TR-150

TECHNICAL REPORT

SUBMARINE SEDIMENT DATA COLLECTION AND MANAGEMENT AT THE U.S. NAVAL OCEANOGRAPHIC OFFICE

JOHN K. DUNCAN

Environment Branch
Oceanographic Analysis Division
Marine Sciences Department

AUGUST 1964

U. S. NAVAL OCEANOGRAPHIC OFFICE
WASHINGTON, D. C. 20390
Price 75 cents

ABSTRACT

This report has been prepared for the use of persons studying the composition of the sea bottom. It describes the source, type, quantity, and geographic distribution of bottom sediment information available at the U. S. Naval Oceanographic Office and lists the principal types of charts which can be prepared from such information. It also describes the forms in which bottom sediment data appear and discusses their relative reliability in terms of the sampling device employed, the type of analysis made, and the classification or description of the sediment. Furthermore, this report describes the filing system used to organize, control, maintain, and retrieve the data.

FOREWORD

This technical report discusses the collection, use, relative reliability, and control of submarine sediment data at the U. S. Naval Oceanographic Office. Data sources are listed and their geographic distribution charted by one-degree quadrangles.

DENYS W. KNOLL
Rear Admiral, U. S. Navy
Commander
U. S. Naval Oceanographic Office

TABLE OF CONTENTS

LIST OF FIGURES

TABLE

SUBMARINE SEDIMENT DATA COLLECTION AND MANAGEMENT AT THE U. S. NAVAL OCEANOGRAPHIC OFFICE

I. Introduction

The primary purpose of establishing a bottom sediment data file is to collect in one place all pertinent data in a form suitable for rapid sorting and retrieval. It also unites on one card or series of cards all of the information describing a particular sample or locations, since the data may be scattered widely through many publications.

II. Major Sources of Submarine Sediment Data

There are three principal sources of bottom sediment information: unpublished survey data; published survey or laboratory data reports and data reported in the scientific literature, or in research reports; and nautical charts.

A. Unpublished Survey Data

Unpublished survey data are the most difficult to locate, acquire, or use. Their existence is discovered, often by hearsay, by personal contact with researchers in the field, and by conscientious and constant perusal of the scientific literature for clues. Careful search for the location of unpublished data and lengthy correspondence with the owners are usually required before they can be borrowed or copied. Finally, since such data often are incompletely analyzed, unchecked, handwritten and often illegible, and unsummarized, considerable labor and expense are required to put them in intelligible and usable form. The information about a single sample often is scattered through a large number of laboratory analysis sheets, each reporting a single operation or type of analysis such as organic carbon analysis; pipette division of the fine fractions; sieve separation of the coarse grains; mineral separation and identification; indentification of foraminifera; measurements of wet density, plasticity, shear strength, chemical composition, and radioactivity; and many others. The field description, geographic location, water depth, and type of sampler often are recorded on separate forms. The great difficulty of acquiring and processing such unpublished data, except those available from Oceanographic Office surveys, has caused effort to be concentrated primarily on published data.

B. Published Survey or Laboratory Data

Descriptions and analyses of large numbers of sediment samples appear in scientific journals, cruise reports, progress reports of research contracts, and published data reports. Data are reported in an infinite variety of tables, lists, graphs, histograms, profiles, sections, summaries, and descriptions. The reported data often are incompatible because they have been derived through many different methods of analysis and are described in terms of different systems of classification and units of weights and measurement. One example is the basic classification of sediments in terms of mud, sand, gravel, and rock which is subject to the following difficulties:

1. These terms may describe quantitatively measured and computed grain size composition,or the observer's opinion based upon the appearance of the sample (wet or dry) or the feel of the sample, or both. If the classification is based upon appearance and feel, its accuracy depends upon many varying and indefinable factors such as the observer's bias, knowledge, and experience; the type and amount of organic material; and the homogeneity of the sample. Experiments have shown that even experienced geologists permit a small (less than 10 percent) proportion of clay, dark color, or stickiness to obscure the dominant coarseness of a sand sample and will classify it as mud or mud-sand.

2. If the grain size of the sediment is measured in the laboratory, classification of the sample still is complicated by determination of the range of grain sizes which defines a mud, sand, or gravel. Such definitions are arbitrary, and no single system of classification has become widely accepted. Attempts to equate English, metric, and logarithmic (phi) scales of measurement cause additional complications.

3. A third source of disagreement in sediment classification is in selection of the statistical parameters (mean, median, or mode of the frequency distribution of grain sizes) used to classify a sample, and the effect of the type and amount of deviation of the grain size distribution from the normal (sorting, skewness, kurtosis). Some geologists describe a sample composed of 70 percent sand sized grains and 30 percent or more silt as a silty sand, while others would classify the same sample as only a sand. Others adopt 20 or 10 percent as the minimum proportion of silt to be classified as silty sand. Some geologists use an elaborate descriptive system,using and often mixing English terms with others of Latin and Greek derivation such

as psammitic pellite (sandy clay), arenaceous lutaceous argillite (sandy silty clay), or psephitic argillaceous calcarenite (gravelly clayey calcareous sand), each denoting fairly specific proportions of each particle size class.

4. Confusion also arises in combining particle size classifications with ones which denote chemical or mineral composition or origin of the sediment. It is extremely difficult to determine exactly what is meant by ''coral sand,'' i.e., whether it is coral (size of particle may range from clay size to massive reefs) and sand, or sand sized calcium carbonate grains of coral origin. Shell may describe mollusks as large as giant clams or microscopic skeletal remains of pelagic foraminifera. Rock and stone are very indefinite terms used to describe a wide range of particle sizes, as well as solid bedrock outcrops or reefs. Detritus, alluvium, and diluvium are terms which indicate origin or mode of deposition, but they are used by many authors to imply various particle size ranges. Volcanic ash and pumice indicate origin and composition with unspecific grain size implications. The terms mud and ooze are used in many different ways to indicate or only to imply fine grain size, or to indicate plasticity, origin, or composition.

5. Determination of exact English equivalents of foreign language terms is difficult and often impossible. The term "wadden" often is used in European journals to describe tidal flat sediments, but some authors restrict it to mud or silts and clays, others include sand sized grains, and many use it without defining it. Russian scientists are not consistent in their use of terms such as mud, as the same author (M. V. Klenova) equates it with silt on one page, equates it with silt and clay on another, and uses it on a third page in a very general sense of a "muddy" sediment which may include large proportions of sand, gravel, pebbles, and shell. Thus, the lack of consistency in analysis, definition, and reporting of bottom sediment data makes it very difficult to adapt machine methods economically to their storage, retrieval, and analysis.

C. Nautical Charts

Abbreviated designations of bottom type appear on nearly all U. S. and foreign nautical charts. The notations of bottom material are made from field descriptions of samples obtained in the course of hydrographic surveys. Few of them are based upon laboratory analysis of samples. They are subject to all of the inconsistencies listed above. However, they are the only type of sediment information existent in sufficient quantities to permit drawing boundaries between different sediment types. U. S. nautical chart notations of bottom material have been defined by W. H. Berninghausen* and his definitions are used as the basis for geologic interpretation of these data in the Naval Oceanographic Office.

The number of sediment notations on nautical charts varies geographically with water depth. Since hydrographic surveys are made primarily to locate dangers to navigation and to chart areas of shoal water having depths less than the draft of ships, most soundings and consequently bottom sediment notations are in shoal nearshore waters of 25 fathoms or less. The number of nautical chart notations also depends on the country which produces the chart. Japanese and Portuguese charts are remarkable for printing a notation of the bottom type for almost every sounding. On some Japanese and Portuguese large scale nearshore charts, notations exceed 50,000 per one-degree quadrangle. Such density of information permits highly exact and detailed delineation of sediment types.

The use of bottom notations on foreign nautical charts is complicated by the language barrier. Nautical chart notations appear in 16 major foreign languages (not including national variations such as between Spanish and Argentinian) and pose the dual problem of translation to English and of determining if the definition of the foreign term is fully equivalent to the definition of the English term. An example of this problem is "st." which is "stein" on German charts and "stone" on British Admiralty charts. It is difficult to determine whether the British use "stone" as synonymous with "rock" to denote a specific range of grain size, or generally to include material ranging from fine gravel through boulders to bedrock reefs, or possibly to indicate lack of specific knowledge of the bottom except that it is hard. It is even more difficult to determine if the German use of the term corresponds to the British use, and to equate both to some term in the U. S. classification of bottom materials, which does not include "stone" as a separate category.

III. Bottom Sediment Chart Compilation

Several types of bottom sediment charts can be prepared showing the geographic distribution of various properties of submarine surface sediments. However, only four major types of sediment charts can be

*BERNINGHAUSEN, W. H. The Quality of the Bottom, a Glossary of Terms, U. S. Navy Hydrographic Office, SP-56, 11 p., November 1961. Washington, D. C.

prepared from nautical chart notations of bottom type. One type shows bottom material classified descriptively as mud, sand, gravel, rock, coral, shell, and various combinations of these. Another can show the quality of the bottom in terms of hard, soft, sticky, rough, etc. The third can show sediments classed according to origin and composition, i.e., shell, coral, volcanic material, oozes (globigerina, radiolarian, diatom, pteropod), blue mud, and red clay. The fourth type of chart can show sediment color.

Charts can be prepared for limited areas showing the surface distribution of other properties of submarine sediments such as mineral composition, chemical composition, statistical grain size parameters, radioactivity, engineering properties, organic content, species of planktonic foraminifera, paleomagnetism, and many others. Other charts can show the vertical variations of these properties in the bottom. However, such charts require information from cores and carefully collected and analyzed sediment samples which are available in sufficient quantities only for small areas. For most of the oceans and seas such data can be presented only for widely scattered specific locations, and no meaningful boundaries can be drawn showing the extent of or change in any parameter except on very large scale charts of small areas.

IV. Relative Reliability of Data

The value of bottom sediment data depends upon how reliably the samples represent the population (sea floor) from which they are drawn. Sediment data reliability varies according to sampling design, type of sample, sampling instrument, accuracy of the ship's position, handling, movement and storage of sample, type of analysis, and initial purpose of collecting the sample. Rarely can the effect of all of these be evaluated for a particular sample or suite of samples. Usually only an estimate of how representative a sample is can be made.

Sediment data can be divided into three major reliability groups, which are relative and often overlap:

A. The best data are those obtained from laboratory analysis of core samples. These are usually less distorted in the sampling process than other types of samples and therefore more representative of the sediment as it exists on the sea floor. Core samples are usually more carefully handled and analyzed than other types because of the longer time requirements and greater expense of obtaining them. Considerable differences in reliability exist between different types of coring devices (gravity, piston, vibro-piston, hydrostatic) and the type of material sampled. Coarse grained and hard sediments such as coarse sand, gravel, and rock are difficult to core, and often poor samples or none at all are obtained. For hard coarse materials (gravel, sand) a scoopfish or bucket dredge may obtain the most representative sample.

B. Generally less representative than cores are dredge, trawl, grab or snapper, and scoopfish samples, even when carefully analyzed by conscientious and competent persons. The grab and snapper samples usually destroy the structure of the sediment and often bias the grain size distribution toward coarser sizes by winnowing or washing in the sampling process. Trawls and dredges also may bias the size distribution by preferential selection of certain sizes. However, they provide composite samples of the submarine bottom material over an area or along a track. While such a composite sample is not representative of the material at any specific spot, it probably is more representative of the range of material in a region than one or even several cores. Therefore, one composite sample might better describe the bottom materials of a given area than one core sample, but ten core samples would describe more accurately the materials of the same area than would ten composite samples.

C. The poorest data and the most numerous are abbreviated notations of types and consistency of bottom materials which appear on boat sheets, compilation sheets, and printed nautical charts. Most of them are cursory identifications of small samples, often only a few grains, brought up on sounding leads in the course of hydrographic surveys. The identifications of these inadequate samples are made routinely by enlisted naval personnel who usually have little or no scientific training in sedimentary petrology or mineralogy. Navigational positioning errors are compounded by cartographic compilation and printing errors. Although some of the notations are highly reliable and accurate abbreviations of field descriptions of samples from the other two groups, they usually cannot be distinguished from the majority of less reliable data and must be classed with them. The total effect of all of these possible sources of errors significantly reduces the reliability of bottom sediment charts based solely upon nautical chart notations. The charts become much more reliable when chart notations are substantiated by numerous and well-distributed core and grab samples.

The bottom sediment data collection maintained by the U. S. Naval Oceanographic Office (apart from chart compilations) consists almost entirely of data of the first two classes. Data in the third class are included only when reported in professional journals (such as Annalen der Hydrographie, Deutsches Hydrographisches Zeitschrift, and Annales

Hydrographiques) or in the scientific literature, where exact positions are given and some evaluation can be made of their validity (Figures 1,2,3,4,10,11, and 12).

Nautical chart notations are compiled region by region from foreign and domestic charts of all scales from 1:5,000 harbor charts to 1:10,000,000 charts covering large ocean areas. The compilation bases are acetate or tissue overlays placed on large or medium scale nautical charts on which the notations are assembled from all available charts which cover portions of the area of the base chart. The numbers and nationality of the chart sources are listed on each overlay, and notes indicate overlaps on other compilation bases. When completed, photostatic reductions of the overlays are made. These are filed together with other miscellaneous geologic data numerically in folders, each of which corresponds to a single sheet of the worldwide strategic plotting chart series.

V. Collection, Filing, and Control of Bottom Sediment Data

Bottom sediment data are analyzed and published in such a great variety of forms that coding or conversion of data to machine punch cards is impractical until some international agreement is reached on uniformity in reporting geologic data. for this and other reasons, manual filing of data on 5" x 8" index cards was adopted.

A. Collection of data -- Bottom sediment data are assembled through systematic search of the published scientific literature and by acquisition, whenever possible, of unpublished data reports, field notes, laboratory analysis summary sheets, survey data records, intelligence reports, and ship logs. Progress in the search is recorded on a 3" x 5" card, one for each journal or series of reports examined which contains bottom sediment data. On the cards are listed the volumes, years, and issue numbers which have been searched and from which all data have been abstracted. The following journals often contain submarine geologic information and have been partially or completely searched to date. This is far from a complete list, and new ones are added when found. It does not include the many sources of data which are not published serially.

American Association of Petroleum Geologists, Bulletin
American Journal of Science
Antarctic Record (Japan)
Archiv der Deutschen Seewarte
Australian Journal of Marine and Freshwater Research

Centre de Recherches et d'Études Oceanographiques, Cahiers du
Commercial Fisheries Review
Consejo Oceanografico Ibero Americano, Memorias del
Deep Sea Research
Deutsche Hydrographische Zeitschrift
Geographical Review
Geographical Journal
Geological Society of America, Bulletin of
Geology, Journal of
Geophysics
Geophysical Research, Journal of
Gosudarstvennogo Okeanograficheskogo Instituta, Trudy
Grønland, Meddelelser om
Hydrographie und Maritimen Meteorologie, Annalen der
Hydrographiques, Annales
Instituta Okeanologii, Trudy
Institute Oceanographique (Monaco), Annales
Institute Oceanographique (Monaco), Bulletin
Instituto Español de Oceanografia, Boletin del
Instituto Español de Oceanografia, Trabajos
Japanese Journal of Geology and Geography
Limnology and Oceanography
Marine Biological Association (UK), Journal of
Marine Research, Journal of
New Zealand Oceanographic Committee, Publications
Okeanologiya
Oceanogråfiska Institutet i Gøteborg, Meddelander från
Oceanographical Society of Japan, Journal (Nippon Kaiyo Gakkaisi)
Oceanologia et Limnologia Sinica
Ozeanographie (Deutsches Hydrographische Institute)
Records of Oceanographic Works in Japan
Science
Scottish Geographical Magazine
Scripps Institution of Oceanography, Bulletins
Scripps Institution of Oceanography, Contributions
Sedimentary Petrology, Journal of
Sedimentology
Station Marine d'Endôume, Recueil de Travaux
Vsesoyuz Nauchno-Issledovatel'skiy Instituta Morskogo
Rybnogo Khozyaistva i Okeanografia, Trudy
Woods Hole Oceanographic Institute (MIT) Papers in
Physical Oceanography
Woods Hole Oceanographic Institute, Technical Reports

Data from these sources are abstracted and recorded on the 5" x 8" data cards, or negative photostats are made of relevant tables, figures, or pages of text and stapled or glued to the cards. Usually only one sample is recorded on each card, front and rear; however, very detailed analyses sometimes require several cards which are clipped or stapled together. Where two or more samples are taken at a single location by the same ship, they may be recorded on a single card even if they are different types of samples (Figure 5). Occasionally, when a very close sampling design is followed on a survey, several samples are recorded on a single card, but only if they are located within a single degree of latitude and longitude (Figures 2,3, and 4).

Several representative examples of the types of data and forms in which bottom samples are recorded on data cards are shown in Figures 1 through 12. The U. S. Naval Oceanographic Office summarizes most of its sediment data as shown in Figure 1. Only the results of engineering tests (Atterberg limits, unconfined compression strength, vane shear strength, and consolidation rate), which are made on a few samples, are reported on a different form. A photostatic reduction of the summary sheet is made to mount it on the 5" x 8" data card.

Figure 2 presents an example of a core analysis (Code 47) which gives the representative median grain size and sorting coefficients; however, the water content is the only sediment property for which the vertical variation is given. In Figure 3 data from an Italian source (Code 276) shows field classifications of eight shallow water samples of the surface sediment which were obtained within the one-degree quadrangle 44°-45°N, 12°-13°E. Such data are more reliable than nautical chart notations only because the source is identified and a scientist (Mario Picotti) has classified the sediment samples. A third sample (Code 20, Murray and Chumley, 1924-1926) in Figure 4 classifies a pelagic sediment sample and reports its mineral composition and the relative proportions of various types of organic remains.

In Figure 10 a shallow water core sample obtained during ATLANTIS Cruise 21 (Code 172) gives a field description of the core, the median and mean grain size, the size sorting coefficient, and the percentage distribution of grain sizes using the phi notation for three representative subsamples. A summary description of a deepwater core (Figure 11) is reported from a French source (Code 138). A qualitative classification of a deepwater sample obtained by the ATLANTIS Cruise 151 is of limited value because of the paucity of information and no indication as to type of sample (Figure 12).

1. SAMPLE NUMBER 10 T.N. Gill		5. SAMPLER TYPE Orange Peel	
2. LATITUDE 29° 40′ 00″		6. WATER DEPTH (fm.) 15′	
3. LONGITUDE 080° 45′ 00″		7. CORE LENGTH (in.)	
4. DATE (Day, month, year) 26 April 1953		8. CORE PENETRATION (in.)	

9. LABORATORY NUMBERS				
10. SUBSAMPLE DEPTH IN CORE (in.)	Surface			
11. COLOR	Pale Olive 10 Y 6/2			
12. ODOR	None			
13. WET DENSITY (lb./ft^3)				
14. RIGIDENSE (mm)				
15. MAXIMUM POROSITY (%)	45			
16. MINIMUM POROSITY (%)	35			
17. WATER CONTENT (%)				
18. ORGANIC CARBON CONTENT (%)				

19. SIZE ANALYSIS AND STATISTICAL MEASURES

a. < -2_ϕ (%)		OD_ϕ .8		OD_ϕ		OD_ϕ		OD_ϕ
b. -2_ϕ to -1_ϕ (%)	11	SK_ϕ .15		SK_ϕ		SK_ϕ		SK_ϕ
c. -1_ϕ to 0_ϕ (%)	17	Md_ϕ .75		Md_ϕ		Md_ϕ		Md_ϕ
d. 0_ϕ to 1_ϕ (%)	33	01_ϕ .15		01_ϕ		01_ϕ		01_ϕ
e. 1_ϕ to 2_ϕ (%)	31	03_ϕ 1.35		03_ϕ		03_ϕ		03_ϕ
f. 2_ϕ to 3_ϕ (%)	6							
g. 3_ϕ to 4_ϕ (%)	1							
h. 4_ϕ to 6_ϕ (%)	0							
i. 6_ϕ to 8_ϕ (%)								
j. > 8_ϕ (%)								

20. SUBSAMPLE DRY WEIGHT (gm)				
21. SPHERICITY (avg.)	High			
22. ROUNDNESS (avg.)	Sub-angular			
23. SURFACE TEXTURE (avg.)				
24. DOMINANT MINERAL (%)	Qtz 80			
25. SECONDARY MINERAL (%)	Shell 20			
26. OTHER MINERALS (%)				

27. REMARKS:

Gill II, Station No. 20—Regular

Large shell framents up to 5 cm.

FIGURE 1 U. S. NAVAL OCEANOGRAPHIC OFFICE SEDIMENT ANALYSIS SUMMARY

CODE 47 MS 152

LATITUDE 43°05′N (APPROX) LONGITUDE 70°42′W

BOTTOM SEDIMENTS OFF PORTSMOUTH, NEW HAMPSHIRE 1947

WATER CONTENT AND LIQUID LIMIT RESULTS

STA.	WATER CONT. TOP	WATER CONT. MIDSEC.	WATER CONT. BOTTOM	WATER CONT. OF LIQ. LIMIT	MED. DIAM.	SORT. COEFF. SO	LOG SO
83	127.0	143.0	160.0	117.9	0.00295	2.9	0.46

FIGURE 2 SAMPLE ANALYSIS EMPHASIZING WATER CONTENT

CODE 276 PICOTTI, MARIO MS 179

DATE: (9, 13) 16/8/55 (10) 17/8/55 (12, 14) 20/8/55 (10B, 12B, 12-15) 9/9/55

STA. NO.	LAT. N. °	′	″	LONG. E. °	′	″	DEPTH (M)	TYPE OF BOTTOM
9	44	58	00	12	35	00	24.5	FANGO
10	44	58	00	12	54	00	33	SABBIA FANGOSA CON ARGILLA
12	44	48	24	12	48	36	34.5	FANGO GRIGIO
13	44	44	18	12	38	30	30	FANGO GRIGIO
14	44	31	24	12	41	00	33	FANGO GRIGIO
10B	44	58	00	12	54	00	33	SABBIA FINE
12B	44	48	24	12	48	36	32	ARGILLA
12-15	44	43	54	12	55	00	37	FANGO POCA SABBIA

FIGURE 3 SAMPLE CLASSIFICATION REPORTED BY AN ITALIAN SOURCE

CODE 20 MS 146

1107 S. S. "BRITANNIA"

SOUNDING 396, JULY 18, 1899, LAT. 46°22′35″N., LONG. 18°51′56″W., 2522 FATHOMS.

