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XII. GEOCHEMICAL CHARACTERISTICS OF DEEP-SEA SEDIMENTS AROUND 3° N, 169° W, THE PACIFIC OCEAN: SAMPLES FOR GH81-4 CRUISE, GEOLOGICAL SURVEY OF JAPAN

Koshi Yamamoto and Ryuichi Sugisaki**

Introduction

An area to the east of the Gilbert Islands was surveyed during GH81-4 cruise, Geological Survey of Japan. This area occupies a central part of that for GH80-1 cruise, and was surveyed in detail during GH81-4. Thirteen piston core and 12 box core sediment samples were collected during GH81-4. The geochemical examination of sediments from the three areas surveyed during cruises of GH79-1, GH80-1, and GH80-4 has already published (SUGISAKI, 1981a; SUGISAKI and KINOSHITA, 1982; SUGISAKI and YAMAMOTO, 1984). Each region is situated in the central Pacific and the sediments may have a common feature in chemistry. The present study is intended to examine the distribution of major elements in sediments from GH81-4 cruise and to present geochemical features in different lithologic types of sediments, in comparison with the sediments from the other cruise areas. The data could be a key to origin and depositional environment of these sediments.

Samples, analytical methods and results

One hundred and twelve sediment samples for this study were selected from 5 piston cores, 14 box corers and one dredge. The location, water depth and lithology of these samples are listed in Table XII-1. Two major types of lithology were discriminated for these samples: one is siliceous clay, the other siliceous ooze.

The samples were dried at 75° C and subsequently ground. Most elements were determined with an X-ray fluorescence spectrometer. Analyses of other components such as FeO, H_2O and salts and the data display of the bulk compositions of them were done according to the method described by SUGISAKI (1981b).

Analytical results are shown in Table XII-2. The analytical values were recalculated by excluding carbonates, salts, water and residual materials (organic matter, sulfides and others). These recalculated value (listed in Table XII-3) will be mostly used in the following discussion.

General features of the sediments

The water depths from which the samples were collected are over 5,000 m. Since this depth exceeds the calcium carbonate compensation depth (BERGER and WINTERER 1974), $CaCO_3$ was scarcely detected in the samples. Two samples (Nos. 98 and 99) containing much $CaCO_3$ were collected from a top of a hill located at 3° 14.99'N, 169° 40.09'W. They may not be recent sediments because a manganese nodule layer,

*Department of Earth Sciences, Nagoya University, Nagoya.

Table XII-1 Description of samples

Sample No.	Station	Observ. No.	Latitude	Longitude	Depth (m)	Location (cm)	Sediments
1	2579	P218	3°19.86'N	169°35.06'W	5473	77-82	Siliceous ooze
2	"	"	"	"	"	127-132	"
3	"	"	"	"	"	177-182	"
4	"	"	"	"	"	227-232	"
5	"	"	"	"	"	277-282	"
6	"	"	"	"	"	327-332	"
7	"	"	"	"	"	377-382	"
8	"	"	"	"	"	427-432	"
9	"	"	"	"	"	477-482	"
10	"	"	"	"	"	527-532	"
11	2651	P224	3°16.64'N	169°41.07'W	5500	5-10	Siliceous clay
12	"	"	"	"	"	45-50	"
13	"	"	"	"	"	95-100	"
14	"	"	"	"	"	145-150	"
15	"	"	"	"	"	150-160	"
16	"	"	"	"	"	160-165	"
17	"	"	"	"	"	165-170	"
18	"	"	"	"	"	170-175	"
19	"	"	"	"	"	178-183	"
20	"	"	"	"	"	185-188	Siliceous ooze
21	"	"	"	"	"	188-193	"
22	"	"	"	"	"	193-203	"
23	"	"	"	"	"	203-208	"
24	"	"	"	"	"	208-213	"
25	"	"	"	"	"	213-218	"
26	"	"	"	"	"	218-223	"
27	"	"	"	"	"	228-233	"
28	"	"	"	"	"	294-299	"
29	"	"	"	"	"	344-349	"
30	"	"	"	"	"	384-389	"
31	"	"	"	"	"	439-444	"
32	"	"	"	"	"	484-489	"
33	"	"	"	"	"	539-544	"
34	"	"	"	"	"	589-594	"
35	"	"	"	"	"	639-644	"
36	"	"	"	"	"	694-699	"
37	"	"	"	"	"	744-749	"
38	2663	P225	3°13.32'N	169°41.65'W	5427	10-15	Siliceous clay
39	"	"	"	"	"	70-75	"
40	"	"	"	"	"	120-125	"
41	"	"	"	"	"	170-175	"
42	"	"	"	"	"	220-225	"
43	"	"	"	"	"	250-255	"
44	"	"	"	"	"	255-260	"
45	"	"	"	"	"	260-263	"
46	"	"	"	"	"	263-268	"
47	"	"	"	"	"	270-275	Siliceous ooze
48	"	"	"	"	"	275-285	"
49	"	"	"	"	"	285-290	"
50	"	"	"	"	"	290-295	"
51	"	"	"	"	"	295-300	"
52	"	"	"	"	"	300-305	"
53	"	"	"	"	"	335-340	"
54	"	"	"	"	"	370-375	"
55	"	"	"	"	"	420-425	"
56	"	"	"	"	"	470-475	"
57	"	"	"	"	"	520-525	"
58	"	"	"	"	"	570-575	"
59	"	"	"	"	"	620-625	"
60	"	"	"	"	"	670-675	"

Table XII-1 (continued)

Sample No.	Station	Observ. No.	Latitude	Longitude	Depth (m)	Location (cm)	Sediments
61	"	"	"	"	"	720-725	"
62	2676	P226	2°53.08'N	169°34.86'W	5547	9-14	Siliceous clay
63	"	"	"	"	"	29-34	"
64	"	"	"	"	"	76-81	"
65	"	"	"	"	"	126-131	"
66	"	"	"	"	"	176-181	"
67	"	"	"	"	"	226-231	"
68	"	"	"	"	"	276-281	"
69	"	"	"	"	"	326-331	"
70	"	"	"	"	"	376-381	"
71	"	"	"	"	"	426-431	"
72	"	"	"	"	"	476-481	"
73	"	"	"	"	"	526-531	"
74	"	"	"	"	"	606-611	"
75	"	"	"	"	"	626-631	"
76	"	"	"	"	"	675-680	"
77	"	"	"	"	"	725-730	"
78	2700	P228	2°49.29'N	169°41.20'W	5568	8-13	Siliceous clay
79	"	"	"	"	"	66-71	"
80	"	"	"	"	"	126-131	"
81	"	"	"	"	"	175-180	"
82	"	"	"	"	"	225-230	"
83	"	"	"	"	"	275-280	"
84	"	"	"	"	"	325-330	"
85	"	"	"	"	"	372-377	"
86	"	"	"	"	"	422-427	"
87	"	"	"	"	"	472-477	"
88	"	"	"	"	"	522-527	"
89	"	"	"	"	"	572-577	"
90	"	"	"	"	"	622-627	"
91	"	"	"	"	"	672-677	"
92	"	"	"	"	"	722-727	"
93	2713	D496	3°14.99'N	169°40.09'W	5365		Claystone
94	"	"	3°15.75'N	169°42.55'W	5304		"
95	2628	B60	3°18.23'N	169°44.94'W	5588	5-10	Siliceous ooze
96	"	"	"	"	"	15-20	"
97	2645	B63	3°17.49'N	169°41.71'W	5628	8-13	Siliceous clay
98	"	"	"	"	"	23-28	Siliceous-calcareous ooze
99	"	"	"	"	"	39-44	Siliceous clay
100	2657	B64	3°14.59'N	169°41.61'W	5368	10-15	"
101	"	"	"	"	"	33-37	Siliceous ooze
102	2613	B57	3°17.50'N	169°38.16'W	5605		"
103	2618	B58	3°20.61'N	169°36.16'W	5483		Siliceous clay
104	2622	B59	3°16.39'N	169°41.26'W	5486		"
105	2628	B60	3°18.23'N	169°44.94'W	5588		"
106	2634	B61	3°12.13'N	169°41.96'W	5461		"
107	2645	B63	3°17.49'N	169°41.71'W	5628		"
108	2657	B64	3°14.59'N	169°41.61'W	5368		"
109	2669	B65	3°14.14'N	169°40.86'W	5368		"
110	2681	B66	2°48.21'N	169°38.93'W	5360		"
111	2695	B67	2°47.29'N	169°40.28'W	5620		"
112	2705	B68	2°50.91'N	169°35.69'W	5514		"

