

I. OUTLINE OF RESEARCH CRUISES

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This report on marine geological and geophysical investigations in the Ogasawara (Bonin) arc forms a part of a five-year research programme by the Geological Survey of Japan on the geology of the continental shelves and slopes around Japan using the research vessel HAKUREI-MARU. It is mainly concerned with the results on on-board observations by the scientific staff, but some results from analyses performed after the cruises are also included.

GH79-2

The first survey, cruise GH79-2, covered the northernmost part of the Mariana Arc and the southernmost part of the Ogasawara Arc (Fig. I-1).

The scientific staff on-board during cruise GH79-2 consisted of six scientists from the Marine Geology Department, a technical official from the Technical Department of the G. S. J., and eight technical assistants who are students of Ryukyu University and Tokyo University of Fisheries. Two guests from the Bureau of Mines of the Philippines and the Director of the Marine Geology Department were on board from Funabashi Port to Hachijo Island (Table I-1).

The ship left Funabashi Port on 16th April, 1979 and for 16 days surveyed the slope area west of the Ogasawara Trench and a region south of 25° N, i.e. the Shichito Ridge around Iwojima and Minami-Iwojima Islands, the slope area, the Mariana Trench and the northernmost part of the Parece Vela Basin.

The ship entered Futami Port on Chichijima Island on May 1st, having made a land survey of Minami-Iwojima Island on the previous day. On May 3rd, the ship left Futami Port and for 13 days surveyed an area southward, down to 21° 40' N, i.e. the northern part of the Mariana Trough, the Mariana and the West Mariana Ridges, the slope area and the Mariana Trench, and also the Shichito Ridge (Table I-2).

The ship covered a total distance of 5,958.9 nautical miles in 30 days. The results of stationary observations are summarized in Table I-9.

GH79-3

The second survey, cruise GH79-3, covered the middle part of the Ogasawara Arc between latitudes 25° and 30°, which area includes Pacific floor, part of the Ogasawara Trench, the Ogasawara Ridge, the Ogasawara Trough, part of the Shichito Ridge, the Izu Ridge and the western margin of the Shikoku Basin (Fig. I-1).

Scientific staff aboard during cruise GH79-3 consisted of six scientists from the Marine Geology Department and a total of twelve technical assistants who are

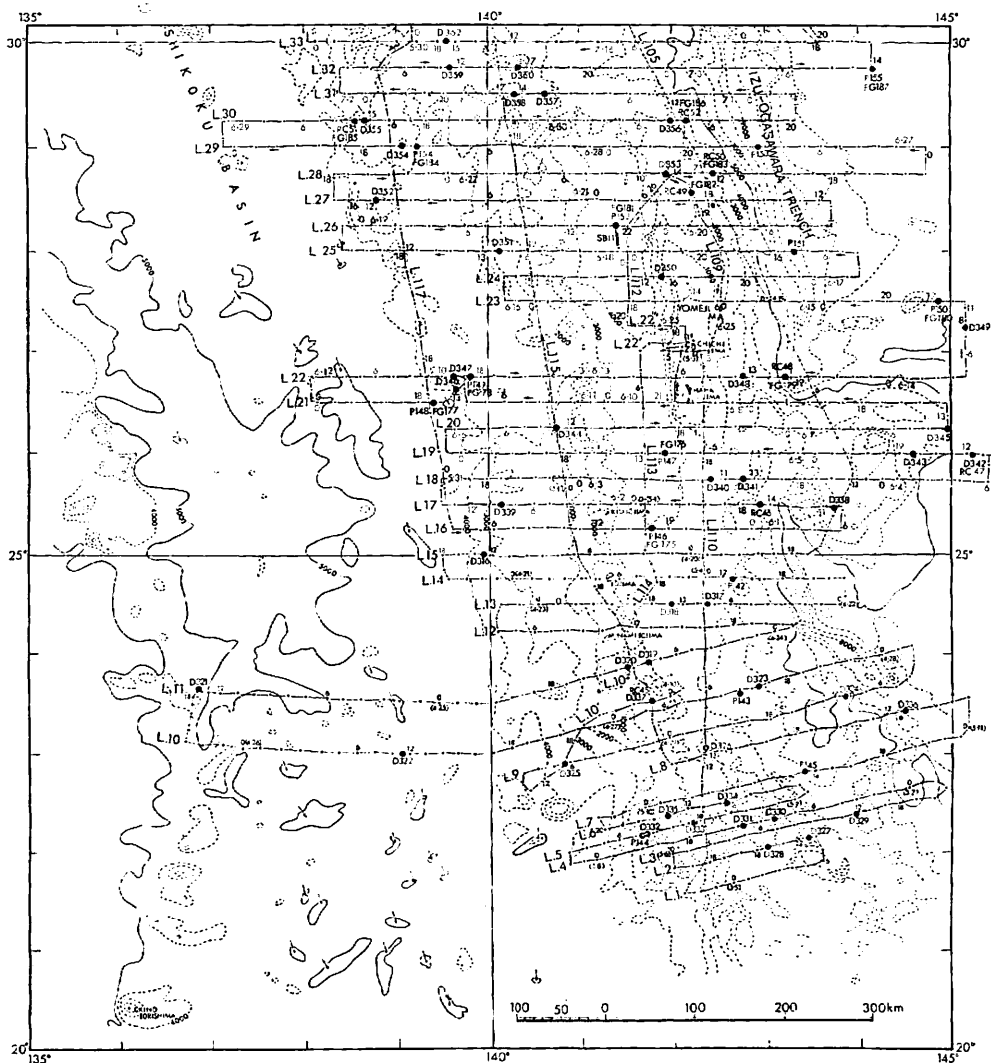


Fig. I-1 Sampling sites and track chart of the geological and geophysical surveys made during cruises GH79-2 and 3.

post and undergraduate students at the University of Tokyo, Tohoku University and Tokyo University of Fisheries (Table I-3).

The ship left Funabashi Port on 28th May, 1979 and for 12 days surveyed the southern area of the Arc which contains the Ogasawara Plateau on the Pacific side and Kita-Iwojima Island on the western side, entering Futami Port on Chichijima Island on 8th June. On 10th June, the ship left Futami Port and surveyed the middle part of the Arc for 14 days. This included a land survey of the two Muko-shima Islands. The ship entered Futami Port again on 23rd June. Finally, on 25th June, the ship left the port and surveyed the northern part of the Arc for 9 days

