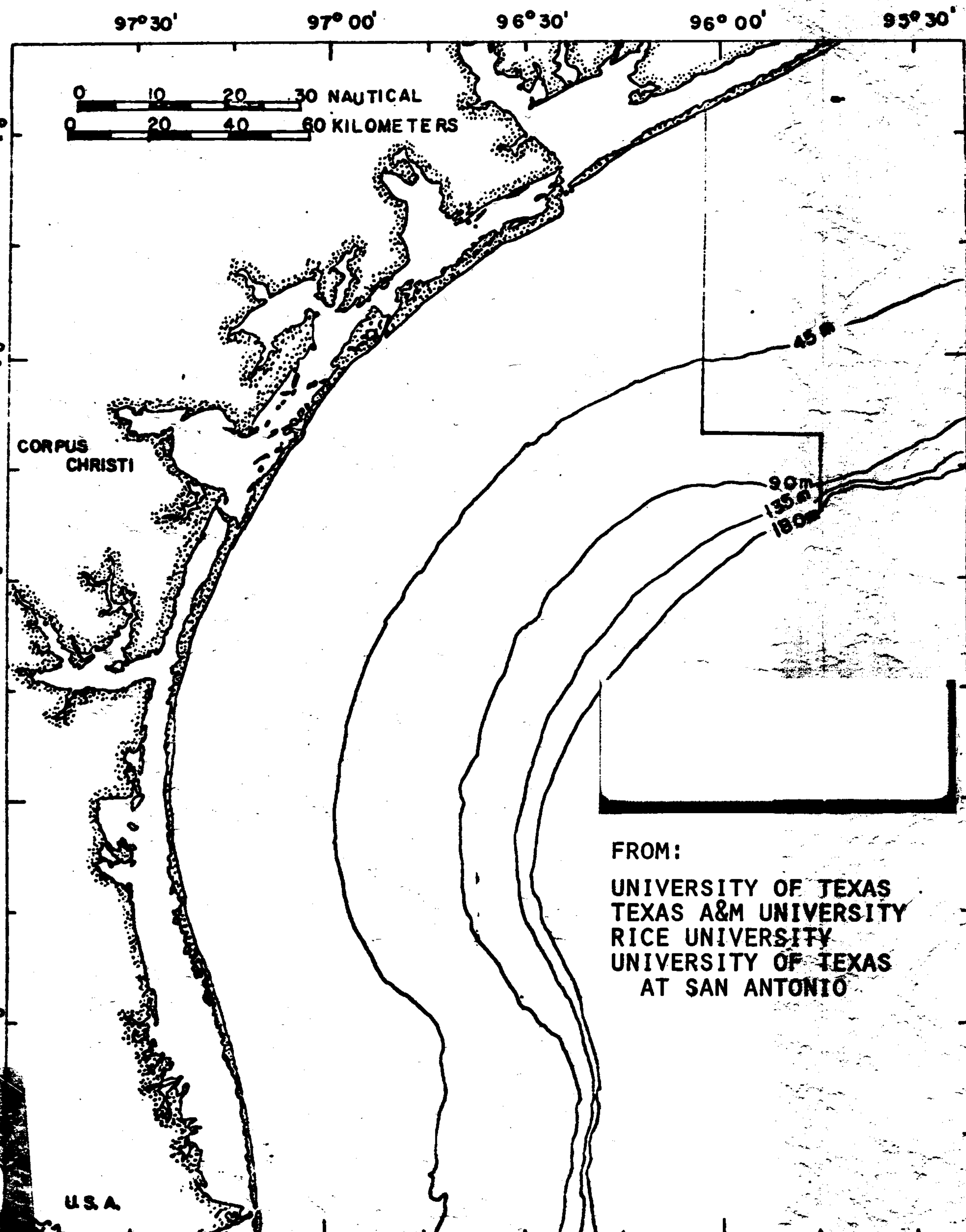
1977 - 13

ENVIRONMENTAL STUDIES, SOUTH TEXAS OUTER CONTINENTAL SHELF, BIOLOGY AND CHEMISTRY



FROM:

UNIVERSITY OF TEXAS
TEXAS A&M UNIVERSITY
RICE UNIVERSITY
UNIVERSITY OF TEXAS
AT SAN ANTONIO

ENVIRONMENTAL STUDIES,

SOUTH TEXAS OUTER CONTINENTAL SHELF,

BIOLOGY AND CHEMISTRY

Submitted to:

The Bureau of Land Management
Washington, D. C.

by

The University of Texas Marine Science Institute
Port Aransas Marine Laboratory
Port Aransas, Texas 78373

Acting for and on behalf of
A Consortium Program
Conducted by:

Rice University
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The University of Texas

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CONTENTS

APPENDIX O

SUPPORTIVE DATA FROM THE U.S. GEOLOGICAL SURVEY CORPUS CHRISTI, TEXAS OFFICE

taken from

ENVIRONMENTAL STUDIES,
SOUTH TEXAS OUTER CONTINENTAL SHELF
1976-GEOLOGY
DRAFT REPORT
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APPENDIX O

SUPPORTIVE DATA FROM THE U.S. GEOLOGICAL SURVEY SEDIMENT TEXTURE AND TRACE METAL ANALYSES OF THE BOTTOM SEDIMENTS

Table of Contents

INTRODUCTION

Analyses of sample material collected by the University of Texas were made by USGS at the request of the BLM. The Corpus Christi office did textural and trace metals analyses of the bottom sediments. Textural analyses were performed on subsamples of the sediment chemistry Smith-McIntyre grab samples (trace metal and hydrocarbon samples were taken from these grabs).

FIELD INVESTIGATIONS

Seasonal Variability of Texture

The OCS sea floor surface sediments acquired during 1976 along the four designated transects were analyzed for seasonal variations in texture. The three seasonal sample suites (winter, spring and summer/fall), supplied by the University of Texas Marine Science Institute at Port Aransas, were subjected to textural analyses using the same analytical procedures as were outlined in the USGS element report for the first year (Berryhill *et al.*, 1976). Duplicate samples taken at each station were analyzed, and the average values of their textural parameters were used to construct transect profiles. Time-series variability profiles based on the three seasonal sample suites were constructed for the following selected parameters: sand/mud ratios, silt/clay ratios, mean diameters and standard deviations. The results are shown by Figures 1 through 4. In addition, the following supplemental textural parameters also were derived: sand percentage, silt percentage, clay percentage, skewness (third moment) and kurtosis (fourth moment). All derived textural parameters are tabulated in Table 1.

Sand/Mud Ratio Variability

The sand/mud ratio provide a general overview of textural variability

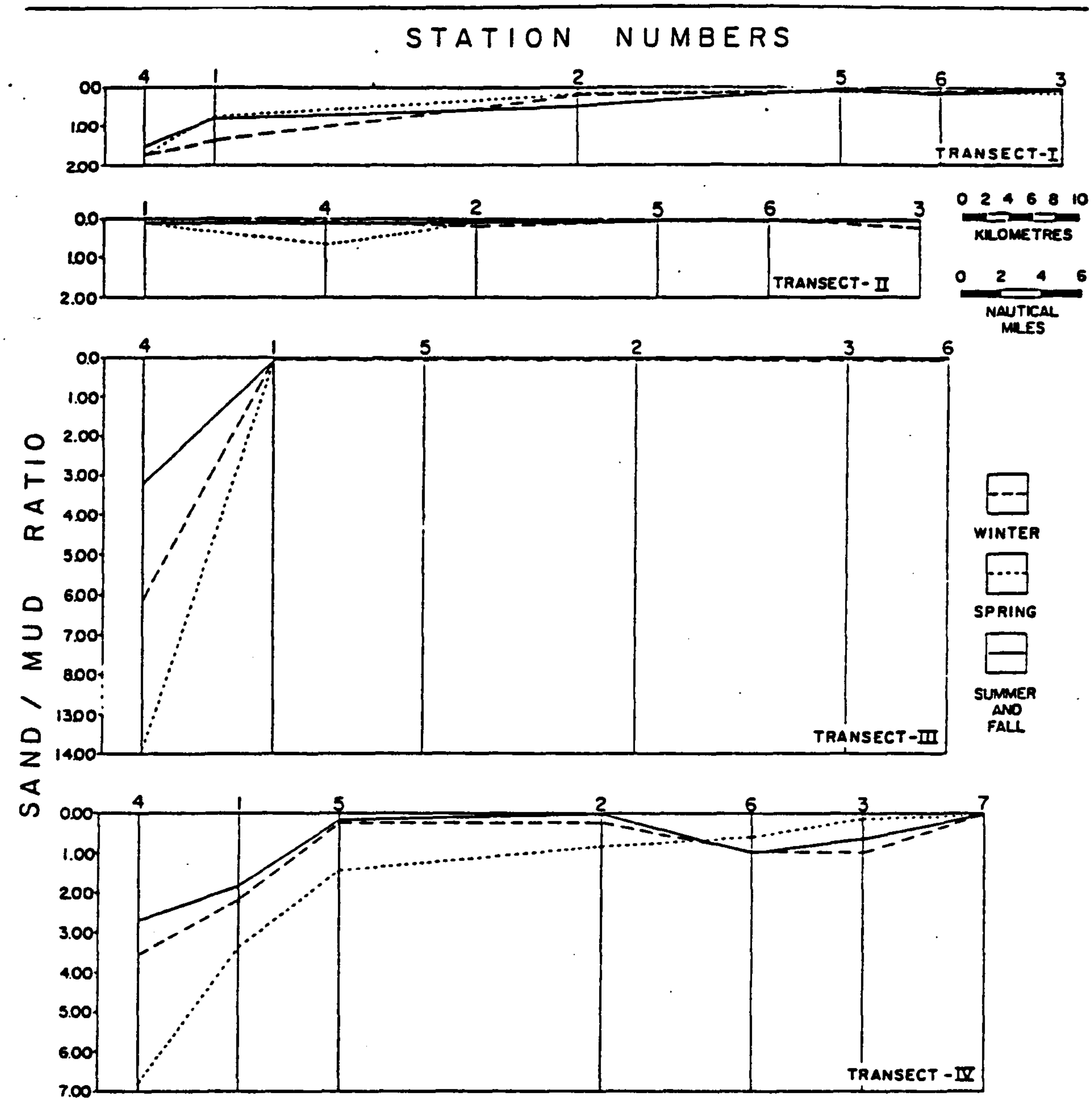

Figure 1. Sand/Mud Ratios for Benthic Sediments, Biological Stations.

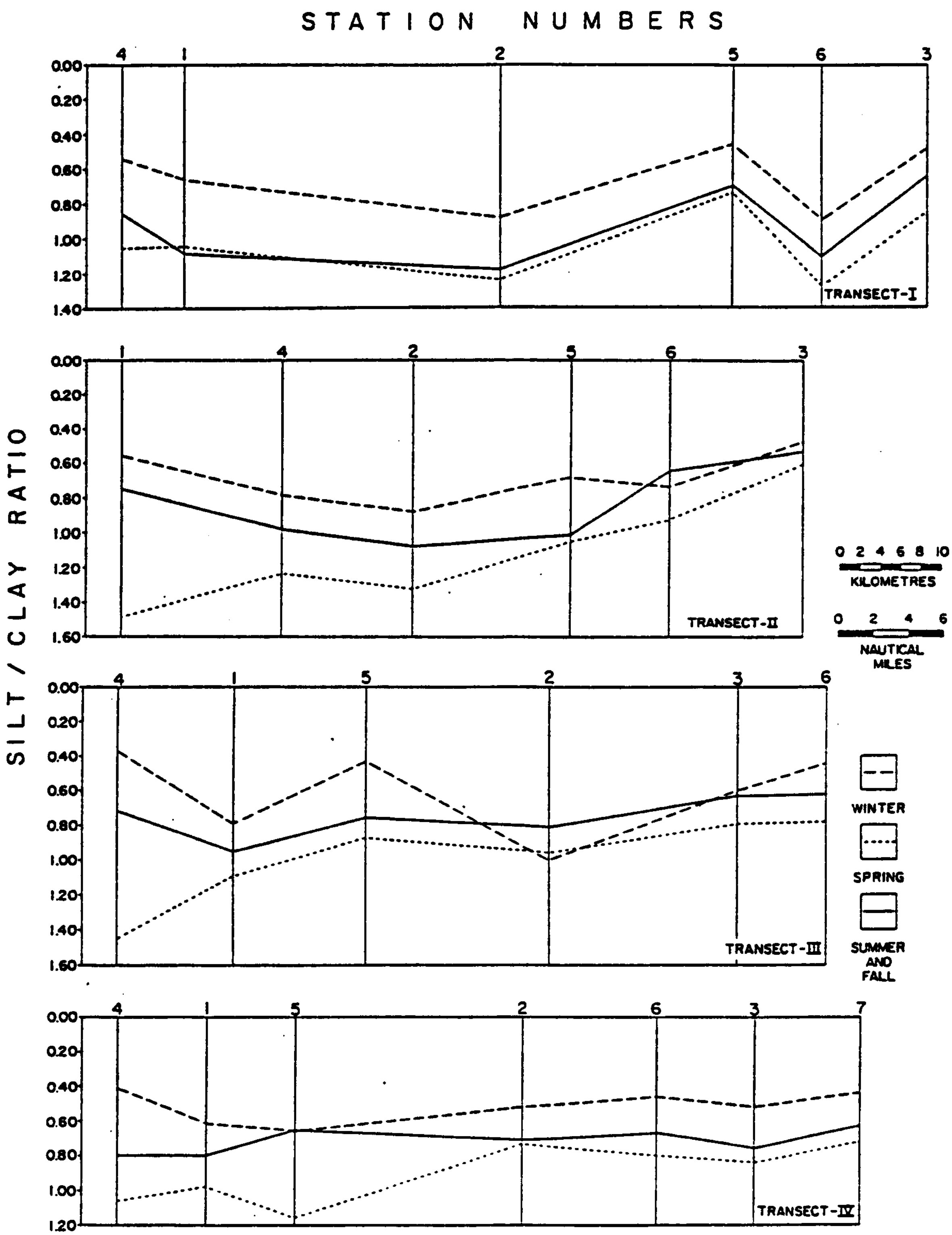

Figure 2. Silt/Clay Ratios for Benthic Sediments, Biological Stations.

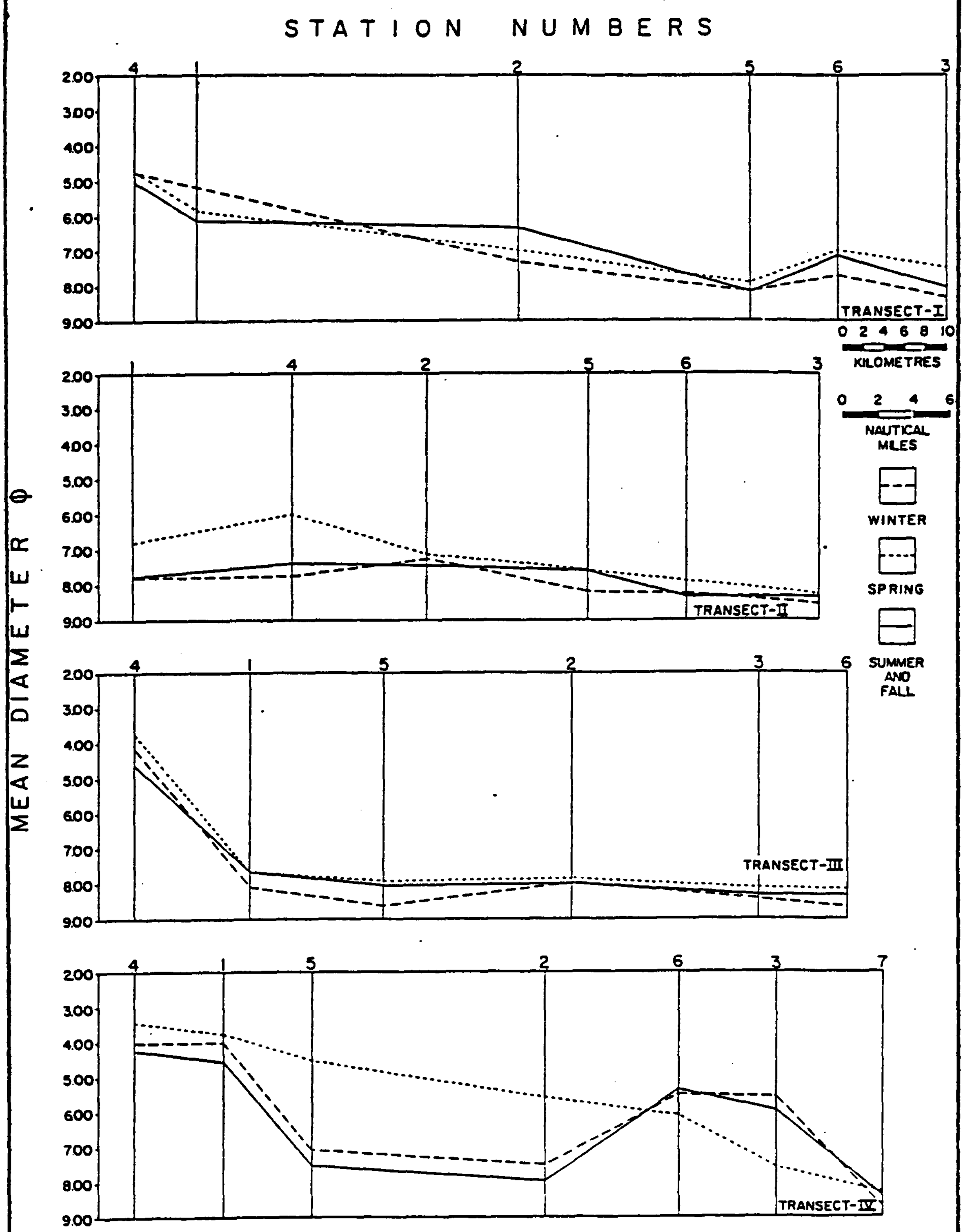

Figure 3. Mean Diameters for Benthic Sediments, Biological Stations.

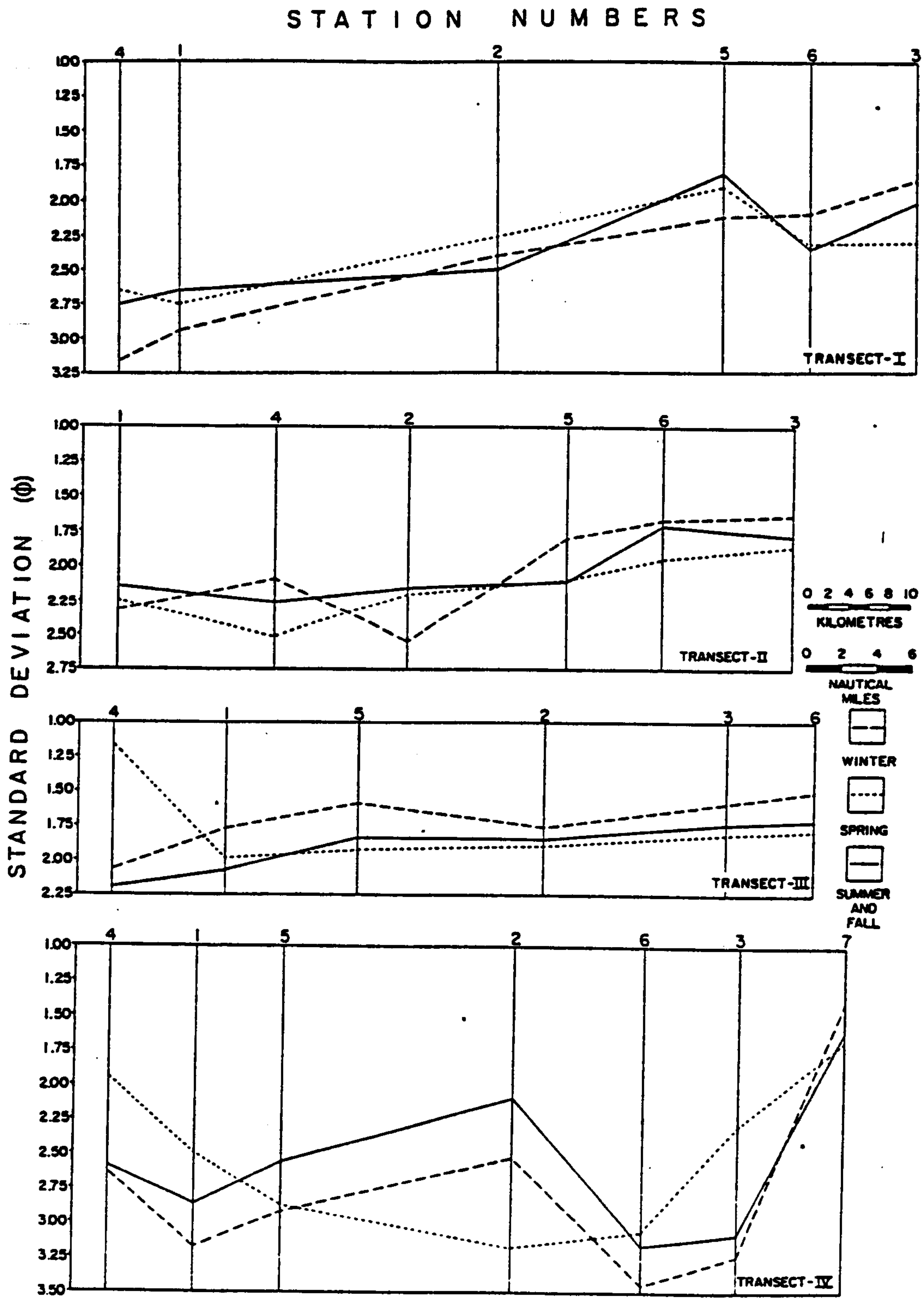

Figure 4. Standard Deviations for Benthic Sediments, Biological Stations.

TABLE 1

TEXTURAL PROPERTIES OF SEASONAL BENTHIC SEDIMENT SAMPLES

Explanation of Table:

Column 1 - Sample station number (Univ. Texas Marine Science Institute designation)

Column 2 - Sample station number (USGS designation): TS = Texas seasonal samples, second character = station number, third character = transect number, fourth character = subsample designation, fifth character = seasonal suite (1 = winter, 2 = spring, 3 = summer/fall)

Column 3 - Station latitude: first two digits = degrees, last two digits = minutes

Column 4 - Station longitude: first two digits = degrees, last two digits = minutes

Column 5 - Station water depth (meters)

Column 6 - Sand percentage (%)

Column 7 - Silt percentage (%)

Column 8 - Clay percentage (%)

Column 9 - Sand/Mud ratio

Column 10 - Data sheet designation numbers (#1 = first data sheet)

Column 11 - Sample station number reiteration (Univ. Texas Marine Science Institute designation)

Column 12 - Sample station number reiteration (USGS designation)

Column 13 - Silt/Clay ratio

Column 14 - Mean diameter in phi units (first moment)

Column 15 - Standard deviation in phi units (second moment)

Column 16 - Skewness (third moment)

Column 17 - Kurtosis (fourth moment)

Column 18 - Data sheet designation number (#2 = second data sheet)

Note: The designation "ND" indicates no data for that specific item.

TABLE 1 CONT.'D

1	2	3	4	5	6	7	8	9	10
HSE-SED	TS-1-1-A-1	28 12	96 27	18	54.66	18.38	26.96	1.20	1
HSF-SED	TS-1-1-B-1	28 12	96 27	18	60.37	15.50	24.13	1.52	1
HSG-SED	TS-2-1-A-1	27 55	96 20	42	17.57	41.06	41.37	0.21	1
HSH-SED	TS-2-1-B-1	27 55	96 20	42	11.98	38.45	49.58	0.14	1
HSI-SED	TS-3-1-A-1	27 34	96 07	134	3.87	35.02	61.11	0.04	1
HSJ-SED	TS-3-1-B-1	27 34	96 07	134	4.54	27.56	67.89	0.05	1
HSR-SED	TS-4-1-A-1	28 14	96 29	10	65.93	11.61	22.46	1.93	1
HSS-SED	TS-4-1-B-1	28 14	96 29	10	59.47	14.54	25.98	1.47	1
HTA-SED	TS-5-1-A-1	27 44	96 14	82	14.27	25.75	59.98	0.17	1
HTB-SED	TS-5-1-B-1	27 44	96 14	82	0.93	32.27	66.80	0.01	1
HTJ-SED	TS-6-1-A-1	27 39	96 12	100	8.94	46.24	44.83	0.10	1
HTK-SED	TS-6-1-B-1	27 39	96 12	100	5.56	41.05	53.39	0.06	1
HRM-SED	TS-1-2-A-1	27 40	96 59	22	11.60	36.26	52.14	0.13	1
HRN-SED	TS-1-2-B-1	27 40	96 59	22	13.20	25.69	61.11	0.15	1
HRP-SED	TS-2-2-A-1	27 30	96 45	49	9.73	39.30	50.97	0.11	1
HRO-SED	TS-2-2-B-1	27 30	96 45	49	18.15	40.26	41.59	0.22	1
HRQ-SED	TS-3-2-A-1	27 18	96 23	131	2.40	35.59	62.02	0.02	1
HRS-SED	TS-3-2-B-1	27 18	96 23	131	1.60	26.18	72.22	0.02	1
HSA-SED	TS-4-2-A-1	27 34	96 50	34	5.99	40.68	53.33	0.06	1
HSB-SED	TS-4-2-B-1	27 34	96 50	34	10.10	40.02	49.88	0.11	1
HOI-SED	TS-5-2-A-1	27 24	96 36	78	2.93	41.54	55.53	0.03	1
HOJ-SED	TS-5-2-B-1	27 24	96 36	78	3.58	35.84	60.58	0.04	1
HPP-SED	TS-6-2-A-1	27 24	96 29	98	0.85	39.53	59.62	0.01	1
HPX-SED	TS-6-2-B-1	27 24	96 29	98	0.79	43.98	55.23	0.01	1
HUH-SED	TS-1-3-A-1	26 58	97 11	25	2.39	37.97	59.65	0.02	1
HUJ-SED	TS-1-3-B-1	26 58	97 11	25	1.28	47.73	50.99	0.01	1
IAD-SED	TS-2-3-A-1	26 58	96 48	65	0.33	56.15	43.52	0.00	1
IAK-SED	TS-2-3-B-1	26 58	96 48	65	1.06	40.81	58.13	0.01	1
IBZ-SED	TS-3-3-A-1	26 58	96 33	106	0.52	33.84	65.64	0.00	1
ICH-SED	TS-3-3-B-1	26 58	96 33	106	0.84	40.52	58.65	0.01	1

TABLE 1 CONT.'D

11	12	13	14	15	16	17	18
HSE-SED	TS-1-1-A-1	0.68	5.43	2.84	0.28	-1.29	2
HSF-SED	TS-1-1-B-1	0.64	4.91	3.02	0.31	-1.16	2
HSG-SED	TS-2-1-A-1	0.99	7.18	2.30	-0.11	-1.10	2
HSH-SED	TS-2-1-B-1	0.77	7.49	2.50	-0.41	-0.03	2
HSI-SED	TS-3-1-A-1	0.57	8.26	1.85	-0.41	0.26	2
HSJ-SED	TS-3-1-B-1	0.41	8.49	1.85	-0.57	1.03	2
HSR-SED	TS-4-1-A-1	0.52	4.64	3.02	0.40	-0.94	2
HSS-SED	TS-4-1-B-1	0.56	4.91	3.18	0.27	-1.29	2
HTA-SED	TS-5-1-A-1	0.43	7.76	2.74	-0.65	0.85	2
HTB-SED	TS-5-1-B-1	0.48	8.61	1.48	-0.30	-0.11	2
HTJ-SED	TS-6-1-A-1	1.03	7.48	2.19	-0.24	-0.45	2
HTK-SED	TS-6-1-B-1	0.77	7.94	1.98	-0.27	-0.47	2
HRM-SED	TS-1-2-A-1	0.69	7.61	2.39	-0.38	-0.26	2
HRN-SED	TS-1-2-B-1	0.42	8.01	2.25	-0.44	-0.30	2
HRP-SED	TS-2-2-A-1	0.77	7.53	2.51	-0.48	0.47	2
HRO-SED	TS-2-2-B-1	0.97	7.00	2.59	-0.24	-0.78	2
HRQ-SED	TS-3-2-A-1	0.57	8.38	1.69	-0.34	0.01	2
HRS-SED	TS-3-2-B-1	0.36	8.72	1.57	-0.50	0.87	2
HSA-SED	TS-4-2-A-1	0.76	7.89	2.00	-0.28	-0.43	2
HSB-SED	TS-4-2-B-1	0.80	7.62	2.17	-0.21	-0.97	2
HOI-SED	TS-5-2-A-1	0.75	8.13	1.78	-0.24	-0.46	2
HOJ-SED	TS-5-2-B-1	0.59	8.27	1.79	-0.35	-0.11	2
HPP-SED	TS-6-2-A-1	0.66	8.36	1.61	-0.20	-0.66	2
HPX-SED	TS-6-2-B-1	0.80	8.15	1.71	-0.16	-0.84	2
HUH-SED	TS-1-3-A-1	0.64	8.25	1.74	-0.29	-0.37	2
HUJ-SED	TS-1-3-B-1	0.94	7.93	1.79	-0.12	-0.92	2
IAD-SED	TS-2-3-A-1	1.29	7.68	1.77	0.05	-1.21	2
IAK-SED	TS-2-3-B-1	0.70	8.24	1.74	-0.21	-0.80	2
IBZ-SED	TS-3-3-A-1	0.51	8.59	1.55	-0.27	-0.50	2
ICH-SED	TS-3-3-B-1	0.69	8.29	1.61	-0.19	-0.69	2

