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VI. BOTTOM SAMPLING AND PHOTOGRAPHING ON THE SOUTHEASTERN OFFSHORE OF THE BOSO PENINSULA

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Introduction

Bottom sampling was attempted during the GH80–2 Cruise eastern off Boso Peninsula, using various apparatus. Thirty seven dredges (D379–415), four piston cores (P180–183), and fifteen rock cores (RC65–79) were taken in order to study the compositions of various stratigraphic units and to get representative sedimentary sequences for the survey area. Undisturbed surface sediments were taken by a Smith-McIntyre grab sampler in order to clarify detail surface sediment distribution mainly on the continental shelf part (G957–1021). Bottom photographing was carried out by using a subsea camera attached to a grab sampler at the same stations of grab sampling.

The results of bottom sampling and photographing are given in this chapter. The sampling stations and data are shown in Table I–6 and Fig. I–1(b).

Cored material

The visual descriptions of piston cores are shown in Fig. VI–1.

P180; This core was taken from a flat between the Kamogawa and the Katsuura Canyons near the southern margin of the survey area, at a depth of 1,930 m. The core is composed of olive gray clay with sand seams and pockets in the upper part, light olive gray pumiceous coarse sand in the middle part, and olive gray clay in the lower part. Longitudinally elongated olive gray clay fragments in the middle part and stripe pattern in the lower part show violent disturbance of sediments at coring.

P183; This core was taken from a flat of the west side of the Katakai Canyon at a depth of 2,530 m. The core is composed of olive gray silt with graded sand beds and laminated fine sand beds.

P181; This core was taken from a center of the Katakai Canyon at a depth of 4,410 m. Only olive gray consolidated silt was obtained in the core catcher.

P182; This coring was carried out in the southern JAPAN Trench out of the surveyed area for sampling of a good sequence of a trench sediment combined with regulation of a wire rolling of the No. 2 winch. The core is composed of olive gray clay with graded sand beds and convolute and parallel laminated sand beds in the middle part.

The visual descriptions of rock cores are shown in Fig. VI–2. Rock coring was attempted primarily to get sediments of older stratigraphic units under surface sediments. But, only three cores (RC 70, RC 75, and RC 77) show two lithologic units in their sequences and others show only surface soft sediments in their cores.

RC 70; The core is composed of medium sand with large shells and shell fragments in the upper part and fine sand without conspicuous shell fragments in the lower part.

RC 75; The core is composed of dark olive gray clayey silt in the upper and middle parts

