-42	379930.50	3633117.38	1208.18	615.470	0.820	0.626	D	D
1113-43	379949.78	3633106.89	1208.14	579.276	0.929	0.678	D	D
1113-44	379968.32	3633100.16	1208.03	501.115	1.211	0.873	D	D
1113-45	379988.32	3633095.45	1207.93	572.460	0.926	0.634	D	D
1113-46	380009.45	3633101.24	1208.10	512.561	1.134	0.760	D	D
1113-47	380026.72	3633109.23	1209.37	662.023	0.748	0.715	D	D
1113-48	380040.67	3633123.91	1211.77	532.200	1.132	0.876	D	D
1113-49	380048.19	3633139.04	1212.13	509.666	1.175	0.844	D	D
1113-50	380037.86	3633151.61	1211.97	521.144	1.099	0.737	D	D
1113-51	380028.04	3633166.33	1209.85	459.799	1.380	0.918	D	D
1113-52	380017.71	3633179.60	1209.14	529.399	1.029	0.590	D	D
1113-53	380008.30	3633193.94	1210.40	530.966	1.015	0.563	D	D
1113-54	380010.37	3633209.97	1210.28	496.892	1.162	0.718	D	D
1113-55	380018.34	3633225.52	1210.93	468.403	1.264	0.754	D	D
1113-56	380028.20	3633242.08	1211.50	461.069	1.293	0.767	D	D
1113-57	380037.47	3633256.62	1212.46	469.041	1.255	0.737	D	D
1113-58	380044.02	3633273.14	1212.92	462.746	1.278	0.745	D	D
1113-59	380035.43	3633289.80	1214.06	554.763	0.976	0.651	D	D
1113-60	380031.06	3633306.91	1211.38	472.317	1.214	0.653	D	D
1113-61	380014.35	3633317.79	1212.27	503.752	1.094	0.570	D	D
1113-62	379998.41	3633325.09	1212.81	481.443	1.183	0.652	D	D
1113-63	379980.46	3633322.12	1212.98	511.324	1.145	0.785	D	D
1113-64	379970.84	3633301.83	1212.47	559.182	0.941	0.568	D	D
1113-65	379985.25	3633291.70	1212.97	456.727	1.313	0.794	D	D
1113-66	380001.02	3633298.50	1213.65	494.700	1.221	0.845	D	D
1113-67	380017.00	3633289.17	1213.19	513.405	1.180	0.874	D	D
1113-68	380006.51	3633274.74	1211.16	556.060	0.963	0.619	D	D
1113-69	380029.20	3633274.64	1214.00	548.421	1.049	0.803	D	D
1113-70	380020.94	3633258.62	1213.41	546.038	1.002	0.659	D	D
1113-71	380006.75	3633251.45	1212.16	689.433	0.628	0.532	D	D
1113-72	380005.45	3633233.79	1212.29	576.930	0.961	0.761	D	D
1113-73	379994.96	3633214.78	1212.08	535.845	1.062	0.748	D	D
1113-74	379992.97	3633197.82	1212.84	518.151	1.130	0.787	D	D
1113-75	379994.10	3633179.96	1212.53	565.338	0.926	0.571	D	D
1113-76	379999.61	3633163.35	1212.84	564.334	0.949	0.645	D	D
1113-77	380010.87	3633148.52	1213.50	527.188	1.085	0.748	D	D
1113-78	380018.52	3633131.25	1212.43	593.871	0.911	0.741	D	D
1113-79	380000.70	3633124.15	1212.57	620.992	0.814	0.657	D	D
1113-80	379982.50	3633123.96	1212.47	556.741	1.024	0.796	D	D
1113-81	379965.62	3633129.00	1212.64	707.594	0.598	0.552	D	D
1113-82	379950.78	3633142.51	1212.95	617.304	0.824	0.661	D	D
1113-83	379941.66	3633159.63	1212.74	613.970	0.839	0.676	D	D
1113-84	379955.38	3633173.26	1213.09	568.331	0.977	0.751	D	D
1113-85	379971.59	3633191.09	1213.09	551.321	1.030	0.779	D	D
1113-86	379976.82	3633209.11	1212.50	635.603	0.784	0.667	D	D

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
1113-87	379985.39	3633224.49	1210.93	572.320	0.937	0.664	D	D
1113-88	379970.45	3633170.86	1213.79	578.555	0.942	0.732	D	D
1113-89	379980.46	3633154.25	1214.47	580.626	0.953	0.756	D	D
1113-90	379963.86	3633149.23	1214.09	591.141	0.903	0.722	D	D
225-5	381317.89	3633234.51	1208.13	447.654	1.347	0.794	E	
23-1	379722.33	3631647.17	1213.33	751.323	0.543	0.652	D	
225-6	381303.64	3633219.70	1208.08	356.323	1.735	0.909	V	
23-2	379718.54	3631646.89	1212.88	452.694	1.314	0.749	D	
225-8	381211.73	3633389.41	1208.16	353.559	1.829	1.050	V	
23-3	379702.00	3631640.41	1210.63	404.660	1.562	0.910	D	
225-9	381241.40	3633378.30	1207.99	452.444	1.277	0.663	E	
23-4	379688.62	3631633.63	1208.10	423.478	1.466	0.852	D	
23-5	379669.03	3631625.95	1207.72	356.499	1.660	0.744	D	
225-17	381756.25	3633483.13	1208.65	466.096	1.259	0.731	E	
225-19	381569.96	3633638.83	1208.38	374.620	1.604	0.797	V	
225-20	381621.21	3633634.00	1208.43	476.674	1.175	0.573	E	
225-25	381279.32	3633796.42	1208.38	480.873	1.211	0.721	E	
225-26	381192.74	3633821.57	1208.42	197.945	2.573	0.898	V	
225-27	381232.04	3633906.20	1208.23	245.601	2.223	0.787	V	
225-28	381278.32	3633888.03	1208.54	503.202	1.126	0.674	E	
225-31	380718.17	3633173.41	1208.05	460.261	1.260	0.677	E	
225-34	380779.23	3633142.03	1208.16	447.344	1.345	0.779	E	
225-35	380769.73	3633094.74	1207.95	422.882	1.394	0.707	V	
225-41	379932.01	3633111.87	1208.47	480.725	1.202	0.683	E	
225-42	379942.65	3633062.72	1208.36	243.964	2.239	0.809	V	
225-45	379954.86	3633033.40	1208.40	453.988	1.310	0.755	E	
225-1	379980.72	3633041.45	1208.58	431.880	1.362	0.698	E	
225-7	381253.86	3633303.33	1208.30	336.133	1.747	0.753	V	
225-16	381771.80	3633524.26	1209.19	445.186	1.335	0.752	E	
225-18	381734.32	3633482.68	1208.44	331.528	1.790	0.809	V	
225-32	380630.55	3633181.19	1208.09	360.551	1.685	0.835	V	
227-90	380796.87	3632964.23	1215.40	508.337	1.127	0.714		
227-91	380812.48	3632968.90	1216.36	496.767	1.144	0.663		
227-92	380819.03	3632952.22	1214.57	540.665	1.020	0.664		
227-93	380837.74	3632959.19	1214.78	469.373	1.298	0.846		
227-94	380853.48	3632965.78	1212.58	467.690	1.231	0.664		
227-95	380877.76	3632966.09	1210.39	528.602	1.136	0.889		
227-97	380920.70	3632949.48	1213.29	518.177	1.090	0.690		
227-98	380945.17	3632952.50	1216.24	535.023	1.036	0.660		
227-99	380965.44	3632962.07	1216.91	464.143	1.287	0.783		
227-100	380991.45	3632972.06	1213.84	470.571	1.220	0.655		
227-101	381007.67	3632956.27	1214.38	464.018	1.264	0.727		
227-102	381024.73	3632943.97	1212.90	468.273	1.224	0.650		
227-105	381115.56	3633005.19	1210.46	495.128	1.152	0.678		
227-106	381132.56	3633005.49	1211.16	591.733	0.889	0.651		
227-107	381149.31	3633010.18	1212.77	501.102	1.169	0.772		
227-85	380703.32	3632922.55	1211.46	430.309	1.369	0.703		
227-86	380724.71	3632959.24	1211.96	493.199	1.163	0.688		

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
227-87	380748.68	3632961.08	1210.92	543.097	1.036	0.728		
227-88	380765.08	3632958.19	1212.01	600.907	0.855	0.608		
227-89	380779.99	3632961.20	1214.16	551.717	1.002	0.684		
213-23	379772.54	3632209.13	1217.39	518.681	1.124	0.770		
213-24	379747.78	3632169.33	1213.02	564.474	1.044	0.858		
213-25	379726.87	3632132.06	1212.63	601.296	0.976	0.921		
213-26	379701.45	3632097.67	1211.19	430.518	1.375	0.724		
213-28	379607.61	3631976.89	1212.30	487.488	1.194	0.719		
213-31	379552.51	3631853.44	1215.99	632.852	0.812	0.698		
227-9	380537.38	3632839.75	1210.25	502.597	1.161	0.753		
227-10	380527.56	3632840.54	1210.58	459.836	1.298	0.785		
227-11	380518.28	3632837.43	1210.66	514.849	1.109	0.720		
227-12	380508.92	3632835.36	1210.49	555.301	0.992	0.698		
227-13	380496.97	3632832.82	1210.36	479.004	1.176	0.595		
227-14	380485.42	3632830.92	1210.63	473.020	1.217	0.672		
227-15	380475.52	3632829.89	1210.66	504.927	1.127	0.692		
227-16	380464.50	3632830.95	1210.65	503.570	1.120	0.653		
227-17	380454.44	3632832.32	1210.83	434.597	1.356	0.706		
227-18	380443.86	3632835.22	1210.96	550.303	0.965	0.569		
227-19	380433.93	3632837.17	1210.60	453.392	1.299	0.725		
227-20	380423.36	3632840.06	1210.54	508.027	1.101	0.638		
227-21	380414.29	3632843.14	1210.51	479.387	1.171	0.584		
227-22	380407.54	3632851.70	1209.97	494.478	1.166	0.717		
227-23	380404.53	3632861.53	1211.94	565.267	0.917	0.545		
227-24	380408.59	3632868.42	1214.35	561.895	0.927	0.546		
227-25	380416.76	3632876.72	1216.33	536.437	1.006	0.581		
227-26	380422.74	3632884.82	1215.66	544.853	0.971	0.546		
227-27	380427.59	3632894.44	1216.36	495.092	1.200	0.804		
227-28	380434.12	3632899.97	1215.91	480.459	1.191	0.663		
227-29	380444.62	3632906.02	1215.71	476.002	1.212	0.680		
227-30	380448.30	3632898.69	1215.81	495.208	1.145	0.657		
227-31	380454.02	3632891.75	1215.40	488.090	1.154	0.623		
227-32	380460.69	3632886.89	1214.43	458.816	1.231	0.575		
227-33	380466.07	3632880.54	1213.20	376.723	1.533	0.624		
227-34	380474.71	3632875.58	1212.63	470.623	1.221	0.662		
227-35	380482.89	3632871.39	1212.35	462.791	1.225	0.595		
227-36	380491.94	3632867.88	1211.88	436.130	1.339	0.678		
227-37	380501.07	3632864.39	1211.70	479.175	1.197	0.668		
227-38	380509.34	3632861.41	1211.23	449.022	1.280	0.622		
227-39	380518.86	3632857.47	1210.80	452.171	1.281	0.661		
227-40	380530.96	3632854.96	1210.18	568.162	0.944	0.653		
227-41	380540.80	3632859.67	1209.83	504.325	1.144	0.728		
227-44	380589.10	3632880.10	1210.46	498.923	1.120	0.603		
227-45	380605.71	3632886.02	1211.85	503.621	1.112	0.636		
227-46	380623.18	3632889.91	1213.02	513.010	1.083	0.626		
227-47	380622.11	3632876.72	1214.68	502.994	1.116	0.646		
227-48	380638.53	3632908.56	1213.80	511.165	1.124	0.732		
227-49	380655.05	3632900.01	1213.13	454.010	1.335	0.826		

Easting/Northing UTM Zone 13N				<u>Method of Moments</u>			Dune / Interdune Type	Transect / Dune Name
Sample Name	E	N	Elevation	Mean D [4, 3]	Mean			
227-50	380670.70	3632895.30	1213.84	454.754	1.290	0.716		
227-51	380681.20	3632880.49	1213.88	443.116	1.345	0.761		
227-52	380681.74	3632864.56	1216.08	493.212	1.151	0.656		
227-53	380689.21	3632851.77	1218.54	565.442	0.914	0.535		
227-54	380705.51	3632846.77	1217.69	459.434	1.234	0.591		
227-55	380719.95	3632842.16	1214.52	438.113	1.300	0.585		
227-56	380727.59	3632846.07	1211.39	474.583	1.220	0.684		
227-57	380716.43	3632852.39	1212.76	374.706	1.562	0.683		
227-58	380716.38	3632857.67	1210.27	564.356	0.926	0.563		
227-59	380711.65	3632854.19	1213.08	479.114	1.218	0.716		
227-59b	380711.35	3632854.89	1212.96	357.614	1.760	0.944		
227-60	380712.06	3632859.86	1210.08	450.042	1.296	0.691		
227-61	380693.12	3632877.94	1210.14	442.975	1.347	0.749		
227-62	380690.03	3632879.60	1212.26	460.332	1.234	0.595		
227-63	380694.13	3632883.71	1210.60	475.104	1.184	0.584		
227-64	380694.20	3632890.89	1210.35	466.746	1.207	0.578		
227-65	380694.18	3632897.98	1210.56	391.313	1.499	0.681		
227-66	380696.21	3632906.59	1210.74	407.300	1.429	0.641		
227-67	380685.43	3632895.45	1212.76	435.467	1.359	0.734		
227-68	380681.59	3632878.51	1213.66	469.945	1.201	0.587		
227-69	380677.72	3632861.85	1215.80	473.256	1.205	0.639		
227-70	380693.80	3632849.78	1218.45	480.676	1.238	0.802		
227-71	380689.33	3632909.68	1211.24	465.973	1.260	0.731		
227-72	380688.97	3632832.66	1217.45	517.259	1.108	0.737		
227-73	380676.59	3632823.30	1214.53	544.248	1.010	0.665		
227-74	380663.13	3632832.00	1214.06	443.780	1.322	0.703		
227-75	380651.32	3632846.60	1212.80	589.712	0.865	0.568		
227-76	380649.60	3632864.22	1211.17	438.524	1.336	0.690		
227-77	380650.52	3632884.53	1212.86	520.649	1.050	0.580		
227-78	380654.83	3632900.73	1213.52	479.876	1.236	0.786		
227-79	380664.15	3632914.88	1212.06	470.427	1.212	0.632		
227-81	380688.17	3632944.52	1210.35	455.059	1.260	0.635		
227-82	380707.69	3632953.70	1211.88	486.146	1.182	0.694		
227-83	380709.12	3632967.98	1211.64	526.112	1.073	0.707		
227-84	380706.82	3632936.15	1211.08	483.264	1.189	0.679		

APPENDIX B: GRAIN SIZE DISTRIBUTION DATA

The phi half-classes listed below are one-half phi size in magnitude and listed by the class midpoint (e.g. the “7.25” class covers the range from 7.5 phi to 7 phi). The values in the table represent the percentage by volume of the analyzed sample in the class.

Phi class (half phi classes) distribution, listed by class midpoints

<u>Sample</u> <u>Name</u>	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
103-1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.192	12.807	32.787	35.745	16.099	1.370	0.000
103-2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.043	2.481	10.153	20.874	27.275	23.692	12.864	2.618	0.000	0.000
103-3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.438	11.322	27.156	33.408	21.706	4.970	0.000	0.000
103-4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	3.972	19.323	34.564	30.095	11.433	0.605	0.000
103-5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.261	9.013	32.828	39.933	16.799	1.167	0.000
103-6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.081	3.197	14.865	29.242	31.561	17.960	3.094	0.000
103-8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.667	13.050	27.088	31.687	20.490	5.009	0.009
103-9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.018	4.979	27.138	42.365	22.792	2.708	0.000
103-10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.723	15.389	35.051	34.153	13.112	0.572	0.000
103-11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.085	7.100	30.809	41.363	19.021	1.622	0.000
103-12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.471	15.544	32.016	32.944	15.755	1.271	0.000
103-13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.081	2.458	10.493	21.867	28.629	24.124	11.370	0.977	0.000
103-14	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.052	2.387	8.944	17.721	23.562	22.913	16.354	7.287	0.782	0.000
103-15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.018	2.954	16.101	32.968	32.715	14.265	0.981	0.000
103-16	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.146	5.728	21.053	33.842	28.456	10.477	0.299	0.000
103-17	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.964	11.661	31.082	36.331	18.256	1.706	0.000
103-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.418	9.018	28.982	37.464	20.873	3.238	0.006
103-19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.229	15.539	32.636	33.371	15.355	0.869	0.000
103-20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.367	13.520	32.756	35.270	16.066	1.020	0.000
103-21	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.718	12.401	23.920	27.105	19.602	10.088	4.167
103-22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.523	14.344	34.063	34.827	14.424	0.819	0.000
103-23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.408	6.676	20.516	31.703	27.875	12.205	0.617	0.000
103-24	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.900	11.678	25.220	30.577	22.167	8.144	0.315	0.000
103-25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.325	9.799	23.573	31.604	24.815	8.809	0.075	0.000
103-26	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.438	6.922	21.385	32.687	27.516	10.691	0.361	0.000
103-27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.257	13.942	29.884	33.200	18.396	2.322	0.000
103-28	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102	3.227	15.336	30.723	32.639	16.711	1.263	0.000
103-30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.052	3.265	15.871	31.374	32.519	15.917	1.003	0.000
103-31	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.832	14.977	30.801	33.047	17.049	1.295	0.000
103-32	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.343	6.633	21.933	33.829	27.777	9.442	0.042	0.000
103-33	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.352	12.899	27.141	31.637	20.720	5.251	0.000	0.000
103-34	0.000	0.000	0.000	0.000	0.000	0.000	0.213	0.437	0.356	0.782	5.916	18.609	30.322	28.776	13.849	0.738	0.000
103-35	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.549	17.725	33.171	31.480	13.477	0.599	0.000
103-36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.279	4.456	17.080	30.801	30.670	15.325	1.390	0.000
103-37	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.562	14.177	29.740	32.844	18.234	2.443	0.000
103-38	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.207	4.082	17.098	31.578	31.302	14.915	0.818	0.000
103-39	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.492	8.596	25.325	34.706	24.502	6.380	0.000	0.000
103-40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.307	9.774	23.964	31.987	24.491	8.374	0.102	0.000
103-41	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102	2.643	11.214	22.822	28.935	23.404	10.318	0.562	0.000
103-42	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.234	3.873	13.276	24.373	28.496	21.283	8.196	0.269	0.000
103-43	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.249	1.967	5.442	10.161	15.423	20.332	21.730	16.368	7.133	1.195
103-44	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.290	2.140	5.724	10.572	16.203	21.644	22.752	15.685	4.933	0.058