TABLE 1 CONT.'D

1	2	3	4	5	6	7	8	9	10
IDV-SED	TS-4-3-A-1	26 58	97 20	15	88.84	3.27	7.89	7.96	1
IDX-SED	TS-4-3-B-1	26 58	97 20	15	81.19	4.65	14.16	4.32	1
IFS-SED	TS-5-3-A-1	26 58	97 02	40	1.67	29.49	68.85	0.02	1
IFW-SED	TS-5-3-B-1	26 58	97 02	40	1.30	29.20	69.50	0.01	1
IHK-SED	TS-6-3-A-1	26 58	96 30	125	0.73	28.51	70.76	0.01	1
IHO-SED	TS-6-3-B-1	26 58	96 30	125	1.21	32.12	66.67	0.01	1
IJE-SED	TS-1-4-A-1	26 10	97 01	27	69.15	9.89	20.96	2.24	1
IJK-SED	TS-1-4-B-1	26 10	97 01	27	67.92	13.77	18.31	2.12	1
JCF-SED	TS-2-4-A-1	26 10	96 39	47	31.90	27.00	41.10	0.47	1
JCG-SED	TS-2-4-B-1	26 10	96 39	47	4.97	25.70	69.33	0.05	1
IMY-SED	TS-3-4-A-1	26 10	96 24	91	46.98	21.28	31.74	0.89	1
INC-SED	TS-3-4-B-1	26 10	96 24	91	51.70	12.78	35.52	1.07	1
IOW-SED	TS-4-4-A-1	26 10	97 08	15	77.23	6.44	16.34	3.39	1
IPA-SED	TS-4-4-B-1	26 10	97 08	15	78.86	6.22	14.93	3.73	1
IQO-SED	TS-5-4-A-1	26 10	96 54	37	26.42	26.41	47.18	0.36	1
IUS-SED	TS-5-4-B-1	26 10	96 54	37	12.60	37.00	50.40	0.14	1
ISF-SED	TS-6-4-A-1	26 10	96 31	65	50.28	16.02	33.70	1.01	1
ISJ-SED	TS-6-4-B-1	26 10	96 31	65	47.37	16.34	36.29	0.90	1
IUG-SED	TS-7-4-A-1	26 10	96 20	130	0.13	33.19	66.69	0.00	1
IUK-SED	TS-7-4-B-1	26 10	96 20	130	0.28	26.77	72.95	0.00	1
LYK	TS-1-1-A-2	28 12	96 27	18	37.72	28.22	34.07	0.61	1
LYR	TS-1-1-B-2	28 12	96 27	18	45.34	30.21	24.45	0.83	1
MAK	TS-2-1-A-2	27 55	96 20	42	8.93	53.45	37.63	0.10	1
MAR	TS-2-1-B-2	27 55	96 20	42	18.67	41.67	39.66	0.23	1
MCH-SED	TS-3-1-A-2	27 34	96 07	134	8.20	41.04	50.75	0.09	1

TABLE 1 CONT.'D

1	2	3	4	5	6	7	8	9	10
MCO-SED	TS-3-1-B-2	27 34	96 07	134	12.18	42.12	45.70	0.14	1
MER	TS-4-1-A-2	28 14	96 29	10	66.12	18.94	14.94	1.95	1
MEI	TS-4-1-B-2	28 14	96 29	10	60.18	18.08	21.74	1.51	1
MFV	TS-5-1-A-2	27 44	96 14	82	11.40	45.92	42.68	0.13	1
MGC	TS-5-1-B-2	27 44	96 14	82	0.81	27.81	71.38	0.01	1
MHP	TS-6-1-A-2	27 39	96 12	100	15.67	44.90	39.43	0.19	1
MEJ	TS-6-1-B-2	27 39	96 12	100	7.71	54.34	37.94	0.08	1
MJJ	TS-1-2-A-2	27 40	96 59	22	0.0	57.18	42.82	0.00	1
MJQ	TS-1-2-B-2	27 40	96 59	22	20.86	49.08	30.06	0.26	1
MLL	TS-2-2-A-2	27 30	96 45	49	9.61	52.65	37.74	0.11	1
MLS	TS-2-2-B-2	27 30	96 45	49	9.34	50.39	40.27	0.10	1
MNM-SED	TS-3-2-A-2	27 18	96 23	131	2.58	35.08	62.34	0.03	1
MNT-SED	TS-3-2-B-2	27 18	96 23	131	2.53	38.05	59.42	0.03	1
MPN	TS-4-2-A-2	27 34	96 50	34	46.24	31.40	22.36	0.86	1
MPG	TS-4-2-B-2	27 34	96 50	34	31.25	35.34	33.41	0.45	1
MQY	TS-5-2-A-2	27 24	96 36	78	4.76	55.20	40.04	0.05	1
MRF	TS-5-2-B-2	27 24	96 36	78	5.18	39.13	55.69	0.05	1
MSQ	TS-6-2-A-2	27 24	96 29	98	2.51	46.15	51.34	0.03	1
MSX	TS-6-2-B-2	27 24	96 29	98	2.57	47.60	49.84	0.03	1
MXM-SED	TS-1-3-A-2	26 58	97 11	25	2.25	46.64	51.12	0.02	1
MXT-SED	TS-1-3-B-2	26 58	97 11	25	1.89	54.99	43.12	0.02	1
MZM-SED	TS-2-3-A-2	26 58	96 48	65	1.19	52.59	46.22	0.01	1
MZT-SED	TS-2-3-B-2	26 58	96 48	65	0.31	43.93	55.76	0.00	1
NBJ-SED	TS-3-3-A-2	26 58	96 33	106	0.0	45.02	54.98	0.00	1
NBQ-SED	TS-3-3-B-2	26 58	96 33	106	0.0	43.24	56.76	0.00	1
NDD-SED	TS-4-3-A-2	26 58	97 20	15	90.60	4.91	4.50	9.64	1
NDK-SED	TS-4-3-B-2	26 58	97 20	15	94.81	3.28	1.91	18.26	1
NEX-SED	TS-5-3-A-2	26 58	97 02	40	1.22	45.73	53.05	0.01	1
NFE-SED	TS-5-3-B-2	26 58	97 02	40	0.74	46.05	53.21	0.01	1
NGP-SED	TS-6-3-A-2	26 58	96 30	125	0.52	43.85	56.30	0.00	1

TABLE 1 CONT.'D

11	12	13	14	15	16	17	18
IDV-SED	TS-4-3-A-1	0.41	4.08	1.73	1.34	5.87	2
IDX-SED	TS-4-3-B-1	0.33	4.23	2.39	0.77	1.24	2
IFS-SED	TS-5-3-A-1	0.43	8.61	1.61	-0.43	0.37	2
IFW-SED	TS-5-3-B-1	0.42	8.66	1.54	-0.40	0.33	2
IHK-SED	TS-6-3-A-1	0.40	8.71	1.46	-0.36	0.03	2
IHO-SED	TS-6-3-B-1	0.48	8.60	1.55	-0.35	0.00	2
IJE-SED	TS-1-4-A-1	0.47	3.97	3.29	0.45	-0.80	2
IJK-SED	TS-1-4-B-1	0.75	3.97	3.05	0.48	-0.53	2
JCF-SED	TS-2-4-A-1	0.66	6.47	3.06	-0.12	-1.47	2
JCG-SED	TS-2-4-B-1	0.37	8.50	1.96	-0.67	1.63	2
IMY-SED	TS-3-4-A-1	0.67	5.60	3.14	0.12	-1.54	2
INC-SED	TS-3-4-B-1	0.36	5.53	3.33	0.11	-1.62	2
IOW-SED	TS-4-4-A-1	0.39	4.09	2.63	0.69	0.38	2
IPA-SED	TS-4-4-B-1	0.42	3.94	2.63	0.73	0.65	2
IOD-SED	TS-5-4-A-1	0.56	6.70	3.25	-0.29	-1.09	2
IQS-SED	TS-5-4-B-1	0.73	7.44	2.58	-0.46	0.10	2
ISF-SED	TS-6-4-A-1	0.47	5.29	3.53	0.09	-1.62	2
ISJ-SED	TS-6-4-B-1	0.45	5.70	3.35	0.02	-1.53	2
IUG-SED	TS-7-4-A-1	0.50	8.60	1.46	-0.23	-0.65	2
IUK-SED	TS-7-4-B-1	0.37	8.78	1.35	-0.32	-0.10	2
LYK	TS-1-1-A-2	0.83	6.15	2.85	0.04	-1.48	2
LYR	TS-1-1-B-2	1.24	5.55	2.65	0.26	-1.17	2
MAK	TS-2-1-A-2	1.42	7.09	2.16	0.01	-1.13	2
MAR	TS-2-1-B-2	1.05	6.95	2.34	-0.05	-1.25	2
MCH-SED	TS-3-1-A-2	0.81	7.71	2.20	-0.27	-0.60	2

TABLE 1 CONT.'D

11	12	13	14	15	16	17	18
MCO-SED	TS-3-1-B-2	0.92	7.29	2.40	-0.71	-1.03	2
MEB	TS-4-1-A-2	1.27	4.54	2.49	0.57	-0.09	2
MEI	TS-4-1-B-2	0.83	4.96	2.80	0.36	-0.93	2
MFV	TS-5-1-A-2	1.08	7.16	2.33	-0.08	-1.22	2
MGC	TS-5-1-B-2	0.39	8.67	1.47	-0.47	0.31	2
MHP	TS-6-1-A-2	1.14	7.01	2.36	-0.06	-1.19	2
MEJ	TS-6-1-B-2	1.43	6.99	2.26	0.03	-1.30	2
MJJ	TS-1-2-A-2	1.33	7.40	2.03	-0.00	-1.31	2
MJQ	TS-1-2-B-2	1.63	6.26	2.46	0.18	-1.26	2
MLL	TS-2-2-A-2	1.39	7.09	2.21	0.01	-1.21	2
MLS	TS-2-2-B-2	1.25	7.17	2.18	-0.02	-1.17	2
MNM-SED	TS-3-2-A-2	0.56	8.33	1.87	-0.36	-0.22	2
MNT-SED	TS-3-2-B-2	0.64	8.21	1.84	-0.32	-0.29	2
MPN	TS-4-2-A-2	1.40	5.52	2.51	0.35	-0.88	2
MPQ	TS-4-2-B-2	1.06	6.44	2.52	0.09	-1.40	2
MQY	TS-5-2-A-2	1.38	7.23	2.11	-0.00	-1.19	2
MRF	TS-5-2-B-2	0.70	7.91	2.06	-0.27	-0.77	2
MSQ	TS-6-2-A-2	0.90	7.92	1.92	-0.17	-0.84	2
MSX	TS-6-2-B-2	0.95	7.85	1.96	-0.13	-0.99	2
MXM-SED	TS-1-3-A-2	0.91	7.85	1.95	-0.15	-0.97	2
MXT-SED	TS-1-3-B-2	1.27	7.48	2.01	-0.02	-1.20	2
MZM-SED	TS-2-3-A-2	1.14	7.53	2.07	-0.07	-1.24	2
MZT-SED	TS-2-3-B-2	0.79	8.17	1.72	-0.13	-1.02	2
NBJ-SED	TS-3-3-A-2	0.82	8.04	1.88	-0.19	-0.94	2
NBQ-SED	TS-3-3-B-2	0.76	8.20	1.74	-0.17	-0.93	2
NDD-SED	TS-4-3-A-2	1.13	3.85	1.38	1.74	11.93	2
NDK-SED	TS-4-3-B-2	1.76	3.66	0.94	2.69	20.84	2
NEX-SED	TS-5-3-A-2	0.87	7.86	1.96	-0.16	-0.79	2
NFE-SED	TS-5-3-B-2	0.86	7.98	1.87	-0.16	-0.99	2
NGP-SED	TS-6-3-A-2	0.78	8.17	1.73	-0.17	-0.89	2

TABLE 1 CONT.'D

1	2	3	4	5	6	7	8	9	10
NGW-SED	TS-6-3-B-2	26 58	96 30	125	1.01	43.46	55.53	0.01	1
NIJ-SED	TS-1-4-A-2	26 10	97 01	27	81.39	9.81	8.80	4.37	1
NIQ-SED	TS-1-4-B-2	26 10	97 01	27	70.72	13.39	15.89	2.42	1
NKJ-SED	TS-2-4-A-2	26 10	96 39	47	44.65	24.55	30.81	0.81	1
NKQ-SED	TS-2-4-B-2	26 10	96 39	47	46.94	21.44	31.61	0.88	1
NMG-SED	TS-3-4-A-2	26 10	96 24	91	11.73	41.29	46.99	0.13	1
NMN-SED	TS-3-4-B-2	26 10	96 24	91	10.15	39.73	50.12	0.11	1
NOA-SED	TS-4-4-A-2	26 10	97 08	15	90.38	5.38	4.24	9.40	1
NOH-SED	TS-4-4-B-2	26 10	97 08	15	80.86	8.83	10.31	4.22	1
NPS-SED	TS-5-4-A-2	26 10	96 54	37	60.51	18.48	21.02	1.53	1
NPZ-SED	TS-5-4-B-2	26 10	96 54	37	57.77	24.85	17.37	1.37	1
NRK-SED	TS-6-4-A-2	26 10	96 31	65	28.03	32.78	39.19	0.39	1
NRP-SED	TS-6-4-B-2	26 10	96 31	65	44.25	24.13	31.62	0.79	1
NTL-SED	TS-7-4-A-2	26 10	96 20	130	0.70	42.95	56.35	0.01	1
NTJ-SED	TS-7-4-B-2	26 10	96 20	130	0.79	40.24	58.97	0.01	1
QYR-SED	TS-1-1-A-3	28 12	96 27	18	47.26	30.18	22.46	0.90	1
QYT-SED	TS-1-1-B-3	28 12	96 27	18	40.21	26.97	32.81	0.67	1
RAI-SED	TS-2-1-A-3	27 55	96 20	42	38.35	35.50	26.16	0.62	1
RAK-SED	TS-2-1-B-3	27 55	96 20	42	23.90	38.05	38.06	0.31	1
RCL-SED	TS-3-1-A-3	27 34	96 07	134	4.70	36.90	58.41	0.05	1
RCN-SED	TS-3-1-B-3	27 34	96 07	134	3.26	38.78	57.96	0.03	1
REC-SED	TS-4-1-A-3	28 14	96 29	10	65.03	15.21	19.76	1.86	1
REE-SED	TS-4-1-B-3	28 14	96 29	10	54.01	22.19	23.80	1.18	1
RFT-SED	TS-5-1-A-3	27 44	96 14	82	0.94	34.41	64.64	0.01	1
RFV-SED	TS-5-1-B-3	27 44	96 14	82	4.81	43.98	51.21	0.05	1

TABLE 1 CONT.'D

11	12	13	14	15	16	17	18
NGW-SED	TS-6-3-B-2	0.78	8.11	1.82	-0.19	-0.79	2
NIJ-SED	TS-1-4-A-2	1.11	3.51	2.19	0.98	2.72	2
NIQ-SED	TS-1-4-B-2	0.84	3.99	2.80	0.61	0.01	2
NKJ-SED	TS-2-4-A-2	0.80	5.59	3.15	0.11	-1.54	2
NKQ-SED	TS-2-4-B-2	0.68	5.54	3.19	0.11	-1.51	2
NMG-SED	TS-3-4-A-2	0.88	7.49	2.28	-0.25	-0.68	2
NMN-SED	TS-3-4-B-2	0.79	7.59	2.32	-0.33	-0.44	2
NOA-SED	TS-4-4-A-2	1.27	3.21	1.55	1.58	9.85	2
NOH-SED	TS-4-4-B-2	0.86	3.61	2.32	0.89	1.91	2
NPS-SED	TS-5-4-A-2	0.88	4.57	2.98	0.42	-0.90	2
NPZ-SED	TS-5-4-B-2	1.43	4.42	2.76	0.50	-0.45	2
NRK-SED	TS-6-4-A-2	0.84	6.49	2.97	-0.11	-1.32	2
NRR-SED	TS-6-4-B-2	0.76	5.62	3.16	0.11	-1.54	2
NTL-SED	TS-7-4-A-2	0.76	8.23	1.70	-0.15	-0.93	2
NTJ-SED	TS-7-4-B-2	0.68	8.29	1.67	-0.20	-0.75	2
QYR-SED	TS-1-1-A-3	1.34	6.09	2.53	0.34	-0.96	2
QYT-SED	TS-1-1-B-3	0.82	6.15	2.76	0.06	-1.49	2
RAI-SED	TS-2-1-A-3	1.36	6.00	2.47	0.22	-1.20	2
RAK-SED	TS-2-1-B-3	1.00	6.75	2.53	-0.00	-1.37	2
RCL-SED	TS-3-1-A-3	0.63	8.04	2.08	-0.40	0.02	2
RCN-SED	TS-3-1-B-3	0.67	8.13	1.96	-0.31	-0.49	2
REC-SED	TS-4-1-A-3	0.77	4.80	2.70	0.48	-0.64	2
REE-SED	TS-4-1-B-3	0.93	5.30	2.80	0.28	-1.20	2
RFT-SED	TS-5-1-A-3	0.53	8.53	1.61	-0.31	-0.24	2
RFV-SED	TS-5-1-B-3	0.86	7.87	2.01	-0.26	-0.50	2

TABLE 1 CONT.'D

1	2	3	4	5	6	7	8	9	10
RHK-SED	TS-6-1-A-3	27 39	96 12	100	13.21	38.11	48.68	0.15	1
RHM-SED	TS-6-1-B-3	27 39	96 12	100	15.13	49.90	34.96	0.18	1
RJL-SED	TS-1-2-A-3	27 40	96 59	22	10.04	38.81	51.15	0.11	1
RJN-SED	TS-1-2-B-3	27 40	96 59	22	5.27	40.36	54.36	0.06	1
RLL-SED	TS-2-2-A-3	27 30	96 45	49	7.73	49.20	43.07	0.08	1
RLN-SED	TS-2-2-B-3	27 30	96 45	49	8.66	45.46	45.88	0.10	1
RNK-SED	TS-3-2-A-3	27 18	96 23	131	1.77	33.84	64.39	0.02	1
RNM-SED	TS-3-2-B-3	27 18	96 23	131	2.35	33.66	64.00	0.02	1
RPA-SED	TS-4-2-A-3	27 34	96 50	34	10.81	42.27	46.92	0.12	1
RPC-SED	TS-4-2-B-3	27 34	96 50	34	8.16	47.30	44.55	0.09	1
RQJ-SED	TS-5-2-A-3	27 24	96 36	78	3.63	53.18	43.18	0.04	1
RQL-SED	TS-5-2-B-3	27 24	96 36	78	7.21	41.02	51.78	0.08	1
RRT-SED	TS-6-2-A-3	27 24	96 29	98	1.18	40.05	58.77	0.01	1
RRV-SED	TS-6-2-B-3	27 24	96 29	98	0.00	37.34	62.66	0.00	1
RTE-SED	TS-1-3-A-3	26 58	97 11	25	6.17	47.36	46.46	0.07	1
RTG-SED	TS-1-3-B-3	26 58	97 11	25	2.02	45.69	52.30	0.02	1
RVC-SED	TS-2-3-A-3	26 58	96 48	65	0.00	45.93	54.07	0.00	1
RVE-SED	TS-2-3-B-3	26 58	96 48	65	1.29	42.50	56.21	0.01	1
RXE-SED	TS-3-3-A-3	26 58	96 33	106	0.79	36.53	62.68	0.01	1
RXG-SED	TS-3-3-B-3	26 58	96 33	106	0.56	40.22	59.22	0.01	1
RYU-SED	TS-4-3-A-3	26 58	97 20	15	74.30	11.06	14.64	2.89	1
RYW-SED	TS-4-3-B-3	26 58	97 20	15	77.96	8.91	13.13	3.54	1
SAD-SED	TS-5-3-A-3	26 58	97 02	40	0.56	43.55	55.89	0.01	1
SAF-SED	TS-5-3-B-3	26 58	97 02	40	1.44	41.86	56.69	0.02	1
SBM-SED	TS-6-3-A-3	26 58	96 30	125	0.78	36.92	62.30	0.01	1
SBO-SED	TS-6-3-B-3	26 58	96 30	125	0.82	38.56	60.62	0.01	1
SCX-SED	TS-1-4-A-3	26 10	97 01	27	65.01	12.22	22.76	1.86	1
SCZ-SED	TS-1-4-B-3	26 10	97 01	27	64.67	18.20	17.13	1.83	1
SEU-SED	TS-2-4-A-3	26 10	96 39	47	3.49	34.46	62.05	0.04	1
SEW-SED	TS-2-4-B-3	26 10	96 39	47	7.10	42.56	50.33	0.08	1

TABLE 1 CONT.'D

1	2	3	4	5	6	7	8	9	10
SGT-SED	TS-3-4-A-3	26 10	96 24	91	38.67	22.35	38.98	0.63	1
SGV-SED	TS-3-4-B-3	26 10	96 24	91	40.00	29.13	30.86	0.67	1
SIK-SED	TS-4-4-A-3	26 10	97 08	15	74.81	12.27	12.92	2.97	1
SIM-SED	TS-4-4-B-3	26 10	97 08	15	70.78	11.41	17.80	2.42	1
SJU-SED	TS-5-4-A-3	26 10	96 54	37	16.71	35.63	47.66	0.20	1
SJW-SED	TS-5-4-B-3	26 10	96 54	37	11.46	31.00	57.54	0.13	1
SLE-SED	TS-6-4-A-3	26 10	96 31	65	41.02	25.01	33.97	0.69	1
SLG-SED	TS-6-4-B-3	26 10	96 31	65	57.72	15.88	26.40	1.36	1
SMO-SED	TS-7-4-A-3	26 10	96 20	130	0.00	40.51	59.49	0.00	1
SMQ-SED	TS-7-4-B-3	26 10	96 20	130	0.00	36.45	63.55	0.00	1

TABLE 1 CONT.'D

11	12	13	14	15	16	17	18
RHK-SED	TS-6-1-A-3	0.78	7.48	2.35	-0.19	-1.06	2
RHM-SED	TS-6-1-B-3	1.43	6.81	2.35	0.04	-1.23	2
RJL-SED	TS-1-2-A-3	0.76	7.58	2.30	-0.21	-1.06	2
RJN-SED	TS-1-2-B-3	0.74	7.96	1.98	-0.29	-0.40	2
RLL-SED	TS-2-2-A-3	1.14	7.36	2.17	-0.06	-1.17	2
RLN-SED	TS-2-2-B-3	0.99	7.56	2.12	-0.16	-0.96	2
RNK-SED	TS-3-2-A-3	0.52	8.42	1.76	-0.38	-0.02	2
RNM-SED	TS-3-2-B-3	0.53	8.35	1.80	-0.40	0.10	2
RPA-SED	TS-4-2-A-3	0.90	7.45	2.26	-0.13	-1.16	2
RPC-SED	TS-4-2-B-3	1.06	7.34	2.26	-0.07	-1.29	2
RQJ-SED	TS-5-2-A-3	1.23	7.44	2.09	-0.04	-1.21	2
RQL-SED	TS-5-2-B-3	0.79	7.79	2.12	-0.22	-0.87	2
RRT-SED	TS-6-2-A-3	0.68	8.26	1.75	-0.23	-0.69	2
RRV-SED	TS-6-2-B-3	0.60	8.43	1.64	-0.23	-0.79	2
RTE-SED	TS-1-3-A-3	1.02	7.55	2.10	-0.13	-1.00	2
RTG-SED	TS-1-3-B-3	0.87	7.81	2.03	-0.18	-1.06	2
RVC-SED	TS-2-3-A-3	0.85	7.99	1.85	-0.15	-1.07	2
RVE-SED	TS-2-3-B-3	0.76	8.02	1.83	-0.22	-0.81	2
RXE-SED	TS-3-3-A-3	0.58	8.44	1.75	-0.28	-0.58	2
RXG-SED	TS-3-3-B-3	0.68	8.24	1.72	-0.22	-0.75	2
RYU-SED	TS-4-3-A-3	0.75	4.78	2.19	0.78	0.94	2
RYW-SED	TS-4-3-B-3	0.68	4.49	2.18	0.82	1.50	2
SAD-SED	TS-5-3-A-3	0.78	8.06	1.81	-0.19	-0.92	2
SAF-SED	TS-5-3-B-3	0.74	8.05	1.84	-0.24	-0.74	2
SBM-SED	TS-6-3-A-3	0.59	8.41	1.65	-0.27	-0.53	2
SBO-SED	TS-6-3-B-3	0.64	8.28	1.77	-0.26	-0.71	2
SCX-SED	TS-1-4-A-3	0.54	4.63	2.99	0.43	-0.91	2
SCZ-SED	TS-1-4-B-3	1.06	4.44	2.74	0.49	-0.52	2
SEU-SED	TS-2-4-A-3	0.56	8.27	1.93	-0.54	1.25	2
SEW-SED	TS-2-4-B-3	0.85	7.63	2.24	-0.28	-0.55	2

TABLE 1 CONT.'D

11	12	13	14	15	16	17	18
SGT-SED	TS-3-4-A-3	0.57	6.18	3.12	-0.03	-1.60	2
SGV-SED	TS-3-4-B-3	0.94	5.77	3.04	0.05	-1.48	2
SIK-SED	TS-4-4-A-3	0.95	4.11	2.44	0.69	0.70	2
SIM-SED	TS-4-4-B-3	0.64	4.35	2.73	0.56	-0.34	2
SJU-SED	TS-5-4-A-3	0.75	7.24	2.65	-0.31	-0.76	2
SJW-SED	TS-5-4-B-3	0.54	7.79	2.47	-0.49	0.08	2
SLE-SED	TS-6-4-A-3	0.74	5.80	3.15	0.05	-1.57	2
SLG-SED	TS-6-4-B-3	0.60	4.93	3.17	0.29	-1.35	2
SMO-SED	TS-7-4-A-3	0.68	8.31	1.63	-0.17	-0.93	2
SMQ-SED	TS-7-4-B-3	0.57	8.45	1.60	-0.24	-0.71	2

(Figure 1) that is most applicable to the shallower inner shelf sector where the detritus of sand size is most abundant.

Transect I

The seasonal variation of sand/mud ratios was maximum at Station 1 (0.72-1.36) and minimum at Station 5; the seasonal variation was generally lowest along the outer shelf where sand is scarce. Along the more variable inner shelf (Station 4-2 sector), the benthic sediments do not show a systematic seasonal trend; they tended to be coarsest (highest ratios) during the winter in the shallower sector and coarsest during the summer in the deeper sector (Station 2).