GLOBIGERINA OOZE, LIGHT BROWN, SLIGHTLY COHERENT.

CALCIUM CARBONATE (82–65%), PELAGIC FORAMINIFERA (78%), BOTTOM FORAMINIFERA (2%), OTHER REMAINS (2–65%), INCLUDING OSTRACODS, ECHINOID SPINES, COCCOLITHS, RHABDOLITHS, COCCOSPHERES, FRAGMENTS OF LIMESTONE.

RESIDUE (17–35%), BROWN—

MINERALS (5%), M. DI. 0–08 MM., ROUNDED AND ANGULAR; PRINCIPALLY QUARTZ GRAINS, WITH ROCK FRAGMENTS, PUMICE, VOLCANIC GLASS ETC.

SILICEOUS REMAINS (2%), RADIOLARIA, SPONGE SPICULES, DIATOMS, IMPERFECT CASTS.

FINE WASHINGS (10–35%), AMORPHOUS CLAYEY MATTER WITH FINE MINERAL PARTICLES.

FIGURE 4 BIOLOGICAL AND MINERAL COMPOSITION OF A SAMPLE REPORTED BY A BRITISH SOURCE

CODE 214 ALBATROSS 1947-48 MS 024

04°45'N., 128°08'E. WATER DEPTH 7710 METERS (MINDANAO TROUGH)

CORE NO. 108 CORE LENGTH—390 CM.

DEPTH IN CORE CM.	
0-3.5	GREY-BROWN SAND.
3.5-285.5	GREYISH GREEN CLAY AND SILT WITH SEVERAL DARK LAYERS.
285.5-360	SEVERAL LAYERS OF DARK SAND CONTAINING SILT AND CLAY. SOME LAYERS BECOME COARSER WITH DEPTH. COLOR—BLACK.
360-389.5	IRREGULARLY MIXED SAND, SILT AND CLAY—LIGHT PARTS ARE FINER THAN THE DARK ONES.

DEEPEST PART OF CORE PROBABLY A MUD FLOW. NEXT ABOVE ARE GRADED SAND LAYERS (TURBIDITY CURRENTS—KUENEN). THESE BEDS COVERED BY 3 METERS OF FINE-GRAINED TERRESTRIAL MUD WITH MINOR AMOUNTS OF VOLCANIC GLASS AND ORGANIC SILICA. A 3 CM. SAND LAYER IS ABOVE ALL. COARSE ROCK FRAGMENTS ARE UNWEATHERED AND DERIVED FROM ANDESITE OR BASALTIC ANDESITE.

PARTICLE SIZE MM. — SAMPLE DEPTH (CM.) WT. % OF DRY, SALT FREE SEDIMENT

<.006	2	45	63	154	525	287	300	306	324	342	365	381	
.006-.02	5.7	49.2		56.2	36.0		3.9				12.2	22.2	16.6
.02-06	1.9	19.0		16.5	15.2		2.2		3.5	3.1	2.8	20.4	7.2
.06-.125	5.5	28.0	90.0	18.1	31.9	85.0	9.2	44.0					15.9
.125-.25	21.6	3.8	9.0	7.1	16.3	15.0	32.9	30.8	7.0	5.2	10.8	30.1	23.6
.25-.5	53.3	—	1.0	1.9	0.6		42.6	25.0	16.3	16.4	27.7	14.9	23.3
.5-1.0	11.5	—	—	0.2	—		9.1	MANY FORAMS.	59.1	34.4	25.6	12.4	10.2
1.0-2.0	0.5	—	—	—	—		0.1		14.1	29.0	11.6		3.2
72.0	—	—	—	—	—		—		—	9.0	9.3	—	—
	—	—	—	—	—		—		—	2.9	3.0	—	—

FIGURE 5 DESCRIPTION AND GRAIN SIZE DISTRIBUTION OF A SAMPLE REPORTED BY A SWEDISH SOURCE

CODE 262 PERSEY MS 283

78°37.3'N. 55°20'E.	STA. NO.	DEPTH (M)	C	ORG. MAT. % N	C/N	CO2
1927-31	1261	207	.79	.11	7.1	.05

PETERSEN DREDGE
BROWN SANDY MUD

CORE 0-4 CM BROWN SANDY MUD
4-16 CM. GREENISH-GREY MUD
16-25 MM. DARK GREY CLAYEY MUD

SURFACE SAMPLE

M.M.	%	GRAIN SIZE M.M.	%
>1	27	<0.01	16
0.1	1	<0.01	30
0.05	26		

FIGURE 6 DESCRIPTION, GRAIN SIZE, AND ORGANIC COMPOSITION OF A SAMPLE TRANSLATED FROM A RUSSIAN SOURCE

CODE 163 MS 005

02°59'N. 49°20'W

NUMBER	DEPTH (M)	FR. GROSSA 40 MICRONS %	FR. FINA 40 MICRONS %	CALCARIO %	CARBONO ORGANICO %	NITROGENIO ORGANICO %	C/N	Q_1	Q_3	MEDIANA	SORTING	$\frac{Q_3-Q_1}{2}$
311	71	83.4	16.6	16	0.979	0.061	16	0.174	0.265	0.210	1.23	0.045

311—AREIAS CONCHIFERAS DE CÔR CINZA E BEIGE, COM 84% DE AREIA E 16% DE CALCÁRIO.

NATUREZA MINERALÓGICA DOS GRÃOS:

NA MAIORIA QUARTZO CRISTALIZADO OU TRANSPARENTE, COM POUCAS MICAS BRANCAS E ALGUMAS BIOTITAS MARRON MAIS OU MENOS ALTERADAS.

GRÃOS DE ARENITO PARECENDO ANTIGO.

GRANDE ABUNDÂNCIA DE MINERAIS PESADOS.

MORFOLOGIA DOS GRÃOS:

OS GRÃOS SÃO TODOS UM POUCO DESGASTADOS, TENDO A FRAÇÃO GROSSA 20 ATÉ 30% DE "ARREDONDADOS BRILHANTES", SENDO ALGUNS FOSCOS.

ORGANISMOS:

GRANDE QUANTIDADE DE ORGANISMOS PLANETÔNICOS E BENTICOS.

CONCHAS DE LAMELIBRÂNQUIOS, GASTERÓPODES E LARVAS.

ECHINODERMOS-FRAGMENTOS DE ESPINAS E UM PEQUENO TIPO DE ECHINODERMO INTEIRO, DE 8 MM. DE DIÂMETRO.

ALGUNS COPRÓLITOS.

OSTRACODES—ESPÍCULAS SILICOSAS DE ESPONJAS, FORAMINÍFEROS, ARENÁCEOS E PLANCTÔNICOS.

GLOBIGERINAS, ORBULINAS, ETC., SENDO ALGUMAS CHEIAS DE MATERIAL FERRUGINOSO OU PRETO.

NOTA:

OBSERVA-SE UMA CONCHA ANTIGA, CHEIA DE UM ARENITO CALCÁRIO ANTIGO, COM GRÃOS BEM ARRENDONDADOS. SEM DÚVIDA O REVOLVIMENTO DE UMA FORMAÇÃO MAIS ANTIGO.

2—FRAÇÃO FINA:

ENCONTRA-SE SILTES, ARGILAS E MICAS EM FOLHETOS FINOS, ALGUMAS ESPÍCULAS SILICOSAS, COM CANAL CHEIO DE TERRA FERRUGINOSA. ALGUMAS VÊZES OBSERVA-SE O INÍCIO DE RECRISTALIZAÇÃO DA SÍLICA AMORFA QUE COMEÇA A SE POLARIZAR. NOTA-SE TAMBÉM ALGUNS "COCOLITOS" SENDO UM PERFEITAMENTE CONSERVADO, ENQUANTO MUITOS OUTROS APRESENTAM-SE FRAGMENTADOS NA LÂMINA ESTUDADA.

FIGURE 7 EXAMPLE OF A DETAILED DESCRIPTION OF A SURFACE SEDIMENT SAMPLE REPORTED IN A PORTUGUESE PUBLICATION

An example of a sediment analysis that is primarily biological and consists of a listing of the species whose skeletal remains have been identified in the sample is provided by Figure 9.

Figure 6 provides examples of samples reported in Swedish and Russian publications. A long core from one of the deepest ocean trenches is reported by the Swedish Deep Sea Expedition (Code 214) and gives a field description of the color and grain size classification, a description of the origin of the material, and the percentage of grains in various size classes at different levels in the core. The Russian publication (Code 262) reports both a core and a dredge sample taken at the same location in the Barents Sea. In this example the information was abstracted from several widely separated pages in the publication, translated, and assembled on one card, a very laborious task.

Another example of treatment of Soviet data is shown in Figure 8. Here the Russian has been transliterated and translated for this report; however, on most of the data cards the information appears in the Cyrillic form and has been neither transliterated nor translated. The widespread ignorance of Russian among Americans greatly limits the use of such data except where translation facilities are available.

Figure 7 is an example of a long description of a sample in Portuguese. Here the language is less of a barrier to English speaking researchers than in Figure 8 but still may cause some difficulty for those unfamiliar with Romance languages.

Another problem in handling sediment data is the reproduction of graphic portrayals of samples (Figure 13). Placing such information on individual sample data cards is complicated further when the original is in color, which cannot be reproduced photostatically.

B. Organization of data file -- The data cards are filed geographically by using the Marsden square system (Figures 14 and 15). The first order division is by 10-degree squares, the second by 5-degree squares, and the third by 1-degree squares. Five-degree square divisions have been used to date in only a few 10-degree squares in which there are too many cards for convenient manual sorting. It has not been necessary as yet to use the 1-degree square breakdown. The Marsden square number is entered on the upper right-hand corner of the data card.

CODE 94 MS 176

CORE NO. 10, DEPTH 1708 M. 42°30'N., 40°25'E.

DEPTH IN CORE (CM)	CHARACTERISTICS OF THE SEDIMENT	PERCENT ORGANIC CARBON, DEHYDRATED, DRY WEIGHT	SO_4	SO_4 / Cl	ALK	pH
20-30	IL GLINISTII, SERII S PROSLOYAMI. SOVREMENNIYE OTLOZHENIYA. (CLAYEY MUD, GREY, WITH LAYERS. CONTEMPORARY SEDIMENTS.)	0.87	0.445	0.038	17.86	8.2
90-100	IL GLINISTII, SERII, S PROSLOYAMI, DREVNECHERNOMORSKIYE OTLOZHENIYA. (CLAYEY MUD, GREY WITH LAYERS. EARLY BLACK SEA SEDIMENTS.)	1.39	0.285	0.025	18.33	8.6
220-230	"	0.91	0.244	0.023	18.41	8.1
310-320	"	1.03	0.223	0.022	17.31	8.1
480-490	"	0.75	0.325	0.036	12.75	8.1
595-605	IL GLINISTII, SERII, S PRIMEC'YU ALEVRITA. NOVOYEVSKINSKIYE OTLOZHENIYA. (CLAYEY MUD, GREY, WITH A MIXTURE OF SILT. NOVOYEVSKINSK SEDIMENTS.)	0.79	0.184	0.021	10.17	8.0
710-721	IL GLINISTII, SERII, ODNORODNII. NOVOYEVSKINSKIYE OTLOZHENIYA. (CLAYEY MUD, GREY, HOMOGENOUS. NOVOYEVSKINSK SEDIMENTS.)	0.45	0.222	0.028	9.39	7.9

FIGURE 8 EXAMPLE OF FIELD CLASSIFICATION AND CHEMICAL ANALYSIS OF A CORE REPORTED IN A RUSSIAN PUBLICATION

CODE 125 MS 465

DATE—12TH DECEMBER, 1912
POSITION—LAT. 42°38 1/2'S. LONG. 148°41 1/2'E.
DEPTH—1,320 FATHOMS
DESCRIPTION—GREEN TERRIGENOUS MUD, WITH SPONGE-SPICULES AND FORAMINIFERA; MUCH DECOMPOSING MATTER.
COMPOSITION:—

	CARBONATE OF LIME	
PERCENTAGE	FORAMINIFERA	OTHER ORGANISMS
72-85	BILOCULINA, MILIOLINA, SIGMOILINA, PLANISPIRINA, BULIMINA, VIRGULINA, BOLIVINA, CASSIDULINA, EHRENBERGINA, LAGENA, NODOSARIA, TRIPLASIA, CRISTELLARIA, POLYMORPHINA, UVIGERINA, SAGRAINA, GLOBIGERINA, ORBULINA, PULLENIA, SPIRILLINA, DISCORBINA, ANOMALINA, TRUNCATULINA, PULVINULINA, ROTALIA, NONIONINA, POLYSTOMELLA, AND HETEROSTEGINA.	A FEW LARGE COCCOLITHS, NUMEROUS ECHINOID SPINES. OSTRACODA ABUNDANT (AGLARIA, PONTOCYPRIS, ARGILLAECIA, MACROCYPRIS, BYTHOCYPRIS, BAIRDIA, CYTHERE, KRITHE, LOXOCONCHA, XESTOLEBERIS, CYTHERURA, CYTHEROPTERON, BYTHOCYTHERE, PSEUDOCYTHERE, CYTHERIDEIS, XIPHICHILUS AND CYTHERELLA.
	RESIDUE	
PERCENTAGE	SILICEOUS ORGANISMS	FINE WASHINGS
27-15	ARENACEOUS FORAMINIFERA (PELOSINA, RHIZAMMINA, NOURIA, REOPHAX, HAPLOPHRAGMIUM, TEXTULARIA, GAUDRYINA, TROCHAMMINA AND CLAVULINA). SPONGE-SPICULES AND A FEW RADIOLARIA.	SPONGE-SPICULES AND TERRIGENOUS SAND.

FIGURE 9 EXAMPLE OF BIOLOGICAL OR MICROPALEONTOLOGIC ANALYSIS OF A SEDIMENT SAMPLE

CODE 172			ATLANTIS 21			MS 081
CRUISE & STATION NUMBER	DATE	LATITUDE (N)	LONGITUDE (W)	WATER DEPTH (FT)	BOTTOM SEDIMENT SAMPLE	
21	6-20-56	28°57′	89°07′	60	G(31)	

PHI Ø CLASSES (%)

	0	1	2	3	4	5	6	7	8	9	10	MDØ	MØ	SOØ
21 #1	CUMULATIVE TO				5.24	1.28	10.03	19.12	15.37	11.61	37.33	8.0	7.7	1.7
#2		0.06	0.42	0.46	8.88	30.55	12.80	9.45	8.52	10.80	2.16	5.7	7.2	2.9
#3		0.09	0.24	0.55	8.91	24.74	15.47	9.82	9.76	12.50	0.77	6.0	7.3	2.9

CORE 56-14-21—PREDOMINANTLY TAN-GRAY CLAYEY SILT. TOP SEVEN INCHES THINLY LAYERED. REMAINDER OF CORE OF HOMOGENOUS SILT EXCEPT FOR THIN LAYER OF SILTY CLAY AND ORGANIC MATERIAL AT 20 INCHES. VERY FINE SAND 5% TO 10% IN SAMPLES. SAMPLES AT SURFACE, 13, AND 25 INCHES. LENGTH, 27 INCHES.

FIGURE 10 DESCRIPTION AND PHI GRAIN SIZE DISTRIBUTION OF A CORE SAMPLE

CODE 138 MS 004

CAROTTE 251 PROVENANCE: ATLANTIQUE EQUATORIAL
STATION 356 POSITION 00°33′N.; 37°06.5′W.
PROFONDEUR: 4,540 M.
LONGUEUR: 940 CM.

ARGILE ROUGE CALCAIRE (DE 0% A 60% CO_3CA) AVEC, À CERTAINS NIVEAUX, DES QUANTITÉS PLUS OU MOINS IMPORTANTES DE BOUE BLEUE. LA TENEUR EN FER (FE 203 RAPPORTE AU SÉDIMENT SANS CALCAIRE) VARIE DE 4% A 8% AVEC UNE VALEUR MOYENNE DE 7%.

FIGURE 11 SAMPLE DESCRIPTION REPORTED IN FRENCH

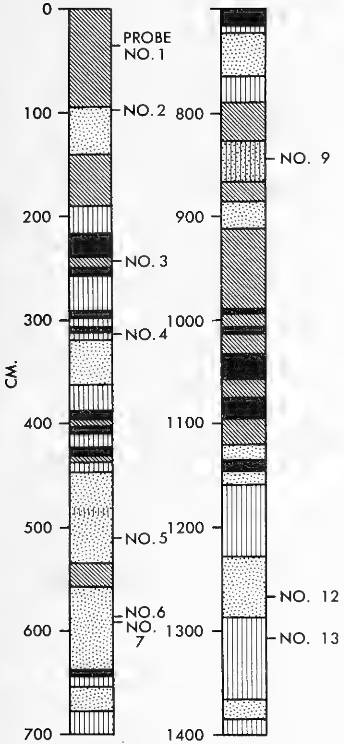
CODE 51 ATLANTIS 151 MS 110-2

LATITUDE	LONGITUDE	ATLANTIS CRUISE 151
30°07′N.	17°27′W.	ATLANTIC OCEAN 7/12/47— 6/ 18/48

DEPTH (FM)	SEDIMENT DESCRIPTION
2387	SOFT BROWN MUD

FIGURE 12 BRIEF FIELD CLASSIFICATION OF A CORE SAMPLE

CODE 220

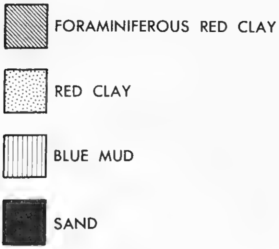


ALBATROSS 1947-48

06°17′N., 43°20′W.

MS 005

WATER DEPTH—4490 METERS



PROBE NO.	SEDIMENTTIEFE	SEDIMENTART
	LOTKERN NR. 255	
1	20.6- 25.8 CM.	FORAMINIFERENREICHER ROTER TON
2	90.0- 95.2 CM.	ROTER TON
3	231.7- 239.2 CM.	SANDIGER BLAUSCHLICK
4	297.2- 298.2 CM.	SAND
5	504.1- 511.5 CM.	ROTER TON MIT FORAMINIFEREN
6	575.9- 583.2 CM.	ROTER TON
7	583.2- 586.8 CM.	TUFF IN ROTEM TON
9	833.9- 840.7 CM.	ROTER TON
12	1255.4-1261.7 CM.	ROTER TON MIT AGGREGATEN
13	1295.2-1304.9 CM.	BLAUSCHLICK

PROBE	KORNGROSSENKLASSEN IN μ Ø							
NO.	<0.2	0.2-0.63	0.63-2	2-6.32	6.32-20	20-63.2	63.2-200	>200
1	15	13	23	17	13	10	4	5
3	17	12	13	15	19	23	1	
4	12	15	14	52	17			
5	13	29	22	19	10	3	1	3
6	19	22	22	24	10	2	1	
7	21	15	26	24	12	1	1	
9	24	11	26	22	12	5		
13	25	17	27	24	6	1		