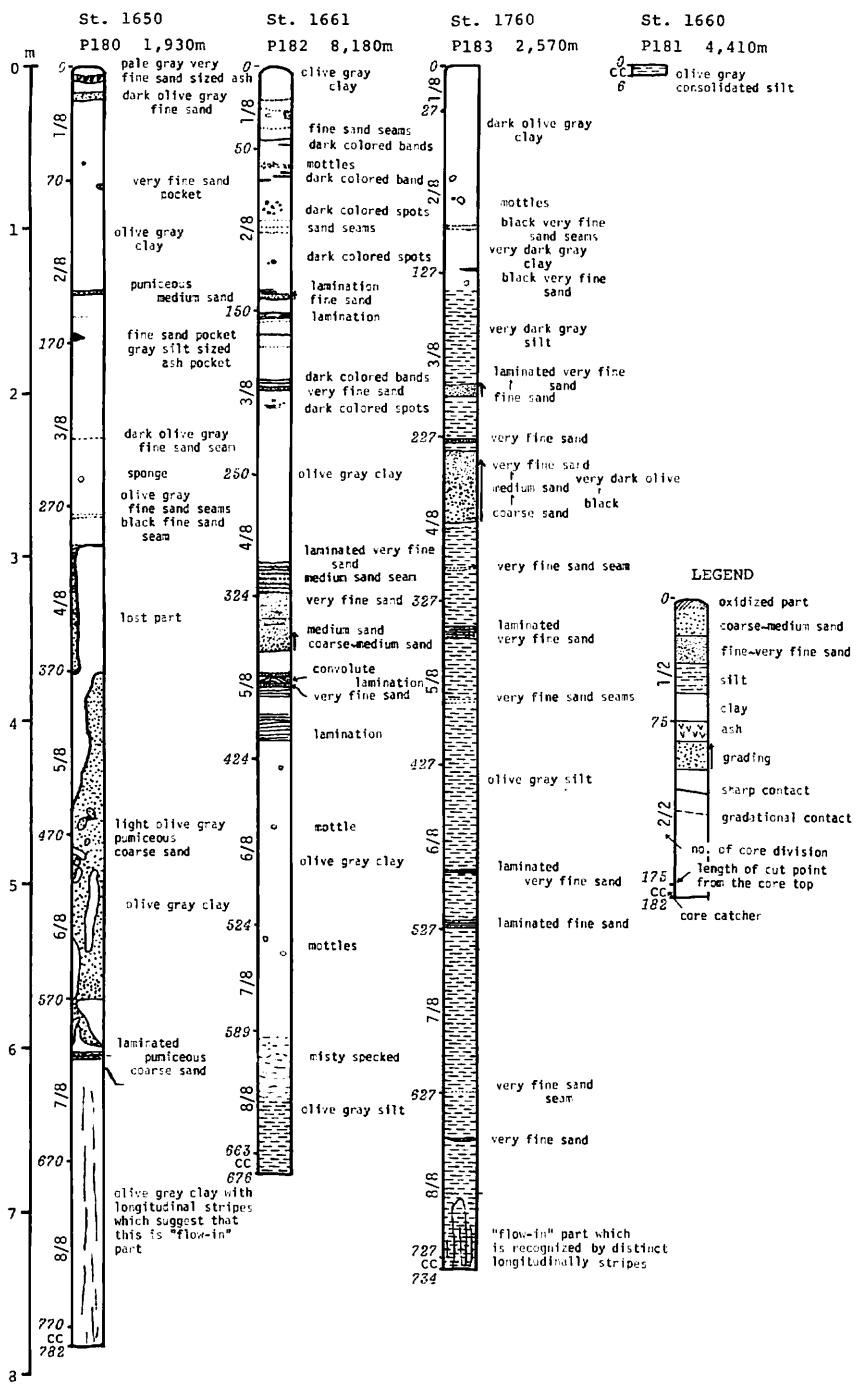

Fig. VI–1 Visual description of piston cores during GH80–2 Cruise.