Transect II

The sand/mud ratio variability was maximum at Station 4 (0.09-0.66); the remainder of the transect shows only minor seasonal variation. At Station 4, the sediments were coarsest in the spring and were uniformly finer throughout the remainder of the year.

Transect III

The sand/mud ratios showed extremely high seasonal variability at the shallowest station (Station 4); grain size ranged from finest in the summer (3.22) to coarsest in the spring (13.95). The remainder of the stations were uniform throughout the year.

Transect IV

The sand/mud ratios showed maximum seasonal variation at the shallowest station (Station 4), with sediments being coarsest in the spring (6.81) and finest (2.70) in the summer; minimal variability occurred at the deepest station (Station 7). Sediments along the inner shelf (Station 2/IV sector) tended to be coarsest in the spring.

In general, the seasonal variability of sand/mud ratios tended to be largest along the shallow inner shelf. The outer shelf was relatively uniform. This difference is probably caused by two dominant factors: 1) sand is most quantitatively significant along the inner shelf; and, 2) the inner shelf experiences a greater range of hydraulic variability. When the four transects are compared, the most pronounced variations were along Transect IV. That this was so is not surprising considering the wide variety in sediment types across the ancestral Rio Grande delta. No systematic seasonal trends were apparent.

Silt/Clay Ratio Variability

The silt/clay ratios provide a somewhat more sensitive general overview of textural variability than do sand/mud ratios. The silt/clay ratios are shown by Figure 2. In addition, silt/clay ratios are more widely applicable to the South Texas OCS where silt and clay are abundant.

For each transect, the silt/clay ratio variability was maximum at the shallowest station (Station 4, Transect I; Station 1, Transect II; Station 4, Transect III, Stations 4, Transect IV). The silt/clay ratios showed substantial seasonal variability throughout the region; they were most variable on the inner shelf, probably because of the more variable hydraulic regime.

In general, the same systematic seasonal trend applied to all transects; the benthic sediments were coarsest (most silty) during the spring and finest (least silty) during the winter).

Mean Diameter Variability

The mean diameter (first moment) provides a sensitive measure of the average grain size of the sediment and indicates the general levels of energy affecting the environment. Results of the analysis for mean diameters are shown by Figure 3.

Transect I

The seasonal variability of mean diameter was maximum at Station 2, with the station sediment being coarsest (6.38 Ø) in the summer and finest (7.34 Ø) in the winter. No systematic seasonal trend was evident.

Transect II

The mean diameter variability was maximum at Station 4, with station sediment being coarsest (5.98 Ø) in the spring and the finest (7.75 Ø) in the winter. The sediments along this transect were consistently and systematically coarsest during the spring.

Transect III

The variations in mean diameter were maximum at the shallowest station (Station 4) and ranged from coarsest (3.76 Ø) in the spring to finest (4.63 Ø) in the summer. The sediments were systematically coarsest in the spring.

Transect IV

The mean diameter variability was maximum at Station 5 where the sediments were coarsest (4.50 Ø) in the spring and finest (7.51 Ø) in the summer. No systematic seasonal trend was evident. During the spring, benthic sediments were coarsest at the inner and mid-shelf sectors, and finest at the deeper stations (Stations 6 and 3).

The average grain size of benthic sediments, in terms of mean diameters, showed substantial seasonal variability throughout the region. However, the only systematic seasonal trend was within the central sector (Transects II and III), where the sediments were coarsest during the spring. The shelfwide trend was decreasing grain size seaward, apparently reflecting an offshore transport component.

Standard Deviation Variability

The standard deviation is a measure of benthic sediment sorting characteristics of homogeneity (Figure 4). This parameter could provide indications of the extent of sediment mixing or of environmental energy consistency.

Transect I

The seasonal variability of standard deviation was maximum at the shallowest station (2.65-3.15 Ø), with sediments being best sorted (lowest standard deviation) during the spring and most poorly sorted during the winter. No systematic seasonal trend was indicated.

Transect II

Standard deviation variability was maximum at Station 4 (2.08-2.51 Ø); sorting was best during the winter and poorest during the spring. No systematic seasonal trend was apparent.

Transect III

The standard deviation variability was maximum at the shallowest station (1.16-2.19 Ø). Sorting was best during the spring and poorest during the summer. Except for the shallowest stations (4 and 1), Transect III had a seasonal trend of best sorting during the winter and poorest sorting during the spring.

Transect IV

Standard deviation variability was maximum at Station 2 (2.09-3.17 Ø), with best sorting during the summer and poorest sorting during the spring.

No systematic seasonal trend was apparent.

The sorting characteristics of sea floor surface sediment, as reflected by the standard deviation measure, showed substantial seasonal variability throughout the region. The greatest variability was along Transect IV which crossed the ancestral Rio Grande delta. In general, sorting improved seaward. However, no systematic seasonal trend in sorting was apparent on a regional basis.

Chemical Characteristics

Surface Sediments-Seasonal Variability in Trace Metals Content

As a means of testing the seasonal variability of trace metals in the benthic sediments and to provide supportive trace metal data for concurrent biologic and hydrocarbon investigations, subsamples from 25 biologic infaunal stations taken during the winter, summer, and fall seasons in 1976 were analyzed. The samples submitted for analysis were composited subsamples obtained by a SMITH-MCINTYRE grab sampler which retrieves an "undisturbed" sample. At each station four grabs were taken, with the subsamples representing both the top 5 cm from each grab and also one subsample pooled from the four grabs. For the summer sampling period both the individual and the pooled subsamples were analyzed. The sampling scheme used permitted comparisons to be made both areally and seasonally and the variability to be assessed.

In addition to the sediment samples, interlaboratory calibration and reference samples were also analyzed. These represent the standard organic material, Orchard Leaves and Bovine Liver (National Bureau of Standards biological standards), plus four exchange samples from the Texas A&M trace metal laboratory. The marine reference sediment material, USGS MAG I; the USGS standard rock material, G-2; and a composite sediment sample from the study area were also interchanged and analyzed. The results of these analyses demonstrates that the precision and accuracy of the analytical techniques of the laboratories compare favorably.

METHODS

Partial Leach (Sediment)

For cadmium, chromium, copper, iron, lead, nickel, vanadium, and zinc determination, the entire sample was dried at 90°C and ground in a ceramic mortar to pass through a 200 mesh nylon screen. From this sample duplicate 1 g subsamples were weighed into preweighed and prefired crucibles, and were heated in a muffle furnace at 450°C for six hours. After cooling in a dessicator, the samples were reweighed and transferred to precleaned culture tubes; 10 ml of 16N HNO_3 (reagent grade) were added. After heating for one hour at 54°C, the solution was transferred to a teflon beaker and evaporated to dryness. The dried sample was brought into solution by the addition of 10 ml of 16N HNO_3, transferred to a culture tube and analyzed by atomic absorption methods. For barium, the method described was modified by the addition of 10 ml of 30% H_2O_2 to the sample prior to the addition of the nitric acid. This solution was then mixed well and analyzed for barium. The instrument settings are given in Table 2.

Totals (Sediment)

The sample was ground and homogenized to pass through a 200 mesh nylon screen. Duplicate 0.25 g samples were placed in preweighed and prefired porcelain crucibles and were fired in a muffle furnace at 450°C for six hours. The sample was then cooled in a dessicator, reweighed, carefully transferred into a 5 ml teflon beaker and wetted with 12N HCL. Four (4) ml of 16N HNO_3 were added. The sample was then stirred and evaporated to dryness. The residue was redissolved in 2 ml of 30% H_2O_2, fol-

TABLE 2

INSTRUMENT PARAMETERS AND MODE OF ANALYSIS
-303 PE WITH AN HG2100 GRAPHITE FURNACE = FLAMELESS
-360 = FLAME

Element	Wave Length	Dilution	Mode	Dry Temp.	Ashing Temp.	Atom. Temp.
Ba	2776	1:40(1:200)	Flameless	100°C	1200°C	2700°C
Cd	2293	1:10	Flameless	100°C	250°C	2100°C
Cu	3262	1:10	Flame	--	--	--
Cr	3589	1:100	Flameless	100°C	1200°C	2700°C
Fe	2483	1:1000	Flame	--	--	--
Mn	2801	1:100	Flame	--	--	--
Ni	2330	1:10	Flame	--	--	--
Pb	2842	1:10	Flameless	100°C	550°C	2000°C
V	3194	1:10	Flameless	100°C	1700°C	2700°C
Zn	2146	1:100	Flame	--	--	--

lowed by the addition in sequence of 3 ml of 12N HCL, 1 ml HF, 10 ml of 8N HNO_3, and 1 ml 12N HCL. One (1) ml of 16N HNO_3 was added to the residue, and it was diluted to a total volume of 10 ml. This solution was analyzed by atomic absorption. The instrument settings are given in Table 2.

Total Biological Material

Duplicate 0.5 g, freeze-dried, homogenized samples were placed into 50 ml teflon beakers, and 6 ml of 3 to 1 concentrated HCL: HNO_3 mixture were added. The sample was covered with a watch glass and allowed to digest at room temperature overnight or until the sample ceased to foam or bubble. It was then slowly heated for 1 1/2 hours and evaporated to near dryness. To this solution, 30% H_2O_2 was added until the resulting solution was clear to yellow. Again the sample was taken to near dryness by repeating the last process. To the residue, 5 ml of 16N HNO_3 were added, and the solution was transferred to a 25 ml volumetric flask, brought to volume with 1 to 1 HNO_3 and filtered through a 0.4 μm NUCLEOPORE filter. The solution was analyzed by atomic absorption methods. The instrument settings are given in Table 2.

RESULTS

Intercalibration

The results of the intercalibration and standardization are given in Table 3. For most elements, very good agreement between laboratories is indicated. The only apparent exception is chromium in the organic material. The Corpus Christi laboratory obtained amounts that were higher than those reported by Texas A&M and those certified by the National Bureau of Standards. As these samples were analyzed by both the direct method and the method of additions with consistent results, we feel our values are

TABLE 3

INTERCALIBRATION SAMPLES

Lab	Ba	Cd	Cr	Cu	Fe	Mn	Ni	Pb	V	Zn
MAG I										
USGS, Corpus Christi	540±1	0.27±.07	108±3	29.0±5	51200±300	666±20	64.5±10	19.7±2	128±8	139±8
Texas A&M	-	-	120±5	30.3±0.6	49300±200	762±24	61.5±3	28.8±2.2	-	140±3
Prof. Paper 841	493	-	121±20	48.8	52400	-	50.7	20.4	132	102
G-2										
USGS, Corpus Christi	1434	0.11	10.3	7.5	-	-	4.3	25.8	-	87.1
Prof. Paper 841	1532	-	8.0	9.7	24400	410	2.4	31.3	44.6	68.2
STOCS I/III										
USGS, Corpus Christi	528±80	0.24±.04	64±1	16.4±3	32800	404	35.4±6	16.4±8	99±8	92±2
Texas A&M	-	-	71±5	17.5±.2	32100±200	468±1	30.9±1	25±1	-	87±2
#4922 Starfish										
USGS, Corpus Christi	-	0.34±.08	4.4±1.0	7.3±1.0	223±20	189±70	1.8±0.2	0.74	-	41.8
Texas A&M	-	0.40	0.6	14	273	-	-	0.9	-	-
#4517 Shrimp										
USGS, Corpus Christi	-	0.02±.01	3.6±0.5	17.3±18	104±13	0.8±0.03	2.0±.3	0.1±.03	-	47.7
Texas A&M	-	0.04	-	20	-	-	-	0.1	-	-
#4924 Shrimp										
USGS, Corpus Christi	-	0.05±0.01	3.6±0.2	12.6±0.7	60±8	1.0±.08	2.4±0.3	.29±.16	-	45.4
Texas A&M	-	0.05	-	15	-	-	-	.2	-	-
Zooplankton										
USGS, Corpus Christi	-	0.32±.02	7.8±1.0	28±0.3	170±36	5.50±0.55	3.1±1.1	0.36±14	-	61.2±5
Texas A&M	-	0.40	-	35	-	-	-	0.3		49

valid. The discrepancy may be due to differences in the splits analyzed. The sample exchanged between laboratories (the composite sediment; the shrimp and zooplankton) may have a slightly wider variation because of the lack of stringent homogenization. For example, in the case of the starfish, two individuals were analyzed; some variation would be expected in this case.

Seasonal Sediment Samples

The results of the analyses from the three seasonal samples are listed in Table 4. The samples were analyzed in duplicate and Table 5 lists the percent deviation for each element.

DISCUSSION

Areal Variation

During the summer cruises, subsamples of the four samples taken at each station were analyzed along with a composite of the four samples. This procedure permitted an excellent opportunity to investigate site variability. Figures 5 through 14 show graphically the variability at each site. The graphs were constructed by plotting the average of the four individual samples along the x-axis against the value for each sample and for the composite. In this manner the variability of the elements is visually displayed. If no significant variability exists, all values should fall along or close to a 1 to 1 line. The graphed results show very close agreement, especially with respect to the composite sample. The few individual samples that fall outside the 10% envelope (the divergent lines on the graphs) are those taken nearest the shore where the texture of the sediment is highly variable.

TABLE 4

SEASONAL SEDIMENT SAMPLES

Explanation to Table:

Column 1 - Sample Number

Column 2 - Barium

Column 3 - Cadmium

Column 4 - Chromium

Column 5 - Copper

Column 6 - Iron

Column 7 - Manganese

Column 8 - Nickel

Column 9 - Lead

Column 10- Vanadium

Column 11- Zinc

TABLE 4 CONT.'D

University of Texas - Season I

1		2	3	4	5	6	7	8	9	10	11
1/I	HAT	91.9	0.16	15.9	4.6	17500	312	16.4	4.8	13.1	52.1
2/I	HCO	66.3	0.11	23.6	6.4	21500	287	16.2	6.7	15.5	70.0
3/I	HDX	145.9	0.14	37.7	6.6	19700	321	20.0	5.6	16.1	75.4
4/I	HFE	104.0	0.15	18.9	5.6	23300	379	12.9	7.0	11.0	56.0
5/I	HGE	43.0	0.07	24.9	6.3	19300	285	17.4	10.0	14.0	81.3
6/I	HHE	40.6	0.10	34.3	5.8	19000	306	17.2	9.8	11.5	66.7
1/II	HIP	114.3	0.12	29.6	6.4	19300	291	12.6	5.5	13.2	57.0
2/II	HKG	54.1	0.07	19.9	5.4	19000	262	11.7	5.3	15.4	64.8
3/II	HLP	85.9	0.20	29.6	6.4	20500	311	16.3	6.8	15.9	75.0
4/II	HMX	65.1	0.09	13.4	4.5	10500	252	12.6	5.7	11.0	51.0
5/II	HOE	42.8	0.09	32.1	5.6	19700	301	13.7	7.0	13.4	65.6
6/II	HPO	46.9	0.11	25.4	6.5	19900	341	19.6	14.9	13.7	81.4
1/III	HUC	100.5	0.13	21.3	6.6	19700	325	15.6	9.0	14.8	63.9
2/III	IAE	72.9	0.10	33.1	6.6	19900	320	17.4	6.2	16.3	71.2
3/III	ICE	61.1	0.17	21.8	6.6	20900	325	18.0	7.6	18.1	74.4
4/III	IEA	32.8	0.04	14.5	1.4	21100	222	5.5	2.4	6.7	28.1
5/III	IFN	70.0	0.11	37.8	7.2	16400	343	15.8	9.4	15.1	72.2
6/III	IHF	48.7	0.13	28.9	6.8	19600	530	17.4	13.6	16.8	82.0
1/IV	IIY	123.2	0.15	20.0	5.3	16400	282	14.0	6.0	13.6	55.3
2/IV	ILE	58.2	0.12	23.8	6.3	19600	299	22.8	7.0	17.3	67.6
3/IV	INB	79.7	0.13	18.7	5.9	19300	370	14.8	7.3	16.5	65.5
4/IV	IOY	113.8	0.19	18.8	4.5	17500	305	9.3	4.2	17.6	43.4
5/IV	IQJ	67.7	0.10	21.5	6.3	21500	334	13.2	9.0	13.7	66.7
6/IV	ISA	44.4	0.11	30.4	5.8	19700	339	14.3	11.7	16.0	67.2
7/IV	IUR	47.3	0.12	40.9	7.2	20500	560	17.9	12.0	15.1	82.6
SB1	JEG	113.6	0.07	31.7	5.5	19300	364	14.4	11.4	15.7	66.5
SB2	JFN	99.9	0.10	31.3	7.2	23300	373	18.9	16.5	19.0	81.5
HR1	JHA	69.1	0.17	18.4	3.9	10500	369	9.6	6.8	16.8	46.4
HR2	JIO	74.1	0.09	27.6	6.6	21100	303	24.4	11.4	21.1	74.6

TABLE 4 CONT.'D

University of Texas - Season II

1		2	3	4	5	6	7	8	9	10	11
1/I	LYF	85.9	0.19	22.0	5.5	18500	288	12.7	9.7	14.8	55.5
	LYG	43.7	0.15	15.9	4.0	13300	221	9.8	2.9	11.1	39.6
	LYH	107.6	0.17	19.1	5.3	15600	275	11.4	5.3	12.3	47.1
	LYI	103.0	0.16	17.6	4.7	16200	259	10.7	5.3	12.5	46.9
	AVG.	85.1	0.17	18.7	4.9	15900	261	11.1	5.8	12.7	47.3
	LYJ	84.0	0.17	19.3	4.8	16300	265	11.1	5.1	12.2	45.9
2/I	MAF	62.1	0.18	21.2	5.5	20500	264	13.6	6.7	13.8	55.3
	MAG	61.0	0.20	24.1	4.9	21000	296	15.0	7.3	14.4	57.3
	MAH	58.0	0.19	26.1	5.7	21900	310	14.6	9.3	20.0	62.8
	MAI	69.0	0.19	24.1	5.2	20200	314	14.0	8.1	17.5	57.6
	AVE.	62.5	0.19	23.9	5.3	20900	296	14.3	7.8	16.4	58.3
	MAJ	68.4	0.20	24.0	5.1	20400	287	13.9	8.1	17.8	57.5
3/I	MCC	57.7	0.28	31.9	7.0	22900	348	17.0	6.3	28.4	69.5
	MCD	41.1	0.28	23.6	7.0	20800	333	17.3	6.0	21.0	61.0
	MCE	45.6	0.28	28.3	6.8	23500	338	16.8	5.8	23.5	67.6
	MCF	48.6	0.29	29.0	7.2	24200	328	18.9	7.7	26.4	70.9
	AVE.	48.3	0.28	28.2	7.0	22900	337	17.5	6.4	24.8	67.3
	MCG	47.5	0.28	25.7	6.4	21200	322	16.4	6.4	22.7	62.6
4/I	MDW	29.1	0.16	8.0	2.3	7600	170	5.4	2.1	10.4	26.7
	MDX	34.8	0.14	8.2	2.3	7800	195	5.1	2.4	9.9	26.4
	MDY	36.4	0.18	9.8	2.8	9700	218	6.1	3.3	10.9	31.1
	MDZ	51.0	0.17	11.8	3.5	12900	263	7.2	4.0	10.1	35.6
	AVG.	37.8	0.16	9.5	2.7	9500	212	6.0	2.9	10.3	30.0
	MEA	43.6	0.17	9.4	2.9	9500	191	6.1	3.1	12.2	30.3
5/I	MFQ	51.2	0.26	27.2	6.1	23100	294	12.9	8.4	20.4	68.3
	MFR	47.7	0.26	29.3	6.1	25500	312	14.4	10.3	20.6	76.7
	MFS	58.4	0.27	30.6	7.0	28200	334	14.9	11.9	23.1	82.4
	MFT	44.6	0.26	29.0	6.7	25000	308	15.0	9.6	20.3	77.5
	AVG.	50.5	0.26	29.0	6.5	25400	312	14.3	10.1	21.1	76.2
	MFU	48.3	0.27	27.7	6.7	23300	319	14.2	9.5	21.9	72.6

TABLE 4 CONT.'D

University of Texas - Season II

1		2	3	4	5	6	7	8	9	10	11
6/I	MHK	36.4	0.20	23.5	4.9	18300	293	12.7	6.1	23.4	58.9
	MHL	39.9	0.20	25.0	7.6	20600	303	14.0	6.8	23.2	59.2
	MHM	41.7	0.21	19.5	4.5	16900	244	11.8	8.3	18.2	49.4
	MHN	42.8	0.21	23.6	5.1	19000	280	12.9	7.3	26.3	61.3
	AVG.	40.2	0.21	22.9	5.5	18700	280	12.9	7.1	22.8	57.2
	MHO	35.9	0.21	23.0	4.9	19100	289	13.7	6.5	27.4	59.8
1/II	MJE	93.1	0.17	16.5	5.4	18800	316	12.1	7.3	17.6	53.3
	MJF	70.5	0.17	13.5	4.3	16000	298	10.9	6.1	15.4	50.2
	MJG	94.8	0.18	15.4	5.2	17800	314	12.0	7.4	16.6	57.2
	MJH	53.3	0.11	8.3	2.8	11700	188	7.3	4.9	11.3	37.6
	AVG.	77.9	0.16	13.4	4.4	16100	279	10.6	6.4	15.2	49.6
	MJI	89.6	0.16	14.2	4.5	16300	283	10.9	6.9	15.4	48.7
2/II	MLG	66.8	0.18	20.4	4.8	19100	288	12.5	7.0	19.5	63.4
	MLH	59.5	0.17	17.1	5.0	18600	300	12.5	6.9	14.7	56.1
	MLI	75.3	0.18	17.6	5.4	18800	307	12.7	7.6	15.0	56.2
	MLJ	63.6	0.18	17.3	5.0	18700	282	12.3	7.4	14.0	53.2
	AVG.	66.3	0.18	18.2	5.1	18800	294	12.5	7.2	15.8	57.2
	MLR	75.3	0.19	18.7	5.3	18700	296	10.7	7.7	14.0	54.6
3/II	MNH	51.5	0.27	34.6	6.7	22800	390	17.0	6.7	16.9	72.8
	MNI	50.4	0.23	32.4	6.7	23600	356	16.7	6.9	17.5	73.1
	MNJ	66.9	0.24	36.1	7.0	25800	372	16.3	9.4	18.2	75.2
	MNK	46.4	0.24	34.0	7.2	26300	500	18.2	6.3	19.4	80.8
	AVG.	53.8	0.25	34.3	6.9	24600	405	17.1	7.3	18.0	75.5
	MNL	51.7	0.23	36.0	6.8	24400	411	16.1	5.5	19.1	80.7
4/II	MPB	91.1	0.20	23.1	5.7	21700	323	14.2	5.2	14.7	63.3
	MPC	90.4	0.19	22.0	5.4	20000	324	13.2	4.7	13.7	59.1
	MPD	104.8	0.19	27.6	6.1	21600	337	13.5	5.5	15.7	67.5
	MPE	88.2	0.19	26.8	5.5	20000	329	13.9	5.3	15.2	62.0
	AVG.	93.6	0.19	24.9	5.6	20800	328	13.7	5.2	14.8	63.0
	MPF	82.8	0.19	23.5	5.4	21300	328	14.1	4.7	13.3	60.1

TABLE 4 CONT.'D

University of Texas - Season II

	1	2	3	4	5	6	7	8	9	10	11
5/II	MQT	75.4	0.23	25.0	5.0	20500	318	13.3	5.6	15.6	63.6
	MQU	55.3	0.21	21.2	4.5	18100	291	12.8	5.7	14.9	54.7
	MQV	94.9	0.21	26.5	5.8	20600	314	15.9	6.2	18.2	67.7
	MQW	70.6	0.22	26.7	5.6	21600	296	14.8	5.0	17.5	64.0
	AVG.	74.1	0.22	24.9	5.3	20200	305	14.2	5.6	16.6	62.5
	MQX	67.8	0.22	25.7	5.5	21400	302	15.7	6.1	15.0	67.2
6/II	MSL	76.2	0.24	29.3	6.1	22900	333	17.6	5.2	20.1	68.3
	MSM	71.3	0.23	31.3	6.2	23900	346	16.7	5.4	17.6	78.0
	MSN	66.0	0.22	31.2	6.0	22500	328	15.4	5.3	17.2	68.9
	MSO	60.5	0.23	30.9	5.5	21800	339	14.6	5.2	19.0	67.7
	AVG.	68.5	0.23	30.7	6.0	22800	339	16.1	5.3	18.5	70.7
	MSP	58.8	0.23	30.9	6.0	21700	327	15.6	5.6	19.0	66.1
1/III	MXH	134.3	0.21	23.3	6.7	23100	353	16.3	6.4	14.1	60.9
	MXI	97.7	0.22	21.1	6.8	22300	328	14.9	5.5	13.7	63.7
	MXJ	144.3	0.23	23.0	6.4	18500	342	13.1	5.4	16.2	61.1
	MXK	151.1	0.23	24.0	6.9	21600	355	15.8	6.1	14.6	61.3
	AVG.	131.9	0.22	22.9	6.7	21400	345	15.0	5.8	14.7	61.8
	MXL	110.9	0.22	22.5	6.3	20200	340	14.2	5.8	15.5	61.4
2/III	MZH	138.0	0.21	29.6	6.4	21900	363	16.7	8.4	22.4	76.7
	MZI	169.5	0.24	32.2	8.1	27800	448	19.4	9.0	20.4	86.4
	MZJ	182.1	0.26	23.8	6.2	19600	434	14.7	5.8	16.9	67.0
	MZK	60.2	0.24	27.3	7.4	21600	479	16.8	9.1	17.3	74.5
	AVG.	137.5	0.24	28.2	7.0	22700	431	16.9	8.1	19.2	76.2
	MZL	139.6	0.24	26.9	7.3	22000	425	18.1	8.9	18.4	70.9
3/III	NBE	40.6	0.24	25.1	8.0	24500	411	18.8	9.0	19.0	78.8
	NBF	37.2	0.23	26.8	7.0	22800	379	18.7	11.8	22.5	75.6
	NBG	41.1	0.17	28.1	7.5	24400	392	18.0	8.2	20.2	75.7
	NBH	37.1	0.18	29.5	6.7	21800	376	16.4	7.3	19.7	73.6
	AVG.	39.0	0.20	27.4	7.3	23400	390	18.0	9.1	20.6	75.9
	NBI	34.9	0.18	28.5	7.4	22300	382	17.1	7.6	20.8	75.3

TABLE 4 CONT.'D

University of Texas - Season II

	1	2	3	4	5	6	7	8	9	10	11
4/III	NCY	15.1	0.06	4.6	0.8	4900	299	3.8	1.7	6.4	21.6
	NCZ	16.8	0.09	6.4	1.2	5800	170	4.4	2.3	7.1	22.3
	NDA	14.2	0.06	4.5	0.6	4600	247	3.6	1.8	5.5	20.9
	NDB	20.4	0.10	5.3	1.5	6700	241	5.2	2.5	7.3	27.6
	AVG.	16.6	0.08	5.2	1.0	5500	239	4.3	2.1	6.6	23.1
	NDC	21.0	0.08	5.0	1.0	5500	251	3.7	2.0	7.1	26.2
5/III	NES	44.0	0.19	23.2	5.9	19500	350	15.1	6.0	16.6	67.6
	NET	46.6	0.19	29.9	6.7	21100	363	22.4	7.2	17.9	73.4
	NEU	54.0		28.1		25400	413			14.9	82.4
	NEV	46.3	0.20	28.0	6.2	20000	340	15.6	7.1	18.2	68.9
	AVG.	47.7	0.20	27.3	6.3	21500	366	17.7	6.8	16.9	73.1
	NEW	47.2	0.20	27.1	6.5	20400	348	18.9	6.9	18.5	71.3
6/III	NGK	37.1	0.18	29.4	6.8	22600	368	18.3	7.8	19.7	78.8
	NGL	35.7	0.20	31.3	6.4	23200	403	18.5	6.6	30.6	80.8
	NGM	33.9	0.20	31.4	6.2	22400	341	18.9	6.6	26.4	81.2
	NGN	40.5	0.20	31.5	6.3	23800	357	17.5	6.8	22.4	78.1
	AVG.	36.8	0.20	30.9	6.4	23000	367	18.3	7.0	24.8	80.0
	NGO	34.5	0.20	32.0	6.2	23200	369	18.3	6.9	24.2	81.5
1/IV	NIE	22.3	0.15	6.7	1.4	5200	118	3.0	1.9	10.4	23.8
	NIF	29.3	0.15	9.0	1.6	5800	110	4.0	2.2	10.7	16.8
	NIG	25.7	0.15	9.5	2.0	6800	131	5.3	2.4	11.1	22.9
	NIH	23.5	0.17	10.8	1.9	6300	136	5.2	2.7	12.2	22.6
	AVG.	25.2	0.16	9.0	1.7	6000	123	4.4	2.3	11.1	21.5
	NII	24.5	0.15	9.8	1.9	6000	133	5.0	2.4	11.7	25.4
2/IV	NKE	19.5	0.15	17.8	3.8	14100	190	8.7	4.1	16.9	47.0
	NKF	19.8	0.16	16.0	3.4	12500	195	8.2	4.0	13.6	37.8
	NKG	21.5	0.16	14.6	2.7	10600	183	6.8	4.1	14.6	33.5
	NKH	23.1	0.16	17.6	4.1	14300	211	9.7	4.6	16.1	41.2
	AVG.	21.0	0.16	16.5	3.5	12900	195	8.4	4.2	15.3	39.9
	NKI	25.4	0.16	15.6	3.5	12600	189	9.4	5.5	15.2	39.0

