ON THE BOTTOM SEDIMENTS OFF AKITA

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Received March 10, 1960.

Abstract

In summer, 1958, bottom sediments were dredged at 366 stations off the coast of the Akita Prefecture.

The bottom is very rugged at the northern and southern parts, and is flat monotonously at the middle. Almost of sediments are sandy. The median map shows parallel contours and grain size changes reguarly from coast to offing with some irregularities. Md-Depth relation shows abrupt change of grain size at the depths of about 10 m and 55 m. Md-So relation shows clear decrease of sorting coefficient at 2.3—3.0 Mdϕ.

1. Introduction.

From July to August, 1958, surveying vessel *Heiyo* of the Hydrographic Office had sounded and dredged at the offing of the southern part of the Akita Prefecture extending from the Oga Peninsula to Takaisozaki. The surveyed area was bounded by the line joining Siosezaki, southeast of the Oga Peninsula, and 5 km west of Takaisozaki. The dredging stations were located in the area 15 km off from shore and 70 m in depth. Positions were fixed by sextants and three-arm protoractor, and depths were sounded with *SOI—41 echosounder*. Dredging density is one station per 1.0 × 1.0 km in neighbour of Matugasaki, south of Akita City, and 1.0 × 1.5 km in other places. Pipe dredger of 10 cm diameter was used for dredging.

2. Topography.

The interval of isobaths of the topographic map(Fig. 1) is 5 m, while original bathymetric chart of 2 m isobath interval was constructed from echograms, except the area near Oga Peninsula. Bottoms of the northern and southern parts of the surveyed area are very rugged; the marginal ridge of Akita Basin approaching near the coast. On the other hand in the middle part, abreast the basin, bottom is flat and monotonous.

In the northern margin, the coast is rocky and sea bottom shows relief similar to the land configuration. In the southern margin, the coast is also rocky and isobaths are very crowded. The middle part slopes slightly toward offing with inclination less than about 1/250. Judging from the H. O. Chart No. 145, the continental shelf of the area has about 7 km width and 120—180 m depth in northern part. Surveyed area contains about half of the shelf.

3. Bottom Sediments.

1). Method and result of the grain size analysis.

Sandy sediments were analysed by the Emery Tube Method (Ao et al, 1957), and muddy ones by the Emery Tube and Tortion Balance Method (Ao and Sato, 1960). Their accuracies are about 0.3 $\phi\pm$. Samples were very little in quantities, and muddy sediments obtained at about 70 m depth were not analysed.

Results of the analyses are listed in Table 1.

Total number of samples is 366, which contains 7 coarse sands, 85 mediate sands, 239 fine sands, 30 very fine sands, and 5 coarse silts; almost of these are fine sands and the remainders are also sandy.

2). Median contour map.

To investigate the horizontal distribution, median contour map has been prepared (Fig. 2), with intervals of 0.25ϕ for 2.0—4.0 Mdϕ, and 0.5ϕ for the rest. Except a few places, the median map shows parallel contours and regular changes of grain size from coast to offing, which coincide with submarine topography. The types of deposits are varied from shore to offing as follows: $III_{12} \rightarrow$ VI $\rightarrow$ I · O $\rightarrow$ (IV · I_2) $\rightarrow II_1 \rightarrow II_2$. Almost of the sandy sediments are well sorted.

Irregular variations are seen in the following areas:

(i). Northern rocky area; the topography is too difficult to show Md-contours precisely, owing to the presence of coarse sediments and the scarceness of sampling stations.

(ii). Offing of Akita harbour, the mouth of the Omono River; no distinct delta configuration is shown in spite of the presence of coarse sediments. The fine sediments are found far front of the river mouth, and distribute towards it. This is considered to come from the effect of pouring from the river or long-shore current, which flows along the south coast of the Oga Peninsula and turns round at the offing of the harbour.

(iii). Area west of Matugasaki; the coarse sands of 2—3 Md ϕ and III in Sand-type distribute in 1 km width and 14 km length along the coast. This is the ancient shore-line deposit.

3). Md-Depth relation.

Fig. 3 shows the Md-Depth relation. The abrupt change of grain size are seen at the depths of about 10 m and 55 m. The former represents the limit of breaker action, and the parts shallower than 10 m are off shore bar and trough. The 10 m is common depth of the limit of breaker along the coast of the Niigata to Akita Prefectures. The sediments from 10 m to 35 m depths are very stable in grain size. The median of deposits become fine slightly at 40m depth and abruptly change muddy at 55m. The latter depth is the wave base or mud line (Hoshino, 1958).

4). Md-So relation.

Fig. 4 is the Md-So relation, showing clear decrease of sorting coefficient at 2.3—3.0 Mdϕ a common value of median with minimum sorting value.

Acknowledgment: The authors are grateful to Messrs. H. Hirota, R. Sekizuka, and the members of the Hydrographic Office, especially Capt. T. Hojo of the *Heiyo*, and Y. Iwabuchi. They are also indebted to Dr. M. Hoshino and Mr. A. Mogi for various criticisms.

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Table 1. Results of Grain Size Analysis

Station No.	Depth	ϕ_{16}	ϕ_{25}	ϕ_{50}	ϕ_{75}	ϕ_{84}	S_0	Sd-Type	Note
1	8	——	——	0.00	1.15	1.80	——	III_2	
2	12	2.32	2.40	2.60	2.75	2.87	0.18	VI	
3	16	2.20	2.35	2.55	2.75	2.83	0.20	VI	
4	22	2.16	2.35	2.65	3.00	3.10	0.33	I_1	rare
5	30	2.07	2.20	2.60	3.10	3.23	0.45	III_1	
6	36	2.20	2.60	3.10	3.40	3.50	0.40	I_2	
7	45	2.70	3.05	3.45	3.85	3.98	0.40	II_1	
8	52	2.43	2.55	2.85	3.15	3.22	0.30	I_1	
9	61	——	——	——	——	——	——	——	none
10	64	0.95	1.55	3.75	4.10	4.35	1.28	IV_1	
11	56	3.30	3.45	3.70	4.10	——	0.33	II_2	
12	48	3.05	3.30	3.70	3.90	4.02	0.30	II_2	
13	39	2.20	2.45	3.00	3.35	3.53	0.45	IV_1	
14	34	2.00	2.23	2.77	3.12	3.25	0.45	IV_1	
15	26	2.26	2.38	2.67	3.00	3.15	0.31	IV_1	
16	18	2.35	2.53	2.73	2.95	3.03	0.21	O	
17	13	2.30	2.40	2.61	2.80	2.90	0.20	VI	
18	9	——	——	——	——	——	——	——	none
19	7	2.10	2.20	2.40	2.50	2.55	0.15	III_1	
20	14	2.20	2.30	2.55	2.80	2.95	0.25	III_1	
21	19	2.40	2.55	2.85	3.05	3.15	0.25	I_1	
22	26	2.55	2.70	3.05	3.35	3.51	0.33	II_1	
23	33	——	——	——	——	——	——	——	none
24	40	2.13	2.25	2.55	3.30	3.50	0.53	IV_1	
25	48	3.15	2.38	3.72	3.95	4.08	0.29	II_2	
26	57	3.50	3.60	3.85	4.00	4.10	0.20	II_2	