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	7.25	6.75	6.25	5.75	5.25	4.75	4.25	3.75	3.25	2.75	2.25	1.75	1.25	0.75	0.25	-0.25	-0.75
103-45	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.181	3.524	13.844	26.181	29.816	20.415	5.985	0.054	0.000
211-1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.427	13.329	28.471	32.631	19.535	3.607	0.000
213-2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.516	7.086	20.322	30.732	27.504	13.044	0.796	0.000
213-3	0.000	0.000	0.000	0.000	0.000	0.040	0.287	0.354	0.221	1.255	8.244	22.131	31.833	25.747	9.603	0.285	0.000
213-15	0.000	0.000	0.000	0.000	0.000	0.000	0.042	0.267	0.475	0.810	3.068	11.412	23.979	30.509	22.527	6.860	0.050
213-16	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.059	2.242	11.483	24.255	30.227	23.054	8.522	0.159	0.000
213-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.031	3.154	13.783	26.084	29.533	20.571	6.806	0.038	0.000
213-19	0.000	0.000	0.000	0.000	0.000	0.085	0.195	0.253	1.114	5.674	15.169	25.005	27.147	18.928	6.383	0.046	0.000
213-20	0.000	0.000	0.000	0.000	0.000	0.032	0.119	0.240	1.331	5.716	14.595	24.217	27.114	19.652	6.908	0.077	0.000
213-21	0.000	0.000	0.000	0.000	0.000	0.023	0.277	0.541	0.664	1.878	8.790	20.976	29.564	25.324	11.364	0.601	0.000
213-22	0.000	0.000	0.000	0.000	0.000	0.022	0.246	0.442	0.536	1.771	8.717	20.994	29.463	25.373	11.717	0.780	0.000
213-27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.755	6.479	17.863	27.986	27.473	16.009	3.457	0.029
213-29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.069	1.863	9.515	21.271	28.771	24.759	12.235	1.516	0.000
213-30	0.000	0.000	0.000	0.000	0.000	0.000	0.194	0.575	0.895	2.023	6.127	14.404	23.316	25.613	18.306	7.418	1.129
227-1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.856	8.057	21.712	31.454	26.759	10.862	0.300	0.000
227-2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.084	1.834	10.096	23.148	30.912	24.757	9.084	0.085	0.000
227-3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.212	9.006	22.024	30.764	25.977	10.699	0.318	0.000
227-4	0.000	0.000	0.000	0.000	0.000	0.028	0.206	0.309	0.524	3.021	11.108	22.865	29.410	23.406	8.946	0.178	0.000
227-5	0.000	0.000	0.000	0.000	0.000	0.031	0.191	0.244	0.496	3.411	11.955	23.560	29.252	22.557	8.206	0.097	0.000
227-6	0.000	0.000	0.000	0.000	0.000	0.159	0.318	0.239	0.635	4.820	14.919	25.658	28.009	19.226	5.957	0.059	0.000
227-8	0.000	0.000	0.000	0.000	0.000	0.090	0.234	0.275	0.756	4.422	13.436	24.260	28.325	20.934	7.251	0.017	0.000
227-42	0.000	0.000	0.000	0.000	0.028	0.323	0.774	1.838	4.924	11.469	19.896	24.604	21.206	11.976	2.963	0.000	0.000
227-43	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.037	2.314	11.569	24.191	30.192	23.181	8.423	0.093	0.000
408-1	0.000	0.000	0.000	0.000	0.000	0.040	0.263	0.483	0.912	3.226	10.383	21.158	27.825	23.331	11.054	1.326	0.000
408-2	0.000	0.000	0.000	0.000	0.000	0.148	0.688	1.075	1.425	3.835	11.143	21.762	27.509	21.949	9.681	0.785	0.000
408-3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.622	7.081	20.643	31.110	26.893	12.226	1.425	0.000
408-4	0.000	0.000	0.000	0.000	0.000	0.081	0.503	0.890	1.640	4.701	12.273	22.322	27.081	20.963	8.866	0.681	0.000
408-5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.874	7.969	21.660	31.286	25.967	11.166	1.078	0.000
408-6	0.000	0.000	0.000	0.000	0.000	0.030	0.158	0.166	0.326	2.611	10.237	21.613	28.530	23.777	11.160	1.390	0.000
408-7	0.000	0.000	0.000	0.000	0.000	0.036	0.281	0.441	0.500	2.125	8.819	20.200	28.375	24.973	12.467	1.783	0.000
408-8	0.000	0.000	0.000	0.000	0.000	0.000	0.193	0.301	0.156	0.728	5.960	18.275	29.809	28.165	14.269	2.145	0.000
408-9	0.000	0.000	0.000	0.000	0.000	0.000	0.112	0.279	0.141	0.068	1.859	11.472	27.564	32.625	19.704	5.597	0.579
408-10	0.000	0.000	0.000	0.000	0.000	0.029	0.238	0.364	0.368	1.496	7.681	19.136	28.355	26.138	13.808	2.388	0.000
408-11	0.000	0.000	0.000	0.000	0.000	0.082	0.501	0.500	0.045	0.787	7.124	20.840	31.431	26.333	11.116	1.240	0.000
408-12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.237	4.901	17.288	29.834	29.259	15.562	2.920	0.000
408-13	0.000	0.000	0.000	0.000	0.000	0.038	0.234	0.228	0.067	1.268	7.936	20.582	29.894	25.701	12.114	1.924	0.014
408-14	0.000	0.000	0.000	0.000	0.000	0.102	0.194	0.094	0.513	4.689	14.771	25.946	28.554	19.223	5.896	0.018	0.000
408-15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.618	9.782	23.109	30.877	24.293	9.757	0.564	0.000
408-17	0.000	0.000	0.000	0.000	0.000	0.032	0.211	0.324	0.569	2.897	10.333	21.647	28.589	23.676	10.731	0.991	0.000
408-18	0.000	0.000	0.000	0.000	0.000	0.018	0.447	0.888	0.953	1.851	7.185	18.845	28.896	25.946	12.722	2.249	0.000
408-19	0.000	0.000	0.000	0.000	0.000	0.047	0.325	0.450	0.338	1.574	8.279	20.235	29.045	25.634	12.552	1.522	0.000
408-20	0.000	0.000	0.000	0.000	0.000	0.000	0.320	0.682	0.897	2.286	7.817	18.141	26.932	25.436	14.225	3.256	0.006
408-21	0.000	0.000	0.000	0.000	0.000	0.000	0.305	0.837	1.112	1.268	4.401	14.063	25.314	27.567	18.078	6.323	0.733
408-22	0.000	0.000	0.000	0.000	0.000	0.034	0.391	0.873	1.155	1.874	6.854	17.547	27.343	26.370	14.654	2.904	0.000
408-23	0.000	0.000	0.000	0.000	0.000	0.000	0.380	1.352	2.399	3.840	7.965	16.429	24.727	24.334	14.430	4.086	0.059
408-24	0.000	0.000	0.000	0.000	0.000	0.000	0.144	0.313	0.475	1.333	5.977	17.223	28.409	27.627	15.039	3.380	0.078
408-25	0.000	0.000	0.000	0.000	0.000	0.000	0.156	0.373	0.503	1.101	5.303	15.313	25.798	27.094	17.422	6.117	0.820
408-26	0.000	0.000	0.000	0.000	0.000	0.000	0.263	0.790	1.503	3.280	8.256	17.149	25.201	24.676	14.790	4.049	0.043
408-27	0.000	0.000	0.000	0.000	0.000	0.076	0.487	0.609	0.544	1.994	8.408	20.089	28.598	24.789	12.196	2.209	0.000
408-28	0.000	0.000	0.000	0.000	0.000	0.000	0.195	0.488	0.750	1.213	3.774	10.699	20.228	25.525	21.531	11.840	3.757
408-29	0.000	0.000	0.000	0.000	0.000	0.036	0.426	0.938	1.430	2.655	6.612	14.364	22.540	24.393	17.445	7.548	1.612
408-30	0.000	0.000	0.000	0.000	0.000	0.000	0.127	0.421	0.568	0.717	2.555	10.660	23.562	29.716	21.741	8.541	1.393
408-31	0.000	0.000	0.000	0.000	0.000	0.019	0.385	0.822	1.049	2.088	6.665	15.926	24.973	25.597	16.430	5.547	0.501
408-32	0.000	0.000	0.000	0.000	0.000	0.039	0.317	0.551	0.621	1.493	7.082	18.065	27.487	26.253	14.824	3.245	0.023
408-33	0.000	0.000	0.000	0.000	0.000	0.057	0.426	0.761	0.708	1.003	5.583	16.609	27.602	27.851	16.113	3.288	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	7.25	6.75	6.25	5.75	5.25	4.75	4.25	3.75	3.25	2.75	2.25	1.75	1.25	0.75	0.25	-0.25	-0.75
408-34	0.000	0.000	0.000	0.000	0.000	0.000	0.189	0.670	1.062	1.529	5.090	14.696	25.706	27.723	17.772	5.404	0.160
408-35	0.000	0.000	0.000	0.000	0.000	0.030	0.570	1.501	2.014	2.729	6.859	16.629	26.826	26.949	14.633	1.259	0.000
408-36	0.000	0.000	0.000	0.000	0.000	0.090	0.795	1.696	2.408	4.271	10.209	20.118	26.986	22.929	10.050	0.448	0.000
408-37	0.000	0.000	0.000	0.000	0.000	0.000	0.223	0.369	0.216	0.750	6.656	19.588	30.627	28.103	12.877	0.591	0.000
408-38	0.000	0.000	0.000	0.000	0.000	0.022	0.195	0.307	0.401	1.742	8.541	20.624	29.732	26.220	11.711	0.506	0.000
408-39	0.000	0.000	0.000	0.000	0.000	0.000	0.184	0.381	0.263	0.527	5.042	17.282	29.740	29.821	15.606	1.153	0.000
408-40	0.000	0.000	0.000	0.000	0.000	0.000	0.181	0.419	0.665	2.208	8.844	20.606	29.476	25.829	11.320	0.450	0.000
408-41	0.000	0.000	0.000	0.000	0.000	0.000	0.182	0.432	0.456	0.981	6.225	18.362	29.815	28.661	14.104	0.783	0.000
408-42	0.000	0.000	0.000	0.000	0.000	0.026	0.240	0.331	0.157	0.875	7.188	19.925	30.308	27.502	12.792	0.656	0.000
408-43	0.000	0.000	0.000	0.000	0.000	0.000	0.345	0.923	1.316	2.578	7.767	18.185	27.843	26.675	13.542	0.826	0.000
408-44	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.818	16.623	30.224	31.143	16.669	1.523	0.000
408-44B	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.072	2.741	11.894	24.335	30.250	22.980	7.692	0.037	0.000
408-45	0.000	0.000	0.000	0.000	0.000	0.000	0.191	0.478	0.549	0.877	4.682	15.680	27.821	29.446	17.320	2.956	0.000
408-46	0.000	0.000	0.000	0.000	0.000	0.043	0.237	0.264	0.333	2.533	10.095	21.690	29.164	24.602	10.611	0.429	0.000
408-47	0.000	0.000	0.000	0.000	0.000	0.000	0.265	0.852	1.063	0.764	2.216	11.839	26.274	31.841	20.755	4.130	0.000
408-48	0.000	0.000	0.000	0.000	0.000	0.000	0.671	2.068	3.046	3.373	5.804	13.806	24.397	27.168	16.802	2.865	0.000
408-49	0.000	0.000	0.000	0.000	0.000	0.000	0.173	0.499	0.766	1.519	5.877	16.052	27.116	28.517	16.794	2.687	0.000
408-50	0.000	0.000	0.000	0.000	0.000	0.000	0.124	0.410	0.659	0.998	2.842	10.515	22.716	29.764	23.112	8.475	0.385
408-51	0.000	0.000	0.000	0.000	0.000	0.000	0.169	0.642	1.036	1.366	4.172	13.218	25.457	29.830	19.759	4.350	0.000
408-52	0.000	0.000	0.000	0.000	0.000	0.033	0.560	1.644	2.340	2.697	5.375	13.476	24.136	27.495	18.091	4.153	0.000
408-53	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.226	14.963	28.670	31.381	18.721	3.038	0.000
408-54	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.494	13.193	27.297	32.005	20.759	4.251	0.000
408-55	0.000	0.000	0.000	0.000	0.000	0.042	0.421	0.848	0.899	1.028	4.896	15.671	27.710	29.272	16.870	2.345	0.000
408-56	0.000	0.000	0.000	0.000	0.000	0.000	0.418	1.008	1.395	2.765	8.191	18.596	27.646	25.861	13.112	1.009	0.000
408-57	0.000	0.000	0.000	0.000	0.000	0.035	0.768	1.966	2.693	3.576	7.938	17.642	26.710	25.147	12.618	0.906	0.000
408-58	0.000	0.000	0.000	0.000	0.000	0.021	0.242	0.429	0.427	1.265	7.526	20.085	30.145	26.996	12.272	0.592	0.000
408-59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.209	4.613	17.127	30.016	30.350	16.165	1.518	0.000
408-60	0.000	0.000	0.000	0.000	0.000	0.000	0.216	0.510	0.630	1.612	7.252	18.800	29.082	27.405	13.655	0.838	0.000
408-61	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.223	4.939	17.481	30.063	30.044	15.801	1.449	0.000
408-62	0.000	0.000	0.000	0.000	0.000	0.000	0.191	0.313	0.169	0.907	7.124	19.608	30.073	27.650	13.224	0.740	0.000
408-63	0.000	0.000	0.000	0.000	0.000	0.041	0.334	0.556	0.606	1.914	8.761	20.878	29.665	25.660	11.138	0.446	0.000
408-64	0.000	0.000	0.000	0.000	0.000	0.127	0.612	1.136	1.971	4.943	12.244	22.086	27.052	21.223	8.360	0.246	0.000
408-65	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.219	4.612	17.214	30.117	30.369	16.108	1.360	0.000
408-66	0.000	0.000	0.000	0.000	0.000	0.000	0.211	0.529	0.513	0.595	4.073	15.461	28.493	30.413	17.403	2.307	0.000
408-67	0.000	0.000	0.000	0.000	0.000	0.035	0.313	0.572	0.729	2.002	8.295	19.769	28.835	26.138	12.594	0.717	0.000
408-68	0.000	0.000	0.000	0.000	0.000	0.043	0.514	1.094	1.367	2.276	6.739	16.402	26.418	27.176	15.715	2.255	0.000
408-69	0.000	0.000	0.000	0.000	0.000	0.082	0.237	0.274	0.558	3.444	11.281	21.920	27.895	23.182	10.558	0.571	0.000
408-70	0.000	0.000	0.000	0.000	0.000	0.000	0.395	1.075	1.361	1.705	4.989	14.013	25.346	28.744	18.587	3.784	0.000
408-71	0.000	0.000	0.000	0.000	0.000	0.000	0.291	0.944	1.336	2.074	5.941	15.203	25.811	27.879	17.238	3.283	0.000
408-72	0.000	0.000	0.000	0.000	0.000	0.000	0.220	0.492	0.634	1.228	5.370	15.454	26.475	28.312	17.699	4.116	0.000
408-73	0.000	0.000	0.000	0.000	0.000	0.175	0.910	1.746	2.236	3.395	8.056	17.238	25.680	24.903	13.745	1.917	0.000
408-74	0.000	0.000	0.000	0.000	0.000	0.020	0.272	0.576	0.671	1.215	5.968	17.155	28.573	28.911	15.592	1.046	0.000
408-75	0.000	0.000	0.000	0.000	0.000	0.000	0.211	0.516	0.613	0.936	4.656	14.737	26.604	29.325	18.467	3.935	0.000
415-1	0.000	0.000	0.000	0.000	0.000	0.096	0.643	1.133	1.568	3.628	10.130	20.559	27.703	23.651	10.426	0.463	0.000
415-2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.907	8.193	21.654	31.193	26.604	11.078	0.370	0.000
415-3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.360	6.882	20.858	31.847	27.971	11.715	0.369	0.000
415-4	0.000	0.000	0.000	0.000	0.000	0.027	0.173	0.169	0.115	1.582	8.560	20.359	29.085	26.093	12.869	0.968	0.000
415-5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.091	3.592	14.132	26.709	30.167	20.142	5.167	0.000	0.000
415-6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.781	8.163	21.935	31.655	26.735	10.522	0.210	0.000
415-7	0.000	0.000	0.000	0.000	0.000	0.032	0.302	0.443	0.189	0.546	6.182	18.774	29.940	28.368	14.167	1.058	0.000
415-8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.078	3.132	13.944	27.167	30.843	20.177	4.659	0.000	0.000
415-9	0.000	0.000	0.000	0.000	0.000	0.026	0.253	0.397	0.379	1.585	8.779	21.612	30.707	25.937	10.151	0.172	0.000
415-10	0.000	0.000	0.000	0.000	0.000	0.054	0.708	1.697	2.004	2.159	5.683	15.421	26.502	27.817	15.894	2.061	0.000
415-11	0.000	0.000	0.000	0.000	0.000	0.000	0.265	0.974	1.493	2.456	6.702	16.418	26.988	27.866	15.525	1.313	0.000
415-12	0.000	0.000	0.000	0.000	0.000	0.000	0.185	0.379	0.517	1.523	7.006	18.128	28.364	27.624	14.774	1.498	0.000