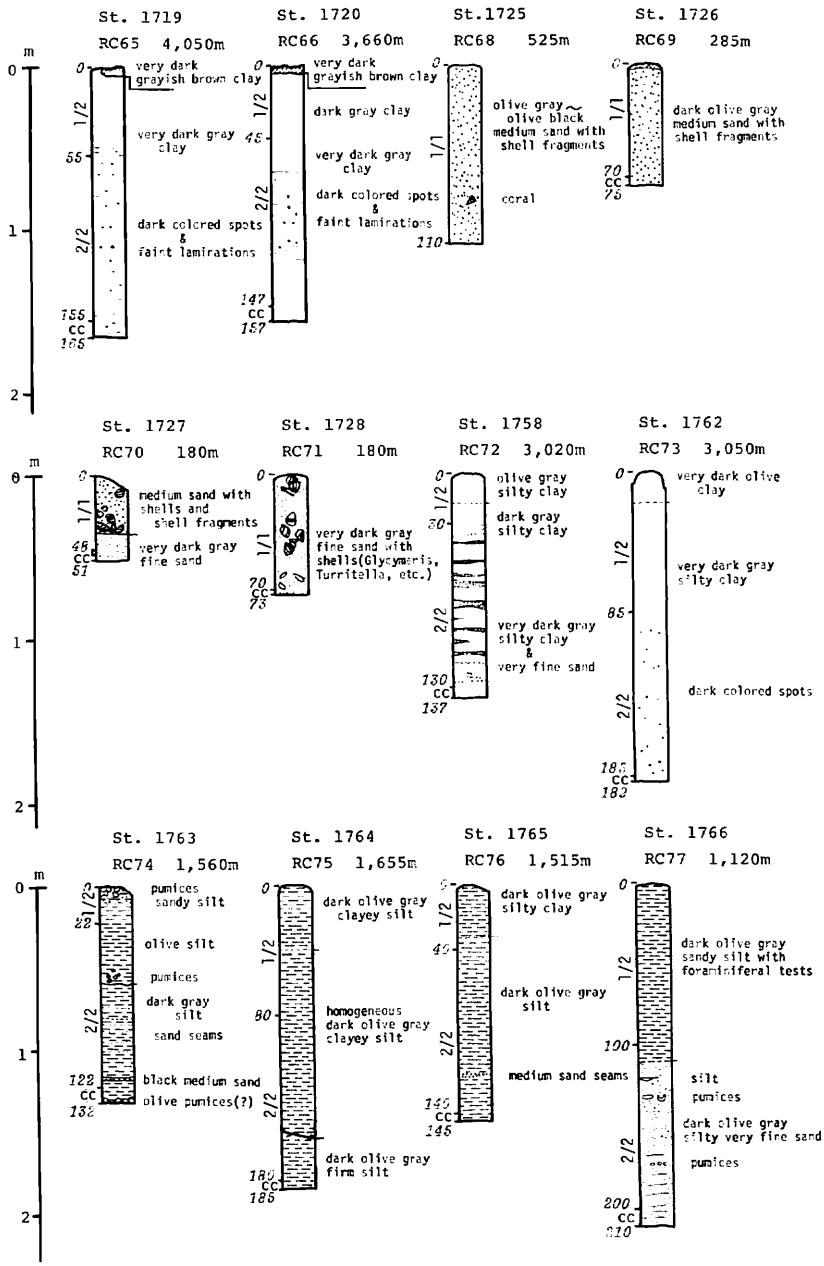

Fig. VI–2 Visual description of rock cores during GH80–2 Cruise. Lengend for this figure is the same as that of Fig. VI–1.

and dark gray semi-consolidated silt in the lower part.
RC 77; The core is composed of dark olive gray sandy silt with foraminiferal tests in the upper part and dark olive gray silty fine sand with pumices in the lower part.

The lithologies of surface sediments of rock cores depend on the depth of their coring stations as follows.

RC 70 and RC 71; ca. 180 m
medium to fine sand with plenty of shells and shell fragments
RC 68 and RC 69; 285–525 m
olive gray medium sand with shell fragments
RC 74, RC 75, RC 76, and RC 77; 1,120–1,655 m
dark olive gray sandy silt to clayey silt
RC 65, RC 66, RC 72, and RC 73; 3,020–4,050 m
dark gray silty clay to clay
Oxidized dark parts are observed on the top of the two cores, RC 65 and RC 66.

Dredged sedimentary rocks

A plenty of sedimentary rock samples except soft sediments was dredged at many sampling stations (Table VI–1). Most of sedimentary rock samples show similar lithologies of siltstones with various hardness. It is not certain that softer siltstone has younger age, compared with the micropaleontological results (chapter VII, in this report). The age determination and correlation to the stratigraphic units on land section of these samples remain.

Coarse-grained scoriaceous sandstone and scoria bearing siltstone are restricted along the Kamogawa and the Onjuku Canyons.

Isolated round pumices and scoriae dredged at some stations (D384, D385, D387, D397, D398, and D401) are thought to be not members of the sedimentary sequences of this area, because of their shapes and excluded from Table VI–1.

