

BOTTOM CHARACTERISTICS OF LOWER COOK INLET,

ALASKA

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INTRODUCTION

Lower Cook Inlet is part of the estuarine system connecting Anchorage with the Pacific Ocean. The area is of high interest to federal, state, industrial and private groups since lease sale C1 was held during the fall of 1977. As part of an overall environmental assessment, a marine geologic study was performed during the summer of 1976 (Fig. 1). Seismic reflection information was collected on board the R/V SEA SOUNDER using single channel sparker, uniboom and 3.5 kilohertz seismic profiling systems. In addition, side-scan records were obtained and a bottom television unit deployed. Bottom sediments were collected with a Van Veen grab sampler, modified by A. Souter (Scripps Institution of Oceanography) and with a gravity corer (Bouma and Hampton, 1976; Hampton and Bouma, 1976).

During the same time period Petty-Ray Geophysical Inc. conducted a seismic survey for the U. S. Geological Survey, Conservation Division, in Anchorage, Alaska. Part of their data are incorporated in this report.

Lower Cook Inlet is characterized by a rather smooth bottom and strong tidal currents. The surficial sediments are sand to pebbly sand in the south, becoming pebbly to the north (Bouma and Hampton, 1976). The high-velocity currents have produced a variety of bedforms of different sizes and shapes (Bouma et al. 1977a; Bouma, Hampton and Orlando, 1977b). Scanning electron microscopy examinations of surface characteristics of quartz grains (Hampton et al., 1978) provided information on movement characteristics of the sand within and outside the field of bedforms.

This report contains information on four major bottom aspects of lower Cook Inlet: bathymetry, distribution of bedforms, grain-size parameters of bottom samples, and a map of Quaternary sediment thicknesses.

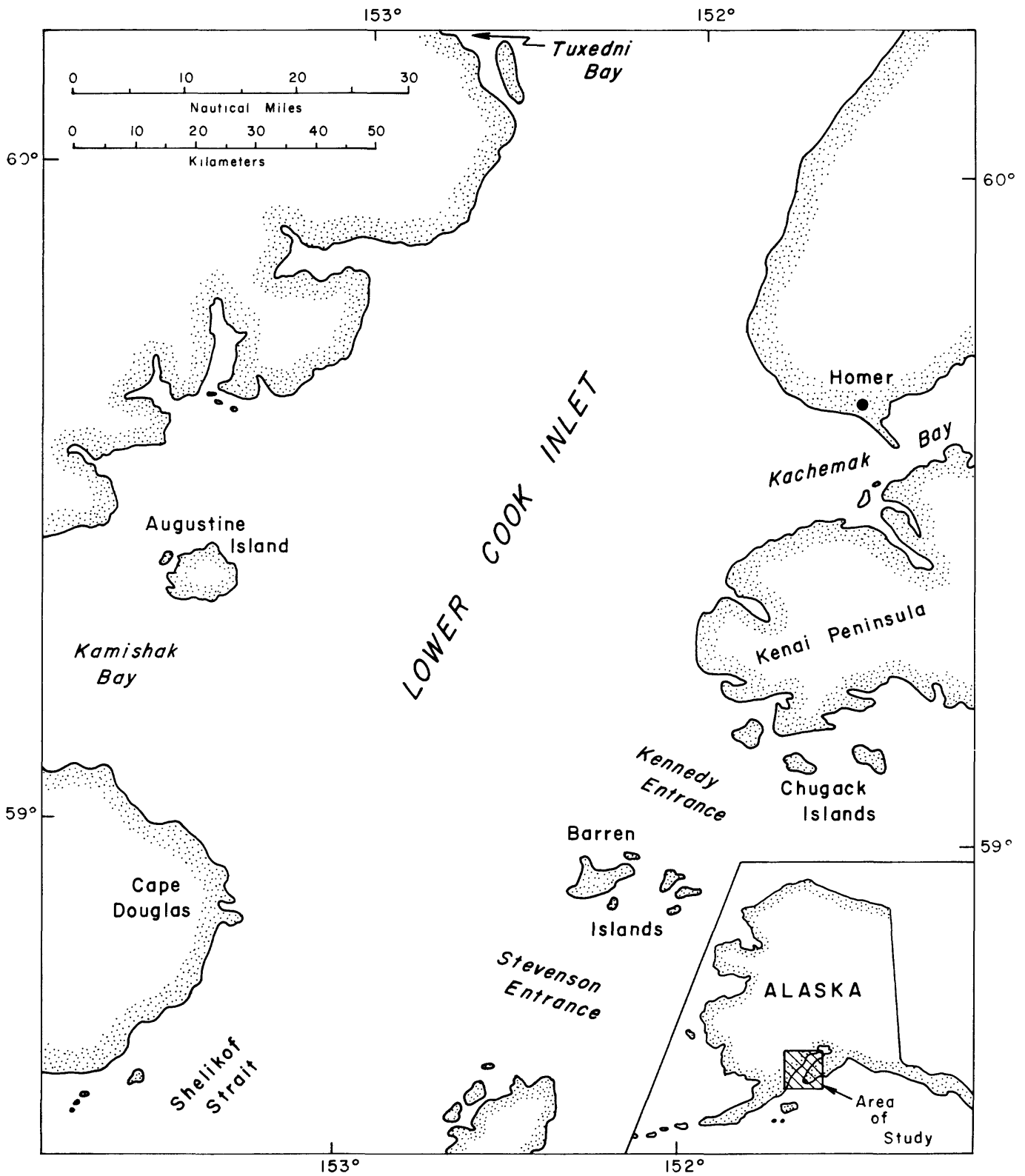


Figure 1.—Location map of lower Cook Inlet, Alaska

BATHYMETRY

Bathymetric information obtained during the 1976 R/V SEA SOUNDER cruise was combined with the bathymetric results collected by Petty-Ray Geophysical; and additional information from the U. S. Coast and Geodetic Survey Boatsheets. All information was converted to the metric system and contours drawn at 5 m intervals. Petty-Ray Geophysical had all their measurements tidally corrected.

Although the overall bathymetry of lower Cook Inlet is rather smooth, a number of characteristic bottom morphologic features are worth mentioning (Fig. 2, Enclosure 1). South and south southwest of Kalgin Island (island cut off by upper boundary of Fig. 2), down to Tuxedni Bay, the bathymetry shows some minor depressions. The eastern half of the northern part of lower Cook Inlet is rather smooth and slopes to the west.

The central area of lower Cook Inlet between Tuxedni Bay and a line between Kenai Peninsula and Augustine Island is rather smooth with a major depression running approximately north-south through its center. The eastern half contains a few minor depressions that line up in a direction parallel to the major depression without revealing the existence of a major linear depression. Another channelized depression exists along the northwestern side of Kenai Peninsula forming the major connection between Cook Inlet and Kachemak Bay. This central part of lower Cook Inlet is also the major area of bedforms (Fig. 3).

Between the central and southern part of lower Cook Inlet a significant ramp occurs, starting at about 70 m water depth and dropping to about 115 m. The ramp is very pronounced on the western side off Cape Douglas. The ramp between the central and southern parts of lower Cook Inlet has a northerly indentation that more or less lines up with the major central depression. This combined

system may represent the paleo channel of Cook Inlet. The central area of southern lower Cook Inlet is a rather uniformly sloping area.

Connections between Cook Inlet and the Pacific Ocean via the Kennedy and Stevenson Entrances reveal complicated bathymetry with many local highs and lows of tectonic origin. A set of highs are present south of the Chugach Islands, bounded by a depression with local deeps on its southern side. It is likely that the major tidal waters flow through this depression and then split into a northern component along Kenai Peninsula into Kachemak Bay and through the eastern half of lower Cook Inlet, while another part of the incoming water deflects off the ramp and turns in a counter clockwise direction toward Shelikof Strait. The bathymetry of Stevenson Entrance is less complicated but still reveals tectonic influences.

Insufficient data are available on the currents and tidal flows to fully establish the importance of the bathymetry on circulation in the inlet. A program by NOAA/PMEL during FY78 hopefully will shed light on these questions. Published information on surface currents via driftbottle studies is discussed by Burbank (1977) but lack of current-meter data prevents further discussion.

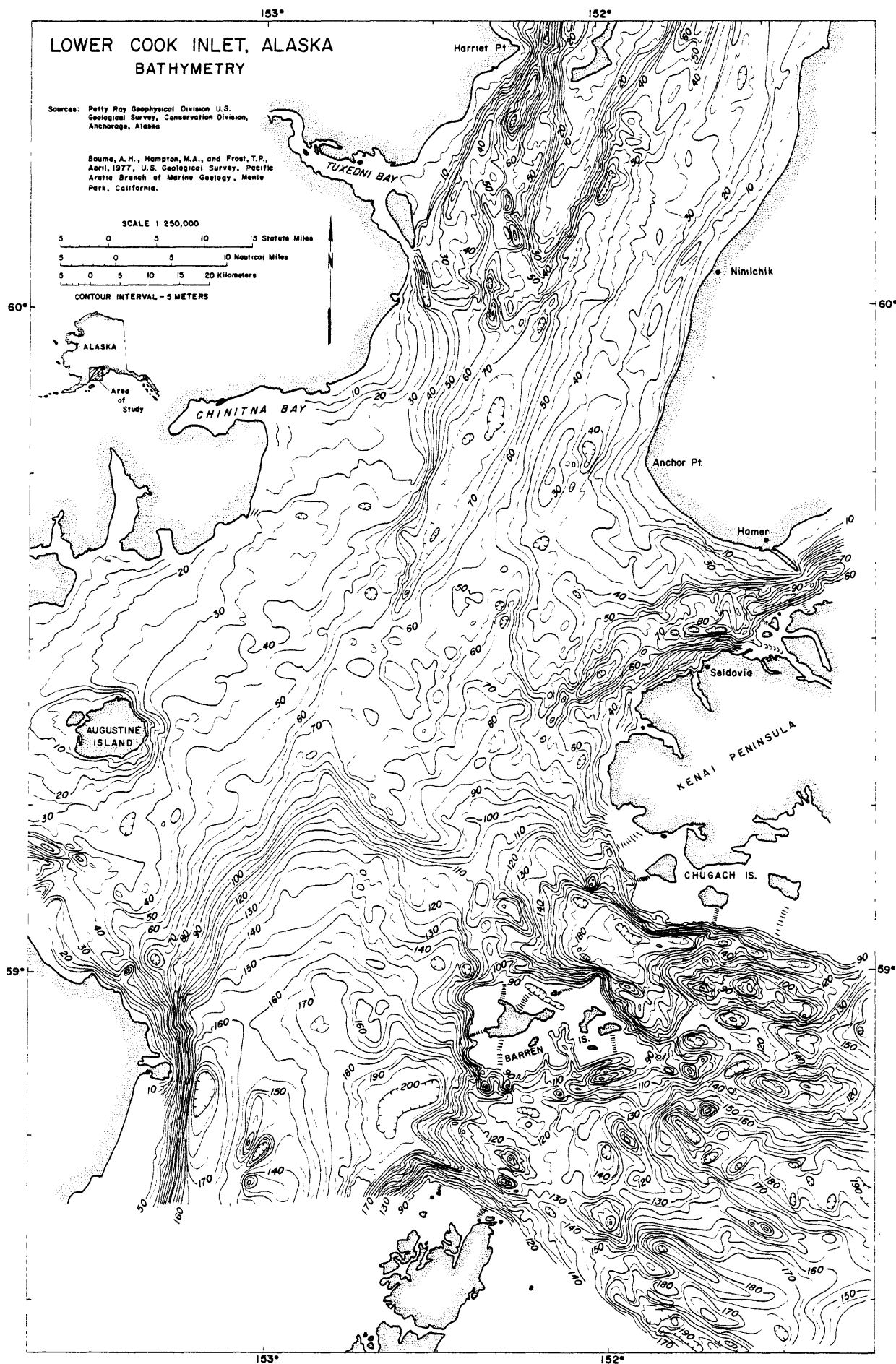


Figure 2. Bathymetry map of lower Cook Inlet, Alaska

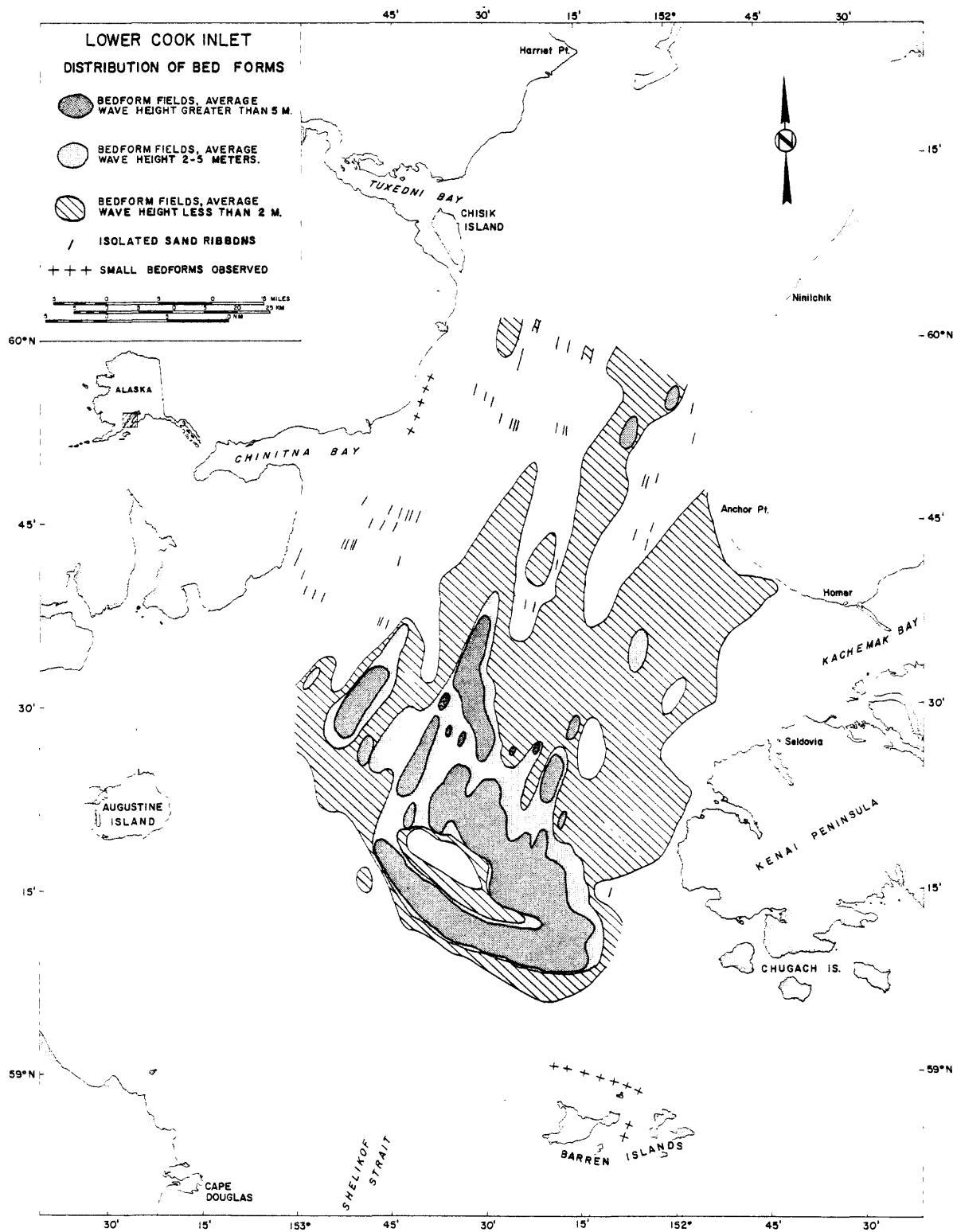


Figure 3. Distribution of bedforms in lower Cook Inlet

DISTRIBUTION OF BEDFORMS

A combination of Petty-Ray Geophysical and R/V SEA SOUNDER seismic high resolution data and side-scan sonar was used to construct a distribution map of bedforms. Figure 3 shows that only the central part of lower Cook Inlet contains significant bedforms. This may be accidental due to insufficient trackline coverage in the surrounding areas. These latter areas do not contain any bedform fields of significant extent, but minor fields may be present.

A major type of bedforms are sand waves that occur in three important size classes (Bouma et al., 1977a): 1) wave length less than 8-15 m and wave heights not exceeding 2 meters, 2) wave lengths ranging from 50-150 m with wave heights ranging from 3-5 m, and 3) wave lengths ranging from 400-1000 m with wave heights between 5-10 m. Sand waves in lower Cook Inlet normally consist of strongly asymmetric rippled bodies of sand with relatively smooth flanks and straight to slightly sinuous crests.

Dunes can occur in similar medium and large size classes. These bedforms differ from sand waves in that their shapes are more irregular, their crests are very sinuous and discontinuous, and their wave length/wave height ratio is smaller.

Sand ridges are only known from the southeast corner of the bedform field. These are larger asymmetric sand bodies with wave lengths ranging 800-1000 m and wave heights from 8-10 m. Their crests, in contrast to sand waves and dunes, are parallel to the main current direction. Medium sand waves occur on the flanks of sand ridges. However, the crests of the medium-sized waves are not parallel but oblique to the crest and sand ridge, presumably due to forced upward movement under the action of helical currents (Bouma et al., 1977a; Hampton and Orlando, 1977b).

Another important type of bedform is the sand ribbon, a narrow, thin body of sand, oriented parallel to the main current. Small sand waves, with crests perpendicular to the sand ribbon, normally cover the surface of the ribbon.

The largest sand waves are concentrated in a number of fields in the southern half of the central part of lower Cook Inlet. They are always surrounded by medium or small-sized sand waves. A number of fields of large sand waves are located in the major depression.

Immediately north of the ramp is a smooth area of sea floor that does not contain bedforms large enough to be detected on high resolution seismic profiles or side-scan sonar records. This "smooth" area is bounded on three sides by large sand waves.

Sand ribbons can only be detected on high quality side-scan sonar records, which may be reason that only a limited number are displayed in figure 3. They only occur where the sand cover is thin or non-existent.

No public data are available to compare the distribution and individual characteristics of the sand waves, especially the larger ones. Although bottom television observations indicate grain motion up to 30 cm/sec over the crests of large sand waves and 1-5 cm/sec in their troughs, and bottom currents may be as high as 1 knot (50 cm/sec), no information is available to migration of the large sand bodies. Scanning electronic microscopy examination on quartz grain surface textures showed that grains are not widely dispersed into and out of the large area of bedforms (Hampton and others, 1978).

GRAIN SIZE PARAMETERS

Introduction

Grain size analyses were run in the laboratory using Rapid Sediment Analyzers. This technique is based on fall velocity through a high column of water. The data were next punch carded and fed to the computer under the heading sieve. The program provides several types of data such as cumulative percentages, statistical parameters and graphic presentations.

This section includes a discussion of the parameters provided, the graphic presentations, and a brief discussion about the findings and preliminary conclusions drawn from this aspect of the study.

Statistical Parameters

Quantitative evaluation and comparison of grain size distributions of sediment samples is possible through the use of statistical parameters. The two methods of determining the size distribution of a sand-size sample are sieving and settling tubes. Both systems give size data in millimeters and/or phi (ϕ) units, though the sieving method measures the physical size of particles, whereas the settling tube measures the settling velocities of the grains through water, which are then compared to the settling velocities of quartz spheres of known size. In other words, a small heavy mineral and a large light mineral may be hydraulic equivalents and fall into the same size range as measured by a settling tube, but the same two grains would be measured as being of quite different diameter in a sieve analysis.

Graphic Representation

The data obtained in a grain size analysis may be plotted in several ways. All methods use grain size as the abscissa and some measure of percentage frequency as the ordinate. It is usual to plot grain size in phi units, which relate logarithmically to millimeters 25: $-\log_2 d = \phi$, where d is grain diameter, and ϕ is size in ϕ -units.

The histogram is a bar graph, where the height of each bar represents the weight percent of grains in a particular size class. A frequency curve is a smooth curve through the midpoints of the bar tops. These types of plots are only pictorial representations, statistical parameters cannot be determined from them.

The cumulative curve is plotted by adding percentages in succeeding size grades and drawing a smooth curve through the points. On arithmetic ordinate paper the curve normally is S-shaped.

From the size analysis and its cumulative curve obtained through sieving or settling tube methods, statistical parameters can be calculated that quantitatively describe features of the sediment. The parameters and certain combinations of parameters can be compared and can give an indication of sedimentary environments of deposition.

Parameters

The parameters calculated in this study include:

- 1) "mode": the most frequently occurring grain size or sizes. It corresponds to the inflection points in the cumulative curve or the highest points on the frequency curve. The mode is useful in transport studies, especially when two or more sources are contributing sediment;

2) "median": half the particles by weight are larger than the median, and half are finer. It is easily found on the cumulative curve, it corresponds to the 50% mark;

3) "mean" (M_z): the average grain size. Several formulas can be used in calculating the mean. The most inclusive graphically derived is that given by Folk (1968):

$$M_z = (\phi_{16} + \phi_{50} + \phi_{84})/3 \quad (1)$$

where ϕ_{16} , ϕ_{50} , ϕ_{84} represent the size at 16, 50, and 84 percent of the sample by weight. Folk's formula is superior to that of Inman (1952) which is based on only two values. The Trask (1950) mean size is also included in our computer printout (App. I) although few people use it anymore.

4) "sorting": several methods exist for graphically determining the sorting, or uniformity, of sediments. In general, the best measures of sorting are those that encompass the greatest part of the size distribution. Folk (1968) introduced the "inclusive graphic standard deviation" (σ_1). It is considered to be the best graphically derived method of measuring the grain size variation in a sample. It is calculated using the formula:

$$(\sigma_1) = \frac{\phi_{84} - \phi_{16}}{4} + \frac{\phi_{95} - \phi_5}{6.6} \quad (2)$$

where ϕ_{84} , ϕ_{16} , ϕ_{95} , ϕ_5 represent the phi values at the 84, 16, 95, and 5 percent marks on the cumulative curve. A verbal classification scale for sorting was present by Folk (1968): $\sigma_1 < 0.35$, very well sorted; $0.35-0.50\phi$, well sorted; $0.50-0.71\phi$, moderately well sorted; $0.71-1.0\phi$, moderately sorted; $1.0-2.0\phi$ poorly sorted; $2.0-4.0\phi$, very poorly sorted; $>4.0\phi$, extremely poorly sorted. Folk's method includes more of the curve than the measure introduced by Inman (1952) where sorting (σ_G) = $(\phi_{84} - \phi_{16})/2$. Trask's (1950) sorting coefficient (S_0) is used only with millimeter values and only includes the middle 50% of the curve.

5) "skewness": cumulative curves for sediment-size distributions may be the same in average size and sorting though they may be quite different in their degree of symmetry. Measures of skewness determine the degree to which a curve approaches symmetry. The most commonly used measure of skewness is Folk's "inclusive graphic skewness" (1968), determined by the formula:

$$Sk_1 = \frac{\phi_{16} + \phi_{84} - 2\phi_{50}}{2(\phi_{84} - \phi_{16})} + \frac{\phi_5 + \phi_{95} - 2\phi_{50}}{2(\phi_{95} - \phi_5)} \quad (3)$$

This formula is preferred as it includes the skewness of the "tails" of the curve as well as the central portion. Other methods for determining skewness, notably those of Inman (1952) and Trask (1950) do not measure the tails of the curve and are of less value than Folk's (1968) method.

Symmetrical curves have a skewness equal to 0.00; those with a large proportion of fine material are positively skewed, those with a large proportion of coarse material are negatively skewed. A verbal classification for skewness suggested by Folk (1968) includes Sk_1 from -1.00 to -0.30: strongly fine skewed; +.30 to +0.10: fine skewed; +0.10 to -0.10: near symmetrical; -0.10 to -0.30: coarse skewed; and -0.30 to -1.00: strongly coarse skewed.

6) "Kurtosis": a measure of "peakedness" in a curve. A normal Gaussian distribution has a kurtosis of 1.00: it is a curve in which the sorting in the tails equals the sorting in the central portion. If a curve is better sorted in the central part of the curve than in the tails, it is said to be excessively peaked, or leptokurtic; if it is better sorted in the tails than in the central portion, it is flat-peaked or platykurtic. Folk's (1968) formula for kurtosis is given by

$$K_g = \frac{\phi_{95} - \phi_5}{2.44(\phi_{75} - \phi_{25})} \quad (4)$$

For normal curves $K_g = 1.00$, leptokurtic curves have $K_g > 1.00$, platykurtic curves have $K_g < 1.00$.

Method of Moments

All the above statistical parameters can be calculated using the method of moments. This method gives a somewhat truer picture of the sediment characteristics, but when calculated by hand, it is a tedious process. The computer program used in this study performs all the necessary calculations, greatly simplifying the determination. The first moment measure corresponds to the mean, the second to the standard deviation, the third to the skewness, and the fourth to the kurtosis.

Cook Inlet Samples

Surficial sediment samples from lower Cook Inlet were taken in June and July of 1976 aboard the R/V Sea Sounder. A modified van Veen grab sample, capable of taking an undisturbed surface sample of 40x60x30 cm was used to collect the unconsolidated sediments. The top two centimeters of each grab sample were used for grain size analyses.

Samples were taken from the bedform fields that occupy much of central lower Cook Inlet (Fig. 4). Water depths range from 40 to 100 m, averaging about 70 m. The area is one of very strong currents. Surface water velocities of 3 - 5 knots (150-250 cm/sec) are common during flood and ebb tides.

Grain size analyses of the samples show several gross trends. The mean grain size decreases more or less uniformly from north to south in the samples analyzed (Fig. 5). Concomitant with the decrease in grain size from north to south is an increase in the degree of sorting of the samples as indicated by the decrease in standard deviation (Figs. 6 and 7).