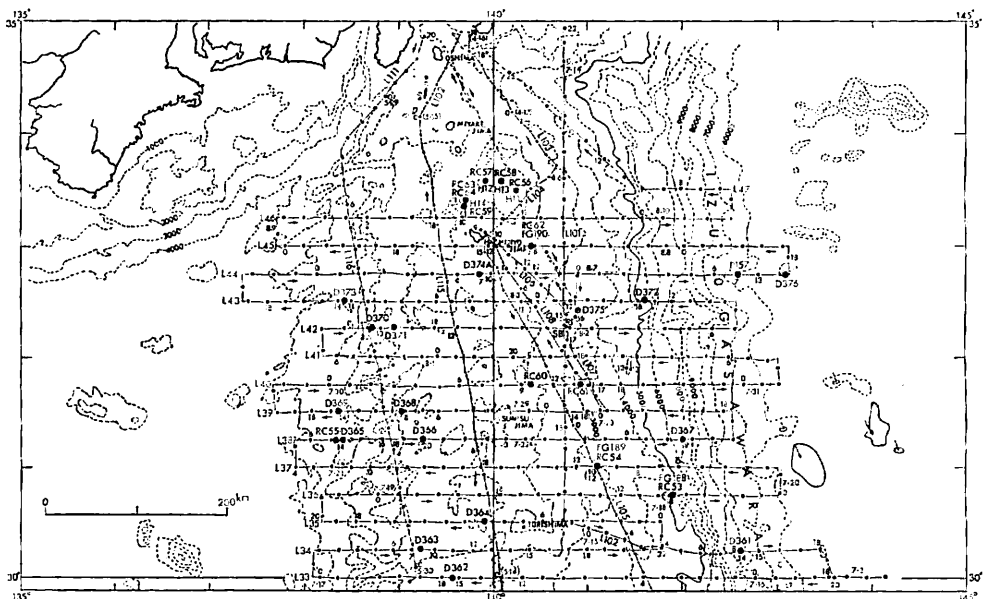


Fig. I-2 Sampling sites and track chart of the geological and geophysical surveys made during cruise GH79-4.

Table I-1 Scientific staff aboard during cruise GH79-2

Name	Organization	Speciality
Takemi ISHIHARA	Marine Geol. Div., G.S.J.	chief scientist, geophysics
Isao ISOYAMA	Technical Div., G.S.J.	geomorphology
Makoto YUASA	Marine Geol. Div., G.S.J.	lithology
Kensaku TAMAKI	Marine Geol. Div., G.S.J.	structural geology
Akira NISHIMURA	Marine Geol. Div., G.S.J.	sedimentology
Manabu TANAHASHI	Marine Geol. Div., G.S.J.	structural geology
Fumitoshi MURAKAMI	Marine Geol. Div., G.S.J.	geophysics
Masayasu NAKAMOTO	Ryukyu Univ.	technical assistance
Tsutomu TAMAKI	Ryukyu Univ.	technical assistance
Kaichi YAMAGATA	Tokyo Fisheries Univ.	technical assistance
Kazuhiro KAWACHI	Tokyo Fisheries Univ.	technical assistance
Hiroshi HOMMA	Tokyo Fisheries Univ.	technical assistance
Shinichi AMANO	Tokyo Fisheries Univ.	technical assistance
Masahiko HANZAWA	Tokyo Fisheries Univ.	technical assistance
Tohru OHSHIMA	Tokyo Fisheries Univ.	technical assistance
*Hokuichiro OHMACHI	Director of the Marine Geol. Div., G.S.J.	geology
*Juanito C. FERNANDEZ	Director of Mines, the Philippines	guest
*Carlos F. TEODORO	Marine Mineral Resources Div., Bureau of Mines, the Philippines	guest, geology

*Funabashi-Hachijo island.

Table I-2 Schedule of cruise GH79-2

April 16	Lv. Funabashi Port. Geophysical survey of the slope area east of Izu-Shichito islands.
April 17	Touch at Borawazawa Port, Hachijo island. Geophysical survey of the slope area west of the Ogasawara Trench. Geological and geophysical survey of the Shichito Ridge around Iwojima and Minami-Iwojima islands, the slope area, the Mariana Trench and the northernmost part of the Parece Vela Basin.
April 30	Land survey of Minami-Iwojima island.
May 1	Ar. at Futami Port, Chichijima island.
May 3	Lv. Futami Port. Geological and geophysical survey of the northern part of the Mariana Trough, the Mariana and the West Mariana Ridges, the slope area and the Mariana Trench. Geophysical survey of the Shichito Ridge.
May 15	Ar. at Funabashi Port.

Table I-3 Scientific staff aboard during cruise GH79-3

Name	Institute	Speciality
Eiichi HONZA	Marine Geol. Dept., G.S.J.	Chief scientist, geology
Kouji ONODERA	Marine Geol. Dept., G.S.J.	geomorphology
Teruki MIYAZAKI	Marine Geol. Dept., G.S.J.	geophysics
Makoto YUASA	Marine Geol. Dept., G.S.J.	lithology
Kensaku TAMAKI	Marine Geol. Dept., G.S.J.	structural geology
Akira NISHIMURA	Marine Geol. Dept., G.S.J.	sedimentology
Hiroshi MAKIMOTO	Geol. Dept., G.S.J.	lithology
**Eiji SAITO	Technical Dept., G.S.J.	geomorphology
Yukio MATSUBARA	Tokyo Univ.	technical assistance
Kazunori KUSUMOTO	Ryukyu Univ.	technical assistance
*Aiihiro KAIRI	Tokyo Fisheries Univ.	technical assistance
*Mitsuhiro SHIODA	Tokyo Fisheries Univ.	technical assistance
*Noritsugu YAMADA	Tokyo Fisheries Univ.	technical assistance
**Izumi KUNINAKA	Tokyo Fisheries Univ.	technical assistance
**Yoichiro NAKAMURA	Tokyo Fisheries Univ.	technical assistance
***Toshio KATAYAMA	Tohoku Univ.	technical assistance
***Kuniko YOSHII	Tokyo Fisheries Univ.	technical assistance
***Ichiro GOTO	Tokyo Fisheries Univ.	technical assistance
****Masahiro SAITO	Tokyo Fisheries Univ.	technical assistance

*Funabashi (28th May)–Chichijima (25th June)

**Funabashi (28th May)–Chichijima (10th June)

***Chichijima (8th June)–Funabashi (6th July)

****Chichijima (23rd June)–Funabashi (6th July)

docking at Hachijo Island for a few hours to disembark a crew member on account of sudden illness. The survey was continued on the east side of Hachijo Island for the remaining two days and the ship entered Funabashi Port on 6th July, 1979 (Table I-4).

The ship covered a total distance of 7,360.4 nautical miles over a period of 40

Table I-4 Schedule of cruise GH79-3

May 28th	Lv. Funabashi Port. Geological and geophysical survey of the Bonin Arc between latitude 25° and 26.5°.
June 8th	Ar. at Futami Port of Chichijima Island.
June 10th	Lv. Futami Port. Geological and geophysical survey of the Bonin Arc between latitude 26.5° and 29° involving the land survey of the two islands of the Yomejima and Nakoudojima.
June 23rd	Ar. at Futami Port.
June 25th	Lv. Futami Port. Geological and geophysical survey of the Bonin Arc between latitude 29° and 30°.
July 4th	A few hours stay in Hachijo Island. Geological and geophysical survey in the eastern of Hachijo Island.
July 6th	Ar. at Funabashi Port.

days. The results of stationary observations are summarized in Table I-10.

GH79-4

Starting from the final position on the last traverse line of cruise GH79-3, geological and geophysical investigations of cruise GH79-4 were carried out along traverse lines spaced at intervals of 15 nautical miles, finishing at a point intermediate between Hachijo and Mikurajima Islands. The area around Hachijo Island was surveyed in more detail than the other areas to facilitate mapping the geology of the area to a scale of 1:200,000 next year (Fig. I-2).