TABLE 4 CONT.'D

University of Texas - Season II

1		2	3	4	5	6	7	8	9	10	11
3/IV	NMB	39.1	0.19	28.1	6.0	20800	353	16.9	6.4	22.7	70.6
	NMC	37.0	0.18	28.3	6.1	23000	377	17.1	6.5	19.4	75.0
	NMD	34.4	0.18	27.8	6.0	22700	385	16.7	6.7	17.0	74.9
	NME	39.3	0.17	28.2	6.5	22400	409	17.6	7.9	17.4	73.7
	AVG.	37.5	0.18	28.1	6.2	22200	381	17.1	6.9	19.1	73.6
	NMF	38.3	0.18	28.8	6.5	22900	381	17.6	6.7	21.9	74.9
4/IV	NNV	28.3	0.08	5.3	1.4	5400	112	4.3	2.2	8.5	16.1
	NNW	24.9	0.08	4.8	0.9	4700	121	3.4	2.0	8.2	13.8
	NNX	26.3	0.08	5.0	0.9	4500	124	3.7	2.4	7.7	15.7
	NNY	24.2	0.10	7.3	1.4	5700	127	3.9	2.2	9.7	15.4
	AVG.	25.6	0.09	5.6	1.2	5100	121	3.8	2.2	8.5	14.7
	NNZ	26.9	0.08	5.2	1.1	4800	111	3.4	2.5	8.5	14.0
5/IV	NPN	37.3	0.13	12.7	3.2	9900	191	7.4	3.6	12.1	32.2
	NPO	35.4	0.13	12.8	3.1	9200	181	6.5	2.9	13.6	27.7
	NPP	45.4	0.12	12.5	3.2	8900	172	6.7	2.9	11.3	32.5
	NPQ	46.2	0.14	14.2	3.4	9500	195	7.0	3.0	13.4	35.5
	AVG.	41.1	0.13	13.1	3.2	9400	185	6.9	3.1	12.6	32.0
	NPR	49.6	0.13	13.8	3.3	9400	190	7.8	2.9	12.1	30.4
6/IV	NRF	38.5	0.16	23.2	4.9	17300	252	13.9	3.9	14.9	52.5
	NRG	32.8	0.17	26.8	4.5	19000	289	15.2	4.7	15.2	62.4
	NRH	28.6	0.12	13.9	3.0	10400	246	7.8	3.5	11.3	30.8
	NRI	35.7	0.15	19.7	4.4	15100	302	11.4	3.6	12.3	44.4
	AVG.	33.9	0.15	20.9	4.2	15500	272	12.1	3.9	13.4	47.5
	NRJ	27.6	0.16	20.2	4.7	17300	267	12.0	4.0	14.4	48.7
7/IV	NSX	38.0	0.19	32.9	7.1	24100	531	18.7	10.3	18.2	79.9
	NSY	37.9	0.20	32.4	6.9	25700	497	19.1	5.6	19.0	78.3
	NSZ	43.9	0.23	36.1	7.6	26600	624	20.8	5.6	23.2	84.4
	NTA	46.5	0.21	30.3	6.9	23100	568	18.3	6.5	18.9	76.9
	AVG.	41.6	0.21	32.9	7.1	24900	486	19.2	7.0	19.8	79.9
	NTB	39.4	0.19	32.3	7.1	26600	564	19.0	5.5	19.7	79.4

TABLE 4 CONT.'D

University of Texas - Season III

1		2	3	4	5	6	7	8	9	10	11
1/I	QYY	103.0	0.08	12.1	4.5	15800	257	10.8	4.3	9.6	50.6
2/I	RAP	74.4	0.06	17.5	4.7	18900	239	14.8	6.9	13.8	58.8
3/I	RCS	54.9	0.09	26.3	6.9	21300	328	16.7	7.1	19.2	75.7
4/I	REJ	40.3	0.05	8.4	2.4	8800	194	6.2	2.3	9.2	30.1
5/I	RGA	77.2	0.09	31.0	6.4	24900	273	17.3	7.7	18.4	81.9
6/I	RHR	54.6	0.06	20.0	4.6	16800	251	11.8	4.9	13.9	58.7
1/II	RJS	102.7	0.08	17.9	5.1	19400	272	12.3	6.5	15.0	59.8
2/II	RLS	63.9	0.07	19.8	4.7	20000	264	13.9	6.1	14.3	61.6
3/II	RNR	67.2	0.37	26.7	6.4	22500	345	16.1	7.5	21.7	78.8
4/II	RPH	131.5	0.08	23.7	5.3	19600	299	14.8	7.0	15.8	66.1
5/II	RQQ	71.7	0.08	23.6	5.5	21100	294	16.9	7.3	19.5	70.7
6/II	RSA	65.7	0.08	26.7	6.2	23900	305	20.9	7.6	17.6	79.9
1/III	RTL	77.3	0.10	24.3	5.4	23300	280	15.3	8.0	19.4	72.5
2/III	RVJ	55.2	0.09	22.8	5.4	21700	287	14.2	6.7	17.1	72.8
3/III	RXL	84.0	0.13	34.0	6.8	24600	388	17.2	9.0	20.9	83.2
4/III	RZB	47.6	0.04	7.9	1.7	8300	247	6.0	2.2	11.8	30.2
5/III	SAK	103.4	0.09	28.1	6.5	23300	399	16.4	8.7	14.2	72.7
6/III	SBT	72.5	0.12	29.1	6.8	25000	321	16.6	7.7	21.4	81.7
1/IV	SDE	64.3	0.05	8.1	2.4	8500	132	6.0	2.3	9.6	27.1
2/IV	SFB	60.0	0.07	24.6	5.8	21700	298	14.3	7.7	17.4	69.0
3/IV	SHA	51.2	0.06	21.4	4.5	16100	248	11.0	5.4	19.3	53.7
4/IV	SIR	49.7	0.05	7.7	1.9	7400	168	4.8	2.0	13.0	24.1
5/IV	SKB	83.8	0.09	22.9	5.8	21200	276	13.7	8.2	17.3	66.7
6/IV	SLL	44.7	0.05	13.9	3.1	11000	200	8.2	3.7	9.7	37.8
7/IV	SMV	76.1	0.11	38.2	7.1	25500	444	16.5	9.1	18.3	84.3

TABLE 5

PERCENT DEVIATION OF DUPLICATE ANALYSES

Ba	9.0	Mn	2.2
Cd	4.6	Ni	6.1
Cr	6.0	Pb	5.4
Cu	5.3	V	6.9
Fe	4.7	Zn	4.3

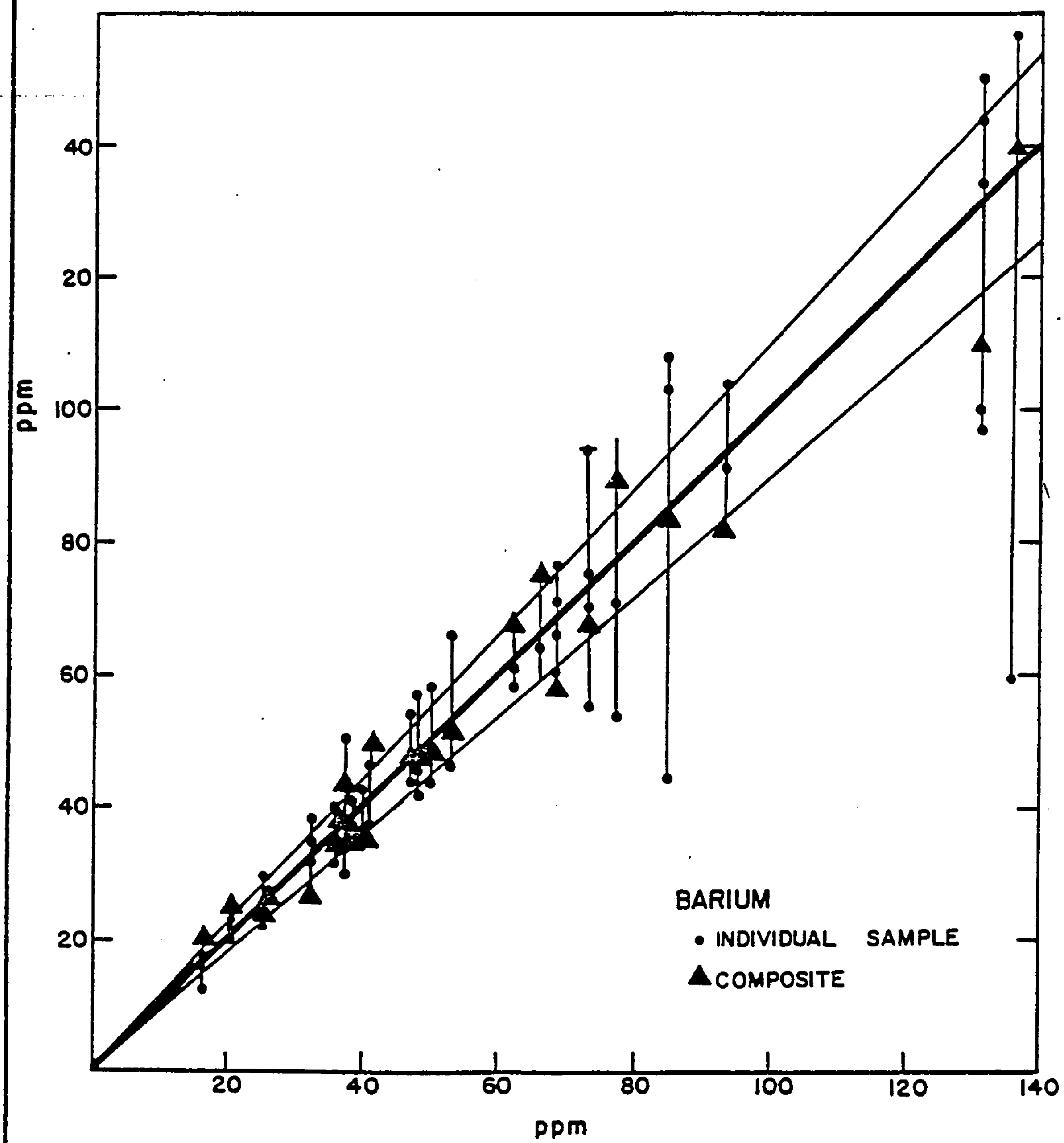

Figure 5. Variations in the Amounts of Barium in Benthic Sediments at Individual Stations, Summer Sampling Period.

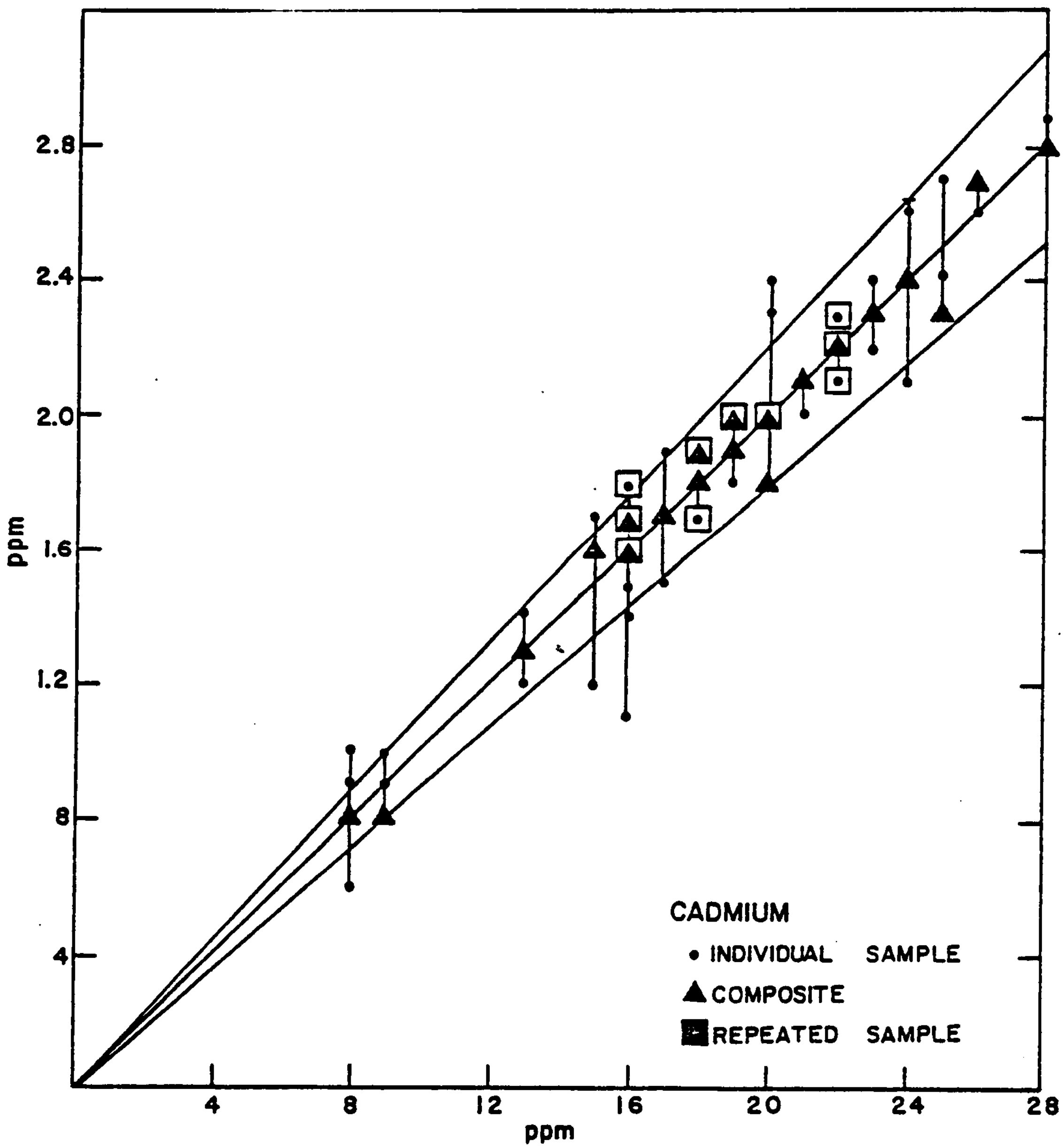

Figure 6. Variations in the Amounts of Cadmium in Benthic Sediments at Individual Stations, Summer Sampling Period.

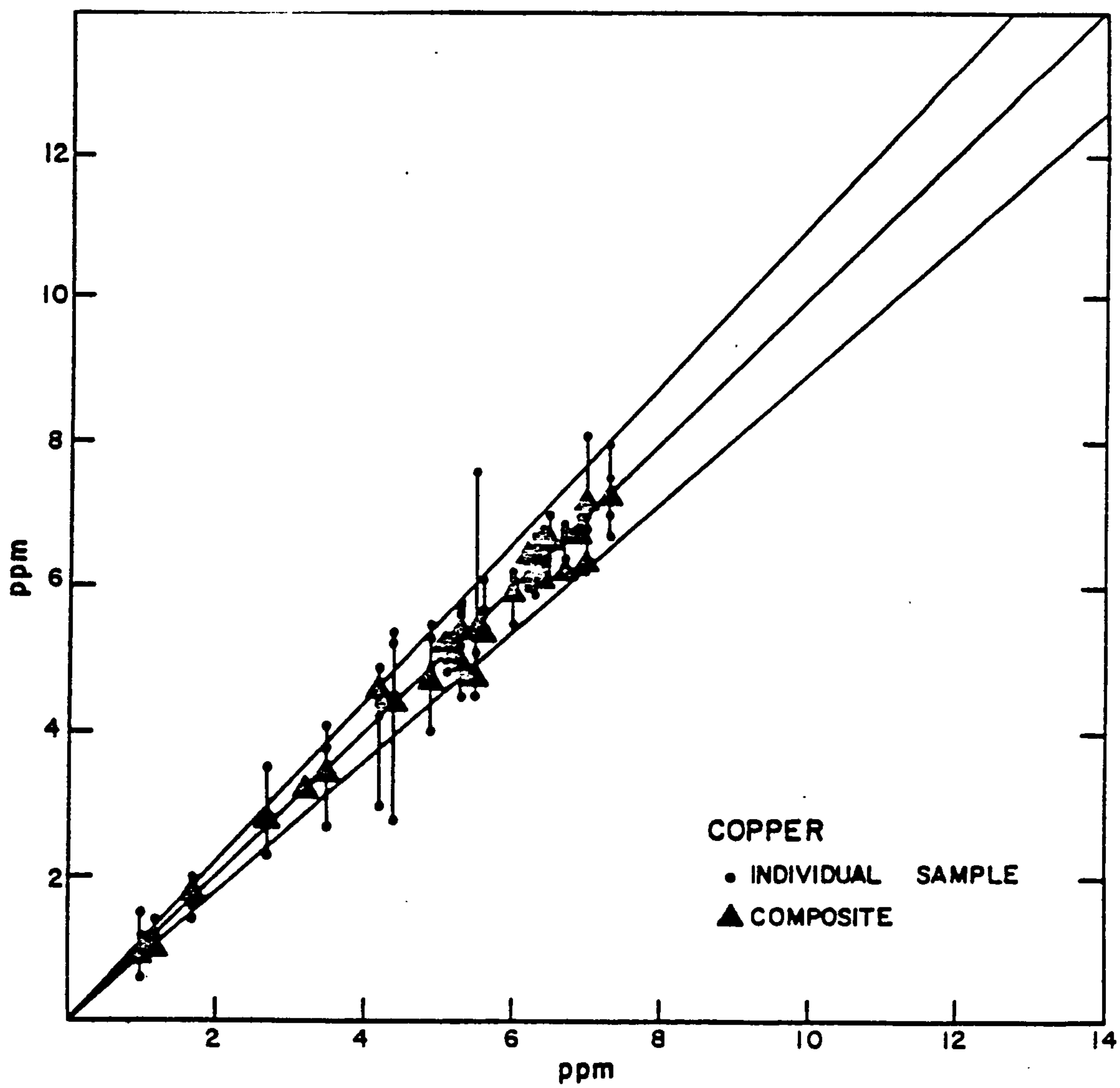

Figure 7. Variations in the Amounts of Copper in Benthic Sediments at Individual Stations, Summer Sampling Period.

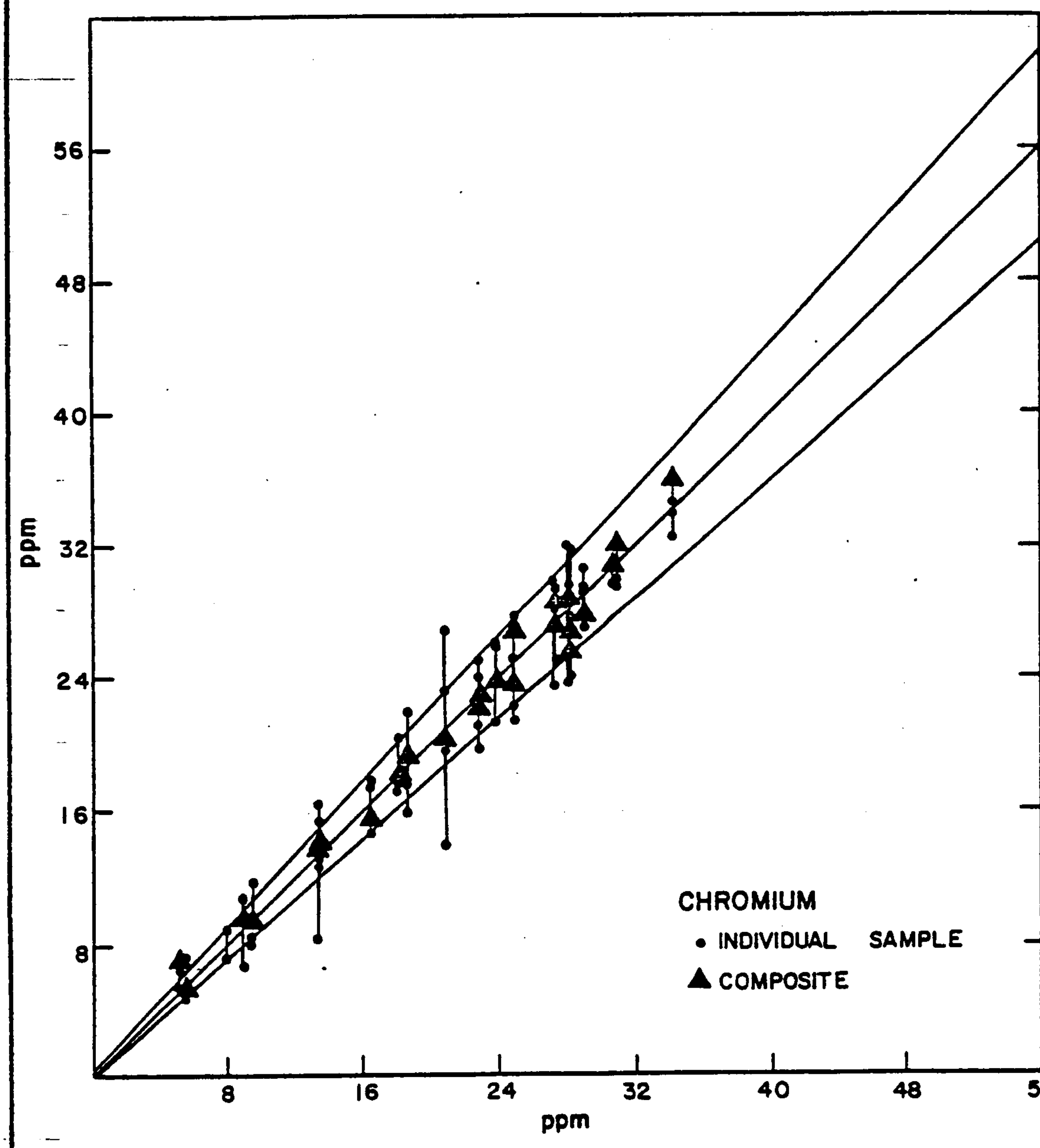

Figure 8. Variations in the Amounts of Chromium in Benthic Sediments at Individual Stations, Summer Sampling Period.

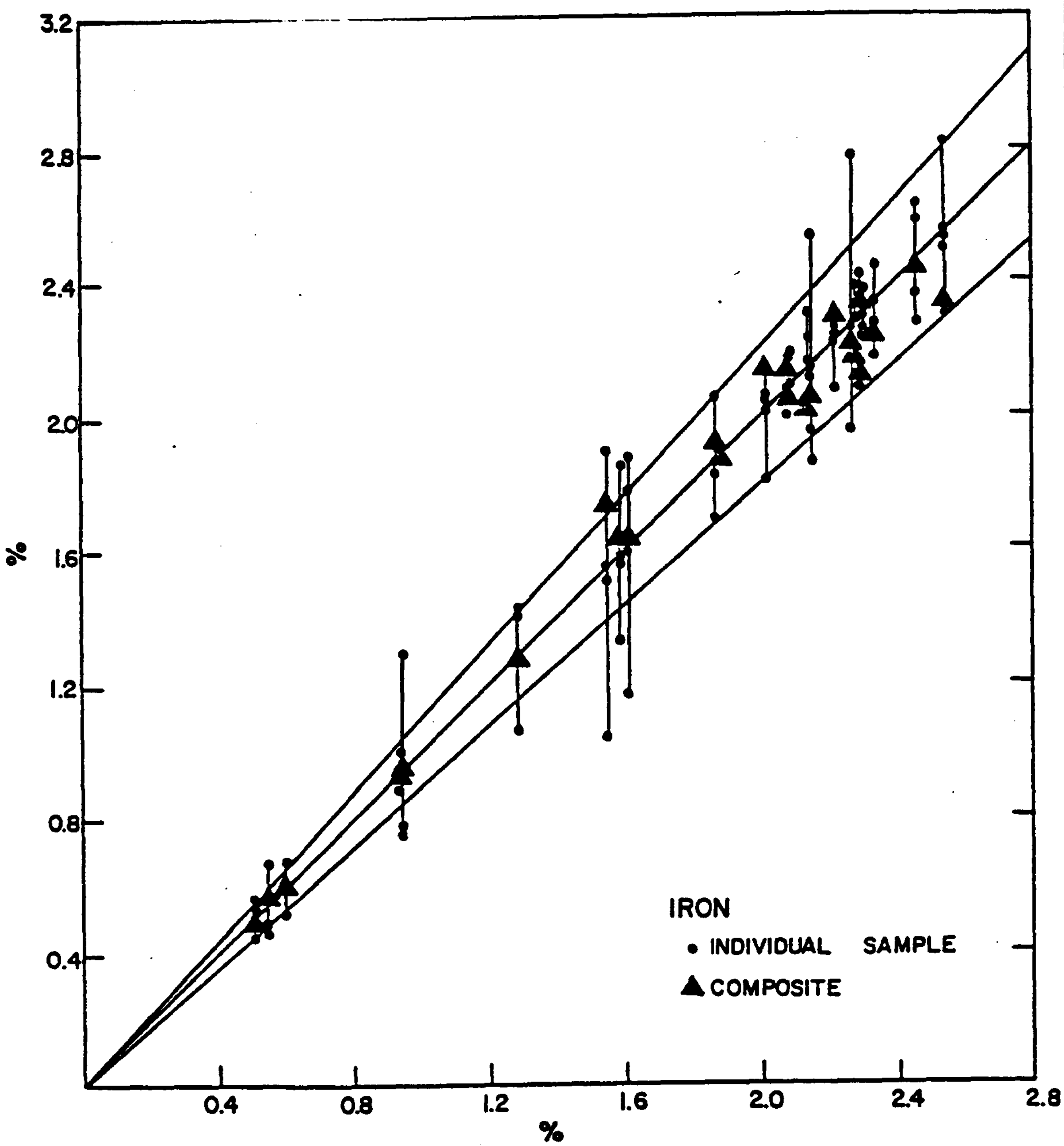

Figure 9. Variations in the Amounts of Iron in Benthic Sediments at Individual Stations, Summer Sampling Period.