The apparent decrease in grain size from north to south in lower Cook Inlet may be due to one or several of the following: 1) it may simply be an artifact of sampling; not enough samples were taken to have a high confidence level in

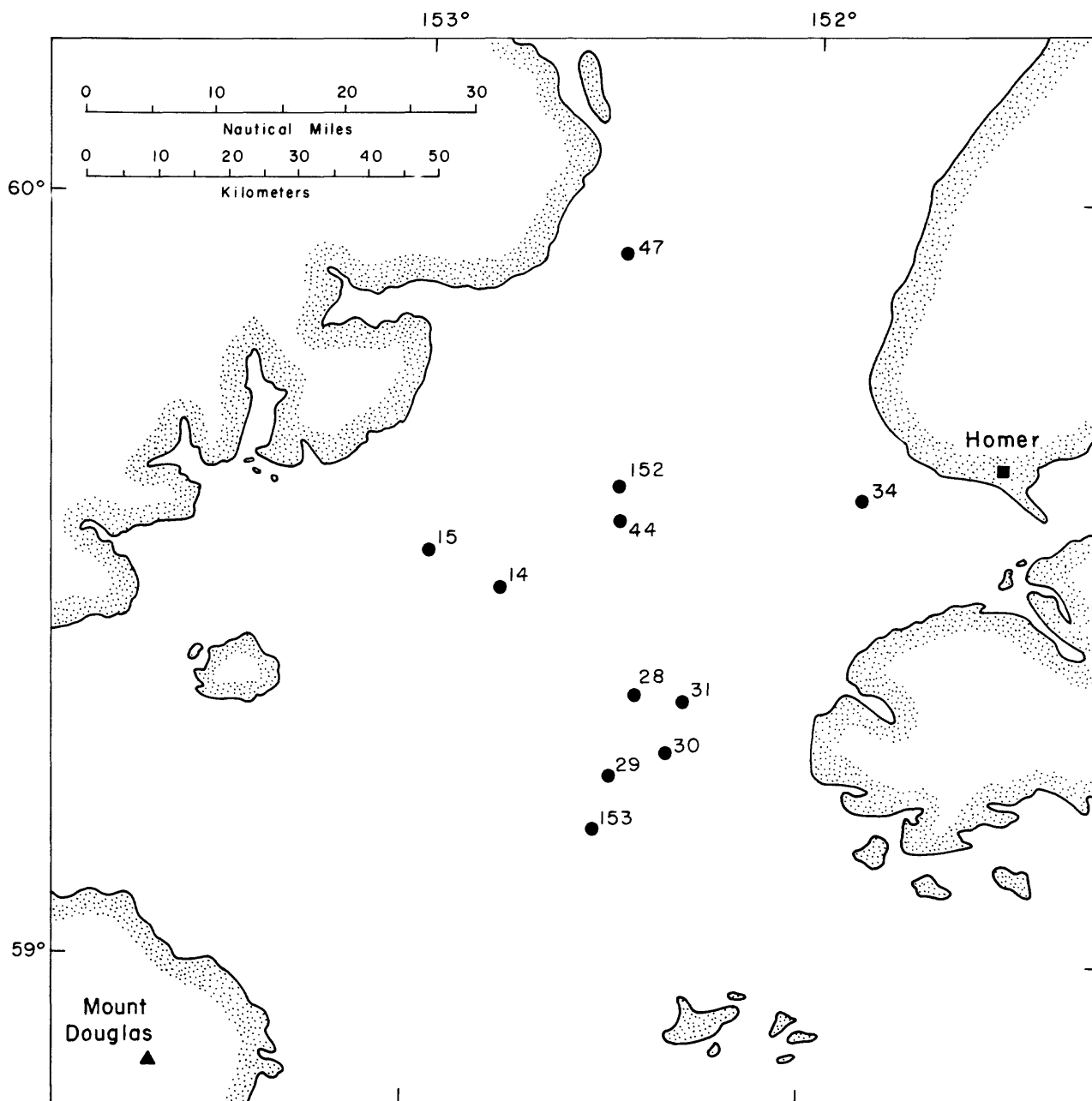


Figure 4. - Sample location map, lower Cook Inlet.

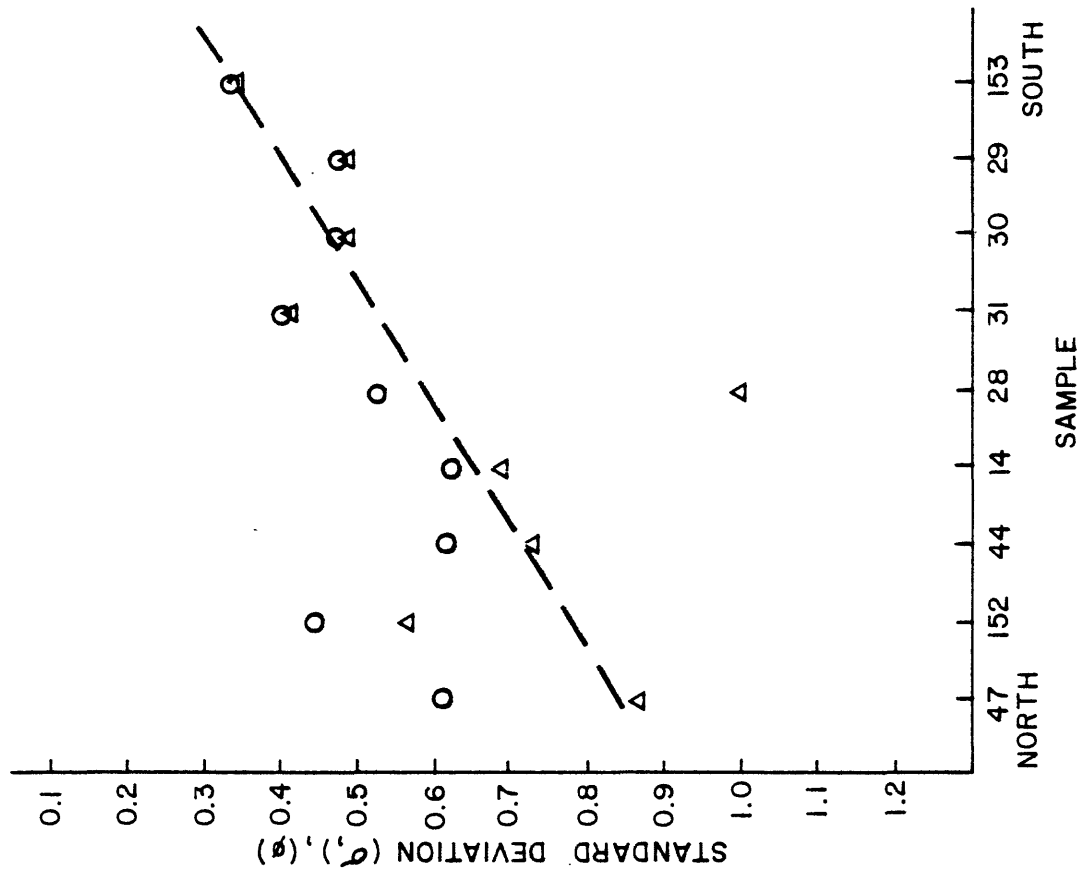


Figure 5.- Mean grain size along a north-south line, lower Cook Inlet.

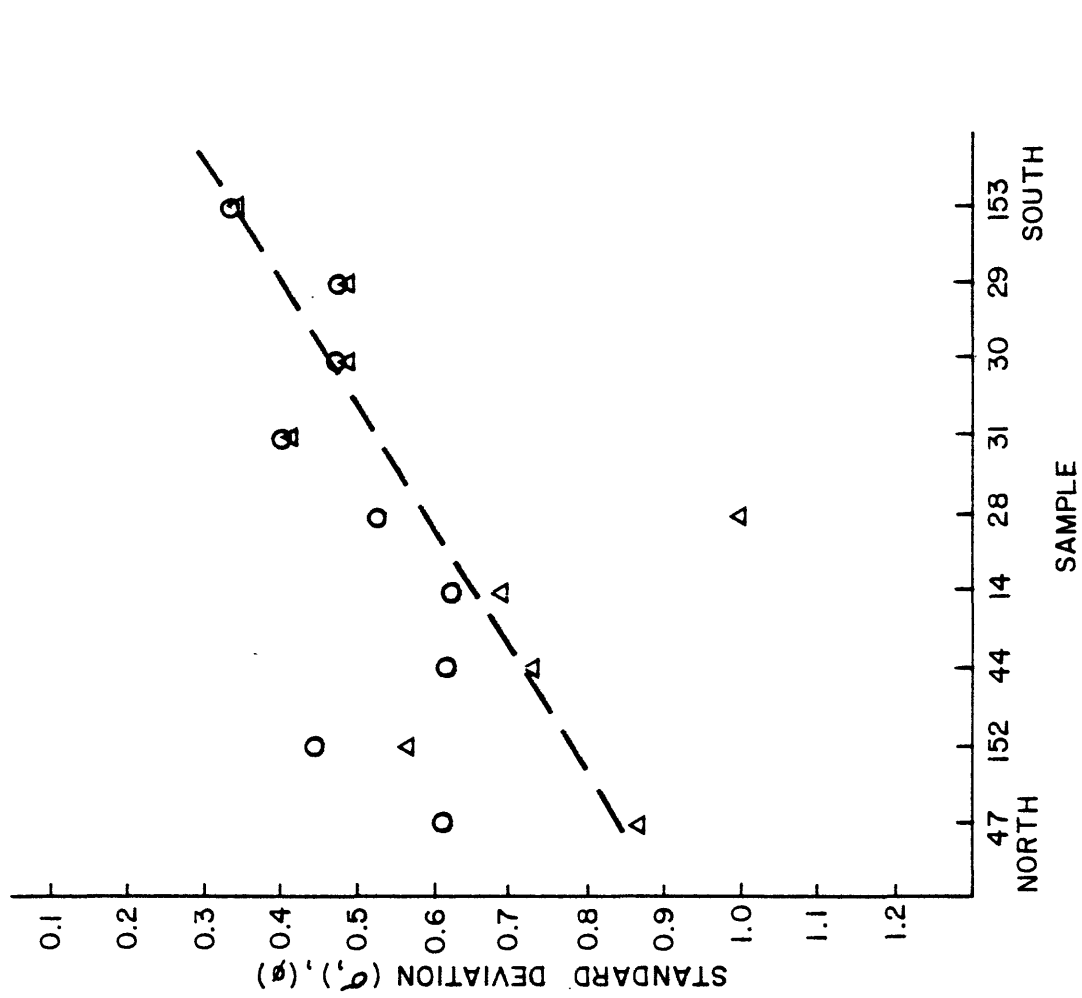


Figure 6.- Standard deviation along a north-south line, lower Cook Inlet

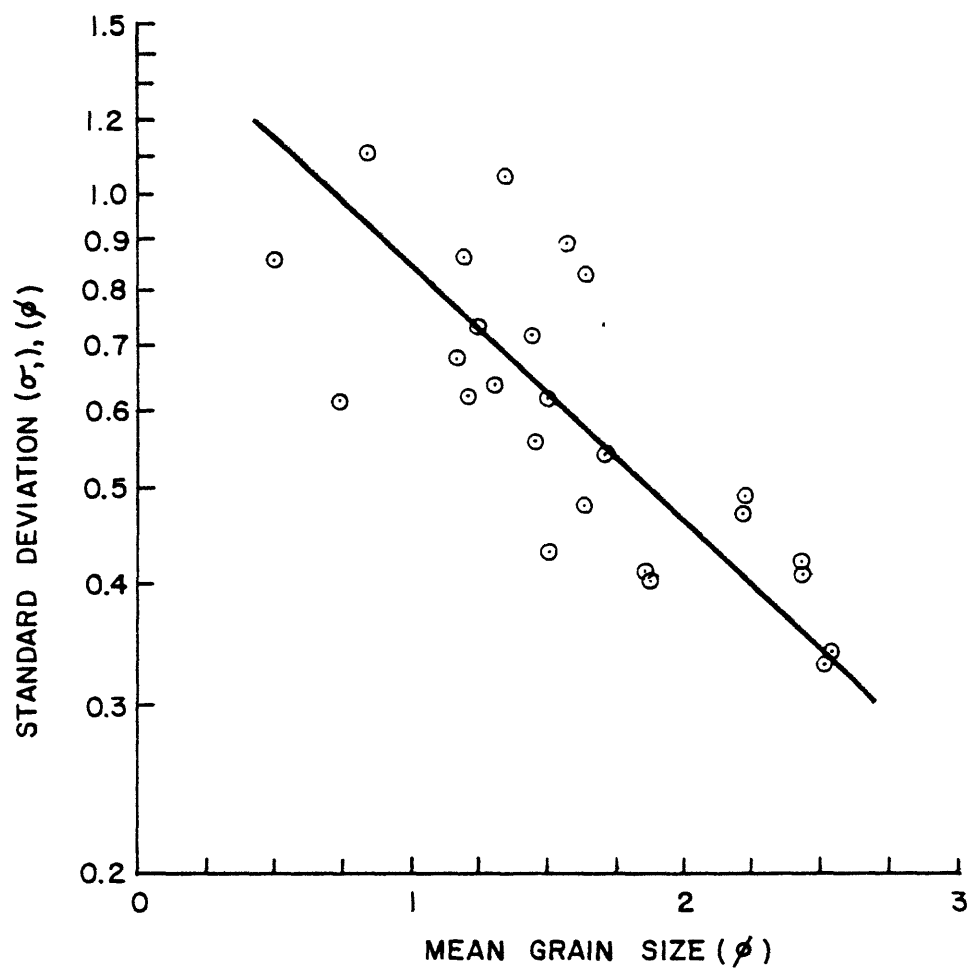


Figure 7.- Mean grain size vs. sorting, lower Cook Inlet.

the results, 2) it may reflect an original variation in mean grain size from north to south in lower Cook Inlet, 3) or it may be due to progressive sorting of the sediments by currents.

A systematic variation in grain size after the last glacial retreat from Cook Inlet is unlikely as glaciers are very poor sorting agents; glacial deposits are generally extremely poorly sorted mixtures of all size grades up to very large boulders. A more probable explanation is that the decrease in mean size and increase in sorting from north to south is due to progressive sorting by transport and winnowing.

Several lines of evidence support this interpretation. First, the majority of bedforms are consistently orientated with their steep faces toward the south indicating net transport in that direction (Bouma and Hampton, 1976; Bouma et al., 1977a). In addition, studies of quartz grain micro-surface textures indicate dominantly mechanical abrasion typical of aqueous transport in the bedform fields (Hampton and et al., 1978). Quartz surface microtextures commonly associated with glacial action are also present in lower Cook Inlet, though, for the most part, these occur in an unmodified state rarely in the bedform fields (Hampton et al., 1978). Most original glacial micro-textures present in the bedform fields have been overprinted with subaqueous transport features, indicating sufficient transport to subdue the original textures.

Inspection of the skewness and kurtosis reveals little information, primarily because so few samples are represented. The range in skewness is -0.5 to 0.4; most samples, however, are very close to symmetrical (0.0) in their size distribution (Fig. 8). Kurtosis shows a greater variation, from 0.28 to 1.96. There appears to be a slight tendency for the sediments to become negatively

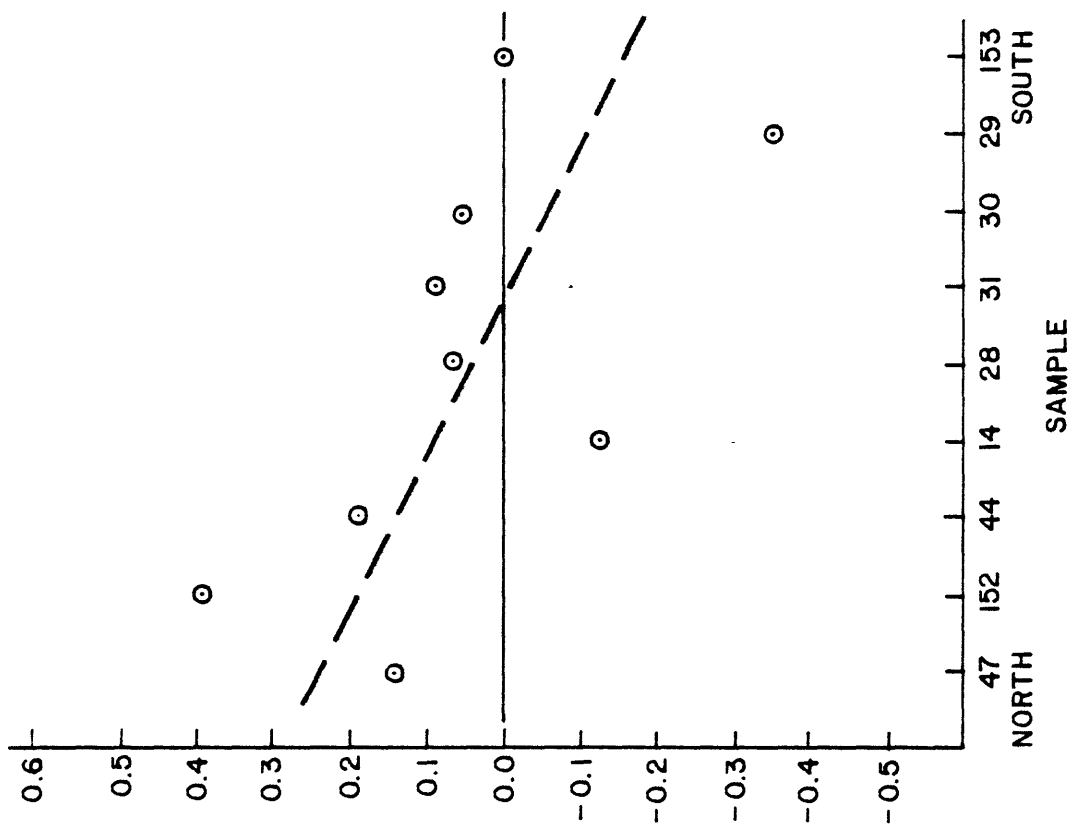


Figure 8.- Skewness along a north-south line, lower Cook Inlet.

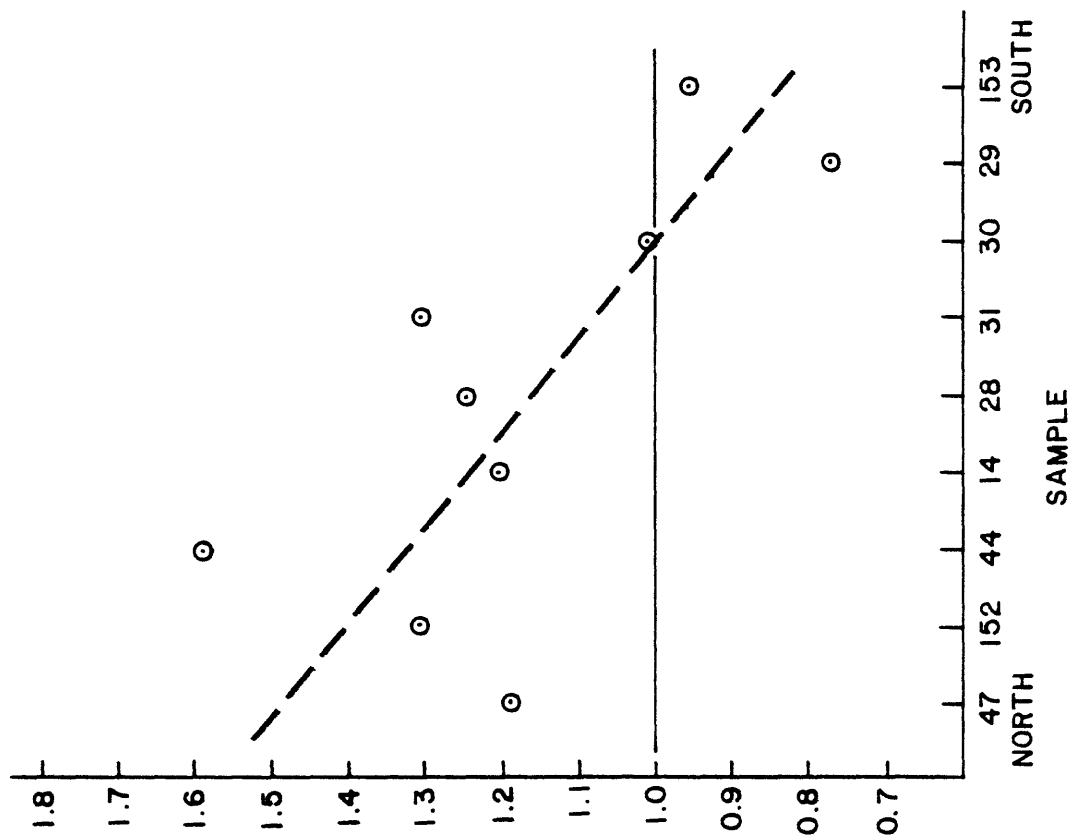


Figure 9.- Kurtosis along a north-south line, lower Cook Inlet.

skewed and platykurtic from north to south (Fig. 9). Grain size data are presented in Appendix I.

GENERALIZED ISOPACH MAP OF QUATERNARY SEDIMENTS

Sparker records from the 1976 cruise of the R/V SEA SOUNDER were used to make thickness measurements at 15 minute shot point positions of the uppermost sedimentary unit in lower Cook Inlet (Fig. 10). From these data, a generalized isopach map was constructed (Fig. 11).

Thicknesses were measured from the sea floor to an angular unconformity that shows distinctly on most of the records. Several thickness measurements were uncertain or indeterminable because of poor-quality records, shallow penetration, or the occurrence of the unconformity within the bubble pulse or a sea-bottom multiple. Where readings of "zero" thickness were recorded, the unconformity apparently rises to the sea floor and controls the sea floor geometry. Variations in the thickness of Quaternary sediments throughout lower Cook Inlet reflect a combination of variations in the elevations of the unconformity surface and of the sea floor.

In making the following maps, the assumption was made that the deformed rocks below the unconformity are of Tertiary age, judging from the on-land geology, and that the generally flat-lying sediments above the unconformity are primary and reworked glacially derived sediments deposited during Pleistocene-Holocene upper Tertiary age.

The thickness measurements were contoured only generally. Many thickness variations greater than one contour interval were ignored because they involve only one or two measurements. Consequently, many small basins and highs exist that do not show on the map. The areas south of Augustine Island and surrounding the Barren Islands are especially complex, and major portions of these areas were not contoured.

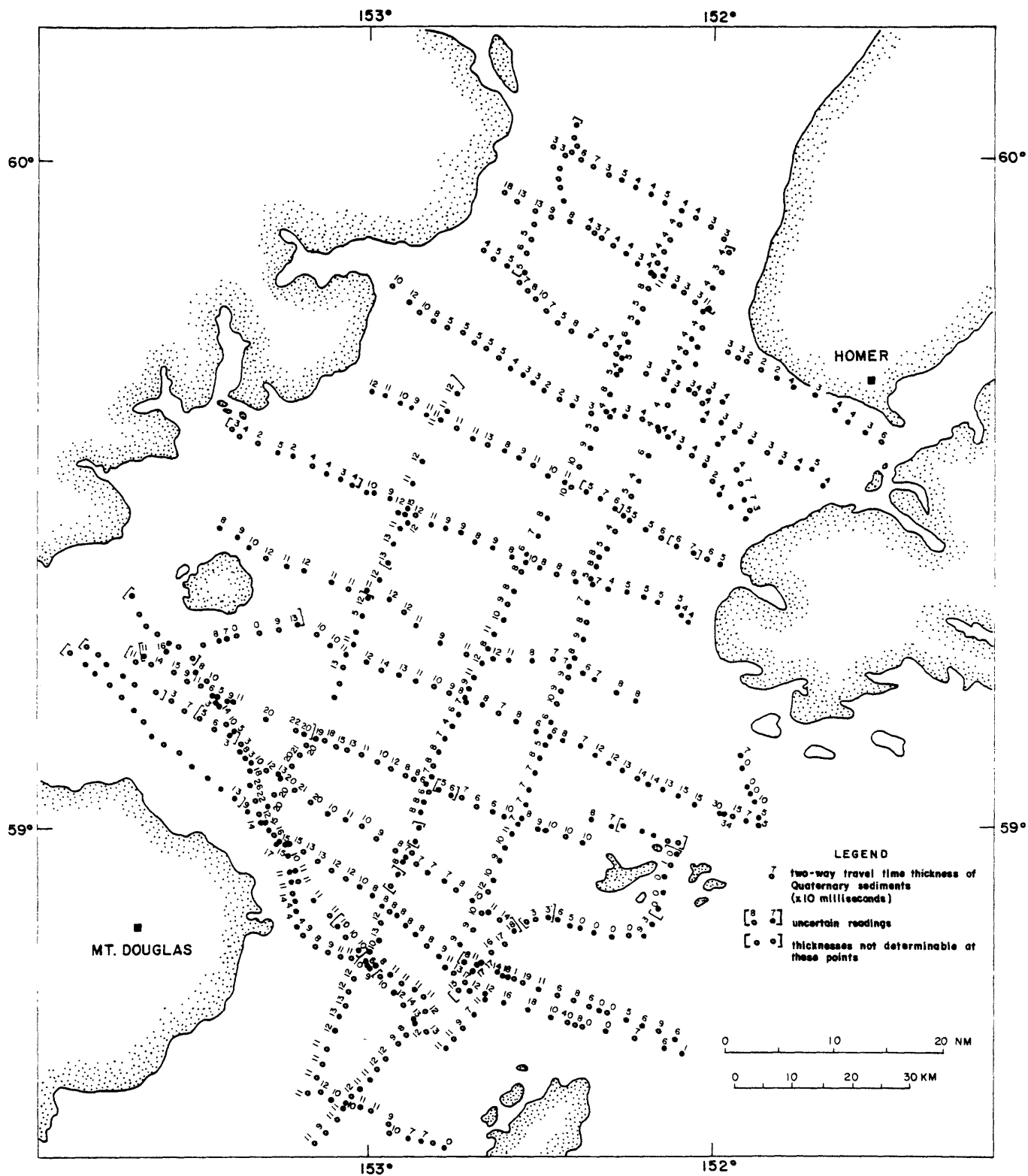


Figure 10. — THICKNESS MEASUREMENTS OF QUATERNARY SEDIMENTS
LOWER COOK INLET

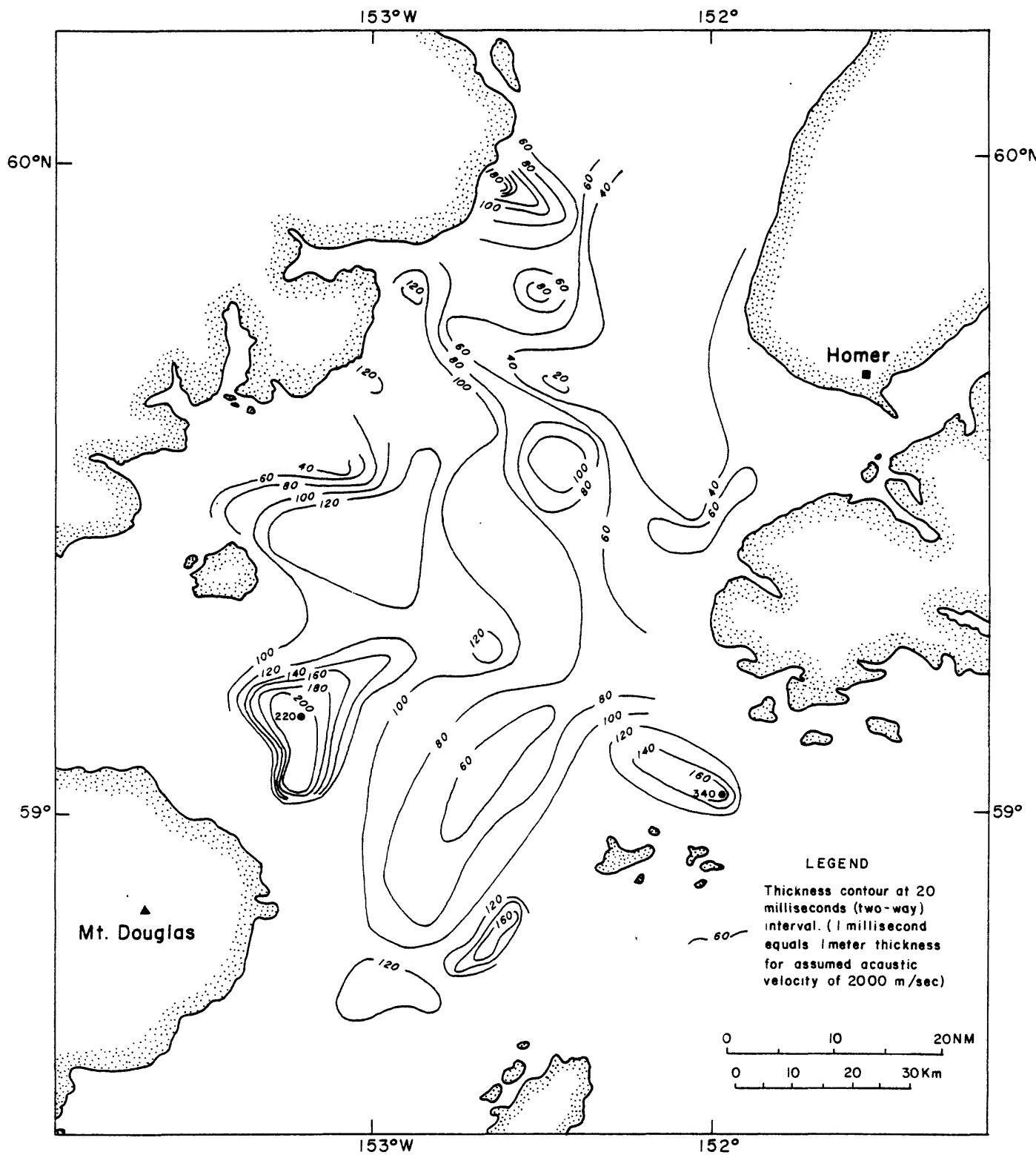


Figure 11.- GENERALIZED ISOPACH MAP OF QUATERNARY SEDIMENTS
LOWER COOK INLET

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APPENDIX I

Computer printout of sampling station data, grain size values, sediment parameters and graphic presentations of the surficial samples analyzed from lower Cook Inlet.