Table 1. Results of Grain Size Analysis

Station No.	Depth	ϕ_{16}	ϕ_{25}	ϕ_{50}	ϕ_{75}	ϕ_{84}	S_0	Sd-Type	Note
27	64	3.85	4.10	4.60	6.50	8.35	1.20	II_2	
28	5	1.63	1.95	2.25	2.45	2.55	0.25	III_1	
29	14	2.25	2.30	2.55	2.75	2.83	0.23	VI	
30	12	2.18	2.30	2.52	2.68	2.74	0.19	VI	
31	19	2.40	2.54	2.78	2.95	3.03	0.21	I_1	
32	26	2.30	2.50	2.80	3.15	3.24	0.33	I_1	
33	34	2.12	2.30	2.70	3.10	3.23	0.40	III_1	
34	40	2.05	2.35	3.10	3.50	3.70	0.58	IV_1	
35	50	2.85	3.05	3.40	3.70	3.85	0.33	II_1	
36	59	3.30	3.45	3.68	3.97	4.10	0.26	II_2	
37	66	3.90	4.10	4.50	4.90	5.50	0.40	II_2	
38	67	——	——	——	——	——	——	——	none
39	59	3.20	3.35	3.65	3.90	4.10	0.28	II_2	
40	50	2.45	2.90	3.50	3.75	3.93	0.43	II_1	
41	40	2.25	2.40	2.75	3.20	3.40	0.40	I_2	
42	33	2.30	2.41	2.73	3.15	3.36	0.37	I_2	
43	6	2.16	2.25	2.40	2.60	2.75	0.18	III_1	
44	26	2.40	2.50	2.80	3.10	3.22	0.33	I_1	
45	18	2.31	2.40	2.60	2.80	2.91	0.20	VI	
46	13	-0.25	1.00	2.40	4.45	6.55	1.73	IV_1	
47	7	2.15	2.25	2.35	2.50	2.60	0.18	III_1	
48	9	2.06	2.17	2.36	2.56	2.66	0.20	III_1	
49	15	2.33	2.40	2.65	2.80	2.95	0.20	VI	
50	21	2.37	2.55	2.76	3.06	3.22	0.26	I_1	
51	30	2.48	2.60	2.95	3.30	3.50	0.35	I_1	
52	37	2.02	2.28	2.53	3.00	3.25	0.36	III_1	
53	44	2.10	2.35	2.75	3.55	3.83	0.60	IV_1	
54	56	3.60	3.78	4.10	——	——	——	II_2	
55	64	3.15	3.40	3.85	4.05	4.15	0.33	II_2	
56	74	2.85	3.15	3.75	4.20	——	0.53	II_1	
57	8	2.00	2.15	2.25	2.30	2.40	0.08	III_2	
58	10	2.33	2.45	2.60	2.80	2.90	0.18	VI	
59	16	2.41	2.54	2.74	2.98	3.15	0.22	I_1	
60	21	2.30	2.50	2.75	3.05	3.24	0.28	I_1	
61	28	2.25	2.46	2.85	3.25	3.39	0.39	I_2	
62	34	1.55	2.00	2.70	3.00	3.10	0.50	I_1	
63	40	3.05	3.30	3.50	3.80	3.90	0.25	II_1	
64	46	3.32	3.45	3.65	4.10	——	0.33	II_2	
65	56	4.00	4.15	4.50	4.85	4.95	0.35	II_2	
66	54	3.42	3.55	3.80	4.10	4.20	0.28	II_2	
67	61	2.50	3.85	4.00	4.30	——	0.23	II_1	
68	58	3.55	3.70	3.95	4.20	——	0.25	II_2	
69	51	3.30	3.50	3.75	3.90	3.97	0.20	II_2	