Dredged volcanic rocks

Volcanic rock samples were taken at only two stations (D402 and D405) (Table VI–2).
D402; This station is situated on a slope of a high of the western-south corner of the surveyed area. This high is belong to the uplift zone leading from the Okinoyama Bank parallel to the Sagami Tectonic Line (KIMURA, 1976). A large amount of volcanic rocks were dredged with a large amount of sedimentary rocks, which implies that these volcanic and sedimentary rocks are *in situ* rocks forming the high relief. Microscopic observation of the thin sections of rock samples shows that they are hypersthene-augite basalt.
D405; This station is situated near the top of a high east of the Kamogawa Canyon. Only one sample was taken at this station and its lithology is augite andesite.

Surface sediments

Distribution map of surface sediments of the surveyed area (Fig. VI–3) is preliminarily made on the onboard visual description and smear slide observation of surface sediments taken by a Smith-McIntyre grab sampler. Data of surface sediments and/or soft sediments taken by a piston corer, a rock corer, and a small cylinder dredge are also used out of grab sampling area. Bottom photographs give good information as to rocky bottom.

Table VI–1. Sedimentary rock samples taken during GH 80–2 Cruise.

STATION No.	SAMPLE No.	rock name	size (cm)	roundness	hardness		remarks
1648	D379–1	light olive gray siltstone	9 × 6 × 4	sR	vs	*	
1649	D380–1	dusky yellow siltstone	16 × 9 × 5	A	h	*	
	–2	light gray tuffite	7 × 5 × 4	A	h		laminated
	–3	olive gray pumiceous medium-grained sandstone	2 × 2 × 1	A	s		
1651	D381–1	light olive gray sandy siltstone	12 × 9 × 4	sA	vs	*	the same lithology as that of D379–1
1652	D382–1	grayish olive silty very-fine-grained sandstone	19 × 12 × 12	R	vs	*	
1653	D383–1	olive gray silty very-fine-grained sandstone	21 × 13 × 7	sA	s	*	
1655	D385–1	grayish olive siltstone	15 × 8 × 7	sR	vs	*	the same lithology as that of D382–1
1657	D387–1	olive gray pumiceous sandy siltstone	27 × 18 × 10	sA	s	*	
1658	D388–1	pale olive siltstone	5 × 4 × 3	sA	h		
1659	D389–1	gray pumiceous sandy siltstone	11 × 10 × 8	A	s	*	
1662	D390–1	gray siltstone	80 × 20 × 20	sR	m	*	
1663	D391–2	olive gray very-fine-grained sandstone	9 × 8 × 5	sR	vs	*	
	–3	pale brown sandy siltstone	11 × 7 × 3	A	vh		calcareous nodule
1664	D392–1	olive gray very-fine-grained sandstone	18 × 15 × 8	sR	vs	*	
1665	D393–1	olive gray siltstone	4 × 2 × 2	A	s		
1666	D394–1	light gray siltstone	7 × 4 × 1	A	m		
1667	D395–1	grayish olive siltstone	5 × 3 × 2	sR	s		
1694	D397–1	light olive gray siltstone	12 × 9 × 6	R	s	*	
	–2	dusky yellow pumice/scoria coarse-grained sandstone	6 × 5 × 3	sA			
1696	D399–1	olive gray foram-tests bearing sandy siltstone	14 × 9 × 7	A	vs	*	the same lithology as that of D385–1
	–2	black scoria coarse-grained sandstone and olive gray siltstone	14 × 7 × 4	A	s		
	–3	olive very-fine-grained sandstone	9 × 8 × 4	A	s		