The computer printout shown in Appendix I gives all the pertinent data regarding the size analyses of the sand samples from lower Cook Inlet. Each sample has five pages of printout; the top of each page gives the cruise identification, sample number and type (in all cases Soutar van Veen grabs) and sample length, which is not applicable in the case of grab samples. The first page gives the method of analysis, total sample weight, and particle size distribution in mm. and phi (ϕ) units, and the size class ratios. Because all samples were entirely composed of sand-size material, the ratios are in all cases non-existent. The second page gives the interpolated values used in calculating graphical statistics, which include Folk and Ward's (1968), Inman's (1952), and Trask's (1950) median, mean, sorting, skewness and kurtosis values. Moment measures and the class midpoints used in their calculation are also included on the second page. The third page gives the mode or modes, the fourth page presents a histogram of frequency versus size, and the fifth page gives a cumulative curve for the sample.

SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-14	S	14	. M	. CM	. CM	1

#F:SV=20,ST= 0,H=0;WT:SV=30.3000,ST= 0.0000,H/P= 0.0000; PHI LIM:CS= 0.0000,PN= 0.00

SAMPLE ANALYZED BY THE FOLLOWING METHOD(S):

---SIZE-RANGE---
 2.0000- 0.0625MM SIEVES

UNEDITED SAMPLE WEIGHTS IN GRAMS:

SIEVES	BSA----	HYDRORHOIMEIER-	PAN----	TOTAL---
30.3000				30.3000 (G)

PARTICLE SIZE DISTRIBUTION:

PHI---	MM---	PERCENT	CUM
-0.7500	1.6818	0.660	0.660
-0.5000	1.4142	1.254	1.914
-0.2500	1.1892	1.320	3.234
0.0000	1.0000	1.485	4.719
0.2500	0.8409	2.013	6.733
0.5000	0.7071	3.036	9.769
0.7500	0.5946	8.680	18.449
1.0000	0.5000	13.366	31.815
1.2500	0.4204	19.571	51.386
1.5000	0.3536	19.670	71.056
1.7500	0.2973	14.587	85.644
2.0000	0.2500	8.812	94.455
2.2500	0.2102	3.135	97.591
2.5000	0.1768	0.891	98.482
2.7500	0.1486	0.528	99.010
3.0000	0.1250	0.363	99.373
3.2500	0.1051	0.198	99.571
3.5000	0.0884	0.165	99.736
3.7500	0.0743	0.132	99.868
4.0000	0.0625	0.132	100.000

SIZE CLASS RATIOS:

GRAVEL=	0.000PCT	GRAVEL/SAND=	0.000
SAND =	100.000PCT	SAND/SILT =	0.000
SILT =	0.000PCT	SILT/CLAY =	0.000
CLAY =	0.000PCT	SAND/CLAY =	0.000
MUD =	0.000PCT	SAND/MUD =	0.000
		GRAVEL/MUD =	0.000

SEA276WG

CRUISE	STATION	SAMPLE TYPE-NUMBER	TOTAL		SAMPLE		METHODS
			LENGTH	CENTER	LENGTH	CENTER	
S276WG	S-14	S 14	. M	. CM	. CM	. CM	1

INTERPOLATED SIZES USED IN GRAPHICAL STATISTICS:

	05.00	10.00	16.00	22.00	50.00	75.00	84.00	90.00	95.00	CUM-PERCENT
PHI	0.040	0.512	0.718	0.887	1.235	1.555	1.715	1.827	2.005	PHI
MM	0.9727	0.7015	0.6080	0.5408	0.4250	0.3404	0.3045	0.2818	0.2491	MM

GRAPHICAL STATISTICS:

	-INMMN-(PHI)2---	-IBASK-(MM)---
EQLK-8-WABD-5EB12		
MEDIAN=	1.2346	MEDIAN= 0.4250
MEAN =	1.2226	MEAN = 0.4406
SORTING=	0.5472	SORTING= 1.2605
SKEWNESS=	-0.1259	SKEWNESS= 1.0193
	SKEW 16/84= -0.0361	
	SKEW 05/95= -0.4251	
KURTOSIS=	1.2057	KURTOSIS= 0.2388

CLASS MID-POINTS(PHI) USED IN THE MOMENT CALCULATIONS:

	-0.88	-0.63	-0.38	-0.13	0.13	0.38	0.63	0.88	1.13	1.38	1.63	1.88	2.13	2.38	2.63
2.88	3.13	3.38	3.63	3.88											

MOMENT MEASURES:

	--PHI--	--MM--
FIRST (ABOUT ORIGIN)=	1.1913	0.4379
SECOND (ABOUT MEAN) =	0.3817	
THIRD (ABOUT MEAN) =	0.6178	
FOURTH (ABOUT MEAN) =	-0.1876	

SEA276WG

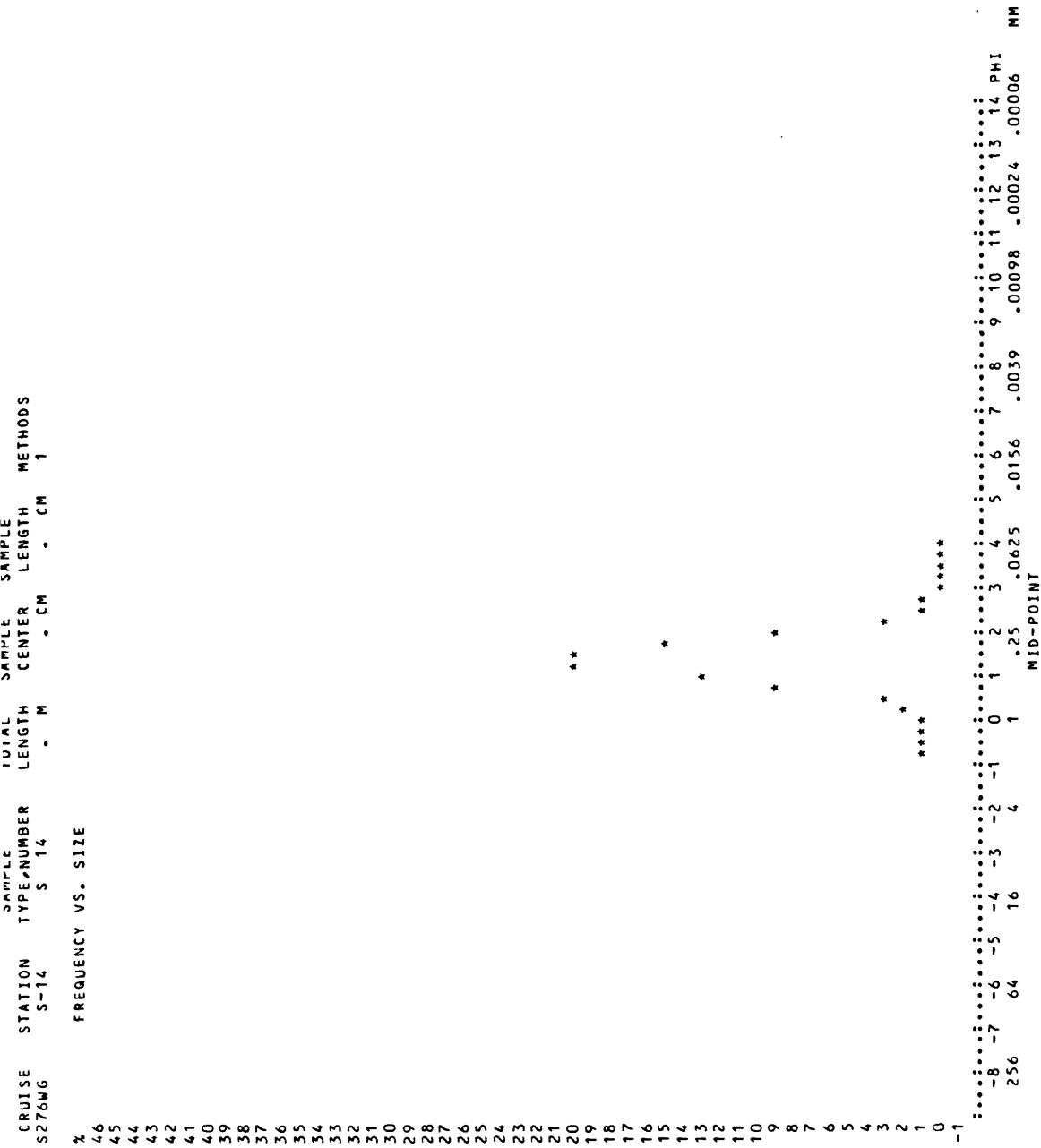
CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-14	S	14	. M	. CM	. CM	1

MODAL ANALYSIS

1 MODE(S) DETECTED IN THIS SAMPLE.

PHI--	MM--	PERCENT
-0.750	1.6818	0.6601
-0.500	1.4142	1.2541
-0.250	1.1892	1.3201
0.000	1.0000	1.4851
0.250	0.8409	2.0132
0.500	0.7071	3.0363
0.750	0.5946	8.6799
1.000	0.5000	13.3663
1.250	0.4204	19.5710
1.500	0.3536	19.6700
1.750	0.2973	14.5875
2.000	0.2500	8.8119
2.250	0.2102	3.1353
2.500	0.1768	0.8911
2.750	0.1486	0.5281
3.000	0.1250	0.3630
3.250	0.1051	0.1980
3.500	0.0884	0.1650
3.750	0.0743	0.1320
4.000	0.0625	0.1320

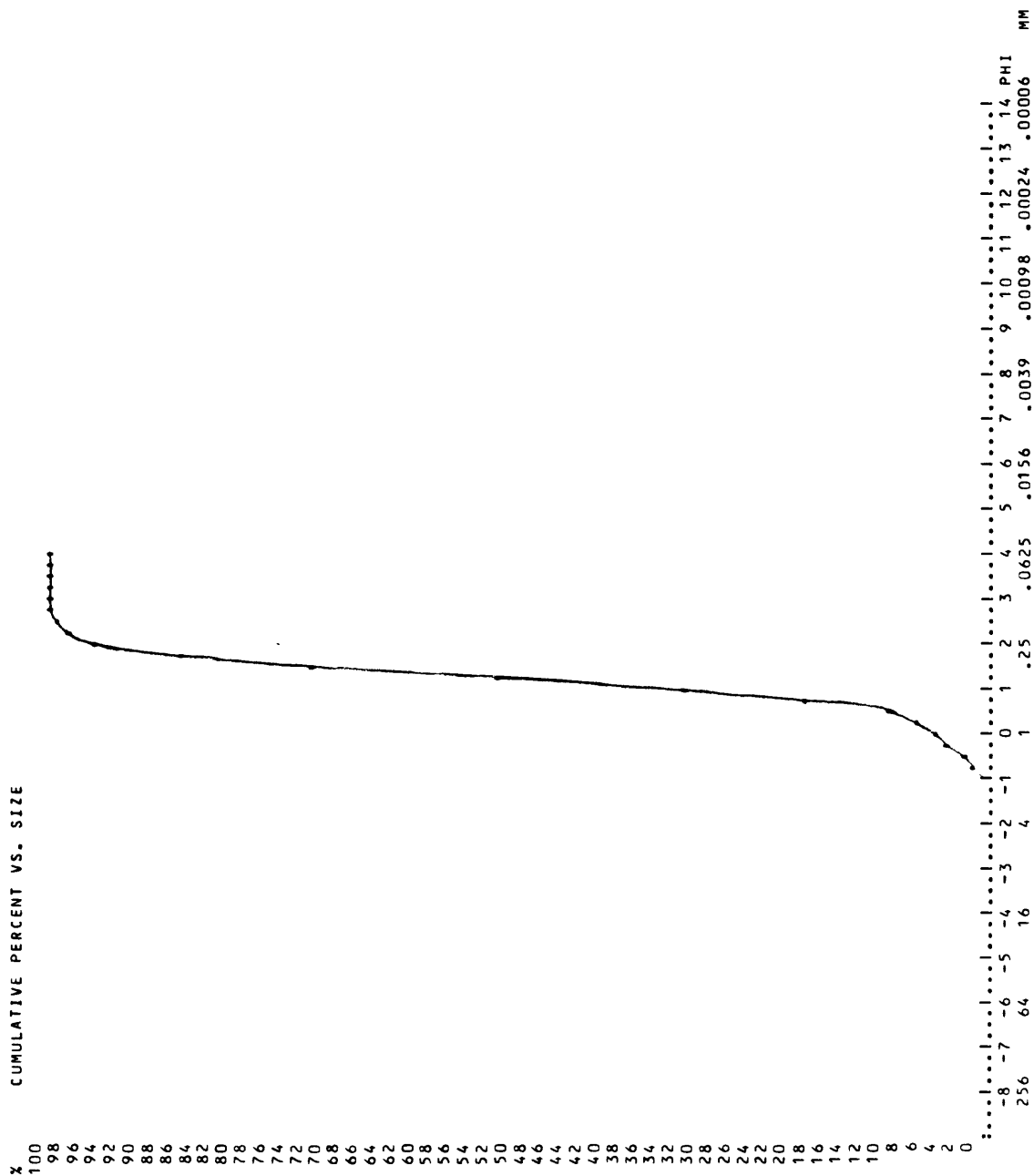
** MODE **



SEA276WG

CRUISE	STATION	SAMPLE TYPE/NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-14	S 14	. M	. CM	. CM	1

CUMULATIVE PERCENT VS. SIZE



CRUISE STATION S-15 SAMPLE TYPE NUMBER S15S1 TOTAL LENGTH . M SAMPLE CENTER . CM SAMPLE LENGTH . CM METHODS 1
S276WG

#F:SV=20,ST= 0,H=0;WT:SV=29.6200,ST= 0.0000,H/P= 0.0000; PHI LIM:CS= 0.00,FN= 0.00

SAMPLE ANALYZED BY THE FOLLOWING METHOD(S):

---SIZE-RANGE--- METHOD-----
2.0000- 0.0625MM SIEVES

UNEDITED SAMPLE WEIGHTS IN GRAMS:

-SIEVES-- --BSA----- HYDROPHOTOMETER-- --PAN----- --TOTAL---
29.6200 29.6200 (G)

PARTICLE SIZE DISTRIBUTION:

	MM--	PERCENT	CUM
-PHI----	1.6818	0.203	0.203
-0.7500	1.4142	0.709	0.912
-0.5000	1.1892	1.013	1.924
-0.2500	1.0000	1.519	3.444
0.2500	0.8409	2.161	5.604
0.5000	0.7071	3.106	8.710
0.7500	0.5946	7.056	15.766
1.0000	0.5000	4.288	20.054
1.2500	0.4204	9.554	29.608
1.5000	0.3536	14.686	44.294
1.7500	0.2973	13.234	57.529
2.0000	0.2500	13.741	71.269
2.2500	0.2102	11.479	82.748
2.5000	0.1768	4.186	86.935
2.7500	0.1486	5.469	92.404
3.0000	0.1250	2.127	94.531
3.2500	0.1051	2.296	96.826
3.5000	0.0884	1.283	98.109
3.7500	0.0743	1.013	99.122
4.0000	0.0625	0.878	100.000

SIZE CLASS RATIOS:

GRAVEL=	0.000PCT	GRAVEL/SAND=	0.000
SAND =	100.000PCT	SAND/SILT =	9999.999
SILT =	0.000PCT	SILT/CLAY =	0.000
CLAY =	0.000PCT	SAND/CLAY =	0.000
MUD =	0.000PCT	SAND/MUD =	9999.999
		GRAVEL/MUD =	0.000

SEA276WG

CRUISE STATION S-15
S276WG S15S1
SAMPLE TYPE NUMBER
TOTAL LENGTH
SAMPLE CENTER
SAMPLE LENGTH
METHODS
1

INTERPOLATED SIZES USED IN GRAPHICAL STATISTICS:

SUM-PERCENT	05.00	10.00	16.00	25.00	50.00	75.00	84.00	90.00	95.00	SUM-PERCENT
PHI	0.189	0.555	0.764	1.160	1.607	2.044	2.323	2.611	3.042	PHI
MM	0.8769	0.6808	0.5890	0.4475	0.3283	0.2425	0.1999	0.1637	0.1214	MM

GRAPHICAL STATISTICS:

EQK-&-WARD-(PHI)	-INMAN-(PHI)	-IRASK-(MM)
MEDIAN= 1.6069	MEDIAN= 1.6069	MEDIAN= 0.3283
MEAN = 1.5645	MEAN = 1.5434	MEAN = 0.3450
SORTING= 0.8220	SORTING= 0.7796	SORTING= 1.3585
SKEWNESS= -0.0377	SKEW 16/84= -0.0815	SKEWNESS= 1.0066
KURTOSIS= 1.3223	SKEW 05/95= 0.0111	KURTOSIS= 0.1982

CLASS MID-POINTS(PHI) USED IN THE MOMENT CALCULATIONS:

-0.88	-0.63	-0.38	-0.13	0.13	0.38	0.63	0.88	1.13	1.38	1.63	1.88	2.13	2.38	2.63
2.88	3.13	3.38	3.63	3.88										

MOMENT MEASURES:

FIRST (ABOUT ORIGIN)=	PHI----	MM----
SECOND (ABOUT MEAN) =	1.6000	0.3299
THIRD (ABOUT MEAN) =	0.6845	
FOURTH (ABOUT MEAN) =	0.8274	
	STANDARD DEVIATION	
	THIRD (ABOUT MEAN) =	-0.0021
	FOURTH (ABOUT MEAN) =	0.1963

SEA276WG

CRUISE	STATION	SAMPLE TYPE,NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-15	S15S1	. M	. CM	. CM	1

MODAL ANALYSIS

5 MODE(S) DETECTED IN THIS SAMPLE.

PHI	WM	PERCENT
-0.750	1.6818	0.2026
-0.500	1.4142	0.7090
-0.250	1.1892	1.0128
0.000	1.0000	1.5192
0.250	0.8409	2.1607
0.500	0.7071	3.1060
0.750	0.5946	7.0560
1.000	0.5000	4.2876
1.250	0.4204	9.5544
1.500	0.3536	14.6860
1.750	0.2973	13.2343
2.000	0.2500	13.7407
2.250	0.2102	11.4787
2.500	0.1768	4.1864
2.750	0.1486	5.4693
3.000	0.1250	2.1269
3.250	0.1051	2.2957
3.500	0.0884	1.2829
3.750	0.0743	1.0128
4.000	0.0625	0.8778

** MODE **

** MODE **

** MODE **

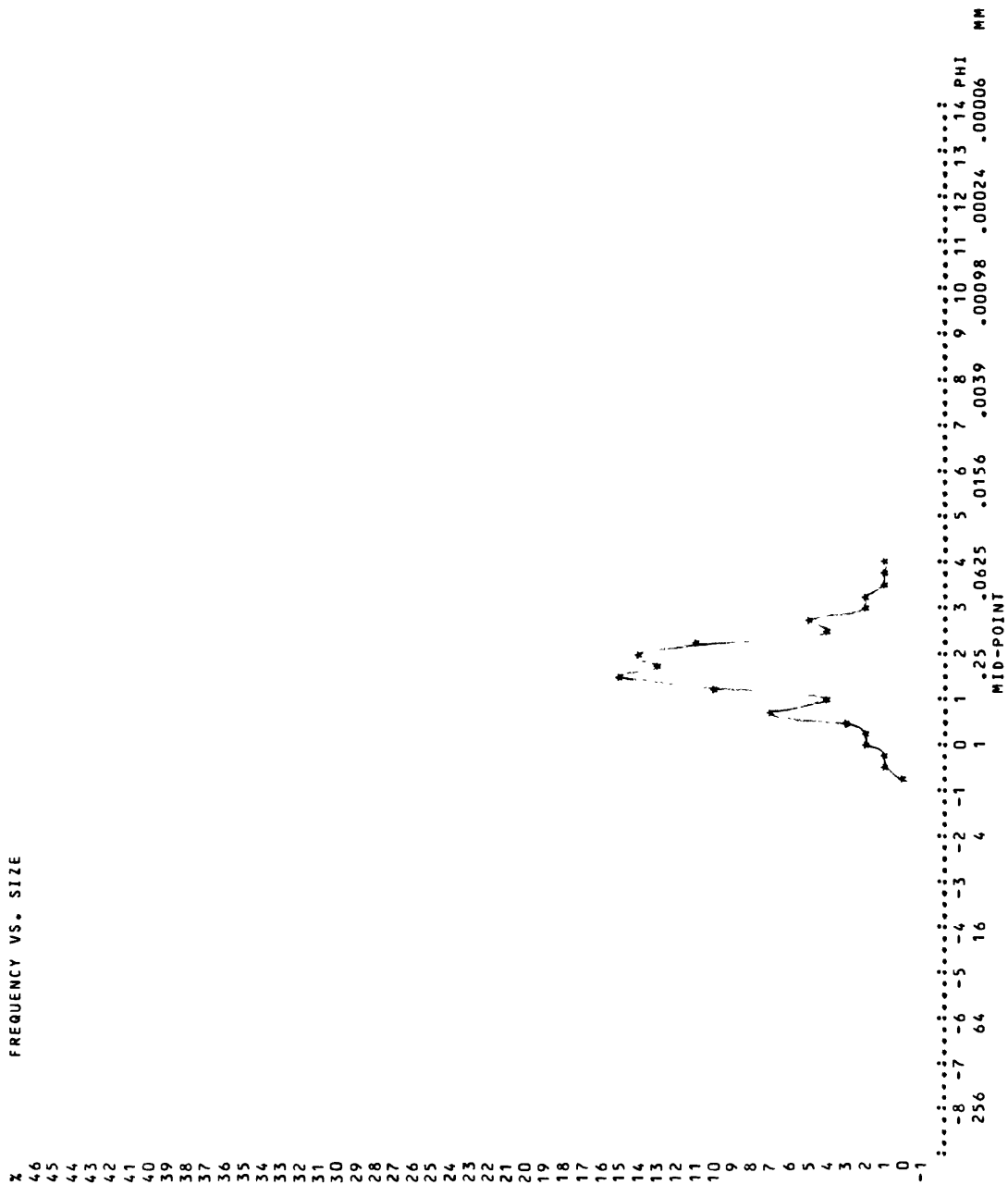
** MODE **

** MODE **

SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHOD
S276WG	S-15	S15S1		M	CM	CM	1

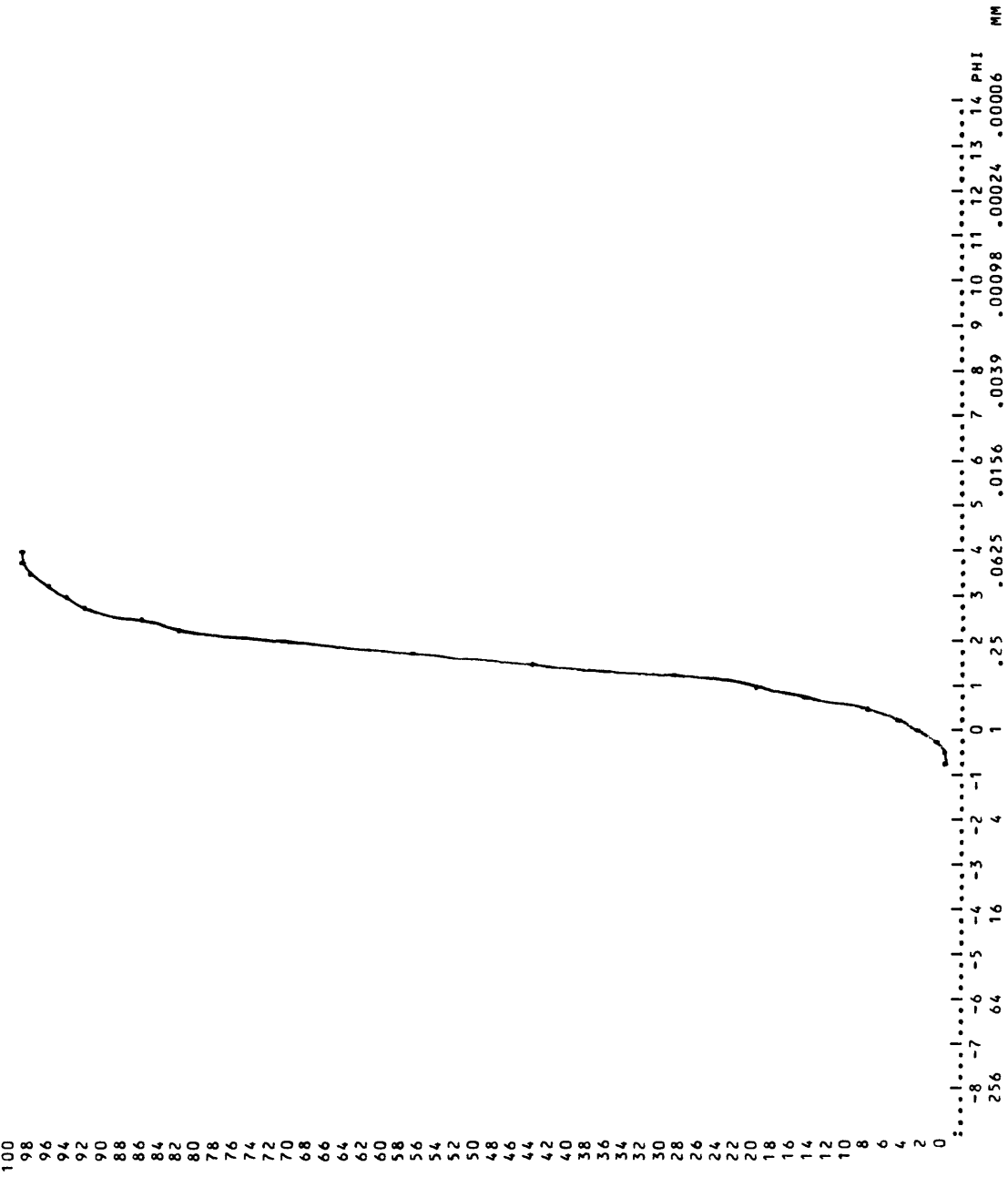
FREQUENCY VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE,NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-15	S1551	. M	. CM	. CM	1