Table 1. Results of Grain Size Analysis

Station No.	Depth	ϕ_{16}	ϕ_{25}	ϕ_{50}	ϕ_{75}	ϕ_{84}	S_0	Sd-Type	Note
70	45	3.25	3.43	3.69	3.92	4.00	0.25	II_2	
71	6	1.87	2.10	2.35	2.55	2.68	0.23	III_1	
72	16	0.10	0.62	1.19	1.69	1.95	0.54	III_2	
73	27	2.65	2.85	3.15	3.40	3.55	0.28	II_1	
74	36	2.95	3.15	3.45	3.70	3.80	0.28	II_1	
75	37	3.08	3.20	3.50	3.75	3.94	0.28	II_1	
76	42	3.00	3.20	3.55	3.85	3.98	0.33	II_1	
77	38	3.20	3.30	3.60	3.90	3.97	0.30	II_1	
78	33	——	——	——	——	——	——	——	mud
79	28	2.50	2.65	3.00	3.25	3.43	0.30	I_1	
80	18	2.48	2.60	2.90	3.15	3.27	0.28	I_1	
81	14	2.20	2.30	2.55	2.80	2.93	0.25	III_1	
82	10	2.22	2.30	2.55	2.90	3.05	0.30	III_1	
83	7	1.75	2.05	2.30	2.45	2.50	0.20	III_2	
84	14	2.37	2.50	2.75	2.95	3.06	0.23	I_1	
85	20	2.55	2.70	2.95	3.20	3.31	0.25	I_1	
86	27	2.35	2.55	2.97	3.32	3.45	0.39	I_2	
87	34	——	1.75	3.47	3.85	4.05	1.05	IV_1	
88	38	3.05	3.25	3.55	3.70	3.80	0.23	II_1	
89	7	1.95	2.15	2.35	2.50	2.58	0.18	III_1	
90	12	2.35	2.45	2.70	2.90	3.04	0.23	I_1	
91	18	2.50	2.65	2.80	3.05	3.18	0.20	O	
92	24	2.45	2.70	3.05	3.35	3.47	0.33	II_1	
93	32	2.40	2.81	3.25	3.57	3.70	0.38	II_1	
94	37	1.70	3.00	3.40	3.65	3.72	0.33	II_1	
95	42	——	——	——	——	——	——	——	none
96	49	3.35	3.50	3.83	4.12	——	0.31	II_2	
97	55	3.72	4.00	4.35	4.70	4.83	0.35	II_2	
98	61	4.00	4.15	4.50	4.85	4.95	0.35	II_2	
99	9	2.06	2.20	2.38	2.60	2.77	0.20	III_1	
100	15	2.33	2.45	2.70	2.85	2.95	0.20	VI	
101	21	2.53	2.62	2.88	3.19	3.32	0.29	I_1	
102	29	2.37	2.65	3.20	3.50	3.64	0.43	IV_1	
103	36	2.75	3.10	3.40	3.75	3.90	0.33	II_1	
104	37	——	——	——	——	——	——	——	none
105	44	3.26	3.40	3.70	3.95	4.10	0.28	II_2	
106	50	3.19	3.40	3.80	4.50	4.95	0.55	II_2	
107	55	3.80	3.95	4.65	4.75	4.88	0.40	II_2	
108	8	1.97	2.10	2.30	2.45	2.52	0.18	III_2	
109	13	2.28	2.36	2.57	2.82	2.93	0.23	VI	
110	18	——	——	——	——	——	——	——	none
111	26	2.41	2.60	2.95	3.25	3.35	0.33	I_1	
112	34	2.35	2.80	3.40	3.70	3.80	0.45	II_1	

Table 1. Results of Grain Size Analysis

Station No.	Depth	ϕ_{16}	ϕ_{25}	ϕ_{50}	ϕ_{75}	ϕ_{84}	S_0	Sd-Type	Note
113	37	3.04	3.20	3.40	3.65	3.80	0.23	II_1	
114	43	3.15	3.30	3.60	3.80	3.93	0.25	II_1	
115	6	1.95	2.10	2.30	2.45	2.55	0.18	III_2	
116	13	2.35	2.45	2.71	2.99	3.12	0.27	I_1	
117	16	2.32	2.40	2.65	2.80	2.95	0.20	VI	
118	23	2.44	2.55	2.85	3.15	3.24	0.30	I_1	
119	30	2.36	2.60	3.15	3.50	3.65	0.45	IV_1	
120	36	2.90	3.10	3.50	3.75	3.98	0.33	II_1	
121	39	2.83	3.00	3.35	3.65	3.76	0.33	II_1	
122	44	2.90	3.20	3.50	3.85	4.10	0.33	II_1	
123	50	3.15	3.30	3.56	3.81	3.90	0.26	II_1	
124	55	3.58	3.80	4.25	4.80	4.96	0.50	II_2	
125	63	3.60	3.73	3.98	4.23	——	0.25	II_2	
126	60	4.00	4.20	4.85	5.80	6.35	0.80	II_2	
127	54	3.40	3.65	4.30	4.90	5.80	0.63	II_2	
128	48	3.16	3.35	3.65	3.85	3.90	0.25	II_2	
129	8	2.02	2.20	2.35	2 54	2.64	0.17	III_1	
130	14	2.23	2.30	2.50	2.65	2.72	0.18	VI	
131	20	2.39	2.50	2.70	2.95	3.05	0.23	I_1	
132	28	2.45	2.60	3.00	3.35	3.47	0.38	I_1	
133	35	1.50	2.45	3.30	3.65	3.80	0.60	IV_1	
134	39	3.05	3.20	3.45	3.75	3.88	0.28	II_1	
135	43	3.25	3.40	3.70	4.00	4.12	0.30	II_2	
136	48	3.10	3.28	3.56	3.90	4.05	0.31	II_1	
137	54	3.45	3.65	4.15	4.60	4.75	0.48	II_2	
138	58	4.00	4.15	4.55	4.95	5.25	0.40	II_2	
139	61	——	——	——	——	——	——	II_2	mud
140	54	3.28	3.50	3.82	4.07	4.17	0.29	II_2	
141	50	3.15	3.33	3.60	3.83	3.95	0.25	II_2	
142	42	3.28	3.44	3.69	3.89	3.97	0.23	II_2	
143	9	2.10	2.25	2.40	2.60	2.70	0.18	III_1	
144	15	2.20	2.35	2.55	2.75	2.90	0.20	III_1	
145	21	2.50	2.60	2.85	3.15	3.25	0.28	I_1	
146	28	2.43	2.60	3.00	3.30	3.50	0.35	I_1	
147	36	2.84	2.95	3.30	3.70	3.92	0.43	V	
148	39	3.06	3.25	3.50	3.80	3.89	0.28	II_1	
149	6	1.85	2.05	2.30	2.50	2.55	0.23	III_1	
150	12	2.24	2.35	2.50	2.70	2.77	0.18	III_1	
151	18	2.35	2.45	2.70	3.00	3.10	0.28	I_1	
152	25	2.55	2.65	2.95	3.20	3.35	0.28	I_1	
153	33	3.05	3.27	3.51	3.80	3.93	0.27	II_1	
154	37	3.13	3.25	3.50	3.70	3.79	0.28	II_1	
155	42	3.55	4.85	4.90	5.90	6.55	0.53	II_2	