1998	D401–1	olive gray foram-tests bearing silty sandstone	4 × 4 × 2	sR	vs		
1712	D402–1	grayish olive pumice bearing very-fine-grained sandstone	14 × 10 × 5	A	vh	*	
	–2	black scoria coarse-grained sandstone	6 × 5 × 5	sA	h	*	a similar lithology of that of D399–2
	–3	grayish olive very-fine-grained sandstone	5 × 3 × 3	A	vh	*	
1713	D403–1	grayish olive tuffaceous sandy siltstone	6 × 6 × 2	A	vs		
	–2	dark gray sandy siltstone	10 × 4 × 3	A	vs		
	–3	black scoria coarse-grained sandstone	8 × 6 × 2	A	s		
1714	D404–1	grayish olive sandy siltstone	10 × 8 × 5	sA	vs	*	
	2	grayish olive scoria bearing sandy siltstone	11 × 5 × 5	sA	vs	*	
	–3	pale brown scoria medium-grained sandstone	8 × 6 × 4	sR	s		
	–4	black scoria coarse-grained sandstone	7 × 5 × 3	sR	s		
1715	D405–1	yellowish brown shell bearing coarse-grained sandstone	5 × 5 × 3	sR	s	*	
1716	D406–1	grayish olive siltstone	13 × 10 × 4	A	h	*	
	–2	grayish olive sandy siltstone with scoria bed	10 × 9 × 6	A	h		
1717	D407–1	light gray siltstone	10 × 8 × 6	sR	m	*	the same lithology as that of D390–1
	–2	gray siltstone	9 × 5 × 4	R	vh		calcareous nodule
1759	D411–1	gray siltstone	5 × 4 × 2	R	vs	*	
1767	D413–1	gray siltstone	12 × 10 × 8	sR	m	*	
	–2	gray siltstone	15 × 10 × 6	sA	vh		calcareous nodule
	–3	olive gray sandy siltstone	13 × 7 × 6	sA	m		
1769	D414–1	gray siltstone	10 × 10 × 5	sA	h	*	a similar lithology of that of D388–1
	–2	gray siltstone	5 × 5 × 2	sR	vh		calcareous nodule
1660	P181 cc	olive gray siltstone		—	s		the same lithology as that of D399–1

roundness: A; angular sA; subangular sR; subround R; round
hardness: vh; very hard, broken by a hammer h; hard, broken by a cutter knife
m; moderate, hardly broken by fingers s; soft, easily broken by fingers
vs; very soft, easily broken into particles
*plenty of samples of the same lithology were taken at the same dredge station.

Table VI-2. Volcanic rock samples taken during GH 80-2 Cruise.

St. No.	Sample No.	Size (cm)	color	rock name*	phenocryst*	groundmass*
1712	D402- 4	12 × 6 × 4	black	hypersthene-augite basalt (porphiritic)	plagioclase > augite ≫ hypersthene	plagioclase, augite, opaque mineral (almost magnetite)
	- 5	6 × 4 × 3	black	hypersthene-augite basalt (porphiritic)	plagioclase > augite > hypersthene with narrow augite rim	plagioclase, augite, opaque mineral, mesostasis
	- 6	6 × 4 × 4	gray	hypersthene-augite basalt	plagioclase, augite, hypersthene with narrow clinopyroxene rim	plagioclase, augite, opaque mineral, brown glass
	-12	5 × 3 × 3	dark gray	hypersthene-augite basalt	plagioclase, augite, hypersthene	plagioclase, augite, opaque mineral, pale brown glass
	-13	3 × 2 × 2	black	glassy basalt-andesite	plagioclase, clino-pyroxene, hypersthene	pale brown glass, plagioclase, augite, hypersthene, opaque mineral
1715	D405	18 × 10 × 10	brown	augite andesite	plagioclase, augite, iron ore	plagioclase, iron ore
					crystal fragment*	rock fragment*
1712	D402- 7	8 × 5 × 3	greenish black	basalt-andesite tuff	augite, plagioclase	amphibole aggregate with zeolite

*microscopic observation and identification by H. Makimoto.