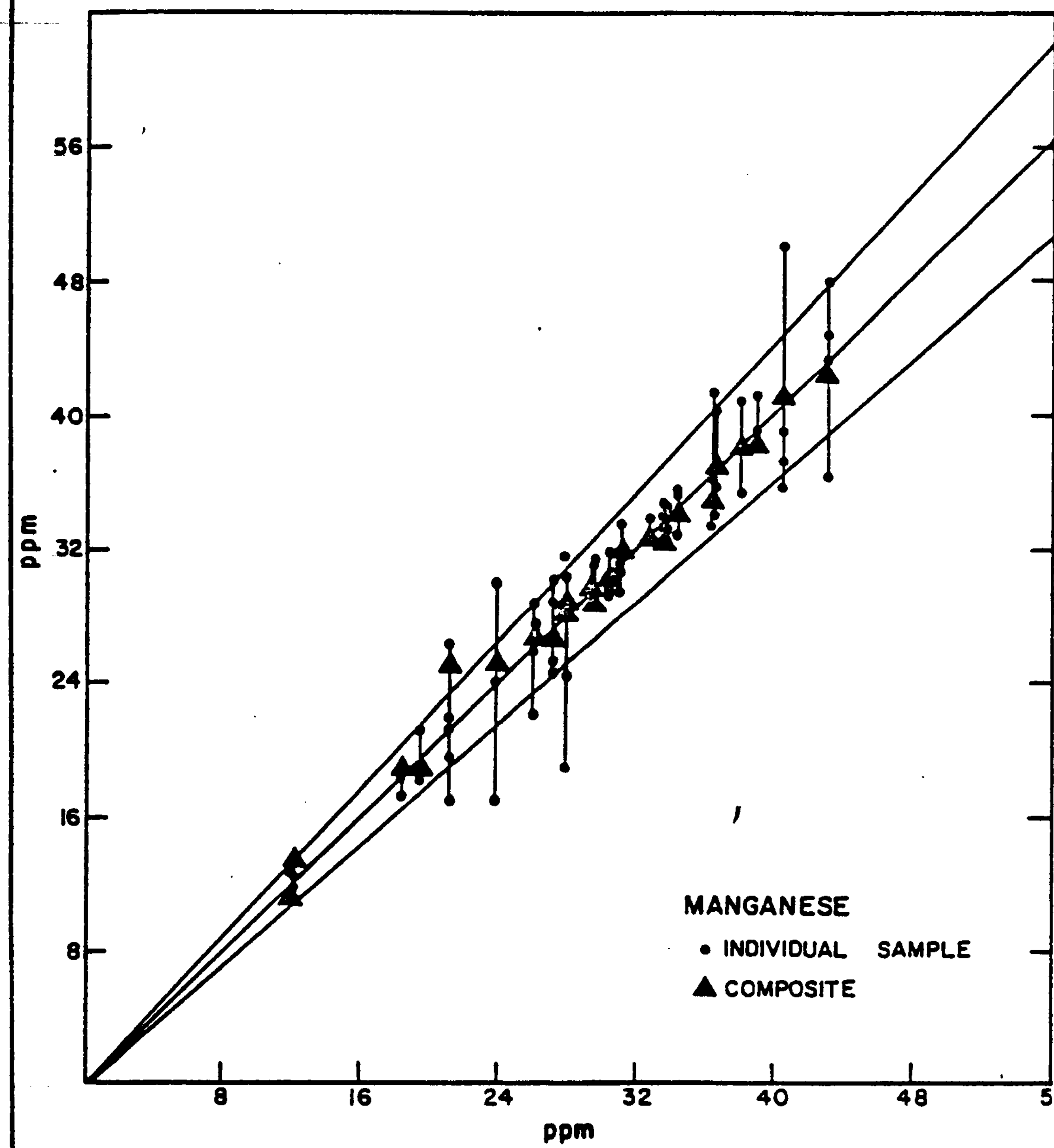

Figure 10. Variations in the Amounts of Manganese in Benthic Sediments at Individual Stations, Summer Sampling Period.

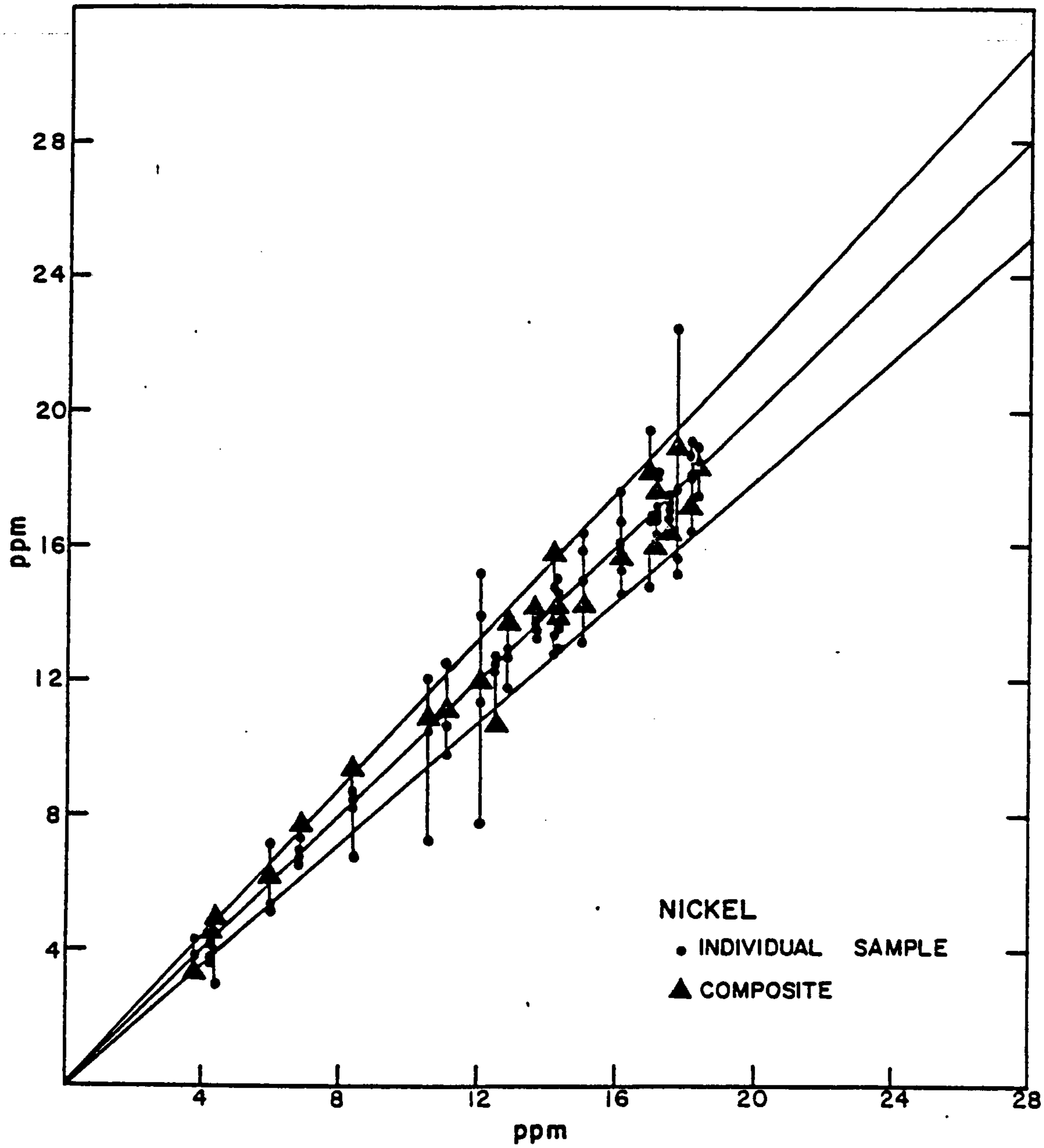

Figure 11. Variations in the Amounts of Nickel in Benthic Sediments at Individual Stations, Summer Sampling Period.

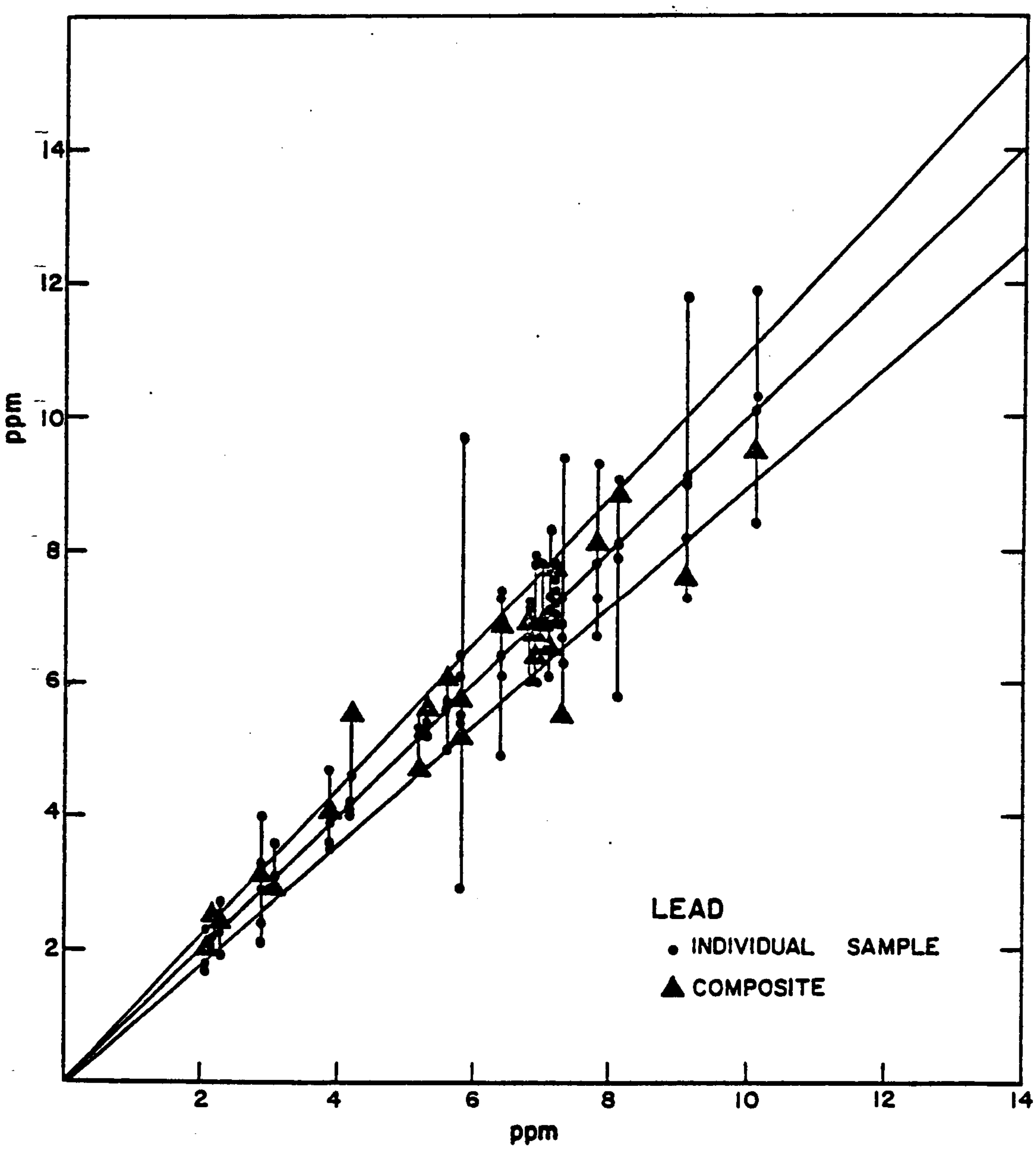

Figure 12. Variations in the Amounts of Lead in Benthic Sediments at Individual Stations, Summer Sampling Period.

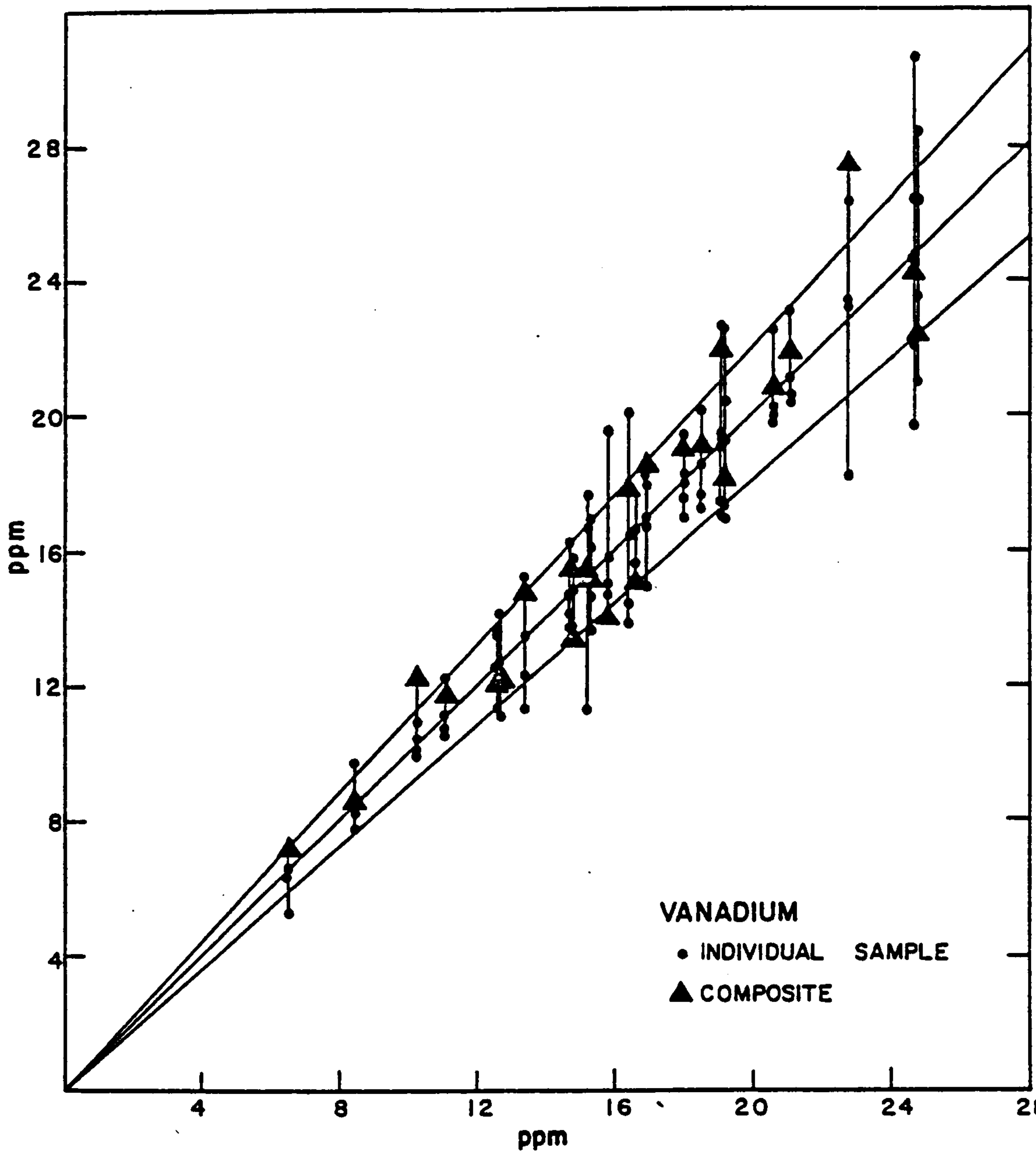

Figure 13. Variations in the Amounts of Vanadium in Benthic Sediments at Individual Stations, Summer Sampling Period.

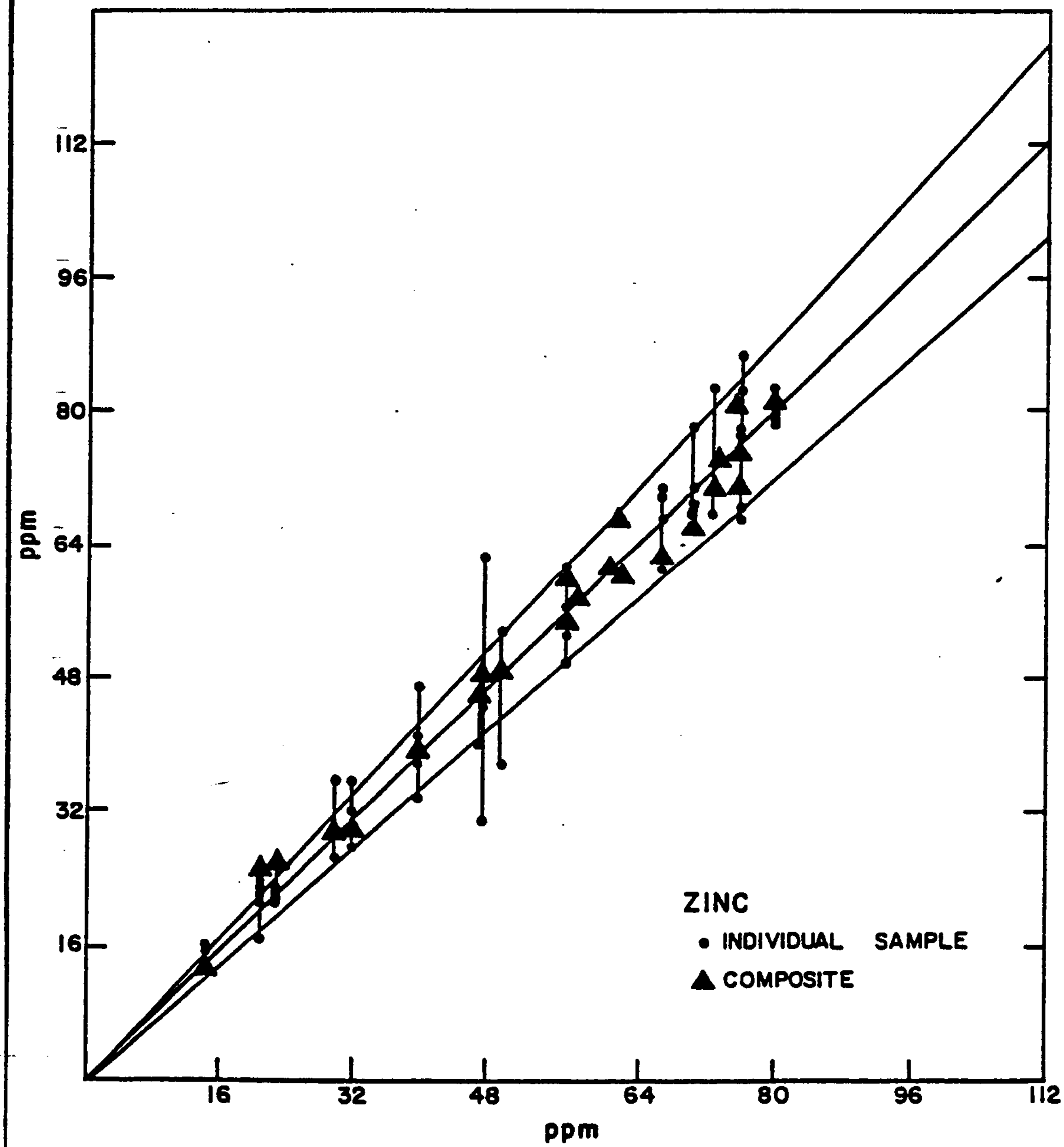

Figure 14. Variations in the Amounts of Zinc in Benthic Sediments at Individual Stations, Summer Sampling Period.

Seasonal Variability

As discussed above, the composite (the pooled sample from the four grabs taken at each station) was established as a good representative sample for the summer period at each location. As the samples analyzed for the winter and fall sampling period also were pooled from four individual grabs, it follows that these are also representative of the sampling station for the respective seasons.

The plots of a dispersion index (the standard deviation divided by the mean) for seasonal samples against those from a single station (those taken on the summer cruises) are shown by Figures 15 through 23. Cadmium was not plotted because of insufficient data for comparison. It no significant differences between the seasonal and areal sampling existed, then the graphed values should fall along or near the 1 to 1 line. The graphs show that for all elements most of the analytical results fall above the line and close to the seasonal axis, indicating that variability on a seasonal basis is greater than the areal variability at a site. The analyses for two stations indicated a significant departure from the pattern of variability common to the other sites. Station 1/II, the innermost station on the transect that extends seaward from Port Aransas, had greater site variability than seasonal variability; in contrast, Station 6/IV, which lies at the outer edge of the ancestral Rio Grande delta, had significantly higher seasonal variability than other stations.

As each season's samples were analyzed when they were submitted to the laboratory, there was a possibility that the variations indicated were caused by inadvertent variations in laboratory processing and procedures. To test this possibility, 10 samples from the different sampling periods were reanalyzed and the results are listed in Table 6. The results docu-

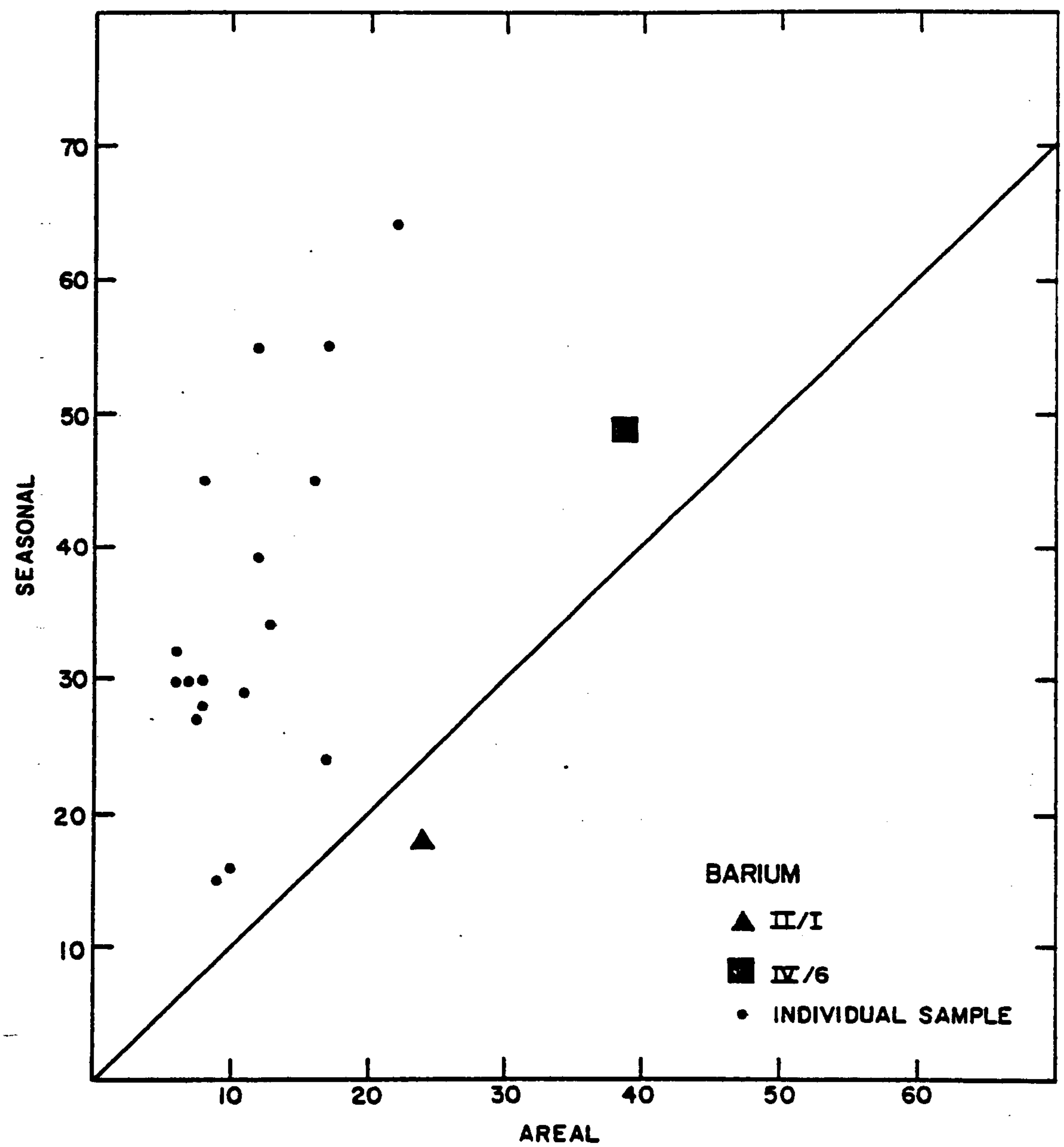

Figure 15. Plot of Dispersion Indices, Seasonal Versus Areal Distribution, for Barium in Benthic Sediments.

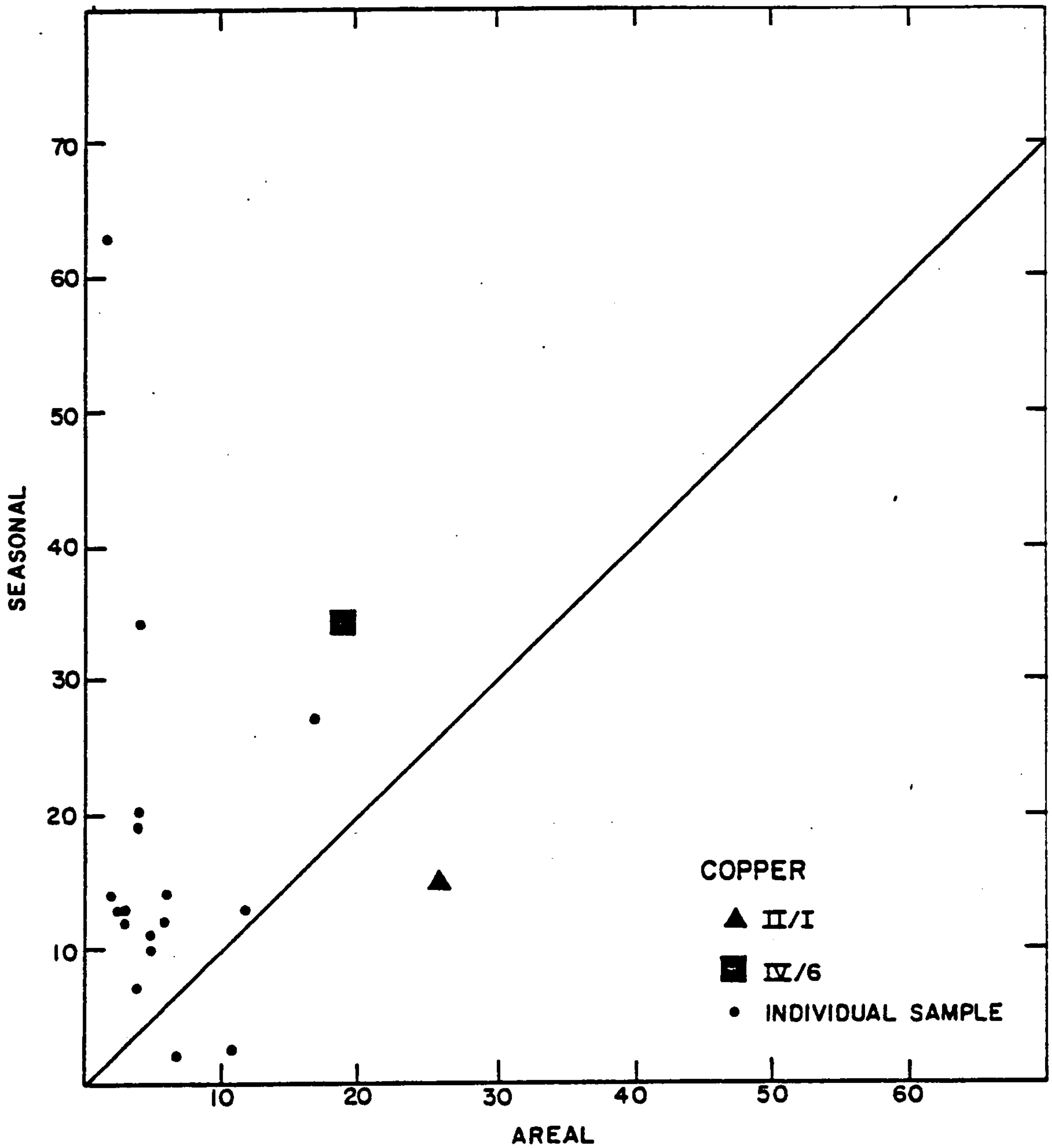

Figure 16. Plot of Dispersion Indices, Seasonal Versus Areal Distribution, for Copper in Benthic Sediments.