FIGURE 13 EXAMPLE OF GRAPHIC REPRESENTATION OF CORE ANALYSIS

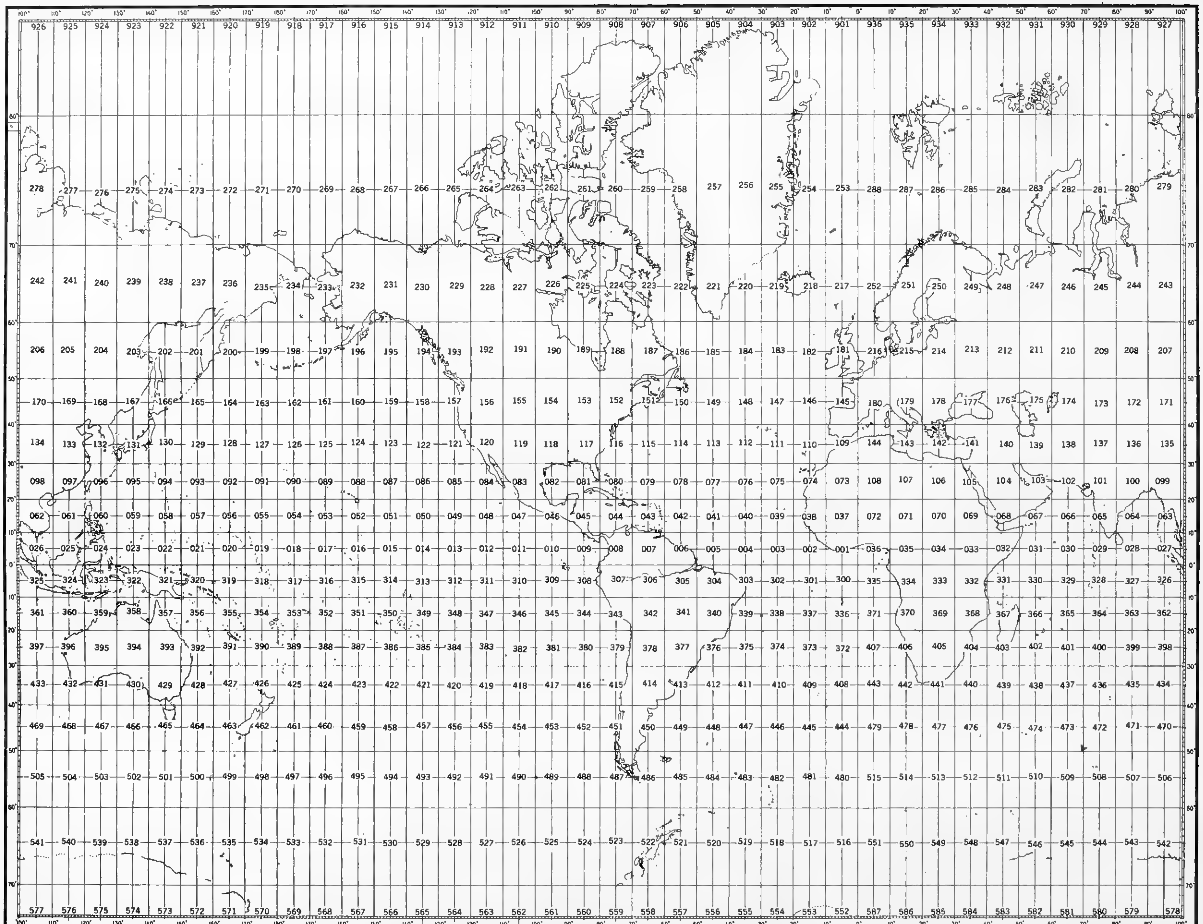


FIGURE 14 TEN-DEGREE DIVISIONS OF MARSDEN SQUARES

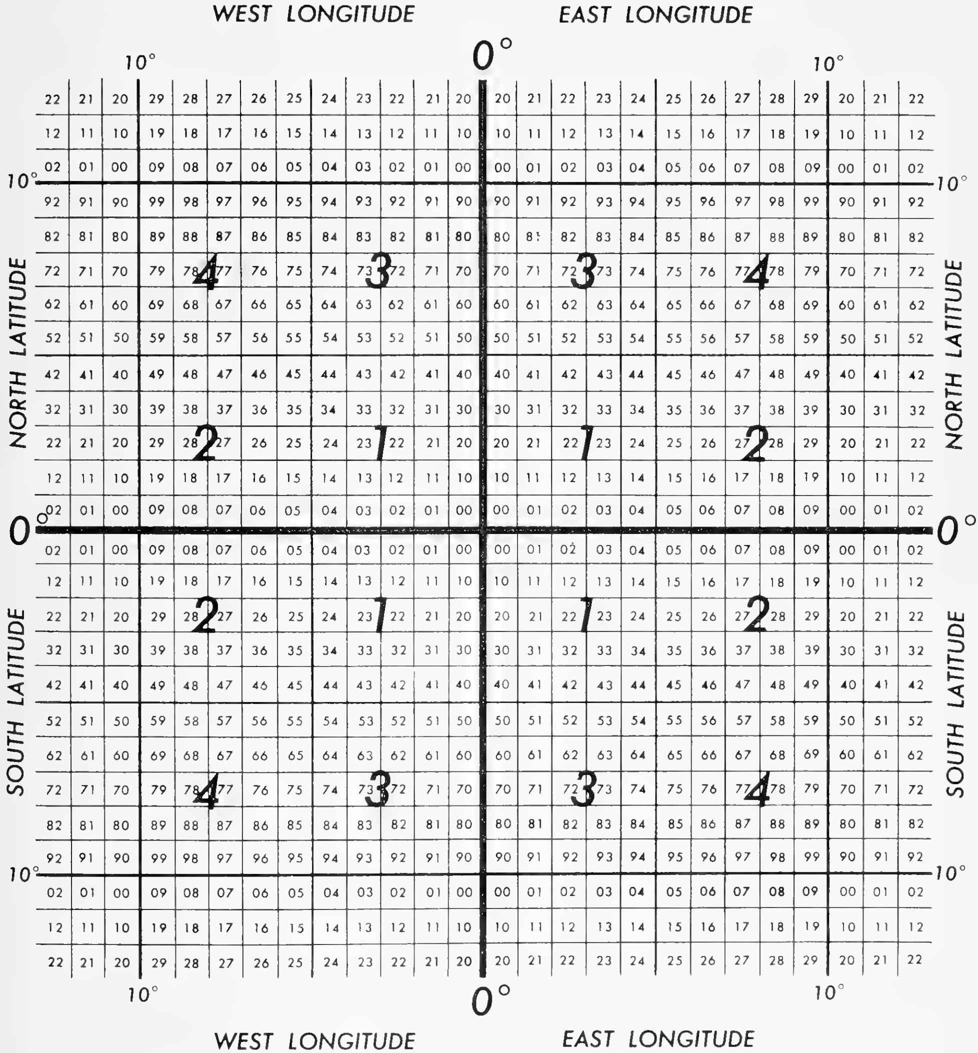


FIGURE 15 FIVE-AND ONE-DEGREE DIVISIONS OF MARSDEN SQUARES

C. Control of data -- Control of the data is accomplished by use of a card file of bibliographic sources, a tally card file, and a log book of sources coded and keyed to bibliographic and data cards.

The bibliographic file is a complete record of all sources, published and unpublished, from which data have been obtained. Each bibliographic card contains the complete bibliographic citation including the library which owns the reference; the ship, expedition, or operation which collected the samples; the date of the survey; the bibliographic code number; a list of cross references; and certain pertinent comments. The comments usually indicate the number and types of samples reported in the source and the numbers of the 10-degree Marsden squares in which the data are filed. The cross references are kept to a minimum and key the geographic area (sea, gulf, bay, etc.) of the survey (unless it is worldwide or oceanwide), the ship or ships, expedition, operation code names, and author(s) of the report to the bibliographic card. When small station location or sediment distribution charts appear in the sources, reduced copies are made and fastened to the bibliographic card.

The library from which the source publication was obtained is indicated on the card (preceding the call number) as follows: NAV OCEANO - Naval Oceanographic Office, USCGS - U. S. Coast and Geodetic Survey, LC - Library of Congress, USGS - U. S. Geological Survey, DI - Department of the Interior, SI - Smithsonian Institution (National Oceanographic Data Center, WB - Weather Bureau, DA - Department of Agriculture, and WHOI (Woods Hole Oceanographic Institute).

The bibliographic cards are filed alphabetically by name of the survey ship and cruise number; e.g., VEMA-6 follows VEMA-5. If the ship is not given, then the expedition, cruise, or operation name is used, e.g., Capricorn Expedition, DEEP FREEZE (operation), AMOS (project). If none of these is given, then the cards are filed alphabetically by senior author or occasionally by geographic area name if the source deals with a limited area such as the Sea of Azov.

The purposes of the bibliographic file are:

1. To direct users of data to the original source for information not supplied by the data card.

2. To prevent duplication of data by indicating if recently acquired data or sources already have been filed.

3. To provide bibliographic listings of marine geologic sources of information (not only bottom sediment samples) for specific areas through area cross references, and to provide lists of reports dealing with projects, operations, cruises, or expeditions.

4. To relate reports and analyses which come from several sources or authors but deal with the same samples. The ship, expedition, or project name with the date is most useful for this purpose.

5. To be able to enter on the cards additional information about the samples from new sources by using the list of Marsden squares given under comments on the bibliographic card.

The tally file is maintained to provide current listings of the numbers and geographic distributions of bottom sediment samples contained in the data collection. Eventually, it is hoped, the tally file will indicate the worldwide distribution of all published and much unpublished bottom sediment data. This file is used as a guide in planning oceanographic surveys by indicating regions for which data are lacking and where survey efforts should be concentrated. Charts prepared periodically from this file will indicate progress in the collection of submarine sediment information.

The tally cards also show the number of core samples and the number of samples of other types (designated surface samples) in each one-degree square. The code number of the source of each sample or the ship's name and date of collection are recorded on the tally card.

A log book is maintained in which all bibliographic sources of bottom sediment data are entered and numbered (code number) in the chronological order in which their data are added to the data file. Its major purpose is to serve as an additional record of sources and as a key to sources which may be indicated on data and tally cards only by code number

VI. Composition of Data Collection

The data file now contains analyses or descriptions of approximately 20,000 samples, of which about 17,000 are surface samples and 3,000 are core samples. Data for several thousand of the samples were obtained from foreign language sources, many of which have been partially translated. However, translation time and cost remain a restriction on full use of foreign sources. Russian, Japanese, Chinese, German, French, Spanish, Greek, Italian, Portuguese, Dutch, Finnish, Turkish, Israeli, and Scandinavian as well as English language sources have supplied data for the collection.

The worldwide distribution of bottom sediment data in the Naval Oceanographic Office collection as of 1 January 1963 is shown in Figures 16 through 25. Two categories of data are shown for each one-degree quadrangle (note exception in North Pole Chart, Figure 24), namely the number of core samples and the number of surface samples of all other types (trawls, dredges, snappers, etc.).

To aid in adequate evaluation of relative density of data per unit area, the table on page 62 is included to show the latitudinal variation in area of 1° quadrangles.

VII. Bibliographic File

The bibliographic file on which this report is based consists of the following sources. Following each citation is a list of the ships and expeditions or project names involved, where appropriate. The library from which the referenced publication was obtained is indicated by abbreviations (identified on page 20) preceding the call number. Where no library is given the publication is in the Naval Oceanographic Office Library.

ANON. Dredging results from the oceanographic cruise "Tithys." Research Proceedings, Marine Laboratory, Greece, vol. 1, no. 2, pp. 7-11, 1962. WHOI
TITHYS 1961

--- Lothungen im Chinesischen Meere und bei Japan. Annalen der Hydrographie und Martimen Meteorologie, jahrgang III, no. 23 and 24, p. 470, 1875. VK 588 A6 1875
ERZHERZOG FRIEDRICH 1875

--- Tiefseelotungen S. M. S. "PLANET" 1910 unter dem kommando von Korvettenkapitan Dominik, Annalen der Hydrographie und Maritimen Meteorologie, jahrgang 39, heft I, pp. 16-20, 1911. VK 588 A6 1911
PLANET 1910

--- Kleinere Mitteilungen - 3. Lotungen in dem Bosporus und dem Schwarzen Meere. Annalen der Hydrographie und Maritimen Meteorologie, jahrgang 34, p. 135, March 1906. VK 588 A6 1906
VON PODBIELSKI 1905

AGASSIZ, A. Reports on the scientific results of the expedition to the tropical Pacific in charge of Alexander Agassiz by the U. S. Fish Commission Steamer ALBATROSS from August 1899 to March 1900, Commander Jefferson F. Moser, U. S. N., Commanding. I. Preliminary Report and list of stations with remarks on the deep-sea deposits by Sir John Murray. Memoirs of the Museum of Comparative Zoology at Harvard College, vol. XXVI, no. 1, pp. 1-114, Cambridge, January 1902. (USGS) S(214) q H 31
ALBATROSS 1899-1900, 1904-1905

AKSENOV, A. A. O zanosimosti podkhodnykh portovykh kanalov v Azovskom More (Deposition in the port approaches and channels of the Azov Sea). Glavnoye Upravleniye Gidrometeorologicheskoi Sluzhby pri Sovete Ministrov SSSR, Trudy Gosudarstvennogo Okeanografičheskogo Insituta, vypusk 31 (43) pp. 58-71, ed. A.A. Aksenov, Leningrad, 1956. Serial File

ALCOCK, A. A naturalist in Indian seas, or four years with the Royal Indian Marine Survey Ship "Investigator." John Murray, London. 328 p. 1902. QL 137 A35
INVESTIGATOR 1888-1892

ALVERSON, D. L. Deep-water trawling survey off the coast of Washington (Aug. 27-Oct 19, 1951), U. S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 13, no. 11, pp. 1-16, November 1951. Serial File
JOHN N. COBB 1951

- - - Deep-water trawling survey off the Oregon and Washington coasts (August 25-October 3, 1952), U. S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 15, no. 10, pp. 5-15, October 1953. Serial File
JOHN N. COBB 1952

ANDERSON, A. W. Oceanographic data report, Project Chiper, March-April 1960. U. S. Navy Hydrographic Office, Informal Manuscript Reports No. 0-38-62, pp. B1-11, September 1962. Unpublished Manuscript.
CHIPER (Project)
BURTON ISLAND 1960

ATHEARN, W. D. Bottom sediments and Foraminifera from Labrador, BLUE DOLPHIN 1951 and 1952. Woods Hole Oceanographic Institution, Reference No. 54-42. 16 p., June 1954. Unpublished Manuscript. GC 491 W8A8 54-42
BLUE DOLPHIN 1951-1952

BADER, R. G., and HENRY, V. J. Marine sediments of Prince of Wales Strait and Amundsen Gulf, West Canadian Arctic. Texas A & M College, Department of Oceanography and Meteorology, Series No. 130, also University of Washington, Department of Oceanography, Contribution No. 231, Journal of Marine Research, vol. 17, no. 1, pp. 35-52, 1958. Serial File

BEAUFORT SEA EXPEDITION 1953

BERRIT, G. R. Étude des teneurs en manganese et en carbonates de quelques carottes sedimentaires Atlantiques et Pacifiques. Meddelanden från Oceanografiska Institutet i Göteborg, 23, Sjatte Foljden, ser. B, band 6, no. 12, 61 p., Göteborgs Kungl. Vetenskapsoch Vitterhets-Samhälle, 1955. AS 284 G7 No. 23

ALBATROSS 1947-1948

SWEDISH DEEP SEA EXPEDITION 1947-1948

BERTHOIS, L. I. Contribution a l'étude litholigique des galets du fond de la Manche in "Missions du navire cablier "Émile-Baudot" sur le plateau continental Breton (Juillet-Août-Septembre 1949)." Cahiers du Centre de Récherches et d'Études Oceánographiques, Travaux de la Station Océanographiques de la Rochelle-Pallice, Cahier No. 3, pp. 1-10, February 1950. GC7 F8Al No. 3

ÉMILE-BAUDOT 1949
(Cable Ship)

BEZRUKOV, P. L., MURDMAA, I. O., SAIDOVA, Kh. M. and FILATOVA, Z. A. Ob osadkakh i donnoi faune severnoi chasti, Vostochno-Kitaiskogo Morya. (Sediments and bottom fauna of the northern part of the East China Sea). Oceanologia et Limnogie Sinica, vol. 1, no. 3, pp. 293-315, November 1958. Serial File

VITYAZ 1955

BLACK, M. Fossil coccospheres from a Tertiary outcrop on the continental slope. Geological Magazine, vol. XCIX, no. 2, pp. 123-127, March-April 1962. (USGS)

SARSIA (R/V) 1959

BLANC-VERNET, L. Étude de quelques sediments dragues au nord du Cap Corse, Marseille. Station Marine d'Endoume. Recueil de Travaux, Fascicule 34, Bulletin No. 21, pp. 103-120, 1961. uncatalogued

CALYPSO 1957 (Sept.)

GYF 1956

BØGGILD, O. B. Sediments sous-marins recueillis dans la mer du Grönland. Geologie. Louis Philippe Robert, Duc d'Orleans, Croisière océanographique accomplié a bord de la Belgica dans la mer du Grönland 1905, pp. 85-98, C. Bulens, ed. Bruxelles, 1907. (USGS)530.1 qL93

- - - Samples of the sea-floor along the coast of East Greenland 741/2-70 N. L. Carlsbergfondet Expedition til Øst Grønland, udfort i Aarene 1898-1900 under Ledelse af G. Amdrup, II, Meddelelser om Grønland, Med 16, vol. 28, pp. 95. Kjøbenhavn, 1909. Serial File
CARLSBERGFONDETS EXPEDITION TO EAST GREENLAND 1898-1900

BORDOVSKIY, O. K. K khimii osadkov tsentral'noi chasti Tikhogo Okeana (The chemistry of sediments of the Central Pacific Ocean). Akademiya Nauk, SSSR, Trudy Instituta Okeanologii, tom XLII, pp. 107-116, 1960. Serial File
VITYAZ 1953-1955

BOURCART, J. Les sediments precontinentaux profonds dans le Golfe de Gênes. Deep Sea Research, vol. 5, no. 3, pp. 215-221, March 1959. Serial File
CALYPSO 1958

BOURNE, G. C. Report of a trawling cruise in HMS RESEARCH off the southwest coast of Ireland. Journal of the Marine Biological Association of the United Kingdom, vol. 1 (N. S.), pp. 306-323, 1889-1890. Serial File
RESEARCH (HMS) 1889

BRAMLETTE, M. N. and BRADLEY, W. H. Geology and biology of North Atlantic deep-sea cores between Newfoundland and Ireland. Part 1, Lithology and geologic interpretations. U. S. Department of the Interior, Geological Survey Professional Paper 196, pp. 1-33, Government Printing Office. 1942. GC 380 B8
LORD KELVIN 1936

BRENNECKE, W. Ozeanographische arbeiten der Deutschen Antarktisches Expedition. Annalen der Hydrographie und Maritimes Meteorologie, jahrgang 39, heft VII, pp. 350-353, heft IX, pp. 464-471, heft XII, pp. 642-647, 1911. VK 588 A6 1911
DEUTSCHLAND 1911
DEUTSCHEN ANTARKTISCHEN EXPEDITION 1911

- - - Die forschungsreise SMS "Planet" Annalen der Hydrographie und Maritimen Meteorologie, jahrgang 34, pp. 353-361, 414, 457-462, and 556-558, 1906. VK 588 A6 1906
PLANET 1906

BRODIE, J. W. Features of the sea-floor west of New Zealand. New Zealand Oceanographic Committee, Publication No. 7, New Zealand Journal of Science and Technology, sect. B, vol. 33, no. 5, pp. 373-384, March 1952. GC1 N45 No. 7
RECORDER (cable ship) 1932

BROTSKAYA, V. and ZENKEVICH, L. Materialy po kolichestvennomy uchetu donnoi fauny Barentsova, Belogo i Karskogo morei (Materials for the quantitative evaluation of the bottom fauna of the Barents, White and Kara seas) vol. 6--Kolichestvenniy uchet donnoi faun Cheshskoi guby (A qualitative evaluation of the bottom fauna of the Cheshskayo Bay). Gidro-meteorologicheskii Komitet SSSR, Trudy, Gosudarstvennogo Okeanograficheskogo Instituta Moskva, tom II, vyp. 2, pp. 41-56, 1932. Serial File
PERSEY X

BRUUN, A. ATLANTIDE-Report No. 1. Scientific results of the Danish Expedition to the coasts of tropical West Africa 1945-1946. The University of Copenhagen and the British Museum (Natural History) London, Danish Science Press Ltd., pp. 1-47, 1950. Q115 Atlantide 1945-1946 No. 1
ATLANTIDE 1945-1946
DANISH EXPEDITION TO TROPICAL WEST AFRICA 1945-1946

- - -, LANGER, E., and PAULY, H. Magnetic particles found by raking the deep sea bottom. Deep Sea Research, vol. 2, no. 3, pp.230-246, April 1955. Serial File
GALATHEA
DANISH DEEP SEA EXPEDITION 1950-1952

BRUYEVICH, S. V. and ZAITSEVA, E. D. K khimii osadkov severo-zapadnoi chasti Tikhogo Okeana (The chemistry of sediments of of the northwestern part of the Pacific Ocean). Akademiya Nauk SSSR, Trudy Instituta Okeanologii, tom XLII, pp. 1-88, 1960. Serial File
VITYAZ 1949-1955

BUCHANAN, J. Y. On the composition of some deep-sea deposits from the Mediterranean. Proceedings, Royal Society of Edinburgh, vol. 18, 1892. GC 387 B9
DACIA, S. S. Sept. 1879

CARSOLA, A. J. Marine geology of the Beaufort and eastern Chukchi Seas. U. S. Navy Electronics Laboratory, San Diego, California NE 12-221-3 (NEL 2A5) Report 392, 49 p., 6 August 1953. GC 411 U5
BURTON ISLAND (US AGB-1) 1950-1952
BAREX RESUPPLY EXPEDITION

CEBULSKI, DONALD E. Distribution of Foraminifera in the barrier reef and lagoon of British Honduras. The Agriculture and Mechanical College of Texas, Department of Oceanography and Meteorology, Project 24, Ref. 61-13T, May 1961.

CHAPMAN, F. Sea floor deposits from soundings. Australasian Antarctic Expedition 1911-1914 under the leadership of Sir Douglas Mawson. Part 1, Scientific Reports. Series A., vol 11, Oceanography, pp. 1-60, J. Spence Actg. Gov't Printer, Sydney, 1922. Q115 AAE 1911-1914 Series A II-III
AURORA 1911-1914
AUSTRALASIAN ANTARCTIC EXPEDITION 1911-1914

CHUMLEY, J. Report on the deposit samples collected during the "Michael Sars" North Atlantic Deep-Sea Expedition 1910 in "Report on the scientific results of the MICHAEL SARS North Atlantic Deep Sea Expedition 1910." vol. 1, pp. 1-10, Bergen Museum, John Grieg, Bergen (1929-1933). Z115 M 6 v.1
MICHAEL SARS
NORTH ATLANTIC DEEP SEA EXPEDITION 1910

CLARKE, A. H., JR. Abyssal mollusks from the South Atlantic Ocean. Contribution No. 503. Lamont Geological Observatory Bulletin, Museum of Comparative Zoology Harvard College, vol. 125, no. 12, pp. 345-387, October 1961.
VEMA CRUISES 12 and 14 1957, 1958

- - - HUNTSMAN, A. G. Results of the Hudson Bay Expedition, 1920. III. The Echinoderms, IV. The Ascidiacea. Contributions to Canadian Biology, New Series, vol. 1, nos. 2 and 3, pp. 21-38, 1922. Serial File
HUDSON BAY EXPEDITION 1920

COHEE, G. F. Sediments of the submarine canyons off the California coast. Journal of Sedimentary Petrology, vol. 8, no. 1, pp. 19-33, April 1938. Serial File

COLOM, G. Foraminiferos de los costas de Galiciea (Campañas del ''Xauen'' en 1949-1950). Boletin del Instituto Español de Oceanografia No. 52, 58 p., 7 June 1952 Serial File
XAUEN 1949-1950

CREAGER, J. S. and McMANUS, D. C. Preliminary investigations of the marine geology of the southeastern Chukchi Sea. BROWN BEAR Cruise No. 236, 1 August to 2 September 1959. University of Washington, Department of Oceanography, Technical Report No. 68. Reference 61-15. 46 p. May 1961. GC 856 W2A4 No. 68
BROWN BEAR CRUISE 236 Aug.-Sept. 1959
PLOWSHARE (OPERATION) -
CHARIOT (PROJECT)

CUSHMAN, J. A. Foraminifera, Part M, Volume IX: Annelids, parasitic worms, protozoans, etc. Report of the Canadian Arctic Expedition 1913-1918, Southern Party 1913-1916, J. de Labroquerie Tache, Ottawa. 13 p., February 6, 1920.(USGS)502(980)C 165 v.9, pt. M
CANADIAN ARCTIC EXPEDTION 1913-1918

DANGEARD, L. Observations de géologie sous-marine et d'océanographie relatives à la Manche. Annales de l'Institut Océanographique (Foundation Albert 1er Prince de Monaco) New series, tome VI, fasc. 1, pp. 1-295, 1928. GC 1 Monaco Serie II
POURQUOI-PAS ? 1922-1927

DAVIS, J. K. Soundings. Australasian Antarctic Expedition 1911-1914 under the leadership of Sir Douglas Mawson. Part 3, Scientific Reports, series A, vol. II, Oceanography, pp. 91-102. T. H. Tennant, Actg. Gov's Printer, Sydney NSW, Australia, 1940. Q115 AAE 1911-1914 Series A II-III.
AURORA 1911-1914
AUSTRALASIAN ANTARCTIC EXPEDITION 1911-1914