Phi class (half phi classes) distribution, listed by class midpoints

<u>Sample</u> <u>Name</u>	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
415-13	0.000	0.000	0.000	0.000	0.000	0.081	0.654	1.350	2.020	3.977	9.704	19.092	26.226	23.733	12.086	1.078	0.000
415-14	0.000	0.000	0.000	0.000	0.000	0.036	0.629	1.669	2.101	2.112	4.878	13.754	25.208	28.381	17.865	3.366	0.000
415-15	0.000	0.000	0.000	0.000	0.000	0.000	0.484	1.820	3.593	5.501	8.661	14.891	22.384	23.989	15.364	3.311	0.000
415-16	0.000	0.000	0.000	0.000	0.000	0.000	0.239	0.893	1.779	3.583	8.161	16.538	24.919	25.442	15.399	3.048	0.000
415-17	0.000	0.000	0.000	0.000	0.000	0.000	0.075	0.269	0.216	0.305	2.950	13.006	26.281	30.979	20.738	5.181	0.000
415-18	0.000	0.000	0.000	0.000	0.000	0.060	0.668	1.612	2.474	3.814	7.818	15.861	24.275	25.178	15.391	2.850	0.000
415-19	0.000	0.000	0.000	0.000	0.000	0.000	0.270	0.804	1.169	1.264	3.194	11.306	23.909	30.232	21.817	6.028	0.006
415-20	0.000	0.000	0.000	0.000	0.000	0.000	0.160	0.415	0.438	0.568	3.661	13.748	26.496	30.383	19.760	4.371	0.000
415-21	0.000	0.000	0.000	0.000	0.000	0.000	0.080	0.286	0.225	0.344	3.626	14.084	27.200	30.966	19.537	3.653	0.000
415-22	0.000	0.000	0.000	0.000	0.000	0.000	0.139	0.400	0.622	1.063	3.540	12.217	24.100	29.279	21.228	7.203	0.209
415-23	0.000	0.000	0.000	0.000	0.000	0.057	0.549	1.515	2.229	2.614	4.830	11.973	22.364	27.148	19.808	6.718	0.194
415-24	0.000	0.000	0.000	0.000	0.000	0.000	0.259	0.850	1.327	1.602	4.233	13.318	25.786	29.974	19.140	3.511	0.000
415-25	0.000	0.000	0.000	0.000	0.000	0.000	0.165	0.536	0.983	1.891	6.190	16.319	27.213	28.196	16.160	2.348	0.000
415-26	0.000	0.000	0.000	0.000	0.000	0.036	0.245	0.256	0.119	1.326	8.902	22.339	31.235	25.710	9.702	0.131	0.000
415-27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.532	6.285	19.005	30.310	28.657	14.313	0.899	0.000
415-28	0.000	0.000	0.000	0.000	0.000	0.050	0.760	1.689	2.105	2.997	7.764	17.847	27.014	25.566	13.142	1.066	0.000
415-29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.201	5.369	17.700	29.184	28.746	16.157	2.642	0.000
415-30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.075	3.011	12.443	24.304	29.271	22.175	8.481	0.240
415-31	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.009	9.111	22.678	31.300	25.719	9.982	0.202	0.000
415-32	0.000	0.000	0.000	0.000	0.000	0.051	0.284	0.513	1.415	4.787	12.153	21.568	26.738	22.109	9.897	0.484	0.000
415-33	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.086	3.605	14.295	26.633	29.922	20.128	5.331	0.000	0.000
415-34	0.000	0.000	0.000	0.000	0.000	0.059	0.546	1.086	1.553	3.715	10.616	21.537	28.487	23.339	8.943	0.120	0.000
415-35	0.000	0.000	0.000	0.000	0.000	0.097	0.557	0.718	0.844	3.264	10.980	22.332	28.808	23.143	9.045	0.213	0.000
415-36	0.000	0.000	0.000	0.000	0.000	0.033	0.245	0.321	0.275	1.454	8.443	21.070	30.262	26.238	11.251	0.408	0.000
415-37	0.000	0.000	0.000	0.000	0.000	0.022	0.241	0.370	0.233	0.911	7.109	20.048	30.708	27.682	12.204	0.473	0.000
415-38	0.000	0.000	0.000	0.000	0.000	0.000	0.086	0.354	0.459	0.712	3.083	12.751	26.296	31.378	20.646	4.236	0.000
415-39	0.000	0.000	0.000	0.000	0.000	0.000	0.073	0.347	0.387	0.238	1.450	9.603	24.065	32.388	24.201	7.207	0.042
415-40	0.000	0.000	0.000	0.000	0.000	0.025	0.495	1.522	2.793	4.503	8.273	15.579	23.567	24.726	15.429	3.088	0.000
415-41	0.000	0.000	0.000	0.000	0.000	0.023	0.239	0.542	0.854	2.079	7.115	17.167	26.941	27.137	15.548	2.354	0.000
415-42	0.000	0.000	0.000	0.000	0.000	0.032	0.303	0.597	0.707	1.307	5.908	16.464	27.420	28.318	16.402	2.543	0.000
415-43	0.000	0.000	0.000	0.000	0.000	0.025	0.229	0.403	0.419	1.581	7.224	18.115	27.966	27.316	14.935	1.787	0.000
415-44	0.000	0.000	0.000	0.000	0.000	0.000	0.338	0.900	1.533	3.051	7.657	16.538	25.609	26.346	15.568	2.461	0.000
415-45	0.000	0.000	0.000	0.000	0.000	0.000	0.189	0.457	0.576	0.933	4.266	14.672	27.219	30.091	18.373	3.223	0.000
415-47	0.000	0.000	0.000	0.000	0.083	0.352	0.505	0.829	2.936	9.052	18.503	25.498	23.930	14.510	3.803	0.000	0.000
415-53	0.000	0.000	0.000	0.000	0.000	0.171	1.205	3.189	5.735	8.764	13.120	18.703	21.993	18.306	8.387	0.428	0.000
415-60	0.000	0.000	0.000	0.000	0.000	0.038	0.318	0.612	0.769	1.468	6.225	17.029	27.796	28.022	15.635	2.088	0.000
415-61	0.000	0.000	0.000	0.000	0.000	0.032	0.292	0.403	0.191	1.082	8.361	21.869	31.275	26.129	10.162	0.204	0.000
415-62	0.000	0.000	0.000	0.000	0.000	0.000	0.584	2.018	3.389	4.897	9.245	18.188	26.237	23.912	11.025	0.504	0.000
415-63	0.000	0.000	0.000	0.000	0.000	0.023	0.397	0.745	1.339	4.122	11.630	22.306	28.230	22.475	8.582	0.152	0.000
415-64	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.302	5.684	18.313	30.208	29.422	15.045	1.027	0.000
415-65	0.000	0.000	0.000	0.000	0.000	0.022	0.362	0.534	0.582	2.320	8.851	20.050	28.642	25.687	12.255	0.695	0.000
415-66	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.560	7.685	21.345	31.514	27.376	11.241	0.278	0.000
520-1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.172	9.519	23.423	31.778	25.183	8.888	0.036	0.000
520-2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025	1.466	9.844	23.487	31.504	24.819	8.794	0.061	0.000
520-3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	1.033	8.185	21.627	31.303	26.629	10.870	0.331	0.000
520-4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.057	9.179	22.877	31.616	25.670	9.492	0.108	0.000
520-5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.494	9.803	23.189	31.242	24.970	9.186	0.117	0.000
520-6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.048	1.955	8.836	19.160	26.293	24.404	14.911	4.336	0.056	0.000
520-7	0.000	0.000	0.000	0.000	0.000	0.090	0.703	1.377	1.794	3.301	8.932	19.059	27.087	24.518	12.192	0.945	0.000
520-8	0.000	0.000	0.000	0.000	0.000	0.173	1.004	2.370	4.132	6.830	11.903	19.219	24.126	20.495	9.286	0.462	0.000
520-9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.246	6.241	20.613	32.366	28.245	11.799	0.491	0.000
520-10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.197	6.211	21.103	32.543	27.449	11.545	0.953	0.000
520-11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.941	14.538	31.288	33.372	17.044	1.818	0.000
520-12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.229	7.797	25.257	35.642	24.746	6.289	0.039
520-13	0.000	0.000	0.000	0.000	0.000	0.000	0.325	2.038	6.274	12.476	17.924	19.883	18.076	13.770	7.688	1.546	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
520-14	0.000	0.000	0.000	0.000	0.000	0.000	0.354	1.940	5.450	10.332	14.885	17.775	18.680	16.753	10.784	3.085	0.014
520-15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.261	6.173	20.876	32.952	27.894	10.924	0.920
520-16	0.000	0.000	0.000	0.000	0.000	0.000	0.328	1.730	3.901	5.638	6.559	9.152	16.017	23.158	21.441	10.417	1.659
520-17	0.000	0.000	0.000	0.000	0.000	0.000	0.087	0.642	1.236	1.292	1.404	6.386	19.906	31.649	27.180	10.062	0.157
520-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.049	3.793	14.300	24.818	27.241	20.195	8.942	0.662	0.000
520-19	0.000	0.000	0.000	0.000	0.000	0.029	0.491	1.870	3.751	5.291	6.850	10.838	18.135	23.441	19.548	8.615	1.142
520-20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.289	5.333	16.220	26.738	27.896	18.247	5.277	0.000	0.000
520-21	0.000	0.000	0.000	0.000	0.000	0.000	0.247	0.688	1.786	4.969	11.773	20.856	26.312	22.274	10.488	0.608	0.000
520-22	0.000	0.000	0.000	0.000	0.000	0.000	0.098	0.421	0.833	2.342	6.934	15.452	24.349	26.352	17.878	5.297	0.042
520-23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.167	3.214	12.447	24.429	29.517	22.099	7.994	0.133	0.000
520-24	0.000	0.000	0.000	0.000	0.000	0.000	0.177	0.296	0.395	1.700	8.308	19.922	28.802	26.134	13.169	1.096	0.000
520-25	0.000	0.000	0.000	0.000	0.000	0.000	0.275	0.470	0.969	3.618	10.616	20.761	27.477	23.927	11.293	0.594	0.000
520-26	0.000	0.000	0.000	0.000	0.000	0.057	0.832	2.203	2.977	3.025	5.243	13.071	23.657	27.075	17.853	4.007	0.000
520-27	0.000	0.000	0.000	0.000	0.000	0.000	0.214	0.857	1.505	1.860	3.677	11.213	23.284	29.702	21.718	5.970	0.000
520-28	0.000	0.000	0.000	0.000	0.000	0.000	0.217	1.145	1.787	2.233	5.159	13.761	24.973	28.429	18.438	3.858	0.000
520-29	0.000	0.000	0.000	0.000	0.000	0.029	0.629	1.456	1.849	2.918	8.033	18.269	27.114	25.321	13.045	1.336	0.000
520-30	0.000	0.000	0.000	0.000	0.000	0.035	0.346	0.621	0.600	1.290	7.151	18.913	28.795	26.894	13.861	1.493	0.000
520-31	0.000	0.000	0.000	0.000	0.000	0.038	0.233	0.249	0.195	1.754	8.835	20.736	29.303	25.857	12.145	0.656	0.000
520-32	0.000	0.000	0.000	0.000	0.000	0.000	0.182	0.286	0.295	1.672	8.472	20.330	29.253	26.206	12.584	0.721	0.000
520-33	0.000	0.000	0.000	0.000	0.000	0.000	0.161	0.332	0.217	0.483	5.199	16.799	28.574	29.225	16.586	2.424	0.000
520-34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.127	4.923	17.474	29.758	29.747	16.098	1.872	0.000
520-35	0.000	0.000	0.000	0.000	0.000	0.000	0.162	0.283	0.201	0.716	5.714	17.510	28.863	28.722	15.755	2.074	0.000
520-36	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.125	3.805	13.704	25.068	28.635	20.682	7.726	0.256	0.000
520-37	0.000	0.000	0.000	0.000	0.000	0.023	0.342	0.996	1.472	2.099	5.139	12.976	23.108	27.122	19.608	6.848	0.269
520-38	0.000	0.000	0.000	0.000	0.000	0.000	0.181	0.634	0.979	1.638	4.758	12.675	23.188	27.910	20.608	7.206	0.222
520-39	0.000	0.000	0.000	0.000	0.000	0.122	0.593	1.268	2.028	3.569	7.632	15.164	23.160	24.874	16.748	4.811	0.030
520-40	0.000	0.000	0.000	0.000	0.000	0.024	0.154	0.181	0.269	2.324	9.756	21.483	29.261	24.860	11.120	0.570	0.000
520-41	0.000	0.000	0.000	0.000	0.000	0.032	0.730	2.174	3.394	4.089	6.499	13.538	22.756	25.491	16.983	4.290	0.026
520-42	0.000	0.000	0.000	0.000	0.000	0.042	0.379	0.764	0.942	1.586	6.261	16.542	26.838	27.389	16.174	3.083	0.000
520-43	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.839	11.817	26.734	32.589	21.534	5.464	0.023
520-44	0.000	0.000	0.000	0.000	0.000	0.000	0.286	1.284	2.071	2.168	3.784	10.738	21.870	27.930	21.406	8.002	0.462
520-45	0.000	0.000	0.000	0.000	0.000	0.000	0.152	0.485	0.757	1.107	3.356	11.271	22.506	28.141	21.819	9.139	1.267
520-46	0.000	0.000	0.000	0.000	0.000	0.000	0.114	0.222	0.271	1.003	5.477	15.216	25.644	27.902	18.594	5.504	0.053
520-47	0.000	0.000	0.000	0.000	0.000	0.000	0.080	0.403	0.714	1.138	3.364	10.993	22.256	28.424	22.371	9.207	1.052
520-48	0.000	0.000	0.000	0.000	0.000	0.026	0.193	0.351	0.804	3.380	10.464	20.647	27.082	23.518	11.984	1.551	0.000
520-49	0.000	0.000	0.000	0.000	0.000	0.000	0.251	0.828	1.427	1.803	2.950	8.950	19.893	27.667	23.532	10.850	1.850
520-50	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.666	1.569	2.079	3.067	7.818	17.751	26.539	24.609	12.884	3.007
520-51	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.187	2.810	13.438	28.708	32.234	18.366	4.257
520-52	0.000	0.000	0.000	0.000	0.000	0.027	0.266	0.496	1.275	4.152	10.577	19.268	25.197	23.087	13.146	2.509	0.000
520-53	0.000	0.000	0.000	0.000	0.000	0.087	0.224	0.261	1.050	5.347	14.592	24.574	27.230	19.456	7.025	0.153	0.000
520-54	0.000	0.000	0.000	0.000	0.000	0.000	0.146	0.575	0.881	0.970	3.134	11.459	23.809	29.878	21.966	7.098	0.085
520-55	0.000	0.000	0.000	0.000	0.000	0.000	0.059	0.289	0.524	1.174	4.748	13.562	24.412	28.281	20.043	6.700	0.208
520-56	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.249	0.292	0.330	2.298	11.051	24.206	30.873	22.924	7.622	0.104
520-57	0.000	0.000	0.000	0.000	0.000	0.030	0.394	0.878	1.263	2.427	6.765	15.534	24.702	26.255	17.110	4.626	0.016
520-58	0.000	0.000	0.000	0.000	0.000	0.023	0.398	1.205	1.661	1.798	4.068	11.682	22.607	27.726	20.672	7.661	0.500
520-59	0.000	0.000	0.000	0.000	0.000	0.056	0.629	1.752	2.466	2.551	4.133	10.372	20.024	25.420	20.588	9.800	2.208
520-60	0.000	0.000	0.000	0.000	0.000	0.028	0.460	0.874	0.877	1.584	6.066	15.762	25.627	26.787	17.060	4.832	0.044
520-61	0.000	0.000	0.000	0.000	0.000	0.000	0.283	0.973	1.301	1.503	4.183	12.288	23.218	27.827	20.426	7.511	0.486
520-62	0.000	0.000	0.000	0.000	0.000	0.000	0.471	1.086	1.485	2.833	8.057	17.946	26.581	25.383	13.969	2.189	0.000
520-63	0.000	0.000	0.000	0.000	0.000	0.017	0.484	1.067	1.146	1.653	5.888	15.767	26.137	27.297	16.762	3.782	0.000
520-64	0.000	0.000	0.000	0.000	0.000	0.000	0.389	1.089	1.755	2.862	6.425	14.003	22.621	25.136	18.015	6.964	0.741
520-65	0.000	0.000	0.000	0.000	0.000	0.075	0.508	1.495	3.914	8.799	15.932	22.254	23.143	16.799	6.796	0.285	0.000
901-1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.216	4.002	15.743	29.460	31.000	17.081	2.498	0.000
901-2	0.000	0.000	0.000	0.000	0.000	0.000	0.191	0.370	0.199	0.277	4.244	15.482	27.807	29.641	17.998	3.792	0.000
901-3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.185	2.754	10.852	22.569	29.411	23.990	9.883	0.357	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
901-4	0.000	0.000	0.000	0.000	0.045	0.376	0.526	0.894	3.549	10.901	21.166	26.911	22.484	11.359	1.790	0.000	0.000
901-5	0.000	0.000	0.000	0.000	0.011	0.312	0.479	0.455	1.902	7.762	18.107	26.648	25.653	15.234	3.438	0.000	0.000
901-7	0.000	0.000	0.000	0.000	0.000	0.102	0.551	0.639	0.787	3.645	12.171	23.879	29.352	21.882	6.984	0.009	0.000
901-8	0.000	0.000	0.000	0.000	0.037	0.328	0.368	0.307	2.118	8.624	19.038	26.492	24.366	14.393	3.909	0.020	0.000
901-9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.353	9.164	21.728	29.653	25.001	11.887	1.214	0.000	0.000
901-10	0.000	0.000	0.000	0.000	0.000	0.120	0.389	0.576	1.480	5.164	13.084	22.594	26.884	21.037	8.413	0.260	0.000
901-12	0.000	0.000	0.000	0.000	0.000	0.137	0.563	0.823	1.487	4.946	13.374	23.836	27.893	20.345	6.545	0.051	0.000
901-13	0.000	0.000	0.000	0.000	0.000	0.102	0.738	1.304	1.651	3.673	10.598	21.608	28.338	22.821	8.917	0.249	0.000
901-14	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.444	9.767	31.080	38.368	18.691	1.650	0.000
901-15	0.000	0.000	0.000	0.000	0.000	0.000	0.259	0.792	1.155	1.258	3.477	12.428	25.271	30.186	20.193	4.982	0.000
901-16	0.000	0.000	0.000	0.000	0.000	0.000	0.076	0.363	0.399	0.196	1.583	9.967	23.963	31.780	23.780	7.790	0.102
901-17	0.000	0.000	0.000	0.000	0.000	0.020	0.258	0.447	1.070	3.814	10.629	20.494	27.315	23.987	11.343	0.623	0.000
901-18	0.000	0.000	0.000	0.000	0.000	0.000	0.176	0.492	0.542	0.562	3.423	13.336	26.248	30.384	19.942	4.894	0.000
901-19	0.000	0.000	0.000	0.000	0.000	0.046	0.309	0.398	0.628	2.919	9.859	20.621	28.235	24.792	11.575	0.618	0.000
901-20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.319	4.935	15.910	27.373	28.927	18.185	4.351	0.000	0.000
901-21	0.000	0.000	0.000	0.000	0.000	0.000	0.203	0.424	0.424	1.253	6.760	18.315	28.957	27.842	14.403	1.419	0.000
901-22	0.000	0.000	0.000	0.000	0.000	0.000	0.175	0.350	0.356	1.098	6.406	17.786	28.797	28.469	15.131	1.432	0.000
901-23	0.000	0.000	0.000	0.000	0.000	0.089	0.559	0.942	1.426	3.717	10.181	19.976	26.738	23.602	11.780	0.990	0.000
901-24	0.000	0.000	0.000	0.000	0.000	0.116	0.367	0.718	2.183	6.543	14.368	22.575	25.426	19.488	7.933	0.283	0.000
901-25	0.000	0.000	0.000	0.000	0.000	0.072	0.458	0.863	1.712	4.745	11.802	21.201	26.487	22.001	10.101	0.558	0.000
901-26	0.000	0.000	0.000	0.000	0.000	0.038	0.513	1.329	2.020	3.007	6.609	14.963	24.854	27.081	16.755	2.832	0.000
901-27	0.000	0.000	0.000	0.000	0.000	0.000	0.179	0.863	1.479	1.800	3.861	11.315	23.237	29.677	21.628	5.963	0.000
901-28	0.000	0.000	0.000	0.000	0.000	0.000	0.141	0.383	0.504	0.814	3.208	12.121	25.064	31.022	21.623	5.110	0.010
901-29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.789	7.175	19.889	30.521	28.021	12.997	0.608	0.000
901-30	0.000	0.000	0.000	0.000	0.000	0.000	0.228	0.458	0.542	1.600	7.458	19.179	29.480	27.554	12.920	0.581	0.000
901-31	0.000	0.000	0.000	0.000	0.000	0.204	0.535	0.482	0.951	4.953	14.579	25.525	28.361	19.195	5.217	0.000	0.000
901-32	0.000	0.000	0.000	0.000	0.000	0.022	0.407	0.704	0.713	1.988	7.794	18.791	28.348	26.799	13.591	0.842	0.000
901-33	0.000	0.000	0.000	0.000	0.000	0.000	0.216	0.600	0.727	0.789	3.798	13.938	26.945	30.601	19.039	3.348	0.000
901-34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.268	14.848	28.849	31.924	18.744	2.368	0.000
901-35	0.000	0.000	0.000	0.000	0.000	0.044	0.235	0.339	0.879	4.107	12.466	23.357	28.489	21.973	8.032	0.080	0.000
901-36	0.000	0.000	0.000	0.000	0.000	0.000	0.186	0.359	0.308	0.963	5.920	17.059	28.296	28.771	16.108	2.030	0.000
901-37	0.000	0.000	0.000	0.000	0.000	0.053	0.663	1.419	1.582	2.145	6.666	17.082	27.486	27.218	14.455	1.232	0.000
901-38	0.000	0.000	0.000	0.000	0.000	0.000	0.176	0.482	0.403	0.282	3.770	15.179	28.832	31.368	17.799	1.709	0.000
901-39	0.000	0.000	0.000	0.000	0.000	0.028	0.263	0.445	0.490	2.026	8.988	21.222	30.083	25.754	10.453	0.247	0.000
901-40	0.000	0.000	0.000	0.000	0.000	0.027	0.219	0.254	0.116	1.450	8.713	21.504	30.667	26.197	10.603	0.249	0.000
901-41	0.000	0.000	0.000	0.000	0.000	0.035	0.515	0.919	0.873	2.046	8.126	19.760	29.247	26.262	11.727	0.490	0.000
901-42	0.000	0.000	0.000	0.000	0.000	0.072	0.686	1.294	1.296	2.360	8.512	20.416	29.641	25.550	10.027	0.146	0.000
901-43	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.219	5.793	19.039	31.112	29.393	13.788	0.657	0.000
901-44	0.000	0.000	0.000	0.000	0.000	0.062	0.371	0.508	0.535	2.848	11.389	23.920	30.284	22.862	7.222	0.000	0.000
901-45	0.000	0.000	0.000	0.000	0.000	0.028	0.602	1.200	1.026	1.398	6.474	18.176	29.272	27.913	13.275	0.637	0.000
901-47	0.000	0.000	0.000	0.000	0.000	0.000	0.304	0.700	0.625	0.509	4.626	16.729	29.725	30.141	15.651	0.991	0.000
901-48	0.000	0.000	0.000	0.000	0.000	0.000	0.334	0.785	0.668	1.047	5.650	16.774	28.478	29.066	15.814	1.383	0.000
901-49	0.000	0.000	0.000	0.000	0.000	0.000	0.238	0.618	0.781	1.218	5.431	16.115	27.977	29.334	16.482	1.805	0.000
901-50	0.000	0.000	0.000	0.000	0.000	0.027	0.537	1.083	1.164	2.146	7.614	18.740	28.571	26.624	12.800	0.695	0.000
901-51	0.000	0.000	0.000	0.000	0.000	0.085	0.571	0.875	1.039	3.162	10.429	21.826	28.989	23.730	9.144	0.150	0.000
901-52	0.000	0.000	0.000	0.000	0.000	0.000	0.242	0.606	0.670	0.812	4.667	15.688	28.330	30.048	16.936	2.001	0.000
901-53	0.000	0.000	0.000	0.000	0.000	0.034	0.285	0.411	0.275	1.483	8.393	20.955	30.342	26.342	11.112	0.368	0.000
901-54	0.000	0.000	0.000	0.000	0.000	0.035	0.326	0.519	0.339	0.930	7.126	19.894	30.520	27.562	12.245	0.504	0.000
901-55	0.000	0.000	0.000	0.000	0.000	0.043	0.272	0.289	0.176	1.993	10.202	23.157	30.802	24.406	8.638	0.024	0.000
901-56	0.000	0.000	0.000	0.000	0.000	0.034	0.272	0.411	0.462	2.380	9.947	22.258	30.178	24.703	9.256	0.098	0.000
901-57	0.000	0.000	0.000	0.000	0.000	0.045	0.262	0.292	0.378	2.941	11.484	23.677	29.954	23.073	7.896	0.000	0.000
901-58	0.000	0.000	0.000	0.000	0.000	0.089	0.267	0.274	0.411	3.355	12.444	24.549	29.835	21.944	6.832	0.000	0.000
901-59	0.000	0.000	0.000	0.000	0.000	0.046	0.244	0.275	0.556	3.438	11.673	22.974	28.898	22.886	8.826	0.185	0.000
901-60	0.000	0.000	0.000	0.000	0.000	0.000	0.222	0.401	0.278	0.796	6.555	19.074	30.138	28.213	13.574	0.749	0.000
901-61	0.000	0.000	0.000	0.000	0.000	0.026	0.292	0.587	0.778	2.344	9.035	20.977	29.746	25.488	10.441	0.285	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
901-62	0.000	0.000	0.000	0.000	0.000	0.023	0.349	0.787	0.941	1.357	6.225	18.022	29.329	28.169	13.963	0.834	0.000
901-63	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.111	4.563	17.216	30.258	30.536	16.098	1.219	0.000
901-64	0.000	0.000	0.000	0.000	0.000	0.030	0.314	0.613	0.777	2.162	8.751	20.775	29.743	25.666	10.799	0.369	0.000
901-65	0.000	0.000	0.000	0.000	0.000	0.022	0.287	0.584	0.654	1.606	7.619	19.687	29.757	26.921	12.279	0.584	0.000
901-66	0.000	0.000	0.000	0.000	0.000	0.027	0.283	0.514	0.538	1.564	8.048	20.487	30.276	26.612	11.277	0.376	0.000
901-67	0.000	0.000	0.000	0.000	0.000	0.032	0.239	0.299	0.207	2.052	9.825	22.342	30.295	24.814	9.671	0.224	0.000
901-68	0.000	0.000	0.000	0.000	0.000	0.039	0.245	0.344	0.535	2.791	10.370	21.929	29.158	24.208	10.043	0.338	0.000
901-69	0.000	0.000	0.000	0.000	0.000	0.035	0.236	0.270	0.237	2.311	9.983	22.017	29.676	24.673	10.213	0.348	0.000
901-70	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.620	10.042	23.349	31.177	24.717	8.987	0.108	0.000
901-71	0.000	0.000	0.000	0.000	0.000	0.029	0.287	0.431	0.249	1.048	7.804	20.932	30.973	26.816	11.084	0.347	0.000
901-72	0.000	0.000	0.000	0.000	0.000	0.021	0.304	0.678	0.880	2.000	8.096	20.035	29.703	26.347	11.478	0.458	0.000
901-73	0.000	0.000	0.000	0.000	0.000	0.029	0.328	0.586	0.543	1.692	8.547	21.199	30.418	25.880	10.487	0.291	0.000
901-74	0.000	0.000	0.000	0.000	0.000	0.045	0.435	0.795	0.641	0.988	7.082	20.394	31.148	27.199	10.995	0.277	0.000
901-75	0.000	0.000	0.000	0.000	0.000	0.029	0.351	0.664	0.640	1.399	7.921	20.877	30.750	26.384	10.683	0.304	0.000
901-76	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.717	10.131	23.568	31.498	24.734	8.300	0.052	0.000
901-77	0.000	0.000	0.000	0.000	0.000	0.044	0.295	0.351	0.263	2.306	10.733	23.636	30.701	23.650	8.020	0.000	0.000
901-78	0.000	0.000	0.000	0.000	0.000	0.083	0.512	0.777	1.038	3.209	10.085	20.839	28.097	24.048	10.788	0.525	0.000
901-79	0.000	0.000	0.000	0.000	0.000	0.051	0.270	0.256	0.329	3.155	11.885	23.929	29.718	22.534	7.827	0.045	0.000
901-80	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.834	11.018	24.595	31.453	23.634	7.466	0.000	0.000
901-81	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.928	8.398	21.794	31.295	26.551	10.739	0.296	0.000
901-82	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.331	11.716	24.968	31.127	22.894	6.963	0.000	0.000
901-83	0.000	0.000	0.000	0.000	0.000	0.030	0.269	0.346	0.135	1.680	9.499	22.778	31.271	25.116	8.856	0.020	0.000
901-84	0.000	0.000	0.000	0.000	0.000	0.023	0.240	0.345	0.185	1.321	8.356	21.206	30.689	26.399	10.907	0.331	0.000
901-85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.948	18.000	32.665	31.148	13.655	0.584	0.000
901-86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.041	14.270	31.252	33.586	16.971	1.881	0.000
901-87	0.000	0.000	0.000	0.000	0.000	0.193	0.576	0.977	2.271	6.572	14.876	23.542	25.695	18.444	6.712	0.141	0.000
901-88	0.000	0.000	0.000	0.000	0.026	0.499	1.339	2.132	3.289	6.890	14.530	23.067	25.248	17.614	5.365	0.000	0.000
901-89	0.000	0.000	0.000	0.000	0.021	0.439	1.285	2.299	3.929	7.925	15.327	22.907	24.173	16.534	5.136	0.023	0.000
901-90	0.000	0.000	0.000	0.000	0.000	0.024	0.266	0.428	0.202	0.436	5.470	17.409	29.066	28.949	15.749	2.001	0.000
918-2	0.000	0.000	0.000	0.000	0.000	0.000	0.219	0.460	0.586	1.718	7.722	19.214	28.900	26.873	13.455	0.854	0.000
918-3	0.000	0.000	0.000	0.000	0.000	0.000	0.195	0.377	0.211	0.438	5.285	17.760	29.953	29.423	15.168	1.191	0.000
918-4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.233	5.298	18.080	30.362	29.681	15.248	1.099	0.000
918-5	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.267	15.937	30.771	31.840	16.485	1.701	0.000
918-6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.039	10.526	27.122	34.164	21.899	5.221	0.029
918-7	0.000	0.000	0.000	0.000	0.000	0.084	0.530	0.953	1.717	4.631	11.745	21.409	26.787	21.951	9.704	0.490	0.000
918-8	0.000	0.000	0.000	0.000	0.000	0.034	0.488	1.057	1.464	2.874	8.046	17.774	26.564	25.775	14.145	1.779	0.000
918-9	0.000	0.000	0.000	0.000	0.000	0.065	0.342	0.338	0.488	2.987	10.320	20.953	27.725	24.001	11.807	0.972	0.000
918-10	0.000	0.000	0.000	0.000	0.000	0.000	0.196	0.474	0.625	1.404	6.701	17.923	28.493	27.837	14.799	1.547	0.000
918-11	0.000	0.000	0.000	0.000	0.000	0.000	0.232	0.443	1.123	3.869	10.426	19.749	26.211	23.555	12.529	1.862	0.000
918-12	0.000	0.000	0.000	0.000	0.000	0.000	0.245	0.841	2.479	6.245	12.748	20.444	24.789	21.058	10.347	0.805	0.000
918-13	0.000	0.000	0.000	0.000	0.000	0.000	0.331	1.083	2.427	5.211	10.833	19.015	25.112	22.737	11.887	1.363	0.000
918-14	0.000	0.000	0.000	0.000	0.000	0.000	0.366	0.930	1.093	1.675	5.889	15.957	26.826	27.953	16.425	2.885	0.000
918-15	0.000	0.000	0.000	0.000	0.000	0.000	0.328	0.904	1.312	2.283	6.459	15.641	25.549	26.989	16.812	3.724	0.000
918-16	0.000	0.000	0.000	0.000	0.000	0.023	0.332	0.880	2.169	5.211	10.894	18.240	23.370	21.778	13.311	3.757	0.034
918-17	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.213	4.801	15.866	27.195	28.681	18.373	4.871	0.000	0.000
918-18	0.000	0.000	0.000	0.000	0.000	0.000	0.231	0.730	1.496	3.394	8.027	15.892	23.633	24.822	16.614	5.105	0.058
918-19	0.000	0.000	0.000	0.000	0.000	0.000	0.256	0.882	1.213	1.846	5.568	14.750	25.545	28.113	17.948	3.879	0.000
918-20	0.000	0.000	0.000	0.000	0.000	0.068	0.669	1.389	1.775	3.201	8.867	19.228	27.531	24.878	11.781	0.613	0.000
918-21	0.000	0.000	0.000	0.000	0.000	0.067	0.400	0.603	0.965	3.321	10.158	20.585	27.710	24.127	11.416	0.648	0.000
918-22	0.000	0.000	0.000	0.000	0.000	0.058	0.284	0.413	1.196	4.554	12.020	21.503	26.739	22.358	10.324	0.550	0.000
918-23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.071	9.097	22.650	31.436	25.804	9.795	0.148	0.000
918-24	0.000	0.000	0.000	0.000	0.000	0.031	0.533	1.068	1.359	3.080	9.539	20.630	28.564	24.462	10.375	0.358	0.000
918-25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.897	17.160	31.676	31.370	15.047	0.851	0.000
918-26	0.000	0.000	0.000	0.000	0.000	0.000	0.099	0.422	0.432	0.318	2.611	12.251	25.834	31.332	21.392	5.288	0.020
918-27	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.686	11.228	25.987	32.126	21.927	6.811	0.234