X CUMULATIVE PERCENT VS. SIZE



SEA276WG

CRUISE STATION S-28
S276WG S2851

SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
	S2851	. M	. CM	. CM	1

#F:SV=20,ST= 0,H=0;WT:SV=26.1000,ST= 0.0000,H/P= 0.0000; PHI LIM:CS= 0.00,FN= 0.00

SAMPLE ANALYZED BY THE FOLLOWING METHOD(S):

-----SIZE-RANGE-----
2.0000- 0.0625MM SIEVES

UNEDITED SAMPLE WEIGHTS IN GRAMS:

-SIEVES-- --RSA---- HYDROPHOTOMETER-- --PAN---- -TOTAL---
26.1000 26.1000 (G)

PARTICLE SIZE DISTRIBUTION:

	PERCENT	CUM
-PHI----		
-0.7500	1.6818	0.115
-0.5000	1.4142	0.383
-0.2500	1.1892	0.766
0.0000	1.0000	1.188
0.2500	0.8409	1.762
0.5000	0.7071	2.337
0.7500	0.5946	3.755
1.0000	0.5000	6.743
1.2500	0.4204	13.410
1.5000	0.3536	34.521
1.7500	0.2973	57.280
2.0000	0.2500	76.245
2.2500	0.2102	89.004
2.5000	0.1768	93.027
2.7500	0.1486	97.739
3.0000	0.1250	98.851
3.2500	0.1051	99.464
3.5000	0.0884	99.732
3.7500	0.0743	99.885
4.0000	0.0625	100.000

SIZE CLASS RATIOS:

GRAVEL=	0.000PCT	GRAVEL/SAND=	0.000
SAND =	100.000PCT	SAND/SILT =	99999.999
SILT =	0.000PCT	SILT/CLAY =	0.000
CLAY =	0.000PCT	SAND/CLAY =	0.000
MUD =	0.000PCT	SAND/MUD =	99999.999
		GRAVEL/MUD =	0.000

SEA276WG

CRUISE STATION S-28
S276WG
SAMPLE TYPE/NUMBER S28S1
TOTAL LENGTH . M
SAMPLE CENTER . CM
SAMPLE LENGTH . CM
METHODS 1

INTERPOLATED SIZES USED IN GRAPHICAL STATISTICS:

CUM-PERCENT	05.00	10.00	16.00	25.00	50.00	75.00	84.00	90.00	95.00	CUM-PERCENT
PHI	0.882	1.154	1.303	1.439	1.668	1.981	2.099	2.310	2.528	PHI
MM	0.5425	0.4494	0.4052	0.3687	0.3147	0.2534	0.2334	0.2017	0.1734	MM

GRAPHICAL STATISTICS:

EOLK & WARD- MEDIAN = 1.6682 MEAN = 1.6901 SORTING = 0.4482 SKEWNESS = 0.0637 KURTOSIS = 1.2454	-INMAN-(PHI)--- MEDIAN = 1.6682 MEAN = 1.7011 SORTING = 0.3978 SKEW 16/84 = 0.0827 SKEW 05/95 = 0.0924 KURTOSIS = 1.0684	-IRASK-(MM)--- MEDIAN = 0.3147 MEAN = 0.3110 SORTING = 1.2064 SKEWNESS = 0.9436 KURTOSIS = 0.2329
--	--	--

CLASS MID-POINTS(PHI) USED IN THE MOMENT CALCULATIONS:

-0.88	-0.63	-0.38	-0.13	0.13	0.38	0.63	0.88	1.13	1.38	1.63	1.88	2.13	2.38	2.63
2.88	3.13	3.38	3.63	3.88										

MOMENT MEASURES:

FIRST (ABOUT ORIGIN) =	--PHI---	---
SECOND (ABOUT MEAN) =	1.6845	0.3111
SECOND (ABOUT MEAN) =	0.2930	VARIANCE
	0.5413	STANDARD DEVIATION
THIRD (ABOUT MEAN) =		-0.1833
FOURTH (ABOUT MEAN) =		1.4095

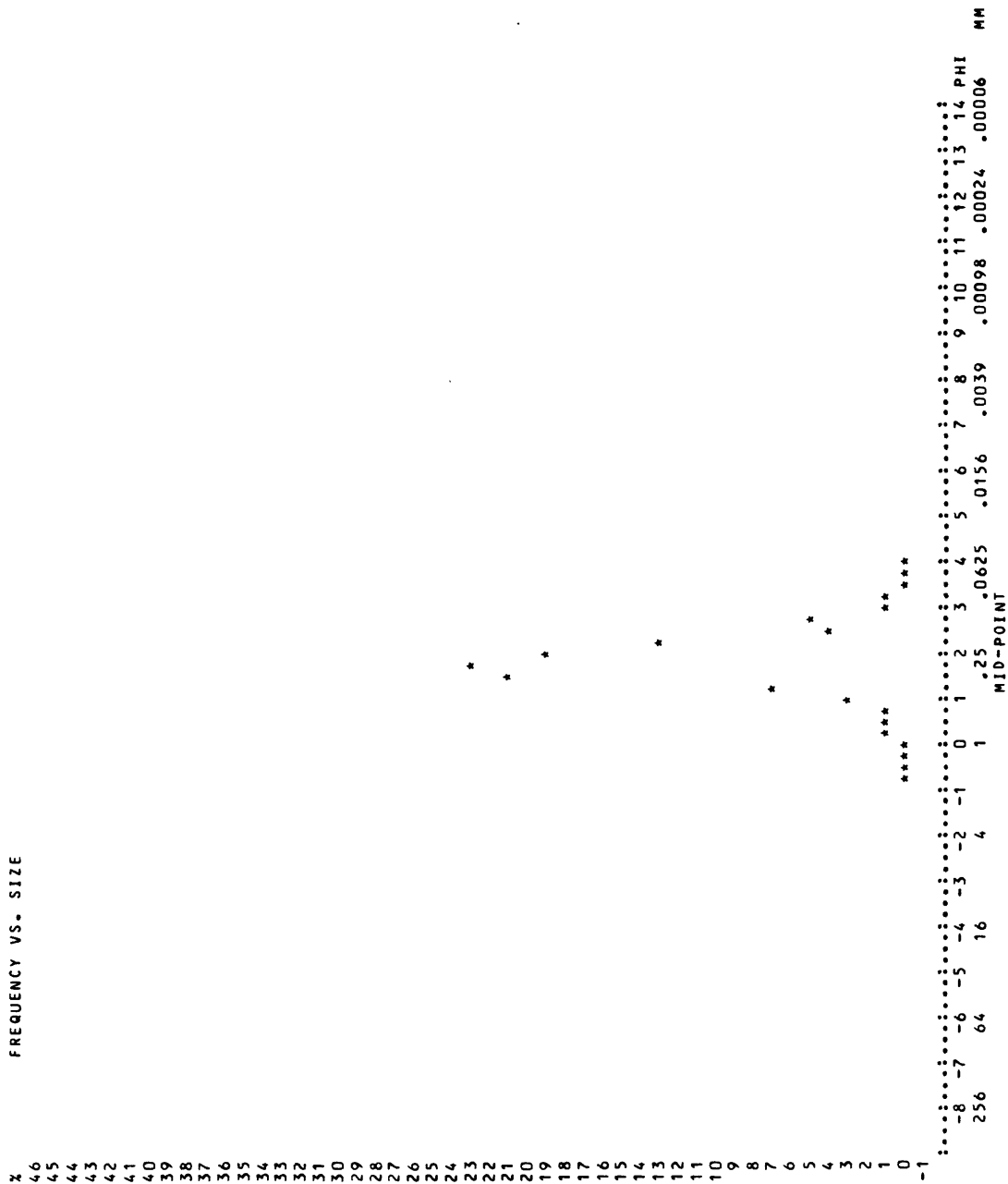
SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-28	S28S1		. M	. CM	. CM	1
MODAL ANALYSIS							
2 MODE(S) DETECTED IN THIS SAMPLE.							
--PHI--	--MM--	--PERCENT					
-0.750	1.6818	0.1149					
-0.500	1.4142	0.2682					
-0.250	1.1892	0.3831					
0.000	1.0000	0.4215					
0.250	0.8409	0.5747					
0.500	0.7071	0.5747					
0.750	0.5946	1.4176					
1.000	0.5000	2.9885					
1.250	0.4204	6.6667					
1.500	0.3536	21.1111					
1.750	0.2973	22.7586					
2.000	0.2500	18.9655					
2.250	0.2102	12.7586					
2.500	0.1768	4.0230					
2.750	0.1486	4.7126					
3.000	0.1250	1.1111					
3.250	0.1051	0.6130					
3.500	0.0884	0.2682					
3.750	0.0743	0.1533					
4.000	0.0625	0.1149					
		** MODE **					
		** MODE **					

SEA276WG

CRUISE STATION S-28 SAMPLE TYPE NUMBER S28S1 TOTAL LENGTH . M SAMPLE CENTER . CM SAMPLE LENGTH . CM METHODS 1

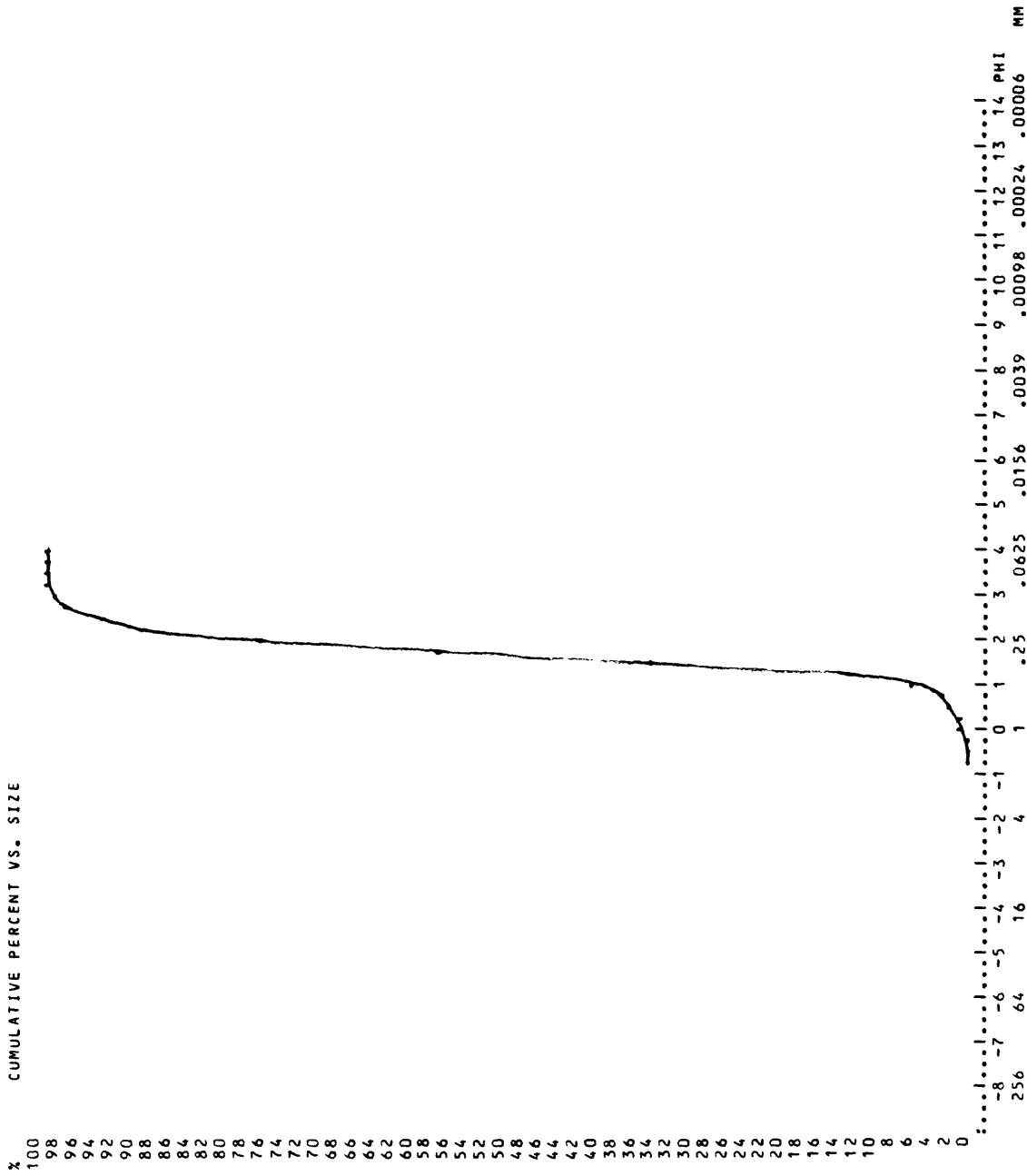
276WG FREQUENCY VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE, NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-28	S2851	M	CM	CM	1

CUMULATIVE PERCENT VS. SIZE



CRUISE STATION SAMPLE TYPE,NUMBER TOTAL LENGTH SAMPLE CENTER SAMPLE LENGTH METHODS
S276WG S-29 S29S1 . M . CM . CM 1

#F:SV=20,ST= 0,H=0;WT:SV=27.6300,ST= 0.0000,H/P= 0.0000; PHI LIM:CS= 0.00, FN= 0.00

SAMPLE ANALYZED BY THE FOLLOWING METHOD(S):

---SIZE-RANGE--- --WEIGHOR-----

2.0000- 0.0625MM SIEVES

UNEDITED SAMPLE WEIGHTS IN GRAMS:

-SIEVES-- --BSA----- HYDBORHOIMEIER- --PAN----- -TOTAL-----
27.6800

PARTICLE SIZE DISTRIBUTION:

-PRT----		-MM----		PERCENTI		CUM	
-0.7500		1.6818		0.072		0.072	
-0.5000		1.4142		0.072		0.145	
-0.2500		1.1892		0.072		0.217	
0.0000		1.0000		0.108		0.325	
0.2500		0.8409		0.145		0.470	
0.5000		0.7071		0.289		0.759	
0.7500		0.5946		0.325		1.084	
1.0000		0.5000		0.361		1.445	
1.2500		0.4204		0.542		1.987	
1.5000		0.3536		1.590		3.577	
1.7500		0.2973		8.887		12.464	
2.0000		0.2500		19.689		32.153	
2.2500		0.2102		21.134		53.288	
2.5000		0.1768		15.282		68.569	
2.7500		0.1486		24.675		93.244	
3.0000		0.1250		4.408		97.652	
3.2500		0.1051		1.590		99.241	
3.5000		0.0884		0.434		99.675	
3.7500		0.0743		0.181		99.855	
4.0000		0.0625		0.145		100.000	

SIZE CLASS RATIOS:

GRAVEL=	0.000PCT	GRAVEL/SAND=	0.000
SAND =	100.000PCT	SAND/SILT =	*****
SILT =	-0.000PCT	SILT/CLAY =	0.000
CLAY =	0.000PCT	SAND/CLAY =	0.000
MUD =	-0.000PCT	SAND/MUD =	*****
		GRAVEL/MUD =	0.000

SEA276WG

CRUISE STATION S-29 SAMPLE TYPE NUMBER S29S1 TOTAL LENGTH . M SAMPLE CENTER . CM SAMPLE LENGTH . CM METHODS 1

INTERPOLATED SIZES USED IN GRAPHICAL STATISTICS:

	CUM_PRCENTI	05.00	10.00	16.00	25.00	50.00	75.00	95.00	CUM_PRCENTI
PHI	1.608	1.681	1.811	1.934	2.208	2.565	2.807	2.807	PHI
MM	0.3280	0.3119	0.2850	0.2616	0.2164	0.1690	0.1575	0.1429	MM

GRAPHICAL STATISTICS:

EQLS-E-WABQ--PHI12
 MEDIAN= 2.2081
 MEAN = 2.1907
 SORTING= 0.3671
 SKEWNESS= -0.0355
 KURTOSIS= 0.7786

-INMAN-(PHI12)---
 MEDIAN= 2.2081
 MEAN = 2.1821
 SORTING= 0.3711
 SKEWNESS= -0.0701
 KURTOSIS= 0.6146

-IRASK-(MM1)---
 MEDIAN= 0.2164
 MEAN = 0.2153
 SORTING= 1.2444
 SKEWNESS= 0.9439
 KURTOSIS= 0.3000

CLASS MID-POINTS(PHI) USED IN THE MOMENT CALCULATIONS:

	-0.88	-0.63	-0.38	-0.13	0.13	0.38	0.63	0.88	1.13	1.38	1.63	1.88	2.13	2.38	2.63
2.88	3.13	3.38	3.63	3.88											

MOMENT MEASURES:

FIRST (ABOUT ORIGIN)=
 SECOND (ABOUT MEAN)=
 SECOND (ABOUT MEAN)=
 THIRD (ABOUT MEAN)=
 FOURTH (ABOUT MEAN)=

---PHI---
 2.2094
 0.2185 VARIANCE
 0.4674 STANDARD DEVIATION
 -0.4674
 2.1667

---MM---
 0.2162

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SEA276WG
CRUISE STATION SAMPLE TYPE/NUMBER TOTAL LENGTH . M SAMPLE CENTER . CM SAMPLE LENGTH . CM METHODS
S276WG S-29 S29S1

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CRUISE	STATION	SAMPLE TYPE/NUMBER	TOTAL LENGTH . M	SAMPLE CENTER . CM	SAMPLE LENGTH . CM	METHODS
S276WG	S-29	S29S1				1

MODAL ANALYSIS

2 MODE(S) DETECTED IN THIS SAMPLE.

PHI	MM	PERCENT
-0.750	1.6818	0.0723
-0.500	1.4142	0.0723
-0.250	1.1892	0.0723
0.000	1.0000	0.1084
0.250	0.8409	0.1445
0.500	0.7071	0.2890
0.750	0.5946	0.3251
1.000	0.5000	0.3613
1.250	0.4204	0.5419
1.500	0.3536	1.5896
1.750	0.2973	8.8873
2.000	0.2500	19.6893
2.250	0.2102	21.1344
2.500	0.1768	15.2818
2.750	0.1486	24.6749
3.000	0.1250	4.4075
3.250	0.1051	1.5896
3.500	0.0884	0.4335
3.750	0.0743	0.1806
4.000	0.0625	0.1445

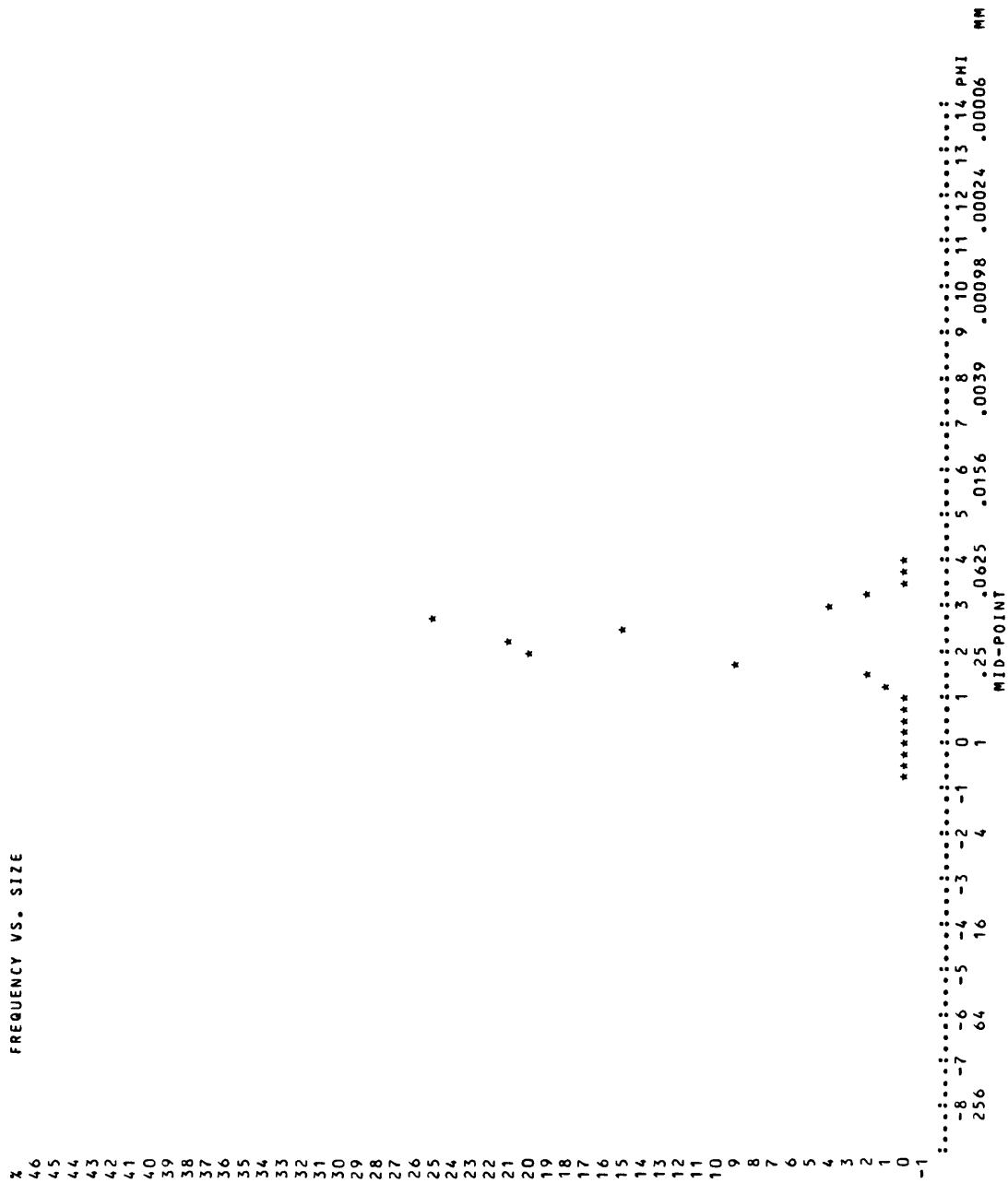
** MODE **

** MODE **

SEA276WG

CRUISE	STATION	SAMPLE	TOTAL	SAMPLE	SAMPLE	METHODS
S276WG	S-29	TYPE/NUMBER	LENGTH	CENTER	LENGTH	
		S29S1	. M	. CM	. CM	1

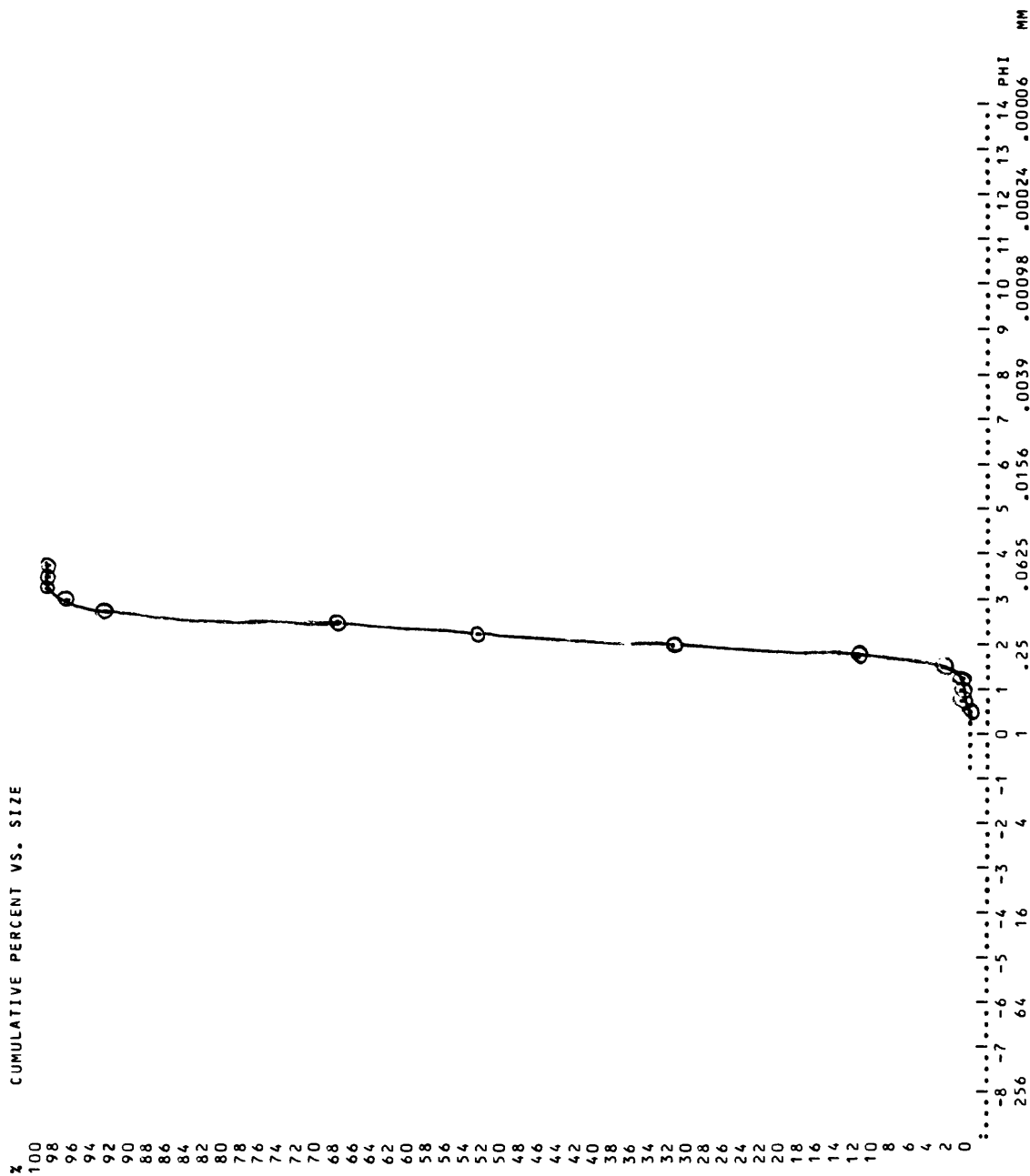
FREQUENCY VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-29	S29S1		M	CM	CM	1