DAY, A. A. The continental margin between Brittany and Ireland. Deep Sea Research, vol. 5, no. 4, pp. 249-265, May 1959. (NOO) Serial File
DALRYMPLE (HMS)
SARSIA (RN)

DEMEL, J. and MULICKI, Z. Quantitative investigations on the biological bottom productivity of the south Baltic. Reports of the south Baltic. Reports of the Sea Fisheries Institute (Morski Instytut Rybacki) in Gdynia, Nr. 7, pp. 75-126. Warsaw, Poland, 1954. (D. I.) QH 301 G27, No. 7

DI NAPOLI ALIATA, E. Étude de la carotte No. 19 campagne du "Vema" dans la Méditerranée (Mer Tyrrhénienne) in "La topographie et la géologie des profondeurs océaniques." Collogues Internationaux du Centre National de la Récherche Scientifique, vol. LXXXIII, Nice-Villefranche 5-12 Mar. 1958, pp. 61-71, Publ. Paris 1959. (LC) GC 83 F7
VEMA Cruise 10 1956

DORAN, E. JR. Land forms of the southeast Bahamas. The University of Texas Publication No. 5509, 38 p. May 1, 1955. (NOO) GB 429 D6
LADY LEONA (Sloop) 1953-1954

DRYGALSKI, E. von. II. Lothungen, Zweiter Theil-Sonderberichte über die fahrt von Kapstadt bis Kerguelen in Deutsche Südpolar-Expedition auf dem Schiff "Gauss," Bericht über die wissenschaftlichen arbeiten auf der fahrt von Kapstadt bis zu den Kerguelen 27 November 1901 bis 2 Januar 1902. Veröffentlichungen des Instituts für Meereskunde und des Geographischen Instituts und der Universität Berlin, heft 2, August 1902. E. S. Mittler u. Sohn, Berlin. GC1 B5-No. 2.5
GAUSS 1901-1903
DEUTSCHE SÜDPOLAR EXPEDITION 1901-1903

EMERY, K. O., Geology of Johnston Island and its surrounding shallows, central Pacific Ocean. Bulletin of the Geological Society of America, vol. 67, no. 11, pp. 1505-1520, November 1956. Serial File

EMERY, K. O., BUTCHER, W. S., GOULD, H. R. and SHEPARD, R. P. Submarine geology off San Diego, California. Scripps Institution of Oceanography, New Series, no. 588, Allan Hancock Foundation Contribution no. 85, The Journal of Geology, vol. 60, no. 6, pp. 511-548, November 1952. Serial File

EMERY, K. O. and HÜLSEMAN, J. The relationship of sediments, life and water in a marine basin. Deep Sea Research, vol. 8, no. 5, pp. 165-180, 1962. Serial File
VELERO IV

ERICSON, D. B., EWING, M. and HEEZEN, B. C. Turbidity currents and sediments in North Atlantic. Lamont Geological Observatory Contribution No. 47. Woods Hole Oceanographic Institution Contribution No. 604, Bulletin of the American Association of Petroleum Geologists, vol. 36, no. 3, pp. 489-511, March 1952. Serial File
ATLANTIS CRUISE 152 1947-1951

ERICSON, D. B., EWING, M., WOLLIN, G. and HEEZEN, B. C. Atlantic deep-sea sediment cores. Geological Society of America Bulletin, vol. 72, no. 2, pp. 193-286, February 1961. Serial File
ATLANTIS REHOBOTH
CARYN SAN PABLO
VEMA

ERICSON, D. B. and WOLLIN, G. Micropaleontology and lithology of Arctic sediment cores. Lamont Geological Observatory Contribution No. 346, in "Scientific studies at Fletcher's Ice Island, T-3 (1952-1955)," vol. I, Geophysical Research Papers No. 63, Geophysics Research Directorate, Air Force Cambridge Research Center, USAF, Air Force Research and Development Command AFLRC-TR-59-232(1) ASTIA Document No. AD-216813, pp. 51-58, September 1959. QC 801 U5G3 No. 63 v. 1
Fletcher'S ICE ISLAND (T-3)

EWING, M. and HEEZEN, B. C. Puerto Rico Trench topographic and geophysical data. Lamont Geological Observatory Contribution No. 135, in Poldervaart, A. Crust of the Earth (A Symposium), Geological Society of America Special Paper 62, pp. 255-263, 1955.
ATLANTIS 1949-1954
CHALLENGER
SAN PABLO

FELL, H. B. The fauna of the Rose Sea, Part 1, Ophiuroidea. New Zealand Oceanographic Institute Memoir No. 18, New Zealand Department of Scientific and Industrial Research, Bulletin 142, 79 p., 1961. GC1 N452 M5 No. 18
ENDEAVOUR Cruise I 1958
(HMNZS) Cruise II 1959

FLEMING, R. H. and Staff. Physical and chemical data, North Pacific Ocean Brown Bear Cruise 199, July-Aug. 1958 for the International Geophysical Year of 1957-1958. University of Washington, Department of Oceanography, Special Report 30, pp. 12-13, March 1959. GC 856 W2A3 No. 30
BROWN BEAR Cruise 199 July-Aug. 1958

FORD, E. Animal communities of the level sea-bottom in the waters adjacent to Plymouth. Journal of the Marine Biological Association of the United Kingdom, vol. XIII (NS), no. 1, pp. 164-224, December 1923. Serial File

FREDRIKSSON, K. A sediment core from the Mindanao Trough. Reports of the Swedish Deep-Sea Expedition 1947-1948. Sediment cores from the West Pacific, vol. VI, fasc. IV, pp. 97-134, Göteborgs Kungl. Vetenskaps Och Vitterhets-Samhälle, July 1959. Q115 S 8 v. 6-7
ALBATROSS 1947-1948
SWEDISH DEEP SEA EXPEDITION 1947-1948

GAUTIER, Y. V. Sur quelques Bryozoaires de la "Zone à coraux profonds" du Golfe de Gênes (Campagne de la "Calypso" de Novembre 1957). Bulletin de l'Institut Océanographique, Monaco, no. 1123, 10 p. 25 July 1958. (DI) GC1 I 45
CALYPSO 1957
ELIE-MONNIER 1952

GOETHEM, C. VON Étude physique et chimique du milieu marin. Institut Royal des Sciences Naturelle de Belgique. "Expédition Océanographique Belge dans les eaux Côtières Africaines del 'Atlantique Sud (1948-1949)," Resultats Scientifiques, vol. II, fasc. 1, 152 p., Bruxelles, 1951. Z115 E9 v. 2, fasc. 1,
NOORDENDE 1948-1949

GOLDBERG, E. P. and KOIDE, M. Ionium-thorium chronology in deep sea sediments of the Pacific. Science, vol. 128, no. 3330, pp. 1003, October 24, 1958. Serial File.
CAPRICORN
CHINOOK
CHUBASCO
CUSP
NORTHERN HOLIDAY

GOMEZ DE LLARENA, J. Observaciones sobre los sedimentos recogidos entre los Cabos Juby y Bojador. Exploración Oceanografica del Africa Occidential, Boletin del Instituto Español de Oceanografia, no. 29, 23 p., 20 March 1950. Serial File
MALASPINA May-June 1947

GONZÁLEZ PENA, J. M. Estúdio mineralógico comparativeo de la fracción ''arcilla'' de algunos sedimentos del litoral espanol, pp. 3-27. Boletiń del Instituto Españal de Oceanografia, no. 90, Madrid, 15 February 1958. Serial File
XAUEN 55-7 & 56-1

GORSHKOVA, T. I. Organicheskiye veshchestvo i karbonaty v osadkakh Barenstova Morya (Organic matter and carbonates in the sediments of the Barents Sea). Kolebaniya chislennosti i usloviya promysla donnykh ryb v Barenstovom More (Variations in the number and trade conditions of bottom fish in the Barents Sea). Trudy Polyarnogo Nauchno-Issledovatel'skogo Instituta Morskogo Rybnogo Khozyaistva i Okeanografiy Imeni N. M. Knipovicha (PINRO) uypusk X, pp. 260-280, 1957. (LC) SH 1 .M8
PERSEY 1927-1931
NICOLAI KNIPOVICH 1930-1931

GORSLINE, DONN S. and STEWART, R. A. Benthic marine exploration of Bahia de San Quintin, Baja, California, 1960-1961. Marine and Quaternary Geology. Pacific Naturalist, vol. 3, no. 8, Oct. 16, 1962.
Serial File

GOULD, H. R. and BUDINGER, T. F. Control of sedimentation and bottom configuration by convection currents, Lake Washington, Washington. University of Washington, Department of Oceanography Contribution No. 221, Journal of Marine Research, vol. 17, pp. 183-198, 1958.
Serial File

GRIEG, J. A. Brachiopoda, Scaphopoda, Gastropoda, and Lamellibranchiata from the "Michael Sars" North Atlantic Deep-Sea Expedition 1910. Report of the Scientific Results of the "Michael Sars" North Atlantic Deep-Sea Expedition 1910, vol. III, pt. II, pp. 1-16, 1916, Bergen Museum, John Grieg, Bergen 1933. Q115 M6 v.3
MICHAEL SAR 1910
NORTH ATLANTIC DEEP-SEA EXPEDITION 1910

GRIPENBERG, S. A study of the sediments of the North Baltic and adjoining seas. Vth Hydrological Conference of the Baltic States. Communication 12A. Helsinki-Helsingfors. 231 p., 1934.
GB 660 Baltic 1936 Commun.
NAUTILUS (FINLAND) 1924-1930

HABE, T. Pelecypod shell remains in Tanabe Bay, Wakayama Prefecture, Records of Oceanographic Works in Japan, Special Number 4, pp. 39-51, March 1960. Serial File

HAMILTON, E. L. Upper Cretaceous, Tertiary, and Recent planktonic foraminifera from Mid-Pacific flat-topped seamounts. Jounal of Paleontology, vol. 27, no. 2, pp. 204-237, March 1953. (USGS) also Contribution No. 615, 1953, Scripps Institution of Oceanography
GC 1 S53 1953
MID-PAC 1950

HANZAWA, S. Diatom (Ethmodiscus) ooze obtained from the tropical southwestern North Pacific Ocean. Records of Oceanographic Works in Japan, vol. VII, no. 1, pp. 37-43, May 1953. Serial File
KOSYU
MANSYU
YODO

HEEZEN, B. C., ERICSON, D. B. and EWING, M. Further evidence for a turbidity current following the 1929 Grand Banks earthquake. Deep Sea Research, vol. 1, no. 4, pp. 193-202, July 1954.
Serial File
ATLANTIS CRUISE 180 1952

HERAS, A. R. et al. Análisis de fondos de la Bahiá de Cadiz, Boletín del Instituto Español de Oceanografia, no. 75, 30 p., Madrid, 15 April 1956. Serial File
XAUEN 1953

HILL, M. N. and KING, W. B. R. Seismic prospecting in the English Channel and its geological interpretation. Quarterly Journal of the Geological Society of London, vol. CIX, no. 1, pp. 1-19, 1953.
(LC) QE 1 G4

HÖHNK, W. Ein beitrag zur ozeanischen Mykologie in-Böhnecke, Bückmann, A. Die expeditionen von F. F. S. "Anton Dohrn" und V.F.S. "Gauss" in Internationalen Geophysikalischen Jahr 1957/ 1958. Deutsches Hydrographisches Institut-Hamburg, Deutschen Hydrographischen Zeitschrift, Erganzungsheft Reihe B (4°), nr. 3, pp. 81-87, 1959. Serial File
ANTON DOHRN 1958

HOLME, N. A. The bottom fauna of Great West Bay, Journal of the Marine Biological Association of the United Kingdom, vol. 29, pp. 163-183, 1950-1951. Serial File

HOLTEDAHL, H. On the Norwegian continental terrace, primarily outside Møre-Romsdal: its geomorphology and sediments. With contribution on the Quaternary geology of the adjacent land on the bottom deposits of the Norwegian Sea. Universitet i Bergen, Årbok 1955, Naturvitenskapelig rekke nr. 14, 209 p. A. S. John Griegs Boktrykkeri, Bergen 1957. GB 457.3 H7
ARMAUER HANSEN 1950-1953
G. O. SARS 1954

- - - Geology and paleontology of Norwegian Sea bottom cores. Journal of Sedimentary Petrology, vol. 29, no. 1, pp. 16-29, March, 1959. Serial File
ARMAUER HANSEN 1950-1953
G. O. SARS 1954

HOLZMAN, J. E. Submarine geology of Cortes and Tanner Banks. Journal of Sedimentary Petrology, vol. 22, no. 2, pp. 97-118, June 1952. Serial File
VELERO IV 1949

HOSOKAWA, I., OKOBE, S., and HAMODA, S. Oceanographical studies on the sediments in the East China Sea, (1) On the contents of organic carbon and total nitrogen. Journal of the Oceanographical Society of Japan, vol. 15, no. 2, pp. 43-47, June 1959. Serial File

HOSHINO, M. and ICHIHARA, Y. Submarine topography and bottom sediments off Kumano-nada and Enshu Nada. Journal of the Oceanographical Society of Japan, vol. 16, no. 2, pp. 41-46, June 1960. Serial File

HOUGH, J. L. Sediments of Cape Cod Bay, Massachusetts. Woods Hole Oceanographic Institution Contribution No. 184, Journal of Sedimentary Petrology, vol 12, no. 1, pp. 10-30, April 1942. Serial File
ASTERIAS 1935

HOUGH, J. L. Sediments of Buzzards Bay, Massachusetts. Woods Hole Oceanographic Institution Contribution No. 187, Journal of Sedimentary Petrology, vol. 10, no. 1, pp. 19-32, April 1940. Serial File
ASTERIAS 1934

HUNKINS, K. L., EWING, M., HEEZEN, B. C. and MENZIES, R. J. Biological and geological observations on the first photographs of the Arctic Ocean deep-sea floor. Lamont Geological Observatory Contribution No. 411. Limnology and Oceanography, vol. 5, no. 2, pp. 154-161, April 1960. Serial File
ARCTIC DRIFT STATION "A" DECEMBER 1957

HURLEY, R. J. Expedition Chinook I lowering log June-August 1956. Scripps Institution of Oceanography. 23 P. 1956. GC 781 S4E9 also GC771 S4S5
CHINOOK I EXPEDITION 1956
SPENCER F. BAIRD 1956

IJAMA, A. The bottom sediments of the Japan and Kuril trenches collected by the Ryofu Maru during the Japanese Deep Sea Expedition in 1959. JEDS Contribution No. 8. Geological Institute, University of Tokyo, The Oceanographical Magazine, vol. 11, no. 2, pp. 225-231, May 1960. Serial File
RYOFU MARU 1959

JARKE, J. Beitrag zur kenntnis der foraminiferen-fauna der mittleren und westlicken Barents-See. Reprint - Int. Revue ges. Hydrobiol., vol. 45, no. 4, pp. 581-654, 1960. Deutsches Hydrographisches Institut, Oceanographie 1960, nr. 8, Hamburg, 1961. GC 1 H 1 1960
CORDILLERA 1939 FRANKEN 1939
HEINRICH BAUMGARTEN 1938 STUTTGART 1938

KAGAMI, H. and IJIMA, A. On the bottom sediments off Onagawa and Kushiro, the adjacent continental slope of Japan Trench. JEDS Contribution No. 9, Geological Institute, University of Tokyo, The Oceanographical Magazine, vol. 11, no. 2, pp. 233-242, March 1960. Serial File
RYOFU MARU 1959

KAGAMI, H. Submarine sediments off Sakata, Yamagata, Japan. Geological Institute University of Tokyo Contribution, Japanese Journal of Geology and Geography, vol. XXXII, nos. 3-4, pp. 397-410, November 25, 1961. Serial File
MEIYO
TENKAI
TORII

KLENOVA, M. V. Geologiya Barentsova Morya (Geology of the Barents Sea). Akademiya Nauk SSSR, Komissiya po Problemam Severa, pri Prezidiume AN SSSR, 367 p., Moskva, 1960.
ISSLEDOVATEL'
POLYARNAYA ZVEZDA
SADKO
PERSEY-2
NICOLAI KNIPOVICH
PERSEY
KASHALOT
SRT-440

KNOX, G. A. General account of the Chatham Islands 1954 Expedition. New Zealand Department of Scientific and Industrial Research Bulletin 122, New Zealand Oceanographic Institute Memoirs No. 2. 37 p., 1957. GC1 N452 M5 (WB Library) M06.5/931 K74ge
CHATHAM ISLANDS EXPEDITION 1954
NORA NIVEN 1907
ALERT 1954

KOBAYASHI, K., OINUMA, K., and SAIDO, T. Clay mineralogical study on recent sediments (I) Samples JEDS-iR', JEDS-1R". JEDS Contribution No. 15, Geological Institute, University of Tokyo, The Oceanographical Magazine, vol. 11, no. 2, pp. 215-223, March 1960. Serial File
RYOFU MARU 1959

KOMUKAI, R. On the bottom topography and sediments in the western passage of Tsugaru Strait. The Report of the Hydrographic Office, Maritime Safety Office, Tokyo, Japan. Various pages. 1956. GC 821 K8

KOTEFF, C. and COTTON, J. E. Preliminary results of recent deep drilling on Cape Code, Massachusetts. Science, vol. 137, no. 3523, p. 34, July 1962. Serial File

KROG, H. Post-glacial submergence of the Great Belt dated by pollen-analysis and radio carbon. International Geological Congress, Report of the Twenty-First Session Norden, Part IV, Proceedings, Section 4 - Chronology and Climatology of the Quaternary, pp. 127-133, 1960.

KRUMBEIN, W. C. and ABERDEEN, E. The sediments of Barataria Bay. Journal of Sedimentary Petrology, vol. 7, no. 1, pp. 3-17, April 1937. Serial File

KUENEN, P. H. Two problems of marine geology: atolls and canyons. Verhndelingen der Koninklijke Nederlandsche Akadamie van Wetenschappen, Afd. Natuurkunde, Tweede Sectie, Deel XLIII, no. 3, pp. 1-69, 1947, N. V. Nood-Hollandsche Uitgevers Maatsschappij, Amsterdam, 1947. QE 33 K 9

KUENEN, P. H. Geological results, vol. V, Bottom samples, pt. 3, Collecting of the samples and some general aspects, section I. also
NEEB, I. G. A. The composition and distribution of the samples in "The Snellius Expedition in the eastern part of the Netherlands East-Indies 1929-1930. 265 p., E. T. Brill-Leiden, 1943. Q115 SNELLIUS v. 5, pt. 3
SNELLIUS EXPEDITION 1929-1930

KULP, O. Beitrag zur entwicklungsgeschichte der Mecklenburger Bucht. Petermanns Geographische Mitteilungen, heft 4, 105 jahrgang, pp. 249-256, VEB. Hermann Haack, Geographische Kartographische, Anstalt Gotha, Dresden, DDR, 1961. Translation.

KULP, J. L. and CARR, D. R. Surface area of deep-sea sediments. Lamont Geological Observatory Contribution 14, Journal of Geology, vol. 60, no. 2, March 1952. Serial File

KURC, G. Foraminifères et Ostracodes de l'Étang de Thau. Revue des Travaux de l'Institut des Pêches Maritimes, tome XXV, fasc. 2. 246 p., Juin 1961. SH 269 A3 v. 25 no. 2
OSTREA 1956-1958

LAEVASTU, T. The occurrence of pigments in marine sediments. Department of Oceanography, University of Washington Contribution No. 228, Journal of Marine Research, vol. 17, no. 4, pp. 325-334, November 1958. Serial File

LAFOND, E. C., DIETZ, R. S., PRITCHARD, D. W. Oceanographic measurements from the USS NEREUS on a cruise to the Bering and Chukchi Seas, 1947, Report 91 Problem 2A5, U. S. Navy Electronics Laboratory, San Diego, California. 96 p., February 1949. GL 841 U5 B41
NEREUS 1947

LAUGHTON, A. S. Sound propagation in compacted ocean sediments. Geophysics, vol. XXII, no. 2, pp. 233-260, April 1957. Serial File
DISCOVERY II 1952

LIVINGSTONE, R. Preliminary investigation of the southeastern Alaska abalone (Haliotis Kamtschatkova). Part I--Exploratory diving. U. S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 14, no. 9, pp. 8-16, September 1952. Serial File
LADY BESS Sept.-Oct. 1951.

LLARENA, J. G. de Observaciones sobre los sedimentos de las costas de Galicia (Campañas del "Xauen" en 1949-1950). Boletin del Instituto Español de Oceanografia, no. 52., 24 p., November 1952. Serial File
XAUEN 1949-1950

LOCHER, F. W. Sedimentpetrographische untersuchung der lotkerne 255 und 257. Reports of the Swedish Deep-Sea Expedition. Sediment cores from the North Atlantic Ocean, vol. VII, no. 4, pp. 187-208. Göteborgs Kungl. Vetenskaps- och Vitterhets-Samhälle 1958. Q155 S8 v. 6-7
ALBATROSS 1947-1948
SWEDISH DEEP SEA EXPEDITION 1947-1948

MATTHEWS, L. H. The marine deposits of the Patagonian continental shelf. Discovery Reports, vol. IX, pp. 175-206, University Press, Cambridge, 1934. Q115 Discovery v. 9
WILLIAM SCORESBY (RRS) 1927-1932

MENARD, H. W. Pleistocene and Recent sediment from the floor of the northeastern Pacific Ocean. Geological Society of America, Bulletin, vol. 64, no. 11, pp. 1279-1294, November 1953. Serial File.
NORTHERN HOLIDAY 1951

MENARD, H. W., ALLISON, E. C. and DURHAM, J. W. A drowned Miocene terrace in the Hawaiian Islands. Science, vol. 138, no. 3543, pp. 896-897, 23 November 1962 Serial File
ARGO 1961

MOLENGRAFF, G. A. F. Geologie-Hoofdstruk (Chapter) VI in "De zeeën van Nederlandsch Oost-Indie," Koninklyk Nederlandsch Aardrijkskundig Genootschap, pp. 272-357. E. J. Brill, Leiden, 1922. (USGS) 503(910) qN28
CACHALOT 1858 GAZELLE 1875
CHALLENGER 1874-1875 SIBOGA 1899-1900
VALDIVIA 1899

MOORE, H. B. The muds of the Clyde Sea area. 1. Phosphate and nitrogen contents. Journal of the Marine Biological Association (United Kingdom), vol. 16, pp. 595-607, 1930. Serial File

MOORE, DAVID G. and SHUMWAY, GEORGE. Sediment thickness and physical properties: Pigeon Point Shelf, California. Journal of Geophysical Research, vol. 64, no. 3, March 1959. Serial File

MÜLLER, G. Die rezenten sedimente im Golf von Neapel. Pubblicazioni della Stazione Zoologica di Napoli, vol. 31, fasc. 1, pp. 1-27, September 1959. (also in Geol. Rundsch. vol. 47, 1958). (SI)
CAVOLINI 1957

MUNTHE, H. Den Svenska Hydrografiska Expeditionen Ar 1877 under ledving af F. L. Ekman, Afdelningen III, Kongliga Svenska Vetenskaps-Akademiens Handlingar, Ny Fjöld, bandet 27, no. 2. 35 p. Stockholm, 1894. (USDA) 502 St6 H27, 1894.