Table 1. Results of Grain Size Analysis

Station No.	Depth	ϕ_{16}	ϕ_{25}	ϕ_{50}	ϕ_{75}	ϕ_{84}	S_0	Sd-Type	Note
156	47	3.30	3.45	3.80	4.25	4.60	0.40	II_2	
157	52	2.95	3.25	3.60	3.80	3.89	0.28	II_1	
158	56	3.57	3.75	4.27	4.85	5.50	0.55	II_2	
159	63	3.95	4.10	4.50	4.90	5.00	0.40	II_2	
160	65	3.65	3.90	4.30	4.70	4.90	0.40	II_2	
161	60	——	——	——	——	——	——	——	none
162	57	3.03	3.20	3.50	3.75	3.85	0.28	II_1	
163	6	1.60	2.10	2.30	2.50	2.58	0.20	III_1	
164	12	2.23	2.30	2.50	2.70	2.80	0.20	VI	
165	18	2.30	2.45	2.65	2.95	3.05	0.25	I_1	
166	26	2.56	2.75	3.00	3.30	3.43	0.28	I_1	
167	34	2.65	2.95	3.30	3.55	3.67	0.30	II_1	
168	38	3.15	3.40	3.75	4.55	5.25	0.58	II_2	
169	42	2.85	3.05	3.40	3.75	3.88	0.35	II_1	
170	47	3.20	3.30	3.55	3.80	3.90	0.25	II_2	
171	52	3.05	3.20	3.50	3.70	3.81	0.25	II_1	
172	45	2.95	3.15	3.35	3.55	3.68	0.20	II_1	
173	48	3.15	3.30	3.60	4.25	4.60	0.48	II_1	
174	53	2.90	3.15	3.85	5.30	5.85	1.13	II_1	
175	60	3.26	3.45	3.75	4.20	4.55	0.38	II_2	
176	64	3.50	3.80	4.20	4.65	4.90	0.43	II_2	
177	10	2.20	2.35	2.60	2.85	2.95	0.25	I_1～III_1	
178	14	2.06	2.20	2.45	2.55	2.67	0.18	III_1	
179	22	2.42	2.55	2.85	3.15	3.30	0.30	I_1	
180	30	2.65	2.85	3.25	3.55	3.75	0.35	II_1	
181	34	2.80	2.95	3.30	3.70	4.25	0.43	II_1	
182	34	——	——	——	——	——	——	——	none
183	32	3.00	3.15	3.40	3.60	3.70	0.23	II_1	
184	32	2.55	2.70	3.05	3.35	3.48	0.33	I_1	
185	26	4.47	2.60	2.95	3.20	3.34	0.30	I_1	
186	18	3.30	2.40	2.60	2.80	2.89	0.20	VI	
187	12	2 26	2.35	2.55	2.75	2.84	0.20	VI	
188	7	2.15	2.25	2.40	2.60	2.65	0.18	III_1	
189	6	2.10	2.20	2.40	2.60	2.65	0.20	III_1	
190	12	2.35	2.45	2.65	2.80	2.93	0.18	VI	
191	17	2.36	2.45	2.70	2.90	2.95	0.23	I_1	
192	24	2.35	2.50	2.85	3.20	3.30	0.35	I_1	
193	28	——	——	——	——	——	——	——	none
194	10	2.20	2.30	2.55	2.70	2.80	0.20	VI	
195	16	2.27	2.40	2.60	2.80	2.98	0.20	I_1	
196	10	2.00	2.25	2.50	2.70	2.81	0.23	VI	
197	20	2.37	2.55	2.80	3.05	3.15	0.25	I_1	
198	34	2.63	2.85	3.35	3.80	4.12	0.48	II_1	

Table 1. Results of Grain Size Analysis

Station No.	Depth	ϕ_{16}	ϕ_{25}	ϕ_{50}	ϕ_{75}	ϕ_{84}	S_0	Sd-Type	Note
199	36	2.67	2.80	3.15	3.45	3.60	0.33	II_1	
200	20	1.75	2.20	2.55	2.80	2.94	0.30	VI	
201	13	——	-0.50	0.50	1.50	1.98	1.00	III_2	
202	11	2.22	2.35	2.50	2.75	2.91	0.20	III_1	
203	19	2.45	2.55	2.85	3.10	3.20	0.28	I_1	
204	29	2.26	2.45	2.80	3.25	3.43	0.40	I_2	
205	22	——	——	——	——	——	——	——	none
206	15	2.27	2.40	2.60	2.90	3.05	0.25	I_1	
207	10	2.34	2.50	2.65	2.80	2.90	0.15	I_1	
208	16	2.25	2.40	2.65	2.90	3.00	0.25	I_1	
209	24	——	——	2.90	——	——	0.25	——	
210	7	1.81	1.95	2.25	2.30	2.39	0.18	III_2	
211	14	2.25	2.35	2.55	2.70	2.78	0.18	VI	
212	10	2.23	2.30	2.50	2.70	2.80	0.20	VI	
213	14	2.34	2.45	2.65	2.80	2.91	0.18	VI	
214	26	——	——	2.80	——	——	0.30	——	
215	24	2.45	2.60	2.90	3.15	3.30	0.28	I_1	
216	31	2.26	2.50	2.95	3.25	3.35	0.38	I_1	
217	26	2.40	2.60	2.90	3.25	3.40	0.33	I_1	
218	35	2.75	3.00	3.40	3.65	3.80	0.33	II_1	
219	8	2.00	2.10	2.30	2.40	2.51	0.15	III_2	
220	12	2.08	2.20	2.35	2.50	2.60	0.15	III_1	
221	22	2.25	2.34	2.57	2.78	2.92	0.22	VI	
222	31	2.44	2.60	2.95	3.35	3.80	0.38	I_1	
223	38	2.70	2.95	3.25	3.60	3.75	0.33	II_1	
224	42	2.45	2.65	3.00	3.40	3.53	0.38	II_1	
225	67	4.00	4.20	4.60	5.20	5.80	0.50	II_2	
226	64	2.65	3.05	4.30	5.35	——	1.15	II_1	
227	45	——	——	——	——	——	——	——	none
228	40	——	——	——	——	——	——	——	none
229	30	2.35	2.50	2.75	3.00	3.14	0.25	I_1	
230	21	——	——	——	——	——	——	——	none
231	14	2.30	2.35	2.55	2.70	2.76	0.18	VI	
232	8	1.63	1.80	2.00	2.10	2.19	0.15	III_2	
233	7	2.02	2.10	2.30	2.45	2.49	0.18	III_2	
234	15	2.34	2.45	2.65	2.75	2.83	0.15	VI	
235	25	2.28	2.35	2.57	2.77	2.90	0.21	I_1	
236	33	2.38	2.45	2.65	2.95	3.12	0.25	I_1	
237	42	2.65	2.85	3.35	3.70	3.75	0.43	II_1	
238	54	1.95	2.50	2.95	3.35	3.55	0.43	I_2	
239	70	3.50	3.80	4.35	4.85	5.15	0.53	II_2	
240	63	2.10	2.25	3.05	4.80	5.75	1.28	IV_1	
241	44	2.16	2.40	2.90	3.30	3.55	0.45	I_2	