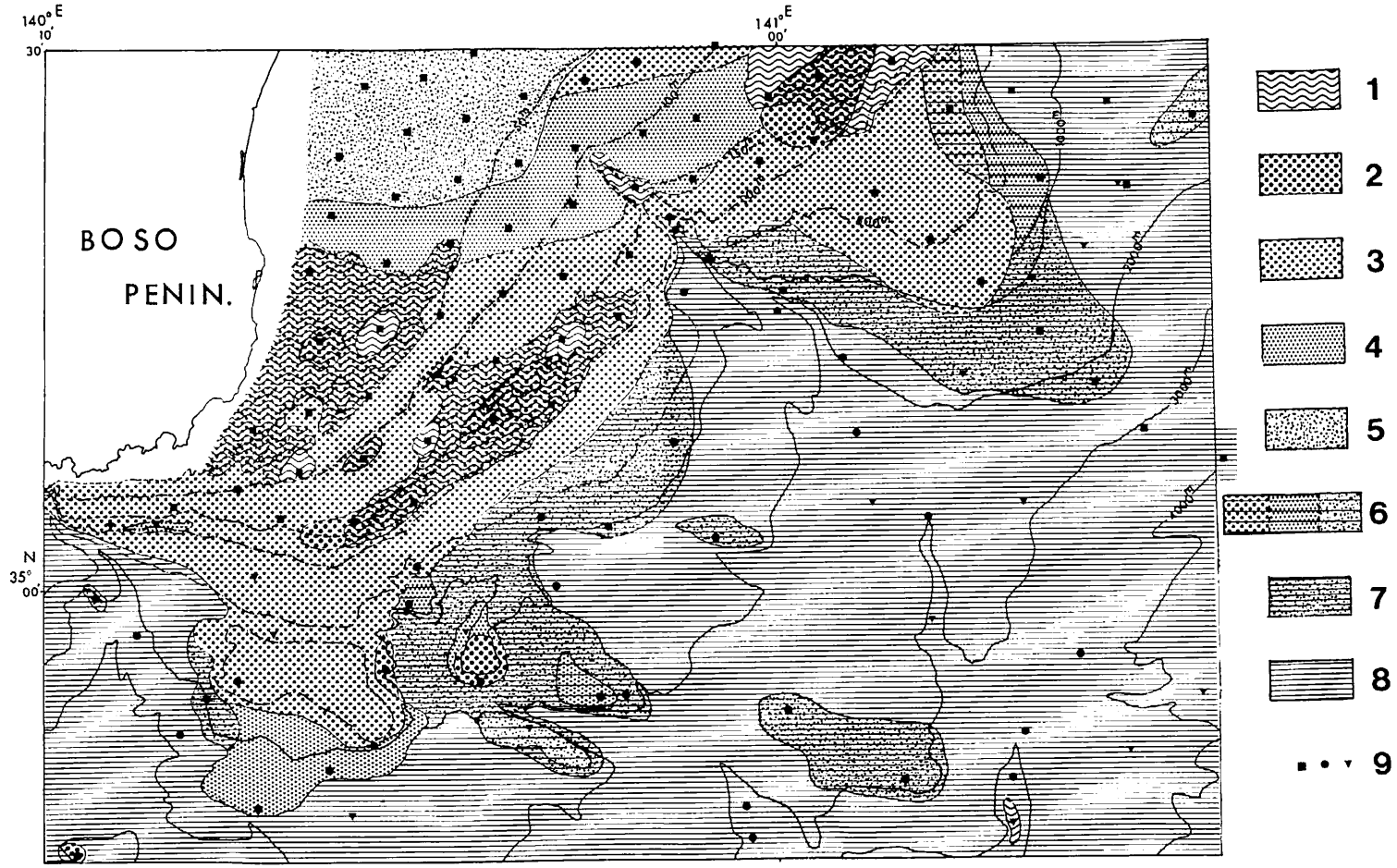

Fig. VI-3 Surface sediment distribution of GH80-2 surveyed area.
1. rocky and gravelly bottom 2. coarse sand 3. medium sand 4. fine sand
5. very fine sand 6. silty sand 7. sandy silt 8. mud (silt-clay) 9. sampling station

Rocky bottom is present around southern continental shelf shallower than 50 m. Medium to coarse sand is distributed on the rocky bottom, making spots of sandy bottom and thin sand covers.