Rock cores were obtained with a "MD500H" rock drill from four sites on the Kurose Bank (a submarine caldera) and the Shinkurose Bank.

The scientific staff consisted of nine scientists of the Geological Survey of Japan and eight students from the universities listed in Table I-5. A marine geologist of the Philippines Bureau of Mines was on board throughout the cruise for cooperative work. Two engineers of the Koken Boring Machine Co., Ltd. joined the cruise for four days to set up the rock drill. Twelve foreign scientists were on board from Oshima to Funabashi for a week of training in marine geological techniques (Table I-6).

Leaving Funabashi Port on July 13th, the HAKUREI-MARU sailed to the final position on the last traverse line of cruise GH79-3. Between the 14th and 22nd July geophysical surveying and sampling work was carried out along the traverse lines. Weather and sea conditions were somewhat rough during this part of the cruise.

The ship docked at Sokodo Port on Hachijo Island on 23rd of July for a change of personnel and for mounting of equipment. After the ship left the port of 25th, a geophysical survey was carried out in the area of the submarine caldera and of the bank north of the island, in order to decide on drilling sites. On 26th July, the "MD500H" drill was used at two sites at depths of 167 m and 249 m on the top area of the Kurose Bank. On the following day, the machine was used at two

Table I-5 Scientific staff aboard during cruise GH79-4

Name	Institute	Speciality
Eiji INOUE	Marine Geol. Dept., G.S.J.	Chief scientist, geology
*Takemi ISHIIHARA	Ditto	Geophysics
**Yoshihisa OKUDA	Ditto	Structural geology
Makoto YUASA	Ditto	Petrology
*Kensaku TAMAKI	Ditto	Structural geology
Akira NISHIMURA	Ditto	Sedimentology and paleontology
***Manabu TANAHASHI	Ditto	Structural geology
*Kiyokazu NISHIMURA	Ditto	Geophysics
*Kaichi ISHIBASHI	Ditto	Geomorphology
Octavio O. DACLISON	Bureau of Mines, Philippines	Geology
*Nobuyuki HONDA	Tohoku Univ.	Technical assistance
*Jin MIYAHARA	Tokyo Fisheries Univ.	Ditto
*Toshinori YAMASAKI	Ditto	Ditto
*Osamu OKAYAMA	Ryukyu Univ.	Ditto
*Kouji UENO	Ditto	Ditto
***Takehiko NAGASE	Ditto	Ditto
****Kazuhiro OKAMOTO	Ditto	Ditto
*Shin IKEI	Ditto	Ditto
*Kouji MOTOMURA	Ditto	Ditto
****Ryo ISHIZAKA	Koken Boring Machine Co., Ltd.	Engineering of rock drill
****Eijiro FUKUNISHI	Ditto	Ditto
*Funabashi-Oshima		
**Hachijo-Funabashi		
***Funabashi-Hachijo		
****Hachijo-Oshima		
****Hachijo-Hachijo		

Table I-6 Foreign participants in the Group Training Course for Offshore Prospecting during cruise GH79-4

Name	Nation	Occupation
M. Etahi MIA	Bangladesh	Geophysics, Bangladesh Oil & Gas Cor., M.P.M.R.
Bhagwan SAHAY	India	Geology, Oil & Natural Gas Commission
Bambang DWIYANTO	Indonesia	Geology, Geological Research & Development Center
Ginagan Harahap TUA	Indonesia	Geology, Directorate General of Petroleum & Natural Gas
Kamal GHANNADI	Iran	Geophysics, National Iranian Oil Company
Park Keun PIL	Korea	Geophysics, Korea Research Institute of Geoscience and Mineral Resources
Hamzah YUNUS	Malaysia	Geophysics, Petronas Carigali Company
Max W. BENAVIDES	Peru	Geology, Petr6leos del Per6
Voltaire MONTEMAYOR	Philippines	Geology, Philippine Bureau of Mines
Edgardo V. GONZALES	Philippines	Geology, Philippine Bureau of Mines
Preecha LAOCHU	Thailand	Geology, Mineral Resources Department
Ahmed M. S. MAJID	United Arab Emirates	Geology, Technical Department, Ministry of Petroleum and Mineral Resources

Table I-7 Schedule of cruise GH79-4

July 13th	Departure from Funabashi Port. Geological and geophysical survey in the northern part of the Izu-Ogasawara Arc System between latitude 31° and 31.5°.
July 23rd	Ar. at Sokodo Port of Hachijo Island. Personnel change and equipment supply.
July 25th	Sailing from the Port. Geological survey in the area north of Hachijo Island.
July 26th	Rock coring with MD500H marine drill.
July 28th	Geological and geophysical survey in the area between latitude 31.5° and 32.5°.
August 5th	Ar. at Okada Port of Oshima Island. Personnel change and embarkation of twelve foreign participants of the Group Training Course for Offshore Prospecting.
August 6th	Departure from the Port. Geological and geophysical survey of the area between latitude 32.5° and 33.5°.
August 11th	Ar. at Funabashi Port.

Table I-8 Observation methods in cruise GH79-2, 3 and 4

Cruising and positioning by NNSS and Loran C.

Geophysical methods

- Bathymetric survey by 12 kHz PDR
 - Prospecting of bottom topography
- Subbottom profiling by 3.5 kHz PDR
 - Prospecting of sedimentary surficial layers and surficial structure
- Continuous seismic profiling survey by airgun
 - Prospecting of sedimentary layers and geological structure
- Refraction measurements by sono-radio buoy
 - Prospecting of sedimentary layers and geological structure
- Magnetic survey by proton magnetometer
- Gravity measurements by surface ship gravimeter
 - Auxiliary consideration of general geological structure

Geological methods

- Bottom sampling by chain-bag and cylinder dredges
 - Sampling of sediments and rocks
 - Bottom sampling by rock corer
 - Sampling of sediments and rocks
 - Bottom sampling by piston corer
 - Observation of vertical sequence of surficial columns
 - Bottom sampling and camera observation by free-fall photo grab
 - Sampling and observation of surficial features
 - Rock drilling
 - Sampling of rocks and observation of vertical sequence of sedimentary rocks
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sites, one at a depth of 180 m on the bank and one at a depth of 131 m on the top of the submarine caldera. Throughout the operation, weather and sea conditions were rather calm, although currents were strong at the drilling sites, attain-