Table XII-2 Analyses of samples (dried at 70°C) for major constituents (% weight).

No.	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	H_2O	$CaCO_3$	Res*	Salt	Total
1	51.67	0.390	8.40	4.54	0.10	6.310	1.62	1.07	3.29	1.86	0.190	10.57	0.0	1.85	7.72	99.59
2	59.45	0.380	9.35	4.56	0.05	1.650	1.89	1.04	4.95	1.90	0.220	10.49	0.0	0.12	5.00	101.05
3	58.91	0.340	8.13	4.07	0.04	1.030	1.61	0.87	4.61	1.76	0.150	9.57	0.0	3.05	5.34	99.47
4	59.56	0.320	7.87	3.97	0.05	1.250	1.47	0.83	3.39	1.77	0.160	11.45	0.0	0.41	7.82	100.32
5	60.61	0.310	7.61	3.84	0.03	0.950	1.32	0.80	2.93	1.73	0.150	11.40	0.0	0.84	7.90	100.43
6	62.08	0.290	7.36	3.56	0.06	0.950	1.56	0.75	4.31	1.68	0.150	12.00	0.0	1.08	4.67	100.51
7	41.44	0.190	4.34	2.36	0.01	0.630	0.67	0.50	0.49	1.12	0.085	28.95	0.0	13.02	7.03	100.82
8	62.24	0.310	7.81	3.78	0.04	1.340	1.54	0.75	3.34	1.66	0.140	10.51	0.0	0.48	6.98	100.91
9	62.75	0.280	7.20	3.35	0.04	1.280	1.50	0.74	2.21	1.59	0.150	10.84	0.0	0.27	7.76	99.96
10	61.38	0.290	7.53	3.59	0.05	3.430	1.58	0.78	2.11	1.66	0.150	11.36	0.0	0.17	7.07	101.16
11	53.41	0.520	11.68	6.16	0.04	0.870	2.32	1.25	1.78	2.15	0.340	11.64	0.0	0.79	7.56	100.52
12	52.54	0.510	11.70	6.18	0.04	0.870	2.41	1.20	1.99	2.13	0.320	12.28	0.0	0.21	7.17	99.54
13	54.71	0.540	12.40	6.44	0.06	0.950	2.37	1.22	2.29	2.16	0.360	10.50	0.0	0.19	6.49	100.68
14	52.28	0.510	11.49	6.11	0.05	0.910	2.35	1.25	2.10	2.13	0.380	11.49	0.0	0.69	7.84	99.57
15	55.62	0.530	12.66	6.44	0.06	1.030	2.38	1.28	2.29	2.20	0.410	10.01	0.0	0.34	5.55	100.79
16	50.85	0.490	10.83	5.96	0.07	0.790	2.22	1.20	2.11	2.11	0.380	12.04	0.0	1.98	7.71	98.75
17	54.42	0.510	11.75	6.18	0.06	0.840	2.29	1.23	2.95	2.16	0.390	11.17	0.0	0.12	6.90	100.96
18	54.63	0.490	11.38	6.01	0.06	0.880	2.39	1.27	2.25	2.09	0.430	11.26	0.0	0.57	7.53	101.24
19	57.02	0.420	10.44	5.21	0.03	0.810	2.62	1.49	2.02	1.64	0.620	10.50	0.0	0.33	7.76	100.90
20	60.50	0.280	8.14	3.62	0.04	0.570	2.73	1.82	1.07	0.96	0.890	12.25	0.0	0.09	7.95	100.90
21	60.53	0.290	8.26	3.81	0.03	0.600	2.69	1.84	1.11	1.01	0.890	11.20	0.0	0.38	8.44	101.09
22	60.25	0.260	7.52	3.42	0.02	0.490	2.48	1.71	1.69	0.94	0.830	9.96	0.0	0.64	8.63	98.84
23	61.42	0.240	6.91	3.13	0.04	0.450	2.38	1.57	1.57	0.85	0.760	12.45	0.0	0.70	7.97	100.43
24	63.96	0.220	6.45	2.90	0.02	0.400	2.12	1.50	1.33	0.80	0.750	11.26	0.0	0.61	7.97	100.28
25	65.43	0.210	6.31	2.75	0.02	0.390	2.02	1.47	1.24	0.79	0.730	10.80	0.0	0.03	8.08	100.27
26	63.88	0.190	5.70	2.53	0.05	0.360	1.70	1.56	1.11	0.79	0.700	11.75	0.0	0.29	8.68	99.29
27	65.26	0.190	5.96	2.58	0.03	0.370	1.92	1.58	2.16	0.80	0.710	10.21	0.0	1.33	7.12	100.24
28	64.70	0.180	5.66	2.33	0.04	0.310	1.48	1.47	2.31	0.91	0.650	10.15	0.0	1.26	8.39	99.84
29	66.00	0.170	5.32	2.26	0.03	0.290	1.40	1.23	0.66	0.88	0.560	10.99	0.0	0.68	8.68	99.15
30	71.24	0.140	4.11	1.80	0.02	0.220	0.92	1.05	1.47	0.79	0.440	9.27	0.0	0.32	7.82	99.61
31	61.35	0.120	3.39	1.60	0.03	0.240	0.59	0.85	0.80	0.76	0.330	15.30	0.0	9.37	6.23	100.96
32	70.59	0.150	4.52	1.97	0.02	0.270	0.81	1.12	0.97	0.86	0.480	10.12	0.0	0.16	7.74	99.79
33	61.83	0.230	6.16	3.18	0.05	0.490	1.46	1.82	0.85	0.99	0.810	7.03	0.0	7.12	7.38	99.41
34	61.95	0.230	6.31	3.09	0.04	0.450	1.22	1.87	0.69	1.01	0.840	11.56	0.0	1.49	7.72	98.49
35	63.64	0.220	5.63	2.92	0.06	0.450	1.10	1.73	0.84	0.98	0.770	11.99	0.0	1.24	7.51	99.08
36	61.25	0.240	6.70	3.24	0.04	0.450	1.29	2.19	1.01	1.14	0.970	12.70	0.0	0.10	7.22	98.53
37	63.68	0.230	6.52	3.04	0.01	0.450	1.46	1.90	1.60	1.07	0.850	11.59	0.0	0.95	6.77	100.11
38	52.37	0.510	11.01	6.01	0.05	1.000	2.07	1.31	2.18	2.10	0.340	13.02	0.0	0.01	7.50	99.47
39	52.34	0.520	11.43	6.02	0.06	0.870	2.24	1.28	2.74	2.08	0.330	8.93	0.0	2.79	7.27	98.91
40	52.88	0.520	11.92	6.20	0.07	0.700	2.34	0.63	2.46	2.16	0.350	8.85	1.13	1.79	8.29	100.30
41	49.74	0.540	11.18	6.56	0.07	0.940	2.26	1.30	3.01	2.19	0.370	8.58	0.0	4.62	7.42	98.78
42	51.39	0.500	11.29	6.10	0.06	0.870	2.32	1.30	3.60	2.17	0.370	10.51	0.0	1.46	7.69	99.63
43	52.47	0 490	11.02	6.08	0.06	1.160	2.52	0.98	3.09	2.00	0.380	10.95	0.51	2.00	7.33	101.05
44	52.74	0.500	11.40	6.14	0.04	1.380	2.49	1.04	3.17	1.98	0.400	11.64	0.60	0.56	7.01	101.10
45	51.92	0.530	11.94	6.53	0.05	1.450	2.87	1.43	2.27	1.86	0.450	11.75	0.0	0.69	7.27	101.02
46	51.07	0.510	11.25	6.19	0.07	1.220	3.02	1.37	2.02	1.74	0.440	12.31	0.0	0.10	8.10	99.41
48	54.39	0.330	9.21	4.03	0.06	0.900	2.76	2.18	1.62	1.15	1.010	12.41	0.0	1.16	7.92	99.13
49	54.40	0.330	9.51	4.04	0.03	0.900	2.69	2.13	1.46	1.16	1.000	13.50	0.0	0.02	8.36	99.53
50	57.31	0.300	8.38	3.76	0.03	0.620	2.50	1.63	1.11	1.03	1.000	11.08	0.94	0.16	9.43	99.27
51	58.46	0.260	7.99	3.37	0.04	0.600	2.30	2.13	0.83	0.94	0.990	12.66	0.0	0.43	9.28	100.29
52	58.91	0.240	7.07	3.09	0.03	0.540	2.18	1.54	0.65	0.88	0.910	10.57	0.72	2.93	8.57	98.83
53	64.97	0.200	6.30	2.69	0.02	0.400	2.08	1.86	1.34	0.80	0.890	9.84	0.0	2.27	7.50	101.15
54	63.45	0.200	6.15	2.55	0.05	0.370	1.80	1.64	0.59	0.83	0.780	11.03	0.0	2.41	8.45	100.31
55	65.15	0.190	5.79	2.43	0.03	0.340	1.72	1.48	0.55	0.83	0.690	10.00	0.0	0.16	10.09	99.45
56	69.54	0.160	4.75	1.96	0.07	0.260	1.30	1.21	1.60	0.75	0.550	10.67	0.0	0.12	8.03	100.98
57	70.17	0.130	3.94	1.62	0.09	0.230	1.05	1.02	0.88	0.70	0.450	9.90	0.0	0.35	8.68	99.21
58	71.93	0.130	4.09	1.68	0.04	0.210	1.01	0.99	1.26	0.74	0.440	9.48	0.0	0.17	7.80	99.97
59	68.79	0.150	4.42	1.93	0.07	0.230	1.05	1.28	1.42	0.78	0.590	10.57	0.0	0.32	8.10	99.70
60	64.59	0.210	6.11	2.82	0.04	0.430	1.54	1.88	1.10	0.86	0.930	10.07	0.0	0.58	8.02	99.18