On the contrary, very fine sand is widely distributed on the northern shallower continental shelf. This very fine sand is well-sorted angular mineral fragments.

Fine sand is distributed surrounding the area of very fine sand. This fine sand is rather well-sorted, and has a small amount of fine particles of diatom fragments and nannoplanktons.

Along the continental shelf edge between 150 m and 200 m deep except around the Katakai Canyon, rocky bottom is present.

Medium to coarse sand is widely distributed around rocky bottom and tops of highs between the Kamogawa and the Onjuku Canyons, and north of the Katakai Canyon. This coarser sand is ill-sorted, round- shaped mineral fragments with a large amount of fine particles of nannoplanktons. Some stained sand with yellowish brown coating is observed at some stations (G961, G994, G995, G997, G999, G1006, G1012, G1015, D392, and D405). Then, glauconite aggregations are found at several stations (G966, G968, G969, G970, G971, G972, G973, G983, G991, G993, G996, G1005, and D392). On and around topographically higher part, dredged soft sediments show rather coarser sediments than those in deeper part.

Mud is distributed in southern and eastern deeper parts of the survey area. The smear slides of mud show very high content of diatoms.

Bottom photographing

Subsea photography at the grab sampling stations was carried out by a subsea camera (an utility camera, Benthos Co.) attached to a Smith-McIntyre grab sampler modified by Y. Kinoshita of Marine Geology Department of GSJ. Photographs were taken just before the time of bottom sampling from ca. 2 m above a sea bottom. At some stations, several photographs were taken for one sampling station by repeats of lifting off and hitting sea bottom for certainty of working of a grab sampler.

The distribution of distinctive features observed in bottom photographs is shown in Fig. VI–4.

Seaweeds flourish on rocky bottom, in southern shallower continetal shelf. Sessil animals such as coelenterata are found on rocky bottom and ripples are present between rocks. Ripples are commonly observed in sandy bottom and their shapes change from sinuous ripple with meanderingly continuous wave crests to linguoid ripple with reticulate faces. On muddy bottom, some ophiuroids are scattered.