SVENSKA HYDROGRAFISKA EXPEDITIONEN AR 1877

MURRAY, J. Balfour Shoal: a submarine elevation in the Coral Sea. The Scottish Geographical Magazine, vol. 13, no. 3, March 1897. Serial File
PENGUIN (HMS) 1894-1895

- - - On the depth and marine deposits of the Indian Ocean, with descriptions of the deposit-samples collected by Mr. J. Stanley Gardiner in 1905. Report No. 13 of the Percy Sladen Trust Expedition to the Indian Ocean in 1905, under the leadership of Mr. J. Stanley Gardiner. The Transactions of the Linnean Society of London, 2nd Ser Zoology, vol. 13, pt. 3, no. 34, pp. 355-396, June 1910. 115 PSTE 1905, v. 2, No. 3

PERCY SLADEN TRUST EXPEDITION 1905

- - - On marine deposits in the Indian, Southern, and Antarctic Oceans. The Scottish Geographical Magazine, vol. 5, no. 8, pp. 405-435, August 1889. (WB) No. 13328, S43 lg v.5. 1889

EGERIA (HMS) 1887
FLYING FISH (HMS) 1887
INVESTIGATOR (HMS) 1887

MURRAY, J. and CHUMLEY, J. The deep-sea deposits of the Atlantic Ocean. Transactions of the Royal Society of Edinburgh, vol. LIV, pt. I. - Session 1923-1924, pp. 1-252. R. Grant & Son, Edinburgh, 1924. (USGS) S(512) qEd. 52 v. 54, 1924-1926.

ATLANTIC DEEP SEA DEPOSITS 1857-1911

ARGUS (HMS) 1879
BRITANNIA (SS) 1897-99
BUCCANEER (SS) 1886
CHALLENGER (HMS) 1872-76
CYCLOPS (HMS) 1857
DACIA (SS) 1883-93
DOLPHIN (USS) 1889
EGERIA (HMS) 1897
ENTERPRISE (USS) 1883
FARADAY (SS) 1903
GAZELLE (SS) 1875
GETTYSBURG (USS) 1876
GOLDFINCH (HMS) 1902-05
KNIGHT ERRANT (HMS) 1880
MICHAEL SARS (SS) 1910
MINIA (SS) 1903
MUTINE (HMS) 1907-08
PORCUPINE (HMS) 1869
RAMBLER (HMS) 1895-99
SCOTIA (SS) 1883
SEINE (SS) 1889
SERPENT (HMS) 1872-76
SIEMENS (SS) 1875
SILVERTOWN (SS) 1884
STEPHAN (SS) 1911
SYLVIA (HMS) 1886
TALISMAN (SS) 1883
TRITON (HMS) 1882
VALDIVIA (SS) 1898
VALOROUS (HMS) 1875

MURRAY, J. and LEE, G. V. The depth and marine deposits of the Pacific. Reports on the scientific results of the Expedition to the Tropical Pacific on USS Steamship ALBATROSS, August 1899 - March 1900, no. XVII. Memoirs of the Museum of Comparative Zoology, vol. 38, no. 1. 170 p. June 1909. GC 771 A2

ALBATROSS EXPEDITION TO THE TROPICAL PACIFIC 1899-1900

MURRAY, J. and RENARD, A. F. Report on deep-sea deposits based on the specimens collected in the years 1872 to 1876. In "Report on the scientific results of the voyage of HMS Challenger during the years 1873-1876", 523 p., London: Longmans & Co., 1891. Q115 CHALLENGER 1873-1876 vol. 2
CHALLENGER 1873-1876

NANSEN, F. The Norwegian North Polar Expedition 1893-1896. Scientific Results, vol. IV-1904, vol. V-1906, Jacob Dydwad, Christiania. Q115 N8 v.4, v. 5
NORWEGIAN NORTH POLAR EXPEDITION 1893-1896

- - - The bathymetrical features of the North Polar Seas with the discussion of the continental shelves and previous oscillations of the shore-line, vol. 4, pt. 13.,231 p., June 1902 - Feb. 1904. Q115 N8 v.4
NORWEGIAN NORTH POLAR EXPEDITION 1893-1896

NASU, N. Particle size distribution in the vicinity off Sagami River mouth. (The processes forming beach and dune sands). Journal of the Faculty of Science, University of Tokyo, Section II--Geology, Mineralogy, Geography, Geophysics, vol. X, pt. 1, pp. 65-103, 1956-1957. (USGS) G(620) T62
ASASHIO R/V 1950

- - - Oceanographic investigation in the Chukchi Sea during the summer of 1958. The Scientific Reports of the Whales Research Institute, no. 15, pp. 143-157, Tokyo, November, 1960. (LC) Serial Division
FUMI MARU No. 16 1958

NASU, N., IJIMA, A. and KAGAMI, H. Geological results in the Japanese Deep Sea Expedition in 1959 -- Exploration of the Ramapo Deep in the Japan Trench and the southernmost part of the Kurile Trench by the RYOFU MARU. JEDS Contribution No. 6, Geological Institute, University of Tokyo, The Oceanographical Magazine, vol. 11, no. 2, pp. 201-214, March 1960. Serial File.
RYOFU MARU 1959

NAVARRO, F. de P. Exploración oceanografica del Africa Occidental desde el Cabo Ghir al Cabo Juby -- Resultados de las campanas del "Malaspina" y del "Xauen" en Mayo de 1946. Ministerio de Marina, Instituto Español de Oceanografia, Trabajos, no. 20. 39 p. Madrid, 1947. GC 1 S7 No.20
XAUEN 1946
MALASPINA 1946

NEAVERSON, E. The sea-floor deposits I. General characters and distribution. Discovery Reports, vol. IX, pp. 295-350, University Press, Cambridge, 1934. Q115 Discovery v. 9
DISCOVERY (RRS.) 1925-1933
WILLIAM SCORESBY 1927-1932

NEUMANN, A. C. The configuration and sediments of Stetson Bank, northwestern Gulf of Mexico. The Agricultural and Mechanical College of Texas, A & M, Project 24, Reference 58-5T, Technical Report No. 26., 124 p., February 1958. GL 521 T35 No. 26
A. A. JAKKULA 57-1, 57-2, 57-9, 1957

NIINO, H. On the soundings from the sea bottom at the offing of Cape Cook, Prince Harald Coast, Antarctic continent. Report of the Japanese Antarctic Research Expeditions, no. 11, pp. 45-47, January 1961, also in Journal of Tokyo University Fisheries (Special ed.), vol. 1, no. 3, 1958. Serial File

SECOND JAPANESE ANTARCTIC RESEARCH EXPEDITION 1957-58
UMITAKA MARU 1957

- - - Study on the natural radioactivity of bottom deposits (II). Bottom deposits in the vicinity of Takamatsu City, Seto Inland Sea. Records of Oceanographic Works in Japan, Special No. 4 (New Series), Japanese National Commission for UNESCO, pp. 165-170, March 1960. Serial File under "Records of"
SHINYO MARU 1958

- - - Sediments of Oki Bank in the Japanese Sea, Journal of Sedimentary Petrology, vol. 18, no. 2, pp. 79-85, August 1948. Serial File
SOYO MARU 1941
SUIROBU MARU

NORIN, E. The sediments of the central Tyrrhenian Sea. Reports of the Swedish Deep-Sea Expedition 1947-1948. Sediment cores from the Mediterranean Sea and the Red Sea, vol. VIII, Fasc. 1, pp. 1-136, Göteborgs Kungl. Vetenskaps-Och Vitterhets-Samhälle, 1958. Q115 S8 v. 8-10
ALBATROSS 1947-1948
SWEDISH DEEP SEA EXPEDITION 1947-1948

NYBELIN, O. Introduction and station list. Report of the Swedish Deep-Sea Expedition 1947-1948. Zoology, vol. II, fasc. 1, pp. 1-28. Göteborgs Kungl. Vetenskaps-Och Vitterhets-Samhälle, 1958. Q 115 S8 1947/48 v. 2 fasc. 1
ALBATROSS 1947-1948
SWEDISH DEEP SEA EXPEDITION 1947-1948

- - - Zoological results of the "Skagerrak" expedition 1946. Introduction and station list. Göteborgs Kungl, Vetenskaps=och Vitterhets= Samhälles Handlingar fj. 6, ser. B, band 5, no. 11. 12 p., 1947. (Meddelanden Från Göteborgs Musei Zoologiska Avdelning 118). (DA) 502 G71 H
ALBATROSS 1947-1948
SKAGERRAK 1946

OFFICER, C. B. and WEBER, J. H. Use of continuous seismic profiles in offshore explorations and engineering. Offshore, vol. 10, no. 6, pp. 36-37, July 1959. Serial File

OLIVER, M. Carta pesca de los Baleares I. Este y Sur de Menorca. Instituto Español de Oceanografia, Trabajos, no. 26, pp. 7-20, Madrid, 1959. GC-1 S7
XAUEN 1958

ORTH, Beiträge zur meereskunde, Annalen der Hydrographie und Maritimen Meteorologie, Jahrgang der Hydrographischen Mitteilungen III, no. 15 und 16, pp. 302-310, 1875. VK 588 A6 1875
DRACHE 1874 BLITZ 1873
METEOR 1873 POMMERANIA 1873

OSTROUMOV, E. A. and FOMINA, L. C. O formakh soyedinenii seri v donnykh otlozheniyakh severo-zapadnoi chasti Tikhogo Okeana (Types of sulfur compounds in the bottom sediments of the northwestern portions of the Pacific Ocean) in Geologicheskiye issledovaniya v dalnevostochnikh moryakh (Geologic studies in the Far Eastern Seas). Akademiya Nauk SSSR, Trudy Instituta Okeanologii, tom XXXII, pp. 206-214, 1960. Serial File
VITYAZ

OSTROUMOV, E. A. and VOLKOV, I. I. O formakh soyedinenii sery v donnykh otlozheniyakh Tikhogo Okeana u Novoi Zelandii (Forms of sulfur compounds in the bottom sediments of the Pacific Ocean near New Zealand). Akademiya Nauk, SSSR, Trudy Instituta Okeanologii, tom XLII, pp. 117-124, 1960. Serial File
VITYAZ

OTTMANN, F. Estudo das amostras do fundo recolhidas pelo N. E. "Almirante Saldanha na região da embocadura do Rio Amazonas. Missão da Diretoria de Hidrografia e Navegacão por ocasião do Ano Geofisico Internacional (Dezembro de 1958). Trabalhos do Instituto de Biologia Maritima e Oceanografia, Universidade do Recife, vol. 1, no. 1, pp. 77-106, December 1959. (LC) 525.8 99 R.29 1959
ALMIRANTE SALDANHA 1958

OTTMANN, F. and OTTMANN, J. M. Les sediments de l'embouchure du Capibaribe, Recife, Bresil. Trabalhos do Instituto de Biologia Maritima e Oceanografia, Universidade de Recife, vol. 1, no. 1, pp. 51-69, December 1959. (LC) 525.7.99 R.29 1959

OWEN, D. M. ATLANTIS Cruise 151 to Mediterranean area, Scientific Report No. 2. Bottom samples and underwater photography. Woods Hole Oceanographic Institution, Reference No. 49-8. 38 p. January 1949. Q115 A88 No. 2
ATLANTIS CRUISE 151 1947-1948

PARR, W. J. Foraminifera. Reports-Series B (Zoology and Botany) B.A.N.Z. Antarctic Research Expedition 1929-1931, vol. V, pt. 6, pp. 235-392, B.A.N.Z.A.R. Expedition Committee, University of Adelaide, The Hassell Press, Adelaide, May 1950. Q115 BANZ Ser. B. v. 5 pt.6
BRITISH-AUSTRALIAN-NEW ZEALAND ANTARCTIC RESEARCH EXPEDITION (BANZ) 1929-1931

PEREZ MATEOS, J. Mineralogiá de la fraccioń "arena" de los sedimentos marinos que se estudian. pp. 29-35, Boletiń del Instituto Español de Oceanografia, no. 90, Madrid, 15 February 1958. Serial File
XAUEN 55-7 & 56-1 1955-56

PERRY, R. B. A study of the marine sediments of the Canadian Eastern Arctic Archipelago. Fisheries Research Board of Canada, Atlantic Oceanographic Group, Manuscript Report Series (Oceanographic and Limnological) no. 89., 80 p., April 1961. GC 854 C2M2 No. 89
LABRADOR July-October 1957

PETTERSSON, H. Three sediment cores from the Tyrrhenian Sea. Meddelanden fran Oceanografiska Institutet i Göteborg, 15, Göteborgs Kungl. Vetenskaps-och Vittershets-Samhälles Handlingar, Sjätte Följden, ser. B band 5, no. 13, 94 p., 1948. AS 284 G7 No. 11-20
SKAGERRAK 1946

- - - Teneur en radium des depôts de mer profonde (PRINCESS-ALICE II et CHALLENGER). Résultats des compagnes scientifiques accomplies sur son yacht par Albert Ier Prince Souverain de Monaco, fasc LXXXI, pp. 3-50, 1930. (LC) QL5 A3
CHALLENGER
PRINCESSE-ALICE II

PHILIPPI, E. Die Grundproben der Deutschen Südpolar-Expedition 1901-1903 in -- Drygalski, E. von. Deutsche Südpolar Expedition 1901-1903 im Auftrage des Reicksamtes des Innern, band II. Geographie und Geologie, heft VI, pp. 415-616. Berlin. 1910. (LC) Q115 D49
DEUTSCHES SÜDPOLAR EXPEDITION 1901-1903
GAUSS 1901-1903

PHLEGER, F. B. and ERICSON, D. B. Hydrography the western Atlantic, bottom sediments off Portsmouth, New Hampshire. Woods Hole Oceanographic Institution, Technical Report No. 6., 15., August 1947. GC 501 W8 No. 6-10
ANTON DOHRN R/V 1946
PHYSALIA R/V 1946

PICOTTI, M. Crociera talassografica Adriatica 1955, III. Tabelle delle osservazioni fisiche, chimiche, biologiche e psammografiche, Instituto Sperimentale Talassografico Trieste, Pubbl. N. 361, Estratto dell'Archivo di Oceanografia e Limnologia, vol. XI, fasc. 3, pp. 371-377 and tables. 1960. GC1 T80 No. 361
ADRIATIC THALASSOGRAPHIC CRUISE 1955

PIRIE, J. H. H. Scottish National Antarctic Expedition 1902-1904: Deep sea deposits. Transactions of the Royal Society of Edinburgh, vol. XLIX, pt. 3, Session 1912-1913, pp. 645-686, 1913. (USGS) S (512) q E 52
SCOTIA 1902-1904
SCOTTISH NATIONAL ANTARCTIC EXPEDITION 1902-1904

PORTER, URQUHART, McCREARY and O'BRIEN CONSULTING ENGINEERS. Feasibility study for harbor development, San Clemente Island, California. U. S. Navy, Bureau of Yards and Docks, Eleventh Naval District, Public Works Office, San Diego, California. 74 p. December 1956. Uncatalogued.

PRATJE, O. Die bodenbedeckung der südlichen und mittleren Ostsee und ihre bedeutung fur die ausdeutung fossiler sedimente (43. Beitrag zur geologie der meere). Deutsches Hydrographisches Institut, Hamburg, Deutsches Hydrographische Zeitschrift, band 1, heft 2/3, pp. 45-61, June 1948. Serial File

PRATJE, O. Die sedimente des Südatlantischen Ozeans. Erste Lieferung-Correns, C. gewinnung und bearbeitung der boden proben. A. Die verfahren der gewinnung und untersuchung der sedimente. B. Schott, W. Die foraminiferen in dem äquatorialen teil des Atlantischen Ozeans. 2. Lieferung - C. Zusammenstellung der untersuchungsergebnisse nach stationen geordnet. D. Auswertung der ergebnisse. Wissenschaftliche Ergebnisse der Deutschen Atlantischen Expedition auf dem Forschungs und Vermessungsschiff "Meteor" 1925-1927. Herausgegeben in auftrage der Notgemeinschaft der Deutschen Wissenschaft von A. Defant, band III, Verlag von W. des Gruyter and Co., Berlin and Leipzig, 298 p., 1937. Q115 Meteor bd. 3, Teil 2 and 3

METEOR 1925-1927

DEUTSCHEN ATLANTISCHEN EXPEDITION 1925-1927

RAO, M. S. Distribution of calcium carbonate in the shelf sediments off East coast of India. Journal of Sedimentary Petrology, vol. 28, no. 3, pp. 274-285, September 1958. Serial File

INDIAN MINESWEEPERS 1952-1957

REED, J. J. and LEOPARD, A. E. Sediments of Cook Strait, New Zealand Oceanographic Committee Publication No. 17, New Zealand Journal of Science and Technology, Section B, vol. 36, no. 1, pp. 14-22, July 1954. GC1 N45 No. 17

LACHLAN (HMNZS)

REVELLE, R. R. I. Marine bottom samples collected in the Pacific Ocean by the CARNEGIE on its seventh cruise.

PIGGOT, C. S. II. Radium content of ocean-bottom sediments. Scientific results of cruise VII of the CARNEGIE during 1928-1929 under command of Captain J. P. Ault. Oceanography II, Dept. of Terrestrial Magnetism, Carnegie Institute of Washington. Pub. 556, 196 p., 1944. Q115 CARNEGIE 0-1-IV

CARNEGIE VII 1928-1929

RICHARDS, H. C. and HILL, D. Great Barrier Reef bores, 1926 and 1937 - descriptions, analysis and interpretations. Reports of the Great Barrier Reef Committee, vol. V, 111 p.,30 April 1942. (USGS) S (890) G32 v. 5
GREAT BARRIER REEF 1926 - 1927

RICHTER, E. VON Liste der grundproben von der studienfahrt der "Minseroog" 1923 Senckenbergiana, Wissenschaftliche Mitteill-ungen, Senckenbergischen Naturforschenden Gesselschaft in Frankfurt a. M., band 10, heft 5, pp. 195-203, September 1928. (USGS) S (530) F 884
MINSEROOG 1923

RICKETTS, N. G. and TRASK, P. D. The bathymetry and sediments, Part 1, Scientific Results (of) The "Marion" Expedition to Davis Strait and Baffin Bay under the direction of the U. S. Coast Guard, 1928. U. S. Treasury Department, Coast Guard, Bulletin No. 19, 81 p. G.P.O., Washington, D. C. 1932. Q115 USCG Pt. 1, 1928.
MARION (USCG) 1928

RIEDEL, W. R. Siliceous organic remains in pelagic sediments. In- SILICA IN SEDIMENTS, a publication of the Society of Economic Paleontologists and Mineralogists, pp. 80-91, May 1959.
GC 771 S4S5
GUIDE (USCGS) 1923
PIONEER (USCGS) 1922
MID-PAC EXPEDITION 1953

RIIS-CARSTENSEN, E. The Godthaab Expedition 1928. Report on the expedition. Kommissionen for Videnskabelige Undersøgelser i Grønland, band 78, nr. 1, pp. 3-105, 1931. (USGS) (980) Mbd. 78 1931-1939
GODTHAAB 1928

ROSENBERG, L. A. Mikrobiologischeskaya kharakteristika gruntov i vody Sredizemnogo Morya (Microbiological characteristics of the bottom and water of the Mediterranean Sea). Akademiya Nauk SSSR, Okeanolgiya, vol. 2, no. 1, pp. 109-117, Moskva, 1962. Serial File
AKADEMIK S. VAVILOV June-August 1960

SCHAEFERS, E. A. and SMITH, K. A. Shellfish explorations in the Yakutat Bay area, Alaska, by the JOHN N. COBB, Spring 1953. U. S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 16, no. 3, pp. 1-11, March, 1954. Serial File
JOHN N. COBB 1953

SCHAEFERS, E. S., SMITH, J. A. and GREENWOOD, M. R. Bottom fish and shellfish explorations in the Prince William Sound area, Alaska, 1954. U. S. Fish and Wildlife Service, Commercial Fisheries Review, vol. 17, no. 4, pp. 6-28, April 1955. Serial File
JOHN N. COBB 1954

SCHMIDT, J. Report on the Danish Oceanographical Expeditions 1908-1910 to the Mediterranean and adjacent seas, vol. I: I. Introduction, pp. 1-48. III. Bøggild, O. B. The deposits of the sea bottom, pp. 255-269. Andr. Fred. Høst & Son, Copenhagen, 1912. Q115 D33 No. 1
THOR 1908-1910

SCHÜLER, F. Untersuchungen über die mächtigkeit von schlickschichten mit hilfe des echographen. Deutsche Hydrographischen Zeitschrift, band 5, heft 5/6, pp. 220-231, 1952. Serial File
GAUSS (VFS) May 1952

SKISHKINA, O. V. Khimicheskii sostav ilovikh vod Tikhogo Okeana (Chemical composition of the interstital water of the Pacific Ocean). Akademiya Nauk SSSR, Trudy Instituta Okeanologii, tom XXXIII, pp. 146-164, 1959. Serial File
VITYAZ 1953-1955

- - - Sulfaty v ilovykh vodakh Chernogo Morya (Sulfates in the muds of waters of the Black Sea). Problemy Khimii Morya, Akademiya Nauk SSSR, Trudy Instituta Okeanologii, tom XXXIII, pp. 178-193, 1959. Serial File
AKADEMIK VAVILOV 1956

SHUKRI, N. M. and HIGAZY, R. A. Mechnical analysis of some bottom deposits of the northern Red Sea. Journal of Sedimentary Petrology, vol. 14, no. 2, pp. 43-69, August 1944. Serial File
MAHABITH (RRS)
EGYPTIAN PRELIMINARY EXPEDITION TO THE NORTHERN RED SEA 1934-1935

STEPHEN, A. C. The Sipunculids of Haifa Bay and neighbourhood. The Bulletin of the Research Council of Israel, vol 7B, No. 3-4, pp. 129-136, Oct. 1958. Records File EN3/EF40, RS 05788, 19 Jul. 62

STETSON, H. C. The sediments of the continental shelf off the eastern coast of the United States. WHOI Contribution No. 178, Papers in Physical Oceanography and Meteorology, Massachusetts Institute of Technology and Woods Hole Oceanographic Institution, vol. V., no. 4, 47 p., July 1938. QC 851 P 15, v. 5 No. 4

STETSON, H. C. The sediments and stratigraphy of the East coast continental margin; Georges Bank to Norfolk Canyon. WHOI Contribution No. 487, Papers in Physical Oceanography and Meteorology, Massachusetts Institute of Technology and Woods Hole Oceanographic Institution, vol. XI, no. 2, 52 p., August 1949. QC 851 P15 v. 11 No. 2

STETSON, H. C. -Part I. The Continental terrace of the western Gulf of Mexico: its surface sediments, origin and development.
TRASK, P. D. -Part II. Chemical studies of sediments of the western Gulf of Mexico. Papers in Physical Oceanography and Meteorology, Massachusetts Institute of Technology and Woods Hole Oceanographic Institution, vol. XII, no. 4, pp. 3-119, May 1953. QC851 P15 v. 12 No. 4
ATLANTIS 1947

STETSON, H. C. Bottom deposits. Contribution No. 5, Woods Hole Oceanographic Institution, Part V. in "Scientific Results of the Nautilus Expedition 1931." Papers in Physical Oceanography and Meteorology, Massachusetts Institute of Technology and Woods Hole Oceanographic Institution, vol. II, no. 3, pp. 17-37, June 1933. QC 851 P15 v. 2, No. 3
NAUTILUS (U. S.) 1931
WILKINS-ELLSWORTH EXPEDITION 1931

STETSON, H. C. and SCHALK, M. Marine erosion of glacial deposits in Massachusetts Bay. Woods Hole Oceanographic Institution Contribution No. 52, Journal of Sedimentary Petrology, vol. 5, no. 1, pp. 40-51, April 1935. Serial File

SMITH, R. J. and CRILLY, J. B. Application of X-ray diffraction to oceanic soil analysis. U. S. Naval Civil Engineering Laboratory, Port Hueneme, California, Technical Report R-213, Y-5015-01-001 (g), 22 p., 26 October 1962.