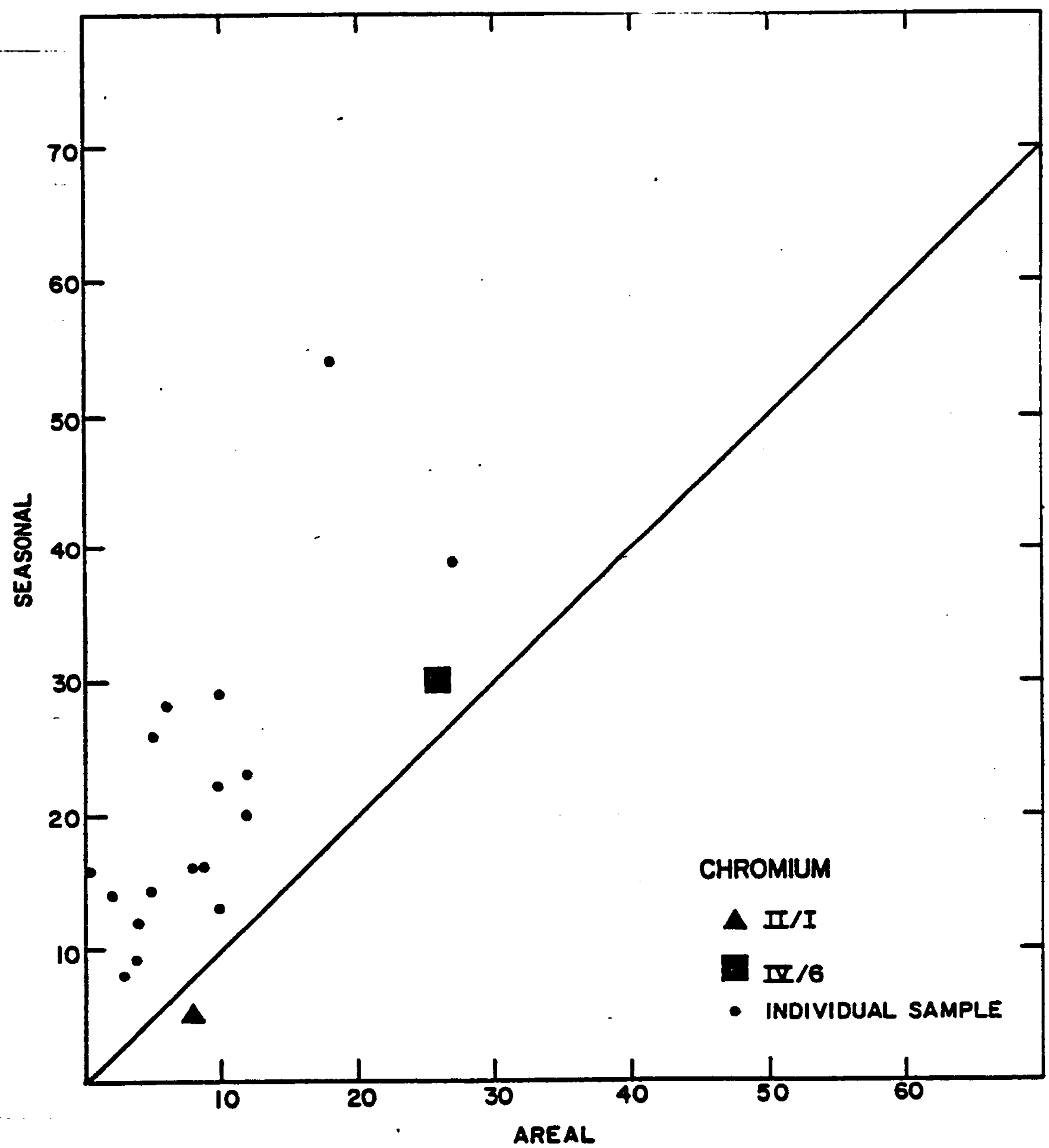

Figure 17. Plot of Dispersion Indices, Seasonal Versus Areal Distribution, for Chromium in Benthic Sediments.

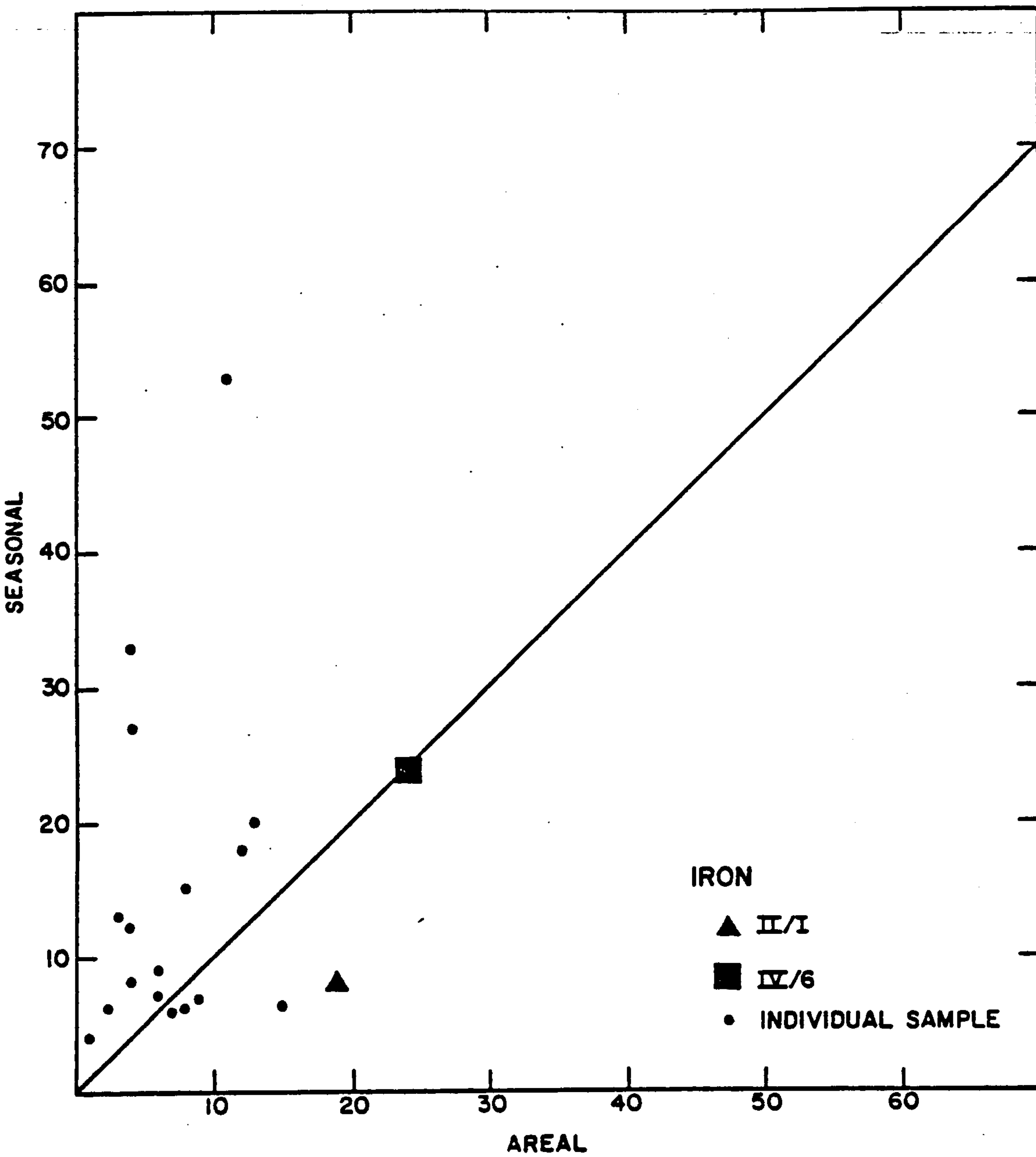

Figure 18. Plot of Dispersion Indices, Seasonal Versus Areal Distribution, for Iron in Benthic Sediments.

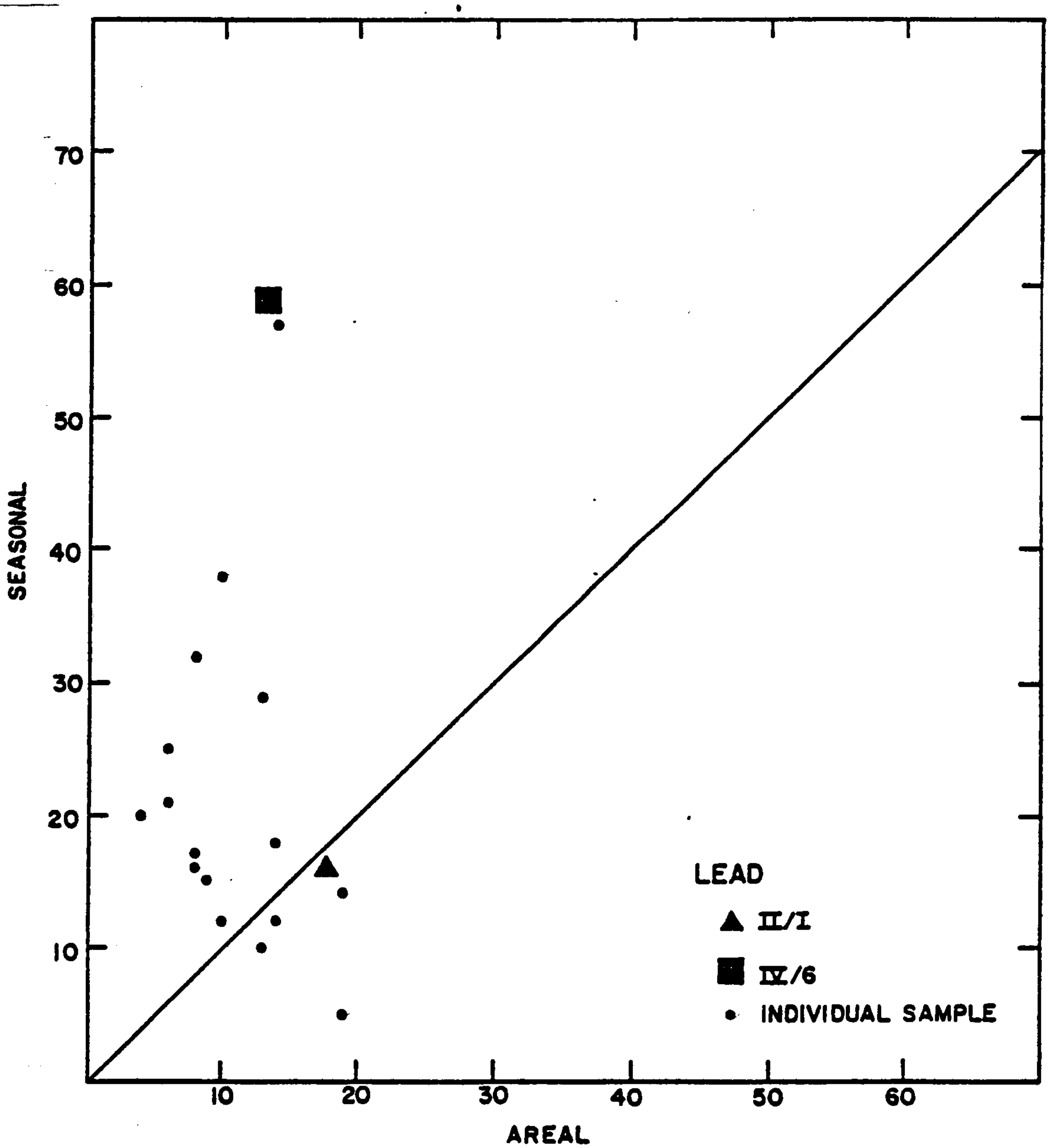

Figure 19. Plot of Dispersion Indices, Seasonal Versus Areal Distribution, for Lead in Benthic Samples.

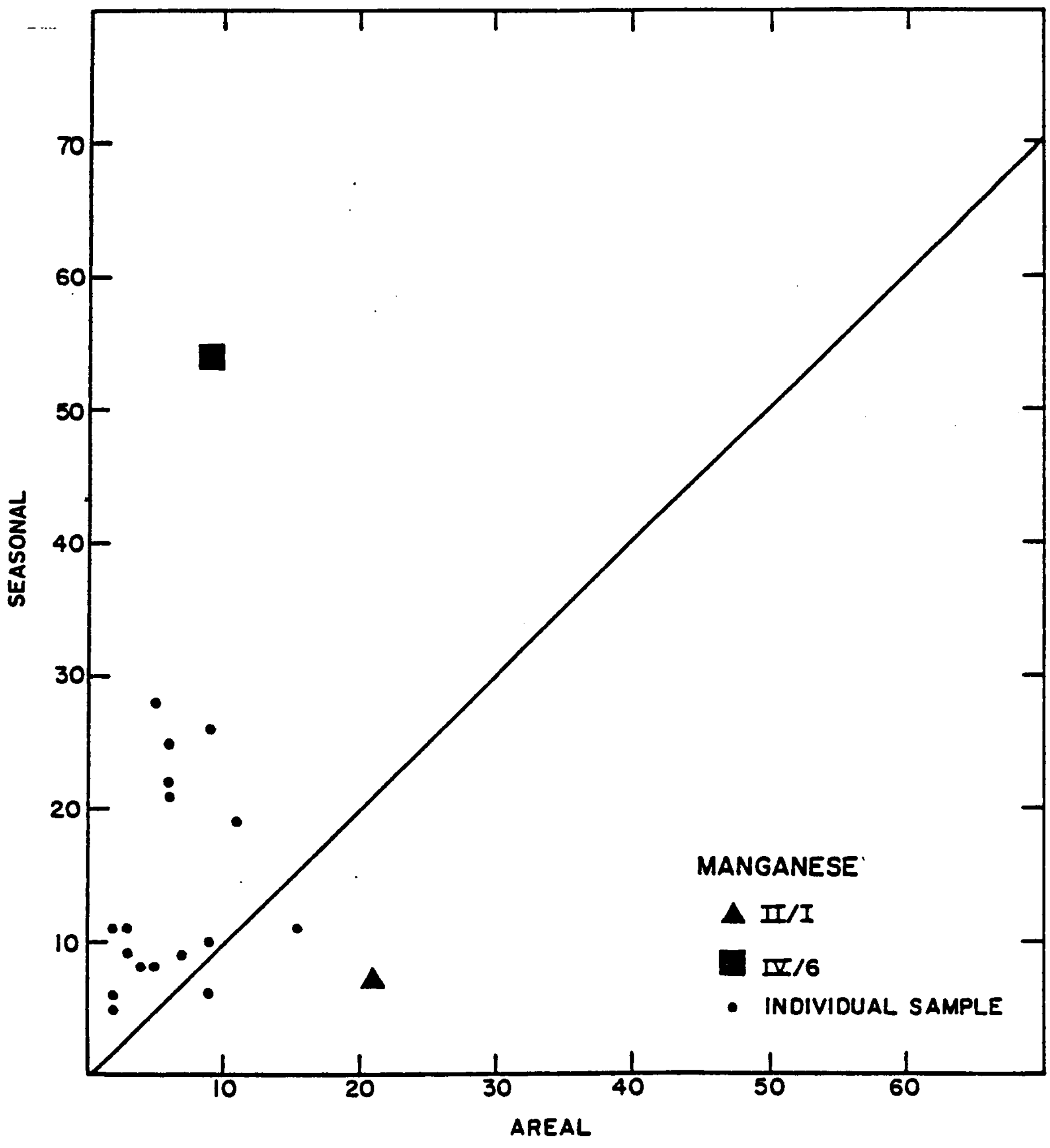

Figure 20. Plot of Dispersion Indices, Seasonal Versus Areal Distribution, for Manganese in Benthic Sediments.

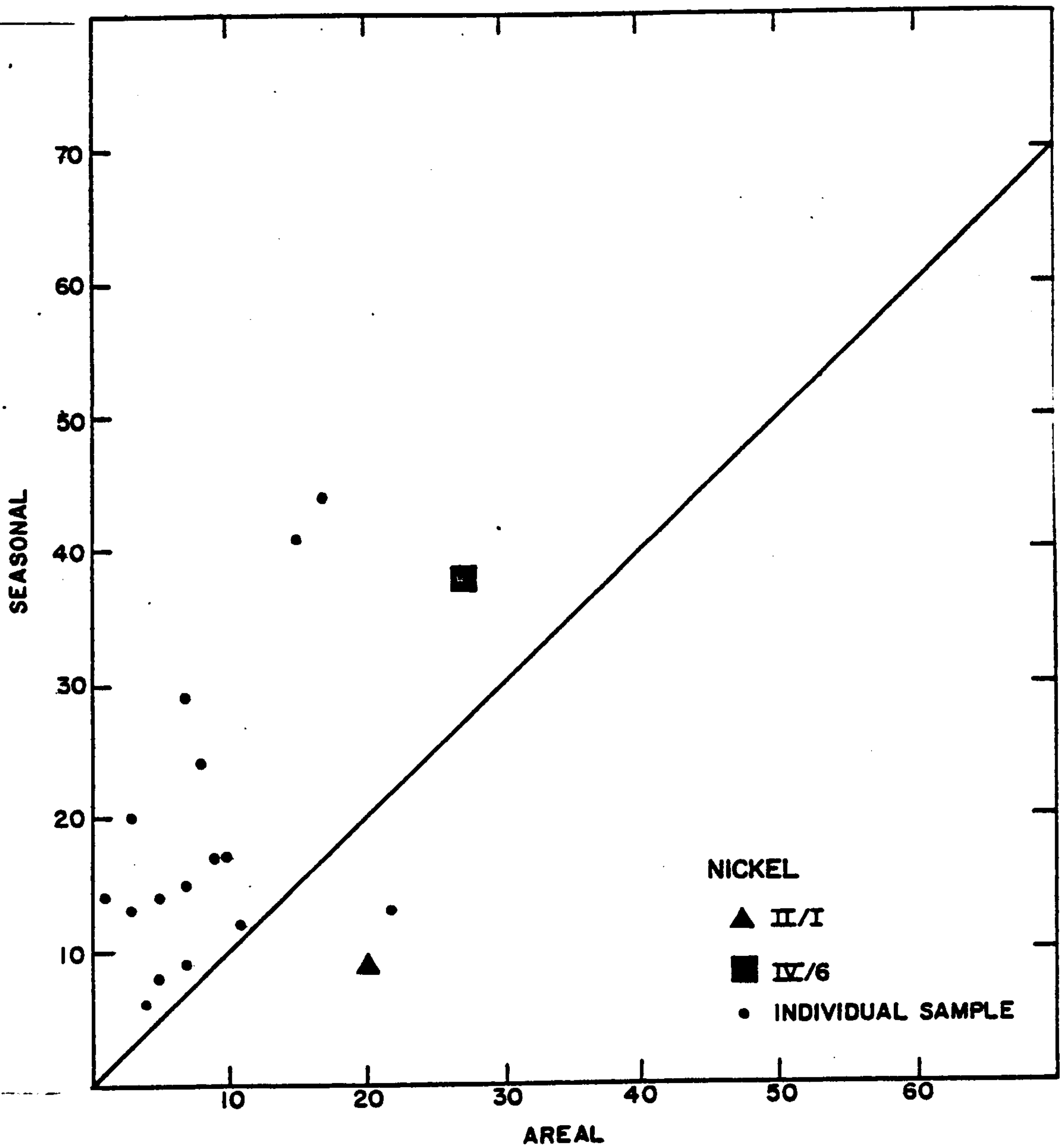

Figure 21. Plot of Dispersion Indices, Seasonal Versus Areal Distribution, for Nickel in Benthic Sediments.

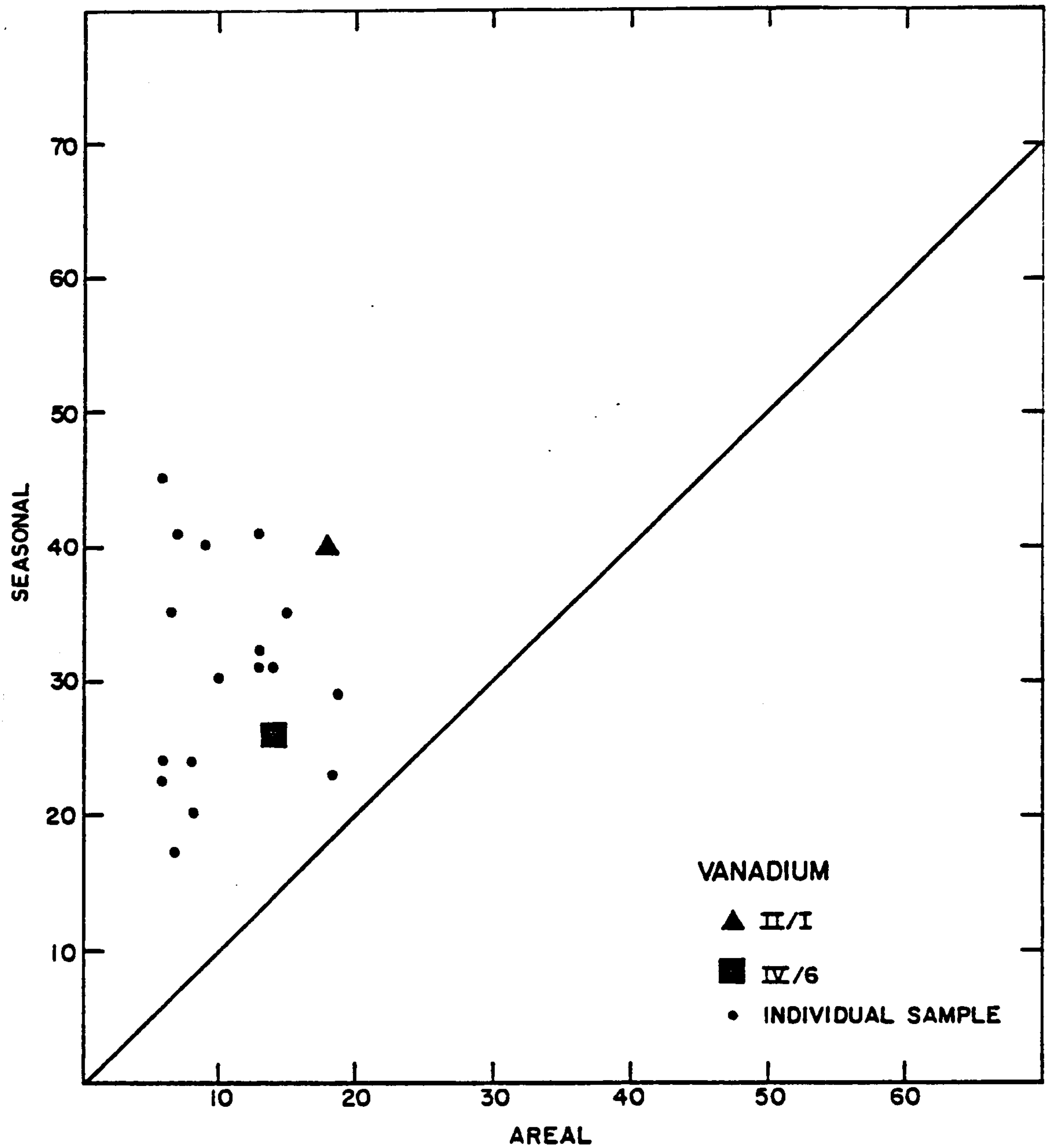

Figure 22. Plot of Dispersion Indices, Seasonal Versus Areal Distribution, for Vanadium in Benthic Sediments.

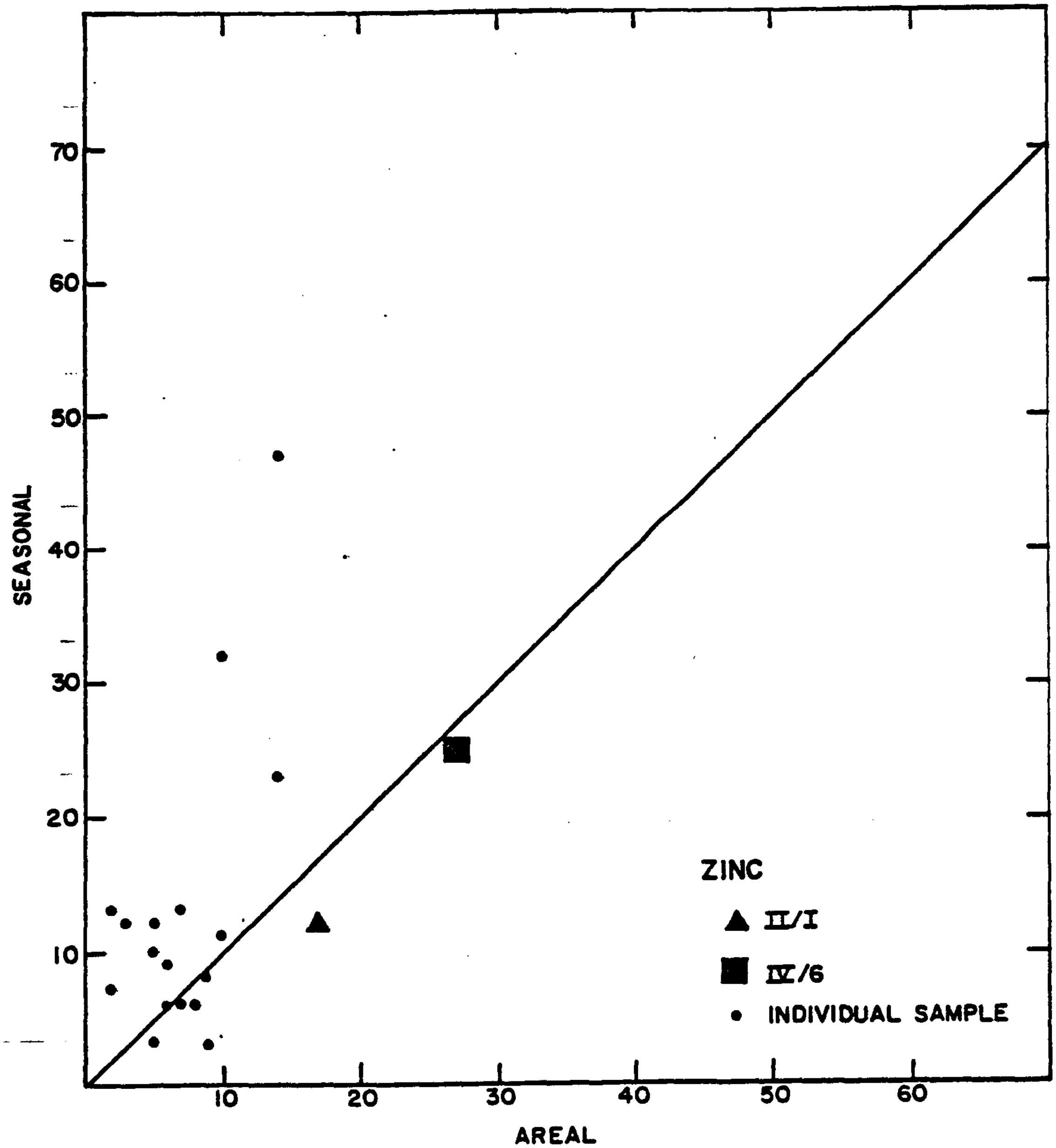

Figure 23. Plot of Dispersion Indices, Seasonal Versus Areal Distribution, for Zinc in Benthic Sediments.

TABLE 6

RESULTS OF REANALYSIS USED TO CHECK VARIATIONS IN INITIAL SEASONAL ANALYTICAL RESULTS THAT MIGHT HAVE BEEN CAUSED BY INADVERTENT CHANGES IN LABORATORY PROCESSING. RERUNS WERE IN TRIPLICATE

SAMPLE	Cu	Cu*	Mn	Mn*	Pb	Pb*	Zn	Zn*
SEASON I								
4/II	1.6	1.4	227	222	2.6	2.4	27.6	28.1
7/IV	6.6	7.2	623	560	10.5	12.2	95.7	82.6
SEASON II								
3/I	6.0	6.4	327	322	5.4	6.4	70.0	62.6
2/II	5.0	5.3	296	296	6.6	7.7	66.2	54.6
1/IV	2.1	1.9	141	136	2.9	2.7	25.1	22.6
5/IV	3.1	3.3	196	190	3.6	2.9	30.0	30.4
SEASON III								
5/II	5.4	5.5	321	312	8.0	7.3	71.0	70.7
6/II	5.9	6.2	359	305	8.7	7.6	80.2	79.9
I/III	5.7	5.4	306	280	7.4	8.0	61.0	72.5
4/IV	1.6	1.9	167	168	2.3	2.0	19.4	24.1

*Check samples

ment excellent agreement between amounts measured during the seasonal analyses and those measured later during reanalysis (Figure 24).