Table 1. Results of Grain Size Analysis

Station No.	Depth	ϕ_{16}	ϕ_{25}	ϕ_{50}	ϕ_{75}	ϕ_{84}	S_0	Sd-Type	Note
242	35	——	——	——	——	——	——	——	none
243	26	2.08	2.30	2.50	2.70	2.78	0.20	VI	
244	17	2.30	2.40	2.63	2.90	3.55	0.25	III_1	
245	10	2.08	2.20	2.45	2.75	2.95	0.28	III_1	
246	7	1.41	1.65	1.95	2.05	2.10	0.20	III_2	
247	14	2.20	2.30	2.45	2.60	2.65	0.15	VI	
248	22	2.35	2.45	2.65	2.80	2.89	0.18	VI	
249	30	2.27	2.40	2.70	2.95	3.13	0.28	I_1	
250	38	2.05	2.20	2.40	2.60	2.70	0.20	III_1	
251	44	2.03	2.20	2.45	2.60	2.67	0.20	VI	
252	53	1.85	2.20	3.00	3.40	3.51	0.60	IV_1	
253	62	2.39	2.50	2.70	3.00	3.15	0.25	I_1	
254	74	——	——	——	——	——	——	——	none
255	10	——	——	——	0.60	1.25	——	VII	
256	11	2.22	2.30	2.50	2.65	2.78	0.18	VI	
257	18	2.35	2.45	2.70	2.95	3.03	0.25	I_1	
258	27	2.37	2.41	2.67	2.92	3.03	0.26	VI	
259	34	2.15	2.30	2.50	2.70	2.78	0.20	VI	
266	41	——	——	——	——	——	——	——	none
261	54	3.30	2.50	3.95	4.55	4.77	0.53	II_1	
262	67	——	——	——	——	——	——	——	none
263	63	3.30	3.50	3.95	4.50	4.71	0.50	II_2	
264	46	1.55	2.05	2.45	2.75	3.15	0.35	III_1	
265	36	2.20	2.30	2.50	2.70	2.83	0.20	III_1	
266	28	2.52	2.60	2.85	3.25	3.40	0.33	I_1	
267	20	2.30	2.45	2.70	2.75	2.87	0.15	I_1	
268	14	2.28	2.35	2.60	2.80	2.90	0.23	VI	
269	6	1.57	1.75	2.00	2.20	2.26	0.23	VII	
270	6	1.60	1.80	2.00	2.20	2.25	0.20	III_2	
271	14	2.15	2.30	2.45	2.65	2.70	0.18	VI	
272	22	2.80	2.90	3.10	3.30	3.37	0.20	O	
273	31	2.29	2.40	2.65	2.95	3.05	0.28	I_1	
274	38	2.10	2.25	2.40	2.60	2.62	0.18	III_1	
275	49	——	——	——	——	——	——	——	mud
276	61	3.45	3.80	4.40	4.85	5.05	0.53	II_2	
277	74	4.15	4.35	4.85	5.80	7.25	0.73	II_2	
278	61	3.40	3.65	4.20	4.70	4.90	0.53	II_2	
279	43	2.05	2.20	2.50	2.80	3.20	0.30	III_1	
280	34	2.02	2.25	2.55	2.80	3.00	0.28	III_1	
281	26	2.25	2.35	2.60	2.80	2.90	0.23	I_1	
282	16	2.26	2.35	2.65	2.95	3.20	0.30	III_1	
283	10	2.02	2.15	2.35	2.50	2.64	0.18	III_1	
284	9	2.10	2.20	2.35	2.50	2.60	0.15	III_1	

Table 1. Results of Grain Size Analysis

Station No.	Depth	ϕ_{16}	ϕ_{25}	ϕ_{50}	ϕ_{75}	ϕ_{84}	S_0	Sd-Type	Note
285	16	2.25	2.45	2.55	2.70	2.83	0.13	VI	
286	25	2.25	2.35	2.60	3.10	3.95	0.38	IV_1	
287	34	2.48	2.60	2.90	3.30	3.51	0.35	I_1	
288	42	2.04	2.15	2.40	2.75	3.03	0.30	III_1	
289	57	3.23	3.50	4.65	5.50	5.70	1.00	II_2	
290	10	2.10	2.25	2.40	2.60	2.67	0.18	III_1	
291	16	2.37	2.50	2.65	2.90	2.98	0.20	VI	
292	24	2.42	2.55	2.90	3.20	3.35	0.33	I_1	
293	30	2.80	2.95	3.25	3.50	3.65	0.28	II_1	
294	36	2.55	2.75	3.00	3.35	3.50	0.30	I_1	
295	42	——	——	——	——	——	——	——	none
296	68	3.85	4.20	4.90	6.05	6.65	0.93	II_2	
297	8	1.92	2.05	2.30	2.45	2.51	0.20	III_2	
298	13	2.30	2.40	2.60	2.85	2.97	0.23	I_1	
299	18	2.45	2.55	2.85	3.10	3.20	0.28	I_1	
300	21	2.40	2.55	2.80	3.05	3.20	0.25	I_1	
301	27	2.42	2.50	2.80	3.20	3.35	0.35	I_1	
302	57	2.65	2.90	3.50	4.50	5.45	0.80	II_1	
303	78	4.25	4.40	5.00	8.00	——	1.80	II_2	
304	15	2.27	2.35	2.60	2.80	2.98	0.23	I_1	
305	12	2.15	2.30	2.50	2.75	2.85	0.23	VI	
306	8	1.65	1.95	2.20	2.40	2.45	0.23	III_2	
307	12	2.23	2.30	2.50	2.70	2.85	0.20	VI	
308	6	2.08	2.20	2.40	2.60	2.67	0.20	III_1	
309	6	2.04	2.10	2.30	2.45	2.48	0.18	III_2	
310	8	2.28	2.35	2.60	2.75	2.85	0.20	VI	
311	15	2.35	2.45	2.60	2.75	2.83	0.15	VI	
312	22	2.62	2.75	3.05	3.35	3.49	0.30	I_1	
313	24	1.80	2.10	2.70	3.15	3.25	0.53	III_1	
314	28	2.67	2.85	3.10	3.40	3.50	0.28	I_1	
315	30	——	——	——	——	——	——	——	very, cS
316	32	2.05	2.25	2.50	2.70	2.80	0.23	VI	
317	38	——	——	——	——	——	——	——	rare, fS
318	44	——	——	——	——	——	——	——	rare, fS
319	53	2.46	2.60	2.90	3.25	3.48	0.33	I_1	
320	26	2.30	2.45	2.75	3.05	3.16	0.30	I_1	
321	39	0.55	1.45	2.30	2.75	2.88	0.65	III_1	
322	48	——	——	——	——	——	——	——	rare, fS
323	56	3.50	4.00	4.80	——	——	——	II_2	
324	64	2.55	2.75	3.50	5.75	——	1.50	II_1	
325	76	3.30	3.75	4.90	6.10	6.65	1.18	II_2	
326	68	——	——	4.00	4.60	4.95	——	——	mud
327	60	——	——	——	——	——	——	——	rare, fS