Table XII-2 (continued)

No.	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	H_2O	$CaCO_3$	Res*	Salt	Total
61	63.84	0.240	6.61	3.07	0.03	0.500	1.66	2.05	0.96	0.87	0.980	10.40	0.0	0.10	8.03	99.35
62	50.89	0.550	11.68	6.37	0.07	0.800	2.35	1.25	2.29	2.13	0.310	12.51	0.0	0.15	8.44	99.80
63	51.80	0.540	12.01	6.37	0.04	0.700	2.34	0.87	2.34	2.14	0.300	11.00	0.66	0.43	9.20	100.74
64	51.61	0.540	12.04	6.29	0.08	1.040	2.20	1.22	2.70	2.14	0.290	10.67	0.0	0.27	9.28	100.37
65	51.44	0.530	11.74	6.17	0.07	0.920	2.34	1.21	2.28	2.13	0.290	10.19	0.0	3.26	8.88	101.45
66	51.14	0.500	11.62	6.02	0.07	0.920	2.15	1.21	1.80	2.06	0.300	10.71	0.0	0.31	10.08	98.89
67	50.88	0.550	12.26	6.48	0.06	0.970	2.37	1.19	2.19	2.13	0.290	10.71	0.0	0.04	9.05	99.17
68	51.27	0.540	12.34	6.42	0.05	0.910	2.65	1.21	2.47	2.11	0.320	10.56	0.0	0.68	9.49	101.02
69	50.28	0.650	12.22	6.37	0.06	0.960	2.44	1.25	2.79	2.10	0.330	10.22	0.0	2.11	8.44	100.23
70	50.92	0.520	11.51	6.30	0.03	0.900	2.31	1.21	2.63	2.10	0.340	11.19	0.0	1.39	8.86	100.20
71	52.33	0.510	11.63	6.12	0.05	0.910	2.52	0.83	2.81	2.09	0.290	11.46	0.53	0.48	8.44	101.02
72	51.68	0.520	11.56	6.15	0.04	1.080	2.43	1.17	2.72	2.09	0.310	12.00	0.0	0.20	9.04	100.98
73	52.26	0.500	11.18	5.99	0.06	0.830	2.33	1.15	2.88	2.00	0.280	12.24	0.0	0.10	8.32	100.12
74	51.99	0.510	10.96	6.11	0.08	1.320	2.38	0.87	2.62	2.02	0.280	12.60	0.51	0.15	7.92	100.32
75	51.65	0.510	11.32	6.22	0.05	1.040	2.16	1.16	2.37	2.05	0.260	11.52	0.0	0.18	8.99	99.48
76	51.64	0.540	12.07	6.49	0.04	1.110	2.56	0.91	2.87	2.02	0.340	11.44	0.65	0.12	8.05	100.85
77	50.31	0.600	12.41	6.97	0.05	1.240	2.61	1.34	2.42	1.97	0.350	12.35	0.0	0.01	7.93	100.56
78	51.32	0.520	11.70	6.13	0.04	1.070	2.19	1.20	2.02	2.07	0.290	12.90	0.0	0.33	8.66	100.45
79	49.82	0.530	11.80	6.29	0.08	0.830	2.26	1.19	2.87	2.06	0.300	10.02	0.0	1.92	9.27	99.23
80	48.67	0.530	11.87	6.36	0.06	0.970	2.42	1.27	2.64	2.04	0.370	11.65	0.0	2.46	8.62	99.93
81	51.70	0.520	11.94	6.18	0.03	0.760	2.28	1.13	2.55	2.06	0.310	10.89	0.0	1.42	9.18	100.96
82	50.46	0.520	11.42	6.25	0.07	1.010	2.40	1.20	3.10	1.98	0.330	12.16	0.0	1.60	8.21	100.71
83	51.76	0.530	11.55	6.33	0.07	1.110	2.36	0.67	2.88	2.02	0.280	10.86	0.93	0.03	9.28	100.65
84	50.32	0.530	11.48	6.39	0.05	1.020	2.43	1.27	1.73	1.93	0.360	11.12	0.0	1.55	8.86	99.02
85	49.44	0.600	12.66	7.02	0.05	1.140	3.14	0.99	1.71	1.92	0.360	10.56	0.59	0.21	8.79	99.19
86	48.80	0.570	12.44	6.77	0.06	1.050	2.86	1.33	2.18	1.83	0.350	11.47	0.0	1.63	9.10	100.44
87	47.62	0.600	12.18	6.78	0.05	1.270	2.95	0.82	1.57	1.80	0.370	10.43	0.91	2.78	8.63	98.77
88	37.91	0.450	8.60	5.39	0.04	0.860	2.04	1.18	1.33	1.48	0.350	24.41	0.0	9.87	6.46	100.36
89	49.35	0.470	10.52	5.85	0.06	0.960	2.51	1.27	1.39	1.76	0.350	12.82	0.0	1.83	9.82	98.96
90	49.67	0.430	9.45	5.26	0.04	0.910	2.08	0.63	1.11	1.79	0.300	13.29	0.95	3.49	9.30	98.69
91	40.68	0.360	7.54	4.48	0.06	0.530	1.65	0.90	1.10	1.54	0.250	22.92	0.26	11.37	7.19	100.82
92	52.12	0.420	9.81	5.14	0.05	0.920	2.13	0.60	1.49	1.89	0.320	10.48	1.10	3.32	9.17	98.96
93	50.79	0.560	13.63	5.11	0.11	0.083	4.26	6.68	0.63	4.11	1.390	7.23	0.83	3.08	0.58	99.08
94	55.04	0.510	14.74	3.83	0.07	0.660	4.15	3.42	1.20	3.72	1.510	10.13	0.0	0.67	1.15	100.81
95	49.46	0.390	9.98	4.98	0.05	0.750	2.74	2.66	0.46	1.29	1.170	12.84	0.0	2.80	10.73	100.30
96	51.00	0.440	9.64	4.85	0.02	0.730	2.40	2.41	0.97	1.31	1.060	11.81	0.0	1.84	10.37	98.86
97	54.94	0.460	10.16	4.85	0.14	0.300	2.12	1.76	1.64	1.86	0.600	13.27	0.0	0.13	8.76	101.01
98	45.10	0.350	8.52	4.23	0.57	0.061	1.44	1.54	0.86	1.67	0.400	9.56	19.08	0.17	7.48	101.02
99	49.20	0.410	9.78	5.24	0.03	0.540	1.66	2.94	1.70	1.85	0.420	11.00	7.18	0.20	8.03	100.19
100	53.01	0.490	11.18	5.80	0.03	1.050	2.17	1.32	1.13	1.91	0.490	9.33	0.25	0.16	10.97	99.28
101	52.17	0.350	8.86	4.31	0.02	0.620	2.53	1.09	2.41	1.46	0.280	12.90	0.0	0.12	11.86	98.98
102	51.86	0.450	10.29	5.39	0.03	0.800	2.30	1.46	2.83	1.81	0.450	11.70	0.0	0.12	11.00	100.49
103	47.84	0.410	9.74	4.92	0.03	0.740	2.36	1.46	4.21	1.69	0.460	13.00	0.0	0.31	12.69	99.86
104	50.11	0.430	9.48	5.22	0.03	0.790	1.78	1.49	2.60	1.77	0.460	13.30	0.0	2.25	10.51	100.22
105	50.97	0.390	8.94	4.86	0.03	0.870	1.91	2.03	2.24	1.53	0.840	11.44	0.0	1.30	11.86	99.21
106	52.35	0.450	10.47	5.52	0.04	0.790	2.05	1.55	2.79	1.86	0.440	11.00	0.0	0.36	10.51	100.17
107	48.68	0.380	8.48	4.50	0.02	0.650	1.81	1.57	2.53	1.57	0.600	12.57	0.0	3.05	12.72	99.14
108	49.57	0.420	9.41	5.05	0.06	1.170	2.00	1.58	3.41	1.69	0.540	12.42	0.0	0.87	11.08	99.27
109	44.97	0.420	8.60	5.12	0.10	6.320	1.93	1.73	2.66	1.58	0.580	14.59	0.0	0.47	9.85	98.91
110	48.99	0.420	9.59	5.10	0.05	0.940	1.97	1.50	3.02	1.67	0.490	13.90	0.0	1.51	11.18	100.32
111	50.11	0.410	9.27	4.84	0.08	0.830	1.95	1.39	3.46	1.66	0.430	12.75	0.0	0.24	12.09	99.52
112	49.26	0.440	9.84	5.20	0.06	0.820	1.69	1.40	2.36	1.74	0.430	12.54	0.0	0.02	13.48	99.29

*Residual materials were calculated by subracting CO_2 and H_2O from ignition loss. They may contain sulfur, organic materials and others.

Table XII-3 Analyses for major constituents on a carbonate, water, and residual materials free basis (% weight). (tot. Fe: total Fe as Fe_2O_3)