Phi class (half phi classes) distribution, listed by class midpoints

<u>Sample</u> <u>Name</u>	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
918-28	0.000	0.000	0.000	0.000	0.000	0.032	0.246	0.366	0.444	2.194	9.721	21.895	29.835	24.875	10.105	0.287	0.000
918-29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.515	12.826	29.435	34.075	19.533	2.617	0.000
918-30	0.000	0.000	0.000	0.000	0.000	0.000	0.189	0.527	0.634	1.024	5.458	16.711	28.614	29.164	15.905	1.775	0.000
918-31	0.000	0.000	0.000	0.000	0.000	0.098	0.502	0.602	0.990	4.253	12.908	24.026	28.581	20.993	7.033	0.013	0.000
918-32	0.000	0.000	0.000	0.000	0.000	0.090	0.409	0.541	1.440	5.592	14.585	24.631	27.425	19.184	6.047	0.056	0.000
918-33	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.872	7.705	20.555	30.492	27.145	12.561	0.671	0.000
918-34	0.000	0.000	0.000	0.000	0.000	0.018	0.418	0.655	0.551	2.025	8.640	20.346	29.153	25.760	11.838	0.596	0.000
918-35	0.000	0.000	0.000	0.000	0.000	0.000	0.410	0.878	1.305	3.124	9.090	19.299	27.292	24.809	12.561	1.230	0.000
918-36	0.000	0.000	0.000	0.000	0.000	0.035	0.252	0.333	0.348	1.948	9.501	21.831	29.785	24.860	10.643	0.465	0.000
918-37	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.952	8.939	22.884	31.813	25.883	9.471	0.057	0.000
918-38	0.000	0.000	0.000	0.000	0.000	0.000	0.173	0.248	0.153	1.003	7.008	19.156	29.526	27.604	13.931	1.199	0.000
918-39	0.000	0.000	0.000	0.000	0.000	0.000	0.221	0.483	0.620	1.876	8.391	20.425	29.657	26.100	11.682	0.545	0.000
918-40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.516	6.035	19.699	31.939	28.714	12.490	0.607	0.000
918-41	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.393	6.411	20.430	32.278	28.288	11.722	0.478	0.000
918-42	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.105	12.965	28.226	32.576	19.902	4.216	0.008
918-43	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.988	15.433	32.916	33.612	15.295	0.756	0.000
918-44	0.000	0.000	0.000	0.000	0.000	0.000	0.255	0.697	1.005	1.743	6.655	17.644	28.182	27.477	14.613	1.727	0.000
918-45	0.000	0.000	0.000	0.000	0.000	0.035	0.544	1.063	1.153	2.287	7.910	18.775	27.943	25.917	13.135	1.236	0.000
918-46	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.033	4.295	18.748	33.312	30.469	12.606	0.536	0.000
918-47	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.085	13.164	33.957	36.083	14.974	0.788	0.000
923-02	0.000	0.000	0.000	0.000	0.000	0.000	0.382	0.901	1.437	3.317	9.205	19.275	27.206	24.692	12.394	1.194	0.000
923-03	0.000	0.000	0.000	0.000	0.000	0.000	0.199	0.403	0.229	0.406	5.217	17.182	29.104	29.089	15.896	2.277	0.000
923-04	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.047	4.424	16.914	29.886	30.406	16.469	1.854	0.000
923-05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.097	3.379	13.218	25.386	29.683	21.239	6.984	0.014
923-06	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.318	10.492	25.700	32.788	22.730	6.876	0.096
923-07	0.000	0.000	0.000	0.000	0.000	0.049	0.265	0.296	0.632	3.923	12.824	24.241	28.997	21.468	7.288	0.015	0.000
923-08	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.172	6.731	25.118	37.526	25.089	5.353	0.010
923-09	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.843	13.915	28.197	31.816	19.390	3.839	0.000
923-10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.132	5.961	22.317	35.251	27.090	8.767	0.482
923-11	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.849	14.962	33.597	33.371	14.274	1.948
923-12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.117	2.001	8.380	19.140	28.221	26.785	13.979	1.377	0.000
923-13	0.000	0.000	0.000	0.000	0.000	0.027	0.137	0.111	0.202	2.294	8.830	18.852	26.659	25.520	14.717	2.651	0.000
923-14	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.208	4.764	15.863	27.288	28.810	18.381	4.686	0.000	0.000
923-15	0.000	0.000	0.000	0.000	0.000	0.062	0.336	0.567	1.296	4.180	10.839	19.959	26.057	23.283	12.097	1.314	0.000
923-16	0.000	0.000	0.000	0.000	0.000	0.193	0.491	0.688	1.816	6.217	14.930	24.015	26.240	18.683	6.614	0.113	0.000
923-17	0.000	0.000	0.000	0.000	0.000	0.031	0.250	1.069	3.386	7.792	13.510	18.703	21.428	19.427	11.744	2.660	0.000
923-18	0.000	0.000	0.000	0.000	0.000	0.170	0.388	0.389	1.178	5.305	14.124	23.764	26.707	19.727	7.909	0.339	0.000
923-19	0.000	0.000	0.000	0.000	0.000	0.000	0.087	0.403	0.476	0.423	1.892	9.910	24.163	31.939	23.138	7.356	0.214
923-20	0.000	0.000	0.000	0.000	0.000	0.032	0.245	0.305	0.161	1.363	8.079	20.378	29.890	26.660	12.268	0.619	0.000
923-21	0.000	0.000	0.000	0.000	0.000	0.211	0.493	0.841	2.593	8.037	17.260	25.207	25.137	16.055	4.166	0.000	0.000
923-22	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.424	6.415	19.509	31.060	28.910	13.147	0.535	0.000
923-23	0.000	0.000	0.000	0.000	0.000	0.000	0.145	0.392	0.460	0.803	4.744	15.319	27.678	30.083	17.819	2.557	0.000
923-24	0.000	0.000	0.000	0.000	0.000	0.197	0.478	0.706	1.957	6.370	14.640	23.091	25.498	19.104	7.695	0.264	0.000
923-25	0.000	0.000	0.000	0.000	0.000	0.040	0.177	0.165	0.674	3.971	11.887	21.903	27.171	22.621	10.740	0.650	0.000
923-26	0.000	0.000	0.000	0.000	0.000	0.000	0.119	0.271	0.167	0.386	4.608	15.637	28.069	30.295	17.927	2.521	0.000
923-27	0.000	0.000	0.000	0.000	0.000	0.026	0.295	0.542	0.493	0.917	6.051	18.044	29.452	28.706	14.603	0.872	0.000
923-28	0.000	0.000	0.000	0.000	0.000	0.000	0.126	0.360	0.348	0.468	4.060	15.227	28.343	30.797	17.942	2.330	0.000
923-29	0.000	0.000	0.000	0.000	0.000	0.000	0.230	0.580	0.969	5.450	17.220	29.329	29.324	15.253	0.976	0.000	0.000
923-30	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.546	16.059	30.011	31.499	17.230	1.656	0.000
923-31	0.000	0.000	0.000	0.000	0.000	0.000	0.265	0.467	0.213	0.603	6.372	19.361	30.881	28.483	12.823	0.532	0.000
923-32	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.378	16.020	30.124	31.657	17.325	1.496	0.000
923-33	0.000	0.000	0.000	0.000	0.000	0.000	0.071	0.339	0.386	0.345	2.608	12.287	26.181	31.888	21.350	4.543	0.000
923-34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.631	6.388	18.474	29.609	28.850	14.980	1.070	0.000
923-35	0.000	0.000	0.000	0.000	0.000	0.026	0.216	0.280	0.171	1.506	8.115	19.731	28.838	26.567	13.537	1.013	0.000
923-36	0.000	0.000	0.000	0.000	0.000	0.000	0.139	0.415	0.462	0.613	4.366	15.618	28.691	30.635	17.205	1.855	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
923-37	0.000	0.000	0.000	0.000	0.000	0.017	0.460	0.862	0.736	1.507	6.884	18.180	28.576	27.531	14.232	1.015	0.000
923-38	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.061	3.814	16.573	30.907	31.308	15.835	1.501	0.000
923-39	0.000	0.000	0.000	0.000	0.000	0.025	0.452	1.039	1.083	0.863	3.616	15.310	29.862	30.983	15.614	1.152	0.000
923-40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.081	3.179	15.266	30.377	32.312	17.031	1.755	0.000
923-41	0.000	0.000	0.000	0.000	0.000	0.000	0.207	0.351	0.164	0.779	6.780	19.160	29.995	28.087	13.689	0.788	0.000
923-42	0.000	0.000	0.000	0.000	0.000	0.022	0.240	0.401	0.368	1.294	7.813	20.452	30.380	26.880	11.702	0.450	0.000
923-43	0.000	0.000	0.000	0.000	0.000	0.020	0.314	0.702	0.835	1.521	6.752	18.268	29.001	27.732	13.977	0.879	0.000
923-44	0.000	0.000	0.000	0.000	0.000	0.000	0.216	0.440	0.290	0.541	5.734	18.221	30.104	29.074	14.513	0.869	0.000
923-45	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.535	7.560	21.265	31.522	27.398	11.393	0.327	0.000
923-46	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.613	7.283	20.942	31.734	27.851	11.324	0.252	0.000
923-47	0.000	0.000	0.000	0.000	0.000	0.063	0.383	0.566	1.036	3.870	11.325	21.564	27.446	22.965	10.322	0.461	0.000
923-48	0.000	0.000	0.000	0.000	0.013	0.140	0.150	0.182	1.830	7.689	17.342	25.039	24.674	16.575	6.177	0.191	0.000
923-49	0.000	0.000	0.000	0.000	0.000	0.000	0.306	1.066	2.856	6.442	12.159	18.834	23.204	21.211	12.055	1.867	0.000
923-50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.089	1.952	8.586	19.388	27.306	25.205	14.447	3.027	0.000	0.000
923-51	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.980	6.195	16.285	25.880	27.109	18.190	5.352	0.000	0.000
923-52	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.281	6.210	19.618	31.229	28.888	13.200	0.574	0.000
923-53	0.000	0.000	0.000	0.000	0.000	0.031	0.587	1.299	1.451	2.184	7.147	17.948	28.034	26.837	13.625	0.856	0.000
923-54	0.000	0.000	0.000	0.000	0.000	0.089	0.553	0.838	1.209	3.828	11.372	22.126	28.119	22.622	9.007	0.237	0.000
923-55	0.000	0.000	0.000	0.000	0.000	0.000	0.264	0.669	1.165	2.821	7.963	17.433	26.461	26.348	14.842	2.033	0.000
923-56	0.000	0.000	0.000	0.000	0.000	0.000	0.187	0.467	0.544	1.099	5.831	17.001	28.588	29.020	15.742	1.519	0.000
923-57	0.000	0.000	0.000	0.000	0.000	0.029	0.221	0.300	0.297	2.158	9.588	21.557	29.569	25.126	10.756	0.399	0.000
923-58	0.000	0.000	0.000	0.000	0.007	0.250	0.332	0.373	2.190	8.432	18.555	26.248	24.795	14.966	3.852	0.000	0.000
923-59	0.000	0.000	0.000	0.000	0.000	0.190	0.432	0.461	1.384	5.801	14.887	24.399	26.712	18.978	6.663	0.093	0.000
923-60	0.000	0.000	0.000	0.000	0.000	0.000	0.222	0.411	0.307	0.841	6.503	18.902	30.061	28.419	13.636	0.696	0.000
923-61	0.000	0.000	0.000	0.000	0.000	0.067	0.395	0.660	1.369	4.466	11.932	21.856	27.237	22.187	9.458	0.373	0.000
923-62	0.000	0.000	0.000	0.000	0.000	0.000	0.199	0.357	0.813	3.031	8.947	18.228	25.983	25.284	14.676	2.481	0.000
923-63	0.000	0.000	0.000	0.000	0.000	0.000	0.187	0.306	0.227	1.139	7.280	19.437	29.768	27.549	13.339	0.767	0.000
923-64	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.117	3.685	13.312	24.484	28.473	21.329	8.332	0.268	0.000
923-65	0.000	0.000	0.000	0.000	0.000	0.028	0.157	0.169	0.332	2.434	9.442	20.636	28.693	25.422	12.035	0.652	0.000
923-66	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.899	6.743	18.531	29.264	28.381	14.949	1.233	0.000
923-67	0.000	0.000	0.000	0.000	0.000	0.000	0.048	0.419	0.968	1.470	3.186	9.922	21.845	29.814	23.729	8.469	0.130
923-68	0.000	0.000	0.000	0.000	0.000	0.103	0.278	0.522	2.038	6.805	15.268	23.713	25.802	18.651	6.716	0.101	0.000
923-69	0.000	0.000	0.000	0.000	0.000	0.000	0.091	0.689	2.004	4.619	9.643	17.617	25.145	24.742	13.815	1.635	0.000
923-70	0.000	0.000	0.000	0.000	0.000	0.000	0.317	2.142	4.132	4.993	6.737	13.828	24.291	26.774	15.434	1.351	0.000
923-71	0.000	0.000	0.000	0.000	0.000	0.000	0.293	3.098	7.983	11.848	12.758	13.574	17.070	18.640	12.302	2.433	0.000
923-72	0.000	0.000	0.000	0.000	0.000	0.000	0.098	0.574	1.011	1.248	2.681	10.300	23.540	31.330	23.144	6.073	0.000
923-73	0.000	0.000	0.000	0.000	0.000	0.000	0.054	0.352	0.958	3.060	8.388	17.324	25.873	26.290	15.443	2.258	0.000
923-74	0.000	0.000	0.000	0.000	0.000	0.044	0.190	0.159	0.455	3.623	12.190	23.274	28.565	22.377	8.867	0.256	0.000
923-75	0.000	0.000	0.000	0.000	0.000	0.000	0.174	0.369	0.245	0.499	5.313	17.325	29.620	29.801	15.649	1.004	0.000
923-76	0.000	0.000	0.000	0.000	0.000	0.055	0.361	0.522	0.772	3.077	10.181	21.159	28.526	24.333	10.590	0.425	0.000
923-77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.280	4.255	14.395	26.050	29.325	20.098	5.597	0.000	0.000
923-78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.107	2.706	11.718	24.381	30.517	23.055	7.516	0.000	0.000
923-79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.000	15.063	29.259	31.903	18.477	2.297	0.000
923-80	0.000	0.000	0.000	0.000	0.000	0.022	0.209	0.295	0.227	1.511	8.438	20.646	29.678	26.205	12.138	0.632	0.000
923-81	0.000	0.000	0.000	0.000	0.000	0.000	0.125	0.186	0.213	1.593	7.732	18.895	28.415	27.101	14.354	1.388	0.000
923-82	0.000	0.000	0.000	0.000	0.000	0.000	0.116	0.327	0.529	1.556	6.719	17.536	28.193	28.300	15.465	1.259	0.000
923-83	0.000	0.000	0.000	0.000	0.000	0.000	0.130	0.308	0.216	0.364	4.081	15.295	28.010	30.196	18.127	3.273	0.000
923-84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.900	6.664	18.230	28.747	28.187	15.395	1.857	0.000
923-85	0.000	0.000	0.000	0.000	0.000	0.000	0.221	0.456	0.509	1.795	8.162	19.923	29.161	26.318	12.703	0.752	0.000
923-86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.210	6.803	21.146	32.097	27.929	11.496	0.320	0.000
923-87	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.186	9.686	23.680	31.886	25.042	8.470	0.050	0.000
923-88	0.000	0.000	0.000	0.000	0.000	0.000	0.147	0.383	0.477	1.019	5.375	15.657	26.768	28.569	17.786	3.817	0.000
923-89	0.000	0.000	0.000	0.000	0.000	0.000	0.193	0.557	0.575	0.605	4.696	16.467	29.330	30.227	16.256	1.092	0.000
923-90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050	3.510	14.597	27.827	31.028	19.316	3.670	0.000
923-91	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.963	7.931	20.601	30.318	27.159	12.457	0.571	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	725	675	625	575	525	475	425	375	325	275	225	175	125	075	025	-025	-075
923-92	0.000	0.000	0.000	0.000	0.000	0.055	0.254	0.409	1.368	5.004	12.570	21.709	26.312	21.633	10.089	0.596	0.000
923-93	0.000	0.000	0.000	0.000	0.000	0.000	0.109	0.531	0.955	2.107	6.340	15.506	25.854	27.950	17.388	3.260	0.000
923-94	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.519	1.169	1.592	2.438	8.506	20.723	29.677	24.689	9.911	0.721
923-95	0.000	0.000	0.000	0.000	0.000	0.000	0.176	0.402	0.293	0.419	4.583	16.511	29.219	30.083	16.490	1.824	0.000
923-96	0.000	0.000	0.000	0.000	0.000	0.000	0.069	0.350	0.576	0.935	3.490	12.125	24.336	29.987	21.656	6.435	0.041
923-97	0.000	0.000	0.000	0.000	0.000	0.000	0.102	0.862	2.033	3.378	5.987	12.251	21.526	26.507	20.136	7.105	0.112
923-98	0.000	0.000	0.000	0.000	0.000	0.030	0.267	0.431	0.485	2.290	9.416	21.112	29.034	24.888	11.415	0.631	0.000
923-99	0.000	0.000	0.000	0.000	0.000	0.072	0.426	0.697	1.420	4.661	12.406	22.354	27.152	21.490	8.967	0.355	0.000
923-100	0.000	0.000	0.000	0.000	0.000	0.000	0.103	0.642	1.307	2.372	5.593	13.146	23.142	27.513	19.914	6.209	0.058
923-101	0.000	0.000	0.000	0.000	0.000	0.000	0.152	0.998	2.410	4.657	8.871	16.117	23.821	24.897	15.397	2.681	0.000
923-102	0.000	0.000	0.000	0.000	0.000	0.000	0.165	1.182	2.696	4.213	6.403	11.648	20.169	25.569	20.206	7.494	0.255
923-103	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.020	10.255	22.626	30.059	24.770	10.017	0.254	0.000
923-104	0.000	0.000	0.000	0.000	0.000	0.000	0.155	0.315	0.382	1.290	6.661	17.719	28.344	28.349	15.488	1.297	0.000
923-105	0.000	0.000	0.000	0.000	0.000	0.000	0.154	0.793	1.848	4.236	9.647	18.395	25.986	24.782	13.161	0.998	0.000
923-106	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.799	6.557	17.481	26.958	26.839	16.904	4.462	0.000	0.000
923-107	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.165	8.663	21.260	29.754	25.616	12.321	1.221	0.000	0.000
923-108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.923	14.117	28.292	32.219	19.642	2.806	0.000
923-109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.984	17.152	30.981	31.383	15.699	0.800	0.000
923-110	0.000	0.000	0.000	0.000	0.000	0.000	0.109	0.325	0.698	2.331	7.951	18.319	27.709	26.983	14.451	1.124	0.000
923-111	0.000	0.000	0.000	0.000	0.000	0.000	0.309	0.602	0.778	2.391	8.408	19.104	28.004	26.243	13.348	0.814	0.000
923-112	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.707	7.544	21.058	31.315	27.383	11.617	0.377	0.000
923-113	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.124	4.583	16.684	29.466	30.547	16.944	1.653	0.000
923-114	0.000	0.000	0.000	0.000	0.000	0.000	0.143	0.535	0.777	1.996	6.910	16.890	26.921	27.804	16.120	1.965	0.000
923-115	0.000	0.000	0.000	0.000	0.000	0.000	0.147	0.932	2.175	4.138	8.058	15.304	23.665	25.799	16.644	3.136	0.000
923-116	0.000	0.000	0.000	0.000	0.000	0.000	0.211	0.452	0.288	0.424	5.268	17.485	29.706	29.634	15.534	0.999	0.000
923-117	0.000	0.000	0.000	0.000	0.000	0.065	0.593	1.075	1.178	2.719	9.218	20.513	28.665	24.827	10.761	0.386	0.000
923-118	0.000	0.000	0.000	0.000	0.000	0.077	0.386	0.461	0.952	4.201	12.320	22.690	27.597	21.814	9.133	0.369	0.000
923-119	0.000	0.000	0.000	0.000	0.000	0.000	0.181	0.470	0.619	1.283	6.358	17.687	28.616	28.366	15.241	1.180	0.000
923-120	0.000	0.000	0.000	0.000	0.000	0.000	0.202	0.551	0.727	1.380	5.902	16.402	27.542	28.692	16.507	2.094	0.000
923-121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.132	5.025	17.968	30.590	30.130	15.259	0.896	0.000
923-122	0.000	0.000	0.000	0.000	0.000	0.000	0.231	0.693	0.939	1.370	5.694	16.563	28.181	28.956	15.973	1.401	0.000
923-123	0.000	0.000	0.000	0.000	0.000	0.000	0.130	0.888	1.780	2.644	5.196	12.395	22.962	28.002	20.149	5.826	0.027
923-124	0.000	0.000	0.000	0.000	0.000	0.000	0.031	0.286	0.449	0.417	1.710	9.153	21.924	30.514	25.486	9.893	0.138
923-125	0.000	0.000	0.000	0.000	0.000	0.028	0.260	0.386	0.261	1.434	8.371	20.678	29.769	26.262	11.984	0.568	0.000
923-126	0.000	0.000	0.000	0.000	0.000	0.000	0.115	1.022	2.128	2.896	4.251	9.752	19.961	27.306	22.601	9.249	0.779
923-127	0.000	0.000	0.000	0.000	0.000	0.000	0.312	0.522	0.523	1.870	7.605	18.313	27.879	27.099	14.613	1.264	0.000
923-128	0.000	0.000	0.000	0.000	0.000	0.000	0.176	0.541	0.630	0.679	3.568	14.352	27.753	30.984	18.620	2.698	0.000
923-129	0.000	0.000	0.000	0.000	0.000	0.000	0.346	0.947	1.445	2.719	7.418	16.886	26.275	26.540	15.240	2.184	0.000
923-130	0.000	0.000	0.000	0.000	0.000	0.000	0.168	0.478	0.546	0.738	4.161	14.443	27.322	30.728	18.744	2.671	0.000
923-131	0.000	0.000	0.000	0.000	0.000	0.000	0.030	0.211	0.239	0.210	2.228	9.908	21.982	29.654	24.768	10.409	0.363
923-132	0.000	0.000	0.000	0.000	0.000	0.000	0.333	1.570	3.435	5.724	9.338	15.675	22.687	23.598	14.721	2.919	0.000
923-133	0.000	0.000	0.000	0.000	0.000	0.000	0.188	0.387	0.447	1.410	7.414	19.202	29.401	27.566	13.311	0.674	0.000
923-134	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.039	1.987	8.804	19.616	27.298	24.912	14.185	3.160	0.000	0.000
923-135	0.000	0.000	0.000	0.000	0.000	0.000	0.234	0.763	2.203	5.584	11.538	18.861	23.877	22.123	12.724	2.093	0.000
923-136	0.000	0.000	0.000	0.000	0.000	0.169	0.454	0.496	1.099	4.840	13.612	23.971	27.690	20.384	7.214	0.070	0.000
923-137	0.000	0.000	0.000	0.000	0.000	0.030	0.206	0.220	0.145	1.998	9.638	21.867	29.959	25.276	10.384	0.278	0.000
923-138	0.000	0.000	0.000	0.000	0.000	0.000	0.191	0.466	0.566	1.079	5.662	16.869	28.542	29.222	16.053	1.350	0.000
923-139	0.000	0.000	0.000	0.000	0.000	0.074	0.396	0.522	1.047	4.290	12.440	22.979	28.021	21.877	8.244	0.109	0.000
923-140	0.000	0.000	0.000	0.000	0.000	0.000	0.066	0.908	2.443	4.080	6.264	11.530	20.589	26.634	20.763	6.671	0.054
923-141	0.000	0.000	0.000	0.000	0.000	0.000	0.140	1.044	2.152	2.940	4.858	11.341	22.080	28.234	21.044	6.146	0.021
923-142	0.000	0.000	0.000	0.000	0.000	0.000	0.323	0.692	1.017	2.643	8.278	18.388	27.107	25.861	13.961	1.729	0.000
923-143	0.000	0.000	0.000	0.000	0.000	0.000	0.160	0.791	1.357	2.274	5.707	13.878	24.044	27.564	19.036	5.191	0.000
923-144	0.000	0.000	0.000	0.000	0.000	0.000	0.060	1.005	3.809	8.677	14.160	18.556	20.852	19.100	11.567	2.214	0.000
923-145	0.000	0.000	0.000	0.000	0.000	0.060	0.398	1.027	2.689	6.823	14.164	22.198	25.257	19.470	7.718	0.196	0.000
901-6	0.096	0.221	0.262	0.262	0.317	0.782	2.298	5.348	9.613	13.881	16.585	16.821	14.882	11.327	6.239	1.066	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