In summary, the seasonal monitoring of variations in trace metals content of benthic sediments indicates that variations between one season and another are greater than those at individual stations within a season. The reason for the pattern of variability indicated is not completely understood, but it may be caused by seasonal variations in biologic activity both along the sea floor surface and within the benthic sediments.

SUMMARY

In summary, the results of analyses of benthic sediments transmitted to USGS by the University of Texas for determination of seasonal variations in grain size and trace metals content at biological stations were as follows:

1. Seasonal variation in the grain size of sediments at individual stations was indicated. The variation from one season to another in terms of sand/mud ratios was greatest along the inner shelf where water depths were shallowest, as would be expected. Causes for the seasonal variability probably are two-fold: sand is most abundant and transitory along the inner shelf; and the inner shelf is subject to a wider range in the energy of moving water. Transect IV, which crosses the highly variable relict sediments of the ancestral Rio Grande delta, had the most pronounced variations.

2. Seasonal variations in the trace metals content of the sediments at the biological stations also were indicated. The reason for the variations, significant in some cases, were not clearly established. The probable cause is variations in the magnitude of infaunal activity from one season to another. Considering the high degree of bioturbation documented

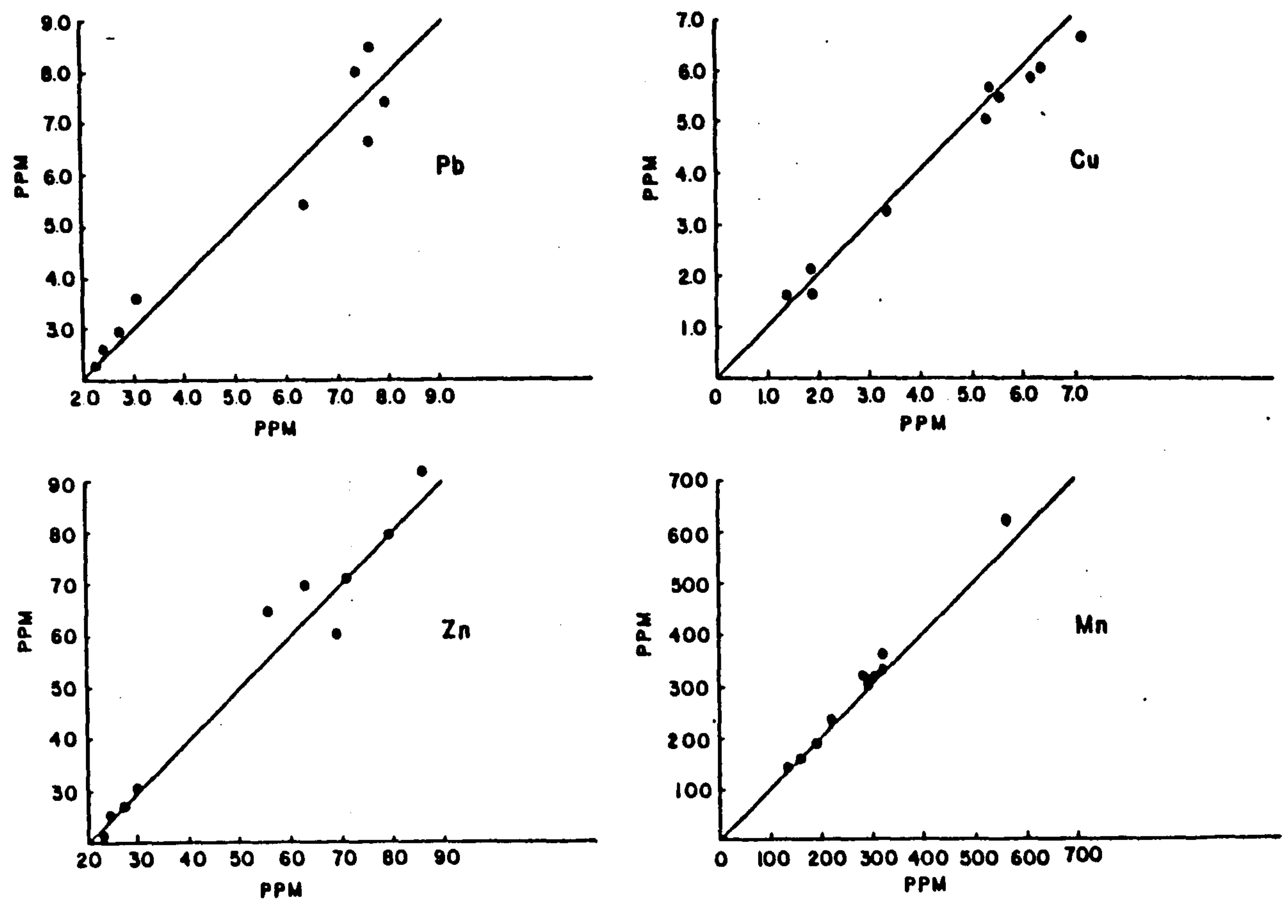

Figure 24. Graphed Plots for Selected Trace Metals Showing Amounts Measured During the Seasonal Analysis Versus Amounts Measured During Reanalyzation as a Check on the Inadvertent Variations in Laboratory Procedures.

for the South Texas OCS, significant modification of the sediment in the near surface zone by infaunal activity logically would be expected.

LITERATURE CITED

Berryhill, H. L. Jr. *et al.* 1976. Environmental studies of the south Texas outer continental shelf, 1975; Geology: Part I, Geologic description and interpretation, 270pp, 115 figs.; Part II, Basic analytical data. A report to the U.S. Bureau of Land Management. U.S. Geological Survey.

APPENDIX P

SUPPORTIVE DATA FROM THE TOPOGRAPHIC FEATURES STUDY
CONTRACT AA550-CT6-18

Principal Investigator:

Richard Rezak

The South Texas Topographic Features Study (Contract AA550-CT6-18) provided the South Texas Biological and Chemistry Study (Contract AA550-CT6-17) with data obtained from transmissometry profiles and sediment texture analyses. The transmissometry profiles (Tables 1-4) were taken along Transect II and at the bank stations. Sediment textural analysis was performed on subsamples of the infauna and meiofauna grabs taken at Hospital Rock and Southern Bank (Table 5).

MEASUREMENT OF WATER TURBIDITY BY MEANS OF A TRANSMISSOMETER

The instrument used to determine the turbidity of the water column is a transmissometer/depth continuous profiling system which measures the relative amount of suspended particulate matter based on the attenuation of light over a 1 m path. The light path of the MARTEK XMR instrument used in this study is folded using a corner mirror to reduce the size of the instrument and increase the ease of handling.

By correlating the profiles obtained with the transmissometer with STD profiles in the same locations, it is possible to get some feeling for the origin and extent of the suspended particulate material that makes up the turbid, or nepheloid layer.

TABLE 1

MARCH CRUISE 1976

Station/ Transect	1/II		2/II		4/II		5/II		6/II	
	Trans*	Depth	Trans.	Depth	Trans.	Depth	Trans.	Depth	Trans.	Depth
Cruise										
76LM18	20.27	0.49	53.45	0.15	43.1	0.24	71.87	0.15	54.1	1.50
	19.97	2.22	53.65	1.06	43.3	7.94	71.87	1.08	62.9	4.51
	17.86	4.45	58.96	1.22	56.6	10.59	74.78	2.63	60.8	6.92
	17.56	7.66	59.66	2.28	54.5	18.77	75.08	7.43	62.6	8.73
	18.46	10.62	58.76	3.65	34.1	20.93	75.08	14.10	61.6	27.08
	27.09	12.60	51.85	4.41	31.3	22.88	74.67	20.76	60.4	39.42
	23.88	13.84	55.06	5.48	31.8	25.96	73.57	28.36	57.8	46.34
	27.29	17.05	57.76	5.93	37.5	23.15	73.37	31.46	55.6	52.97
	22.98	18.04	58.06	11.56	36.1	29.11	72.37	35.02	58.2	55.97
	13.75	19.02	58.86	14.15	30.1	30.32	71.37	40.91	61.0	59.89
	4.72	18.78	59.56	15.97	25.9	31.04	69.27	42.61	61.6	65.30
	0.40	19.27	58.96	17.19	21.4	31.04	70.97	44.16	60.0	63.01
			60.56	18.40	7.3	30.80	73.27	44.78	62.1	63.92
			62.46	21.60			73.17	47.42	62.1	70.72
			63.86	25.40			72.07	49.74	60.9	72.83
			63.16	29.36			67.17	50.98	55.3	75.23
			62.46	32.55			63.86	53.62	50.5	78.24
			61.66	38.33			61.56	56.40	45.8	82.16
			59.16	40.46			58.46	60.12	42.0	84.26
			55.86	41.83			54.55	61.21	38.6	85.47
			51.45	42.28			49.75	63.07	35.4	89.98
			46.95	43.35			47.25	64.93	32.8	92.99
			42.84	43.96			44.34	67.72	28.4	93.59
			34.43	45.48			42.24	70.04		
							41.04	71.37		
							38.34	72.37		
							34.23	73.61		
							10.61	73.61		
							2.60	73.61		

*Trans. = transmissivity

TABLE 2
APRIL CRUISE 1976

Station/ Transect	1/II		2/II		3/II		4/II		5/II		6/II	
Cruise	Trans.	Depth	Trans.	Depth	Trans.	Depth	Trans.	Depth	Trans.	Depth	Trans.	Depth
76L3	20.7	0.89	58.04	0.72	81.48	0.60	30.43	1.62	58.8	0.36	73.93	0.30
	21.4	1.61	56.64	4.85	77.98	4.49	42.54	2.07	59.5	1.53	74.83	6.89
	21.8	2.14	57.34	12.65	75.66	10.77	45.65	3.77	60.8	3.33	74.73	14.09
	23.0	2.95	60.24	13.10	75.28	14.66	48.35	5.66	60.0	4.68	73.83	19.78
	24.7	3.66	60.64	13.91	76.08	17.65	49.05	7.72	59.9	6.20	73.13	24.88
	25.0	4.11	58.44	17.41	77.08	18.54	49.45	10.33	61.0	8.18	72.53	37.16
	24.8	4.56	60.34	19.02	77.18	20.64	49.75	11.86	60.7	10.25	72.13	42.56
	23.7	4.91	59.44	20.82	74.47	21.83	49.15	14.91	62.4	12.86	71.13	49.15
	22.7	6.17	61.74	23.24	73.67	26.92	48.25	13.14	65.8	13.40	69.43	56.04
	18.3	7.33	63.44	27.01	74.07	30.51	45.95	19.94	65.7	17.44	67.43	61.74
	16.9	8.67	62.94	30.15	75.08	32.90	42.84	20.84	63.3	23.02	64.94	67.13
	15.1	8.85	62.74	32.03	75.08	38.29	38.94	21.65	63.4	25.53	61.84	69.83
	14.2	9.38	64.64	33.02	74.37	40.38	34.53	22.46	62.4	26.70	58.04	71.63
	7.3	10.10	64.34	37.42	74.27	47.56	30.63	23.44	62.3	30.48	52.75	72.83
	7.0	10.28	60.84	38.41	73.87	56.23	28.33	24.34	64.7	51.19	49.35	76.12
	7.5	10.63	64.15	39.57	68.67	61.02	25.93	24.79	61.4	61.50	50.55	78.22
	11.1	11.17	50.55	41.81	69.37	75.67	22.22	26.05	59.0	64.47	54.16	78.82
	7.1	11.53	48.35	44.33	66.47	79.26	19.72	27.22	52.6	65.45	54.85	79.72
	4.4	12.42	44.66	46.30	62.36	80.16	16.72	28.20	46.3	67.07	54.26	80.92
	3.9	13.05	39.66	47.20	59.16	80.44	10.61	28.65	38.6	68.24	52.05	82.42
	4.6	13.40	36.76	48.28	58.56	81.36	1.70	28.56	28.8	69.95	51.45	83.32
	8.1	13.67			59.36	84.65			17.4	71.12	51.85	85.41
	8.0	14.03			65.87	84.95			9.3	72.74	55.24	90.51
	7.9	14.48			64.56	88.24					59.94	92.01
	4.6	15.01			62.76	89.13					60.14	93.81
	3.0	16.17			65.97	90.03					59.54	95.30
	1.8	18.32			67.47	90.93					51.65	96.80
	1.6	18.86			69.47	95.41					37.86	98.00

TABLE 2 CONT.'D

APRIL CRUISE 1976 (CONT.'D)

Station/ Transect	1/II		2/II		3/II		4/II		5/II		6/II	
	Trans.	Depth	Trans.	Depth	Trans.	Depth	Trans.	Depth	Trans.	Depth	Trans.	Depth
Cruise 76L3	0.9	19.03			67.57	102.29					29.77	98.00
	0.1	20.55			64.66	106.78					25.17	99.50
	-0.9	19.39			60.56	110.39					21.98	101.90
					54.25	110.97					18.68	104.30
					48.35	111.86						
					43.04	118.44						
					38.34	120.84						
					31.93	120.54						

TABLE 2 CONT.'D

APRIL CRUISE 1976 (CONT.'D)

Stations	Hospital Rock 3		Hospital Rock 4		Southern Bank 2		Southern Bank 3	
	Trans.	Depth	Trans.	Depth	Trans.	Depth	Trans.	Depth
Cruise								
76L3	80.0	0.18	75.22	0.27	63.0	0.09	87.59	0.09
	79.7	2.07	74.53	8.70	62.8	33.39	89.49	1.08
	80.8	4.13	74.83	10.86	61.7	42.48	90.09	3.32
	80.5	5.66	75.62	14.09	61.8	55.8	91.69	6.20
	81.1	7.81	76.72	18.04	61.6	68.94	90.29	11.68
	81.3	12.86	78.92	21.45	58.4	70.83	88.39	14.64
	84.0	15.81	81.52	23.60	52.8	71.28	86.09	16.26
	82.4	24.43	84.32	26.11	46.5	71.55	84.38	16.35
	80.4	26.68	84.72	28.44	45.1	72.45	81.98	19.58
	57.7	29.19	83.72	38.67	46.8	73.62	81.38	20.66
	80.0	30.81	83.22	45.04	54.9	74.52	84.68	22.81
	79.8	33.68	81.62	48.90	65.3	75.96	89.09	25.42
	74.2	34.22	80.42	52.40	67.9	77.67	90.39	26.59
	82.4	37.54	78.82	56.53	64.4	80.1	90.29	42.75
	83.3	38.98	76.62	58.59	57.1	81.36	89.29	49.40
	82.3	39.88	74.03	62.27	4.0	81.81	88.09	59.46
	79.8	40.69	70.53	63.62			87.09	65.48
	83.5	43.38	65.03	65.05			86.09	69.52
	81.8	45.99	56.84	66.31			70.67	71.41
	79.7	46.62	55.94	69.72			63.76	71.68
	77.7	47.69	50.05	69.54			59.16	72.22
	78.5	48.50	44.26	70.98			57.06	73.92
	81.1	48.86	36.06	70.98			59.06	75.09
	77.3	53.62	29.17	71.07			62.96	75.18
	68.2	54.61	22.58	71.69			63.46	75.72
	66.3	55.78	18.38	72.05			63.36	76.35
	66.1	57.40	13.69	72.68			53.85	76.53
	66.8	59.28	9.59	73.76			44.84	77.16
	72.0	60.09	8.49	75.55			32.13	78.32
	78.8	62.16	6.89	76.09			26.13	78.50
	79.7	63.14					20.82	79.04

TABLE 2 CONT.'D

APRIL CRUISE 1976 (CONT.'D)

Stations	Hospital Rock 3	
	Trans.	Depth
Cruise 76L3	78.7	64.13
	72.2	64.67
	66.8	66.02
	63.8	67.46
	61.9	69.70
	59.0	71.59
	53.8	73.92
	42.1	75.0
	28.8	75.54
	19.4	76.17
	13.7	77.78

TABLE 3

SPRING CRUISE 1976

Station/ Transect	1/II		2/II		3/II		4/II		5/II		6/II	
	Trans.	Depth	Trans.	Depth	Trans.	Depth	Trans.	Depth	Trans.	Depth	Trans.	Depth
Cruise												
76L5	69.81	1.03	86.5	0.20	86.33	0.00	61.14	0.91	49.94	0.53	75.48	0.25
	70.21	1.80	86.4	1.83	86.83	6.93	69.93	1.37	64.36	0.88	77.78	4.06
	71.41	3.08	71.5	2.03	86.73	9.70	71.03	2.16	66.47	2.54	77.78	5.84
	71.41	4.87	71.5	7.71	84.93	12.20	71.43	6.04	66.37	6.65	79.78	8.12
	71.61	6.84	71.2	12.67	87.13	13.86	70.63	9.34	65.87	9.56	78.98	11.67
	71.82	8.55	70.9	14.70	86.83	16.08	71.83	15.26	66.77	12.02	80.78	13.96
	71.51	9.23	71.2	17.74	88.32	23.56	70.83	16.86	66.77	17.28	81.08	27.40
	70.31	9.83	71.2	20.28	88.72	27.44	71.63	17.88	57.86	18.69	80.78	36.03
	67.60	10.69	63.8	20.79	88.02	32.15	70.03	20.39	68.27	20.09	80.28	41.36
	64.89	11.20	71.3	21.60	88.02	41.30	67.53	22.09	67.67	29.92	80.38	47.45
	62.79	11.88	71.9	22.20	87.43	46.84	68.93	23.23	68.67	32.81	80.58	52.02
	57.57	12.65	71.2	23.42	88.12	50.44	64.64	25.05	68.97	37.11	79.98	54.56
	49.75	13.17	71.0	25.15	87.33	55.99	62.14	26.08	67.47	40.71	80.28	59.63
			68.5	26.46	87.82	65.97	55.84	27.10	68.07	42.03	80.78	66.23
			67.9	28.09	87.43	68.18	57.04	27.90	68.47	53.78	81.78	74.86
			67.8	28.69	87.72	75.94	63.44	28.47	67.67	57.03	81.38	80.95
			57.8	29.91	89.12	80.66	65.23	29.50	67.77	62.91	76.38	83.74
			65.4	30.12	90.12	92.85	63.44	29.84	67.57	67.03	76.08	86.53
			69.0	31.22	90.12	98.95	57.84	30.52	62.96	67.91	70.17	89.32
			69.9	31.16	90.52	100.89	52.35	30.41	56.24	69.31	62.76	90.33
			69.9	31.68	90.52	111.14			53.05	70.28	27.83	95.41
			68.7	36.60	88.72	115.02			49.15	70.45		
			67.8	39.64	85.23	118.63			45.35	70.63		
			68.2	41.06	54.19	126.67			38.94	71.42		
			66.7	42.48					39.04	73.00		
			63.0	42.38					43.54	74.31		
			36.0	44.51					42.44	76.51		
			6.1	51.00					38.34	77.03		
									34.53	77.91		
									31.83	78.96		
									27.33	79.23		
									22.62	79.49		
									16.82	80.10		
									12.61	81.24		

TABLE 3 CONT.'D

SPRING CRUISE 1976 (CONT.'D)

Stations	Hospital Rock 3		Hospital Rock 4		Southern Bank 3		Southern Bank 4	
	Trans.	Depth	Trans.	Depth	Trans.	Depth	Trans.	Depth
Cruise 76L5	67.00	0.08	62.74	0.27	69.0	1.68	71.16	0.25
	72.28	1.02	67.83	0.91	69.7	3.69	71.46	1.17
	72.48	3.22	68.03	3.02	69.0	6.37	71.96	4.20
	71.98	6.02	69.83	4.48	66.6	9.56	70.46	9.15
	71.39	9.24	69.53	12.07	68.7	10.73	68.86	9.90
	68.10	10.59	58.24	13.26	70.3	12.07	70.76	10.99
	64.51	11.36	69.93	13.63	71.2	15.26	73.35	11.83
	63.11	12.20	71.33	14.54	70.5	16.93	72.85	13.93
	65.90	14.49	63.54	15.82	67.0	17.69	71.46	15.78
	68.39	15.00	65.63	18.02	69.9	18.53	66.87	16.28
	72.48	14.32	63.84	19.75	72.7	18.86	75.45	16.95
	75.37	15.68	68.03	20.85	73.8	21.46	75.55	20.64
	76.57	17.46	71.93	23.32	72.7	23.39	75.25	21.99
	77.27	19.83	74.53	24.87	72.9	27.58	76.25	23.33
	78.07	23.56	75.52	26.80	73.3	29.34	75.75	27.94
	78.46	25.68	75.42	29.54	73.0	38.06	75.25	30.04
	78.17	31.95	74.03	31.55	72.2	39.32	75.05	35.08
	77.57	35.34	71.93	34.20	73.1	43.84	75.25	38.10
	77.37	39.07	70.13	36.49	72.6	47.03	75.75	42.71
	77.87	42.97	69.13	38.23	72.6	52.81	75.35	47.08
	76.87	46.53	71.13	42.07	71.8	56.25	74.85	50.69
	75.27	48.39	64.14	43.44	71.0	60.95	74.65	54.80
	70.89	50.93	62.54	47.28	67.4	61.62	74.35	56.81
	64.91	53.54	52.25	48.47	62.2	62.20	70.76	58.15
	60.32	54.24	45.25	48.83	55.5	62.96	66.97	59.75
	57.03	55.85	39.16	49.57	48.6	63.63	63.17	61.01
	54.33	57.37	34.97	50.48	44.2	64.89	59.68	62.69
	40.06	58.14	33.57	52.40	39.3	66.23	54.29	63.27
	40.18	58.56	33.17	55.15	37.2	67.49	51.20	63.36
	34.90	59.32	30.57	56.06	39.5	68.83	48.70	64.62
	31.41	59.24	28.07	56.52	43.7	69.50	47.70	66.29

TABLE 3 CONT.'D

SPRING CRUISE 1976 (CONT.'D)

Stations	Hospital Rock 3		Hospital Rock 4		Southern Bank 3		Southern Bank 4	
	Trans.	Depth	Trans.	Depth	Trans.	Depth	Trans.	Depth
Cruise 76L5	30.61	61.02	24.58	57.25	44.4	70.00	44.21	66.88
	32.00	62.37	22.98	58.07	43.6	70.50	39.92	67.89
	32.10	65.25	22.08	61.82	38.1	71.17	35.33	68.73
	30.81	66.44	16.78	63.38	32.6	71.26	31.54	69.57
	29.61	66.19	16.08	67.31	28.8	71.93	29.04	70.99
	28.61	68.14	11.49	68.04	24.0	72.77	28.04	73.68
	24.53	68.39	9.69	69.41	21.2	73.10	26.75	75.36
	24.33	69.49			18.3	73.86	23.65	75.61
	19.94	71.36			14.5	75.28	20.66	75.86
	16.15	72.97			13.5	75.87	17.76	76.78
							15.27	77.79
							14.47	78.29

TABLE 4

FALL CRUISE 1976

Sta/Tran 3/II				4/II				6/II					
Trans.	Depth	Trans.	Depth	Temp.	Depth	Salin.	Depth	Trans.	Depth	Temp	Depth	Salin.	Depth
67.00	0.30	56.99	0.54	24.97	0.00	35.28	1.36	73.88	1.45	24.49	0.38	35.67	0.38
67.90	6.00	56.89	3.43	24.93	0.00	35.29	1.36	75.17	3.61	24.54	12.44	35.70	15.00
67.40	16.20	56.39	5.77	24.94	0.73	35.29	25.86	73.78	21.78	21.98	20.73	35.79	18.00
66.10	22.80	58.38	7.85	24.95	17.10	35.30	26.76	72.38	22.32	21.83	22.24	35.56	19.88
65.60	29.10	58.78	10.10	24.95	21.83	35.29	27.67	70.99	35.78	17.98	41.08	36.25	25.50
64.81	34.80	58.88	11.72	24.96	17.46	35.31	26.76	70.39	53.31	18.09	41.84	35.89	28.13
64.41	38.40	57.49	13.08	24.95	22.19	35.31	22.68	69.19	54.67	18.07	44.10	36.25	29.63
63.21	41.70	57.88	14.61	24.94	23.65	35.31	29.03	65.00	57.11	14.64	62.19	35.96	31.50
61.22	44.70	56.99	18.58					64.71	59.37	14.31	69.35	36.23	31.88
63.91	46.50	55.09	20.20					66.30	60.90	13.98	71.24	35.95	34.50
64.71	54.30	55.29	23.45					64.81	61.72	13.96	72.37	36.20	35.63
63.71	54.90	51.80	24.89					59.72	63.25	13.92	72.74	36.01	36.75
63.61	60.60	54.79	27.32					59.82	67.95	13.94	73.12	36.24	41.63
60.62	63.90	51.40	28.23					67.90	70.03	13.92	73.12	36.09	43.13
60.72	69.90	44.81	29.49					67.80	72.47	13.93	73.87	36.24	43.88
62.01	75.30	41.22	31.11					70.59	73.46			36.04	46.13
64.31	76.80	34.03	32.37					70.19	76.08			36.31	47.63
67.90	78.60	26.05	32.83					69.79	78.34			36.13	50.25
68.69	81.60	10.98	33.55					66.50	79.25			36.28	52.88
68.79	86.40							59.42	81.14			36.20	54.75
68.99	92.70							45.06	82.86			36.88	55.13
60.42	96.90							37.99	84.31			36.23	56.25
61.91	98.40											36.27	58.50
68.49	102.00											36.01	60.00
68.49	105.30											36.16	62.63
60.42	107.40											36.00	63.38
61.52	110.10											36.14	64.50
67.80	114.30											36.31	66.38
63.01	117.00											36.13	66.75
54.84	118.20											36.35	70.50
49.75	119.70											36.30	72.75
47.26	125.40											36.36	73.50
43.07	124.80											36.17	75.75
												36.35	78.75

TABLE 5

SOUTHERN BANK STATION 1	FEBRUARY '76								MARCH '76						
SAMPLE	1-1a JDB	1-2a JDH	1-3a JDN	1-4 JDT	1-5 JDV	1-6 JDX	1 JEH	1-9 JEL	1-1 JZF	1-2 JZH	1-3 JZJ	1-4 JZL	1-5 JZN	1-6 JZP	1-7 KCT
Gravel %	0.0	0.0	0.0	0.0	0.06	0.0	0.16	0.0	0.0	0.0	0.0	0.7	0.16	0.0	0.0
Sand %	23.82	8.34	22.23	18.16	20.47	29.5	25.66	19.05	10.3	21.43	18.85	8.88	11.36	8.71	20.87
Silt %	53.31	51.55	54.71	56.87	57.96	45.99	57.64	60.23	48.59	51.92	57.64	62.93	63.08	52.46	45.4
Clay %	22.87	40.11	23.06	24.97	21.42	24.51	16.54	20.72	41.11	26.65	23.51	27.49	25.4	38.82	33.73
Med. Dia.	4.89	7.04	5.11	5.79	5.22	5.09	5.04	5.08	7.23	5.90	5.66	6.01	5.09	7.12	6.57
Mean Dia.	5.82	6.97	5.9	6.17	5.93	5.86	5.78	5.85	7.12	6.26	6.14	6.47	6.31	7.05	6.59
Std. Dev.	2.22	2.19	2.21	2.24	2.21	2.35	2.21	2.15	2.35	2.31	2.24	2.17	2.52	2.26	2.42
Skewness	0.56	-0.04	0.5	0.26	0.45	0.46	0.48	0.5	-0.06	0.24	0.32	0.28	0.64	-0.03	0.05
Kurtosis	0.73	0.69	0.73	0.8	0.82	0.67	0.76	0.83	0.67	0.67	0.78	0.75	0.81	0.73	0.63
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