No.	SiO_2	TiO_2	Al_2O_3	tot. Fe	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	FeO	Fe_2O_3
1	65.04	0.491	10.57	5.85	7.943	2.04	1.35	4.15	2.34	0.239	0.12	5.72
2	69.58	0.445	10.94	5.41	1.931	2.21	1.22	5.80	2.22	0.257	0.06	5.34
3	72.27	0.417	9.97	5.05	1.264	1.97	1 07	5.65	2.16	0.184	0.05	5.00
4	73.87	0.397	9.76	4.99	1.550	1.82	1.03	4.20	2.20	0.198	0.06	4.92
5	75.49	0.386	9.48	4.83	1.183	1.64	1.00	3.65	2.15	0.187	0.04	4.79
6	75.02	0.350	8.89	4.39	1.148	1.89	0.91	5.21	2.03	0.181	0.07	4.31
7	79.95	0.367	8.37	4.57	1.216	1.29	0.96	0.94	2.16	0.164	0.03	4.54
8	75.04	0.374	9.42	4.61	1.615	1.86	0.90	4.02	2.00	0.169	0.05	4.55
9	77.38	0.345	8.88	4.19	1.578	1.85	0.91	2.72	1.96	0.185	0.05	4.14
10	74.35	0.351	9.12	4.42	4.155	1.91	0.94	2.56	2.01	0.182	0.06	4.35
11	66.32	0.646	14.50	7.71	1.080	2.89	1.55	2.21	2.67	0.422	0.05	7.66
12	65.77	0.638	14.65	7.79	1.089	3.02	1.50	2.49	2.67	0.401	0.05	7.73
13	65.52	0.647	14.85	7.80	1.138	2.83	1.46	2.75	2.59	0.431	0.08	7.71
14	65.71	0.641	14.44	7.74	1.144	2.96	1.57	2.64	2.68	0.478	0.06	7.68
15	65.52	0.624	14.91	7.66	1.213	2.80	1.51	2.69	2.59	0.483	0.07	7.58
16	66.02	0.636	14.06	7.84	1.026	2.89	1.56	2.74	2.74	0.493	0.09	7.74
17	65.74	0.616	14.19	7.55	1.015	2.77	1.49	3.56	2.61	0.471	0.08	7.47
18	66.72	0.598	13.90	7.43	1.075	2.91	1.55	2.75	2.55	0.525	0.07	7.34
19	69.27	0.510	12.68	6.37	0.984	3.18	1.81	2.45	1.99	0.753	0.04	6.33
20	75.05	0.347	10.10	4.54	0.707	3.38	2.26	1.33	1.19	1.104	0.05	4.49
21	74.67	0.358	10.19	4.74	0.740	3.32	2.27	1.37	1.25	1.098	0.04	4.70
22	75.68	0.327	9.45	4.32	0.615	3.12	2.15	2.13	1.18	1.043	0.02	4.30
23	77.44	0.303	8.71	4.00	0.567	3.00	1.98	1.98	1.07	0.958	0.05	3.94
24	79.51	0.273	8.02	3.63	0.497	2.63	1.86	1.66	0.99	0.932	0.02	3.60
25	80.43	0.258	7.76	3.40	0.479	2.48	1.81	1.52	0.97	0.897	0.03	3.37
26	81.31	0.242	7.26	3.28	0.458	2.16	1.99	1.42	1.01	0.891	0.06	3.22
27	80.00	0.233	7.31	3.21	0.454	2.36	1.94	2.65	0.98	0.870	0.04	3.17
28	80.84	0.225	7.07	2.97	0.387	1.85	1.84	2.88	1.14	0.812	0.05	2.91
29	83.76	0.216	6.75	2.91	0.368	1.77	1.56	0.84	1.12	0.711	0.03	2.87
30	86.67	0.170	5.00	2.21	0.268	1.11	1.28	1.79	0.96	0.535	0.02	2.19
31	87.56	0.171	4.84	2.33	0.343	0.85	1.21	1.15	1.08	0.471	0.04	2.29
32	86.33	0.183	5.53	2.45	0.330	0.99	1.37	1.18	1.05	0.587	0.03	2.41
33	79.40	0.295	7.91	4.16	0.629	1.87	2.34	1.09	1.27	1.040	0.07	4.09
34	79.72	0.296	8.12	4.04	0.579	1.57	2.41	0.89	1.30	1.081	0.06	3.98
35	81.23	0.281	7.19	3.82	0.574	1.40	2.21	1.07	1.25	0.983	0.08	3.73
36	78.02	0.306	8.53	4.18	0.573	1.64	2.79	1.28	1.45	1.236	0.05	4.12
37	78.81	0.285	8.07	3.77	0.557	1.80	2.35	1.97	1.32	1.052	0.01	3.76
38	66.33	0.646	13.95	7.69	1.267	2.62	1.66	2.76	2.66	0.431	0.07	7.61
39	65.49	0.651	14.30	7.62	1.089	2.81	1.60	3.43	2.60	0.413	0.08	7.53
40	65.91	0.648	14.86	7.83	0.827	2.92	0.78	3.07	2.69	0.436	0.09	7.73
41	63.64	0.691	14.30	8.50	1.203	2.90	1.66	3.85	2.80	0.473	0.10	8.39
42	64.26	0.625	14.12	7.70	1.088	2.91	1.63	4.50	2.71	0.463	0.07	7.62
43	65.38	0.611	13.73	7.65	1.445	3.14	1.23	3.85	2.49	0.474	0.07	7.57
44	64.88	0.615	14.02	7.61	1.698	3.06	1.28	3.90	2.44	0.492	0.05	7.55
45	63.85	0.652	14.68	8.10	1.783	3.53	1.76	2.80	2.29	0.553	0.07	8.03
46	64.73	0.646	14.26	7.95	1.546	3.82	1.74	2.56	2.21	0.558	0.09	7.85
48	70.05	0.425	11.86	5.28	1.159	3.55	2.81	2.09	1.48	1.301	0.08	5.19