Table 1. Results of Grain Size Analysis

Station No.	Depth	ϕ_{16}	ϕ_{25}	ϕ_{50}	ϕ_{75}	ϕ_{84}	S_0	Sd-Type	Note
328	70	3.95	4.20	4.80	5.40	5.95	0.60	II_2	
329	38	2.56	2.75	3.00	3.25	3.38	0.25	I_1	
330	40	——	——	——	——	——	——	VII	rare
331	44	2.65	2.80	3.10	3.35	3.45	0.28	I_1	
332	49	2.53	2.70	2.95	3.20	3.35	0.25	I_1	
333	56	2.54	2.79	3.08	3.30	3.40	0.26	I_1	
334	63	3.00	3.20	3.70	5.20	5.95	1.00	II_1	
335	61	2.77	2.95	3.35	3.65	3.80	0.35	II_1	
336	54	2.60	2.80	3.15	3.50	3.85	0.35	II_1	
337	44	2.55	2.75	3.05	3.25	3.38	0.25	I_1	
338	38	2.65	2.75	3.05	3.25	3.35	0.25	I_1	
339	8	2.35	2.40	2.60	2.75	2.78	0.18	VI	
340	11	2.45	2.50	2.70	2.90	2.98	0.20	O	
341	36	2.68	2.75	3.10	3.25	3.33	0.25	I_1	
342	35	2.80	2.90	3.05	3.20	3.35	0.15	O	
343	32	1.75	2.05	2.50	2.85	3.05	0.40	III_1	
344	36	1.55	2.00	2.55	2.90	3.18	0.45	III_1	
345	42	1.95	2.20	2.55	2.90	3.10	0.35	III_1	
346	46	1.80	2.02	2.50	2.84	3.00	0.41	III_1	
347	53	2.60	2.75	3.10	3.55	4.05	0.40	II_1	
348	62	3.06	3.35	4.35	5.40	5.71	1.03	II_1	
349	6	2.63	2.75	2.95	3.15	3.25	0.20	O	
350	8	2.55	2.70	3.00	3.20	3.29	0.25	I_1	
351	8	——	——	——	——	——	——	——	rare, cS
352	7	2.40	3.30	5.25	6.35	6.80	1.53	II_1	
353	12	2.56	2.65	2.90	3.10	3.20	0.23	O	
354	10	2.69	2.80	3.00	3.20	3.25	0.20	O	
355	8	2.52	2.60	2.80	3.00	3.07	0.20	O	
356	5	2.35	2.50	2.70	2.90	2.95	0.20	VI	
357	28	0.20	0.50	1.10	1.40	1.61	0.45	III_2	
358	20	2.67	2.80	3.00	3.20	3.31	0.20	$O\sim I_1$	
359	16	2.53	2.60	2.85	3.05	3.15	0.23	O	
360	7	2.50	2.57	2.78	2.97	3.07	0.20	O	
361	13	2.50	2.60	2.80	3.00	3.15	0.20	O	
362	7	2.47	2.60	2.80	3.00	3.08	0.20	O	
363	9	2.60	2.69	2.90	3.11	3.23	0.21	O	
364	6	2.63	2.76	3.04	3.23	3.35	0.19	I_1	
365	7	2.30	2.55	2.95	3.15	3.23	0.30	I_1	
366	18	1.65	1.95	2.55	3.00	3.15	0.53	III_1	

As for the classification of Sd-type, see the references by Sato and Tamaki(1959) and by Sato(1959).