SOUTHERN BANK STATION 1	JULY '76							OCTOBER '76							
SAMPLE	1-1 ONZ	1-2 OOB	1-3 OOD	1-4 OOF	1-5 OOH	1-6 OOJ	1-7 OOS	1-1 SMY	1-2 SNG	1-3 SNC	1-4 SNE	1-5 SNG	1-6 SNI	1-7 SNR	
Gravel %	0.05	0.0	0.0	0.0	0.0	0.38	0.0	0.0	0.0	0.07	0.0	0.29	0.08	0.17	
Sand %	27.58	9.61	12.76	5.9	13.4	5.42	14.37	16.62	19.81	20.95	19.04	16.88	15.31	18.17	
Silt %	29.37	47.34	44.53	52.06	37.04	48.21	38.96	68.94	49.27	61.12	52.35	56.45	50.7	49.14	
Clay %	43.0	43.05	42.71	42.04	49.56	45.99	46.67	14.44	30.92	17.93	28.6	26.38	33.91	32.52	
Med. Dia.	7.4	7.5	7.43	7.96	7.94	7.67	7.78	6.53	7.01	6.74	6.04	6.92	7.46	7.37	
Mean Dia.	7.01	7.38	7.10	7.23	7.38	7.53	7.23	6.12	6.56	6.23	6.17	6.39	6.87	6.58	
Std. Dev.	2.37	2.14	2.34	2.13	2.32	2.07	2.4	1.9	2.25	1.98	2.3	2.17	2.19	2.29	
Skewness	-0.14	-0.11	-0.17	-0.09	-0.31	-0.14	-0.27	-0.17	-0.19	-0.22	0.13	-0.2	-0.29	-0.33	
Kurtosis	0.51	0.82	0.76	0.71	0.88	0.78	0.84	1.0	0.69	0.92	0.82	0.96	1.26	0.91	
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

SOUTHERN BANK STATION 1	NOVEMBER '76														
SAMPLE	1-1 VHM	1-2 VHP	1-3 VHS	1-4 VHV	1-5 VHY	1-6 VIB									
Gravel %	0.0	0.03	0.06	0.08	0.03	0.0									
Sand %	24.74	7.16	12.43	10.53	15.43	11.12									
Silt %	36.74	41.95	46.83	38.83	35.26	38.36									
Clay %	38.52	50.87	40.68	50.56	49.28	50.52									
Med. Dia.	7.40	8.0	7.28	7.98	7.93	7.98									
Mean Dia.	6.86	7.69	6.98	7.34	7.24	7.45									
Std. Dev.	2.41	1.98	2.3	2.25	2.36	2.14									
Skewness	-0.23	-0.28	-0.15	-0.36	-0.35	-0.35									
Kurtosis	0.67	0.97	0.69	0.96	0.99	095									
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

SOUTHERN BANK STATION 2	FEBRUARY '76							APRIL '76							
SAMPLE	2-1A JDL	2-2A QEV	2-3A QFA	2-4 QFF	2-5 QFH	2-6 QFQ	2-9 QFX	2-1 KTG	2-2 KTI	2-3 KTK	2-4 KTM	2-5 KTO	2-6 KTQ	2-7 KTZ	
Gravel %						0.0								0.0	
Sand %						0.19								3.7	
Silt %	47.53	38.82	35.01	49.03	63.45	33.2	45.56	35.05	38.03	40.53	40.78	45.07	44.85	42.6	
Clay %	52.47	61.18	64.99	50.97	36.55	66.61	54.44	64.95	61.97	59.47	59.22	54.93	55.15	53.7	
Med. Dia.	8.06	8.33	8.38	7.99	7.33	7.7	8.12	8.55	8.41	8.32	8.36	8.16	8.17	8.19	
Mean Dia.	7.92	8.28	8.38	7.96	7.38	7.6	7.98	8.49	8.34	8.28	8.26	8.15	8.14	8.08	
Std. Dev.	1.68	1.35	1.27	1.34	1.55	1.69	1.51	1.35	1.42	1.4	1.51	1.49	1.5	1.6	
Skewness	-0.14	-0.08	-0.05	-0.04	0.08	-0.07	-0.15	-0.1	-0.1	-0.06	-0.11	-0.03	-0.04	-0.12	
Kurtosis	0.88	0.97	1.03	1.06	0.83	0.83	0.98	0.86	0.89	0.84	0.81	0.83	0.85	0.87	
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

SOUTHERN BANK STATION 2	JULY '76							OCTOBER '76						
SAMPLE	2-1 OPF	2-2 OPH	2-3 OPJ	2-4 OPL	2-5 OPN	2-6 OPP	2-7 OPY	2-1 SNT	2-2 SNV	2-3 SNX	2-4 SNZ	2-5 SOB	2-6 SOD	2-7 SOM
Gravel %				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sand %				0.0	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0
Silt %	40.33	41.3	35.9	39.28	24.31	35.36	46.18	64.12	59.97	56.05	54.53	59.73	52.13	43.45
Clay %	59.67	58.7	64.1	60.72	75.69	64.64	53.82	35.88	36.93	43.95	45.47	40.27	47.87	56.55
Med. Dia.	8.4	8.36	8.55	8.32	8.88	8.59	8.34	7.52	7.52	7.79	7.84	7.69	7.91	8.24
Mean Dia.	8.22	8.24	8.49	8.29	8.85	8.54	8.23	7.49	7.42	7.90	7.96	7.83	8.02	8.31
Std. Dev.	1.51	1.61	1.5	1.40	1.18	1.48	1.56	1.45	1.65	1.31	1.26	1.18	1.30	1.25
Skewness	-0.18	-0.13	-0.11	-0.05	-0.12	-0.1	-0.1	-0.01	-0.09	0.1	0.12	0.18	0.08	0.05
Kurtosis	0.85	0.79	0.83	0.95	0.88	0.79	0.82	1.07	1.04	1.12	1.06	1.13	1.23	0.93
Quartz %														
Foram %														
Shell %														
Algae-Coral %														
Misc. %														
Carb. %														

TABLE 5 CONT.'D

SOUTHERN BANK STATION 2	NOVEMBER '76														
SAMPLE	2-1 VIL	2-2 VIO	2-3 VIR	2-4 VIU	2-5 VIX	2-6 VJA	2-7 VJH								
Gravel %															
Sand %															
Silt %	40.89	52.78	60.11	35.11	46.14	49.16	28.32								
Clay %	59.11	47.22	39.89	64.29	53.86	50.84	71.68								
Med. Dia.	8.23	7.87	7.45	8.4	8.07	7.98	7.86								
Mean Dia.	8.3	7.85	7.59	8.42	8.08	8.08	7.99								
Std. Dev.	1.25	1.52	1.5	1.28	1.31	1.3	1.08								
Skewness	0.04	-0.03	0.12	-0.02	-0.01	0.08	0.16								
Kurtosis	0.96	0.97	0.87	0.97	1.0	1.01	1.39								
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

SOUTHERN BANK STATION 3	APRIL '76							JUNE '76							
SAMPLE	3-1 KUB	3-2 KUC	3-3 KUF	3-4 KUH	3-5 KUG	3-6 KVB	3-7 KUS	3-1 MUT	3-2 MUV	3-3 MUX	3-4 MUZ	3-5 MVB	3-6 MVD	3-7 NUE	
Gravel %	13.16	15.83	16.36	21.9	19.91	6.06	19.37	13.28	27.87	27.81	25.4	48.11	36.29	26.73	
Sand %	51.57	46.65	46.23	42.8	57.18	32.54	51.95	57.21	65.89	60.47	56.0	40.78	57.58	63.04	
Silt %	17.03	18.55	20.23	20.15	13.48	39.55	15.99	12.83	3.28	651	7.29	5.16	2.38	4.69	
Clay %	18.24	18.97	17.18	15.15	9.43	21.85	12.69	16.68	2.96	5.21	11.31	5.95	3.75	5.53	
Med. Dia.	1.03	0.95	0.90	0.99	0.59	5.36	0.69	1.17	0.20	0.21	0.44	-0.53	0.0	0.22	
Mean Dia.	3.01	2.94	2.65	2.51	1.73	4.85	2.25	3.06	-9.33	0.09	1.78	-0.29	-0.25	-0.01	
Std. Dev.	4.0	4.06	4.12	4.04	3.46	3.9	0.86	3.79	1.83	2.22	3.58	2.28	1.87	2.17	
Skewness	0.59	0.59	0.54	0.50	0.52	-0.2	0.55	0.57	0.09	0.21	0.55	0.49	0.10	0.14	
Kurtosis	0.76	0.72	0.77	0.73	1.23	0.75	0.88	0.96	1.76	1.64	1.16	2.10	2.02	2.18	
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

SOUTHERN BANK STATION 3	AUGUST '76							DECEMBER '76							
SAMPLE	3-1 OZZ	3-2 PAB	3-3 PAD	3-4 PAF	3-5 PAH	3-6 PAQ	3-7 PAS	3-1 WHL	3-2 WHO	3-3 WHR	3-4 WHU	3-5 WHX	3-6 WIA	3-7 WIH	
Gravel %	21.49	20.34	23.87	22.57	14.4	19.69	18.29	16.3	16.3	12.38	9.21	12.82	10.39	1.60	
Sand %	64.62	52.23	51.33	57.3	59.83	55.59	52.81	39.89	62.96	22.45	34.92	48.46	42.33	49.53	
Silt %	5.2	8.72	10.77	8.67	13.43	9.55	14.44	23.05	9.47	37.11	30.32	19.05	24.22	26.97	
Clay %	8.69	18.71	14.03	11.46	12.34	15.17	14.46	20.76	16.27	28.06	25.55	19.67	23.06	21.9	
Med. Dia.	0.4	0.71	0.58	0.53	0.71	0.66	0.71	3.16	1.08	6.01	5.35	1.51	3.55	3.88	
Mean Dia.	0.89	2.62	2.27	1.87	2.37	2.15	2.25	3.55	3.02	5.08	4.94	3.22	4.13	4.54	
Std. Dev.	3.03	4.19	3.98	3.63	3.67	4.21	4.09	4.25	3.82	4.14	4.0	4.01	4.04	3.54	
Skewness	0.42	0.57	0.56	0.54	0.59	0.5	0.51	0.13	0.60	-0.31	-0.18	0.5	0.14	0.24	
Kurtosis	1.86	0.75	1.05	1.16	1.07	1.22	0.83	0.6	1.16	0.64	0.67	0.7	0.66	0.86	
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

SOUTHERN BANK STATION 4	MARCH '76					JUNE '76							AUGUST '76		
SAMPLE	4-2 KAA	4-3 KAC	4-4 KAE	4-5 4AG	4-6 KAI	4-1 MVP	4-1 MVN	4-3 MVR	4-4 MVT	4-5 MVV	4-6 MVX	4-7 NUF	4-1 PAU	4-2 PAW	4-3 PAY
Gravel %	0.0	0.37	0.6	0.0	0.46	0.15	0.0	0.55	0.0	0.43	0.33	1.89	0.31	1.64	0.52
Sand %	28.32	14.25	13.76	9.4	9.52	12.37	11.9	23.78	6.43	19.68	8.73	11.2	13.25	24.67	19.64
Silt %	47.51	56.3	58.16	46.01	53.89	57.49	59.58	36.18	42.61	67.02	41.81	48.45	34.15	34.58	31.56
Clay %	24.17	29.0	27.48	44.59	36.13	29.49	28.52	39.49	50.96	12.87	49.13	38.47	52.29	39.11	48.28
Med. Dia.	5.7	5.92	6.05	7.64	6.94	6.31	7.17	7.13	8.01	4.82	7.92	7.03	8.11	7.1	7.86
Mean Dia.	6.04	6.39	6.39	7.35	7.06	6.56	6.74	6.83	7.82	5.35	7.71	6.9	7.5	6.74	7.16
Std. Dev.	2.37	2.26	2.19	2.19	2.16	2.21	1.92	2.49	1.97	1.81	2.01	2.36	2.35	2.87	2.57
Skewness	0.22	0.29	0.24	-0.19	0.03	0.16	-0.25	-0.11	-0.22	0.5	-0.23	-0.06	-0.32	-0.25	-0.32
Kurtosis	0.71	0.69	0.71	0.8	0.81	0.74	0.9	0.58	0.94	1.46	0.96	0.67	0.84	0.74	0.78
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

SOUTHERN BANK STATION 4	AUGUST '76				DECEMBER '76										
SAMPLE	4-4 PBA	4 5 PBC	4-6 PBE	4-7 PBN	4-1 WIK	4-2 WIN	4-3 WIG	4-4 WGC	4 WGG	4 5 WOG	4-6 WGZ	4-7 WIH			
Gravel %	1.78	1.78	5.52	0.39	0.2	0.05	4.24	0.72	0.2	2.36	0.3	7.54			
Sand %	22.89	25.86	20.35	30.19	28.83	22.15	31.84	29.91	28.83	25.53	8.31	15.5			
Silt %	47.77	24.09	26.53	36.26	52.27	54.12	41.53	36.13	56.94	39.22	67.98	47.57			
Clay %	27.56	48.27	47.6	33.17	18.7	23.69	22.37	33.23	14.03	32.88	23.41	79.4			
Med. Dia.	5.61	7.84	7.78	6.05	4.92	5.72	5.55	6.45	4.92	6.51	5.76	6.21			
Mean Dia.	6.13	7.09	7.06	6.3	5.65	6.13	5.23	6.53	5.66	6.47	6.29	5.35			
Std. Dev.	2.69	2.76	3.45	2.57	2.18	2.28	3.36	2.52	2.19	2.96	2.06	3.99			
Skewness	0.14	-0.36	-0.46	0.14	0.49	0.28	-0.12	0.06	0.48	-0.13	0.37	-0.32			
Kurtosis	0.88	0.6	0.93	0.58	0.88	0.74	0.97	0.59	0.88	0.83	0.87	1.22			
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

HOSPITAL BANK STATION 1	MARCH '76														
SAMPLE	5-1 KAR	5-2 KAT	5-3 KAV	5-4 KAY	5-5 KAZ	5-6 KBB	5-7 KCK								
Gravel %	25.22	18.93	29.27	22.82	13.75	32.28	20.91								
Sand %	43.46	46.92	52.11	55.5	64.03	45.75	56.5								
Silt %	18.81	21.35	10.54	14.68	13.3	10.51	8.0								
Clay %	12.51	12.8	8.08	7.0	8.92	11.46	14.59								
Med. Dia.	0.32	0.52	0.1	0.23	0.36	0.44	2.06								
Mean Dia.	2.07	2.03	1.15	1.4	1.84	1.85	2.37								
Std. Dev.	3.89	0.54	3.5	3.25	3.33	5.75	3.6								
Skewness	0.61	4.0	0.52	0.56	0.63	0.55	0.21								
Kurtosis	0.71	0.82	0.92	1.08	1.24	1.0	1.35								
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

HOSPITAL BANK STATION 1	FEBRUARY '76								JULY '76						
SAMPLE	1-1a JFS	1-2a JGI	1-3a JGN	1-4 JGS	1-5 JGU	1-6 JGW	1-8 JHF	1-9 JHJ	1-1 OGA	1-2 OGC	1-3 OGE	1-4 OGG	1-5 OGI	1-7 OGT	
Gravel %	18.16	33.08	38.45	26.8	22.19	27.27	24.96	19.56	23.42	19.49	34.68	33.37	32.09	38.88	
Sand %	45.77	45.82	46.52	52.65	53.53	57.72	57.82	51.70	52.88	56.45	43.32	52.97	48.7	47.95	
Silt %	15.57	10.55	7.0	11.32	10.65	12.74	6.57	13.99	7.95	10.65	10.64	6.46	9.83	6.85	
Clay %	20.8	10.55	8.03	9.23	13.63	8.27	10.65	14.75	15.75	13.4	11.35	7.2	9.38	6.3	
Med. Dia.	0.83	0.35	0.2	0.46	0.42	0.31	0.37	0.42	0.57	0.77	0.27	0.23	0.44	0.04	
Mean Dia.	2.6	1.72	0.84	1.48	2.16	1.34	1.32	2.31	2.4	2.16	1.83	0.83	1.55	0.67	
Std. Dev.	4.28	3.64	2.97	3.37	3.9	3.3	3.24	3.99	4.08	4.01	3.76	2.92	3.48	2.84	
Skewness	0.52	0.56	0.47	0.51	0.60	0.53	0.51	0.61	0.58	0.49	0.59	0.46	0.52	0.49	
Kurtosis	0.69	0.98	1.93	0.89	1.16	0.89	1.44	0.92	1.13	1.27	0.95	2.01	1.43	1.92	
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

HOSPITAL BANK STATION 1	NOVEMBER '76					
SAMPLE	VJK 1-1	VJN 1-2	VJQ 1-3	VJT 1-4	VJW 1-5	VJZ 1-6
Gravel %	43.94	53.93	31.19	44.42	46.71	47.95
Sand %	50.70	36.63	55.54	49.3	47.56	44.20
Silt %	3.72	6.49	8.99	3.81	2.59	5.27
Clay %	1.64	2.95	4.28	2.47	3.13	2.58
Med. Dia.	-0.32	-1.06	0.24	-0.46	-0.48	-0.61
Mean Dia.	-0.46	-0.67	0.77	-0.51	-0.50	-0.56
Std. Dev.	1.59	1.99	2.71	1.87	1.83	1.93
Skewness	0.16	0.65	0.43	0.29	0.31	0.39
Kurtosis	1.8	2.04	1.78	2.31	2.07	2.27
Quartz %						
Foram %						
Shell %						
Algae-Coral %						
Misc. %						
Carb. %						

TABLE 5 CONT.'D

HOSPITAL BANK STATION 2	MARCH '76														
SAMPLE	6-1 KBK	6-2 KBM	6-3 KBO	6-4 KBQ	6-5 KBS	6-6 KBU	6-7 KCL								
Gravel %	0.0	0.0	0.56	0.0	0.0	0.0	0.0								
Sand %	7.38	9.63	19.95	10.79	5.9	11.66	8.01								
Silt %	54.64	49.25	48.22	41.61	42.57	43.81	65.55								
Clay %	37.98	41.12	31.34	47.6	51.54	44.53	28.64								
Med. Dia.	7.15	7.45	6.25	7.8	8.05	7.5	7.05								
Mean Dia.	7.12	7.42	6.48	7.54	7.82	7.36	7.05								
Std. Dev.	-2.17	2.03	2.41	2.2	2.03	2.03	2.22								
Skewness	-0.03	-0.09	0.16	-0.2	-0.22	-0.12	-0.01								
Kurtosis	0.79	0.93	0.65	0.9	0.94	0.76	0.73								
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

HOSPITAL BANK STATION 2	FEBRUARY '76								JULY '76						
SAMPLE	2-1a JIIR	2-2a JHW	2-3a JIB	2-4 JIQ	2-5 JII	2-6 JIK	2-8 JIT	2-9 JIX	2-1 OGV	2-2 OGX	2-3 OGZ	2-4 ORV	2-5 ORY	2-6 ORZ	2 OSI
Gravel %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.16	0.0	0.0	0.0	0.0	0.0	0.0
Sand %	3.31	6.01	4.48	8.82	6.35		5.34	7.0	4.78	5.19	8.28	5.13	5.62	5.09	6.38
Silt %	70.55	65.97	73.77	37.23	44.48	43.59	52.78	47.53	41.53	43.62	42.8	38.85	30.66	37.53	46.08
Clay %	26.14	28.02	21.75	53.95	49.17	56.41	41.88	45.47	53.53	51.19	48.92	56.02	63.72	57.38	47.54
Med. Dia.	6.39	5.65	5.56	8.11	7.91	8.13	7.49	7.7	8.14	8.03	7.91	8.24	8.69	8.33	8.53
Mean Dia.	6.48	6.42	6.23	7.81	7.46	7.94	7.32	7.4	7.93	7.7	7.67	8.05	8.26	8.05	8.12
Std. Dev.	1.8	2.14	1.94	1.9	2.19	1.51	2.05	2.10	1.98	2.11	7.06	1.9	2.12	1.95	2.03
Skewness	0.13	0.46	0.49	-0.31	-0.27	-0.19	-0.13	-0.21	-0.22	-0.24	-0.22	-0.23	-0.35	-0.28	-0.37
Kurtosis	0.76	0.72	0.86	1.11	0.73	1.05	0.78	0.79	0.91	0.79	0.98	1.03	1.01	0.97	0.93
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

HOSPITAL BANK STATION 2	OCTOBER '76							NOVEMBER 76							
SAMPLE	2-1 SPQ	2-2 SPL	2-3 SPN	2-4 SPP	2-5 SPR	2-6 SPT	2 SQC	VKJ 2-1	VKM 2-2	VKP 2-3	VKS 2-4	VKV 2-5	VKY 2-6	VLF 2-7	
Gravel %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.08	0.0	0.0	0.0	0.0	0.0	
Sand %	11.85	8.18	8.49	40.53	3.04	3.71	3.88	6.94	8.07	8.4	17.37	7.9	9.87	18.67	
Silt %	43.97	46.73	51.32	28.81	54.38	56.7	69.87	53.57	46.21	46.76	45.15	40.68	36.46	50.32	
Clay %	44.18	45.09	40.19	30.66	42.55	39.59	26.25	39.49	45.64	44.84	37.48	51.42	53.68	31.01	
Med. Dia.	7.69	7.8	7.62	6.89	7.72	7.64	7.59	7.56	7.83	7.83	7.38	8.02	8.12	7.68	
Mean Dia.	7.42	7.63	7.39	6.4	7.67	7.59	7.69	7.33	7.8	7.74	6.8	7.85	7.59	6.95	
Std. Dev.	2.08	1.85	1.91	2.31	1.65	1.61	1.46	1.95	1.76	1.73	2.31	1.9	2.15	2.34	
Skewness	-0.22	-0.21	-0.21	-0.18	-0.07	-0.08	0.04	-0.18	-0.15	-0.19	-0.27	-0.23	-0.36	-0.34	
Kurtosis	0.97	1.24	1.07	0.6	1.02	1.21	1.24	1.03	1.41	1.6	0.8	1.13	0.99	0.94	
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

HOSPITAL BANK STATION 3	APRIL '76														
SAMPLE	7-1 KRS	7-2 KRU	7-3 KRW	7-4 KRY	7-5 KSA	7-6 KSC	7-7 KSI								
Gravel %	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
Sand %	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
Silt %	46.94	44.01	41.59	46.93	49.25	43.74	58.98								
Clay %	53.06	55.99	58.41	53.07	50.75	56.26	41.02								
Med. Dia.	8.11	8.25	8.33	8.11	8.0	8.22	8.09								
Mean Dia.	8.06	8.17	8.19	8.04	7.89	8.19	8.03								
Std. Dev.	1.56	1.57	1.60	1.58	1.7	1.43	1.61								
Skewness	-0.04	-0.08	-0.15	-0.06	-0.08	-0.04	-0.05								
Kurtosis	0.77	0.76	0.85	0.79	0.74	0.83	0.77								
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

HOSPITAL BANK STATION 3	JUNE '76							AUGUST '76							
SAMPLE	3-1 MTF	3-2 MTH	3-3 MTQ	3-4 MTL	3-5 MTN	3-6 MTP	3-7 MIC	3-1 PBP	3-2 PBR	3-3 PBT	3-4 PBV	3-6 PBZ	3-7 PCI		
Gravel %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Sand %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Silt %	41.82	37.72	39.83	45.38	37.91	35.58	48.89	33.16	32.0	25.4	44.98	38.63	46.52		
Clay %	58.18	62.28	60.17	54.62	62.09	64.42	51.11	66.84	68.0	74.6	55.02	61.37	53.46		
Med. Dia.	8.16	8.42	8.33	8.1	8.3	8.43	8.41	8.56	8.63	8.83	8.2	8.44	8.61		
Mean Dia.	8.18	8.34	8.22	7.98	8.1	8.36	8.28	8.49	8.55	8.77	8.06	8.33	8.53		
Std. Dev.	1.26	1.41	1.43	1.48	1.46	1.57	1.44	1.36	1.33	1.17	1.63	1.53	1.36		
Skewness	-0.02	-0.11	-0.13	-0.12	-0.19	-0.12	-0.17	-0.19	-0.12	-0.11	-0.11	-0.16	-0.12		
Kurtosis	1.13	0.92	0.91	0.95	1.06	1.0	1.02	0.92	0.9	0.89	0.77	0.92	0.87		
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

HOSPITAL ROCK STATION 3	DECEMBER '76														
SAMPLE	3-1 WFN	3-2 WFG	3-3 WFT	3-4 WFW	3-5 WFZ	3-6 WGZ	3-7 WGJ								
Gravel %	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
Sand %	0.0	0.0	0.0	0.0	0.0	0.0	0.0								
Silt %	45.51	48.09	42.89	49.75	55.13	49.93	54.21								
Clay %	54.49	51.91	57.11	50.22	44.87	50.07	45.79								
Med. Dia.	8.2	8.03	8.32	7.97	7.63	7.96	8.33								
Mean Dia.	7.77	8.0	8.21	7.97	7.7	7.98	8.16								
Std. Dev.	1.92	1.60	1.57	1.64	1.77	1.68	1.69								
Skewness	-0.22	-0.05	-0.10	-0.01	0.05	0.01	-0.15								
Kurtosis	0.87	0.8	0.76	0.76	0.74	0.74	0.72								
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

HOSPITAL BANK STATION 4	APRIL '76														
SAMPLE	81 KSM	8-2 KSO	8-3 KSQ	8-4 KSS	8-5 KSV	8-7 KTE									
Gravel %	0.0	0.0	0.0	0.0	0.0	0.0									
Sand %	0.0	0.0	0.0	0.0	0.0	0.0									
Silt %	46.83	46.53	43.49	45.21	46.71	62.25									
Clay %	53.17	53.47	56.51	54.79	53.29	37.75									
Med. Dia.	8.11	8.13	8.23	8.18	8.12	7.95									
Mean Dia.	8.05	8.04	8.17	8.09	8.03	7.91									
Std. Dev.	1.59	1.63	1.48	1.58	1.60	1.58									
Skewness	-0.06	-0.08	-0.07	-0.09	-0.07	-0.03									
Kurtosis	0.78	0.78	0.8	0.80	0.79	0.78									
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

HOSPITAL BANK STATION 4	JUNE '76							AUGUST '76							
SAMPLE	4-1 MTZ	4-2 MUB	4-3 MUDA	4-4 MUF	4-5 MUH	4-6 MUJ	4-7 NUD	4-1 PCK	4-2 PCM	4-3 PCO	4-4 PCQ	4-5 PCS	4-6 PCU	4-7 PDO	
Gravel %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Sand %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Silt %	50.84	39.99	48.94	45.46	46.99	4517	51.98	33.35	41.1	32.07	27.57	33.7	39.9	45.88	
Clay %	49.16	60.01	51.06	54.54	53.01	54.83	48.02	66.65	58.9	67.93	72.43	66.3	60.1	54.12	
Med. Dia.	7.93	8.3	7.99	8.09	8.03	8.04	8.4	8.63	8.38	8.75	895	8.82	8.42	8.65	
Mean Dia.	8.0	8.22	8.01	7.97	8.01	8.13	8.23	852	8.21	8.57	8.77	8.58	8.21	8.47	
Std. Dev.	1.38	1.41	1.3	1.45	1.26	1.1	1.5	1.42	1.63	1.49	1.33	1.48	1.63	1.5	
Skewness	0.06	-0.12	4.05	-0.12	-0.05	0.07	-0.17	-0.15	-0.17	-0.21	-0.25	-0.25	-0.19	-0.19	
Kurtosis	0.9	0.98	1.12	0.99	1.22	1.29	0.92	0.89	0.81	0.9	0.89	0.8	0.83	0.9	
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

TABLE 5 CONT.'D

HOSPITAL BANK STATION 4	DECEMBER '76														
SAMPLE	4-1 WGM	4-2 WGP	4-3 WGS	4-4 WGV	4-5 WGY	4-6 WHB									
Gravel %		25.18				0.0									
Sand %		40.29				0.0									
Silt %	45.88	16.99	34.06	58.13	54.13	66.31									
Clay %	54.12	17.54	65.94	41.87	45.87	33.69									
Med. Dia.	8.14	1.43	8.75	7.43	7.67	7.58									
Mean Dia.	807	2.77	8.54	7.62	7.72	7.65									
Std. Dev.	1.55	4.19	1.5	1.75	1.81	1.77									
Skewness	-0.07	0.42	-0.21	0.12	0.03	0.03									
Kurtosis	0.81	0.64	0.8	0.76	0.68	0.76									
Quartz %															
Foram %															
Shell %															
Algae-Coral %															
Misc. %															
Carb. %															

The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Minerals Revenue Management** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.