901-6	0.096	0.223	0.261	0.254	0.308	0.751	2.150	4.984	9.057	13.304	16.273	17.026	15.504	11.932	6.594	1.283	0.000
227-7	0.183	0.264	0.302	0.258	0.210	0.618	2.434	6.465	12.213	17.517	19.645	17.374	12.250	7.016	2.965	0.286	0.000
227-80	0.000	0.000	0.000	0.000	0.051	0.695	2.553	6.199	11.405	16.888	20.121	18.749	13.420	7.314	2.525	0.079	0.000
227-96	0.000	0.000	0.000	0.000	0.014	0.331	0.843	1.638	3.726	8.792	16.649	23.147	23.108	15.830	5.784	0.138	0.000
227-103	0.000	0.000	0.000	0.000	0.043	0.861	4.194	10.861	18.480	22.326	19.437	12.106	5.775	3.055	2.085	0.761	0.016
227-104	0.000	0.000	0.000	0.000	0.141	0.642	1.873	4.381	8.634	14.437	19.763	21.101	16.840	9.459	2.714	0.017	0.000
415-46	0.000	0.000	0.000	0.045	0.226	0.434	0.842	2.401	6.897	14.805	22.484	23.960	17.677	8.428	1.769	0.031	0.000
415-48	0.146	0.235	0.211	0.180	0.313	0.729	1.390	2.535	5.388	11.469	19.470	23.875	20.316	11.201	2.541	0.000	0.000
415-49	0.000	0.000	0.000	0.000	0.084	0.388	0.656	1.100	3.171	8.903	17.702	24.388	23.448	15.159	4.965	0.036	0.000
415-50	0.000	0.000	0.000	0.000	0.164	0.552	0.878	1.463	4.027	10.660	19.936	25.421	21.970	12.165	2.765	0.000	0.000
415-51	0.186	0.268	0.305	0.310	0.399	0.852	2.194	5.087	9.890	15.905	20.571	20.499	14.940	7.216	1.376	0.000	0.000
415-52	0.198	0.306	0.385	0.393	0.394	0.852	2.824	7.297	13.733	19.424	20.926	17.053	10.352	4.603	1.237	0.023	0.000
415-54	0.000	0.000	0.000	0.000	0.000	0.194	0.996	2.656	5.563	9.968	15.528	20.358	21.258	16.147	6.999	0.332	0.000
415-55	0.105	0.246	0.294	0.259	0.236	0.668	2.327	5.637	9.942	13.912	16.581	17.497	16.014	11.416	4.687	0.178	0.000
415-57	0.147	0.262	0.298	0.297	0.407	0.938	2.276	4.685	8.224	12.792	17.496	19.879	17.510	10.983	3.734	0.073	0.000
415-58	0.145	0.243	0.249	0.218	0.277	0.620	1.400	2.716	4.878	8.664	14.403	20.092	21.604	16.495	7.306	0.691	0.000
415-59	0.000	0.000	0.000	0.000	0.000	0.134	0.494	0.804	1.283	3.563	9.938	19.707	26.820	24.216	12.120	0.921	0.000
1118-2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.211	5.415	18.681	30.990	29.623	14.319	0.761	0.000
1118-3	0.000	0.000	0.000	0.000	0.000	0.022	0.321	0.785	1.200	2.349	7.741	18.602	28.222	26.536	13.303	0.918	0.000
1118-4	0.000	0.000	0.000	0.000	0.000	0.000	0.206	0.527	0.878	1.851	6.753	17.591	28.074	27.680	14.851	1.589	0.000
1118-5	0.000	0.000	0.000	0.000	0.000	0.000	0.255	0.881	1.492	2.018	4.276	13.204	25.286	29.192	19.026	4.355	0.015
1118-6	0.000	0.000	0.000	0.000	0.000	0.000	0.286	0.752	0.949	1.132	4.085	14.366	27.143	30.043	18.155	3.088	0.000
1118-9	0.000	0.000	0.000	0.000	0.000	0.086	1.148	4.732	11.588	19.638	24.041	21.129	12.744	4.556	0.338	0.000	0.000
1118-10	0.000	0.000	0.000	0.000	0.000	0.000	0.146	0.333	0.320	0.639	4.235	14.626	26.989	29.987	18.833	3.893	0.000
1118-11	0.000	0.000	0.000	0.000	0.000	0.000	0.133	0.436	0.465	0.401	2.158	11.148	26.079	32.636	21.506	5.038	0.000
1118-12	0.000	0.000	0.000	0.000	0.000	0.000	0.177	0.492	0.589	0.649	2.270	10.602	23.987	30.958	22.883	7.310	0.083
1118-13	0.000	0.000	0.000	0.000	0.000	0.000	0.286	0.719	0.880	0.985	3.126	12.260	25.174	30.268	20.739	5.549	0.015
1118-14	0.000	0.000	0.000	0.000	0.000	0.000	0.241	0.606	0.861	1.285	4.167	12.773	24.256	28.771	20.333	6.515	0.193
1118-15	0.000	0.000	0.000	0.000	0.000	0.000	0.124	0.343	0.592	1.373	5.215	14.308	24.998	28.086	19.084	5.811	0.066
1118-16	0.000	0.000	0.000	0.000	0.000	0.000	0.075	0.307	0.328	0.419	3.103	12.313	24.851	30.114	21.495	6.905	0.090
1118-17	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.483	10.887	26.517	33.451	22.265	5.397	0.000
1118-18	0.000	0.000	0.000	0.000	0.000	0.176	0.644	1.444	3.386	8.129	16.153	23.740	24.533	16.524	5.257	0.015	0.000
1118-22	0.000	0.000	0.000	0.000	0.000	0.000	0.205	0.484	0.447	0.516	2.977	12.887	27.063	31.551	19.646	4.203	0.022
1118-23	0.000	0.000	0.000	0.000	0.000	0.000	0.195	0.377	0.322	0.714	4.637	15.848	28.183	29.855	17.345	2.523	0.000
1118-24	0.000	0.000	0.000	0.000	0.000	0.000	0.144	0.335	0.327	0.656	4.047	15.174	28.761	30.709	17.179	2.667	0.000
1118-25	0.000	0.000	0.000	0.000	0.000	0.000	0.237	0.436	0.301	0.637	5.773	18.246	29.958	28.904	14.594	0.914	0.000
1118-27	0.000	0.000	0.000	0.000	0.000	0.240	0.793	1.632	3.633	8.543	16.649	23.858	23.985	15.768	4.844	0.055	0.000
1118-29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.056	2.115	10.716	23.487	30.401	23.934	9.092	0.199	0.000
1118-30	0.000	0.000	0.000	0.000	0.000	0.042	0.520	1.087	1.774	3.954	9.869	19.090	25.876	23.513	12.528	1.746	0.000
1118-31	0.000	0.000	0.000	0.000	0.000	0.000	0.208	0.366	0.199	0.529	5.139	17.895	30.962	29.792	14.069	0.842	0.000
1118-32	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.196	5.668	18.805	30.801	29.331	14.374	0.825	0.000
1118-33	0.000	0.000	0.000	0.000	0.000	0.042	0.270	0.299	0.184	1.765	9.337	21.782	29.981	25.204	10.705	0.430	0.000
1118-34	0.000	0.000	0.000	0.000	0.000	0.046	0.356	0.673	0.963	2.496	8.993	20.264	28.575	25.150	11.810	0.673	0.000
1118-35	0.000	0.000	0.000	0.000	0.000	0.025	0.243	0.448	0.562	1.598	7.566	19.138	28.989	27.000	13.480	0.951	0.000
1118-36	0.000	0.000	0.000	0.000	0.000	0.031	0.350	0.713	0.772	1.180	5.760	16.869	28.322	28.667	15.634	1.701	0.000
1118-37	0.000	0.000	0.000	0.000	0.000	0.000	0.227	0.546	0.599	0.884	4.689	16.514	29.315	30.029	15.951	1.247	0.000
1118-38	0.000	0.000	0.000	0.000	0.000	0.053	0.384	0.540	0.252	0.845	7.603	20.981	31.027	26.750	11.167	0.397	0.000
1118-39	0.000	0.000	0.000	0.000	0.000	0.000	0.203	0.667	0.956	1.099	3.691	13.244	26.116	30.321	19.560	4.143	0.000
1118-40	0.000	0.000	0.000	0.000	0.006	0.370	1.301	2.993	5.914	10.859	17.484	22.482	21.336	13.478	3.776	0.000	0.000
1118-41	0.000	0.000	0.000	0.000	0.043	0.409	0.958	2.077	4.966	11.034	19.109	24.077	21.338	12.465	3.436	0.088	0.000
1118-42	0.000	0.000	0.000	0.000	0.000	0.246	0.834	1.341	2.160	5.349	12.875	22.290	26.326	20.205	8.077	0.298	0.000
1118-43	0.000	0.000	0.000	0.000	0.000	0.027	0.290	0.629	0.973	2.163	7.841	18.958	28.436	26.444	13.201	1.088	0.000
1118-44	0.000	0.000	0.000	0.000	0.000	0.023	0.255	0.478	0.585	1.881	8.425	20.296	29.347	25.977	12.069	0.665	0.000
1118-45	0.000	0.000	0.000	0.000	0.000	0.077	1.005	2.498	3.237	3.254	5.862	14.384	24.766	26.398	15.705	2.813	0.000
1118-46	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.349	13.290	28.719	32.939	19.406	3.296	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
1118-47	0.000	0.000	0.000	0.000	0.000	0.000	0.096	0.411	0.477	0.493	2.144	10.400	24.750	32.217	22.626	63.36	0.052
1118-48	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.167	10.405	26.105	33.523	22.821	5.951	0.029
1118-49	0.000	0.000	0.000	0.000	0.000	0.000	0.358	1.081	1.408	1.803	5.353	14.870	26.070	28.136	17.256	3.665	0.000
1118-50	0.000	0.000	0.000	0.000	0.000	0.000	0.509	1.545	2.339	3.223	6.991	16.018	25.864	26.410	14.926	2.176	0.000
1118-51	0.000	0.000	0.000	0.000	0.000	0.034	0.238	0.298	0.281	1.975	9.563	22.018	30.090	24.903	10.227	0.374	0.000
1118-52	0.000	0.000	0.000	0.000	0.000	0.000	0.365	1.106	1.670	2.425	5.866	14.429	24.699	27.163	17.587	4.667	0.022
1118-53	0.000	0.000	0.000	0.000	0.000	0.169	0.904	3.437	9.004	16.918	23.197	22.965	15.805	6.753	0.848	0.000	0.000
1118-54	0.000	0.000	0.000	0.000	0.016	0.165	0.756	3.046	8.590	16.892	23.657	23.510	16.009	6.613	0.747	0.000	0.000
1118-55	0.091	0.186	0.173	0.146	0.214	0.504	1.241	3.042	6.909	13.156	19.630	22.131	18.397	10.744	3.392	0.045	0.000
1118-56	0.000	0.000	0.000	0.000	0.000	0.000	0.340	0.600	0.387	1.137	6.396	17.568	28.293	28.003	15.264	2.012	0.000
1118-57	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.134	4.366	16.427	29.459	30.564	16.911	2.138	0.000
1118-58	0.000	0.000	0.000	0.000	0.000	0.033	0.294	0.479	0.415	0.992	6.276	18.088	28.820	27.858	14.835	1.959	0.000
1118-59	0.000	0.000	0.000	0.000	0.000	0.000	0.276	0.740	1.027	1.628	6.162	16.998	28.147	28.164	15.142	1.716	0.000
1118-60	0.000	0.000	0.000	0.000	0.000	0.000	0.255	0.561	0.639	1.251	6.642	18.790	29.739	27.859	13.482	0.783	0.000
1118-61	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.489	6.555	20.845	32.624	28.039	11.078	0.371	0.000
1118-62	0.000	0.000	0.000	0.000	0.000	0.046	0.274	0.256	0.114	2.009	10.630	23.706	30.794	23.819	8.312	0.041	0.000
1118-64	0.000	0.000	0.000	0.000	0.000	0.168	0.945	2.027	3.270	5.705	11.394	19.903	25.340	21.205	9.538	0.505	0.000
1118-65	0.000	0.000	0.000	0.000	0.000	0.022	0.323	0.793	1.094	1.546	5.109	14.864	26.466	28.880	17.669	3.234	0.000
1118-66	0.000	0.000	0.000	0.000	0.000	0.025	0.408	0.993	1.277	1.558	5.495	16.224	27.829	28.491	15.717	1.981	0.000
1118-67	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.375	10.352	25.379	32.712	22.952	7.057	0.174
1118-68	0.000	0.000	0.000	0.000	0.000	0.000	0.153	0.450	0.609	0.905	3.132	11.902	25.228	30.705	20.775	6.010	0.129
1118-69	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.072	3.045	14.799	29.914	32.451	17.620	2.099	0.000
1118-70	0.000	0.000	0.000	0.000	0.000	0.000	0.306	0.675	0.632	0.727	5.203	17.363	29.567	29.095	14.995	1.438	0.000
1118-71	0.000	0.000	0.000	0.000	0.000	0.000	0.525	1.262	1.369	1.930	6.877	18.217	28.920	27.291	12.946	0.664	0.000
1118-72	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.184	5.439	19.450	32.471	29.518	12.442	0.494	0.000
1118-73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.041	11.468	25.099	31.497	23.052	6.844	0.000	0.000
1118-74	0.000	0.000	0.000	0.000	0.000	0.232	0.583	1.079	2.991	8.466	17.534	25.169	24.632	15.319	3.996	0.000	0.000
1118-75	0.000	0.000	0.000	0.000	0.000	0.053	0.749	1.792	2.528	3.477	7.237	15.610	24.510	25.340	15.444	3.260	0.000
1118-76	0.000	0.000	0.000	0.000	0.000	0.048	0.700	1.642	2.160	2.905	6.823	15.937	25.728	26.576	15.342	2.139	0.000
1118-77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.571	18.183	31.841	30.412	14.163	0.830	0.000
1118-78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.200	5.024	17.250	29.586	29.863	16.225	1.853	0.000
1118-79	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.058	3.584	14.613	27.197	30.106	19.588	4.853	0.000
1118-80	0.000	0.000	0.000	0.000	0.000	0.213	0.536	0.721	1.702	5.876	14.571	24.043	26.695	19.051	6.530	0.062	0.000
1118-81	0.000	0.000	0.000	0.000	0.000	0.259	1.089	2.127	2.917	4.351	9.047	17.783	25.229	23.428	12.255	1.516	0.000
1118-82	0.000	0.000	0.000	0.000	0.000	0.126	1.170	3.691	7.919	13.065	17.391	19.106	17.411	12.662	6.354	1.104	0.000
1118-83	0.000	0.000	0.000	0.000	0.000	0.306	2.028	6.001	11.695	16.993	19.459	18.130	13.999	8.392	2.974	0.082	0.000
1118-84	0.000	0.000	0.000	0.000	0.000	0.398	2.536	7.587	14.916	21.244	22.458	17.439	9.606	3.413	0.402	0.000	0.000
1118-86	0.000	0.000	0.000	0.000	0.067	0.314	1.150	3.788	9.454	17.443	23.560	22.821	15.101	5.846	0.457	0.000	0.000
1118-87	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.342	6.470	21.088	32.883	27.861	10.950	0.407	0.000
1118-88	0.000	0.000	0.000	0.000	0.000	0.044	0.324	0.406	0.211	1.534	9.625	23.168	31.380	24.695	8.575	0.038	0.000
1118-89	0.000	0.000	0.000	0.000	0.000	0.027	0.305	0.574	0.587	1.396	7.617	20.082	30.062	26.639	12.070	0.641	0.000
1118-90	0.000	0.000	0.000	0.000	0.000	0.058	0.362	0.479	0.370	1.756	9.332	22.144	30.446	24.948	9.820	0.286	0.000
1118-91	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.282	19.355	34.207	30.314	11.480	0.361	0.000
1118-92	0.000	0.000	0.000	0.000	0.000	0.130	0.429	0.572	0.696	3.032	11.291	23.376	29.578	22.620	8.132	0.144	0.000
1118-93	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.279	4.576	17.350	31.175	30.748	14.887	0.985	0.000
1118-94	0.000	0.000	0.000	0.000	0.000	0.000	0.282	0.709	0.791	0.842	3.683	14.730	29.032	31.121	16.720	2.092	0.000
1118-95	0.000	0.000	0.000	0.000	0.000	0.049	0.315	0.470	0.563	2.411	9.488	20.963	28.827	24.821	11.444	0.649	0.000
1118-96	0.000	0.000	0.000	0.000	0.020	0.189	0.201	0.144	1.765	8.306	19.484	27.896	25.482	13.873	2.640	0.000	0.000
1118-97	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.775	10.377	23.304	30.536	24.267	9.460	0.282	0.000
1118-98	0.000	0.000	0.000	0.000	0.000	0.000	0.237	0.388	0.176	0.534	5.721	18.969	31.419	28.838	12.954	0.764	0.000
1118-99	0.000	0.000	0.000	0.000	0.000	0.000	0.251	0.479	0.301	0.369	4.316	16.324	29.727	30.172	15.865	2.195	0.000
1118-100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.642	6.423	18.492	29.249	28.185	15.046	1.961	0.000
1118-101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.378	16.200	31.104	31.722	15.999	1.597	0.000
1118-102	0.000	0.000	0.000	0.000	0.000	0.000	0.242	0.487	0.430	0.695	4.738	16.542	29.453	29.497	15.512	2.404	0.000
1118-103	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.324	15.716	30.126	31.293	16.911	2.630	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
1118-104	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.501	6.053	18.654	30.044	28.591	14.586	1.571	0.000
1118-105	0.000	0.000	0.000	0.000	0.000	0.043	0.355	0.529	0.313	0.656	5.450	18.264	30.873	29.048	13.526	0.944	0.000
1118-106	0.000	0.000	0.000	0.000	0.000	0.128	0.333	0.361	0.698	4.280	13.547	24.676	28.491	20.477	6.944	0.065	0.000
1118-107	0.000	0.000	0.000	0.000	0.000	0.230	1.407	2.981	4.519	7.034	12.673	20.508	24.263	18.716	7.406	0.265	0.000
1118-108	0.000	0.000	0.000	0.000	0.000	0.257	2.294	5.867	9.664	12.790	15.894	18.803	18.378	12.314	3.724	0.015	0.000
1118-109	0.000	0.000	0.000	0.000	0.000	0.110	0.819	1.711	2.805	5.651	12.471	21.734	26.200	20.208	7.993	0.298	0.000
1118-110	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.029	3.635	17.191	31.643	30.509	14.938	2.056	0.000
1118-111	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.264	6.506	22.091	34.052	27.391	9.467	0.230	0.000
1118-112	0.000	0.000	0.000	0.000	0.000	0.045	0.335	0.553	0.604	1.783	7.760	19.214	28.657	26.377	13.302	1.370	0.000
1118-113	0.000	0.000	0.000	0.000	0.000	0.000	0.197	0.398	0.557	1.830	7.900	19.359	28.861	26.556	13.240	1.103	0.000
1118-114	0.000	0.000	0.000	0.000	0.000	0.000	0.216	0.485	0.623	1.698	6.999	17.815	27.901	27.269	14.884	2.109	0.000
1118-115	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.045	2.054	10.348	22.892	30.186	24.382	9.776	0.317
1118-116	0.000	0.000	0.000	0.000	0.000	0.204	0.544	0.472	0.771	4.339	13.467	24.477	28.304	20.386	6.961	0.075	0.000
1118-117	0.000	0.000	0.000	0.000	0.000	0.000	0.134	0.276	0.474	1.494	5.968	15.148	24.975	27.273	18.453	5.689	0.116
1118-118	0.000	0.000	0.000	0.000	0.000	0.026	0.173	0.175	0.128	1.585	8.119	19.478	28.427	26.274	13.771	1.843	0.000
1118-119	0.000	0.000	0.000	0.000	0.000	0.000	0.171	0.416	0.514	0.979	5.040	15.965	27.898	29.206	16.933	2.880	0.000
1118-120	0.000	0.000	0.000	0.000	0.000	0.069	0.462	0.730	0.603	1.051	6.479	18.267	28.782	27.409	14.332	1.816	0.000
1118-121	0.000	0.000	0.000	0.000	0.000	0.000	0.192	0.428	0.332	0.442	4.467	16.101	28.900	30.179	16.844	2.115	0.000
1118-122	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.105	3.262	14.370	28.543	31.416	18.512	3.791	0.000
1118-123	0.000	0.000	0.000	0.000	0.000	0.021	0.340	0.786	0.846	0.716	3.504	13.684	26.714	30.276	19.106	4.008	0.000
1118-124	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.525	14.102	29.246	32.496	18.649	2.982	0.000
1118-125	0.000	0.000	0.000	0.000	0.000	0.000	0.242	0.488	0.368	0.511	4.146	16.188	30.137	30.749	15.644	1.527	0.000
1118-126	0.000	0.000	0.000	0.000	0.000	0.041	0.280	0.470	0.690	1.966	7.799	18.709	27.893	26.385	14.067	1.701	0.000
1118-127	0.000	0.000	0.000	0.000	0.000	0.045	0.447	0.898	0.862	0.881	5.224	17.154	29.271	28.971	15.021	1.225	0.000
1118-128	0.000	0.000	0.000	0.000	0.000	0.000	0.162	0.413	0.490	0.877	5.271	16.537	28.361	29.007	16.306	2.576	0.000
1118-129	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.454	5.027	16.479	28.348	29.418	17.212	3.062	0.000
1118-130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.530	14.328	28.893	32.181	19.101	2.967	0.000
1118-131	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.682	9.948	27.603	35.453	22.130	4.184	0.000
1118-132	0.000	0.000	0.000	0.000	0.000	0.336	1.506	3.817	7.882	14.046	20.537	22.870	18.127	9.186	1.693	0.000	0.000
1118-133	0.000	0.000	0.000	0.000	0.020	0.224	0.389	0.556	1.940	7.339	17.120	25.584	25.407	16.273	5.083	0.064	0.000
1118-134	0.000	0.000	0.000	0.000	0.000	0.000	0.156	0.670	1.041	1.371	3.386	9.764	19.888	26.747	22.960	11.416	2.600
1118-135	0.000	0.000	0.000	0.000	0.000	0.072	0.539	0.962	1.324	3.263	9.399	19.270	26.598	24.203	12.733	1.637	0.000
1118-136	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.603	7.534	23.024	33.903	26.194	8.513	0.229
1118-137	0.000	0.000	0.000	0.000	0.000	0.000	0.180	0.672	1.133	1.362	2.729	9.107	20.432	28.210	23.631	10.717	1.828
1118-138	0.000	0.000	0.000	0.000	0.000	0.000	0.201	0.493	0.621	1.413	6.553	17.745	28.377	27.703	14.902	1.990	0.000
1118-139	0.000	0.000	0.000	0.000	0.000	0.000	0.161	0.311	0.326	1.123	6.480	17.809	28.450	27.887	15.216	2.238	0.000
1118-140	0.000	0.000	0.000	0.000	0.000	0.000	0.151	0.385	0.420	0.626	3.815	13.767	26.093	29.857	19.831	5.055	0.000
1118-141	0.000	0.000	0.000	0.000	0.000	0.000	0.372	0.894	0.807	0.890	4.589	14.621	26.357	28.915	18.261	4.276	0.018
1118-142	0.000	0.000	0.000	0.000	0.000	0.000	0.139	0.374	0.695	1.980	6.892	16.697	26.460	27.136	16.315	3.312	0.000
1118-143	0.000	0.000	0.000	0.000	0.000	0.029	0.352	0.808	1.167	2.437	8.182	19.371	28.638	25.956	12.348	0.711	0.000
1118-144	0.000	0.000	0.000	0.000	0.000	0.000	0.503	1.440	2.171	3.375	7.983	17.610	26.659	25.444	13.295	1.519	0.000
1118-145	0.000	0.000	0.000	0.000	0.000	0.000	0.177	0.487	0.546	0.751	4.099	15.364	29.014	30.499	16.592	2.472	0.000
1118-146	0.000	0.000	0.000	0.000	0.000	0.000	0.190	0.464	0.588	1.162	5.488	17.519	30.189	29.227	14.095	1.076	0.000
1118-147	0.000	0.000	0.000	0.000	0.000	0.057	0.385	0.796	1.450	4.070	11.345	21.826	27.805	22.479	9.390	0.397	0.000
1118-148	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.677	9.243	25.619	34.220	23.884	6.336	0.022	0.000
1118-149	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.061	3.135	14.571	29.051	31.810	18.270	3.102	0.000
1118-150	0.000	0.000	0.000	0.000	0.000	0.092	0.606	0.959	1.144	2.984	9.372	19.764	27.225	24.215	12.227	1.412	0.000
1118-151	0.000	0.000	0.000	0.000	0.000	0.000	0.284	1.075	1.886	4.170	11.741	22.667	27.681	20.486	7.722	0.660	0.000
1118-152	0.000	0.000	0.000	0.000	0.000	0.000	0.168	0.451	0.370	0.140	2.191	11.733	25.460	31.403	21.962	6.098	0.023
1118-153	0.000	0.000	0.000	0.000	0.000	0.088	0.552	0.811	1.019	3.197	10.091	20.551	27.358	23.658	11.641	1.034	0.000
1118-07	0.095	0.216	0.235	0.182	0.168	0.587	2.146	5.509	10.648	16.246	19.657	18.645	13.842	8.087	3.362	0.373	0.000
1118-08	0.000	0.000	0.000	0.000	0.019	0.434	1.484	3.180	5.685	9.601	15.016	19.878	20.678	15.737	7.424	0.864	0.000
1118-19	0.000	0.000	0.000	0.000	0.000	0.087	1.381	5.825	13.773	21.833	24.294	18.812	9.704	3.200	0.860	0.221	0.010
1118-20	0.000	0.000	0.000	0.000	0.000	0.084	0.846	2.487	5.170	9.353	15.235	20.932	22.270	16.601	6.755	0.268	0.000
1118-21	0.000	0.000	0.000	0.000	0.000	0.152	0.705	1.716	3.827	8.134	14.800	21.154	22.766	17.572	8.279	0.894	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