SMITH, W. D. Recent underwater surveys using low frequency sound to locate shallow bedrock. Bulletin of the Geological Society of America, vol. 69, no. 1. pp. 79-90, January 1958. Serial File
PASSAMAQUODDY BAY SURVEY 1951

SPETHMANN, H. Studien über die bodenzusammen-setzung der Baltischen depression vom Kattegat bis zur Insel Gottland. Laboratorium für Internationale Meeresforschung in Kiel, Hydrografische Abteilung nr. 8, Wissenschaftliche Meeresuntersuchungen Kommission zur Wissenschaftlichen Untersuchung der Deutschen Meere in Kiel und der Biologischen Anstalt auf Helgoland, Neue folge, 12th band, pp. 303-314, abteilung Kiel, 1911 (USGS) 530qW 1 "Kiel" N. F. Bd 11-12
POSEIDON 1909

STARIKOVA, N. D. Nekotoriye danniye po organischeskomy veshchestvu zhidkoi fazi osadkov Chernogo i Azovskogo morei (Some data on the organic composition of the liquid phase of sediments of the Black and Azov Seas) in Khimiya Morya (Marine Chemistry) Akademiya Nauk SSSR, Trudy Okeanograficheskoi Komissii, tom X, vyp. 2, pp. 30-48, 1960. (LC) T168.25, Tom X, vyp 2. 1960
VAVILOV 1956-1957

STARIKOVA, N. D. Organicheskii veshchesti zhidkoi fazi osadkov severozapadnoi chasti Tikhogo okeano (Organic matter of the liquid phase of the sediments of the northwestern Pacific Ocean). Akademiya Nauk SSSR, Trudy Instituta Okeanologii, tom XXXIII, pp. 165-177, 1959.
VITYAZ 1953-55

STARK, J. T. and DAPPLES, E. C. Nearshore lagoon sediments from Raiatea, Society Islands. Journal of Sedimentary Petrology, vol. 11, no. 1, pp. 21-27, April 1941 Serial File

STETSON, H. C. and UPSON, J. E. Bottom deposits of the Ross Sea, Woods Hole Oceanographic Institution Contribution No. 130. Journal of Sedimentary Petrology, vol. 7, no. 2, pp. 55-66, August 1937. Serial File
BEAR 1934
Second Byrd Antarctic Expedition 1934-35

STETSON, T. R. Report on Atlantis Cruise No. 266 June-July 1961, Woods Hole Oceanographic Institution, Reference No. 61-35, 24 p. October 1961. Uncatalogued
ATLANTIS 1961 Cruise 266

STEWART, H. B. Oceanographic cruise report USC&GSS EXPLORER 1960. Seattle, Wash. to Norfolk, Virginia, 2 Feb. - 27 Apr. 1960. Coast and Geodetic Survey, U. S. Department of Commerce. GPO, Wash. D. C., pp. 100-120, 1960. GC 57 S8
EXPLORER (USCGS) 2 Feb. - 27 Apr. 1960

STRIDE, A. H. A linear pattern on the sea floor and its interpretation Journal of the Marine Biological Association of the United Kingdom, vol. 38, no. 2, pp. 313-318, June 1959. Serial File
SARSIA (RV) Sept. 1958

STUBBINGS, H. G. The marine deposits of the Arabian Sea. An investigation into their distribution and biology. The John Murray Expedition 1933-34, Scientific Reports, vol. III, no. 2, pp. 32-158, British Museum (Natural History), 1939. Q115 Murray 1933-34 v. 2 and 3
THE JOHN MURRAY EXPEDITION 1933-34
MAHABISS 1933-34

SUGIMURA, Y. and NOGUCHI, J. Content of organic matter in the bottom sediments off Lützow-Holm Bay collected by the 2nd Japanese Antarctic Research Expedition. Antarctic Record, vol. 12, no. 3, March 1961. Serial File or HO Route Sheet No. 936
Second Japanese Antarctic Research Expedition 1957-58
SOYA 1957-58

SÜSSBACH, S. and BRECKNER, A. Die seeigel, seesterne und schlangensterne der Nord-und Ostsee. Wissenshaftliche Meeresuntersuchungen, Kommission zur Wissenschaftlichen Untersuchungen der Deutschen Meere in Kiel und der Biologischen Anstalt auf Helgoland. Neue folge, 12th band, Abteilung Kiel, pp. 169-299, 1911. (USGS) 530q W76 wl "Kiel" N. F. Bd. 1112
POSEIDON 1902-07

SUTTON, G. H., BERCKHEMER, H. and NAFE, J. E. Physical analysis of deep sea sediments. Lamont Geological Observatory Contribution No. 260, Geophysics, vol. XXII, no. 4, pp. 779-812, October 1957. Serial File
VEMA 4 July-Sept 1954

SVIRENKO, I. P. Granulometricheskiy i mineralogicheskiy sostav donnykh otlozheniy morya Deyvisa (Granulometric and mineralogic composition of the bottom sediments of the Davis Sea). Arkticheskiy i Antarktischeskiy Nauchno-Issledovatel'skiy Institut, Glavnogo Upravleniya Severnogo Morskogo Puti, Ministerstva Morskogo Flota SSSR, Informatsionnyi Byulleten Sovietskoi Antarkticheskoi Ekspeditsii, no. 22, pp. 17-31, Morskoi Transport, Leningrad, 1960. G 860 S581 No. 22
OB' 1955 -57

THOMAS, C. W., Commander - Bering Sea Patrol, 1948, Report, U. S. Coast Guard, various pages and annexes, 1948. Q115 B51 1948
NORTHWIND (USCG) 1948

THORP, E. M. The sediments of Pearl and Hermes Reef. Journal of Sedimentary Petrology, vol. 6, no. 2, pp. 109-118, August 1936 Serial File

THORP, E. M. Descriptions of deep-sea bottom samples from the western North Atlantic and the Caribbean Sea. Scripps Institution of Oceanography, Bulletin, Technical Series, vol. 3, no. 1, pp. 1-31, 1931. GH 95 C3 v.3
BACHE
DISCOVERER
GUIDE
LYDONIA
PIONEER
SIALIA
SURVEYOR

THOULET, J. Étude lithologique de fonds recueilles dans les parages de la Nouvelle-Zemble. Duc D'Orleans - Campagne Arctique de 1907, 28 p., Charles Bulens, ed. Bruxelles, 1910. Q115Belgica 1907, Vol I Large.
BELGICA 1907
DUC D'ORLEANS CAMPAGNE ARCTIQUE DE 1907

THOULET, M. J. Relations entre la composition des sediments sous-marins et les conditions des eaux superficielles. Bulletin de l'Institut Oceanographique (Monaco) no. 470, 28 p., 1 February 1926. GCI Monaco 469-486

TODD, J. P. Shoal water deposits of the Bermuda Banks. Woods Hole Oceanographic Institution, Contribution No. 191, Journal of Sedimentary Petrology, vol. 9, no. 1, pp. 8-13, April 1939. Serial File

TODD, R. Foraminifera from western Mediterranean deep-sea cores. Reports of the Swedish Deep-Sea Expedition 1947-48. Sediment cores from the Mediterranean Sea and the Red Sea, vol VIII, fasc. II, pp. 169-215, Göteborges Kungl. Vetenskaps-Och Vitterhets-Samhälle, 1958 Q115 S8 v. 8-10
ALBATROSS 1946-48
SWEDISH DEEP SEA EXPEDITION 1947-48

TOLBERT, W. H. and AUSTIN, G. B. On the nearshore marine environment of the Gulf of Mexico at Panama City, Florida. U. S. Navy Mine Defense Laboratory Tehnical Paper No. TP 161, 104 p., May 1959. GC 521 U505
SEASITE (Project) 1955-58

TOOMBS, R. B. Some characteristics of Bute Inlet sediments. Canadian Committee on Oceanography, Transactions of the Royal Society of Canada, vol. L., series III, pp. 59-65, June 1956. GC-83 C2

TRASK, P. D. Origin and environment of source sediments of petroleum. American Petroleum Institute Project 4, 1926-31, Gulf Publishing Co., Houston, Texas, 323 p., 1932. (USGS) 467 T 69
API Project 4 1926-31

TYLER, S. A. A study of sediments from the North Carolina and Florida coasts. Journal of Sedimentary Petrology, vol. 4, no. 1, pp. 3-11, April 1934. Serial File
LYDONIA (USCGS)

URRY, W. D. Radioactivity of ocean sediments, VI. Concentrations of the radio-elements in marine sediments of the southern hemisphere American Journal of Science, vol. 247, no. 4, pp. 257-275, April 1949. Serial File
NORTHWIND 1946-47

VASNETSOV, V. A. K gidrologii Karskogo morya (Hydrology of the Kara Sea). Trudy Gosudarstvennogo Okeanograficheskogo Instituta, tom. I. vypusk 2-3, pp. 5-46, 1931. (LC) GCI M58t. 1, 1931/32
PERSEY-14 Sept 1927

VAYSSIERE, A. J. Resultats des campagnes scientifiques accomplies sur son yacht par Albert I-er, Prince Souverain de Monaco. Mollusques, Heteropodes et Eupteropodes provenant des campagnes des yachts Princesse-Alice I et II et Hirondelle II. fascicule LXXI, 383 p. 4, June 1927. Imprimerie de Monaco. 1927. (LC) QL 5.A3
HIRONDELLE 1886-1915
PRINCESSE-ALICE I & II 1886-1915

VERNON, J. H. and BADER, R. G. Recent sedimentation and related oceanographic factors in the west Mississippi delta area. The Agricultural and Mechanical College of Texas, Department of Oceanography and Meteorology, Texas A and M Research Foundation, A and M Project 142 and 197, Reference 61-6T and 61-10F, 187 pp., May 1961.

VINOGRADOVA, P. S. Issledovaniye rel'efa dna i gruntov raiona Korytova (Investigation of the bottom relief and sediments in the Korytov region). Kolebaniy chislennosti i usloviya promysla donnykh ryb v Barentsevom More. (Variations in the number and trade conditions of bottom fish in the Barents Sea). Trudy Polyarnogo Nauchno-Issledovatel'skogo Instituta Morskogo Rybnogo Khozyaistva i Okeanografiy Imeni N. M. Knipovicha (PINRO), Vypusk X, pp. 186-197, 1957. (LC) SH 1. M 8
KASHALOT 1935-54 PERSEY-2 1954
PERSEY 1935

WALTON, W. R. Ecology of living benthonic Foraminifera, Todos Santos Bay, Baja California. Scripps Institution of Oceanography Contribution No. 814, Marine Foraminifera Laboratory Contribution No. 23, Journal of Paleontology, vol. 29, no. 6, pp. 952-1018, November 1955. (USGS) G (200) J83p

WANGERSKY, P. J. Sedimentation in three carbonate cores. Journal of Geology, vol. 70, no. 3, pp. 364-374, May 1962. Serial File

WEIBULL, W. The thickness of ocean sediments measured by a reflection method. Meddelanden från Oceanografiska Institutet i Göteborg. 12. Göteborgs Kungl. Vetenskaps-och Vittershets-Samhälles Handlingar, Sjätte Följden, ser. B., band 5, no. 4, 17 p., 1947. AS284 G7 No. 11-20
SKAGERRAK 1944-45

WISEMAN, J. D. H. and BENNETT, H. The distribution of organic carbon and nitrogen in sediments from the Arabian Sea. vol. III, no. 4, pp. 194-221, 1940. Q115 Murray 1933-34 v. 2 and 3
MAHABISS 1933-34
THE JOHN MURRAY EXPEDITION 1933-34

WIGLEY, R. L. Bottom sediments of Georges Bank. Journal of Sedimentary Petrology, vol. 31, no. 2, pp. 165-188, June 1961. Serial File
ALBATROSS III (USFWS) 1957

WISEMAN, J. D. The relation between paleotemperature and carbonate in an equatorial Atlantic pilot core. Journal of Geology, vol. 67, no. 6, pp. 685-690, November 1959. Serial File
ALBATROSS 1947-48
SWEDISH DEEP SEA EXPEDITION 1947-48

WOLFENDEN, R. N. Scientific and biological researches in the North Atlantic conducted by the author on his yachts "The Walwin" and the "Silver Belle." Memoirs of the Challenger Society, no. 1, 234 p., Rebman Ltd. London, 1907. Q115 Wolf
SILVER BELLE 1904-07
WALWIN 1904-07

ZAITSEVA, E. D. Yemkost' obmena kationov osadkov Tikhogo Okeana (Exchange capacity of cations of Pacific Ocean sediments). Trudy Instituta Okeanologii, Akademii Nauk, SSSR, tom XXXIII, pp. 128-136, 1959. Serial File
VITYAZ 1953-55

ZIEGLER, J., HOFFMEISTER, W., GIESE, G., and TASHA, H. Discovery of Eocene sediments in subsurface of Cape Cod. Science, vol. 132, no. 2437, pp. 1397-98, 11 November 1960. Serial File
CAPE COD 1960

HUMBOLDT STATE COLLEGE. An oceanographic study between the points of Trinidad Head and Eel River. Humboldt State College, Arcata, California, Annual Report-1959 for the California Water Pollution Control Board, 1959. TD 425 C2

INSTITUTO ESPAÑOL DE OCEANOGRAFIA Exploracion oceanografica del Africa Occidental Campañas del "Malaspina" en 1947 y 1948 en aguas del Sahara, desde Cabo Juby a Punta Durnford-Registro de operaciones. Boletin del Instituto Español de Oceanografia no. 23, 28 p. 26 January 1950. Serial File
MALASPINA 1947-58 Cruise 475 and 485

INSTITUTO ESPAÑOL DE OCEANOGRAFIA Exploracion oceanografica del Africa Occidental Campaña del "Malaspina" en enero de 1950 en aguas del Sahara, desde Punta Durnford a Cabo Barbas. Registro de operaciones, Ministerio de Marina, Boletin del Instituto Español de Oceanografia, no. 38, 12 p., Madrid 15 July 1950. Serial File
MALASPINA Cruise 501 January 1950

INSTITUTO ESPAÑOL DE OCEANOGRAFIA Campaña del "Tofiño" "T.5212" (13 a 20 Diciembre de 1952). Registro de operaciones: sondeos con cable. Cuadro 1. Instituto Español de Oceanografia, Trabajos, no. 22, pp. 11-13, Madrid, 1953. GC 1 S7 No. 21-29
TOFIÑO T-5212

INSTITUTO ESPAÑOL DE OCEANOGRAFIA Campañas del "Xauen" en 1947 y 1948 en el Mar de Alborán y en el Estrecho de Gibraltar, Boletin del Instituto Español de Oceanografia, no. 18, 53 p., 30 June 1949. GC1 Spain 1949 Nos. 13-24 or Serial File
XAUEN Cruise X-474, 481, 482, 488 Sept. 1948

INSTITUTO ESPAÑOL DE OCEANOGRAFIA Campañas biologicas del "Xauen" en las costas del Mediterraneo marroqui, Mar de Alborán, Baleares Noroeste y Cantabrico españoles en los años 1952, 1953 y 1954. Registro de operaciones. Boletín del Instituto Español de Oceanografia, no. 103, pp. 3-150, February 1961. Serial File
XAUEN 1952-54

INSTITUT OKEANOLOGII, ADADAMIYA NAUK, SSSR. Bottom sediment tables "Ekvator" Atlantic Ocean, 3-31 October 1958. (NODC) 137.5 A-2
EKVATOR Oct. 1958

INSTITUT OKEANOLOGII, AKADEMIYA NAUK, SSSR. Bottom sediment tables "Ekvator" Atlantic Ocean, 3-31 October 1958. (NODC) 137.5 A-2
EKVATOR Oct. 1958

INSTITUT OKEANOLOGII, AKADEMIYA NAUK, SSSR. Bottom sediment tables "Ekvator" Atlantic Ocean, 28 March - 25 April 1958. (NODC) 137.5 A-1
EKVATOR 1958

INSTITUT OKEANOLOGII, AKADEMIYA NAUK, SSSR. Bottom sediment tables 1st cruise "M. Lomonosov" Atlantic Ocean, November 1957. (NODC) 137.4 A-2
MIKHAIL LOMONOSOV 1 November 1957

INSTITUT OKEANOLOGII, AKADEMIYA NAUK, SSSR. Bottom sediment tables Second Cruise "Mikhail Lomonosov" Atlantic Ocean, 2 Mar.-5 June 1958, 30 p. (NODC) 137.4A2
MIKHAIL LOMONOSOV Cruise 2 Mar-Jun 1958

KOBE MARINE OBSERVATORY. The report of the oceanographical observations on board the R. M. S. "Syunpu Maru" in the Maizuru Bay (Oct. 15-18, 1947). The Kobe Marine Observatory, The Data of the Oceanographical Observation, no. 7, 10 p., 1947. GC 821 Kobe No. 7
SYUNPU MARU (RMS) 1947

SCRIPPS INSTITUTION OF OCEANOGRAPHY. List of cores collected on CAPRICORN (1952-53), CUSP (1954) and ACAPULCO TRENCH (1954) Expeditions, University of California, LaJolla, pp. 1-18, 1 May 1958, GC 380 S4L7
CAPRICORN EXPEDITION 1952-53
HORIZON 1952-53
SPENCER F. BAIRD 1952-53

SCRIPPS INSTITUTION OF OCEANOGRAPHY. List of cores collected on CAPRICORN (1952-53), CUSP (1954) and ACAPULCO TRENCH (1954) Expeditions. University of California, LaJolla, 30 p., 1 May 1958. GC 380 S4L7
CHUBASCO (ACAPULCO TRENCH) 1954
CUSP 1954
CAPRICORN 1952-53

SCRIPPS INSTITUTION OF OCEANOGRAPHY DOWNWIND Expedition 1957-58. List of cores and dredge samples copied from shipboard logs. University of California, LaJolla, 28 p., May 1958. GC771 S4 D7

DOWNWIND EXPEDITION 1957-58
SPENCER F. BAIRD
HORIZON

SCRIPPS INSTITUTION OF OCEANOGRAPHY. List of cores and dredge samples copied from shipboard logs on the Fanfare Expedition 1959.