Σ CUMULATIVE PERCENT VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE	NUMBER	TOTAL LENGTH	SAMPLE CENTER	LENGTH	SAMPLE METHODS
S276WG	S-30	S30S1		M	CM	CM	1

#F:SV=20,ST= 0,H=0;WT:SV=27.1600,ST= 0.0000,H/P= 0.0000; PHI LIM:CS= 0.00, FN= 0.00

SAMPLE ANALYZED BY THE FOLLOWING METHOD(S):

----SIZE-RANGE-- --METHOD-----
2.0000- 0.0625MM SIEVES

UNEDITED SAMPLE WEIGHTS IN GRAMS:

-SIEVES--	--BSA----	HYDRORHOIOMETER-	--PAN----	--TOTAL---
27.1550				27.1550 (G)

PARTICLE SIZE DISTRIBUTION:

	PERCENTI	CUM
-PHI----	PERCENTI	PERCENTI
-0.7500	1.6818	0.184
-0.5000	1.4142	0.147
-0.2500	1.1892	0.110
0.0000	1.0000	0.184
0.2500	0.8409	0.368
0.5000	0.7071	0.552
0.7500	0.5946	0.739
1.0000	0.5000	4.345
1.2500	0.4204	10.974
1.5000	0.3536	24.415
1.7500	0.2973	19.959
2.0000	0.2500	17.750
2.2500	0.2102	13.036
2.5000	0.1768	3.535
2.7500	0.1486	2.136
3.0000	0.1250	0.368
3.2500	0.1051	0.221
3.5000	0.0884	0.037
3.7500	0.0743	0.018
4.0000	0.0625	0.018

SIZE CLASS RATIOS:

GRAVEL=	0.000PCT	GRAVEL/SAND=	0.000
SAND =	100.000PCT	SAND/SILT =	99999.999
SILT =	0.000PCT	SILT/CLAY =	0.000
CLAY =	0.000PCT	SAND/CLAY =	0.000
MUD =	0.000PCT	SAND/MUD =	99999.999
		GRAVEL/MUD =	0.000

SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-30	S30S1		. M	. CM	. CM	1

INTERPOLATED SIZES USED IN GRAPHICAL STATISTICS:

	05.00	10.00	16.00	25.00	50.00	75.00	84.00	90.00	95.00	CUM-PERCENT
PHI	0.896	1.084	1.221	1.334	1.584	1.914	2.011	2.123	2.328	PHI
MM	0.5373	0.4718	0.4291	0.3966	0.3335	0.2654	0.2481	0.2295	0.1992	MM

GRAPHICAL STATISTICS:

EQUB-WARD-PHI1	INMAN-PHI1	IRASK-SMM1
MEDIAN= 1.5844	MEDIAN= 1.5844	MEDIAN= 0.3335
MEAN = 1.6055	MEAN = 1.6160	MEAN = 0.3310
SORTING= 0.4146	SORTING= 0.3953	SORTING= 1.2224
SKEWNESS= 0.0591	SKEW 16/84= 0.0799	SKEWNESS= 0.9468
KURTOSIS= 1.0125	SKEW 05/95= 0.0695	KURTOSIS= 0.2708

CLASS MID-POINTS(PHI) USED IN THE MOMENT CALCULATIONS:

-0.88	-0.63	-0.38	-0.13	0.13	0.38	0.63	0.88	1.13	1.38	1.63	1.88	2.13	2.38	2.63
2.88	3.13	3.38	3.63	3.88										

MOMENT MEASURES:

FIRST (ABOUT ORIGIN)=	PHI---	---
SECOND (ABOUT MEAN) =	1.6011	MM---
THIRD (ABOUT MEAN) =	0.2273	0.3296
FOURTH (ABOUT MEAN) =	0.4768	
	STANDARD DEVIATION	
	THIRD (ABOUT MEAN) =	-0.2209
	FOURTH (ABOUT MEAN) =	1.2283


```

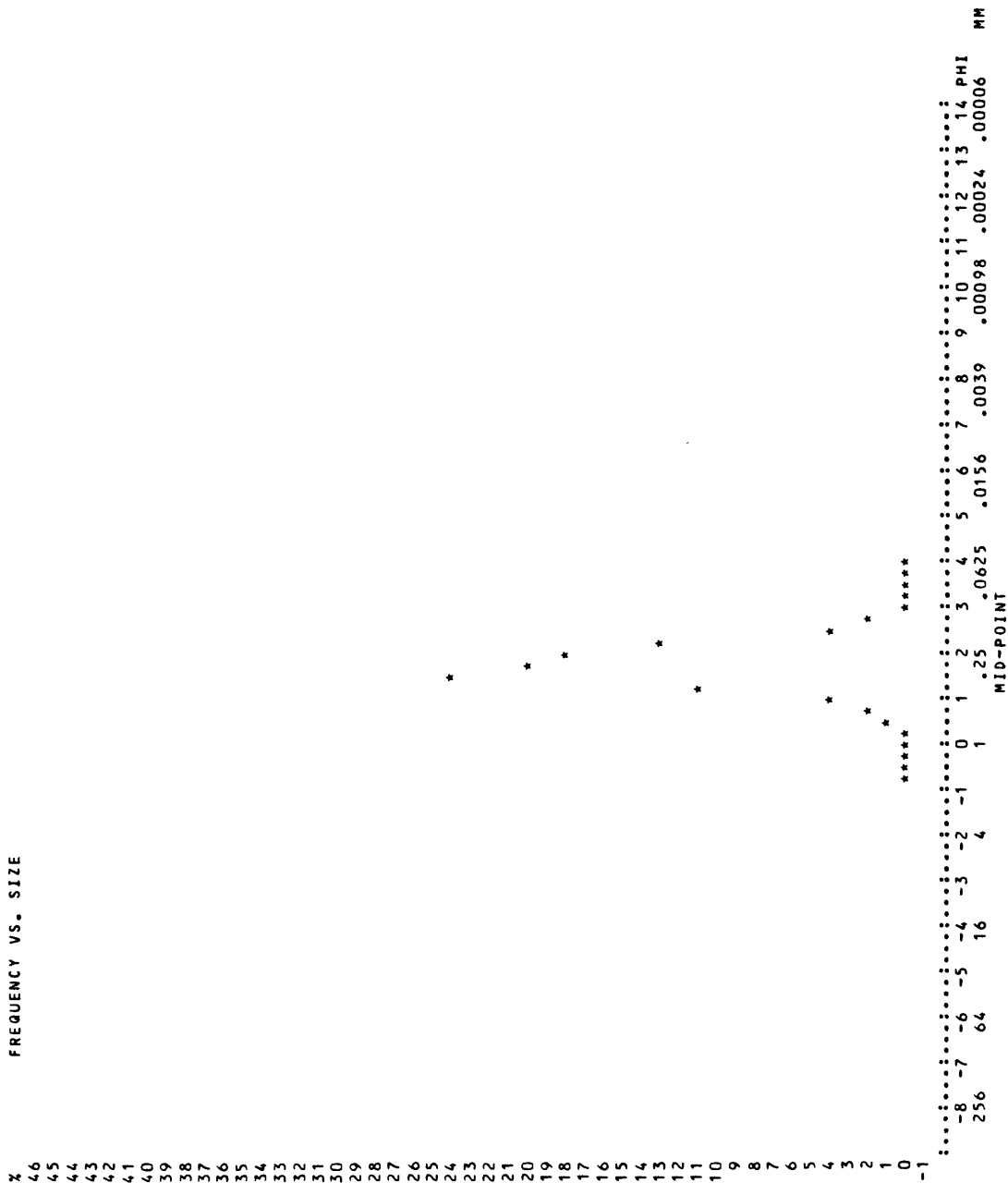
SEA276WG
CRUISE   STATION   SAMPLE   TOTAL   SAMPLE   SAMPLE   METHODS
S276WG   S-30        TYPE,NUMBER LENGTH  CENTER  LENGTH  CM  1
          S30S1
MODAL ANALYSIS
1 MODE(S) DETECTED IN THIS SAMPLE.
--PHI--  --WM--  --PERCENTI
-0.750   1.6818   0.1841
-0.500   1.4142   0.1473
-0.250   1.1892   0.1105
0.000    1.0000   0.1841
0.250    0.8409   0.3683
0.500    0.7071   0.5524
0.750    0.5946   1.6387
1.000    0.5000   4.3454
1.250    0.4204   10.9740
1.500    0.3536   24.4154
1.750    0.2973   19.9595
2.000    0.2500   17.7500
2.250    0.2102   13.0363
2.500    0.1768   3.5353
2.750    0.1486   2.1359
3.000    0.1250   0.3683
3.250    0.1051   0.2210
3.500    0.0884   0.0368
3.750    0.0743   0.0184
4.000    0.0625   0.0184
** MODE **

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SEA276WG

CRUISE	STATION	SAMPLE TYPE/NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-30	S30S1	. M	. CM	. CM	1

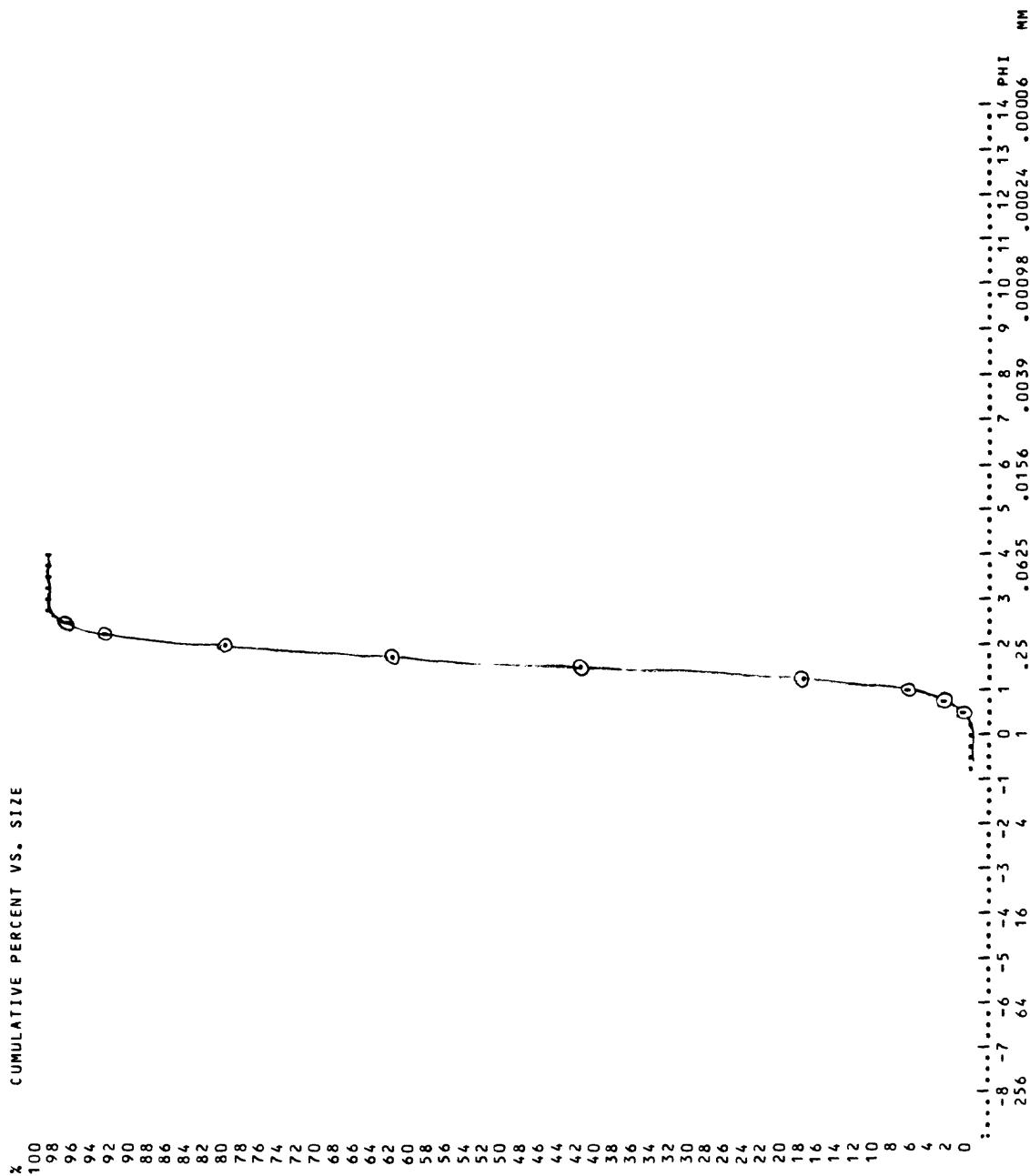
FREQUENCY VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE, NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-30	S30S1	M	CM	CM	1

CUMULATIVE PERCENT VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-30	S30S2		. M	. CM	. CM	1

#F:SV=20,ST= 0,H=0;WT:SV=29.0800,ST= 0.0000,H/P= 0.0000; PHI LIM:CS= 0.00, FN= 0.00

SAMPLE ANALYZED BY THE FOLLOWING METHOD(S):

SIZE RANGE	METHOD
2.0000- 0.0625MM	SIEVES

UNEDITED SAMPLE WEIGHTS IN GRAMS:

SIEVES	RSR	HYDROPHOQUEMER	PAN	LOIAL
29.0800				29.0800 (G)

PARTICLE SIZE DISTRIBUTION:									
PHI		MM		PERCENT		PERCENT		CUM	
-0.7500		1.6818		0.653		0.653			
-0.5000		1.4142		1.238		1.891			
-0.2500		1.1892		1.272		3.164			
0.0000		1.0000		1.376		4.539			
0.2500		0.8409		1.754		6.293			
0.5000		0.7071		2.201		8.494			
0.7500		0.5946		5.949		14.443			
1.0000		0.5000		10.660		25.103			
1.2500		0.4204		14.271		39.374			
1.5000		0.3536		20.770		60.144			
1.7500		0.2973		13.927		74.072			
2.0000		0.2500		13.686		87.758			
2.2500		0.2102		9.078		96.836			
2.5000		0.1768		1.857		98.693			
2.7500		0.1486		1.066		99.759			
3.0000		0.1250		0.103		99.862			
3.2500		0.1051		0.069		99.931			
3.5000		0.0884		0.034		99.966			
3.7500		0.0743		0.017		99.983			
4.0000		0.0625		0.017		100.000			

SIZE CLASS RATIOS:					
GRAVEL	=	0.000PCT	GRAVEL/SAND	=	0.000
SAND	=	100.000PCT	SAND/SILT	=	99999.999
SILT	=	0.000PCT	SILT/CLAY	=	0.000
CLAY	=	0.000PCT	SAND/CLAY	=	0.000
MUD	=	0.000PCT	SAND/MUD	=	99999.999
			GRAVEL/MUD	=	0.000

SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-30	S30S2		. M	. CM	. CM	1

INTERPOLATED SIZES USED IN GRAPHICAL STATISTICS:

	CUW-PERCENT	PHI	MM	05.00	10.00	16.00	25.00	50.00	75.00	84.00	90.00	95.00	SUM-PERCENT
				0.072	0.596	0.796	0.998	1.377	1.764	1.924	2.062	2.132	PHI
				0.9516	0.6614	0.5759	0.5006	0.3850	0.2943	0.2636	0.2395	0.2282	MM

GRAPHICAL STATISTICS:

FORWARD-PHI	INMAN-PHI	IRASK-SMM
MEDIAN = 1.3771	MEDIAN = 1.3771	MEDIAN = 0.3850
MEAN = 1.3656	MEAN = 1.3598	MEAN = 0.3975
SORTING = 0.5940	SORTING = 0.5637	SORTING = 1.3041
SKEWNESS = -0.1491	SKEW 16/84 = -0.0307	SKEWNESS = 0.9941
KURTOSIS = 1.1019	SKEW 05/95 = -0.4888	KURTOSIS = 0.2444

CLASS MID-POINTS(PHI) USED IN THE MOMENT CALCULATIONS:

-0.88	-0.63	-0.38	-0.13	0.13	0.38	0.63	0.88	1.13	1.38	1.63	1.88	2.13	2.38	2.63
2.88	3.13	3.38	3.63	3.88										

MOMENT MEASURES:

FIRST (ABOUT ORIGIN) =	PHI	MM
SECOND (ABOUT MEAN) =	1.3226	0.3998
THIRD (ABOUT MEAN) =	0.4052	VARIANCE
FOURTH (ABOUT MEAN) =	0.6365	STANDARD DEVIATION
		THIRD (ABOUT MEAN) = -0.4064
		FOURTH (ABOUT MEAN) = 0.6487

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SEA276WG
CRUISE STATION SAMPLE TYPE NUMBER TOTAL LENGTH SAMPLE LENGTH SAMPLE METHODS
S276WG S-30 S3052 . M . CM . CM 1

MODAL ANALYSIS
1 MODE(S) DETECTED IN THIS SAMPLE.
--PHI-- --MM-- --PERCENT
--0.750 1.6818 0.6534
--0.500 1.4142 1.2380
--0.250 1.1892 1.2724
0.000 1.0000 1.3755
0.250 0.8409 1.7538
0.500 0.7071 2.2008
0.750 0.5946 5.9491
1.000 0.5000 10.6602
1.250 0.4204 14.2710
1.500 0.3536 20.7703
1.750 0.2973 13.9271
2.000 0.2500 13.6864
2.250 0.2102 9.0784
2.500 0.1768 1.8569
2.750 0.1486 1.0660
3.000 0.1250 0.1032
3.250 0.1051 0.0688
3.500 0.0884 0.0344
3.750 0.0743 0.0172
4.000 0.0625 0.0172

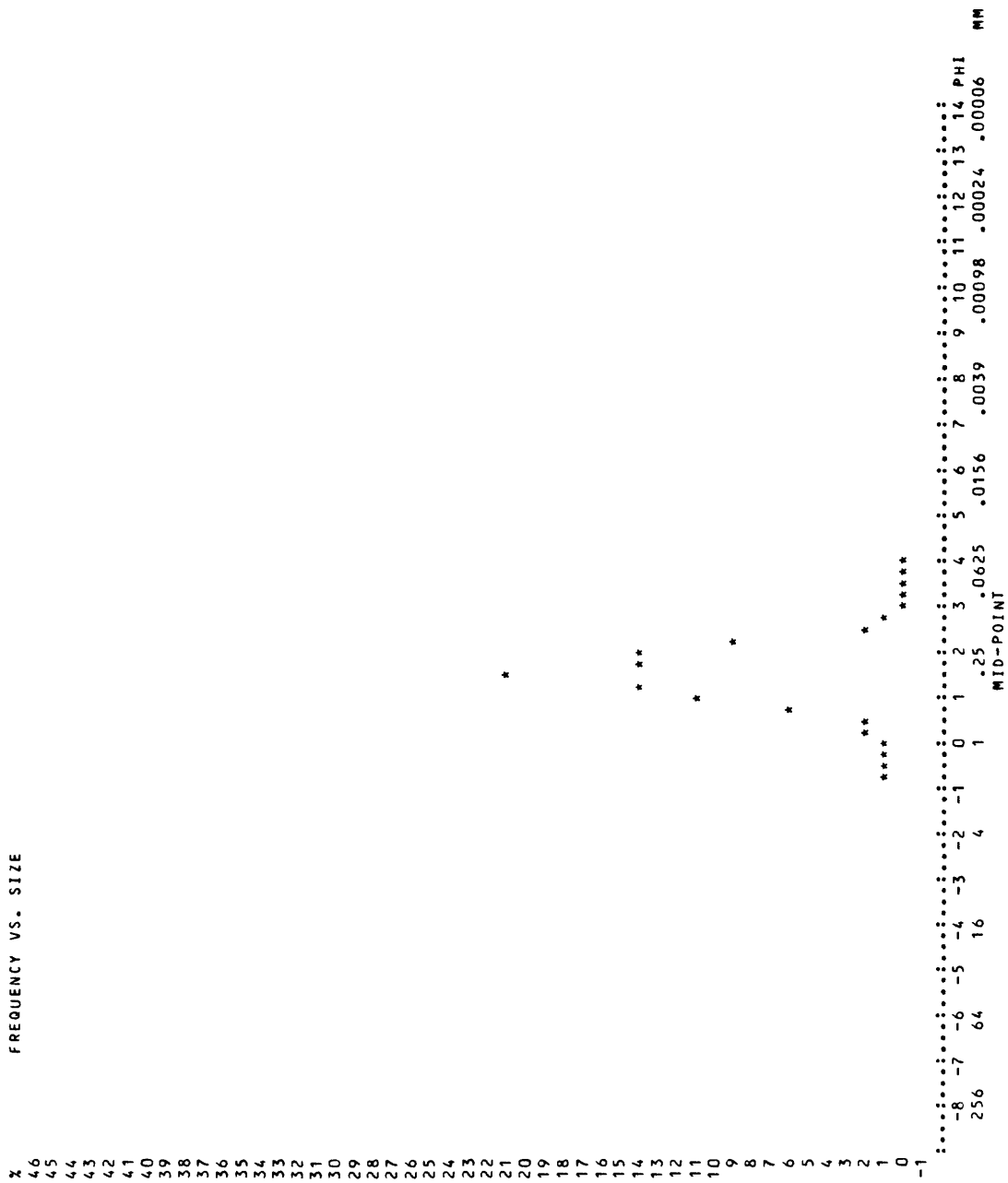
** MODE **

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SEA276WG

CRUISE	STATION	SAMPLE TYPE#NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-30	S30S2	M	CM	CM	1

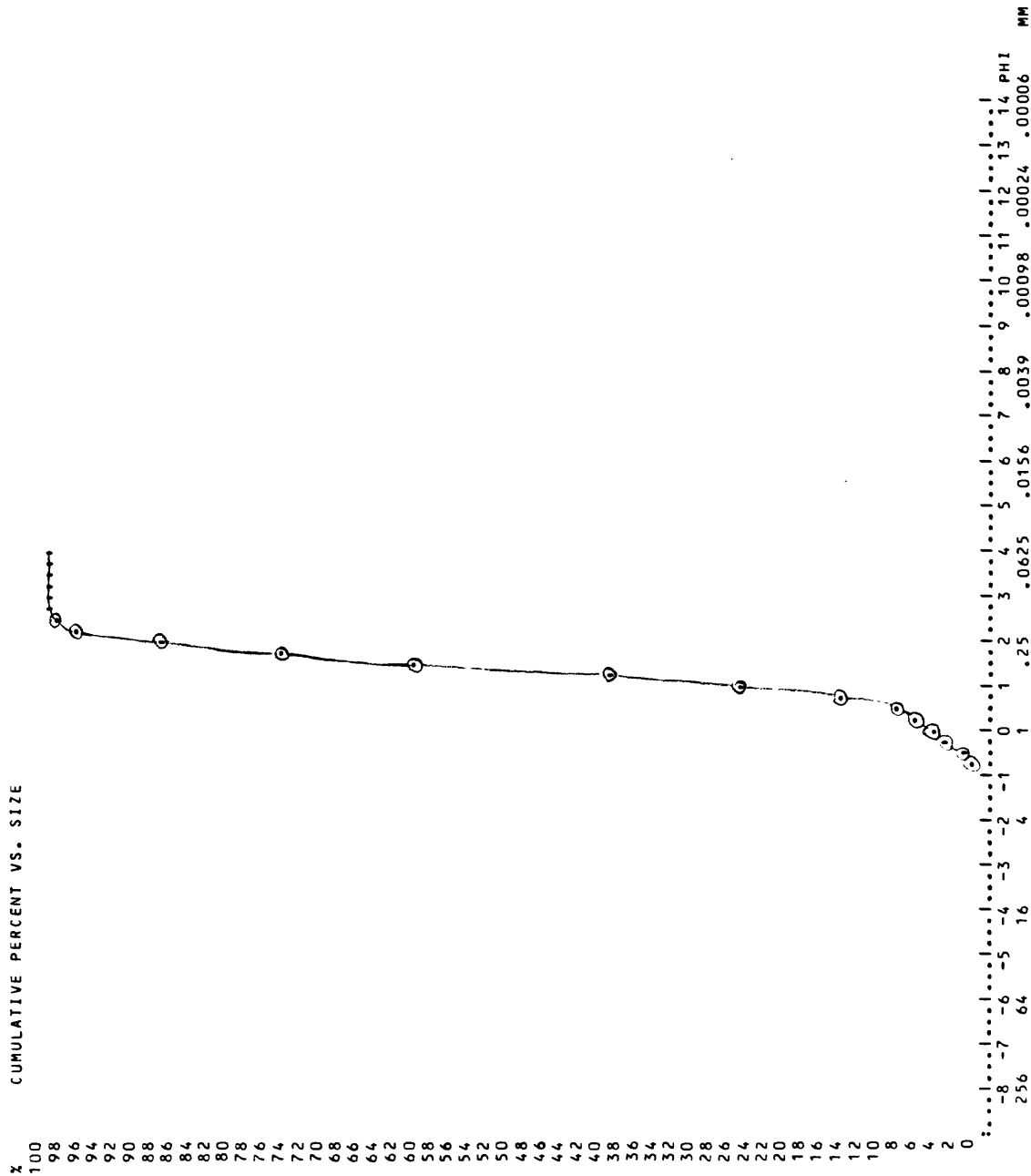
FREQUENCY VS. SIZE



SEA276WG
 CRUISE STATION S-30
 S276WG

SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S30S2		M	CM	CM	1

CUMULATIVE PERCENT VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE,NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-31	S31S1	. M	. CM	. CM	1

#F:SV=20,ST= 0,H=0;WT:SV=30.0000,ST= 0.0000,H/P= 0.0000; PHI LIM:CS= 0.00,FN= 0.00

SAMPLE ANALYZED BY THE FOLLOWING METHOD(S):

SIZE-RANGE	MEIHO
2.0000- 0.0625MM	SIEVES

UNEDITED SAMPLE WEIGHTS IN GRAMS:

SIEVES	RS	HYDRORHOIEMETER	PAN	TOTAL
30.0000				30.0000 (G)

PARTICLE SIZE DISTRIBUTION:

PHI	MM	PERCENT	CUM
-0.7500	1.6818	0.000	0.000
-0.5000	1.4142	0.000	0.000
-0.2500	1.1892	0.067	0.067
0.0000	1.0000	0.033	0.100
0.2500	0.8409	0.033	0.133
0.5000	0.7071	0.100	0.233
0.7500	0.5946	0.233	0.467
1.0000	0.5000	0.400	0.867
1.2500	0.4204	1.033	1.900
1.5000	0.3536	13.767	15.667
1.7500	0.2973	25.500	41.167
2.0000	0.2500	28.700	69.867
2.2500	0.2102	18.867	88.733
2.5000	0.1768	4.700	93.433
2.7500	0.1486	3.533	96.967
3.0000	0.1250	1.400	98.367
3.2500	0.1051	0.967	99.333
3.5000	0.0884	0.633	99.967
3.7500	0.0743	0.017	99.983
4.0000	0.0625	0.017	100.000

SIZE CLASS RATIOS:

GRAVEL =	0.000PCT	GRAVEL/SAND =	0.000
SAND =	100.000PCT	SAND/SILT =	9999.999
SILT =	0.000PCT	SILT/CLAY =	0.000
CLAY =	0.000PCT	SAND/CLAY =	0.000
MUD =	0.000PCT	SAND/MUD =	9999.999
		GRAVEL/MUD =	0.000

SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-31	S31S1					1

INTERPOLATED SIZES USED IN GRAPHICAL STATISTICS:

CUM PERCENT	PHI	MM	0.4044	0.3797	0.3525	0.3278	25.00	16.00	10.00	5.00	2.00	0.00
25.00	2.005	0.2491	0.3278	0.3525	0.3278	0.2832	25.00	16.00	10.00	5.00	2.00	0.00
50.00	2.309	0.2018	0.3278	0.3525	0.3278	0.2832	50.00	16.00	10.00	5.00	2.00	0.00
75.00	2.574	0.1679	0.3278	0.3525	0.3278	0.2832	75.00	16.00	10.00	5.00	2.00	0.00
95.00	2.839	0.1289	0.3278	0.3525	0.3278	0.2832	95.00	16.00	10.00	5.00	2.00	0.00

GRAPHICAL STATISTICS:

EQLS-6-WARD-(PHI)	INMAN-(PHI)	IRASK-(MM)
MEDIAN= 1.8203	MEDIAN= 1.8203	MEDIAN= 0.2832
MEAN = 1.8173	MEAN = 1.8158	MEAN = 0.2885
SORTING= 0.3478	SORTING= 0.3116	SORTING= 1.1470
SKEWNESS= 0.0872	SKEW 16/84= -0.0145	SKEWNESS= 1.0187
	SKEW 05/95= 0.3844	
KURTOSIS= 1.3124	KURTOSIS= 1.0342	KURTOSIS= 0.2211

CLASS MID-POINTS(PHI) USED IN THE MOMENT CALCULATIONS:

-0.88	-0.63	-0.38	-0.13	0.13	0.38	0.63	0.88	1.13	1.38	1.63	1.88	2.13	2.38	2.63
2.88	3.13	3.38	3.63	3.88	4.13	4.38	4.63	4.88	5.13	5.38	5.63	5.88	6.13	6.38

MOMENT MEASURES:

FIRST (ABOUT ORIGIN)=	SECOND (ABOUT MEAN) =	THIRD (ABOUT MEAN) =	FOURTH (ABOUT MEAN) =
1.8569	0.1594	0.3993	1.3424
0.1594	0.3993	0.3092	1.3424
0.3993	0.3092	1.3424	1.3424
1.3424	1.3424	1.3424	1.3424

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SEA276WG
CRUISE STATION S-31
S276WG S31S1
SAMPLE TYPE,NUMBER S31S1
TOTAL LENGTH . M
SAMPLE CENTER . CM
SAMPLE LENGTH . CM
METHODS 1

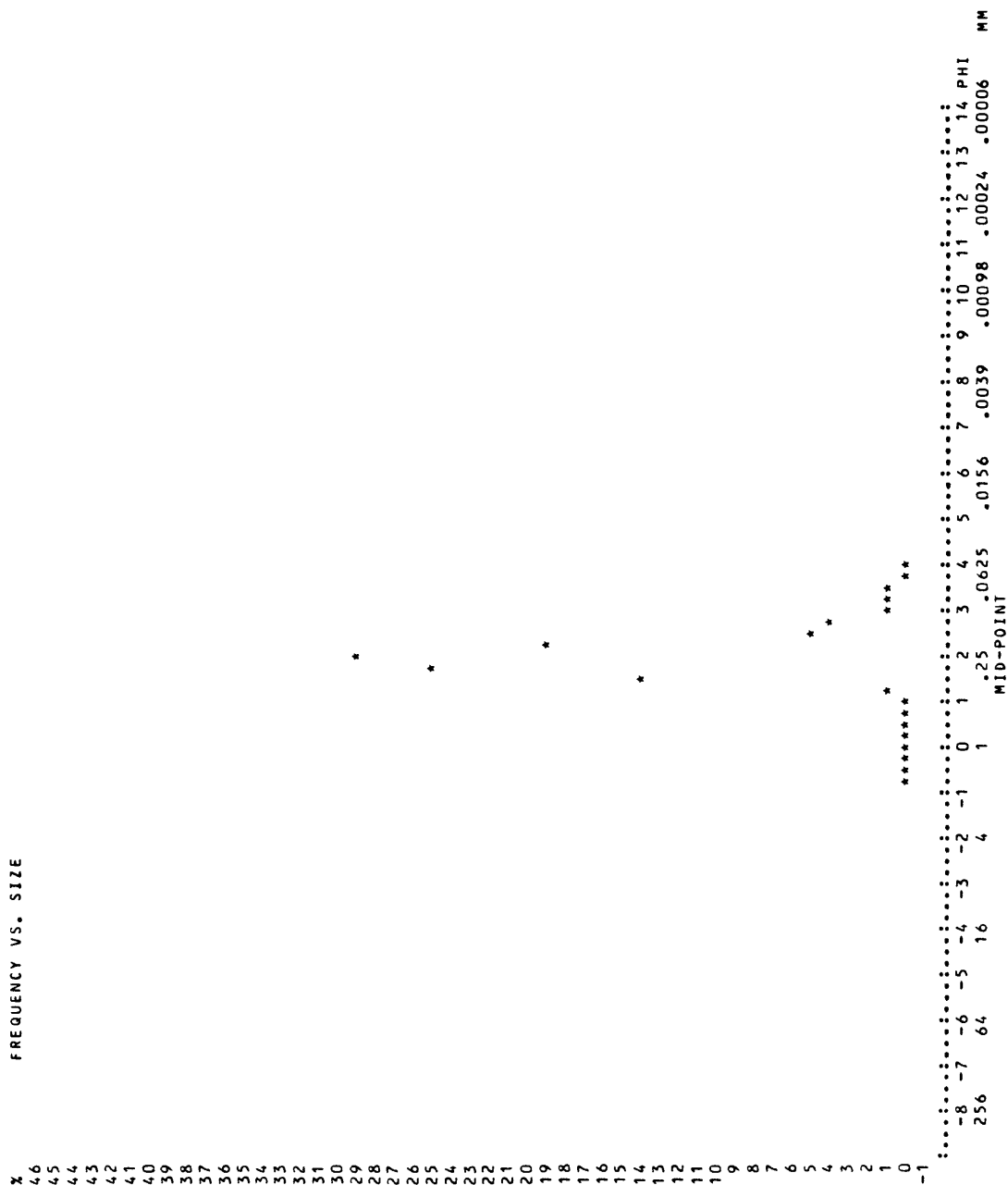
MODAL ANALYSIS
2 MODE(S) DETECTED IN THIS SAMPLE.
--PHI-- --MM-- --PERCENT--
-0.750 1.6818 0.0000
-0.500 1.4142 0.0000
-0.250 1.1892 0.0667 ** MODE **
0.000 1.0000 0.0333
0.250 0.8409 0.0333
0.500 0.7071 0.1000
0.750 0.5946 0.2333
1.000 0.5000 0.4000
1.250 0.4204 1.0333
1.500 0.3536 13.7667
1.750 0.2973 25.5000
2.000 0.2500 28.7000
2.250 0.2102 18.8667
2.500 0.1768 4.7000
2.750 0.1486 3.5333
3.000 0.1250 1.4000
3.250 0.1051 0.9667
3.500 0.0884 0.6333
3.750 0.0743 0.0167
4.000 0.0625 0.0167

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SEA276WG

CRUISE	STATION	SAMPLE TYPE#NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-31	S31S1	. M	. CM	. CM	1

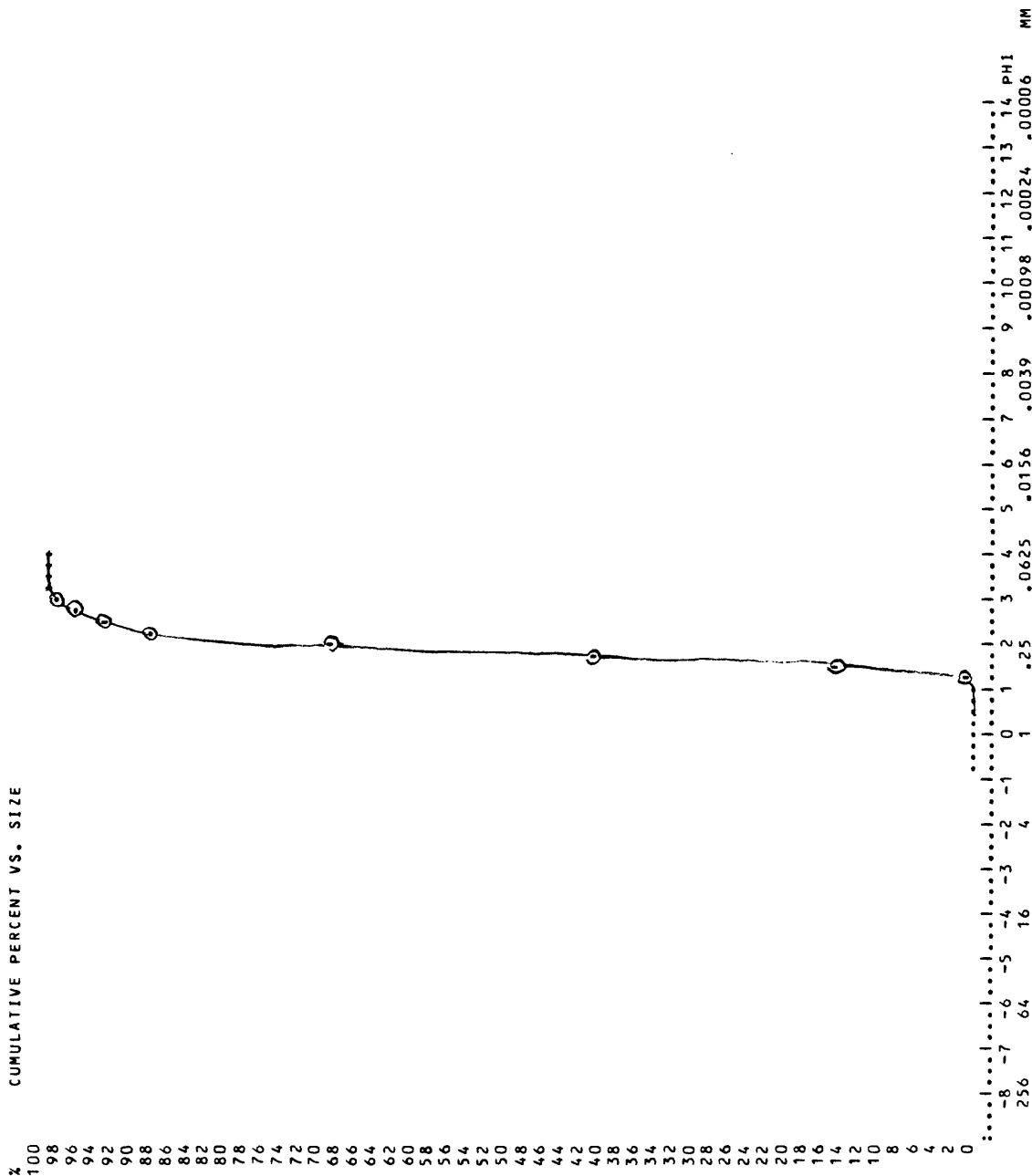
FREQUENCY VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-31		S31S1	M	CM	CM	1

CUMULATIVE PERCENT VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE,NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-34	S34S1	. M	. CM	. CM	1

#F:SV=20,ST= 0,H=0;WT:SV=29.0500,ST= 0.0000,H/P= 0.0000; PHI LIM:CS= 0.00,FN= 0.00

SAMPLE ANALYZED BY THE FOLLOWING METHOD(S):

--SIZE-RANGE--
2.0000- 0.0625MM SIEVES

UNEDITED SAMPLE WEIGHTS IN GRAMS:

-SIEVES--	--BSA----	HYDRORHOIMEIER-	--PAN-----	-TOTAL----
29.0500				29.0500 (G)

PARTICLE SIZE DISTRIBUTION:

	--MM--	PERCENT	CUM
-P1----	1.6818	0.000	0.000
-0.7500	1.4142	0.000	0.000
-0.5000	1.1892	0.000	0.000
-0.2500	1.0000	0.034	0.034
0.0000	0.8409	0.034	0.069
0.2500	0.7071	0.034	0.103
0.5000	0.5946	0.034	0.138
0.7500	0.5000	0.069	0.207
1.0000	0.4204	0.172	0.379
1.2500	0.3536	0.482	0.861
1.5000	0.2973	1.170	2.031
1.7500	0.2500	5.921	7.952
2.0000	0.2102	32.324	40.275
2.2500	0.1768	16.351	56.627
2.5000	0.1486	28.021	84.647
2.7500	0.1250	6.781	91.429
3.0000	0.1051	3.890	95.318
3.2500	0.0884	2.582	97.900
3.5000	0.0743	1.446	99.346
3.7500	0.0625	0.654	100.000

SIZE CLASS RATIOS:

GRAVEL=	0.000PCT	GRAVEL/SAND=	0.000
SAND =	100.000PCT	SAND/SILT =	9999.999
SILT =	0.000PCT	SILT/CLAY =	0.000
CLAY =	0.000PCT	SAND/CLAY =	0.000
MUD =	0.000PCT	SAND/MUD =	9999.999
		GRAVEL/MUD =	0.000

SEA276WG

CRUISE STATION S-34
S276WG S34S1
SAMPLE TYPE NUMBER 10.00
TOTAL LENGTH . M
SAMPLE CENTER . CM
SAMPLE LENGTH . CM
METHODS 1

INTERPOLATED SIZES USED IN GRAPHICAL STATISTICS:

CUM-PERCENT	05.00	10.00	16.00	22.00	30.00	40.00	50.00	60.00	75.00	84.00	90.00	95.00	CUM-PERCENT
PHI	1.985	2.039	2.135	2.229	2.398	2.605	2.934	3.225	3.605	4.000	4.398	4.799	PHI
MM	0.2526	0.2433	0.2276	0.2133	0.1897	0.1643	0.1308	0.1069	0.0805	0.0599	0.0439	0.0325	MM

GRAPHICAL STATISTICS:

FORWARD (PHI)	INMAN (PHI)	IRASK (MM)
MEDIAN = 2.3983	MEDIAN = 2.3983	MEDIAN = 0.1897
MEAN = 2.4240	MEAN = 2.4368	MEAN = 0.1888
SORTING = 0.3387	SORTING = 0.3016	SORTING = 1.1393
SKEWNESS = 0.2306	SKEW 16/84 = 0.1276	SKEWNESS = 0.9740
KURTOSIS = 1.3501	SKEW 05/95 = 0.6860	KURTOSIS = 0.2177

CLASS MID-POINTS (PHI) USED IN THE MOMENT CALCULATIONS:

-0.88	-0.63	-0.38	-0.13	0.13	0.38	0.63	0.88	1.13	1.38	1.63	1.88	2.13	2.38	2.63
2.88	3.13	3.38	3.63	3.88										

MOMENT MEASURES:

FIRST (ABOUT ORIGIN) =	PHI	MM
SECOND (ABOUT MEAN) =	2.4317	0.1853
THIRD (ABOUT MEAN) =	0.1732	
FOURTH (ABOUT MEAN) =	0.4162	
	THIRD (ABOUT MEAN) =	0.2354
	FOURTH (ABOUT MEAN) =	1.0493

SEA276WG

CRUISE	STATION	SAMPLE TYPE,NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-34	S34S1	. M	. CM	. CM	1

MODAL ANALYSIS
2 MODE(S) DETECTED IN THIS SAMPLE.

PHI	MM	PERCENT
-0.750	1.6818	0.0000
-0.500	1.4142	0.0000
-0.250	1.1892	0.0000
0.000	1.0000	0.0344
0.250	0.8409	0.0344
0.500	0.7071	0.0344
0.750	0.5946	0.0344
1.000	0.5000	0.0688
1.250	0.4204	0.1721
1.500	0.3536	0.4819
1.750	0.2973	1.1704
2.000	0.2500	5.9208
2.250	0.2102	32.3236
2.500	0.1768	16.3511
2.750	0.1486	28.0207
3.000	0.1250	6.7814
3.250	0.1051	3.8898
3.500	0.0884	2.5818
3.750	0.0743	1.4458
4.000	0.0625	0.6540

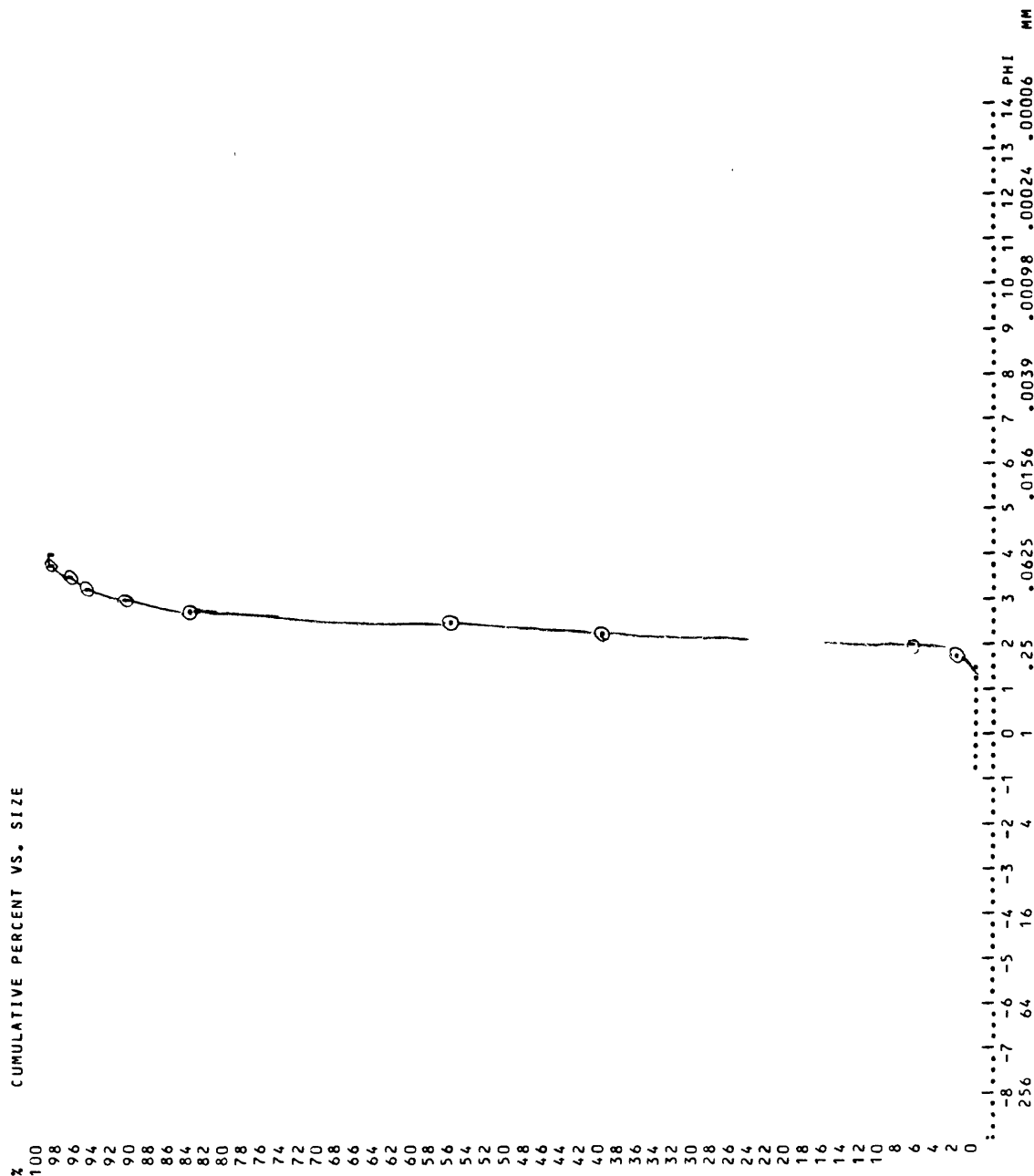
** MODE **

** MODE **

SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
				. M	. CM	. CM	
S276WG	S-34		S34S1				1

CUMULATIVE PERCENT VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-44	S	44	. M	. CM	. CM	1

#F:SV=20,ST= 0,H=0;WT:SV=29.0800,ST= 0.0000,H/P= 0.0000; PHI LIM:CS= 0.00,FN= 0.00

SAMPLE ANALYZED BY THE FOLLOWING METHOD(S):

---SIZE-RANGE---
2.0000- 0.0625MM SIEVES

UNEDITED SAMPLE WEIGHTS IN GRAMS:

-SIEVES--	--BSA----	HYDROPHOICMEIER-	--PAN-----	-TOTAL---
29.0800				29.0800 (G)

PARTICLE SIZE DISTRIBUTION:				
	PERCENT	PERCENT	CUM	
PHI---	MM--			
-0.7500	1.6818	0.344	0.344	
-0.5000	1.4142	0.516	0.860	
-0.2500	1.1892	0.653	1.513	
0.0000	1.0000	0.928	2.442	
0.2500	0.8409	1.651	4.092	
0.5000	0.7071	1.685	5.777	
0.7500	0.5946	2.992	8.769	
1.0000	0.5000	3.542	12.311	
1.2500	0.4204	10.488	22.799	
1.5000	0.3536	30.502	53.301	
1.7500	0.2973	17.297	70.598	
2.0000	0.2500	12.895	83.494	
2.2500	0.2102	8.047	91.541	
2.5000	0.1768	2.682	94.223	
2.7500	0.1486	3.542	97.765	
3.0000	0.1250	0.963	98.728	
3.2500	0.1051	0.585	99.312	
3.5000	0.0884	0.275	99.587	
3.7500	0.0743	0.206	99.794	
4.0000	0.0625	0.206	100.000	
SIZE CLASS RATIOS:				
GRAVEL=	0.000PCT	GRAVEL/SAND=	0.000	
SAND =	100.000PCT	SAND/SILT =	*****	
SILT =	-0.000PCT	SILT/CLAY =	0.000	
CLAY =	0.000PCT	SAND/CLAY =	0.000	
MUD =	-0.000PCT	SAND/MUD =	*****	
		GRAVEL/MUD =	0.000	

SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-44	S	44	. M	. CM	. CM	1

INTERPOLATED SIZES USED IN GRAPHICAL STATISTICS:

CUM-PERCENT	05.00	10.00	16.00	25.00	50.00	75.00	84.00	90.00	95.00	CUM-PERCENT
PHI	0.390	0.844	1.135	1.276	1.484	1.822	2.004	2.170	2.514	PHI
MM	0.7632	0.5569	0.4555	0.4130	0.3574	0.2829	0.2494	0.2222	0.1751	MM

GRAPHICAL STATISTICS:

EQLS-8-WARD-(PHI)2	-INMAN-(PHI)2---	-IRASK-(MM)----
MEDIAN= 1.4842	MEDIAN= 1.4842	MEDIAN= 0.3574
MEAN = 1.5408	MEAN = 1.5691	MEAN = 0.3479
SORTING= 0.5391	SORTING= 0.4346	SORTING= 1.2083
SKEWNESS= 0.0824	SKEW 16/84= 0.1953	SKEWNESS= 0.9143
	SKEW 05/95= -0.0746	
KURTOSIS= 1.5941	KURTOSIS= 1.4436	KURTOSIS= 0.1944

CLASS MID-POINTS(PHI) USED IN THE MOMENT CALCULATIONS:

-0.88	-0.63	-0.38	-0.13	0.13	0.38	0.63	0.88	1.13	1.38	1.63	1.88	2.13	2.38	2.63
2.88	3.13	3.38	3.63	3.88										

MOMENT MEASURES:

FIRST (ABOUT ORIGIN)=	SECOND (ABOUT MEAN) =	SECOND (ABOUT MEAN) =
--PHI----	1.5069	0.3519
	0.3808	VARIANCE
	0.6171	STANDARD DEVIATION
	THIRD (ABOUT MEAN) =	-0.1642
	FOURTH (ABOUT MEAN) =	1.1803

SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-44	S	44	. M	. CM	. CM	1
MODAL ANALYSIS							
2 MODE(S) DETECTED IN THIS SAMPLE.							
--PHI--	--MM--	--PERCENT--					
-0.750	1.6818	0.3439					
-0.500	1.4142	0.5158					
-0.250	1.1892	0.6534					
0.000	1.0000	0.9285					
0.250	0.8409	1.6506					
0.500	0.7071	1.6850					
0.750	0.5946	2.9917					
1.000	0.5000	3.5420					
1.250	0.4204	10.4883					
1.500	0.3536	30.5021					
1.750	0.2973	17.2971					
2.000	0.2500	12.8955					
2.250	0.2102	8.0468					
2.500	0.1768	2.6823					
2.750	0.1486	3.5420					
3.000	0.1250	0.9629					
3.250	0.1051	0.5846					
3.500	0.0884	0.2751					
3.750	0.0743	0.2063					
4.000	0.0625	0.2063					
				** MODE	**		
				** MODE	**		

SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-44	S	44	. M	. CM	. CM	1

FREQUENCY VS. SIZE

46
45
44
43
42
41
40
39
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31
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26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
-1

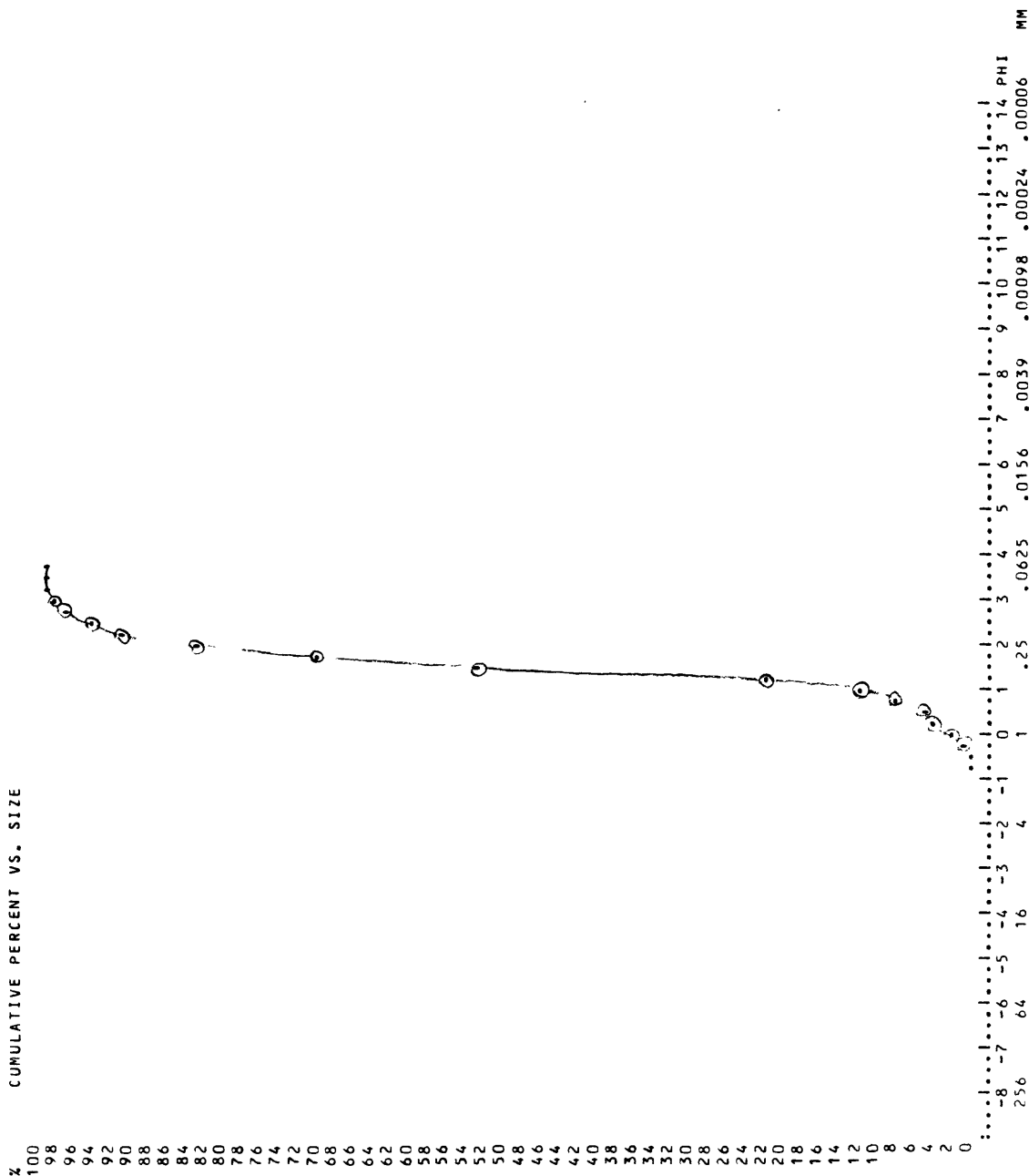
PHI	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
MM	.00006	.00024	.00098	.0039	.0156	.0625	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25	.25

MID-POINT

SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-44	S	44	M	CM	CM	1

CUMULATIVE PERCENT VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-44S2	S44S2		. M	. CM	. CM	1

#F:SV=20,ST= 0,H=0;WT:SV=24.2800,ST= 0.0000,H/P= 0.0000; PHI LIM:CS= 0.00, FN= 0.00

SAMPLE ANALYZED BY THE FOLLOWING METHOD(S):

---SIZE-RANGE---
2.0000- 0.0625MM --METHOD-----

UNEDITED SAMPLE WEIGHTS IN GRAMS:

SIEVES--	--BSA----	HYDROWEIGHT	--PAN----	--TOTAL---
24.2700				24.2700 (G)

PARTICLE SIZE DISTRIBUTION:

PHI---	--MM--	PERCENT	CUM
-0.7500	1.6818	1.319	1.319
-0.5000	1.4142	2.678	3.997
-0.2500	1.1892	2.637	6.634
0.0000	1.0000	3.090	9.724
0.2500	0.8409	3.214	12.938
0.5000	0.7071	3.337	16.275
0.7500	0.5946	3.131	19.407
1.0000	0.5000	2.802	22.208
1.2500	0.4204	7.540	29.749
1.5000	0.3536	32.468	62.217
1.7500	0.2973	18.789	81.005
2.0000	0.2500	10.713	91.718
2.2500	0.2102	5.150	96.869
2.5000	0.1768	1.360	98.228
2.7500	0.1486	1.277	99.506
3.0000	0.1250	0.165	99.670
3.2500	0.1051	0.165	99.835
3.5000	0.0884	0.082	99.918
3.7500	0.0743	0.062	99.979
4.0000	0.0625	0.021	100.000

SIZE CLASS RATIOS:

GRAVEL =	0.000PCT	GRAVEL/SAND =	0.000
SAND =	100.000PCT	SAND/SILT =	9999.999
SILT =	0.000PCT	SILT/CLAY =	0.000
CLAY =	0.000PCT	SAND/CLAY =	0.000
MUD =	0.000PCT	SAND/MUD =	9999.999
		GRAVEL/MUD =	0.000

SEA276WG

CRUISE STATION SAMPLE TYPE-NUMBER TOTAL LENGTH SAMPLE CENTER LENGTH SAMPLE METHODS
S276WG S-44S2 S44S2 . M . CM . CM 1

INTERPOLATED SIZES USED IN GRAPHICAL STATISTICS:

CUM-PERCENT	05.00	10.00	16.00	25.00	50.00	75.00	84.00	90.00	95.00	CUM-PERCENT
PHI	-0.403	0.022	0.479	1.133	1.471	1.653	1.798	1.945	2.091	PHI
MM	1.3224	0.9850	0.7174	0.4561	0.3607	0.3180	0.2877	0.2597	0.2348	MM

GRAPHICAL STATISTICS:

EQLE-8-WARD-(PHI)2	-INMEAN-(PHI)2---	-IRASK-(MM)2---
MEDIAN= 1.4711	MEDIAN= 1.4711	MEDIAN= 0.3607
MEAN = 1.2493	MEAN = 1.1384	MEAN = 0.3870
SORTING= 0.7074	SORTING= 0.6592	SORTING= 1.1975
SKEWNESS= -0.5039	SKEW 16/84= -0.5047	SKEWNESS= 1.1147
KURTOSIS= 1.9650	SKEW 05/95= -0.9517	KURTOSIS= 0.0952

CLASS MID-POINTS(PHI) USED IN THE MOMENT CALCULATIONS:

-0.88	-0.63	-0.38	-0.13	0.13	0.38	0.63	0.88	1.13	1.38	1.63	1.88	2.13	2.38	2.63
2.88	3.13	3.38	3.63	3.88										

MOMENT MEASURES:

FIRST (ABOUT ORIGIN)=	--PHI---	---
SECOND (ABOUT MEAN) =	1.2470	---
THIRD (ABOUT MEAN) =	0.5382	---
FOURTH (ABOUT MEAN) =	0.7336	---
	STANDARD DEVIATION	---
	THIRD (ABOUT MEAN) =	---
	FOURTH (ABOUT MEAN) =	---

SEA276WG

CRUISE	STATION	SAMPLE TYPE,NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-44S2	S44S2	. M	. CM	. CM	1

MODAL ANALYSIS

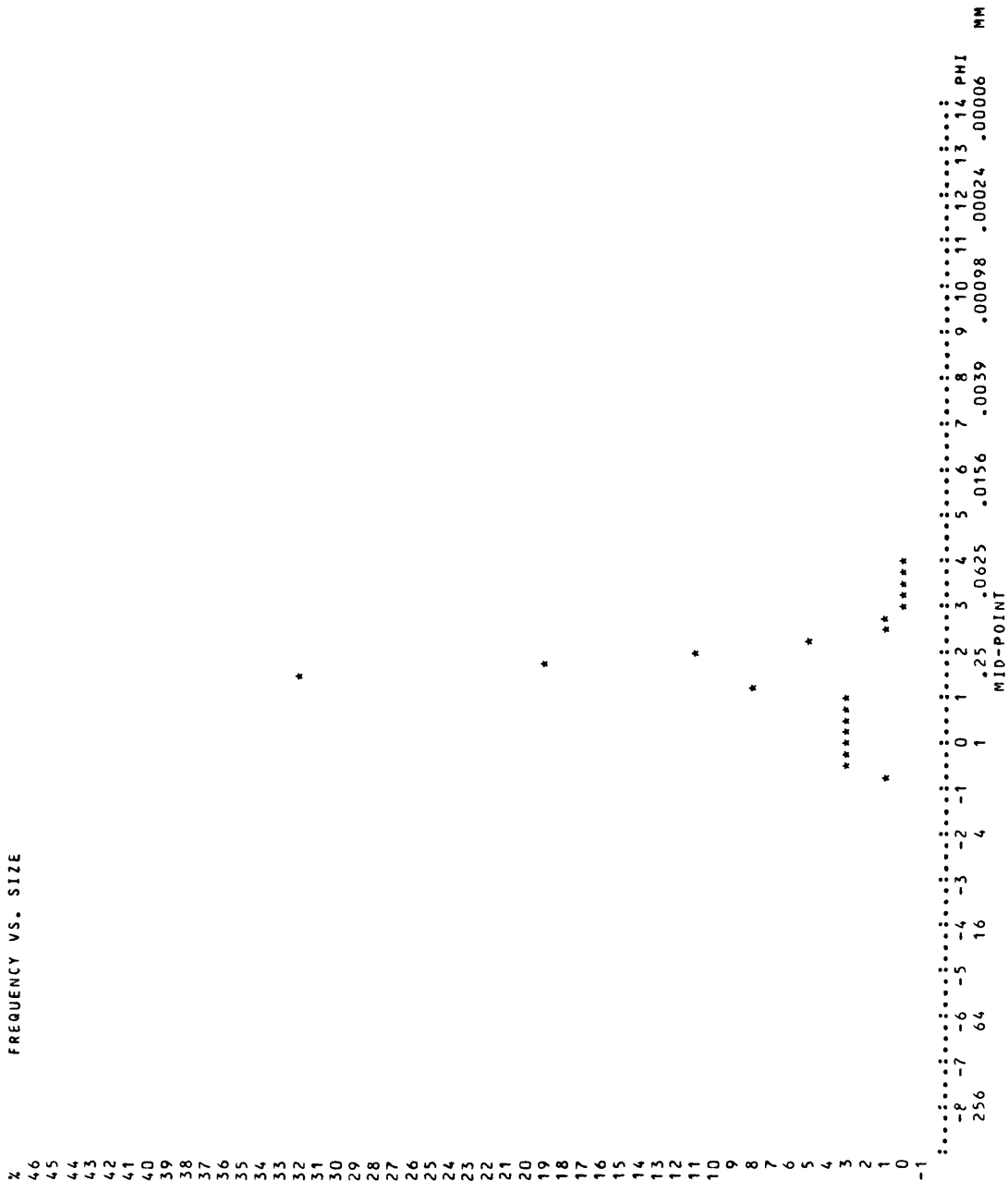
3 MODE(S) DETECTED IN THIS SAMPLE.

PERCENTI	MM	MODE
1.6818	1.3185	** MODE **
2.6782	2.6370	** MODE **
3.0902	3.2138	** MODE **
3.3375	3.1314	** MODE **
2.8018	7.5402	** MODE **
32.4681	18.7886	
10.7128	5.1504	
1.3597	1.2773	
0.1648	0.1648	
0.0824	0.0824	
0.0618	0.0618	
0.0206	0.0206	

SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-4452	S452		. M	. CM	. CM	1

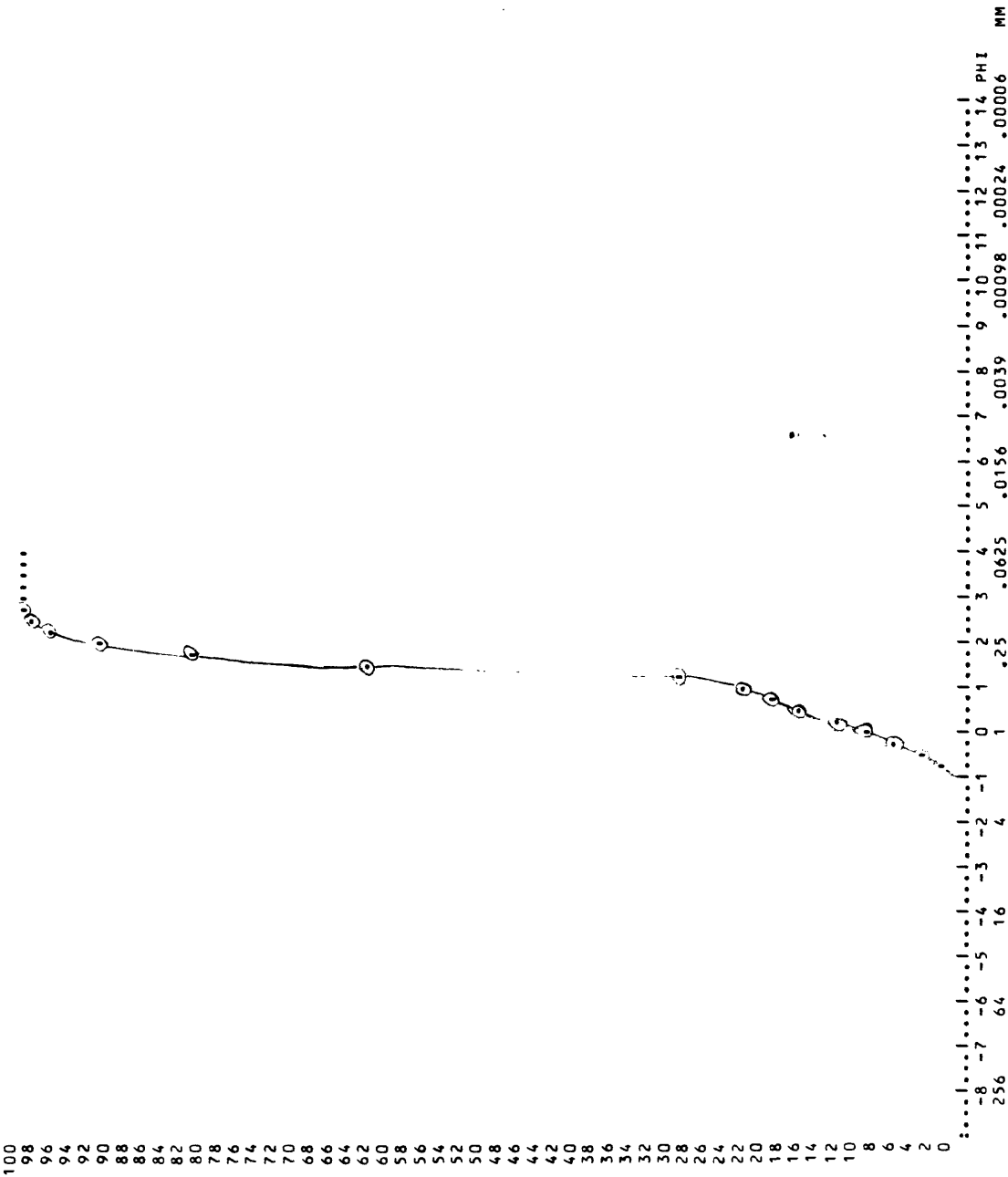
FREQUENCY VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-44S2	S44S2		. M	. CM	. CM	1

% CUMULATIVE PERCENT VS. SIZE



STATISTICS

CRUISE S27600 0.47 0.136 0.9356 16.00 0.271 0.8229 22.00 0.754 0.5930 50.00 0.754 0.5930 1

INTERPOLATED TOTAL SAMPLE CENTER LENGTH METHODS

CUM-RECENT 25.00 20.00 84.00 25.00 25.00 25.00
PHI 1.714 1.438 1.280 1.099 1.099 1.099
MM 0.3048 0.3691 0.4117 0.4669 0.4669 0.4669

GRAPHICAL STATISTICS

LEAD-CUM-RECENT 16.00 16.00 16.00 16.00 16.00 16.00
MEDIAN= 0.7539 MEDIAN= 0.7539 MEDIAN= 0.7539 MEDIAN= 0.7539 MEDIAN= 0.7539
MEAN= 0.7539 MEAN= 0.7539 MEAN= 0.7539 MEAN= 0.7539 MEAN= 0.7539
SKEWNESS= 0.0004 SKEWNESS= 0.0004 SKEWNESS= 0.0004 SKEWNESS= 0.0004 SKEWNESS= 0.0004
KURTOSIS= 1.3181 KURTOSIS= 1.3181 KURTOSIS= 1.3181 KURTOSIS= 1.3181 KURTOSIS= 1.3181

CLASS FREQUENCIES USED IN THE MOMENT CALCULATIONS:

-0.48 -0.65 -0.82 -1.00 -1.18 -1.36 -1.54 -1.72 -1.90 -2.08 -2.26 -2.44 -2.62 -2.80 -2.98 -3.16 -3.34 -3.52 -3.70 -3.88 -4.06 -4.24 -4.42 -4.60 -4.78 -4.96 -5.14 -5.32 -5.50 -5.68 -5.86 -6.04 -6.22 -6.40 -6.58 -6.76 -6.94 -7.12 -7.30 -7.48 -7.66 -7.84 -8.02 -8.20 -8.38 -8.56 -8.74 -8.92 -9.10 -9.28 -9.46 -9.64 -9.82 -10.00

MOMENT MEASURES:

FIRST (ABOUT ORIGIN)= 0.7718
SECOND (ABOUT MEAN)= 0.3215
THIRD (ABOUT MEAN)= 0.0933
FOURTH (ABOUT MEAN)= 0.6731