1118-26	0.000	0.000	0.000	0.000	0.000	0.000	0.820	3.203	6.828	10.914	15.197	19.382	20.826	16.021	6.561	0.246	0.000
1118-28	0.000	0.000	0.000	0.000	0.008	0.249	0.539	1.160	3.609	9.924	19.306	25.832	23.339	13.159	2.873	0.000	0.000
1118-63	0.051	0.114	0.126	0.095	0.111	0.500	1.593	3.791	7.244	11.828	16.741	20.003	19.094	13.254	5.232	0.221	0.000
1111-02	0.000	0.000	0.000	0.000	0.000	0.033	0.237	0.275	0.190	1.759	9.518	22.172	30.196	24.892	10.320	0.408	0.000
1111-03	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.849	8.316	21.925	31.341	26.378	10.826	0.364	0.000
1111-04	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.854	7.865	20.911	30.543	26.741	12.370	0.716	0.000
1111-05	0.000	0.000	0.000	0.000	0.000	0.071	0.610	1.128	1.264	2.557	8.401	19.298	28.096	25.432	12.368	0.775	0.000
1111-06	0.000	0.000	0.000	0.000	0.000	0.000	0.381	0.877	1.255	2.520	7.211	16.429	25.535	26.114	15.975	3.694	0.010
1111-07	0.000	0.000	0.000	0.000	0.000	0.085	0.679	2.047	4.939	10.161	17.259	22.977	22.606	14.844	4.403	0.000	0.000
1111-08	0.000	0.000	0.000	0.000	0.000	0.060	0.563	1.400	2.604	5.333	11.525	20.504	26.167	21.821	9.568	0.454	0.000
1111-09	0.000	0.000	0.000	0.000	0.000	0.087	0.632	1.951	4.959	10.383	17.381	22.594	22.009	14.845	5.100	0.059	0.000
1111-10	0.000	0.000	0.000	0.000	0.000	0.239	0.799	1.671	3.789	8.952	17.368	24.591	24.052	14.837	3.704	0.000	0.000
1111-11	0.000	0.000	0.000	0.000	0.011	0.260	0.478	0.988	3.417	9.817	19.308	26.020	23.707	13.335	2.659	0.000	0.000
1111-12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.685	14.228	29.397	32.510	18.378	2.801	0.000
1111-13	0.000	0.000	0.000	0.000	0.000	0.000	0.225	0.503	0.485	0.788	5.389	16.719	28.273	28.711	16.227	2.681	0.000
1111-14	0.000	0.000	0.000	0.000	0.000	0.000	0.154	0.412	0.404	0.457	3.365	13.451	26.316	30.207	19.866	5.340	0.027
1111-15	0.000	0.000	0.000	0.000	0.000	0.035	0.564	1.268	1.455	1.983	6.151	16.031	26.408	27.113	15.896	3.095	0.000
1111-16	0.000	0.000	0.000	0.000	0.000	0.000	0.229	0.478	0.485	0.958	5.616	16.694	28.018	28.484	16.212	2.825	0.000
1111-17	0.000	0.000	0.000	0.000	0.000	0.000	0.206	0.462	0.585	1.205	5.614	15.971	26.961	28.239	17.074	3.683	0.000
1111-18	0.000	0.000	0.000	0.000	0.000	0.095	0.851	2.030	3.104	4.385	7.854	15.043	22.850	23.981	15.480	4.297	0.030
1111-19	0.000	0.000	0.000	0.000	0.000	0.040	0.573	1.310	1.875	3.168	7.775	16.767	25.305	25.184	14.898	3.105	0.000
1111-20	0.000	0.000	0.000	0.000	0.000	0.036	0.347	0.690	0.820	1.477	6.289	17.029	27.654	27.714	15.540	2.405	0.000
1111-21	0.000	0.000	0.000	0.000	0.000	0.032	0.304	0.574	0.636	1.207	6.061	17.190	28.003	27.895	15.600	2.498	0.000
1111-22	0.000	0.000	0.000	0.000	0.000	0.022	0.238	0.376	0.224	0.704	5.969	17.770	28.841	28.285	15.381	2.192	0.000
1111-23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.342	13.663	29.017	32.810	19.089	3.080	0.000
1111-24	0.000	0.000	0.000	0.000	0.000	0.032	0.395	0.899	1.134	1.560	5.812	16.433	27.571	27.991	15.697	2.477	0.000
1111-25	0.000	0.000	0.000	0.000	0.000	0.032	0.570	1.326	1.781	2.858	7.564	17.325	26.548	25.777	14.082	2.136	0.000
1111-26	0.000	0.000	0.000	0.000	0.000	0.020	0.293	0.643	0.745	1.178	5.634	16.574	27.857	28.273	16.020	2.763	0.000
1111-27	0.000	0.000	0.000	0.000	0.000	0.000	0.216	0.447	0.442	0.786	4.141	14.778	27.960	30.264	17.580	3.376	0.011
1111-28	0.000	0.000	0.000	0.000	0.000	0.000	0.261	0.647	0.678	0.642	3.824	14.179	26.750	29.760	18.833	4.407	0.018
1111-29	0.000	0.000	0.000	0.000	0.000	0.000	0.284	0.696	0.913	1.546	6.287	17.141	27.912	27.851	15.307	2.063	0.000
1111-30	0.000	0.000	0.000	0.000	0.000	0.000	0.205	0.538	0.815	2.107	6.694	15.544	24.679	26.377	17.549	5.421	0.070
1111-31	0.000	0.000	0.000	0.000	0.000	0.000	0.149	0.276	0.265	1.108	6.411	17.403	27.945	27.946	15.836	2.661	0.000
1111-32	0.000	0.000	0.000	0.000	0.000	0.000	0.158	0.368	0.345	0.603	4.683	15.533	27.696	29.574	17.675	3.365	0.000
1111-33	0.000	0.000	0.000	0.000	0.000	0.025	0.242	0.386	0.306	1.218	7.279	19.216	29.368	27.301	13.599	1.060	0.000
1111-34	0.000	0.000	0.000	0.000	0.000	0.076	0.562	1.061	1.653	4.113	11.076	21.451	27.675	22.568	9.393	0.373	0.000
1111-35	0.000	0.000	0.000	0.000	0.000	0.088	0.629	1.013	1.132	2.871	9.377	20.130	27.687	24.190	11.555	1.329	0.000
1111-36	0.000	0.000	0.000	0.000	0.000	0.061	0.443	0.798	1.228	3.331	9.590	19.529	26.768	23.987	12.433	1.832	0.000
1111-37	0.000	0.000	0.000	0.000	0.000	0.055	0.372	0.663	1.216	3.712	10.354	20.224	26.959	23.632	11.660	1.154	0.000
1111-38	0.000	0.000	0.000	0.000	0.000	0.032	0.562	1.123	1.268	2.447	8.157	19.177	28.317	25.743	12.418	0.757	0.000
1111-39	0.000	0.000	0.000	0.000	0.000	0.045	0.289	0.301	0.127	1.871	10.192	23.285	30.809	24.232	8.749	0.102	0.000
1111-40	0.000	0.000	0.000	0.000	0.000	0.000	0.228	0.430	0.272	0.653	6.065	18.361	29.745	28.480	14.443	1.324	0.000
1111-41	0.000	0.000	0.000	0.000	0.000	0.075	0.537	0.785	0.775	2.696	10.030	21.824	29.218	23.893	9.789	0.377	0.000
1111-42	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.063	2.858	14.418	29.249	31.839	18.176	3.397	0.000
1111-43	0.000	0.000	0.000	0.000	0.000	0.000	0.199	0.574	0.695	0.757	3.772	13.749	26.262	29.630	19.181	5.149	0.031
1111-44	0.000	0.000	0.000	0.000	0.000	0.000	0.240	0.592	0.683	0.932	4.991	15.728	27.363	28.687	17.150	3.635	0.000
1111-45	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.187	5.336	18.447	30.963	29.743	14.498	0.826	0.000
1111-46	0.000	0.000	0.000	0.000	0.000	0.033	0.373	0.670	0.499	0.976	6.677	19.118	29.902	27.507	13.277	0.967	0.000
1111-47	0.000	0.000	0.000	0.000	0.000	0.073	0.604	0.921	0.656	1.958	8.974	21.533	30.209	25.055	9.775	0.242	0.000
1111-48	0.000	0.000	0.000	0.000	0.000	0.073	0.744	1.549	1.809	2.795	8.161	19.017	28.113	25.338	11.772	0.629	0.000
1111-49	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.320	6.309	19.914	31.420	28.479	12.918	0.642	0.000
1111-50	0.000	0.000	0.000	0.000	0.000	0.067	0.455	0.652	0.797	3.037	10.454	21.866	28.878	23.648	9.771	0.374	0.000
1111-51	0.000	0.000	0.000	0.000	0.000	0.069	0.621	1.294	1.918	4.048	10.550	20.953	27.754	22.987	9.475	0.331	0.000
1111-52	0.000	0.000	0.000	0.000	0.000	0.053	0.592	1.183	1.259	2.287	8.004	19.317	28.687	25.909	12.068	0.641	0.000
1111-53	0.000	0.000	0.000	0.000	0.000	0.042	0.510	0.841	0.789	2.064	8.109	19.326	28.434	25.979	12.887	1.020	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
1111-54	0.000	0.000	0.000	0.000	0.000	0.000	0.268	0.654	0.822	1.217	5.247	15.715	27.270	28.665	16.938	3.204	0.000
1111-55	0.000	0.000	0.000	0.000	0.000	0.056	0.515	0.939	1.031	2.455	8.744	20.195	28.882	25.228	11.373	0.582	0.000
1111-56	0.000	0.000	0.000	0.000	0.000	0.000	0.296	0.552	0.306	0.330	5.627	18.636	30.655	28.987	13.856	0.755	0.000
1111-57	0.000	0.000	0.000	0.000	0.000	0.038	0.346	0.542	0.321	0.711	6.456	19.094	30.140	27.982	13.550	0.822	0.000
1111-58	0.000	0.000	0.000	0.000	0.000	0.020	0.276	0.494	0.372	0.992	7.091	19.708	30.267	27.421	12.683	0.677	0.000
1111-59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.069	3.744	16.419	30.913	31.419	15.871	1.566	0.000
1111-60	0.000	0.000	0.000	0.000	0.000	0.025	0.340	0.632	0.406	0.266	4.695	16.809	29.328	29.591	15.944	1.964	0.000
1111-61	0.000	0.000	0.000	0.000	0.000	0.000	0.275	0.547	0.402	0.684	5.972	18.429	30.091	28.659	14.090	0.851	0.000
1111-62	0.000	0.000	0.000	0.000	0.000	0.032	0.650	1.391	1.473	2.132	7.295	18.560	28.635	26.502	12.623	0.708	0.000
1111-63	0.000	0.000	0.000	0.000	0.000	0.028	0.545	1.125	1.354	2.674	8.508	19.503	28.331	25.343	11.909	0.680	0.000
1111-64	0.000	0.000	0.000	0.000	0.000	0.033	0.603	1.291	1.682	3.224	9.239	20.074	28.218	24.426	10.724	0.487	0.000
1111-65	0.000	0.000	0.000	0.000	0.000	0.034	0.380	0.679	0.493	0.531	5.383	17.662	29.552	28.859	14.934	1.493	0.000
1111-66	0.000	0.000	0.000	0.000	0.000	0.028	0.483	0.930	1.185	2.939	9.418	20.541	28.605	24.633	10.765	0.471	0.000
1111-67	0.000	0.000	0.000	0.000	0.000	0.000	0.256	0.547	0.581	1.301	7.093	19.084	29.561	27.498	13.308	0.771	0.000
1111-68	0.000	0.000	0.000	0.000	0.000	0.021	0.271	0.500	0.447	0.986	6.565	18.913	29.836	27.854	13.659	0.948	0.000
1111-69	0.000	0.000	0.000	0.000	0.000	0.040	0.626	1.155	1.012	1.755	7.327	18.802	28.627	26.436	13.126	1.093	0.000
1111-70	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.096	3.074	13.501	26.797	30.867	20.283	5.361	0.021
1111-71	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.370	16.789	29.565	30.223	16.767	2.286	0.000
1111-72	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.111	2.698	13.259	27.907	32.075	19.677	4.251	0.022
1111-73	0.000	0.000	0.000	0.000	0.000	0.000	0.171	0.452	0.510	0.695	4.318	14.682	27.116	29.961	18.479	3.618	0.000
1111-74	0.000	0.000	0.000	0.000	0.000	0.292	0.761	1.252	3.001	8.443	17.821	25.591	24.478	14.637	3.723	0.000	0.000
1111-75	0.000	0.000	0.000	0.000	0.000	0.271	1.030	2.596	5.988	12.214	19.939	24.212	20.599	11.026	2.126	0.000	0.000
1111-76	0.000	0.000	0.000	0.000	0.000	0.238	1.362	4.116	8.719	14.098	18.072	18.937	16.612	11.749	5.515	0.582	0.000
1111-77	0.000	0.000	0.000	0.000	0.000	0.148	0.668	0.900	1.043	3.472	11.195	22.427	28.578	22.639	8.722	0.208	0.000
1111-78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.671	10.222	23.248	30.649	24.461	9.496	0.253	0.000
1111-79	0.000	0.000	0.000	0.000	0.000	0.041	0.323	0.518	0.533	1.545	8.002	20.216	29.656	26.308	12.184	0.674	0.000
1111-80	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.377	11.650	27.528	33.581	21.402	4.461	0.000
1111-81	0.000	0.000	0.000	0.000	0.000	0.000	0.149	0.257	0.155	0.524	4.594	14.587	25.804	28.608	19.229	6.011	0.082
1111-82	0.000	0.000	0.000	0.000	0.000	0.000	0.188	0.272	0.117	0.617	5.504	16.494	27.370	28.245	17.211	3.980	0.000
1111-83	0.000	0.000	0.000	0.000	0.000	0.000	0.195	0.421	0.383	0.492	3.436	13.034	25.259	29.548	20.528	6.607	0.095
1111-84	0.000	0.000	0.000	0.000	0.000	0.028	0.267	0.400	0.221	0.849	6.746	18.914	29.556	27.922	14.108	0.988	0.000
1111-85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.031	1.802	10.182	22.992	30.321	24.377	9.917	0.378	0.000
1111-86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.028	4.081	17.209	31.202	30.926	15.354	1.200	0.000
1111-87	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.300	5.532	18.248	30.251	29.338	15.082	1.249	0.000
1111-88	0.000	0.000	0.000	0.000	0.000	0.042	0.317	0.440	0.302	1.123	7.528	19.999	29.887	26.907	12.724	0.731	0.000
1111-89	0.000	0.000	0.000	0.000	0.000	0.090	0.639	1.190	1.742	3.890	10.216	20.169	27.071	23.451	10.933	0.608	0.000
1111-90	0.000	0.000	0.000	0.000	0.000	0.000	0.241	0.417	0.203	0.386	5.014	17.106	29.257	29.348	15.926	2.102	0.000
1111-91	0.000	0.000	0.000	0.000	0.000	0.076	0.520	0.849	1.131	3.178	9.695	19.992	27.276	24.181	12.095	1.006	0.000
1111-92	0.000	0.000	0.000	0.000	0.000	0.036	0.245	0.353	0.492	2.438	9.341	20.543	28.435	24.959	12.119	1.039	0.000
1111-93	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.367	5.556	17.646	29.216	29.011	15.906	2.300	0.000	0.000
1111-94	0.000	0.000	0.000	0.000	0.000	0.083	0.548	1.030	1.706	4.036	10.050	19.086	25.630	23.265	12.520	2.046	0.000
1111-95	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.112	2.441	12.000	26.227	31.838	21.240	6.040	0.103
1111-96	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.592	5.779	17.450	28.853	28.873	16.019	2.434	0.000
1111-97	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.090	2.461	10.907	23.142	29.798	23.660	9.563	0.380	0.000
1111-98	0.000	0.000	0.000	0.000	0.000	0.049	0.327	0.462	0.497	2.246	9.540	21.426	29.306	24.722	10.879	0.547	0.000
1111-99	0.000	0.000	0.000	0.000	0.000	0.047	0.262	0.261	0.305	2.918	11.501	23.713	29.832	22.794	8.223	0.144	0.000
1111-100	0.000	0.000	0.000	0.000	0.000	0.027	0.303	0.493	0.305	0.817	6.863	19.634	30.309	27.545	12.960	0.744	0.000
1111-101	0.000	0.000	0.000	0.000	0.000	0.088	0.256	0.209	0.353	3.722	13.085	24.851	29.296	21.133	6.981	0.027	0.000
1111-102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.214	5.090	16.780	28.226	28.709	17.169	3.811	0.000	0.000
1111-103	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.466	4.765	15.110	26.585	29.037	19.013	5.024	0.000	0.000
1111-104	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020	2.422	12.477	26.087	31.227	21.655	6.111	0.000	0.000
1111-105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.289	6.268	19.814	31.246	28.448	13.212	0.724	0.000
1111-106	0.000	0.000	0.000	0.000	0.000	0.049	0.351	0.438	0.229	1.240	8.630	23.080	32.478	25.113	8.305	0.088	0.000
1111-107	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.132	5.256	19.469	32.533	29.385	12.625	0.600	0.000
1111-108	0.000	0.000	0.000	0.000	0.000	0.108	0.646	0.852	0.959	3.610	12.047	23.873	29.293	21.617	6.941	0.055	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
1111-109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.960	9.559	24.769	32.982	24.118	7.555	0.058	0.000
1111-110	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.115	4.625	17.483	30.203	29.335	15.568	2.671	0.000	0.000
1111-111	0.000	0.000	0.000	0.000	0.000	0.056	0.341	0.509	0.914	3.345	9.937	19.645	26.442	23.897	12.838	2.075	0.000
1111-112	0.000	0.000	0.000	0.000	0.000	0.080	0.486	0.648	0.809	3.183	10.647	21.725	28.345	23.363	10.202	0.512	0.000
1111-113	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.365	15.698	30.212	31.493	16.853	2.378	0.000
1111-114	0.000	0.000	0.000	0.000	0.000	0.059	0.425	0.656	0.548	2.000	9.499	22.279	30.425	24.613	9.306	0.190	0.000
1111-115	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.036	4.694	19.498	33.755	29.914	11.675	0.427	0.000
1111-116	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.586	7.976	22.984	33.219	26.191	8.915	0.128	0.000
1111-117	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.330	5.557	19.293	32.122	29.281	12.794	0.622	0.000
1111-118	0.000	0.000	0.000	0.000	0.000	0.033	0.313	0.474	0.271	1.253	7.793	20.429	30.211	26.567	12.018	0.637	0.000
1111-119	0.000	0.000	0.000	0.000	0.000	0.063	0.447	0.697	0.534	1.175	7.304	19.474	29.407	26.788	13.092	1.018	0.000
1111-120	0.000	0.000	0.000	0.000	0.000	0.037	0.647	1.357	1.456	2.140	7.154	18.092	28.073	26.437	13.318	1.290	0.000
1111-121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.488	8.890	27.424	36.486	22.372	4.313	0.028
1111-122	0.000	0.000	0.000	0.000	0.000	0.000	0.279	0.523	0.329	0.640	6.270	19.067	30.460	28.316	13.386	0.732	0.000
1111-123	0.000	0.000	0.000	0.000	0.000	0.000	0.287	0.567	0.430	0.721	5.978	18.322	29.824	28.497	14.310	1.066	0.000
1111-124	0.000	0.000	0.000	0.000	0.000	0.020	0.290	0.519	0.382	1.198	7.557	20.218	30.386	26.989	11.916	0.526	0.000
1111-125	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.432	6.862	21.272	32.662	27.653	10.765	0.354	0.000
1111-126	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.758	6.911	19.175	29.653	27.825	14.203	1.474	0.000
1111-127	0.000	0.000	0.000	0.000	0.000	0.022	0.223	0.319	0.190	1.419	7.799	19.664	29.215	26.716	13.322	1.112	0.000
1111-128	0.000	0.000	0.000	0.000	0.000	0.000	0.251	0.535	0.506	1.221	6.456	17.630	28.132	27.650	15.262	2.356	0.000
1111-129	0.000	0.000	0.000	0.000	0.000	0.000	0.234	0.409	0.339	1.192	7.430	19.584	29.613	27.115	13.246	0.837	0.000
1111-130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.363	15.974	33.924	33.304	13.774	0.661	0.000
1111-131	0.000	0.000	0.000	0.000	0.000	0.036	0.380	0.705	0.675	1.267	7.185	19.630	29.996	27.112	12.397	0.618	0.000
1111-132	0.000	0.000	0.000	0.000	0.000	0.072	0.764	1.586	1.742	2.423	7.422	18.248	27.985	25.993	12.842	0.972	0.000
1111-133	0.000	0.000	0.000	0.000	0.000	0.000	0.286	0.560	0.435	0.838	6.564	19.246	30.302	27.948	13.118	0.703	0.000
1111-134	0.000	0.000	0.000	0.000	0.000	0.058	0.434	0.713	0.584	1.106	6.928	19.166	29.420	27.021	13.304	1.266	0.000
1111-135	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.030	2.490	13.308	28.255	32.351	19.601	3.966	0.000
1111-136	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.335	6.275	19.422	30.758	28.581	13.815	0.814	0.000
1111-137	0.000	0.000	0.000	0.000	0.000	0.092	0.605	0.941	1.215	3.534	10.854	21.841	28.255	22.814	9.450	0.398	0.000
1111-138	0.000	0.000	0.000	0.000	0.000	0.037	0.340	0.570	0.507	1.487	7.976	20.251	29.755	26.348	12.084	0.645	0.000
1111-139	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.839	7.564	20.724	30.996	27.402	11.982	0.492	0.000
1111-140	0.000	0.000	0.000	0.000	0.000	0.025	0.270	0.430	0.242	0.682	6.218	18.480	29.742	28.551	14.451	0.909	0.000
1111-141	0.000	0.000	0.000	0.000	0.000	0.000	0.239	0.464	0.311	0.349	4.477	15.709	27.985	29.661	17.602	3.203	0.000
1111-142	0.000	0.000	0.000	0.000	0.000	0.047	0.236	0.262	0.504	3.226	10.994	21.782	28.001	23.441	10.876	0.631	0.000
1111-143	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.345	5.776	18.456	30.189	29.120	14.952	1.161	0.000
1111-144	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.773	7.292	19.894	30.076	27.499	13.479	0.987	0.000
1111-145	0.000	0.000	0.000	0.000	0.000	0.048	0.364	0.608	0.665	1.752	7.919	19.622	29.114	26.457	12.708	0.743	0.000
1111-146	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.381	6.639	20.125	31.274	28.283	12.722	0.575	0.000
1111-147	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.455	15.427	29.103	31.398	18.182	2.435	0.000
1111-148	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.068	4.792	17.573	30.331	30.313	15.882	1.041	0.000
1111-149	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	4.924	18.612	32.028	30.069	13.555	0.675	0.000
1111-150	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.241	6.256	19.918	31.480	28.728	12.845	0.531	0.000
1111-151	0.000	0.000	0.000	0.000	0.000	0.026	0.342	0.391	0.474	2.802	10.264	21.679	29.129	24.498	10.104	0.290	0.000
1104-02	0.000	0.000	0.000	0.000	0.000	0.000	0.191	0.437	0.585	1.744	7.820	19.480	29.331	27.038	12.746	0.629	0.000
1104-03	0.000	0.000	0.000	0.000	0.000	0.129	0.801	1.721	2.553	4.296	9.394	18.384	25.929	23.982	12.071	0.741	0.000
1104-04	0.000	0.000	0.000	0.000	0.000	0.035	0.533	1.162	1.488	2.696	7.909	18.199	27.477	26.150	13.469	0.882	0.000
1104-05	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.507	1.193	2.272	5.340	12.802	23.206	28.056	20.274	6.279	0.061
1104-06	0.000	0.000	0.000	0.000	0.000	0.000	0.990	5.571	12.368	16.422	14.235	9.643	9.444	12.819	12.097	5.676	0.735
1104-07	0.000	0.000	0.000	0.000	0.000	0.000	0.006	1.022	2.832	3.915	4.347	8.224	18.294	27.076	23.307	9.915	1.063
1104-08	0.000	0.000	0.000	0.000	0.000	0.000	0.103	1.656	4.342	5.906	5.229	6.215	13.763	23.411	23.491	12.792	3.091
1104-09	0.000	0.000	0.000	0.000	0.000	0.000	0.215	2.321	5.886	8.214	7.612	7.738	13.608	21.380	20.545	10.416	2.064
1104-10	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.454	3.632	9.995	17.289	22.040	22.063	16.571	7.504	0.452	0.000
1104-11	0.000	0.000	0.000	0.000	0.000	0.000	0.058	0.642	1.873	4.479	9.677	17.844	25.256	24.572	13.745	1.853	0.000
1104-12	0.000	0.000	0.000	0.000	0.000	0.000	0.089	0.798	1.658	2.424	5.013	12.773	23.933	28.362	19.420	5.492	0.038
1104-13	0.000	0.000	0.000	0.000	0.000	0.000	0.175	1.737	4.085	5.598	6.529	10.701	19.586	25.415	19.427	6.648	0.099