FANFARE EXPEDITION 1959

SCRIPPS INSTITUTION OF OCEANOGRAPHY. Pacific bottom samples. MUKLUK Expedition, July-August 1957. Core and dredge samples. Information from shipboard coring log. 6 p., 1957. GC 851 S4 M9

MUKLUK EXPEDITION 1957

SCRIPPS INSTITUTION OF OCEANOGRAPHY. Northern Holiday core log August-September 1951, Scripps Institution of Oceanography 7 p., 1951. GC 781 S4 N87 also GC 771 S4 S5

NORTHERN HOLIDAY 1951

U. S. COAST AND GEODETIC SURVEY. Bottom sediment Analysis Work Sheets (for USC and GS Ship Hydrographer) vol 2, May to June 1955. QE 581 U52 v. 2

HYDROGRAPHER (USCGS) May-June 1955

U. S. NAVY HYDROGRAPHIC OFFICE. Bottom Sediments, North Atlantic Ocean and Adjacent Seas 1949-53. 246 p., May 1958. H. O. TR-36 (unpublished)

AMOS 1949-53

U. S. NAVY HYDROGRAPHIC OFFICE. Survey results of BuShips-Hydrographic Office anchor testing - bottom sediment sampling conducted in Norfolk-Little Creek area, York River mouth and Key West harbor approaches 2 October through 7 November 1956. U. S. Navy Hydrographic Office, H. O. Misc. 16547, 10 p., March 1957. H. O. Misc. 16547

Anchor Test 1956

U. S. NAVY HYDROGRAPHIC OFFICE. Operation Deep Freeze 60, 1959-60, Oceanographic survey results. Technical Report TR-82, 231 p., June 1961. H. O. TR-82
DEEP FREEZE 60 Expedition 1960
BURTON ISLAND (AGB-1)
EASTWIND (WAGB-279)
GLACIER (AGB-4)

U. S. NAVY HYDROGRAPHIC OFFICE. Operation Deep Freeze II 1956-57 oceanographic survey results. Technical Report TR-29. 155 p., October 1957. H. O. TR-29
ATKA (USS)
DEEPFREEZE II 1956-57
GLACIER (AGB-4)
NORTHWIND (USCGS)
STATEN ISLAND (USS)

U. S. NAVY HYDROGRAPHIC OFFICE. Oceanographic survey results Project 572, July - Sept. 1955 USS REQUISITE (AGS-18) Beaufort Sea, Amundsen Gulf, Dolphin and Union Strait, Shepherd Bay. U. S. Navy Hydrographic Office, Wash. D. C. 170 p., April 1957. HO Misc. No. 16366
REQUISITE (AGS 18) USS 1955

U. S. NAVY HYDROGRAPHIC OFFICE. Oceanographic survey results Task Force Five 26 August - 20 Sept. 1955, USS STATEN ISLAND (AGB-5) Beaufort Sea, Chukchi Sea, Bering Strait, Bering Sea. H. O. Misc. No. 15047-36, 6 p., March 1956. HO Misc. 15047-36
STATEN ISLAND (USS - AGB-5) 1955

U. S. NAVY HYDROGRAPHIC OFFICE. Oceanographic observations in Arctic waters, Task Force Five and Six, Summer-Autumn 1956. USS REQUISITE (AGS-18), USS ELDORADO (AGC-11), USS ATKA (AGB-3) USCGC EASTWIND (WAGB-279) Technical Report TR-58, 89 p. October 1960. HO TR-58
ATKA (USS-AGB-3)
Task Force 5 and 6
EASTWIND (USCGC-WAGB-279)
REQUISITE (USS-AGS-18)
ELDORADO (USS-AGS-11)

U. S. NAVY HYDROGRAPHIC OFFICE. Oceanographic observations, Arctic waters, Task Force Five and Six, Summer - Autumn 1957. Technical Report TR-59, 45 p., November 1959. HO TR-59
ATKA (USS-AGB-3) EASTWIND (USCGC-WAGB-279)
Task Force 5 and 6 WESTWIND (USCGC-WAGB-281)
SPAR (USCGC-WAGL-403)

U. S. NAVY HYDROGRAPHIC OFFICE. Bottom sediment analyses. Supplement No. 1 to oceanographic observations U.S.F. & W.S. M/V Theodore N. Gill Cruises I-IX 1953-54, U. S. Navy Hydrographic Office, Wash. D. C.,H. O. Misc. 15610, 119 p., June 1958. HO Misc. 15610
THEODORE N. GILL (M/V) Cruise I-IX 1953-54

U. S. NAVY HYDROGRAPHIC OFFICE. Oceanographic survey results Bering Sea area Winter and Spring 1955. Technical Report TR-46, 95 p., April 1958. H. O. TR-46 1958
BURTON ISLAND (AGB-1)
NORTHWIND (USCGC-WAGB-282) 1955

U. S. NAVY HYDROGRAPHIC OFFICE. Unpublished bottom sediment analysis summary and work sheets - Bottom samples taken aboard CYRUS FIELD during cable laying operations south and east of Newfoundland and Georges Bank, 1953-55, vol. 1. QE581 U52 v. 1.
CYRUS FIELD (Cable Layer) 1953-55

USS WHIPPOORWILL. Hydrographic-oceanographic-meteorological data collected by USS WHIPPOORWILL (MSC 207) during the period 27-31 July 1959 while operating at Karatsu, Japan. Ltr. to Hydrographer MSC-207/01: an/3160 Ser: 292, 17 August 1959. (NAVOCEANO Records) File H1, RS 12654, 31 August 1959
WHIPPOORWILL (USS) 1959

U. S. NAVY HYDROGRAPHIC OFFICE. Unpublished summary sheets of samples taken by various U. S. Navy ships in the Mediterranean Sea by Ocean Survey Division - James Underwood in charge. Sept. 61 - Jan. 62
SWERVE FLOOD (project)

U. S. NAVY HYDROGRAPHIC OFFICE. Samples taken along submarine cable routes by Bell Telephone Laboratories, and analyzed by the U. S. Navy Hydrographic Office.

U. S. NAVY HYDROGRAPHIC OFFICE. Unpublished data of bottom samples taken during June 1962 by Naval Oceanographic Office for Naval Ordnance Laboratory off Ft. Lauderdale, Florida
AKL-43

U. S. NAVY HYDROGRAPHIC OFFICE. Unpublished summary sheets of sediment samples taken by the USS ATKA and USCGC WESTWIND during Project Arctic 1958. U. S. Hydrographic Office Cruise 00602
ARCTIC 1958
ATKA (USS) 1958
WESTWIND (USCGC) 1958

U. S. NAVY HYDROGRAPHIC OFFICE. Unpublished summary sheets of sediment samples taken by U. S. Hydrographic Office Cruises in the Arctic region in 1959.
ARCTIC 1959

Variation of Area of 1° Quadrangles with Latitude

Latitude(°)	Approximate Area of 1° Quadrangle (nautical miles^2)
0	3,768
10	3,534
20	3,377
30	3,118
40	2,763
45	2,555
50	2,324
55	2,079
60	1,813
65	1,533
70	1,241
75	941
80	631
85	317
89	63
90	0