49	70.05	0.425	12.25	5.25	1.159	3.46	2.74	1.88	1.49	1.288	0.04	5.21
50	73.79	0.386	10.79	4.88	0.798	3.21	2.10	1.43	1.33	1.288	0.03	4.84

Table XII-3 (continued)

No.	SiO_2	TiO_2	Al_2O_3	tot. Fe	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	FeO	Fe_2O_3
51	75.03	0.334	10.25	4.39	0.770	2.95	2.73	1.07	1.21	1.271	0.05	4.33
52	77.47	0.316	9.30	4.10	0.710	2.87	2.02	0.86	1.16	1.197	0.03	4.06
53	79.67	0 245	7.73	3.32	0.491	2.55	2.28	1.64	0.98	1.091	0.02	3.30
54	80.92	0.255	7.84	3.33	0.472	2.30	2.09	0.75	1.06	0.995	0.07	3.26
55	82.26	0.240	7.31	3.11	0.429	2.17	1.87	0.69	1.05	0.871	0.03	3.07
56	84.64	0.195	5.78	2.48	0.316	1.58	1.47	1.95	0.91	0.669	0.08	2.39
57	87.41	0.162	4.91	2.14	0.287	1.30	1.27	1.10	0.87	0.561	0.11	2.02
58	87.18	0.158	4.96	2.08	0.255	1.22	1.20	1.52	0.90	0.533	0.04	2.04
59	85.23	0.186	5.48	2.49	0.285	1.30	1.59	1.76	0.97	0.731	0.09	2.39
60	80.22	0.261	7.59	3.56	0.534	1.92	2.33	1.36	1.07	1.155	0.05	3.51
61	78.99	0.297	8.18	3.85	0.619	2.06	2.54	1.19	1.08	1.213	0.04	3.80
62	64.66	0.699	14.84	8.20	1.017	2.99	1.59	2.92	2.71	0.394	0.09	8.10
63	65.20	0.680	15.12	8.07	0.881	2.95	1.09	2.95	2.69	0.378	0.05	8.01
64	64.39	0.674	15.02	7.96	1.298	2.74	1.52	3.37	2.67	0.362	0.10	7.85
65	65.01	0.670	14.84	7.90	1.163	2.96	1.53	2.88	2.69	0.366	0.09	7.80
66	65.74	0.643	14.94	7.84	1.183	2.77	1.56	2,31	2.65	0.386	0.09	7.74
67	64.11	0.693	15.45	8.24	1.222	2.99	1.50	2.76	2.68	0.365	0.07	8.16
68	63.85	0.673	15.37	8.07	1.133	3.30	1.51	3.07	2.63	0.399	0.07	8.00
69	63.28	0.818	15.38	8.10	1.208	3.08	1.57	3.52	2.64	0.415	0.07	8.02
70	64.65	0.660	14.61	8.04	1.143	2.93	1.54	3.34	2.67	0.432	0.04	8.00
71	65.33	0.637	14.52	7.71	1.136	3.15	1.04	3.51	2.61	0.362	0.07	7.64
72	64.81	0.652	14.50	7.76	1.354	3.05	1.47	3.41	2.62	0.389	0.05	7.71
73	65.78	0.629	14.07	7.61	1.045	2.93	1.45	3.62	2.52	0.352	0.07	7.53
74	65.69	0.644	13.85	7.83	1.668	3.01	1.10	3.32	2.55	0.354	0.10	7.72
75	65.55	0.647	14.37	7.97	1.320	2.74	1.47	3.01	2.60	0.330	0.07	7.89
76	64.08	0.670	14.98	8.10	1.377	3.18	1.12	3.57	2.51	0.422	0.04	8.05
77	62.68	0.747	15.46	8.76	1.545	3.25	1.67	3.01	2.45	0.436	0.07	8.68
78	65.33	0.662	14.89	7.87	1.362	2.79	1.53	2.57	2.64	0.369	0.05	7.81
79	63.85	0.679	15.12	8.18	1.064	2.89	1.53	3.68	2.64	0.384	0.10	8.07
80	63.04	0.686	15.37	8.33	1.256	3.14	1.64	3.42	2.64	0.479	0.08	8.23
81	65.06	0.654	15.02	7.83	0.956	2.87	1.42	3.21	2.59	0.390	0.04	7.78
82	64.08	0.660	14.50	8.04	1.283	3.05	1.52	3.94	2.51	0.419	0.09	7.94
83	65.06	0.666	14.52	8.05	1.395	2.96	0.84	3.63	2.54	0.352	0.08	7.95
84	64.93	0.684	14.81	8.31	1.316	3.13	1.64	2.23	2.49	0.465	0.06	8.25
85	62.56	0.759	16.02	8.96	1.442	3.97	1.25	2.16	2.43	0.456	0.07	8.88
86	62.37	0.729	15.90	8.74	1.342	3.65	1.70	2.78	2.34	0.447	0.08	8.65
87	62.64	0.789	16.02	9.00	1.671	3.88	1.08	2.07	2.37	0.487	0.07	8.92
88	63.58	0.755	14.42	9.11	1.442	3.42	1.98	2.23	2.48	0.587	0.06	9.04
89	66.25	0.631	14.12	7.95	1.289	3.37	1.70	1.86	2.36	0.470	0.08	7.86
90	69.31	0.600	13.19	7.41	1.270	2.90	0.88	1.54	2.50	0.419	0.06	7.35
91	68.85	0.609	12.76	7.68	0.897	2.79	1.53	1.86	2.61	0.423	0.09	7.58
92	69.59	0.561	13.10	6.94	1.228	2.85	0.81	1.99	2.52	0.427	0.07	6.86
93	58.14	0.641	15.60	5.99	0.095	4.88	7.65	0.72	4.70	1.591	0.13	5.85
94	61.95	0.574	16.59	4.40	0.743	4.67	3.85	1.35	4.19	1.699	0.08	4.32
95	66.90	0.528	13.50	6.82	1.014	3.70	3.60	0.62	1.74	1.583	0.07	6.74