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
1104-14	0.000	0.000	0.000	0.000	0.000	0.000	0.151	1.613	3.526	4.021	3.342	6.179	15.856	25.607	24.183	12.580	2.942
1104-15	0.000	0.000	0.000	0.000	0.000	0.000	0.248	1.676	3.583	5.393	8.492	15.404	23.722	24.727	14.555	2.200	0.000
1104-16	0.000	0.000	0.000	0.000	0.000	0.000	0.149	0.980	2.172	3.953	8.024	16.105	24.805	25.535	15.304	2.974	0.000
1104-17	0.000	0.000	0.000	0.000	0.000	0.000	0.241	0.903	1.734	3.653	9.025	18.594	26.799	24.975	12.817	1.260	0.000
1104-18	0.000	0.000	0.000	0.000	0.000	0.023	0.264	0.468	1.326	4.842	12.845	23.049	27.841	21.375	7.851	0.117	0.000
1104-19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.057	1.568	6.952	16.157	24.429	25.581	18.147	6.896	0.214	0.000
1104-20	0.000	0.000	0.000	0.000	0.000	0.133	0.446	0.553	1.511	6.175	16.125	26.429	27.604	17.142	3.883	0.000	0.000
1104-21	0.000	0.000	0.000	0.000	0.000	0.000	0.404	1.493	2.518	3.606	7.390	16.355	25.984	25.999	14.276	1.975	0.000
1104-22	0.000	0.000	0.000	0.000	0.000	0.000	0.117	1.827	6.363	12.782	18.066	20.103	18.870	14.286	6.949	0.637	0.000
1104-23	0.000	0.000	0.000	0.000	0.000	0.000	0.476	2.409	5.236	7.562	9.351	12.943	18.697	21.219	15.644	5.955	0.508
1104-24	0.000	0.000	0.000	0.000	0.000	0.000	0.330	1.433	2.271	2.648	5.258	13.709	24.932	28.007	17.709	3.703	0.000
1104-25	0.000	0.000	0.000	0.000	0.000	0.000	0.159	0.580	0.831	1.167	4.940	15.232	27.143	29.104	17.494	3.348	0.000
1104-26	0.000	0.000	0.000	0.000	0.000	0.000	0.203	2.339	8.002	16.244	22.530	22.573	16.721	8.869	2.467	0.052	0.000
1104-27	0.000	0.000	0.000	0.000	0.000	0.028	0.645	1.938	3.736	6.665	12.329	20.344	25.106	20.373	8.503	0.332	0.000
1104-28	0.000	0.000	0.000	0.000	0.000	0.000	0.214	0.713	0.956	0.857	2.244	10.775	25.097	31.573	21.502	6.010	0.059
1104-29	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.044	2.152	11.151	24.193	30.747	23.147	8.217	0.348
1104-30	0.000	0.000	0.000	0.000	0.000	0.000	0.198	1.242	2.425	3.328	5.486	12.017	21.891	26.634	19.615	6.868	0.296
1104-31	0.000	0.000	0.000	0.000	0.000	0.000	0.386	1.241	2.328	4.083	8.253	15.949	23.669	24.264	15.477	4.319	0.030
1104-32	0.000	0.000	0.000	0.000	0.000	0.091	0.169	0.130	1.006	5.551	15.025	25.035	27.445	19.142	6.362	0.044	0.000
1104-33	0.000	0.000	0.000	0.000	0.000	0.000	0.206	0.784	1.245	1.285	1.933	7.692	20.735	30.510	24.873	9.746	0.991
1104-34	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.031	4.070	18.506	33.030	29.313	12.772	2.277
1104-35	0.000	0.000	0.000	0.000	0.000	0.000	0.057	0.346	0.506	0.472	1.681	9.061	21.857	29.939	24.329	10.357	1.394
1104-36	0.000	0.000	0.000	0.000	0.000	0.000	0.215	0.596	0.683	0.807	4.166	13.693	25.338	28.771	19.521	6.125	0.084
1104-37	0.000	0.000	0.000	0.000	0.000	0.000	0.096	0.410	0.446	0.430	2.662	12.078	25.074	30.390	21.491	6.835	0.089
1104-38	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.087	3.941	16.082	29.610	30.453	16.849	2.979	0.000
1104-39	0.000	0.000	0.000	0.000	0.000	0.072	0.420	0.495	0.620	3.151	10.954	22.219	28.568	23.161	9.883	0.458	0.000
1104-40	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.369	5.405	16.541	27.511	28.374	17.599	4.201	0.000	0.000
1104-41	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.772	9.455	21.632	29.592	25.197	11.658	0.693	0.000
1104-42	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.049	2.803	13.336	27.075	31.116	20.320	5.300	0.000	0.000
1104-43	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.052	1.925	10.143	22.653	29.933	24.386	10.416	0.492	0.000
1104-44	0.000	0.000	0.000	0.000	0.000	0.000	0.196	0.392	0.526	2.014	8.279	19.373	28.064	25.722	13.483	1.951	0.000
1104-45	0.000	0.000	0.000	0.000	0.000	0.000	0.039	0.273	0.403	0.337	1.283	7.884	21.384	30.976	25.292	10.551	1.577
1104-46	0.000	0.000	0.000	0.000	0.000	0.000	0.177	0.381	0.243	0.349	3.930	15.319	28.692	30.315	17.301	3.292	0.000
1104-47	0.000	0.000	0.000	0.000	0.000	0.000	0.360	0.556	0.442	1.958	8.563	20.141	28.882	25.785	12.526	0.788	0.000
1104-48	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.033	2.170	10.453	22.319	28.874	23.649	11.172	1.330	0.000	0.000
1104-49	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.021	1.580	8.489	19.746	27.813	25.270	14.073	3.009	0.000	0.000
1104-50	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.142	3.196	13.462	26.766	30.577	19.897	5.875	0.085
1104-51	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.407	15.066	35.354	33.863	12.944	1.366
1104-52	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.024	4.337	20.936	36.117	28.417	9.332	0.836	
1104-53	0.000	0.000	0.000	0.000	0.000	0.000	0.061	0.321	0.374	0.227	1.294	8.375	22.358	31.654	24.941	9.478	0.918
1104-54	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.868	9.229	24.496	33.139	24.341	7.810	0.117
1104-55	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	3.019	18.037	34.235	30.061	12.516	2.113	
1104-56	0.000	0.000	0.000	0.000	0.000	0.020	0.396	0.692	0.817	2.315	8.057	18.214	26.651	25.417	14.485	2.930	0.006
1104-57	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.270	3.707	13.042	24.713	29.149	21.314	7.638	0.166	0.000
1104-58	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.277	3.180	10.868	21.245	27.115	23.062	12.073	2.181	0.000	0.000
1104-59	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.039	1.937	9.355	20.595	27.935	24.597	13.142	2.400	0.000	0.000
1104-60	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.159	2.207	8.479	18.400	26.121	25.090	15.445	4.098	0.000	0.000
1104-61	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.951	5.902	15.979	26.088	27.701	18.322	5.036	0.000	0.000
1104-62	0.000	0.000	0.000	0.000	0.000	0.030	0.184	0.231	0.443	3.106	11.378	23.251	29.546	23.058	8.604	0.168	0.000
1104-63	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.032	1.654	9.839	22.810	30.684	24.879	9.816	0.287	0.000
1104-64	0.000	0.000	0.000	0.000	0.000	0.000	0.156	0.466	0.527	0.750	4.750	15.479	27.460	29.315	17.692	3.405	0.000
1104-65	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.057	3.665	14.458	26.904	29.882	19.507	5.483	0.044	
1104-66	0.000	0.000	0.000	0.000	0.000	0.000	0.159	0.404	0.650	1.913	7.426	18.012	27.473	26.678	14.891	2.395	0.000
1104-67	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	1.073	6.895	18.036	27.824	27.174	15.821	3.167	0.000	0.000
1104-68	0.000	0.000	0.000	0.000	0.000	0.026	0.187	0.241	0.317	2.454	9.980	21.612	29.136	24.667	10.882	0.497	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
1104-69	0.000	0.000	0.000	0.000	0.000	0.078	0.190	0.129	0.387	3.795	13.086	24.387	28.505	21.003	8.126	0.314	0.000
1104-70	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.086	4.003	14.976	26.952	29.302	19.220	5.454	0.007	0.000
1104-71	0.000	0.000	0.000	0.000	0.000	0.000	0.169	0.387	0.310	0.570	5.112	16.523	28.265	28.940	16.674	3.050	0.000
1104-72	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.381	4.647	15.018	26.420	28.945	19.057	5.484	0.048
1104-73	0.000	0.000	0.000	0.000	0.000	0.000	0.398	0.741	0.769	2.207	8.501	19.873	28.746	25.784	12.277	0.704	0.000
1104-74	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.115	3.360	13.617	26.127	30.005	20.650	6.117	0.008	0.000
1104-75	0.000	0.000	0.000	0.000	0.000	0.144	0.667	1.289	2.311	5.398	12.358	21.388	25.906	20.762	9.207	0.570	0.000
1104-76	0.000	0.000	0.000	0.000	0.000	0.089	0.247	0.174	0.235	3.449	12.991	24.891	29.262	21.183	7.365	0.113	0.000
1104-77	0.000	0.000	0.000	0.000	0.000	0.041	0.276	0.287	0.143	2.403	11.105	24.009	30.626	23.237	7.857	0.016	0.000
1104-78	0.000	0.000	0.000	0.000	0.000	0.046	0.262	0.284	0.361	3.189	12.313	24.621	29.964	21.969	6.976	0.015	0.000
1104-79	0.000	0.000	0.000	0.000	0.000	0.095	0.310	0.244	0.114	2.732	12.219	25.087	30.429	21.954	6.791	0.024	0.000
1104-81	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.278	0.469	0.302	0.737	6.698	19.322	29.430	26.403	13.297	3.065
1104-82	0.000	0.000	0.000	0.000	0.000	0.000	0.041	0.257	0.321	0.179	1.250	8.611	22.638	31.283	24.280	9.706	1.435
1104-83	0.000	0.000	0.000	0.000	0.000	0.000	0.135	0.432	0.582	0.921	4.654	15.365	27.496	29.410	17.648	3.357	0.000
1104-84	0.000	0.000	0.000	0.000	0.000	0.000	0.206	0.450	0.571	1.563	7.572	19.242	29.026	26.861	13.472	1.039	0.000
1104-85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.295	6.202	20.432	32.238	28.227	12.042	0.564	0.000
1104-86	0.000	0.000	0.000	0.000	0.000	0.000	0.325	0.744	0.582	0.876	5.262	15.964	27.297	28.452	17.020	3.478	0.000
1104-87	0.000	0.000	0.000	0.000	0.000	0.021	0.456	0.694	0.575	2.157	9.144	21.164	29.490	25.004	10.808	0.486	0.000
1104-88	0.000	0.000	0.000	0.000	0.000	0.000	0.114	0.564	0.972	1.836	5.170	12.992	22.923	27.094	20.137	7.630	0.568
1104-89	0.000	0.000	0.000	0.000	0.000	0.000	0.326	1.124	1.601	1.980	5.143	14.112	25.208	28.025	18.071	4.410	0.000
1104-90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.026	0.834	4.657	12.751	22.103	26.380	21.612	10.554	1.083	0.000
1104-91	0.000	0.000	0.000	0.000	0.000	0.000	0.111	0.777	1.640	2.836	6.146	13.837	23.538	26.757	18.489	5.795	0.073
1104-92	0.000	0.000	0.000	0.000	0.000	0.000	0.041	0.384	0.830	1.137	2.251	8.600	20.553	29.152	24.600	10.872	1.579
1104-93	0.000	0.000	0.000	0.000	0.000	0.000	0.072	0.487	0.782	0.697	1.628	9.050	22.648	31.171	24.382	8.843	0.239
1104-94	0.000	0.000	0.000	0.000	0.000	0.000	0.142	0.445	0.464	0.475	2.740	12.682	27.302	32.013	19.750	3.987	0.000
1104-95	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.277	3.735	13.417	25.465	29.771	21.045	6.290	0.000	0.000
1104-96	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.730	2.805	5.834	8.655	11.496	15.977	20.465	19.269	11.332	3.429
1104-97	0.000	0.000	0.000	0.000	0.000	0.039	0.236	0.326	0.752	3.931	12.557	23.779	28.634	21.539	8.006	0.200	0.000
1104-98	0.000	0.000	0.000	0.000	0.000	0.027	0.126	0.587	2.782	8.187	16.162	22.835	23.568	17.281	7.717	0.727	0.000
1104-99	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.079	3.851	14.607	26.745	28.876	18.814	6.577	0.450	0.000	0.000
1104-100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.093	3.573	12.452	23.135	27.370	21.313	10.263	1.801	0.000	0.000
1104-101	0.000	0.000	0.000	0.000	0.000	0.000	0.135	1.111	3.572	7.867	13.297	18.324	20.927	18.970	12.011	3.667	0.119
1104-102	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.375	0.768	0.649	0.698	5.549	17.820	28.920	27.215	14.412	3.588
1104-103	0.000	0.000	0.000	0.000	0.000	0.000	0.009	1.353	6.738	14.939	21.219	21.782	17.502	11.208	4.826	0.424	0.000
1104-104	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.075	3.793	14.618	27.034	29.230	18.730	6.177	0.343	0.000	0.000
1104-105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.075	3.160	11.728	22.741	27.797	22.121	10.679	1.698	0.000	0.000
1104-106	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.488	5.446	15.646	25.362	26.516	18.152	7.470	0.920	0.000	0.000
1104-107	0.000	0.000	0.000	0.000	0.000	0.000	0.258	1.737	4.762	8.205	10.478	12.204	15.468	18.670	16.650	9.116	2.451
1104-108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.528	8.996	20.987	28.900	25.059	12.721	1.810	0.000	0.000
1104-109	0.000	0.000	0.000	0.000	0.000	0.000	0.058	0.346	0.689	1.295	4.750	14.643	26.534	29.287	18.401	3.998	0.000
1104-110	0.000	0.000	0.000	0.000	0.000	0.000	0.045	0.263	0.331	0.170	1.033	7.521	20.030	29.437	25.835	12.637	2.698
1104-111	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.443	10.120	24.498	32.010	23.397	8.013	0.519
1104-112	0.000	0.000	0.000	0.000	0.000	0.000	0.065	0.845	2.227	4.024	6.913	12.734	20.862	24.956	19.122	7.570	0.683
1104-113	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.046	1.531	7.117	16.405	24.293	24.925	17.740	7.525	0.419	0.000
1104-114	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025	1.497	7.725	17.833	25.705	25.063	16.332	5.671	0.149	0.000
1104-114a	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.424	10.349	24.742	31.399	22.710	8.588	0.787	0.000	0.000
1104-114b	0.000	0.000	0.000	0.000	0.000	0.000	0.049	0.690	1.549	2.516	5.023	11.777	21.853	27.209	20.809	7.942	0.584
1104-114c	0.000	0.000	0.000	0.000	0.000	0.000	0.277	1.097	2.288	4.288	8.572	16.155	23.883	24.596	15.362	3.470	0.012
1104-114d	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.907	7.705	19.599	28.387	25.956	14.408	3.037	0.000	0.000
1104-114e	0.000	0.000	0.000	0.000	0.014	0.100	0.082	0.444	3.290	10.434	20.031	25.825	22.905	13.322	3.529	0.024	0.000
1104-114f	0.000	0.000	0.000	0.000	0.000	0.000	0.114	0.720	1.832	3.929	8.091	15.138	22.806	24.797	17.122	5.387	0.063
1104-114g	0.000	0.000	0.000	0.000	0.000	0.000	0.155	1.220	4.127	9.470	16.103	21.260	21.962	16.887	8.066	0.750	0.000
1104-114h	0.000	0.000	0.000	0.000	0.000	0.000	0.088	0.606	2.174	5.766	11.765	18.914	23.566	21.442	12.578	3.096	0.006
1104-114i	0.000	0.000	0.000	0.000	0.000	0.000	0.280	0.818	1.882	4.552	10.373	18.978	25.533	23.437	12.509	1.637	0.000
1104-115	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.521	5.427	16.182	27.001	28.257	18.000	4.612	0.000	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
1104-116	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.342	0.393	1.288	6.271	16.932	27.613	28.232	16.310	2.470	0.000
1104-117	0.000	0.000	0.000	0.000	0.000	0.000	0.150	0.381	0.540	1.447	6.851	18.285	28.920	27.884	14.395	1.147	0.000
1104-118	0.000	0.000	0.000	0.000	0.000	0.000	0.127	0.384	0.553	1.133	5.292	15.207	26.146	28.287	18.202	4.669	0.000
1104-119	0.000	0.000	0.000	0.000	0.000	0.000	0.213	0.548	0.793	1.879	7.636	18.927	28.497	26.520	13.566	1.419	0.000
1104-120	0.000	0.000	0.000	0.000	0.000	0.000	0.337	0.807	0.754	1.240	5.891	16.826	28.083	28.493	15.723	1.847	0.000
1104-121	0.000	0.000	0.000	0.000	0.000	0.000	0.447	1.431	2.429	3.647	7.167	14.981	23.872	25.513	16.388	4.125	0.000
1104-122	0.000	0.000	0.000	0.000	0.000	0.000	0.181	1.211	2.041	1.725	1.992	7.616	19.561	28.631	24.389	10.912	1.741
1104-123	0.000	0.000	0.000	0.000	0.000	0.000	0.276	0.855	1.378	1.859	4.948	13.906	25.080	28.290	18.650	4.759	0.000
1104-124	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.612	1.272	1.946	3.716	10.123	20.839	27.776	22.706	9.696	1.215
1104-125	0.000	0.000	0.000	0.000	0.000	0.021	0.290	0.709	1.126	2.749	8.953	19.988	28.443	25.225	11.835	0.662	0.000
1104-126	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.046	1.827	9.057	20.619	28.511	25.120	12.973	1.846	0.000	0.000
1104-127	0.000	0.000	0.000	0.000	0.000	0.021	0.291	0.727	2.140	6.153	13.754	22.458	26.030	20.054	8.076	0.285	0.000
1104-128	0.000	0.000	0.000	0.000	0.000	0.000	0.301	0.885	2.007	4.868	11.186	20.269	26.379	22.794	10.716	0.595	0.000
1104-129	0.000	0.000	0.000	0.000	0.000	0.021	0.279	0.673	2.093	6.254	14.035	22.643	25.900	19.876	7.973	0.254	0.000
1104-130	0.000	0.000	0.000	0.000	0.000	0.065	0.337	0.675	1.992	6.175	14.142	22.759	25.653	19.502	8.290	0.411	0.000
1104-131	0.000	0.000	0.000	0.000	0.000	0.000	0.222	0.931	1.735	3.319	8.091	17.481	26.592	26.048	14.054	1.527	0.000
1104-132	0.000	0.000	0.000	0.000	0.000	0.000	0.153	1.148	2.400	3.295	5.094	11.039	20.993	26.990	20.985	7.636	0.266
1104-133	0.000	0.000	0.000	0.000	0.000	0.000	0.762	6.204	15.660	23.234	22.833	15.711	8.481	4.478	2.238	0.400	0.000
1104-134	0.000	0.000	0.000	0.000	0.000	0.000	0.005	1.770	11.586	26.540	32.239	21.377	6.345	0.137	0.000	0.000	0.000
1104-135	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.194	2.259	8.470	18.125	25.644	24.958	15.901	4.448	0.000	0.000
1104-136	0.000	0.000	0.000	0.000	0.000	0.000	0.106	0.822	2.284	4.772	9.053	15.895	23.144	24.432	15.857	3.635	0.000
1113-2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.860	8.855	23.966	33.292	25.307	7.698	0.023	0.000
1113-3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.800	7.657	20.716	30.823	27.297	12.163	0.545	0.000
1113-4	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.816	10.358	23.642	31.161	24.412	8.560	0.021	0.000
1113-6	0.000	0.000	0.000	0.000	0.000	0.000	0.051	0.399	0.657	0.868	2.991	10.075	21.290	28.608	24.026	10.535	0.500
1113-7	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.809	7.144	19.445	29.629	27.709	14.188	1.077	0.000
1113-8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.901	11.281	23.951	29.795	23.160	9.517	0.395	0.000
1113-9	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.137	5.029	16.934	28.409	28.936	17.155	3.402	0.000
1113-10	0.000	0.000	0.000	0.000	0.000	0.000	0.544	2.177	4.359	6.599	9.968	16.068	22.463	22.345	13.168	2.309	0.000
1113-11	0.000	0.000	0.000	0.000	0.000	0.158	0.295	0.835	3.428	9.807	18.749	24.853	23.105	14.405	4.313	0.053	0.000
1113-12	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.214	15.920	30.510	31.091	16.600	2.666	0.000	0.000
1113-13	0.000	0.000	0.000	0.000	0.000	0.000	0.257	0.609	0.830	1.957	6.591	16.040	25.873	27.266	16.970	3.605	0.000
1113-14	0.000	0.000	0.000	0.000	0.000	0.000	0.233	1.336	2.927	3.988	4.886	8.976	18.371	26.496	22.745	9.343	0.700
1113-15	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.021	1.534	10.025	23.750	31.572	24.620	8.479	0.000
1113-16	0.000	0.000	0.000	0.000	0.000	0.000	0.412	1.375	2.557	4.292	8.409	16.289	24.413	24.844	14.770	2.640	0.000
1113-17	0.000	0.000	0.000	0.000	0.000	0.000	0.540	2.094	5.046	9.727	15.953	21.690	22.753	16.422	5.756	0.019	0.000
1113-18	0.000	0.000	0.000	0.000	0.000	0.000	0.149	1.236	2.492	3.042	4.569	11.354	22.869	28.631	20.193	5.456	0.010
1113-19	0.000	0.000	0.000	0.000	0.000	0.000	0.199	0.814	1.357	1.425	2.186	8.635	21.021	29.451	24.041	9.861	1.010
1113-20	0.000	0.000	0.000	0.000	0.000	0.000	0.275	0.621	1.068	2.708	7.563	16.137	24.425	25.516	16.832	4.823	0.031
1113-21	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.289	4.238	14.408	25.934	29.063	20.057	5.997	0.013	0.000
1113-22	0.000	0.000	0.000	0.000	0.000	0.000	0.165	0.324	0.322	1.085	6.528	17.854	28.454	27.966	15.251	2.051	0.000
1113-23	0.000	0.000	0.000	0.000	0.000	0.025	0.138	0.168	0.386	2.428	8.678	18.574	26.599	25.723	14.829	2.453	0.000
1113-24	0.000	0.000	0.000	0.000	0.000	0.043	0.280	0.335	0.323	2.515	10.778	23.071	29.839	23.585	9.018	0.211	0.000
1113-25	0.000	0.000	0.000	0.000	0.000	0.000	0.207	0.448	0.430	0.884	5.605	16.674	28.040	28.834	16.489	2.389	0.000
1113-26	0.000	0.000	0.000	0.000	0.000	0.000	0.233	0.645	0.845	1.283	5.512	16.248	27.930	29.043	16.337	1.925	0.000
1113-27	0.000	0.000	0.000	0.000	0.000	0.000	0.351	1.296	1.801	1.826	4.284	12.944	24.940	29.105	19.142	4.311	0.000
1113-28	0.000	0.000	0.000	0.000	0.000	0.027	0.383	0.988	1.399	1.594	4.097	12.666	24.566	29.172	19.942	5.166	0.000
1113-29	0.000	0.000	0.000	0.000	0.000	0.000	0.183	0.528	0.732	1.025	4.245	13.719	25.721	29.502	19.515	4.829	0.000
1113-30	0.000	0.000	0.000	0.000	0.000	0.000	0.233	0.635	1.007	1.601	4.695	13.162	24.177	28.364	19.918	6.143	0.066
1113-31	0.000	0.000	0.000	0.000	0.000	0.126	0.370	0.416	1.240	5.236	13.764	23.359	26.766	20.231	8.173	0.319	0.000
1113-32	0.000	0.000	0.000	0.000	0.000	0.000	0.461	1.359	2.237	3.456	7.106	15.001	23.965	25.824	16.657	3.922	0.012
1113-33	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.025	1.032	7.343	19.338	29.300	27.436	14.128	1.399	0.000
1113-34	0.000	0.000	0.000	0.000	0.000	0.000	0.058	0.241	0.245	0.343	2.364	10.962	24.188	31.133	23.074	7.314	0.077
1113-35	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.676	5.798	16.421	26.632	27.580	17.857	5.035	0.000
1113-36	0.000	0.000	0.000	0.000	0.000	0.058	0.303	0.383	0.910	3.868	11.148	21.021	27.087	23.321	11.231	0.670	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
1113-37	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.142	2.297	9.601	20.649	28.216	25.156	12.697	1.242	0.000
1113-38	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.064	2.190	10.545	22.970	30.102	24.292	9.592	0.246	0.000
1113-39	0.000	0.000	0.000	0.000	0.000	0.032	0.241	0.284	0.180	1.682	9.311	21.941	30.176	25.180	10.564	0.408	0.000
1113-40	0.000	0.000	0.000	0.000	0.000	0.000	0.061	0.388	0.697	0.899	2.301	9.562	22.538	30.895	24.176	8.362	0.121
1113-41	0.000	0.000	0.000	0.000	0.000	0.000	0.347	1.313	2.039	2.318	4.514	12.122	23.303	28.294	20.023	5.701	0.026
1113-42	0.000	0.000	0.000	0.000	0.000	0.000	0.067	0.298	0.293	0.182	1.647	10.056	24.016	31.797	23.885	7.674	0.085
1113-43	0.000	0.000	0.000	0.000	0.000	0.000	0.142	0.347	0.368	0.601	3.677	13.112	25.112	29.427	20.559	6.567	0.089
1113-44	0.000	0.000	0.000	0.000	0.000	0.034	0.624	1.711	2.588	3.509	6.833	14.721	23.961	25.965	16.538	3.517	0.000
1113-45	0.000	0.000	0.000	0.000	0.000	0.000	0.089	0.352	0.328	0.348	2.777	12.720	26.296	31.326	20.901	4.854	0.010
1113-46	0.000	0.000	0.000	0.000	0.000	0.000	0.218	0.761	1.264	2.506	6.843	15.807	25.476	27.075	16.813	3.236	0.000
1113-47	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.301	0.708	1.146	2.309	8.052	19.670	29.171	25.685	11.503	1.450
1113-48	0.000	0.000	0.000	0.000	0.000	0.024	0.358	1.195	2.316	3.879	7.119	13.566	21.730	25.230	18.497	6.019	0.066
1113-49	0.000	0.000	0.000	0.000	0.000	0.000	0.380	1.372	2.360	3.455	6.731	14.485	23.958	26.397	17.072	3.789	0.000
1113-50	0.000	0.000	0.000	0.000	0.000	0.000	0.306	0.785	0.970	1.700	5.883	15.534	26.236	28.110	17.253	3.222	0.000
1113-51	0.000	0.000	0.000	0.000	0.000	0.000	0.135	1.232	3.848	7.779	12.068	16.355	20.232	20.504	13.844	3.981	0.022
1113-52	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.322	4.857	16.486	28.756	30.030	17.214	2.335	0.000	0.000
1113-53	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.072	3.959	16.071	29.545	31.226	17.371	1.757	0.000
1113-54	0.000	0.000	0.000	0.000	0.000	0.000	0.256	0.646	0.899	2.112	7.106	17.166	27.147	27.470	15.429	1.768	0.000
1113-55	0.000	0.000	0.000	0.000	0.000	0.000	0.278	0.767	1.452	3.454	9.033	18.568	26.714	25.245	13.223	1.267	0.000
1113-56	0.000	0.000	0.000	0.000	0.000	0.000	0.326	0.857	1.627	3.814	9.535	18.827	26.420	24.690	12.859	1.046	0.000
1113-57	0.000	0.000	0.000	0.000	0.000	0.000	0.276	0.725	1.278	3.132	8.758	18.649	27.226	25.785	13.316	0.857	0.000
1113-58	0.000	0.000	0.000	0.000	0.000	0.000	0.309	0.750	1.332	3.386	9.319	19.184	27.089	24.965	12.724	0.943	0.000
1113-59	0.000	0.000	0.000	0.000	0.000	0.000	0.093	0.424	0.520	0.573	3.509	13.636	26.794	30.883	19.724	3.845	0.000
1113-60	0.000	0.000	0.000	0.000	0.000	0.022	0.205	0.307	0.297	1.605	8.358	20.358	29.474	26.281	12.396	0.696	0.000
1113-61	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.234	5.672	18.518	30.464	29.441	14.785	0.885	0.000
1113-62	0.000	0.000	0.000	0.000	0.000	0.037	0.319	0.471	0.327	0.963	6.930	19.536	30.120	27.662	12.977	0.658	0.000
1113-63	0.000	0.000	0.000	0.000	0.000	0.000	0.332	1.106	1.694	2.478	6.156	15.200	25.665	27.515	16.765	3.088	0.000
1113-64	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.779	14.179	28.201	31.738	19.564	3.539	0.000
1113-65	0.000	0.000	0.000	0.000	0.000	0.127	0.691	1.213	1.507	3.216	9.250	19.380	26.990	24.332	12.244	1.050	0.000
1113-66	0.000	0.000	0.000	0.000	0.000	0.000	0.336	1.420	2.576	3.873	7.390	15.296	24.326	25.740	15.884	3.158	0.000
1113-67	0.000	0.000	0.000	0.000	0.000	0.000	0.348	1.514	2.799	3.982	6.790	13.782	22.947	25.935	17.466	4.436	0.000
1113-68	0.000	0.000	0.000	0.000	0.000	0.000	0.128	0.328	0.211	0.185	3.101	13.913	27.536	31.382	19.636	3.579	0.000
1113-69	0.000	0.000	0.000	0.000	0.000	0.000	0.296	1.200	1.845	2.132	4.560	12.608	23.985	28.522	19.636	5.216	0.000
1113-70	0.000	0.000	0.000	0.000	0.000	0.000	0.146	0.432	0.513	0.709	3.890	14.309	27.132	30.418	18.929	3.522	0.000
1113-71	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.024	4.501	20.081	34.458	29.198	10.834	0.903
1113-72	0.000	0.000	0.000	0.000	0.000	0.000	0.129	0.814	1.369	1.655	3.870	11.570	23.299	29.167	21.321	6.733	0.074
1113-73	0.000	0.000	0.000	0.000	0.000	0.000	0.159	0.813	1.286	1.914	5.213	13.992	25.226	28.751	18.702	3.944	0.000
1113-74	0.000	0.000	0.000	0.000	0.000	0.000	0.157	0.851	1.652	2.961	6.756	14.982	24.583	26.823	17.279	3.955	0.000
1113-75	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.075	2.843	13.320	27.454	32.203	20.436	3.669	0.000
1113-76	0.000	0.000	0.000	0.000	0.000	0.000	0.131	0.406	0.437	0.474	2.947	12.979	26.503	31.341	20.549	4.232	0.000
1113-77	0.000	0.000	0.000	0.000	0.000	0.000	0.348	0.859	1.023	1.622	5.599	15.126	25.933	28.122	17.656	3.712	0.000
1113-78	0.000	0.000	0.000	0.000	0.000	0.000	0.240	0.728	1.049	1.098	3.093	10.965	23.156	29.661	22.314	7.586	0.110
1113-79	0.000	0.000	0.000	0.000	0.000	0.000	0.103	0.514	0.666	0.446	1.266	8.901	23.095	32.159	24.909	7.874	0.066
1113-80	0.000	0.000	0.000	0.000	0.000	0.030	0.390	1.013	1.564	2.034	4.300	12.267	23.726	28.794	20.326	5.548	0.009
1113-81	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.041	4.673	19.048	32.769	29.450	12.531	1.487
1113-82	0.000	0.000	0.000	0.000	0.000	0.000	0.098	0.519	0.682	0.437	1.395	9.271	23.403	31.944	24.375	7.796	0.079
1113-83	0.000	0.000	0.000	0.000	0.000	0.000	0.102	0.522	0.722	0.612	1.755	9.633	23.367	31.384	23.848	7.949	0.106
1113-84	0.000	0.000	0.000	0.000	0.000	0.000	0.146	0.855	1.361	1.551	3.789	11.778	23.883	29.728	21.181	5.729	0.000
1113-85	0.000	0.000	0.000	0.000	0.000	0.000	0.276	1.080	1.608	1.832	4.279	12.477	24.259	29.218	20.094	4.878	0.000
1113-86	0.000	0.000	0.000	0.000	0.000	0.000	0.081	0.510	0.773	0.583	1.136	7.953	22.059	31.942	25.710	9.117	0.137
1113-87	0.000	0.000	0.000	0.000	0.000	0.000	0.086	0.380	0.506	0.708	3.313	12.700	25.518	30.532	20.894	5.362	0.000
1113-88	0.000	0.000	0.000	0.000	0.000	0.000	0.183	0.786	1.281	1.378	2.759	10.846	24.137	30.831	21.937	5.863	0.000
1113-89	0.000	0.000	0.000	0.000	0.000	0.000	0.142	0.631	1.222	1.799	3.913	11.687	23.245	28.850	21.188	7.208	0.115
1113-90	0.000	0.000	0.000	0.000	0.000	0.000	0.355	0.979	1.152	0.691	1.521	10.011	24.414	31.838	22.865	6.175	0.000
225-5	0.000	0.000	0.000	0.000	0.000	0.170	0.598	0.815	1.340	4.150	11.136	20.447	25.921	22.403	11.557	1.464	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
23-1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.189	0.434	0.356	0.525	4.221	16.227	29.068	29.355	15.962	3.664
225-6	0.000	0.000	0.000	0.000	0.033	0.463	1.350	2.627	4.781	9.135	15.915	21.866	22.168	15.548	5.918	0.193	0.000
23-2	0.000	0.000	0.000	0.000	0.000	0.000	0.300	0.629	1.324	3.979	10.556	20.077	26.584	23.583	11.991	0.977	0.000
225-8	0.000	0.000	0.000	0.000	0.000	0.401	2.302	5.285	8.064	10.166	12.939	17.023	19.501	16.216	7.663	0.439	0.000
23-3	0.000	0.000	0.000	0.000	0.000	0.000	0.360	1.851	4.873	9.276	14.202	18.627	20.846	18.165	10.102	1.697	0.000
225-9	0.000	0.000	0.000	0.000	0.000	0.113	0.354	0.368	0.276	1.720	9.402	22.071	30.166	24.972	10.212	0.346	0.000
23-4	0.000	0.000	0.000	0.000	0.000	0.000	0.080	0.984	3.457	7.983	13.815	19.307	22.135	19.461	10.918	1.859	0.000
23-5	0.000	0.000	0.000	0.000	0.010	0.199	0.260	0.544	2.755	8.977	18.338	25.319	24.186	15.193	4.219	0.000	0.000
225-17	0.000	0.000	0.000	0.000	0.000	0.110	0.425	0.743	1.029	2.515	8.439	19.304	28.255	25.939	12.539	0.703	0.000
225-19	0.000	0.000	0.000	0.000	0.007	0.327	0.810	1.239	2.500	6.905	15.485	24.158	25.652	17.485	5.407	0.025	0.000
225-20	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.627	7.326	20.776	31.417	27.744	11.729	0.382	0.000
225-25	0.000	0.000	0.000	0.000	0.000	0.040	0.299	0.579	0.901	2.385	8.068	18.587	27.668	26.236	13.786	1.449	0.000
225-26	0.244	0.276	0.265	0.211	0.152	0.596	2.834	8.152	15.909	22.410	22.918	16.431	7.580	1.801	0.142	0.000	0.000
225-27	0.000	0.000	0.000	0.000	0.013	0.280	1.250	4.290	10.481	18.654	24.217	22.318	13.710	4.593	0.193	0.000	0.000
225-28	0.000	0.000	0.000	0.000	0.000	0.026	0.265	0.483	0.498	1.136	6.137	17.448	28.575	28.473	15.326	1.633	0.000
225-31	0.000	0.000	0.000	0.000	0.000	0.087	0.270	0.304	0.413	2.141	9.493	21.164	28.968	24.991	11.550	0.619	0.000
225-34	0.000	0.000	0.000	0.000	0.000	0.114	0.384	0.607	1.404	4.552	11.518	20.445	25.671	22.258	11.513	1.534	0.000
225-35	0.000	0.000	0.000	0.000	0.000	0.062	0.370	0.576	0.941	3.786	12.004	23.187	28.581	22.019	8.289	0.185	0.000
225-41	0.000	0.000	0.000	0.000	0.000	0.044	0.211	0.179	0.204	2.075	9.081	20.046	27.823	25.188	13.301	1.848	0.000
225-42	0.044	0.082	0.080	0.079	0.080	0.148	0.972	4.101	10.789	19.346	24.514	21.817	13.059	4.557	0.331	0.000	0.000
225-45	0.000	0.000	0.000	0.000	0.000	0.068	0.451	0.741	1.137	3.454	10.182	20.329	27.108	23.680	11.710	1.142	0.000
225-1	0.000	0.000	0.000	0.000	0.000	0.091	0.249	0.325	0.732	3.787	11.868	22.607	28.173	22.581	9.269	0.318	0.000
225-7	0.000	0.000	0.000	0.000	0.045	0.355	0.455	0.724	3.121	10.025	20.029	26.313	23.157	12.908	2.869	0.000	0.000
225-16	0.000	0.000	0.000	0.000	0.000	0.079	0.539	0.927	1.288	3.354	9.939	20.535	27.962	24.113	10.762	0.501	0.000
225-18	0.000	0.000	0.000	0.000	0.043	0.429	0.881	1.610	4.033	10.176	19.169	25.180	22.600	12.931	2.948	0.000	0.000
225-32	0.000	0.000	0.000	0.000	0.000	0.207	0.667	1.676	4.164	9.275	16.632	22.736	22.960	16.023	5.623	0.036	0.000
227-90	0.000	0.000	0.000	0.000	0.000	0.021	0.286	0.635	0.838	1.581	6.256	16.762	27.414	27.854	15.892	2.462	0.000
227-91	0.000	0.000	0.000	0.000	0.000	0.000	0.137	0.320	0.525	1.499	6.769	18.055	28.585	27.844	14.760	1.505	0.000
227-92	0.000	0.000	0.000	0.000	0.000	0.000	0.132	0.385	0.488	0.851	4.469	14.907	27.127	29.727	18.348	3.567	0.000
227-93	0.000	0.000	0.000	0.000	0.000	0.000	0.555	1.613	2.587	4.030	8.413	17.103	25.346	24.589	13.630	2.134	0.000
227-94	0.000	0.000	0.000	0.000	0.000	0.027	0.244	0.390	0.447	1.699	8.492	20.598	29.564	25.951	11.945	0.644	0.000
227-95	0.000	0.000	0.000	0.000	0.000	0.055	0.756	1.971	2.623	2.652	4.889	12.794	23.658	27.418	18.416	4.765	0.000
227-97	0.000	0.000	0.000	0.000	0.000	0.029	0.303	0.566	0.561	0.940	5.430	16.609	27.945	28.518	16.352	2.747	0.000
227-98	0.000	0.000	0.000	0.000	0.000	0.000	0.143	0.328	0.315	0.714	5.065	15.882	27.496	28.989	17.439	3.603	0.026
227-99	0.000	0.000	0.000	0.000	0.000	0.000	0.447	1.165	1.769	3.340	8.739	18.708	27.004	24.764	12.593	1.470	0.000
227-100	0.000	0.000	0.000	0.000	0.000	0.025	0.247	0.371	0.306	1.393	8.317	20.764	29.825	25.961	11.960	0.831	0.000
227-101	0.000	0.000	0.000	0.000	0.000	0.036	0.400	0.869	1.198	2.359	8.223	19.545	28.717	25.833	12.145	0.675	0.000
227-102	0.000	0.000	0.000	0.000	0.000	0.044	0.308	0.375	0.202	1.220	8.249	21.067	30.223	26.007	11.674	0.630	0.000
227-105	0.000	0.000	0.000	0.000	0.000	0.040	0.328	0.505	0.382	1.018	6.804	18.664	28.884	27.330	14.301	1.744	0.000
227-106	0.000	0.000	0.000	0.000	0.000	0.000	0.085	0.320	0.265	0.228	2.781	12.497	25.354	30.152	21.125	7.017	0.176
227-107	0.000	0.000	0.000	0.000	0.000	0.017	0.474	1.090	1.301	2.067	6.613	16.667	26.722	26.881	15.415	2.752	0.000
227-85	0.000	0.000	0.000	0.000	0.000	0.051	0.309	0.479	0.811	3.592	11.794	22.950	28.412	22.142	9.055	0.404	0.000
227-86	0.000	0.000	0.000	0.000	0.000	0.000	0.237	0.535	0.664	1.403	6.956	18.592	28.646	26.935	14.096	1.936	0.000
227-87	0.000	0.000	0.000	0.000	0.000	0.027	0.324	0.693	0.808	1.079	4.688	14.797	26.216	28.480	18.195	4.683	0.009
227-88	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102	2.589	12.080	25.562	30.826	21.310	7.080	0.453
227-89	0.000	0.000	0.000	0.000	0.000	0.000	0.179	0.377	0.358	0.706	4.821	15.133	26.386	28.463	18.328	5.200	0.048
213-23	0.000	0.000	0.000	0.000	0.000	0.000	0.267	0.788	1.180	2.298	6.824	16.159	25.518	26.230	16.351	4.360	0.026
213-24	0.000	0.000	0.000	0.000	0.000	0.000	0.146	0.983	1.989	3.102	6.031	13.097	22.143	25.396	18.501	7.485	1.128
213-25	0.000	0.000	0.000	0.000	0.000	0.000	0.293	1.474	2.645	3.090	4.444	10.261	20.018	25.746	20.715	9.451	1.864
213-26	0.000	0.000	0.000	0.000	0.000	0.059	0.402	0.632	1.055	3.822	11.551	22.378	28.103	22.311	9.277	0.411	0.000
213-28	0.000	0.000	0.000	0.000	0.000	0.000	0.235	0.549	0.713	2.158	8.255	19.105	27.529	25.225	13.648	2.583	0.000
213-31	0.000	0.000	0.000	0.000	0.000	0.000	0.086	0.343	0.338	0.345	2.566	11.150	23.027	28.709	22.223	9.603	1.610
227-9	0.000	0.000	0.000	0.000	0.000	0.000	0.294	0.691	1.049	2.493	7.498	16.914	25.993	26.386	15.745	2.938	0.000
227-10	0.000	0.000	0.000	0.000	0.000	0.062	0.699	1.351	1.593	2.850	8.410	18.883	27.591	25.404	12.442	0.714	0.000
227-11	0.000	0.000	0.000	0.000	0.000	0.039	0.364	0.719	0.847	1.335	5.654	16.242	27.354	28.332	16.462	2.652	0.000