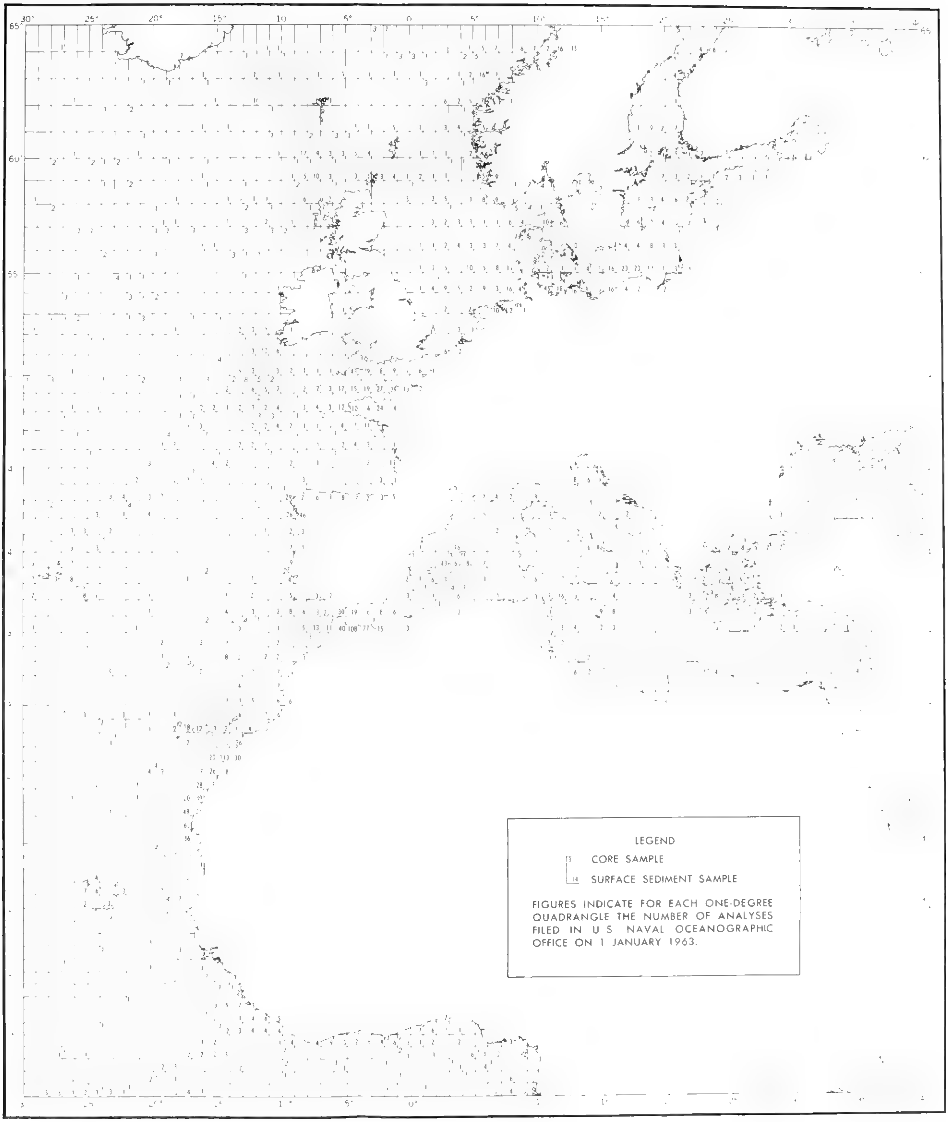


FIGURE 16 EASTERN NORTH ATLANTIC OCEAN—DISTRIBUTION OF SUBMARINE SEDIMENT SAMPLE ANALYSES

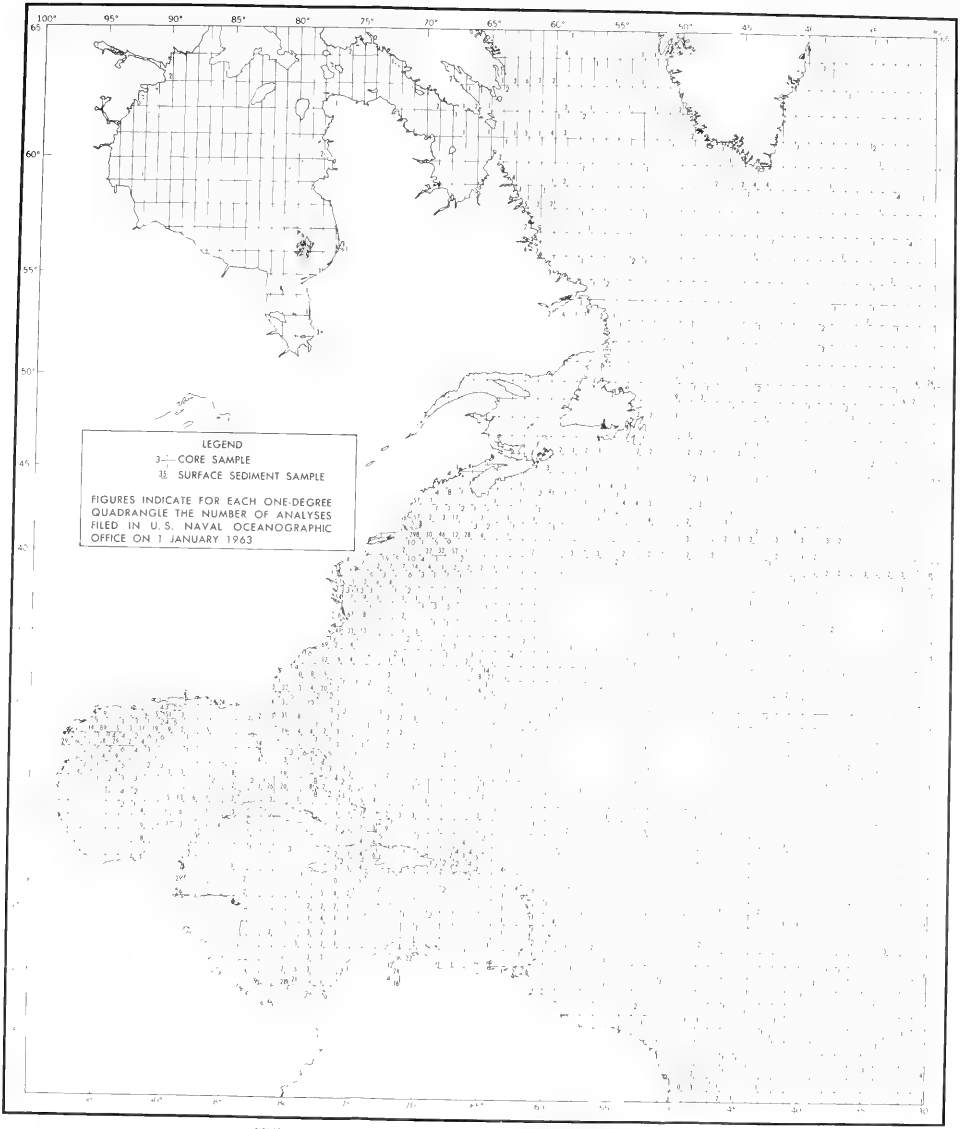


FIGURE 17 WESTERN NORTH ATLANTIC OCEAN—DISTRIBUTION OF SUBMARINE SEDIMENT SAMPLE ANALYSES

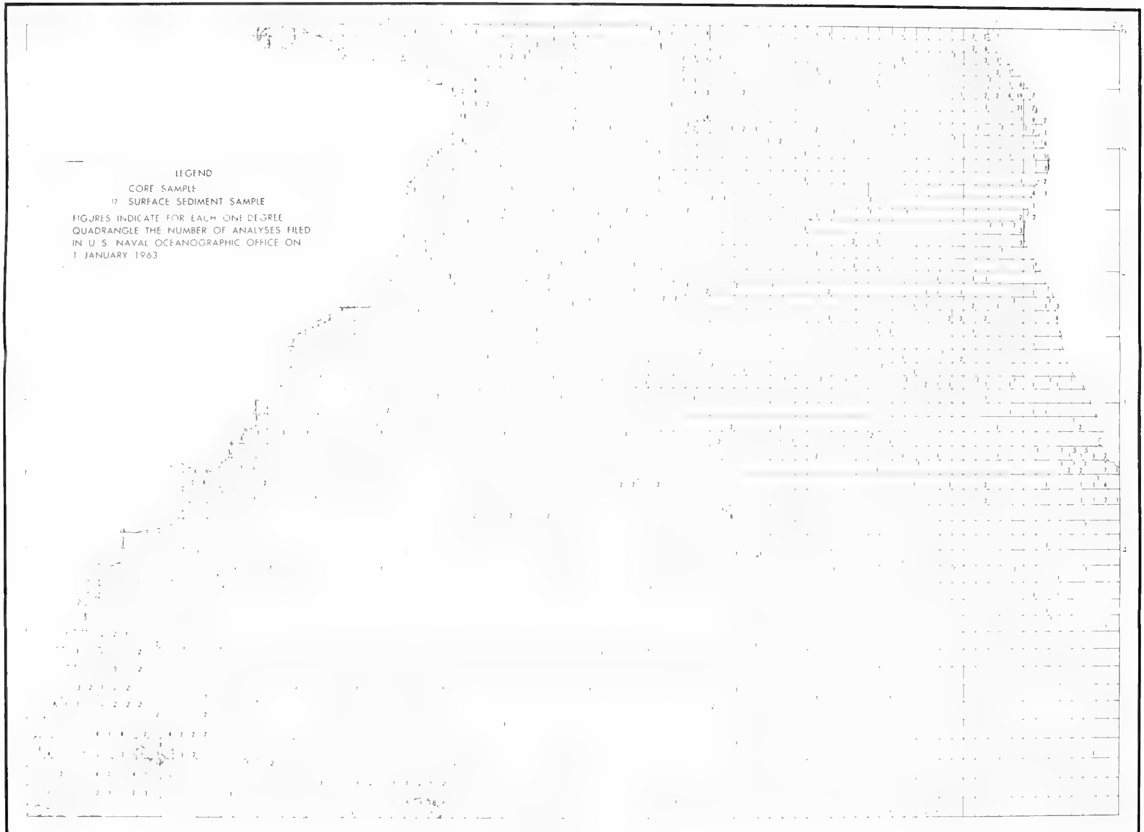


FIGURE 18 SOUTH ATLANTIC OCEAN DISTRIBUTION OF SUBMARINE SEDIMENT SAMPLE ANALYSES

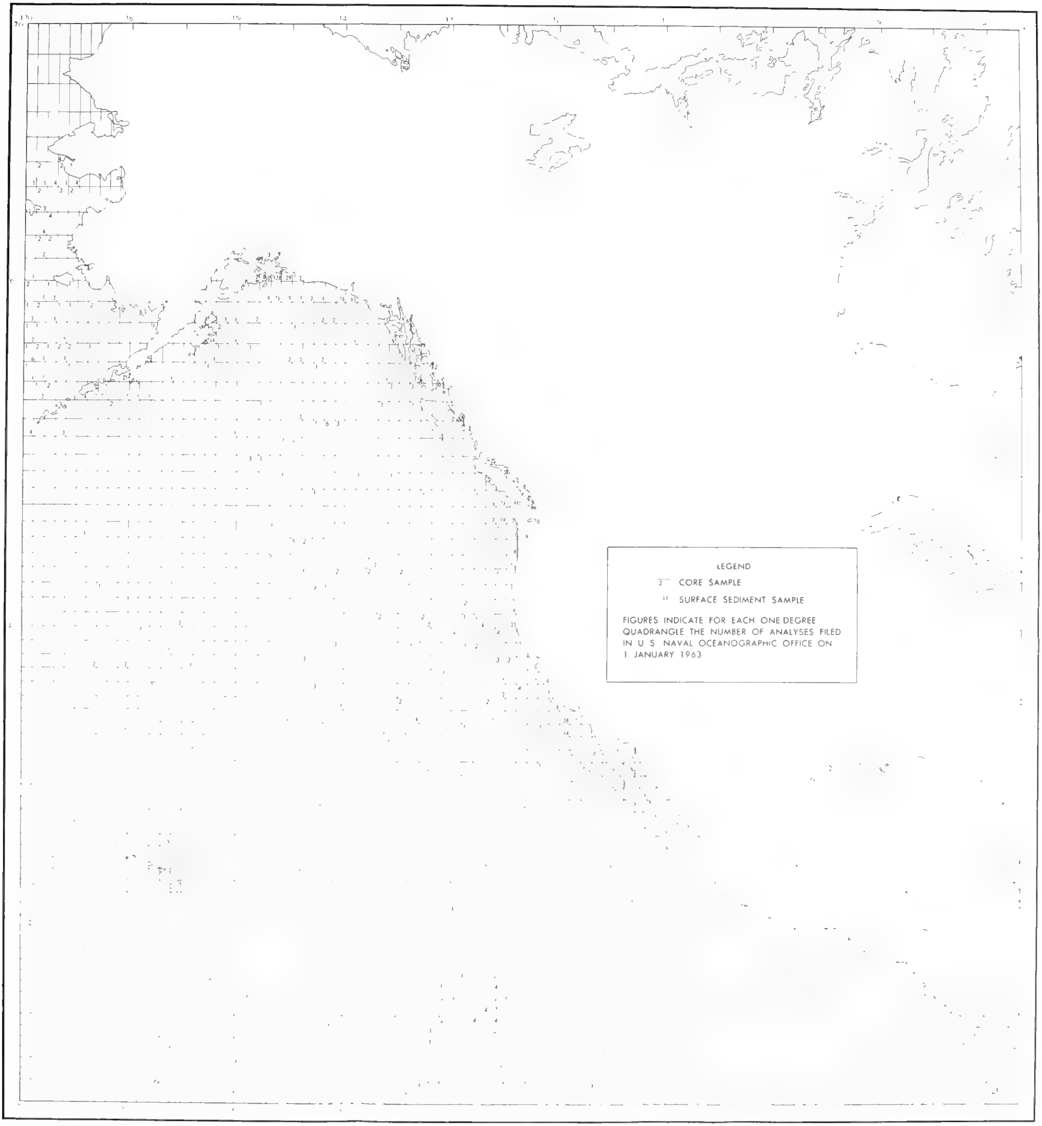


FIGURE 19 EASTERN NORTH PACIFIC OCEAN D STR BUT ON OF SUBMARINE SEDIMENT SAMPLE ANALYSES

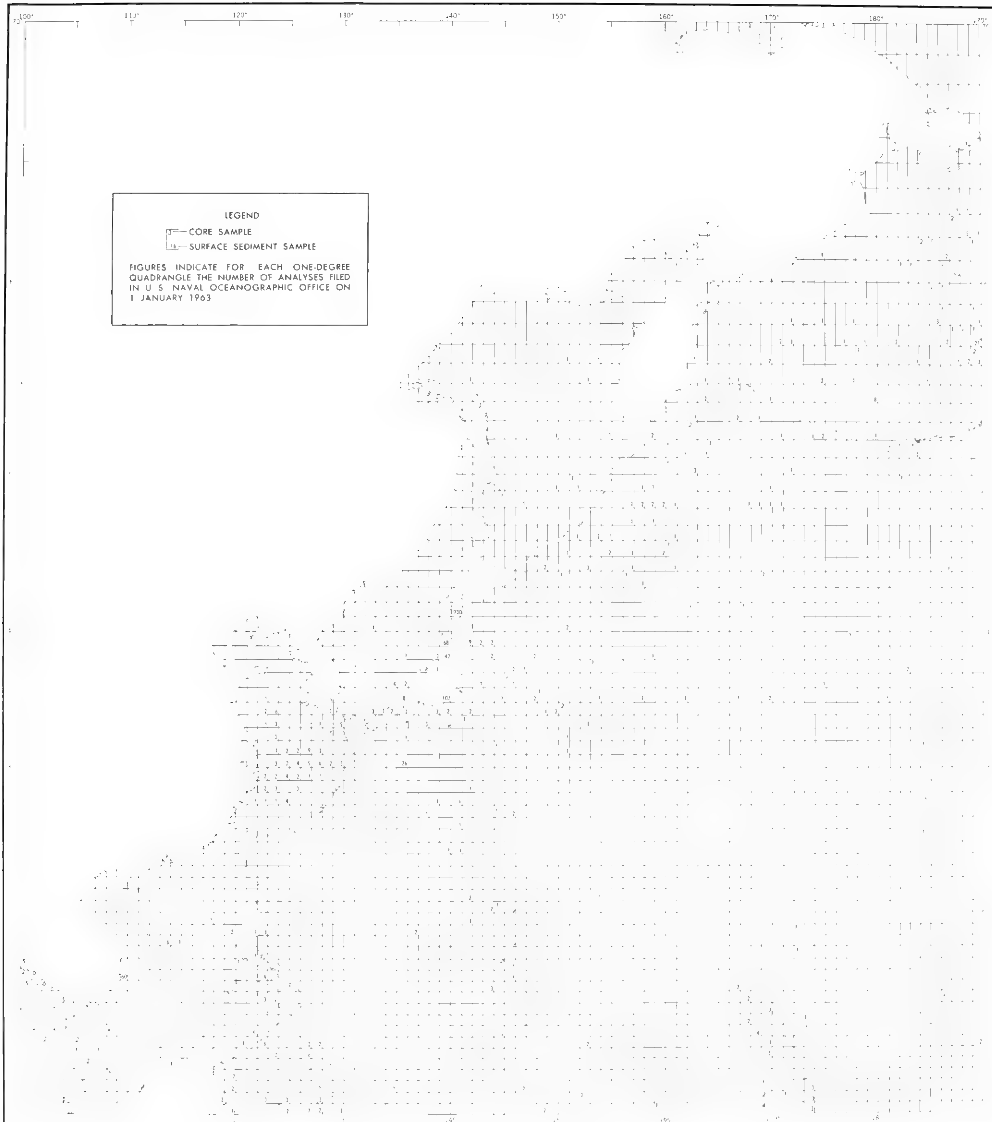


FIGURE 20 WESTERN NORTH PACIFIC OCEAN—DISTRIBUTION OF SUBMARINE SEDIMENT SAMPLE ANALYSES

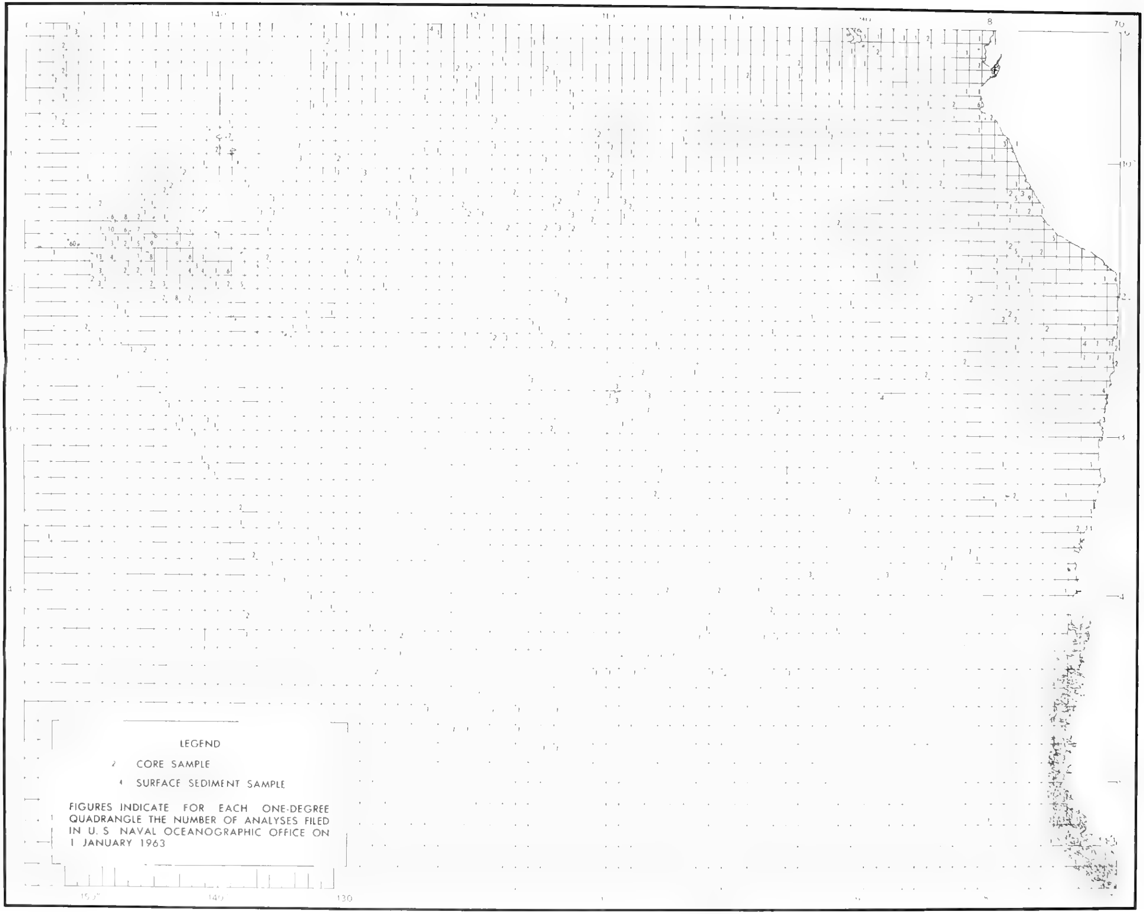


FIGURE 21 EASTERN SOUTH PACIFIC OCEAN–DISTRIBUTION OF SUBMARINE SEDIMENT SAMPLE ANALYSES

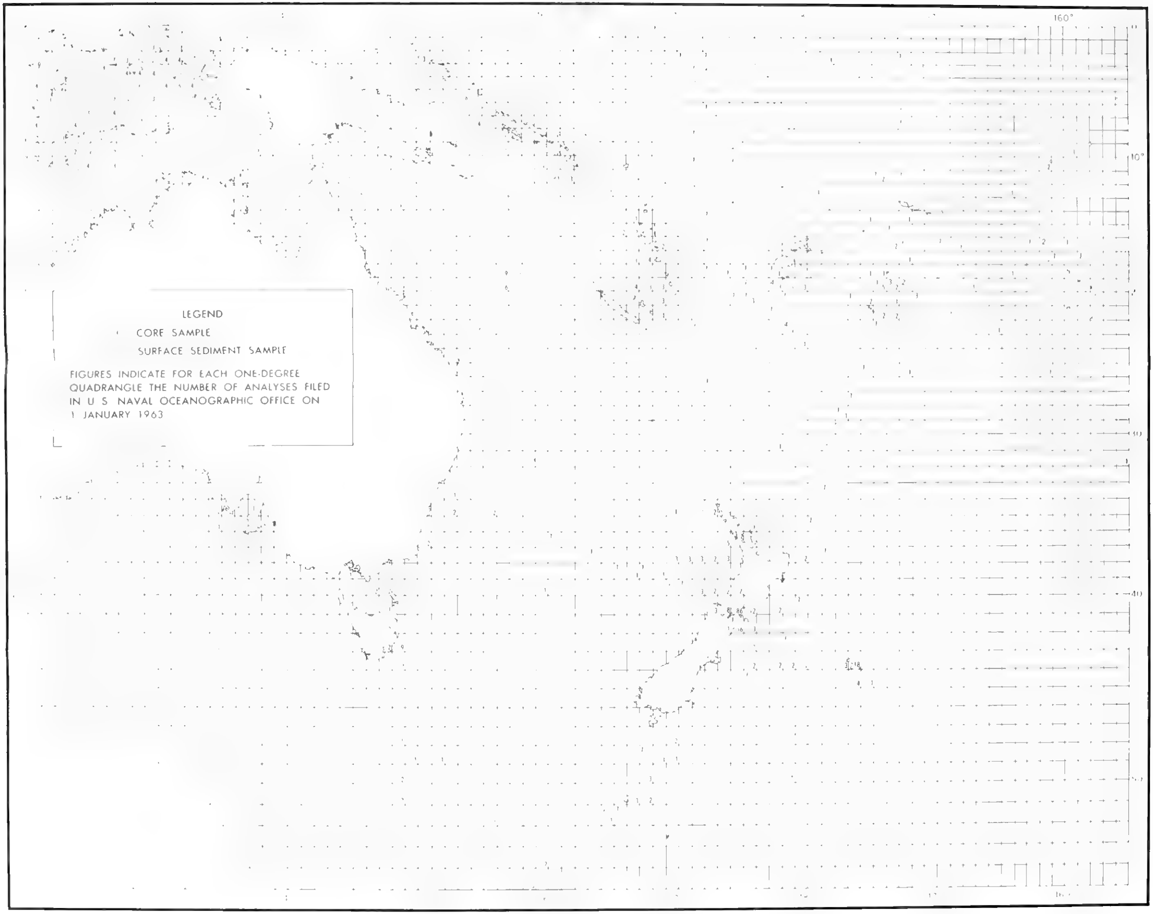


FIGURE 22 WESTERN SOUTH PACIFIC OCEAN—DISTRIBUTION OF SUBMARINE SEDIMENT SAMPLE ANALYSES

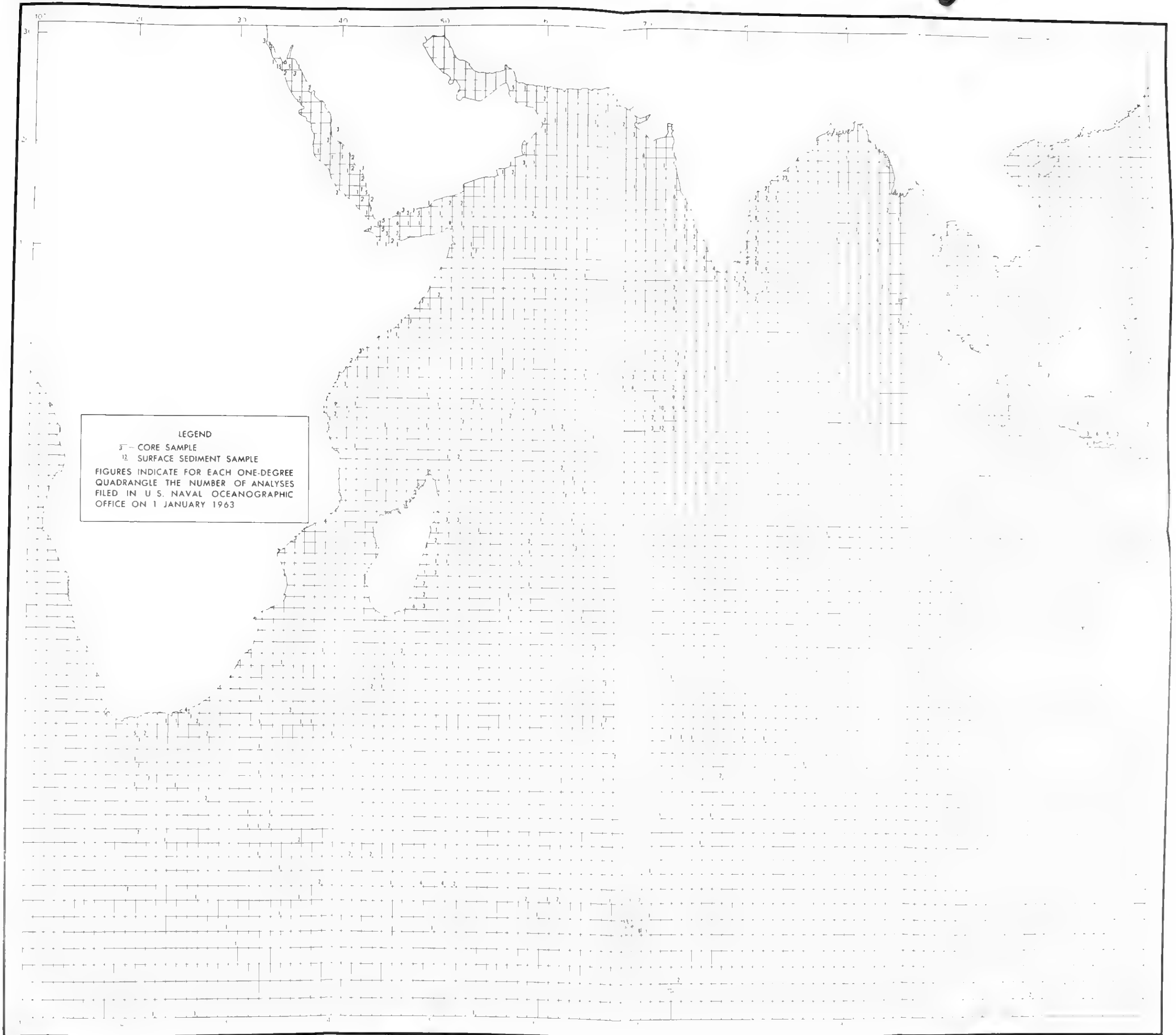


FIGURE 23 INDIAN OCEAN—DISTRIBUTION OF SUBMARINE SEDIMENT SAMPLE ANALYSES

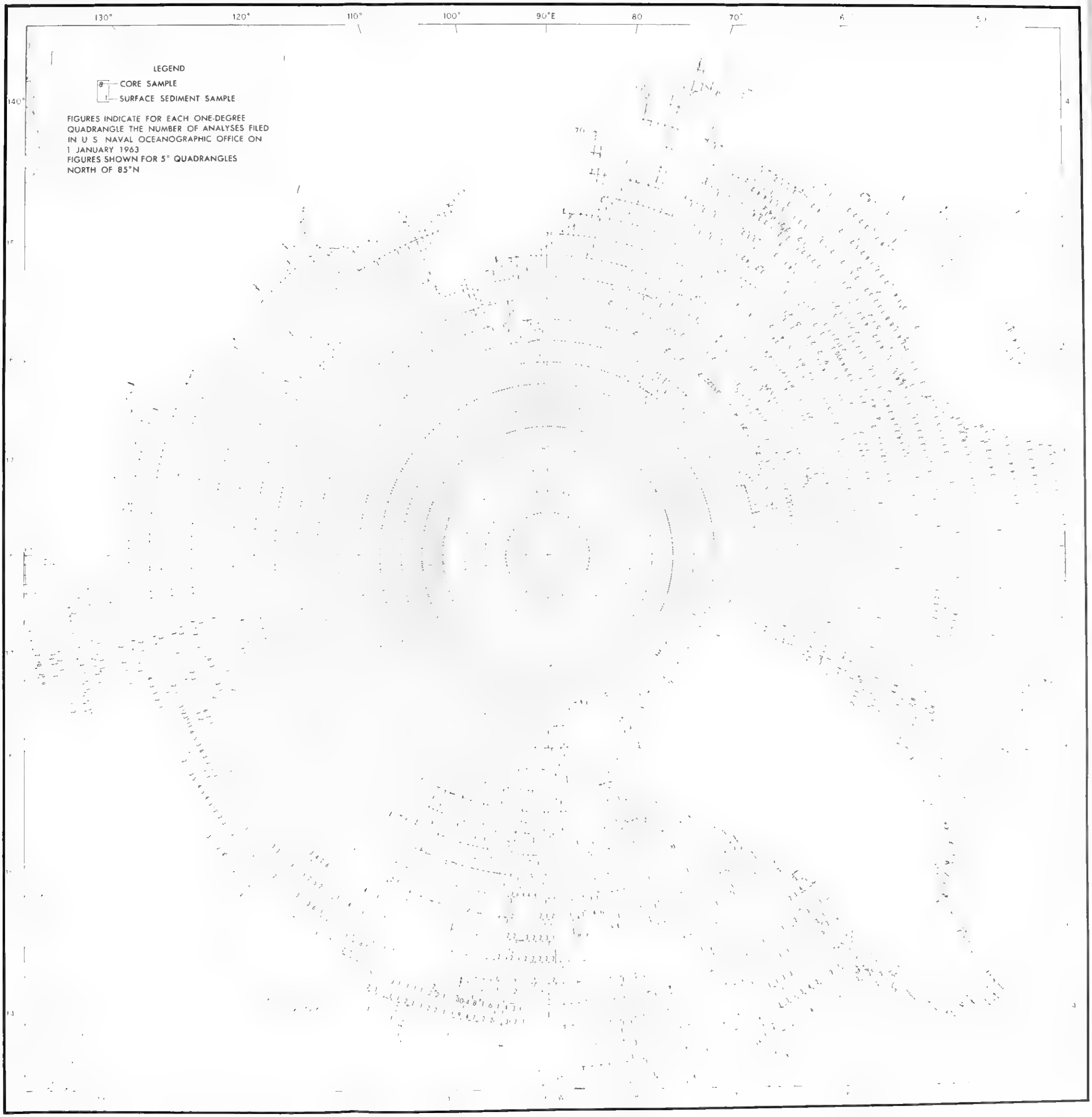


FIGURE 24 ARCTIC OCEAN DISTRIBUTION OF SUBMARINE SEDIMENT SAMPLE ANALYSES

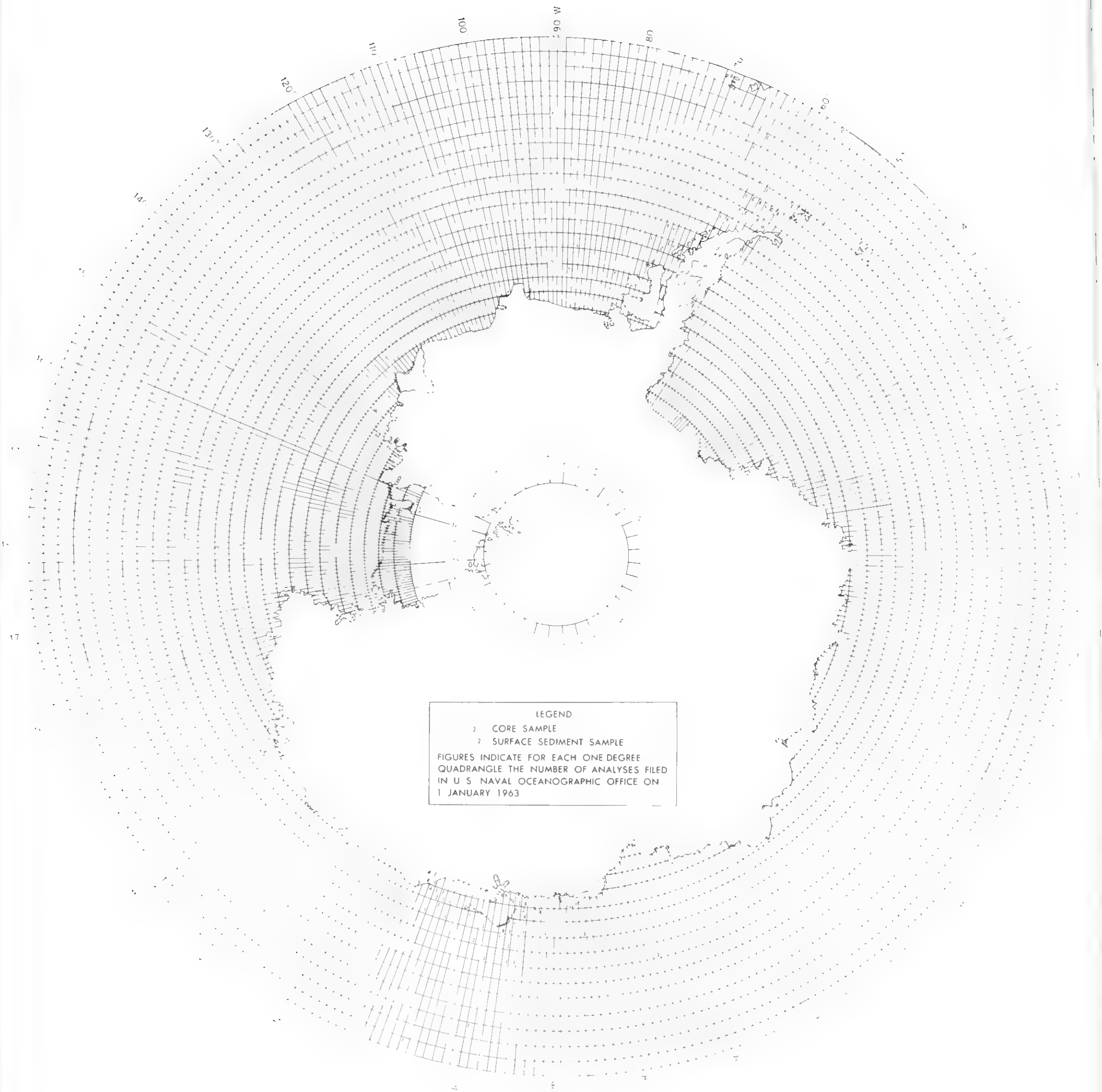


FIGURE 25 SEAS AROUND ANTARCTICA—DISTRIBUTION OF SUBMARINE SEDIMENT SAMPLE ANALYSES

U. S. Naval Oceanographic Office
SUBMARINE SEDIMENT DATA COLLECTION AND MANAGEMENT AT THE U. S. NAVAL OCEANOGRAPHIC OFFICE by John K. Duncan. August 1964. 88p. including bibliographic file and figures.

This technical report describes the methods of securing, processing and storing submarine sediment data at the U.S. Naval Oceanographic Office. Data sources are listed and world wide distribution by one-degree quadrangles is shown.

1. Bottom Sediments
2. Sedimentation
3. Submarine Sediments
4. Marine Geology

i. title: Submarine Sediment Data Collection and Management at the U.S. Naval Oceanographic Office.
ii. author: John K. Duncan
iii. TR-150

U. S. Naval Oceanographic Office
SUBMARINE SEDIMENT DATA COLLECTION AND MANAGEMENT AT THE U. S. NAVAL OCEANOGRAPHIC OFFICE by John K. Duncan. August 1964. 88p. including bibliographic file and figures.

This technical report describes the methods of securing, processing and storing submarine sediment data at the U.S. Naval Oceanographic Office. Data sources are listed and world wide distribution by one-degree quadrangles is shown.

1. Bottom Sediments
2. Sedimentation
3. Submarine Sediments
4. Marine Geology

i. title: Submarine Sediment Data Collection and Management at the U.S. Naval Oceanographic Office.
ii. author: John K. Duncan
iii. TR-150

U. S. Naval Oceanographic Office
SUBMARINE SEDIMENT DATA COLLECTION AND MANAGEMENT AT THE U. S. NAVAL OCEANOGRAPHIC OFFICE by John K. Duncan. August 1964. 88p. including bibliographic file and figures.

This technical report describes the methods of securing, processing and storing submarine sediment data at the U.S. Naval Oceanographic Office. Data sources are listed and world wide distribution by one-degree quadrangles is shown.

1. Bottom Sediments
2. Sedimentation
3. Submarine Sediments
4. Marine Geology

i. title: Submarine Sediment Data Collection and Management at the U.S. Naval Oceanographic Office.
ii. author: John K. Duncan
iii. TR-150

U. S. Naval Oceanographic Office
SUBMARINE SEDIMENT DATA COLLECTION AND MANAGEMENT AT THE U. S. NAVAL OCEANOGRAPHIC OFFICE by John K. Duncan. August 1964. 88p. including bibliographic file and figures.

This technical report describes the methods of securing, processing and storing submarine sediment data at the U.S. Naval Oceanographic Office. Data sources are listed and world wide distribution by one-degree quadrangles is shown.

1. Bottom Sediments
2. Sedimentation
3. Submarine Sediments
4. Marine Geology

i. title: Submarine Sediment Data Collection and Management at the U.S. Naval Oceanographic Office.
ii. author: John K. Duncan
iii. TR-150