Table I-9 Results of stationary observations during cruise

Station No.	Sample No.	Date	Time	Position		Depth m	Sampler
				Latitude, N	Longitude, E		
1493	D316	1979, April 20	13:17	25°00.2'	139°56.7'	2480	Chain-bag type and cylinder type dredges
			}	}	}	}	
			15:03	25°00.2'	139°57.2'	2270	
1494	FG165C	April 21	12:51	24°45.6'	142°39.1'	2580	Free-fall grab with camera
			}	}	}	}	
			14:35				
	P142		13:10	24°44.6'	142°37.4'	2538	Piston corer
		}	}	}	}		
			14:20				
1495	D317	April 22	9:29	24°29.6'	142°20.8'	2600	Chain-bag type and cylinder type dredges
			}	}	}	}	
			11:31	24°29.3'	142°20.0'	2470	
1496	D318		14:17	24°29.6'	141°58.6'	2525	ditto
			}	}	}	}	
			16:16	24°29.7'	141°57.5'	2375	
1497	D319	April 24	8:41	23°53.9'	141°42.1'	1893	ditto
			}	}	}	}	
			9:58	23°54.2'	141°41.9'	1870	
1498	D320		12:03	23°50.1'	141°27.7'	1305	ditto
			}	}	}	}	
			13:21	23°50.7'	141°27.5'	1315	
1499	FG166C	April 25	13:39	23°38.1'	136°50.0'	2458	Free-fall grab with camera
			}	}	}	}	
			16:45				
	D321		13:43	23°38.5'	136°51.3'	2350	Chain-bag type and cylinder type dredges
		}	}	}	}		
			16:21	23°38.6'	136°51.7'	2050	
1500	FG167C	April 26	8:47	22°59.9'	139°02.1'	3945	Free-fall grab with camera
			}	}	}	}	
			11:18				
	D322		8:50	22°59.9'	139°01.9'	3740	Chain-bag type and cylinder type dredges
		}	}	}	}		
			11:05	22°59.9'	139°01.3'	3500	

GH79-2 (compiled by M. YUASA and A. NISHIMURA).

Area and topography	Samples	Remarks
Southern part of Izu Ridge slope	Dark greyish brown foraminifera ooze and pumice (with ferromanganese coating in some cases).	
East off Iwo Is., a high on the trench slope	No. sample. Photograph of bottom.	
ditto	197 cm long core, foraminifera rich silt with two scoria layers and two pumice layers.	
ditto, slope of a knoll	Dark greyish brown foraminiferal sand and scoria.	
Southern extension of Ogasawara Trough, slope of a high	Dark greyish brown foraminifera bearing foraminiferal test rich clay, dark brown fine-grained sandstone, grey siltstone, light brownish grey sandy siltstone and scoria.	In situ sedimentary rocks.
South off Minami-Iwo Is., slope of a high on the Ridge	Basaltic rock fragment (ϕ 3 cm, may be in situ), volcanoclastic breccia and rubble.	
ditto	Fine-mesh pumice (partly black coated, probably taken from outcrop of pumice layer).	In situ. Chain-bag type dredge was lost by the tension of 3.1 t.
Bending part of Kyushu-Palau Ridge, slope of a seamount	No sample. Photograph of bottom.	
ditto	Pumice (maximum diameter, 5 cm).	
Southern part of Kinan Seamounts, slope of a seamount	Pumice and manganese nodule. Photograph of bottom.	
ditto	Dark brown clay, pumice and scoria.	

Table I-9

Station No.	Sample No.	Date	Time	Position		Depth m	Sampler
				Latitude, N	Longitude, E		
1501	FG168C	April 27	10:44	23°38.1'	142°41.8'	3185	Free-fall grab with camera
			}				
			12:16				
	P143		10:51	23°37.9'	142°42.5'	3195	Piston corer
			}				
			12:12				
1502	D323		13:56	23°40.8'	142°53.3'	3415	Chain-bag type and cylinder type dredges
			}	}	}	}	
			16:12	23°39.5'	142°53.6'	3340	
1503	FG169C	April 28	8:35	23°34.4'	144°49.5'	5660	Free-fall grab with camera
			}				
			12:03				
	D324		8:40	23°34.7'	143°49.7'	5660	Chain-bag type and cylinder type dredges
			}	}	}	}	
			11:47	23°35.7'	143°50.0'	5400	
1504	FG170C	April 29	13:54	22°53.2'	140°48.4'	3135	Free-fall grab with camera
			}				
			16:09				
	D325		13:58	22°53.4'	140°48.4'	2865	Chain-bag type and cylinder type dredges
			}	}	}	}	
			16:22	22°53.7'	140°47.9'	2815	
1505	D326	May 4	9:25	23°03.7'	142°19.4'	680	ditto
			}	}	}	}	
			10:16	23°03.9'	142°19.6'	550	
1506	D327	May 5	8:58	22°07.1'	143°24.7'	1430	ditto
			}	}	}	}	
			11:07	22°07.2'	143°24.7'	1280	
1507	D328	May 5	14:56	22°02.4'	142°59.3'	3850	ditto
			}	}	}	}	
			17:13	22°02.0'	142°59.1'	3790	
1508	D329	May 6	12:38	22°23.3'	143°58.2'	3200	ditto
			}	}	}	}	
			14:40	22°22.8'	143°58.4'	3250	

(Continued)

Area and topography	Samples	Remarks
East of Minami-Hiyoshi Seamount, trench slope	Dark brown silt. Photograph of bottom.	
ditto	144 cm long core, dark brown to brown silt with tuff layers and thick (60 cm) pumice layer.	
ditto, slope of small high on trench slope	Acid volcanic rock fragments and microfossil bearing breccia both with ferromanganese coating.	In situ.
ditto, slope of a high on lower part of trench slope	No sample. Photograph of bottom.	
ditto	Brown consolidated siltstone and its fragments.	In situ siltstone.
West of the joint between Volcano Is. ridge and West Mariana Ridge, slope of a high	Rock fragment and sand. Photograph of bottom.	
ditto	Volcanic breccia with ferromanganese crust, and ferromanganese nodule.	In situ.
Slope of Nikko Seamount	Many blocks of glassy andesite, partly with flow structure by elongated pipe, 38 cm × 26 cm × 20 cm in maximum size.	In situ.
Slope of a seamount on Mariana Ridge	Many blocks of porphyrite and foraminifera bearing sandstone, both with ferromanganese coating.	In situ.
Slope of a high in Mariana Trough	Dark brown clay and small fragments of pumice and black volcanic glass.	
Northeast of Fukujin Seamount, slope of a high on trench slope	Dark greyish brown foraminifera ooze, foraminifera bearing sandstone, greyish brown fine-grained sandstone, conglomerate and pumice sandstones partly have like aggregation of micro manganese nodules.	Sandstones may be in situ.