Phi class (half phi classes) distribution, listed by class midpoints

Sample Name	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
227-12	0.000	0.000	0.000	0.000	0.000	0.000	0.200	0.519	0.702	1.124	4.034	13.505	25.705	29.838	19.800	4.551	0.021
227-13	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.912	7.880	20.786	30.347	26.852	12.531	0.691	0.000
227-14	0.000	0.000	0.000	0.000	0.000	0.025	0.243	0.450	0.598	1.750	7.970	19.750	29.319	26.659	12.578	0.658	0.000
227-15	0.000	0.000	0.000	0.000	0.000	0.029	0.320	0.629	0.687	1.132	5.857	17.186	28.401	28.418	15.515	1.826	0.000
227-16	0.000	0.000	0.000	0.000	0.000	0.000	0.200	0.352	0.325	1.022	6.283	17.811	28.761	28.366	15.243	1.636	0.000
227-17	0.000	0.000	0.000	0.000	0.000	0.042	0.260	0.449	0.912	3.729	11.576	22.244	28.005	22.765	9.643	0.375	0.000
227-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.151	3.180	14.508	28.453	31.806	19.097	2.804	0.000
227-19	0.000	0.000	0.000	0.000	0.000	0.032	0.296	0.667	1.190	3.219	9.594	20.168	28.046	24.809	11.431	0.548	0.000
227-20	0.000	0.000	0.000	0.000	0.000	0.000	0.168	0.370	0.412	0.946	5.299	17.006	29.157	29.656	15.837	1.151	0.000
227-21	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.620	7.610	20.833	30.732	27.265	12.369	0.571	0.000
227-22	0.000	0.000	0.000	0.000	0.000	0.039	0.388	0.778	0.937	1.565	6.457	17.441	28.100	27.881	14.997	1.415	0.000
227-23	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.949	12.782	28.562	33.457	20.015	3.235	0.000
227-24	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.018	13.150	28.879	33.211	19.569	3.173	0.000
227-25	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.300	4.081	15.826	28.871	30.690	17.734	2.497	0.000
227-26	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.033	2.703	14.358	29.790	32.799	18.135	2.184	0.000
227-27	0.000	0.000	0.000	0.000	0.000	0.000	0.410	1.241	1.951	3.030	6.995	15.837	25.572	26.794	15.821	2.349	0.000
227-28	0.000	0.000	0.000	0.000	0.000	0.000	0.238	0.482	0.534	1.391	7.310	19.349	29.527	27.216	13.183	0.770	0.000
227-29	0.000	0.000	0.000	0.000	0.000	0.000	0.219	0.475	0.639	1.861	8.064	19.598	28.870	26.332	12.990	0.953	0.000
227-30	0.000	0.000	0.000	0.000	0.000	0.000	0.220	0.456	0.467	1.094	6.399	18.226	29.214	28.211	14.568	1.144	0.000
227-31	0.000	0.000	0.000	0.000	0.000	0.000	0.209	0.345	0.187	0.677	6.489	19.308	30.428	28.239	13.401	0.718	0.000
227-32	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.875	8.663	22.616	31.716	26.010	9.937	0.182	0.000
227-33	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.523	5.721	17.042	27.848	28.148	16.949	3.769	0.000	0.000
227-34	0.000	0.000	0.000	0.000	0.000	0.030	0.247	0.381	0.429	1.608	8.249	20.353	29.528	26.288	12.245	0.641	0.000
227-35	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.034	1.316	8.840	21.855	30.792	26.079	10.757	0.325	0.000
227-36	0.000	0.000	0.000	0.000	0.000	0.045	0.294	0.416	0.552	2.861	11.044	22.938	29.293	23.131	9.136	0.289	0.000
227-37	0.000	0.000	0.000	0.000	0.000	0.022	0.248	0.459	0.503	1.454	7.630	19.502	29.287	26.918	13.177	0.799	0.000
227-38	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.060	2.289	10.675	22.892	29.683	23.941	10.031	0.429	0.000
227-39	0.000	0.000	0.000	0.000	0.000	0.038	0.214	0.206	0.251	2.406	10.284	22.036	29.129	24.263	10.668	0.505	0.000
227-40	0.000	0.000	0.000	0.000	0.000	0.000	0.072	0.287	0.369	0.681	3.598	13.129	25.740	30.449	20.631	5.035	0.010
227-41	0.000	0.000	0.000	0.000	0.000	0.026	0.276	0.641	1.034	2.018	6.569	16.609	26.962	27.695	15.929	2.240	0.000
227-44	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.808	6.863	18.996	29.437	28.016	14.469	1.412	0.000
227-45	0.000	0.000	0.000	0.000	0.000	0.000	0.216	0.421	0.339	0.679	5.564	17.586	29.537	29.348	15.258	1.053	0.000
227-46	0.000	0.000	0.000	0.000	0.000	0.000	0.178	0.313	0.176	0.573	5.160	17.238	29.408	29.524	15.748	1.682	0.000
227-47	0.000	0.000	0.000	0.000	0.000	0.000	0.242	0.578	0.542	0.665	5.122	17.269	29.759	29.738	15.191	0.895	0.000
227-48	0.000	0.000	0.000	0.000	0.000	0.000	0.339	0.896	1.034	1.606	5.866	15.991	26.995	28.375	16.583	2.315	0.000
227-49	0.000	0.000	0.000	0.000	0.000	0.049	0.700	1.675	2.397	3.759	8.629	18.120	26.552	24.847	12.494	0.778	0.000
227-50	0.000	0.000	0.000	0.000	0.000	0.000	0.426	0.806	0.953	2.617	9.125	20.450	28.830	25.099	11.179	0.516	0.000
227-51	0.000	0.000	0.000	0.000	0.000	0.034	0.516	1.096	1.580	3.515	9.837	20.346	27.867	24.092	10.663	0.453	0.000
227-52	0.000	0.000	0.000	0.000	0.000	0.000	0.171	0.390	0.509	1.297	6.633	18.262	29.073	28.122	14.497	1.045	0.000
227-53	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.418	12.929	28.846	33.558	20.319	2.929	0.000
227-54	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.043	1.312	8.911	22.218	31.088	25.858	10.302	0.269	0.000
227-55	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.569	10.707	24.261	31.308	24.015	8.141	0.000	0.000
227-56	0.000	0.000	0.000	0.000	0.000	0.030	0.198	0.262	0.339	2.297	9.186	20.097	27.973	25.254	12.983	1.381	0.000
227-57	0.000	0.000	0.000	0.000	0.000	0.106	0.170	0.163	1.292	6.697	17.007	26.430	26.747	16.934	4.452	0.000	0.000
227-58	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.039	2.531	13.259	28.169	32.506	19.783	3.714	0.000
227-59	0.000	0.000	0.000	0.000	0.000	0.029	0.253	0.456	0.662	2.473	8.861	19.430	27.400	25.129	13.407	1.901	0.000
227-59b	0.000	0.000	0.000	0.000	0.000	0.000	0.853	3.488	7.191	11.097	15.105	18.835	19.939	15.766	7.310	0.416	0.000
227-60	0.000	0.000	0.000	0.000	0.000	0.040	0.306	0.537	0.735	2.620	9.687	21.237	29.149	24.803	10.516	0.370	0.000
227-61	0.000	0.000	0.000	0.000	0.000	0.000	0.238	0.520	1.464	4.649	11.477	20.488	26.198	22.869	11.368	0.729	0.000
227-62	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.341	9.202	22.140	30.673	25.754	10.572	0.318	0.000
227-63	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.589	7.945	21.432	30.867	26.679	11.920	0.568	0.000
227-64	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.598	8.331	22.212	31.338	26.253	10.889	0.380	0.000
227-65	0.000	0.000	0.000	0.000	0.000	0.127	0.237	0.157	0.744	5.511	15.647	25.852	27.498	18.473	5.686	0.069	0.000
227-66	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.318	4.626	14.516	25.275	28.293	20.200	6.772	0.000	0.000
227-67	0.000	0.000	0.000	0.000	0.000	0.083	0.579	0.887	1.037	3.190	10.513	21.789	28.670	23.477	9.497	0.279	0.000

Phi class (half phi classes) distribution, listed by class midpoints

<u>Sample</u>																	
<u>Name</u>	<u>7.25</u>	<u>6.75</u>	<u>6.25</u>	<u>5.75</u>	<u>5.25</u>	<u>4.75</u>	<u>4.25</u>	<u>3.75</u>	<u>3.25</u>	<u>2.75</u>	<u>2.25</u>	<u>1.75</u>	<u>1.25</u>	<u>0.75</u>	<u>0.25</u>	<u>-0.25</u>	<u>-0.75</u>
227-68	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.964	8.236	21.439	30.923	26.649	11.366	0.423	0.000
227-69	0.000	0.000	0.000	0.000	0.000	0.025	0.233	0.316	0.184	1.185	7.959	20.521	30.131	26.687	12.155	0.603	0.000
227-70	0.000	0.000	0.000	0.000	0.000	0.069	0.735	1.540	1.673	2.221	6.887	17.377	27.332	26.487	14.057	1.622	0.000
227-71	0.000	0.000	0.000	0.000	0.000	0.000	0.388	0.869	1.151	2.638	8.465	19.217	28.123	25.788	12.611	0.751	0.000
227-72	0.000	0.000	0.000	0.000	0.000	0.023	0.363	0.856	1.079	1.453	5.500	15.836	27.011	28.240	16.666	2.971	0.000
227-73	0.000	0.000	0.000	0.000	0.000	0.000	0.168	0.435	0.485	0.734	4.129	14.632	27.131	29.977	18.609	3.700	0.000
227-74	0.000	0.000	0.000	0.000	0.000	0.053	0.336	0.546	0.824	2.935	10.429	21.766	28.700	23.811	10.179	0.420	0.000
227-75	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.039	2.028	11.494	26.391	32.791	21.903	5.355	0.000
227-76	0.000	0.000	0.000	0.000	0.000	0.088	0.301	0.373	0.518	3.102	11.236	22.596	28.682	23.041	9.656	0.406	0.000
227-77	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.133	4.951	17.474	29.724	29.637	16.047	2.033	0.000
227-78	0.000	0.000	0.000	0.000	0.000	0.030	0.551	1.288	1.653	2.621	7.363	17.406	27.033	26.385	14.119	1.550	0.000
227-79	0.000	0.000	0.000	0.000	0.000	0.027	0.215	0.247	0.112	1.190	8.203	20.957	30.279	26.400	11.807	0.563	0.000
227-81	0.000	0.000	0.000	0.000	0.000	0.036	0.248	0.277	0.146	1.531	9.196	22.085	30.572	25.414	10.211	0.285	0.000
227-82	0.000	0.000	0.000	0.000	0.000	0.044	0.409	0.755	0.780	1.211	6.400	18.508	29.377	27.760	13.824	0.931	0.000
227-83	0.000	0.000	0.000	0.000	0.000	0.000	0.283	0.674	0.833	1.157	4.961	15.550	27.279	28.892	17.221	3.150	0.000
227-84	0.000	0.000	0.000	0.000	0.000	0.024	0.250	0.459	0.547	1.555	7.582	19.212	28.892	26.759	13.462	1.258	0.000

CURRICULUM VITA

Slade Jones was born in Dallas, Texas in 1970 and graduated from Cistercian Preparatory School in Irving, Texas in 1988. Choosing to remain in Texas, he then studied psychology at Trinity University in San Antonio and the University of North Texas in Denton, changing majors to chemistry and working while attending school part-time before leaving school in 1995 to work in information technology. During the next few years he then took a variety of earth science classes at the University of Texas at Dallas in part-time pursuit of a Multidisciplinary Studies degree. After working for software development companies and health insurance providers as a network and server administrator until 2003, he began working as an independent computer and network support provider over the next five years. In 2008, he returned to school at the University of Texas at El Paso (UTEP), determined to finally complete his bachelor's degree. It was at this point that he realized that a huge number of his elective classes had been in the earth and planetary sciences, and set out on the course which led to this research. He graduated in 2009 with a Bachelor's of Interdisciplinary Studies with concentrations in geology, business computing, and general sciences, and was offered an assistantship in the geology department and entered the Graduate School of the University of Texas at El Paso. In 2009-11, he taught laboratories and lectures in Introductory Geology, Weather, and Climate Science undergraduate classes. In 2010, he led a team of earth scientists representing the UTEP in the Imperial Barrel Competition sponsored by the American Association of Petroleum Geologists, of which he was Student Chapter President for the UTEP, and was selected as a student delegate to their Leadership Summit. In the summer of 2011, he worked as an intern for Chevron NA in their Mid-Continent/Alaska Business Unit, leading to the offer of a full time job, begun in March of 2012. A preliminary analysis of this research was presented as a poster at the 2011 Annual Meeting of the Geological Society of America. Slade lives in Midland, Texas with his wife and four children.

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