Fig 2. Dredged stations and median contours

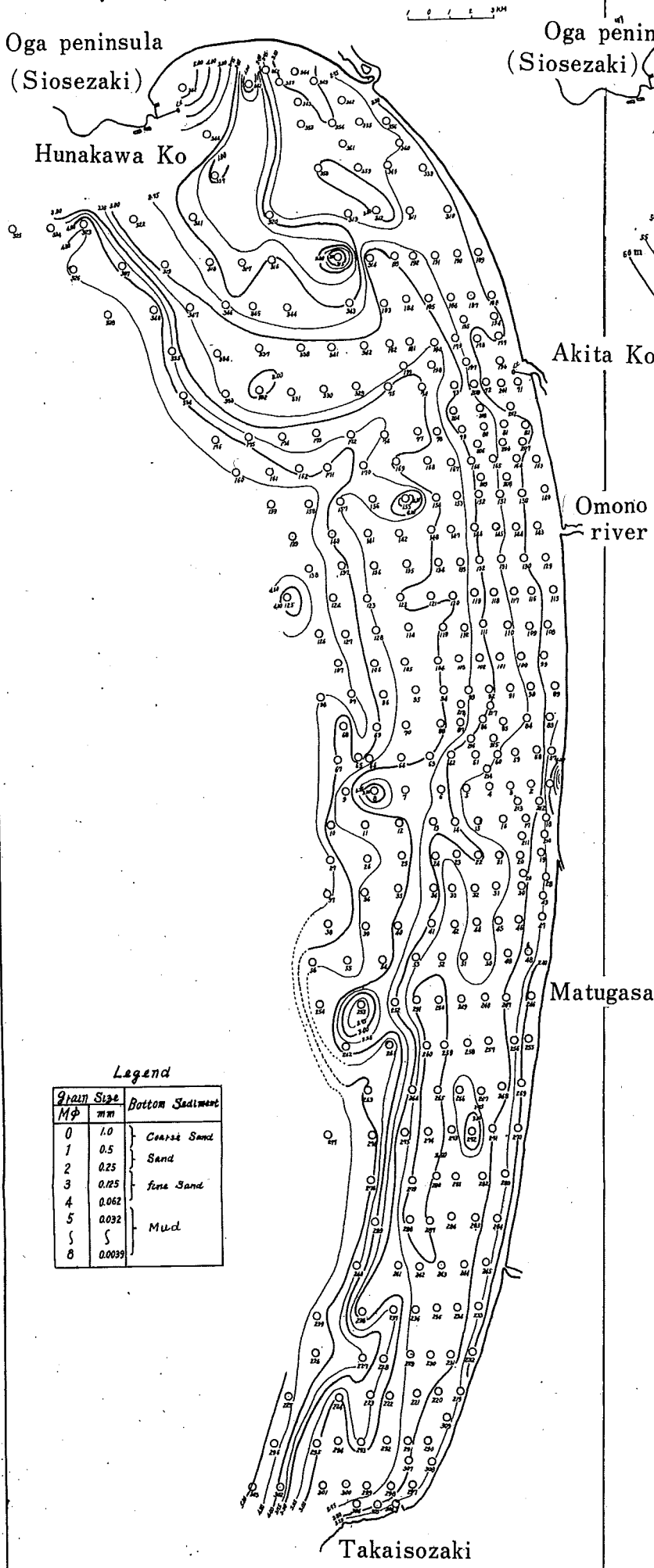
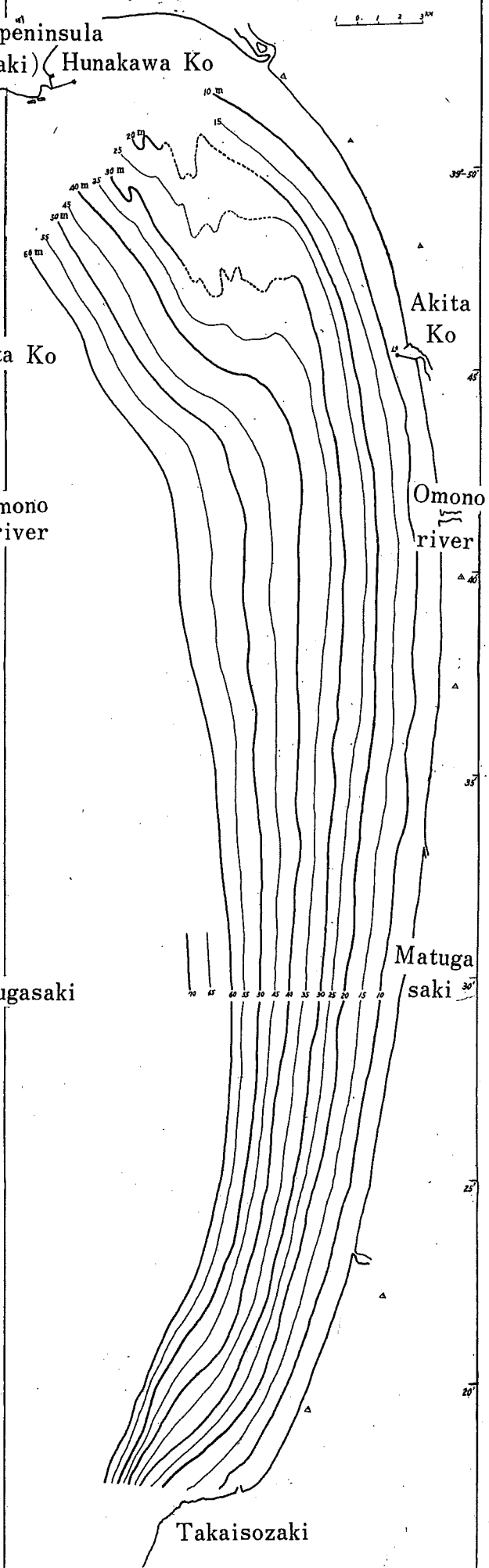