Table I-9

Station No.	Sample No.	Date	Time	Position		Depth m	Sampler
				Latitude, N	Longitude, E		
1509	D330	May 7	8:40	22°20.5'	143°06.3'	2130	ditto
			9:56	22°20.7'	143°06.0'	2070	
1510	D331		12:48	22°15.8'	142°42.8'	2835	ditto
			14:23	22°15.8'	142°42.9'	2630	
1511	D332	May 8	8:37	22°10.3'	141°42.4'	1020	ditto
			10:01	22°10.1'	141°42.6'	830	
1512	FG171C	May 8	10:29	22°09.5'	141°39.6'	2000	Free-fall grab with camera
			11:55				
	P144		10:43	22°09.6'	141°39.6'	1840	Piston corer
			11:48				
1513	D333		15:57	22°17.9'	142°12.1'	1958	Chain-bag type and cylinder type dredges
			17:18	22°17.1'	142°11.9'	1845	
1514	D334	May 9	6:58	22°30.7'	142°34.3'	2470	ditto
			9:12	22°31.0'	142°33.6'	2255	
1515	D335		13:39	22°22.7'	141°56.6'	1485	ditto
			15:14	22°23.3'	141°56.2'	1312	
1516	FG172C	May 10	11:18	22°48.5'	143°24.5'	4280	Free-fall grab with camera
			13:22				
	P145		11:25	22°48.5'	143°24.8'	4280	Piston-corer
			13:14				
1517	FG173C	May 11	7:05	23°25.4'	144°28.1'	6000	Free-fall grab with camera
			10:53				
	D336		7:10	23°25.8'	144°27.5'	5975	Chain-bag type and cylinder type dredges
			10:35	23°26.1'	144°27.0'	5980	

(Continued)

Area and topography	Samples	Remarks
Slope of a seamount on the Mariana Ridge	Dark brown foraminifera sand, small fragments of volcanic rock, and ferromanganese coated pumice.	
Slope of a high in Mariana Trough	Foraminifera and manganese micro-nodule bearing sand, and rock fragments with manganese micro-nodules on the surface.	
Slope of a seamount on West Mariana Ridge	Calcareous sand containing micro manganese nodule and rock fragment, pumice and ferromanganese coated conglomerate with ferromanganese coating.	
Slope between West Mariana Ridge and Mariana Trough	Sand. Photograph of bottom.	
ditto	36 cm core length, dark reddish brown (upper) and dark brown (lower) silt, and manganese nodules on the top.	
Slope of a seamount in Mariana Trough	Foraminifera sand and micro manganese nodule aggregations.	
ditto	Dark brown foraminifera rich clay, glassy andesite (maximum size: 9 cm × 7 cm × 4 cm) and pumice.	In situ andesite.
Slope of a seamount on West Mariana Ridge	Manganese coated. Altered volcanic (probably acid) rocks with ferromanganese coating.	In situ.
Gently slope of small basin between Mariana Ridge and Trench	No sample. Photograph of bottom.	
ditto	Ca. 100 cm long core brown silt with pumice layer representing distinct reversal grading.	Upper Ca. 63 cm was disturbed.
Slope of a seamount in Mariana Trough	Brown silt and brown siltstone with thin black coating. Photograph of bottom.	
ditto	Dark brown silt containing small grains of siltstone, a large block of siltstone with micro manganese nodule on surface, play shape of rubble of siltstone and sandstone, scoria and pumice.	In situ siltstone.

Table I-9

Station No.	Sample No.	Date	Time	Position		Depth m	Sampler
				Latitude, N	Longitude, E		
1518	FG174C	May 12	6:27	23°32.7'	141°43.9'	1470	Free-fall grab with camera
			7:27				
	RC45	6:33	23°32.7'	141°43.9'	1460	Rock corer	
D337			7:38	23°32.5'	141°44.4'	1460	Chain-bag type and cylinder
			7:46	23°32.4'	141°44.2'	1447	type dredges

ing speeds of 1.5-2.0 knots.

Geophysical surveying and sampling were continued along the traverse lines until the ship arrived at Oshima Port on 4th August. The twelve foreign students of the Group Training Course went on board at Oshima on 5th August and the ship left there on 6th. A refraction survey using the sono-buoy system was carried out for several hours in the area between Hachijo and Torishima Islands. Geophysical surveying and sampling were continued until the ship arrived at Funabashi Port on 11th August (Table I-7).

The ship covered a total distance of 5,593.9 nautical miles in 30 days. The results of stationary observations are summarized in Table I-11.

Routine seismic and magnetic profiling surveys along E-W traverses 15 nautical miles apart were carried out with Bolt type airguns and a proton magnetometer, all of which were towed from the stern. 3.5 kHz and 12 kHz echo sounders and a surface ship gravimeter were used to obtain bottom and sub-bottom information. Seismic refraction measurements were carried out using a sono-buoy system in the troughs. Dredge, rock coring and piston coring sites were selected to ascertain the material which constituted the bottom and to correlate this with seismic profiling results. At some of the sites, simultaneous bottom sampling and one-shot camera observations by a free-fall photo grab were carried out especially to study the surficial features of the bottom. NNSS and Loran C were used to fix the ship's position (Table I-8).

(Continued)

Area and topography	Samples	Remarks
Northernmost part of Mariana Trough, central hollow	No sample. No photograph.	
ditto	163 cm long core, dark olive silt. Lost part is composed of black scoria (coarse-sand size) and lower-most fine-grained sandstone.	
ditto, slope beside the hollow	Dark greyish olive very fine-grained sand, and several scoria.	

Table I-10 Results of stationary observations during cruise

Station No.	Sample No.	Date	Time	Position		Depth m	Sampler
				Latitude, N	Longitude, E		
1519	FG175C	1979 May 31	15:14	25°15.0'	141°45.7'	2982	Free-fall grab with camera
			17:03				
	P146		15:21	25°15.0'	141°45.9'	2989	Piston corer
			16:56				
1520	D338	June 1	9:12	25°28.0'	143°43.5'	1950	Chain-bag type and cylinder type dredges
			10:24	25°27.8'	142°43.3'	1950	
1521	RC46		15:30	25°30.0'	142°57.4'	3050	Rock corer
			16:56				
1522	D339	June 2	8:46	25°28.9'	140°07.1'	2750	Chain-bag type and cylinder type dredges
			10:24	25°28.9'	140°06.8'	2600	
1523	D340	June 3	8:18	25°44.9'	142°25.1'	2360	ditto
			10:05	25°45.0'	142°24.4'	2200	
1524	D341		13:20	25°45.2'	142°49.7'	2608	ditto
			15:07	25°45.4'	142°49.7'	2625	
1525	D342	June 4	8:50	25°58.8'	145°15.3'	2050	ditto
			10:17	25°58.8'	145°15.3'	1890	
1526	RC47		10:38	25°58.8'	145°15.3'	1350	Rock corer
			11:22				
1527	D343		15:35	26°00.0'	144°37.5'	3225	Chain-bag type and cylinder type dredges
			17:41	26°00.0'	144°37.9'	3170	
1528	FG176C	June 5	9:09	25°59.7'	141°54.9'	3340	Free-fall grab with camera
			11:01				
	P147		9:18	26°00.2'	141°54.9'	3344	Piston corer
			10:58				
1529	D344	June 6	9:23	26°15.1'	140°45.2'	1876	Chain-bag type and cylinder type dredges
			11:05	26°15.2'	140°46.0'	1841	

GH79-3 (compiled by M. YUASA and A. NISHIMURA).