Table XII-3 (continued)

No.	SiO_2	TiO_2	Al_2O_3	tot. Fe	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	FeO	Fe_2O_3
96	68.14	0.588	12.88	6.52	0.975	3.21	3.22	1.30	1.75	1.416	0.03	6.48
97	69.69	0.583	12.89	6.35	0.381	2.69	2.23	2.09	2.36	0.761	0.18	6.16
98	69.67	0.541	13.16	7.51	0.094	2.22	2.38	1.32	2.58	0.618	0.88	6.53
99	66.68	0.556	13.26	7.16	0.732	2.25	3.99	2.31	2.51	0.569	0.04	7.11
100	67.47	0.624	14.23	7.42	1.336	2.76	1.68	1.43	2.43	0.624	0.03	7.38
101	70.40	0.472	11.96	5.84	0.837	3.41	1.47	3.26	1.97	0.378	0.02	5.82
102	66.77	0.579	13.25	6.98	1.030	2.96	1.88	3.64	2.33	0.579	0.04	6.94
103	64.77	0.555	13.19	6.70	1.002	3.20	1.98	5.70	2.29	0.623	0.04	6.66
104	67.57	0.580	12.78	7.09	1.065	2.40	2.01	3.50	2.39	0.620	0.04	7.04
105	68.32	0.523	11.98	6.55	1.166	2.56	2.72	3.01	2.05	1.126	0.04	6.51
106	66.86	0.575	13.37	7.10	1.009	2.62	1.98	3.56	2.38	0.562	0.04	7.05
107	68.76	0.537	11.98	6.40	0.918	2.56	2.22	3.57	2.22	0.848	0.03	6.36
108	66.18	0.561	12.56	6.82	1.562	2.67	2.11	4.56	2.26	0.721	0.08	6.74
109	60.76	0.568	11.62	7.07	8.540	2.60	2.34	3.60	2.13	0.784	0.14	6.92
110	66.44	0.570	13.01	7.00	1.275	2.67	2.03	4.09	2.26	0.665	0.07	6.92
111	67.32	0.551	12.45	6.62	1.115	2.63	1.87	4.65	2.23	0.578	0.10	6.51
112	67.25	0.601	13.43	7.19	1.120	2.31	1.91	3.23	2.38	0.587	0.09	7.10

Table XII-4 Average composition (%) and standard deviation of sediments.

	GH81-4	GH80-5[1)]	GH80-1[2)]	GH79-3[3)]
Number of Samples	112	106	111	34
SiO_2	70.45 ± 7.29	60.75 ± 5.37	62.88 ± 8.47	62.83 ± 6.34
TiO_2	0.51 ± 0.18	0.68 ± 0.15	0.88 ± 0.52	0.84 ± 0.26
Al_2O_3	11.93 ± 3.21	16.28 ± 2.72	14.44 ± 3.16	15.91 ± 1.53
Total Fe as Fe_2O_3	6.17 ± 2.00	7.80 ± 1.33	8.72 ± 2.94	8.26 ± 2.64
MnO	1.15 ± 1.09	1.77 ± 0.57	2.09 ± 1.54	0.85 ± 0.24
MgO	2.67 ± 0.72	3.76 ± 0.66	2.48 ± 1.04	3.25 ± 0.41
CaO	1.79 ± 0.82	1.97 ± 1.50	2.79 ± 1.55	2.19 ± 1.29
Na_2O	2.60 ± 1.17	3.63 ± 0.92	1.81 ± 0.72	1.38 ± 0.64
K_2O	2.09 ± 0.71	2.86 ± 0.48	2.73 ± 0.77	3.48 ± 0.71
P_2O_3	0.64 ± 0.35	0.79 ± 0.69	1.19 ± 1.05	1.05 ± 0.70

1) Sugisaki and Yamamoto (1984)
2) Sugisaki and Kinoshita (1982)
3) Sugisaki (1981a)

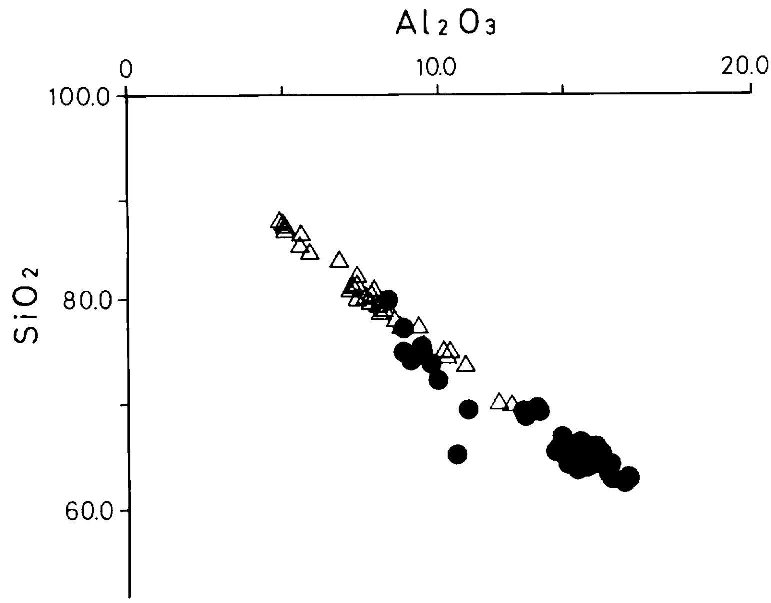

Fig. XII-1 Plots of SiO_2 against Al_2O_3. Open triangles and solid circles represent siliceous ooze and siliceous clay (see Table XII-1), respectively.