Fig 1. Bottom Topography



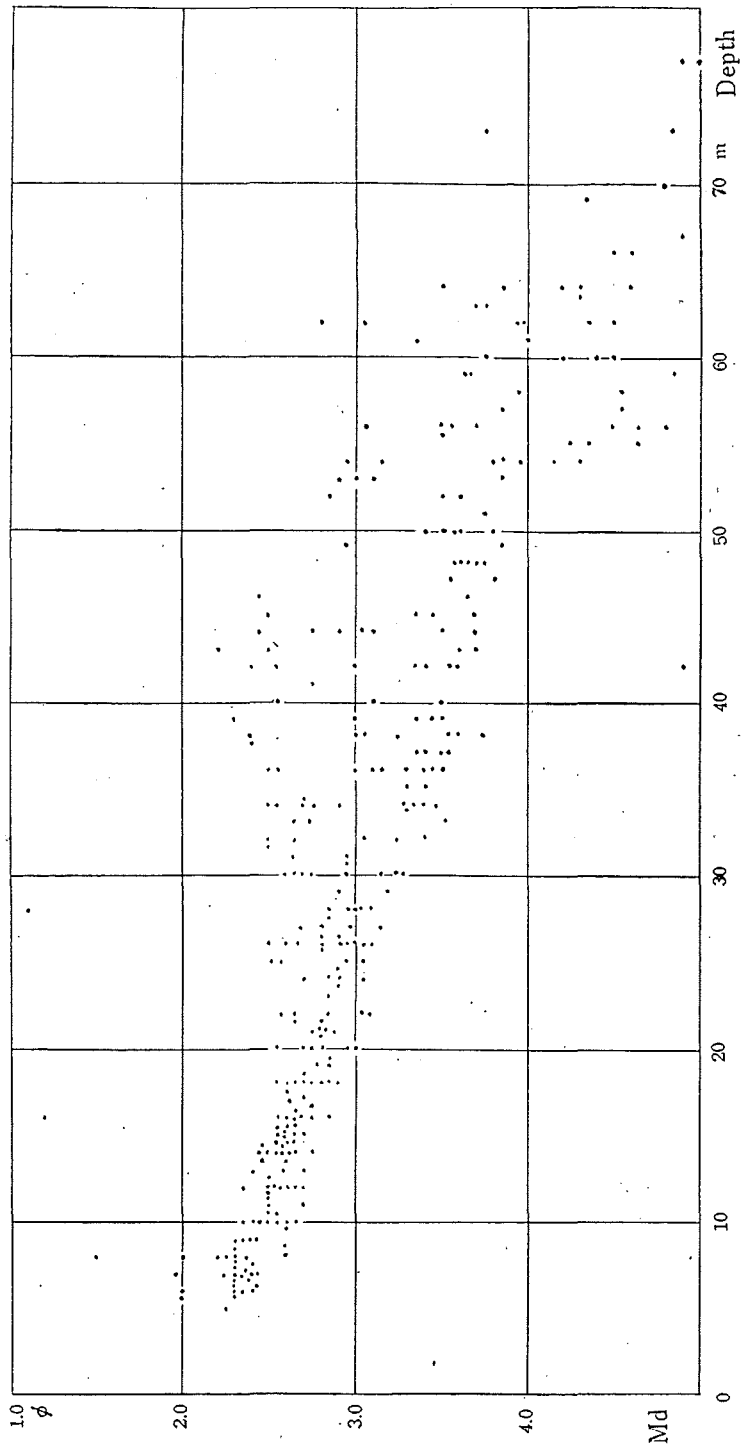


Fig. 3. Md–Depth Relation.

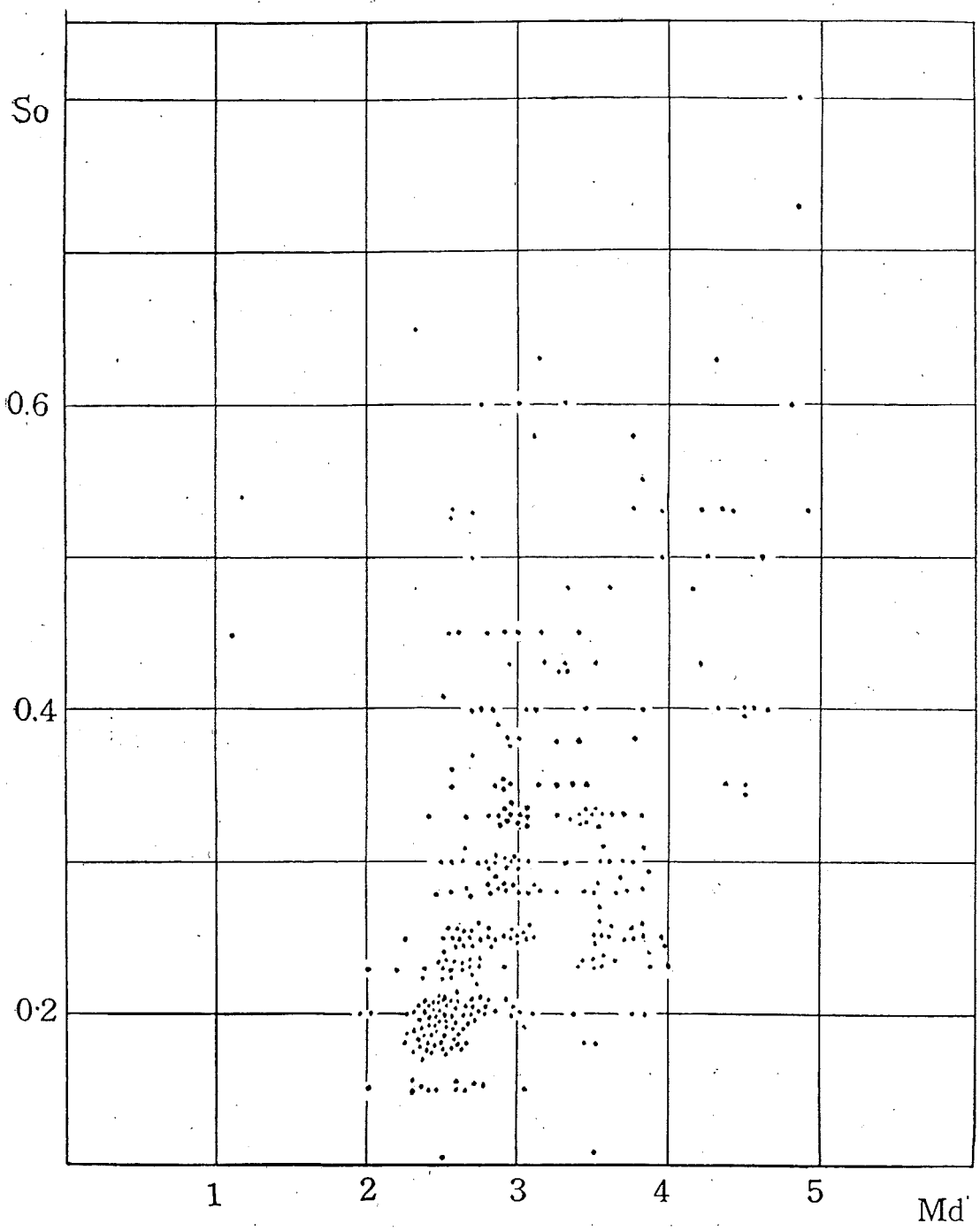


Fig. 4. Md–So Relation.