Area and topography	Samples	Remarks
Flat bottom of Ogasawara Trough	Dark greyish brown clay and pumice no photograph.	
ditto	Dark olive grey silty very fine-grained sand.	Residue of inner tube of corer.
Slope of Ogasawara Plateau	Pumice, Scoria, and foraminiferal sand.	
Top of a small high on Mariana Trench slope	Olive grey medium-grained sand.	
Slope of a small seamount of Izu Ridge	Manganese crust with andesite core, manganese-coated scoria, pumice, and volcanic sand including foraminifers.	
A high on Ogasawara Ridge	Rock fragment, pumice, and medium sand composed of pumice and foraminifers.	
Eastern slope of Ogasawara Ridge	Manganese-coated sandstone, manganese-coated breccia, pumice and medium-grained sand of pumice and foraminifers.	
Steep slope near top of guyot	Greyish brown foraminifera ooze.	
ditto	No sample.	
A slope of a high on the eastern edge of Ogasawara Plateau	Pumice with ferromanganese coating in some case, mudstone(?) with ferromanganese coating.	
Flat bottom of Ogasawara Trough	Brown clay and pumice. Photograph of bottom.	
ditto	Brown clay. HF(X)	Attached with the out side of the corer.
Slope of a high on Shichito Ridge	Sandstone, basalt, volcanic breccia and pumice with mangan coating. Coarse sand of volcanic rock fragment and foraminifers.	Sandstone is thought to be in situ because of its shape.

Table I-10

Station No.	Sample No.	Date	Time	Position		Depth m	Sampler
				Latitude, N	Longitude, E		
1530	D345	June 7	10:03	26°14.4'	144°57.3'	2696	Chain-bag type and cylinder type dredges
			}	}	}	}	
			11:59	26°14.2'	144°57.9'	2320	
1531	D346	June 11	10:13	26°35.7'	139°40.6'	3100	ditto
			}	}	}	}	
			12:14	26°37.0'	139°40.1'	3150	
1532	FG177C		14:16	26°30.3'	139°25.1'	4530	Free-fall grab with camera
			}				
			16:44				
	P148		14:27	26°30.2'	139°24.8'	4535	Piston corer
		}					
			16:37				
1533	D347	June 12	10:50	26°44.4'	139°36.5'	3285	Chain-bag type and cylinder type dredges
			}	}	}	}	
			13:03	26°44.5'	139°35.8'	3150	
1534	FG178C		14:46	26°45.0'	139°47.0'	3832	Free-fall grab with camera
			}				
			16:57				
	P149		14:54	26°45.0'	139°47.1'	3835	Piston corer
		}					
			16:49				
1535	D348	June 13	10:06	26°45.2'	142°44.9'	2380	Chain-bag type and cylinder type dredges
			}	}	}	}	
			12:14	26°45.8'	142°44.5'	2410	
1536	FG179C		15:26	26°45.1'	143°13.3'	5310	Free-fall grab with camera
			}				
			17:50				
	RC48		15:33	26°45.1'	143°13.3'	5300	Rock corer
		}					
			17:45				
1537	D349	June 14	8:34	27°15.7'	145°09.9'	880	Chain-bag type and cylinder type dredges
			}	}	}	}	
			9:45	27°15.6'	145°10.9'	485	
1538	FG180C	June 14	12:54	27°30.0'	144°52.8'	5473	Free-fall grab with camera
			}				
			15:46				
	P150		12:59	27°30.2'	144°53.0'	5475	Piston corer
		}					
			15:39				

(Continued)

Area and topography	Samples	Remarks
Slope of a guyot	Sandy siltstone.	(In situ?)
Slope of a small seamount on Izu Ridge	Fragment of manganese crust and foraminifera medium sand.	
Ocean basin of Shikoku Basin	Scoria and brown clay. Photograph of bottom.	
ditto	620 cm long core, brown clay in upper 1.5 m and olive grey clay and silt in lower core section. Some turbidite sand layers are intercalated. HF(O)	
Slope near a top of a seamount on Shichito Ridge	Pumices and brown foraminifera ooze.	
Basin between Shichito and Izu Ridges	Brown clay. Photograph of bottom.	
ditto	497 cm long core, brown clay in upper 1.0 m and olive grey clay in lower part. HF(O)	
A small high on Ogasawara Trench slope	Pumice and brown foraminifera ooze (Sandy silt).	
Top of small high on Ogasawara Trench slope	Brown clay. Photograph of bottom.	
ditto	22 cm long core, brown clay. Coated surface with manganese.	
Steep slope near the top of a seamount on Northwestern Pacific Basin	Very coarse grained sand to granule of molluscan shell. Gastropoda bivalvia, coral, sponge, calcareous algae, brachiopoda, and shark teeth.	
Flat bottom of Northwestern Pacific Basin	Brown clay and pumice. Photograph of bottom.	
ditto	1.139 cm long core, brown to dark brown clay throughout core section. HF(O)	

Table I-10

Station No.	Sample No.	Date	Time	Position		Depth m	Sampler
				Latitude, N	Longitude, E		
1539	D350	June 16	13:27	27°45.0'	141°53.3'	1040	Chain-bag type and cylinder type-dredges
			}	}	}	}	
			14:37	27°45.0'	141°53.3'	900	
1540	P151	June 17	8:23	27°59.3'	143°17.5'	8665	Piston corer
			}	}	}	}	
			14:35				
1541	D351	June 18	8:40	27°59.7'	140°07.0'	3400	Chain-bag type and cylinder type dredges
			}	}	}	}	
			11:47	27°59.7'	149°06.7'	2690	
1542	FG181C	June 19	14:42	28°15.0'	141°24.9'	4150	Free-fall grab with camera
			}	}	}	}	
			17:09				
	P152		14:50	28°15.0'	141°25.1'	4150	Piston corer
			}	}	}	}	
			17:02				
1544	D352	June 21	12:35	28°29.9'	138°47.2'	2466	Chain-bag type and cylinder type dredges
			}	}	}	}	
			14:32	28°29.9'	138°46.7'	2160	
1545	D353	June 22	11:35	28°44.9'	141°01.0'	1660	ditto
			}	}	}	}	
			13:03	28°44.9'	141°57.0'	1530	
1546	FG182C	June 22	15:41	28°35.1'	142°12.6'	2150	Free-fall grab with camera
			}	}	}	}	
			17:14				
	RC49		15:49	28°35.1'	142°12.6'	2230	Rock corer
			}	}	}	}	
			17:09				
1547	FG183C	June 26	8:46	28°45.1'	142°26.7'	4150	Free-fall grab with camera
			}	}	}	}	
			11:26				
	RC50		8:54	28°45.1'	142°26.7'	4075	Rock
			}	}	}	}	
			11:16				
1548	P153	June 27	10:18	28°59.6'	142°55.5'	9410	Piston corer
			}	}	}	}	
			15:41				
1549	FG184C	June 28	9:54	28°59.7'	139°14.3'	3280	Free-fall grab with camera
			}	}	}	}	
			12:02				
	P154		10:02	28°59.6'	139°13.8'	3300	Piston corer
			}	}	}	}	
			11:56				

(Continued)