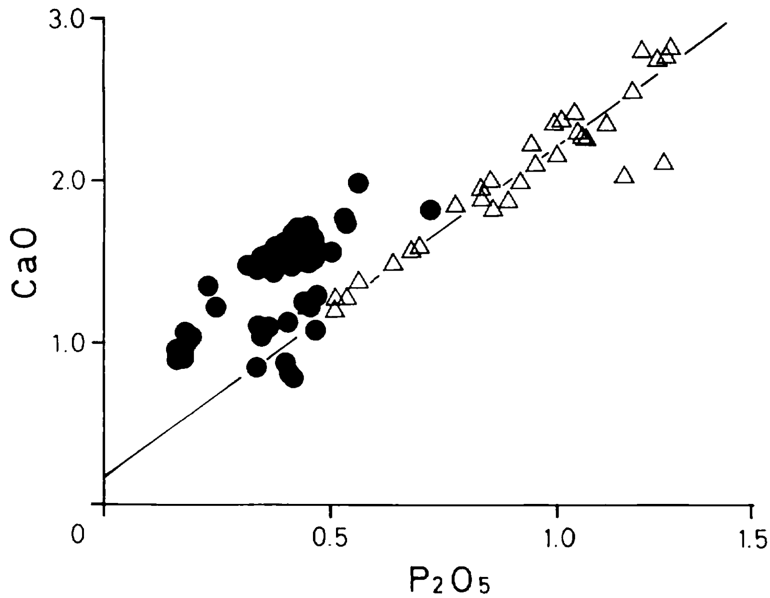

Fig. XII-2 Plots of CaO against P_2O_5. The symbols are the same as in Fig. XII-1.

which is overlain by younger sediments of about 20 cm thick, occurs just above them.

Table XII-4 shows the comparison of the average composition of the sediments from the four cruise areas in the central Pacific. In comparison with sediments from the three areas previously surveyed, the present samples tend to be higher in SiO_2 and P_2O_5.

The higher SiO_2 content can be attributed to biogenic silica such as radiolarians which abundantly occur in the samples. The relation between Al_2O_3 and SiO_2 (Fig. XII-1) indicates the mixing of terrigenous materials with biogenic silica: on the figure, SiO_2 converges on 100%, if Al_2O_3 representing terrigenous materials becomes null. This type of two-components sediments which is represented by this mixing line has been reported for marine sediments formed under a high biological activity (e.g. in the Japan Trench: SUGISAKI, 1980) and for typical radiolarian cherts on land (e.g. in central Japan: SUGISAKI *et al.*, 1982).

The higher P_2O_5 content may be also due to high biological productivity. The correlation between CaO and P_2O_5 (Fig. XII-2) shows that the phosphorus occurs as calcium phosphate. This feature was also observed in other cruise areas (SUGISAKI, 1981; SUGISAKI and KINOSHITA, 1982; SUGISAKI and YAMAMOTO, 1984). The regression line in Fig. XII-2, however, is drawn for the data of open triangles representing siliceous ooze. Other data (solid circles) somewhat deviate from the line. This two trends on the figure correspond to two types of sediments in this area, respectively, which will be discussed in the following section.

Two sedimentary facies viewed from the geochemical features

Two types of sediments are chemically discriminated in the present samples; one is sediments with high concentrations of P_2O_5 and SiO_2, and the other with low concentrations. The former type is mainly responsible for the higher averages of P_2O_5 and SiO_2 within the present area (Table XII-4). This contrastive feature has a relation to difference in lithology of the sediments. The sediments of high SiO_2 and P_2O_5 are designated as siliceous ooze in Table XII-1. Attention is directed to high ratios of Al_2O_3/TiO_2 in the ooze. On the basis of comprehensive data of marine sediments, SUGISAKI (1984) pointed out the significance of the value normalized to TiO_2 for each component in sediments, which is helpful for evaluating origin and depositional environment of sediments. The Al_2O_3/TiO_2 ratio is a clue to original materials of sediments. Al and Ti are hardly soluble in water and their mutual ratio remains stationary during weathering of rocks and sedimentation processes (SUGISAKI, 1984) such as dilution by biological materials as exemplified by Fig. XII-1. Al_2O_3/TiO_2 ratios in usual marine sediments fall into a narrow range between 22 and 24 (SUGISAKI, *et al.*, 1982). It is particularly interesting that the ratios are similar to mean values of those of granites and basalts, because this suggests that the lithologic part of the marine argillaceous sediments is derived mostly from the continental crust. The exception can be attributed to the contribution from oceanic basalt, acidic tuff and others.

The high ratio observed in the siliceous ooze suggests a particular origin of the sediments. The vertical variation of Al_2O_3/TiO_2 ratios in the cores (Fig. XII-3) shows that the zone of siliceous ooze (zone C) posseses higher Al_2O_3/TiO_2 ratio than that of siliceous clay (zone B), although the ratio of siliceous ooze in core p218 is not con-