```

SEA2760
CRUISE STATION 5-47
S27600

SEA AREA 16.27777778
S4751

TOTAL LENGTH 0.0
CENTER 0.0
SAMPLE LENGTH 0.0
METHODS 1

MODAL ANALYSIS
1 MODE(S) OF TOTAL IN THIS SAMPLE.
--PUL-- --%--
-0.750 1.6815 --PUL--
-0.500 1.4142 0.7509
-0.250 1.1822 1.3136
0.000 1.0000 1.0400
0.250 0.8499 0.9950
0.500 0.7271 0.9155
0.750 0.6250 0.8074
1.000 0.5000 0.6953
1.250 0.4000 0.5762
1.500 0.3000 0.4523
1.750 0.2075 0.3257
2.000 0.2000 0.2552
2.250 0.2100 0.1854
2.500 0.1700 0.2544
2.750 0.1400 0.2444
3.000 0.1250 0.0631
3.250 0.1051 0.0631
3.500 0.0000 0.0631
3.750 0.0000 0.0421
4.000 0.0000 0.0210

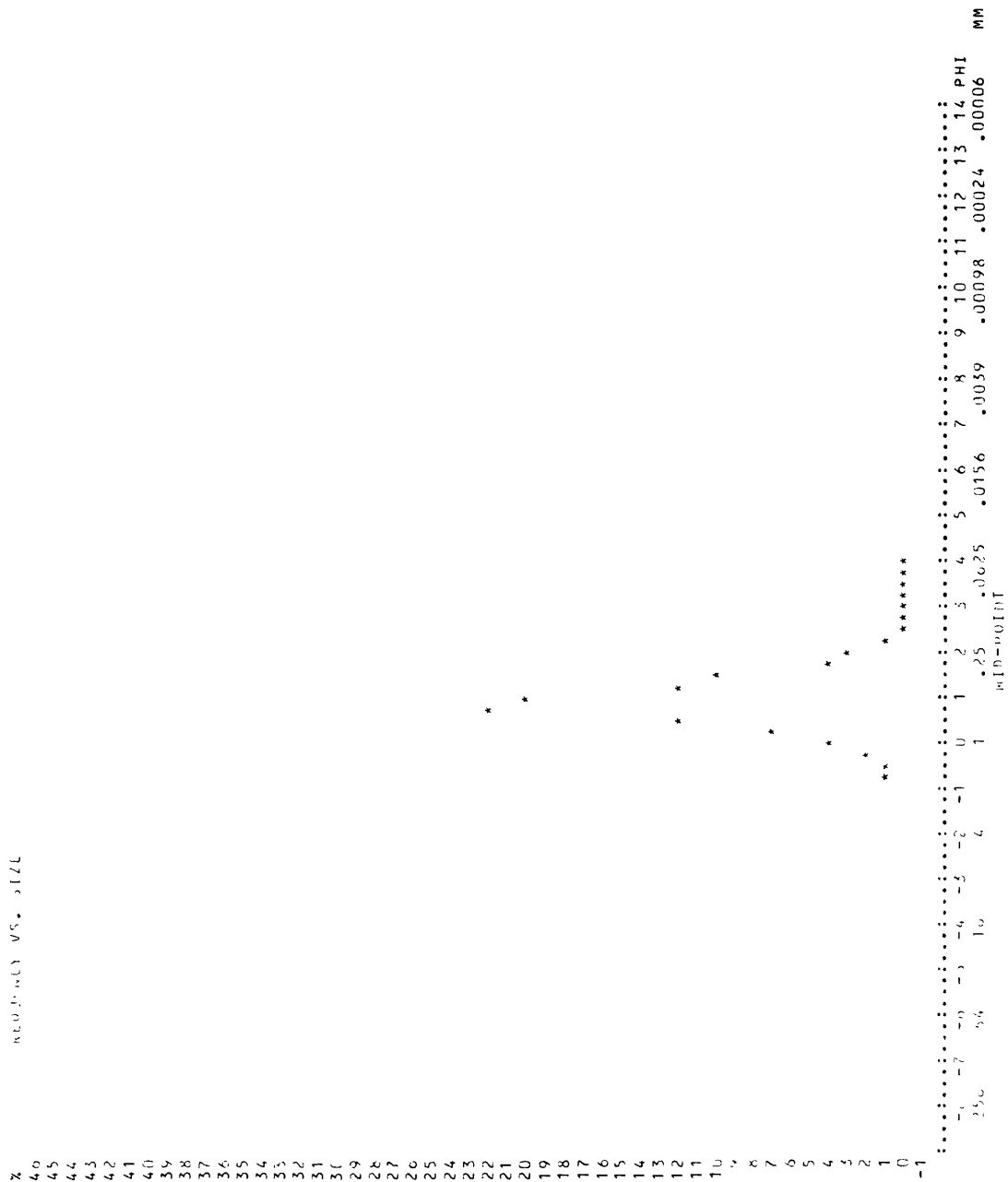
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SIZE
CRUSH TYPE SIZE TOTAL SAMPLE LENGTH METHODS
S270x6 5-6 54/51 . 6 . CM 1

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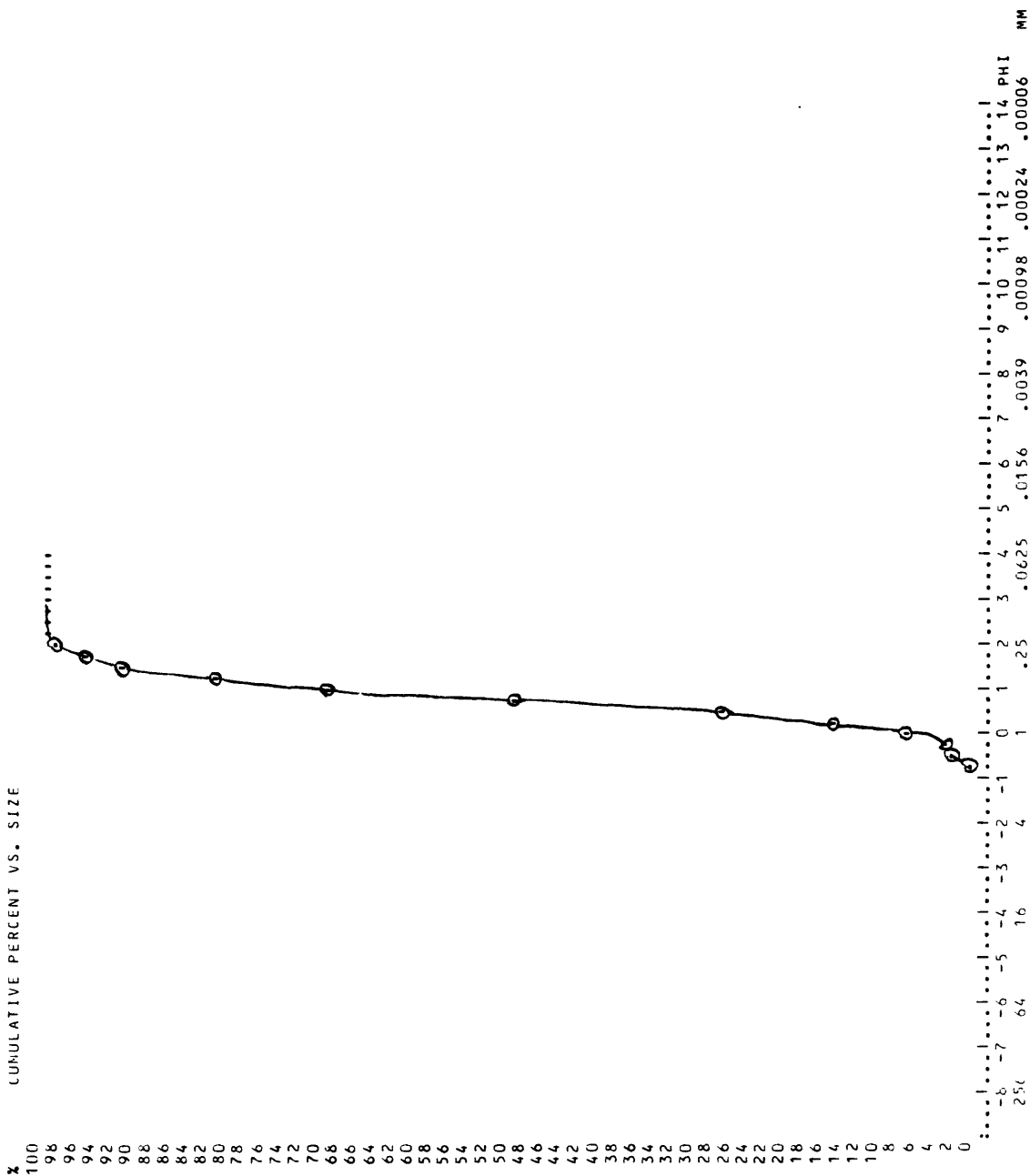
REDUCED VS. SIZE



SEA376WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-47		S47S1	. M	. CM	. CM	1

% CUMULATIVE PERCENT VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-152	S152		. M	. CM	. CM	1

#F:SV=20,ST= 0,H=0;WT:SV=26.9200,ST= 0.0000,H/P= 0.0000; PHI LIM:CS= 0.00,FN= 0.00

SAMPLE ANALYZED BY THE FOLLOWING METHOD(S):

---SIZE-RANGE---
2.0000- 0.0625MM SIEVES

UNEDITED SAMPLE WEIGHTS IN GRAMS:

-SIEVES--	--RSA----	HYDRORHOIMEIER-	--PAN-----	-TOTAL----
26.8700				26.8700 (G)

PARTICLE SIZE DISTRIBUTION:

	--MM--	PERCENT	CUM
-PHI----		PERCENT	
-0.7500	1.6818	0.037	0.037
-0.5000	1.4142	0.037	0.074
-0.2500	1.1892	0.037	0.112
0.0000	1.0000	0.037	0.149
0.2500	0.8409	0.149	0.298
0.5000	0.7071	0.149	0.447
0.7500	0.5946	0.893	1.340
1.0000	0.5000	3.722	5.061
1.2500	0.4204	19.352	24.414
1.5000	0.3536	40.863	65.277
1.7500	0.2973	13.398	78.675
2.0000	0.2500	8.709	87.384
2.2500	0.2102	6.736	94.120
2.5000	0.1768	2.419	96.539
2.7500	0.1486	1.861	98.400
3.0000	0.1250	0.744	99.144
3.2500	0.1051	0.484	99.628
3.5000	0.0884	0.186	99.814
3.7500	0.0743	0.112	99.926
4.0000	0.0625	0.074	100.000

SIZE CLASS RATIOS:

GRAVEL=	0.000PCT	GRAVEL/SAND=	0.000
SAND =	100.000PCT	SAND/SILT =	*****
SILT =	-0.000PCT	SILT/CLAY =	0.000
CLAY =	0.000PCT	SAND/CLAY =	0.000
MUD =	-0.000PCT	SAND/MUD =	*****
		GRAVEL/MUD =	0.000

SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-152	S152		. M	. CM	. CM	1

INTERPOLATED SIZES USED IN GRAPHICAL STATISTICS:

CUM-PERCENT	02.00	10.00	16.00	22.00	50.00	75.00	84.00	90.00	92.00	CUM-PERCENT
PHI	0.996	1.152	1.141	1.252	1.383	1.669	1.894	2.055	2.331	PHI
MM	0.5014	0.4502	0.4533	0.4198	0.3833	0.3144	0.2691	0.2406	0.1987	MM

GRAPHICAL STATISTICS:

EQK-&-WARD-(PHI)	INMAN-(PHI)	IRASK-(MM)
MEDIAN= 1.3834	MEDIAN= 1.3834	MEDIAN= 0.3833
MEAN = 1.4729	MEAN = 1.5176	MEAN = 0.3671
SORTING= 0.3905	SORTING= 0.3763	SORTING= 1.1555
SKEWNESS= 0.3880	SKEW 16/84= 0.3565	SKEWNESS= 0.8984
KURTOSIS= 1.3124	SKEW 05/95= 0.7443	KURTOSIS= 0.2515

CLASS MID-POINTS(PHI) USED IN THE MOMENT CALCULATIONS:

-0.88	-0.63	-0.38	-0.13	0.13	0.38	0.63	0.88	1.13	1.38	1.63	1.88	2.13	2.38	2.63
2.88	3.13	3.38	3.63	3.88										

MOMENT MEASURES:

FIRST (ABOUT ORIGIN)=	PHI---	MM---
SECOND (ABOUT MEAN) =	1.4979	0.3541
SECOND (ABOUT MEAN) =	0.1911	VARIANCE
	0.4371	STANDARD DEVIATION
THIRD (ABOUT MEAN) =		0.5602
FOURTH (ABOUT MEAN) =		1.7280

SEA276WG

CRUISE	STATION	SAMPLE TYPE,NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-152	S152	- M	. CM	. CM	1

MODAL ANALYSIS
1 MODE(S) DETECTED IN THIS SAMPLE.