Area and topography	Samples	Remarks
Steep slope of the western side of Ogasawara Ridge	Tuff*, tuffaceous sandstone*, limestone** volcanic rocks and olive grey fine-grained foraminifera ooze.	*In situ. **Including Eocene <i>Nummulites</i> sp.
Deepest bottom of crass section of Ogasawara Trench	759 cm long core, olive clay intercalating some coarse-grained sand layers (2-160 cm thick).	
Steep slope of a seamount on Shichito Ridge	Manganese coated (5 mm thick)* siltstone tuffaceous sandstone*, volcanic rock, and pumice. Olive grey fine-grained foraminifera ooze.	*In situ.
Flat bottom of Ogasawara Trough	Brown clay and pumice. Photograph of bottom.	
ditto	408 cm long core, grey to dark grey clay with black silt sized ash layers. HF(O) Brown silty medium-grained sand (foraminifera ooze) and pumice.	
Slope near the top of a high on Ogasawara Ridge	Manganese nodule. Manganese-coated rock*.	*In situ (volcanic rock).
Narrow flat plain on the slope of high on Ogasawara Ridge	No sample. Photograph of bottom.	
ditto	Grey clay. HF(O)	Attached with the core catcher
Narrow bench on the slope of Ogasawara Trench	Brown clay. Photograph of bottom.	
ditto	207 cm long core, dark yellowish brown loose clay in upper 0.6 m, pale brown clay in middle part and brown clay in lower part. HF(X)	Clay of core catcher contains Pliocene(?) foraminifers.
Near the axis of Ogasawara Trench	415 cm long core, olive grey laminated silt to very fine-grained sand size ash throughout the section.	
Flat bottom between Izu and Shichito Ridges	Brown clay, pumice, fish and brachipoda. Photograph of bottom.	
ditto	657 cm long core, grey clay except greyish brown clay in upper 80 cm of the core. Two ash layers are present. HF(O)	

Table I-10

Station No.	Sample No.	Date	Time	Position		Depth m	Sampler
				Latitude, N	Longitude, E		
1550	D354		14:16	29°00.0'	139°03.3'	2150	Chain-bag type and cylinder type dredges
			15:47		139°03.5'	2115	
1551	D335	June 29	10:10	29°15.0'	138°43.0'	1180	ditto
			11:15	29°14.9'	138°40.2'	1185	
1552	FG185C		12:03	29°14.7'	139°35.3'	2215	Free-fall grab with camera
			13:59				
	RC51		12:15	29°14.6'	139°35.3'	2420	Rock corer
			13:50				
1553	D356	June 30	8:19	29°14.9'	141°59.6'	2880	Chain-bag type and cylinder type dredges
			10:12	29°15.1'	141°59.5'	2870	
1554	FG186C		11:41	29°14.9'	142°10.5'	4550	Free-fall grab with camera
			14:18	29°14.9'	142°10.5'	4550	
	RC52		11:48	29°14.9'	142°10.5'	4550	Rock corer
			14:10				
1555	D357	June 1	10:57	29°30.2'	140°10.5'	2471	Chain-bag type and cylinder type dredges
			12:13	29°30.3'	140°38.1'	2453	
1556	D358		14:56	29°30.0'	140°35.9'	1356	ditto
			16:18	29°30.0'	140°35.9'	1240	
1557	D359	June 2	8:58	29°45.4'	139°35.8'	2550	ditto
			11:15	29°45.8'	139°35.1'	2116	
1558	D360		15:08	29°45.7'	140°21.5'	502	ditto
			15:57	29°45.9'	140°21.7'	540	
1559	FG187C	June 3	10:09	29°44.8'	144°11.0'	5796	Free-fall grab with camera
			13:12				
	P155		10:16	29°44.9'	144°11.4'	5800	Piston corer
			13:03				

HF (O) and HF (X) mean the heat flow measurements, successful (O) and unsuccessful (X).

(Continued)

Area and topography	Samples	Remarks
Slope of a seamount on Izu Ridge	Many manganese nodule.	
Near the top of Izu Ridge	Many manganese nodules and pale brown medium-grained sands (foraminifera ooze).	
Slope of Izu Ridge	No sample. No photograph.	
ditto	208 cm long core, brown to dark grey silt and clay containing foraminifera tests throughout the section. HF(O)	
A high on the northern edge of Ogasawara Ridge	Pumice (max. 12 cm), manganese nodules, manganese-coated clay stone and pale brown silt (alcareous ooze).	
A small bench on the slope of Ogasawara Ridge	Brown clay. Photograph of bottom.	
ditto	Pumiceous fine-grained sand. HF(O)	Attached with the core catcher.
A small high on Shichito Ridge	Pumice and brown clay.	
Slope of the Shichito Ridge	Pumice*, volcanic rock (rhyolite?), manganese nodules and dark brown granule bearing medium-grained sand (foraminifera ooze).	*In situ.
A slope of a small seamount between Shichito and Ridges	Manganese-coated siltstone, andesite, manganese nodules, pumice and pale brown fine-grained sand (foraminifera ooze).	
A slope near "Sofuiwa" on Shichito Ridge	Volcanic coarse-grained sandstone, volcanic rock, coral, and mollusca.	
Flat of Northwest Pacific Basin	Pumice and brown clay. Photograph of bottom.	
ditto	Brown to greyish brown clay throughout the section. Two ash layers and several dark brown laminated layers are present. HF(O)	

Table I-11 Results of stationary observations during cruise

Station No.	Sample No.	Date	Time	Position		Depth m	Sampler
				Latitude, N	Longitude, E		
1560	D361	1979	8:31	30°14.9'	142°34.9'	8350	Chain-bag type and cylinder type dredges
		July	}	}	}	}	
		15	13:30	30°14.6'	142°35.4'	8315	
1561	D362	July	15:56	29°59.7'	139°32.8'	1790	ditto
		16	}	}	}	}	
			17:11	29°59.7'	139°32.3'	1655	
1562	D363	July	7:58	30°15.0'	139°12.0'	1200	ditto
		17	}	}	}	}	
			9:07	30°14.0'	139°12.1'	1100	
1563	D364	July	9:39	30°29.9'	139°53.0'	1262	ditto
		18	}	}	}	}	
			10:41	30°29.7'	139°53.0'	1250	
1564	FG188C	July	15:00	30°44.9'	141°50.7'	5230	Free-fall grab with camera
		19	}				
			17:44				
	RC57		15:05	30°44.1'	141°50.3'	5090	Rock corer
			17:30				
1565	FG189C	July	10:16	30°00.0'	141°04.5'	2915	Free-fall grab with camera
		20	}				
			11:43				
	RC54		10:23	30°59.7'	141°04.8'	2915	Rock corer
			}				
			11:36				
1566	D365	July	8:22	31°15.2'	138°23.4'	2370	Chain-bag type and cylinder type dredges
		21	}	}	}	}	
			10:03	31°15.9'	138°24.2'	1850	
1567	RC55		10:54	31°15.3'	138°17.9'	3680	Rock corer
			}				
			13:42				
1568	D366		18:12	31°14.8'	139°13.8'	1200	Chain-bag type and cylinder type dredges
			}	}	}	}	
			19:23	31°14.5'	139°14.5'	980	