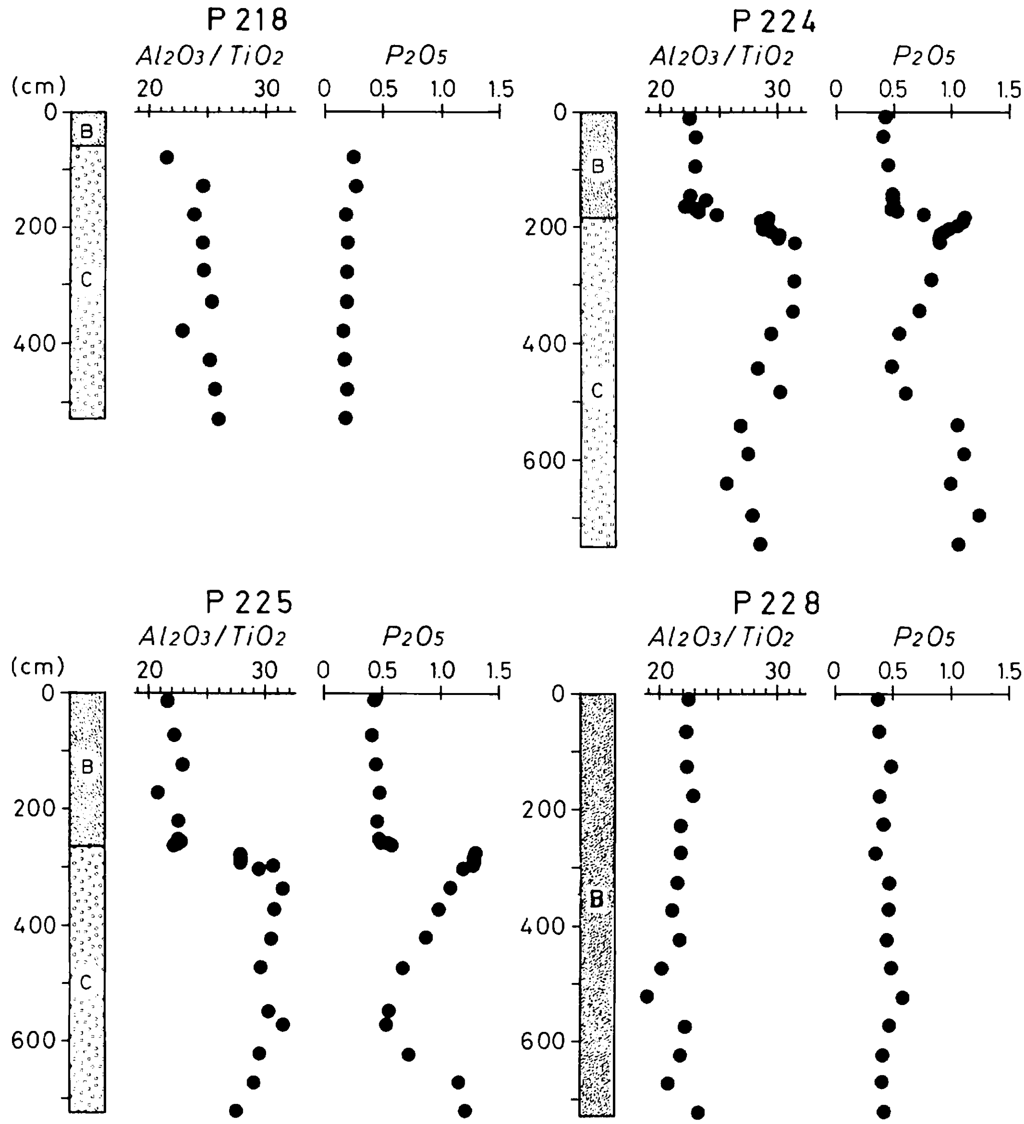

Fig. XII-3 Vertical variations of Al_2O_3/TiO_2 and P_2O_5 in four piston cores. Each left column shows lithology of sediments in the core. B and C show siliceous clay and siliceous ooze, respectively.

spicously high. The ratio pertaining to zone B is closely similar to that for usual marine sediments (≒22). On the other hand, the high ratio implies the contribution of acidic tuff to zone C (Table XII-5). The Al_2O_3/TiO_2 ratio in acidic tuffs ranges from 20 to 150 and the ratio does not change during alteration (YAMAMOTO, *et al.*, 1986). This range overlaps in part with the value of normal marine sediments (≒22), but the ratios observed in zone C (28.30 in average) cannot be regarded as normal. This evidence sug-

Table XII-5 Average compositions (%) of sediments for lithologic types.

	Siliceous clay	Siliceous ooze
Number of samples	50	41
SiO_2	65.15 ± 1.63	78.84 ± 4.83
TiO_2	0.66 ± 0.058	0.30 ± 0.080
Al_2O_3	14.48 ± 0.92	8.22 ± 1.88
Total Fe as Fe_2O_3	7.90 ± 0.56	3.82 ± 0.94
MnO	1.37 ± 0.97	0.81 ± 0.68
MgO	3.03 ± 0.33	2.10 ± 0.72
CaO	1.45 ± 0.27	1.79 ± 0.60
Na_2O	2.98 ± 0.66	2.01 ± 1.31
K_2O	2.56 ± 0.15	1.34 ± 0.44
P_2O_3	0.43 ± 0.078	0.79 ± 0.39
Al_2O_3/TiO_2	22.14 ± 1.04	28.30 ± 2.34

gests that the sediments in zone C comprise acidic tuffs and/or their altered materials. The fraction of tuffs in sediments, however, cannot be estimated only with the present data, because the high ratio up to 150 in acidic tuffs is essentially lowered if they mix with normal sediments. Alternatively, this relatively lower ratio may show that the tuff as a source materials was not remarkably acidic, but intermediate.

The sediments of this type were observed in the surveyed area during GH80-5 cruise, which is adjacent to the present area. In GH80-5 area, three types of lithology were discriminated, namely, pelagic sediments, zeolitic sediments and siliceous sediments. Among them, zeolitic sediments display high Al_2O_3/TiO_2 ratio of 27.82 in average for 28 samples (cf. Table XII-6 in SUGISAKI and YAMAMOTO, 1984), which is remarkably close to that (28.30) for the present samples. Zeolite minerals such as phillipsite and clinoptilolite in the deep sea deposits are accepted to be formed during diagenesis by the alteration of volcanic debris (BONATTI, 1963; SHEPPARD, *et al.*, 1970). It is therefore inferred that the zeolite minerals in the sediments of GH80-5 area have been formed from the volcanic glass as a precursor with high ratio of Al_2O_3/TiO_2. The data obtained from the previous cruises in the central Pacific indicate that zeolite occurs in sediments of high Al_2O_3/TiO_2 ratio whereas sediments with high ratio are not always associated with zeolite. In the case of the present samples, zeolite is not detected in zone C in spite of its high Al_2O_3/TiO_2 ratio (NISHIMURA, private communication). This lack of zeolite in zone C may be resulted from that the zeolite had not formed and/or the minerals had been scarcely detected if any because the main part of zone C is biogenic silica.

The stratigraphic position of zone C should be also noted. In piston cores recovered by the present cruise, zone C lies below the sediments (zone B) with normal Al_2O_3/TiO_2 (Fig. XII-3). In GH80-5 area, the zeolitic clay with high ratio also underlies the siliceous fossil rich clay and pelagic clay (NISHIMURA, 1984). The latter two shows the normal Al_2O_3/TiO_2 ratio. Therefore, zone C designated as siliceous ooze in the present area can be stratigraphically correlated with zone of zeolitic clay in GH80-5 area. Paleontological (NISHIMURA, 1984) and paleomagnetic (JOSHIMA and NISHIMURA, 1984) data show that the zeolitic clay had deposited before the late Miocene. This correlation may be supported by high P_2O_5 content observed in both zeolitic clay and siliceous ooze. However, SiO_2 content in zeolitic clay is much lower than that in siliceous ooze. This may be ascribed to the areal difference of bilogical activity in the Miocene.

Summary

The results of the geochemical study with regard to 112 samples of deep-sea sediments recovered by GH81-5 cruise are summarized as follows.

(1) In comparison with sediments from the surveyed area during the previous cruise in the central Pacific, the present samples are characterized by high P_2O_5 and SiO_2 contents.

(2) P_2O_5 and SiO_2 are remarkably concentrated in siliceous ooze, which occurs stratigraphically lower position in cores.

(3) The siliceous ooze shows higher ratio of Al_2O_3/TiO_2 than that of normal marine sediments. The high ratio suggests that the ooze contains much volcanic materials such as acidic tuff, which could diagenetically alter to zeolite.

(4) The siliceous ooze characterized by high P_2O_5 content and high Al_2O_3/TiO_2 ratio may be a stratigraphic equivalent for zeolitic clay observed in the areas of GH80-1 and GH80-5.

Acknowledgments

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