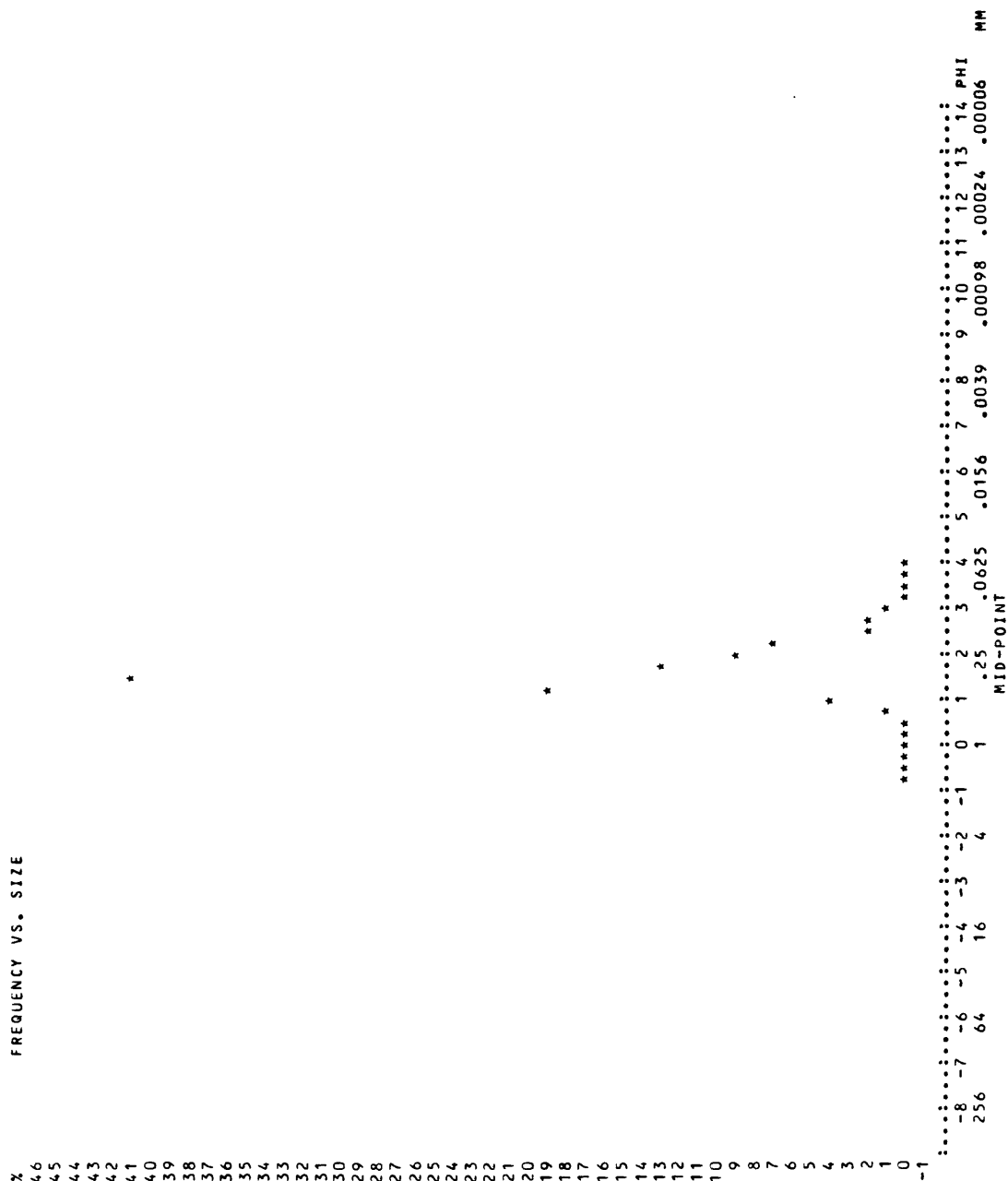
--PHI--	--MM--	--PERCENTI
--0.750	1.6818	0.0372
-0.500	1.4142	0.0372
-0.250	1.1892	0.0372
0.000	1.0000	0.0372
0.250	0.8409	0.1489
0.500	0.7071	0.1489
0.750	0.5946	0.8932
1.000	0.5000	3.7216
1.250	0.4204	19.3524
1.500	0.3536	40.8634
1.750	0.2973	13.3978
2.000	0.2500	8.7086
2.250	0.2102	6.7361
2.500	0.1768	2.4191
2.750	0.1486	1.8608
3.000	0.1250	0.7443
3.250	0.1051	0.4838
3.500	0.0884	0.1861
3.750	0.0743	0.1116
4.000	0.0625	0.0744

** MODE **

SEA276WG

CRUISE	STATION	SAMPLE TYPE, NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-152	S152	. M	. CM	. CM	1

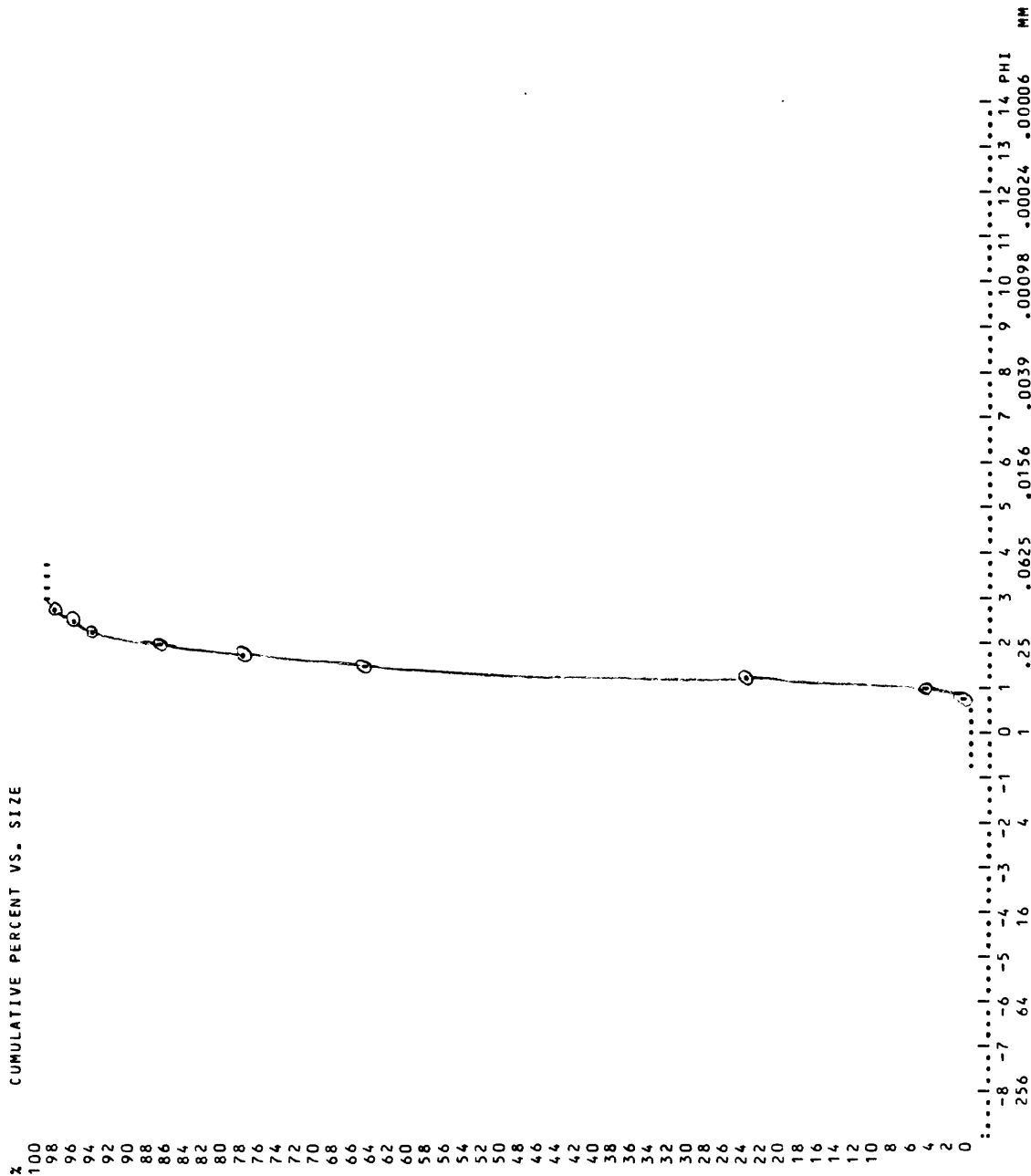
FREQUENCY VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE/NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-152	S152	. M	. CM	. CM	1

CUMULATIVE PERCENT VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE, NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-153	S153	. M	. CM	. CM	1

MF:SV=20,ST= 0,H=0;WT:SV=30.0500,ST= 0.0000,H/P= 0.0000; PHI LIM:CS= 0.00,FN= 0.00

SAMPLE ANALYZED BY THE FOLLOWING METHOD(S):

---SIZE-RANGE---
 2.0000- 0.0625MM
 ---METHOD-----

UNEDITED SAMPLE WEIGHTS IN GRAMS:

SIEVES--	--BSA----	HYDROPHOTOMETER-	--PAN----	--TOTAL---
30.0600				30.0600 (G)

PARTICLE SIZE DISTRIBUTION:

PHI---	MM---	PERCENT	CUM PERCENT
-0.7500	1.6818	0.000	0.000
-0.5000	1.4142	0.033	0.033
-0.2500	1.1892	0.033	0.067
0.0000	1.0000	0.033	0.100
0.2500	0.8409	0.033	0.133
0.5000	0.7071	0.033	0.166
0.7500	0.5946	0.033	0.200
1.0000	0.5000	0.100	0.299
1.2500	0.4204	0.166	0.466
1.5000	0.3536	0.333	0.798
1.7500	0.2973	0.432	1.231
2.0000	0.2500	1.331	2.562
2.2500	0.2102	16.334	18.896
2.5000	0.1768	20.293	39.188
2.7500	0.1486	45.975	85.163
3.0000	0.1250	10.612	95.775
3.2500	0.1051	2.728	98.503
3.5000	0.0884	0.732	99.235
3.7500	0.0743	0.466	99.701
4.0000	0.0625	0.299	100.000

SIZE CLASS RATIOS:

GRAVEL=	0.000PCT	GRAVEL/SAND=	0.000
SAND =	100.000PCT	SAND/SILT =	*****
SILT =	-0.000PCT	SILT/CLAY =	0.000
CLAY =	0.000PCT	SAND/CLAY =	0.000
MUD =	-0.000PCT	SAND/MUD =	*****
		GRAVEL/MUD =	0.000

SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-153	S153					1

INTERPOLATED SIZES USED IN GRAPHICAL STATISTICS:

	05.00	10.00	16.00	25.00	50.00	84.00	90.00	95.00	SUM-PERCENT
PHI	2.204	2.114	2.206	2.333	2.518	2.738	2.788	2.961	PHI
MM	0.2170	0.2310	0.2168	0.1984	0.1746	0.1499	0.1448	0.1284	MM

GRAPHICAL STATISTICS:

EQWK-&-WARD-(PHI)	INMAN-(PHI)	IRASK-(MM)
MEDIAN= 2.5177	MEDIAN= 2.5177	MEDIAN= 0.1746
MEAN = 2.4871	MEAN = 2.4719	MEAN = 0.1786
SORTING= 0.2478	SORTING= 0.2662	SORTING= 1.1181
SKEWNESS= -0.0002	SKEW 16/84= -0.1721	SKEWNESS= 1.0329
	SKEW 05/95= 0.2441	
KURTOSIS= 0.9629	KURTOSIS= 0.4217	KURTOSIS= 0.2302

CLASS MID-POINTS(PHI) USED IN THE MOMENT CALCULATIONS:

	-0.88	-0.63	-0.38	-0.13	0.13	0.38	0.63	0.88	1.13	1.38	1.63	1.88	2.13	2.38	2.63
	2.88	3.13	3.38	3.63	3.88										

MOMENT MEASURES:

	PHI---	MM---
FIRST (ABOUT ORIGIN)=	2.5187	0.1745
SECOND (ABOUT MEAN) =	0.1070	
THIRD (ABOUT MEAN) =	0.3272	-0.5133
FOURTH (ABOUT MEAN) =		5.0054

SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-153	S153		. M	. CM	. CM	1

MODAL ANALYSIS

1 MODE(S) DETECTED IN THIS SAMPLE.

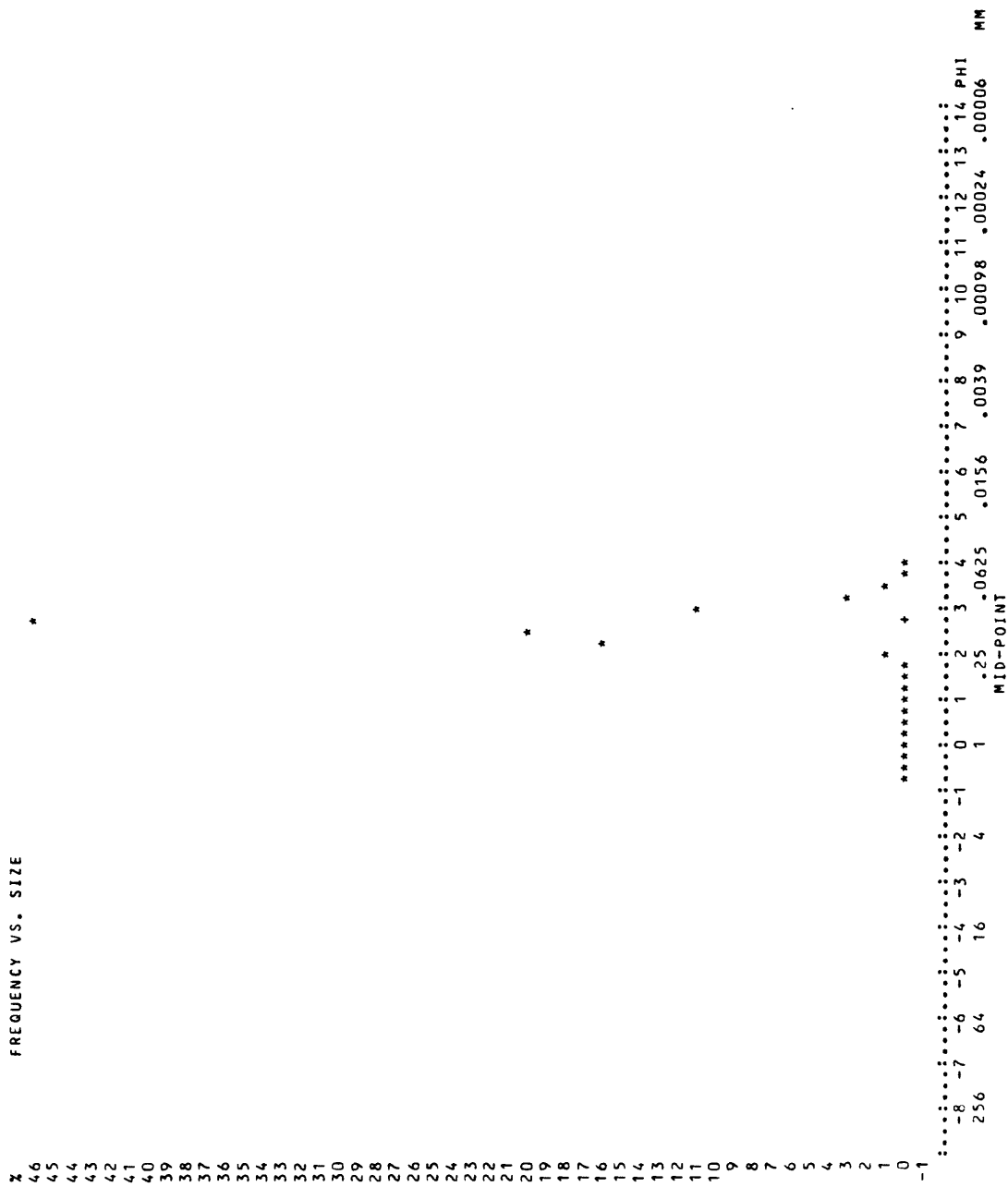
PHI	MM	PERCENT
-0.750	1.6818	0.0000
-0.500	1.4142	0.0333
-0.250	1.1892	0.0333
0.000	1.0000	0.0333
0.250	0.8409	0.0333
0.500	0.7071	0.0333
0.750	0.5946	0.0333
1.000	0.5000	0.0998
1.250	0.4204	0.1663
1.500	0.3536	0.3327
1.750	0.2973	0.4325
2.000	0.2500	1.3307
2.250	0.2102	16.3340
2.500	0.1768	20.2927
2.750	0.1486	45.9747
3.000	0.1250	10.6121
3.250	0.1051	2.7279
3.500	0.0884	0.7319
3.750	0.0743	0.4657
4.000	0.0625	0.2994

** MODE **

SEA276WG

CRUISE	STATION	SAMPLE TYPE, NUMBER	SAMPLE LENGTH	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	SAMPLE LENGTH	METHODS
S276WG	S-153	S153	-	M	-	CM	CM	1

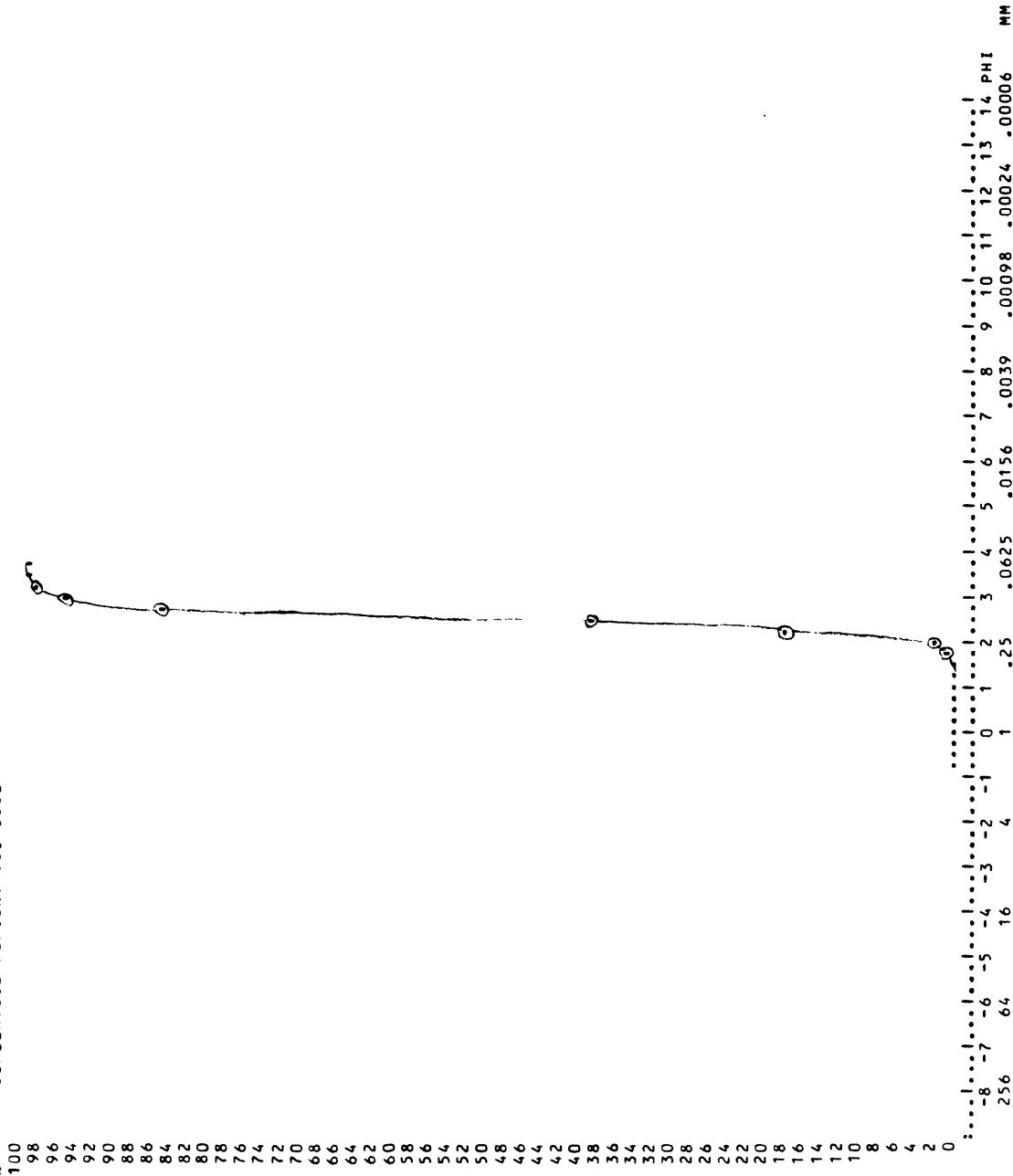
FREQUENCY VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	S-153		S153	. M	. CM	. CM	1

X CUMULATIVE PERCENT VS. SIZE



SEA276WG

CRUISE	STATION	SAMPLE TYPE	SAMPLE NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
S276WG	153-S1	S	153	. M	. CM	. CM	2

SUMMARY OF THE PREVIOUS 26 SAMPLES ** MEAN **
SAMPLES ARE LISTED IN ORDER OF INCREASING MEAN SIZE

SEQUENCE NO.	SAMPLE NO.	SAMPLE NAME	1ST MOMENT (PHI)
26	S276WG	S-153 S153	2.5187
13	S276WG	ES-153 S153	2.5175
21	S276WG	S-34 S34S1	2.4317
8	S276WG	ES-34 S34S1	2.4317
17	S276WG	S-29 S29S1	2.2094
4	S276WG	ES-29 S29S1	2.2022
20	S276WG	S-31 S31S1	1.8569
7	S276WG	ES-31 S31S1	1.8549
16	S276WG	S-28 S28S1	1.6845
18	S276WG	S-30 S30S1	1.6011
15	S276WG	S-15 S15S1	1.6000
5	S276WG	ES-30 S30S1	1.5951
2	S276WG	ES-15 S15S1	1.5530
22	S276WG	S-44 S 44	1.5069
25	S276WG	S-152 S152	1.4979
12	S276WG	ES-152 S152	1.4509
9	S276WG	ES-44 S 44	1.4502
3	S276WG	ES-28 S28S1	1.3540
19	S276WG	S-30 S30S2	1.3226
23	S276WG	S-44S2 S44S2	1.2470
14	S276WG	S-14 S 14	1.1913
6	S276WG	ES-30 S30S2	1.1629
1	S276WG	ES-14 S 14	1.1560
10	S276WG	ES44S2 S44S2	0.8258
24	S276WG	S-47 S47S1	0.7333
11	S276WG	ES-47 S47S1	0.4791

SEA276WG

CRUISE	STATION	SAMPLE TYPE, NUMBER	TOTAL LENGTH	SAMPLE CENTER	SAMPLE LENGTH	METHODS
		S 153	. M	. CM	. CM	2
S276WG	153-S1					

SAMPLES OF THE PREVIOUS 26 SAMPLES **STANDARD DEVIATION **
 SAMPLES ARE LISTED IN ORDER OF DECREASING DEVIATION.

SEQUENCE NO.	SAMPLE NO.	SAMPLE TYPE	SAMPLE NAME	2ND MOMENT (PHI)
10	S276WG	ES44S2 S44S2	1	1.1244
3	S276WG	ES-28 S28S1	1	1.0382
2	S276WG	ES-15 S15S1	1	0.8936
6	S276WG	ES-30 S30S2	1	0.8626
11	S276WG	ES-47 S47S1	1	0.8611
15	S276WG	S-15 S15S1	1	0.8274
23	S276WG	S-44S2 S44S2	1	0.7336
9	S276WG	ES-44 S 44	1	0.7201
1	S276WG	ES-14 S 14	1	0.6757
19	S276WG	S-30 S30S2	1	0.6365
14	S276WG	S-14 S 14	1	0.6178
22	S276WG	S-44 S 44	1	0.6171
24	S276WG	S-47 S47S1	1	0.6132
12	S276WG	ES-152 S152	1	0.5556
16	S276WG	S-28 S28S1	1	0.5413
5	S276WG	ES-30 S30S1	1	0.4931
4	S276WG	ES-29 S29S1	1	0.4920
18	S276WG	S-30 S30S1	1	0.4768
17	S276WG	S-29 S29S1	1	0.4674
25	S276WG	S-152 S152	1	0.4371
21	S276WG	S-34 S34S1	1	0.4162
8	S276WG	ES-34 S34S1	1	0.4162
7	S276WG	ES-31 S31S1	1	0.4065
20	S276WG	S-31 S31S1	1	0.3993
13	S276WG	ES-153 S153	1	0.3338
26	S276WG	S-153 S153	1	0.3272

NORMAL TERMINATION.
 END OF INPUT DATA SET REACHED.