Area and topography	Samples	Remarks
East off Tori-shima Is., outer trench slope of Ogasawara Trench	Reddish brown clay containing a amount of small fragments of claystone, siliceous rock fragments (platy and shaly), claystone and metalliferous platy rock.	Probably in situ rocks.
Southwest off Tori-shima Is., slope of small seamount of Shichito Ridge	Foraminifera fine-grained sand, pumice and ferromanganese nodule including volcanic rock fragment as core.	
West off Tori-shima Is., slope of seamount of Shichito Ridge	Foraminifera medium-grained sand and small fragments of pumice	
West off Tori-shima Is., slope of seamount of Shichito Ridge	Foraminifera medium-grained sand, pumice (in situ), volcanic rock fragment and sandstone.	
East off Tori-shima Is., upper inner slope of Ogasawara Trench	Brown clay and claystone. Photograph of bottom.	
ditto	161 cm long core, brown to dark greyish brown clay with some pumice and many mottles.	
Hollow near the trench slope break of Ogasawara Trench	No sample. Photograph of bottom.	
ditto	66 cm long core, coarse to very coarse-grained sand-size grey and dark grey pumice.	
West off Smith Is., slope of seamount of Izu Ridge	Foraminifera bearing sandy silt and pumice.	
West off Smith Is., lower slope of seamount of Izu Ridge	127 cm long core, greyish brown to grey with small mottles.	
Southwest off Smith Is., slope of seamount eastern part of Izu Ridge	Foraminifera sand, manganese nodule, rocks (basalt and porphyrites) with manganese crust, and pumice.	

Table I-11

Station No.	Sample No.	Date	Time	Position		Depth m	Sampler
				Latitude, N	Longitude, E		
1569	D467	July 22	9:33	31°14.9'	142°00.0'	7200	ditto
			13:23	31°14.8'	141°59.3'	7010	
1570	RC56	July 26	8:58	33°29.1'	140°13.8'	166	Rock corer
	H11		9:23	33°29.1'	140°14.0'	168	Marine drill MD500H
1571	RC57		14:13	33°33.8'	138°53.6'	280	Rock corer
	H12		14:38	33°33.8'	139°53.5'	245	Marine drill MD500H
1572	RC58	July 27	9:00	33°33.9'	140°03.7'	180	Rock corer
	H13		9:56	33°33.7'	140°04.1'	180	Marine drill MD500H
1573	RC59		14:07	33°21.4'	139°40.7'	138	Rock corer
	H14		14:55	33°21.5'	139°41.0'	131	Marine drill MD500H
1574	D368	July 29	8:28	31°30.3'	139°01.4'	1140	Chain-bag type and cylinder type dredges
			9:50	31°29.8'	139°02.7'	1220	
1575	D369	July 29	14:31	31°30.5'	138°20.4'	2310	ditto
			16:10	31°30.9'	138°20.9'	2300	
1576	RC60	July 30	10:01	31°45.0'	140°23.5'	1980	Rock corer

(Continued)

Area and topography	Samples	Remarks
East off Smith Is., lower inner slope of Ogasawara Trench	Brown clay.	
Northeast off Hachijo Is., flat top of a bank		
ditto	No core obtained.	
ditto		
ditto	186 cm long core, sandy limestone.	
ditto		
ditto	134 cm long core, calcareous-algal sandstone.	
Northwest off Hachijo Is., flat top of seamount		
ditto	55 cm long core, pumice-bearing conglomerate and breccia.	
Slope of seamount of Izu Ridge	Foraminifera sand, manganese nodule (core: basalt, sandstone, siltstone) and pumice.	
Slope of seamount of Izu Ridge	Light greyish brown silty sand containing a large amount of foraminifera, pale green-colored schist, manganese-coated siltstone and cherty rock, manganese crust, and pumice.	
Northeast off Smith Is., slope of Shichito Ridge	30 cm long core, grey to dark grey very fine-grained ash with pumice layers.	

Table I-11

Station No.	Sample No.	Date	Time	Position		Depth m	Sampler
				Latitude, N	Longitude, E		
1577	RC61	July 30	14:28 } 15:47	31°45.3' N	141°53.6' E	3240	ditto
1578	D370	Aug. 1	10:58 } 12:19	32°14.9' } 32°15.3'	138°42.5' } 138°43.1'	2005 } 1850	Chain-bag type dredge
1579	D371		14:39 } 16:10	32°14.8' } 32°15.5'	138°56.1' } 138°57.0'	1734 } 1270	ditto
1580	D372	Aug. 2	14:32 } 17:31	32°29.9' } 32°29.8'	141°34.8' } 141°34.5'	5255 } 5127	ditto
1581	D373	Aug. 3	11:42 } 13:16	32°30.3' } 32°30.5'	138°30.6' } 138°23.8'	2900 } 2870	ditto
1582	D374	Aug. 4	7:34 } 8:13	32°44.7' } 32°45.1'	139°50.6' } 139°49.8'	500 } 460	ditto
	D374		8:33 } 9:24	32°44.6' } 32°44.5'	139°50.4' } 139°50.6'	428 } 410	ditto
1583	D375		16:32 } 18:37	32°22.6' } 32°23.7'	140°52.7' } 140°54.0'	3505 } 3290	ditto
1584	P157	Aug. 7	8:33 } 11:53	32°44.9'	142°33.6'	6320	Piston corer
1585	D376		14:50 } 17:08	32°44.9' } 32°45.3'	143°04.0' } 143°04.6'	4050 } 3720	Chain-bag type and cylinder type dredges
1586	FG190C	Aug. 8	8:44 } 9:26	32°59.8'	140°22.7'	950	Free-fall grab with camera
	RC62		8:49 } 9:22	32°59.6'	140°23.1'	980	Rock corer
1587	RC63	Aug. 9	12:13 } 12:44	33°23.1'	139°41.0'	630	ditto
1588	RC64	Aug. 9	13:22 } 13:48	33°24.9'	139°41.0'	355	ditto

(Continued)

Area and topography	Samples	Remarks
Wall of canyon on the slope of Shichito Ridge	No sample.	
Slope of seamount of Izu Ridge	Foraminifera sand, pumice and manganese-coated rock fragments (pored basalt).	
ditto	Foraminifera bearing sand and pumice.	
Southeast off Hachijo Is., inner slope of Ogasawara Trench	Dark brown silt containing very small fragments of pumice and scoria.	
Southwest off Hachijo Is., slope of seamount of Izu Ridge	Foraminifera bearing brown clay manganese-coated siltstone (in situ max., 32 × 25 × 10), manganese crust and pumice.	
South of Hachijo Is., slope of seamount of Shichito Ridge	Small fragment of acid volcanic rock.	
	Medium sand consisting of ash and fragment of shell and coral, pumice (in situ) and volcanic breccia (in situ).	
East off Aogashima Is., wall of canyon	Sandy silt containing of scoriaceous ash, pumice and scoria.	
East off Hachijo Is., foot of a seamount on the upper outside slope of Ogasawara Trench	498 cm long core, brown clay with several thin (less than 50 mm) ash layers.	
East off Hachijo Is., slope of seamount outside of Ogasawara Trench	Silty sand and pumice.	
East off Hachijo Is., upper slope of Shichito Ridge	No sample. Photograph of bottom.	
	No sample.	
Northwest off Hachijo Is., bottom of central hollow of a seamount	90 cm long core, pumice (max., 10 cm in 10 cm in diameter) with light brownish grey very coarse-grained sand to granules of pumice and biogenic materials (echinoid and mollusca).	
Inner wall of the same hollow as St. 1587	No sample.	