Acknowledgement

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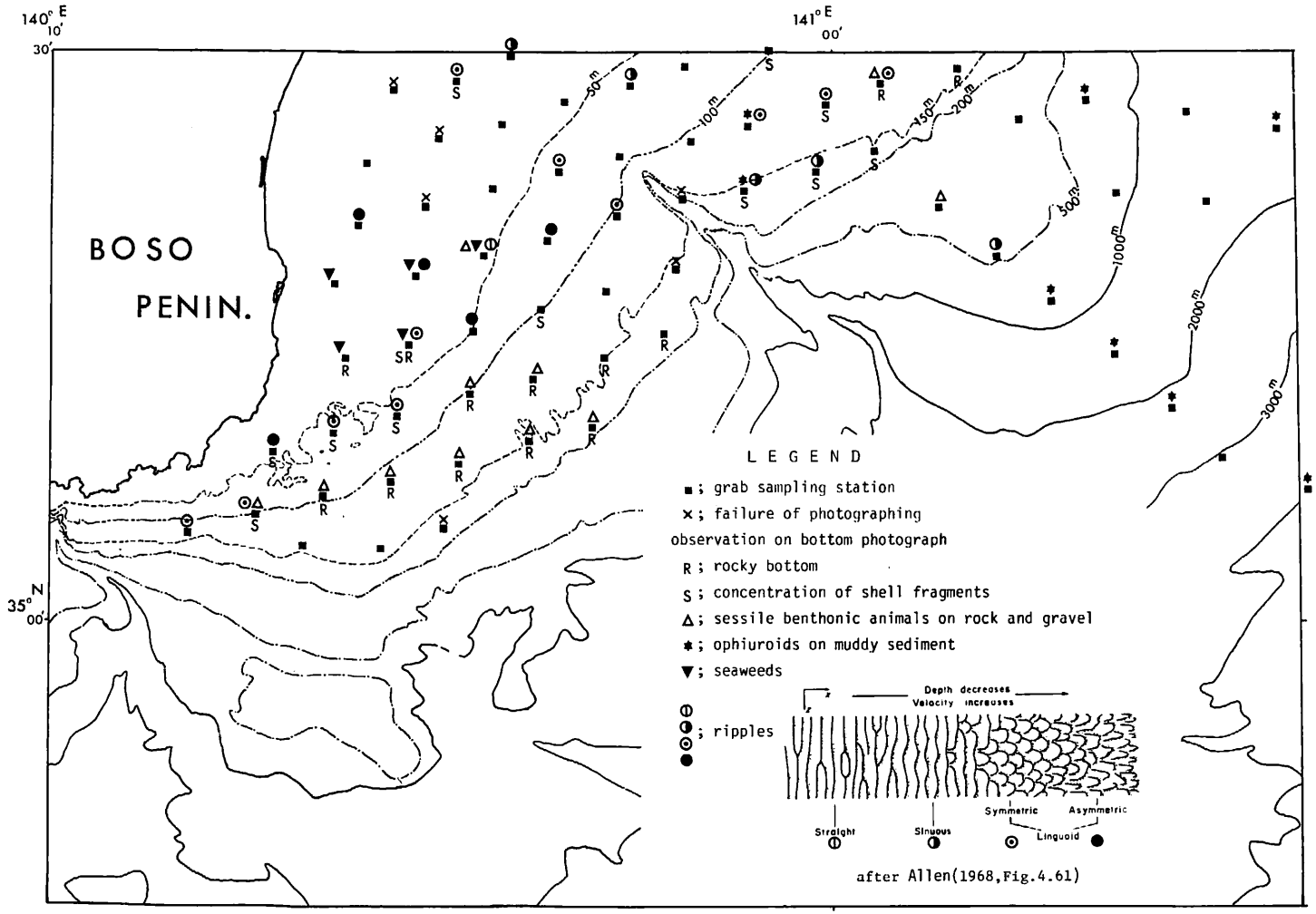

Fig. VI-4 Remarkable features observed in bottom photographs.

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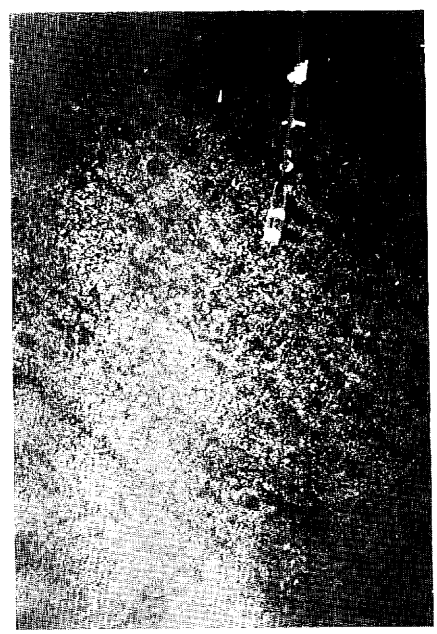

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Fig. VI–5 Representative bottom photographs. The diameter of a white circle of compass in photographs is ca. 6 cm.

1. St. 1749, 26 m in depth, numerous seaweeds on rocky bottom.
2. St. 1744, 28 m in depth, seaweeds on rocks and a row of linguoid ripples.
3. St. 1746, 154 m in depth, rocky bottom with numerous sessile benthos (sponges and coelenterata).
4. St. 1680, 130 m in depth, rocky bottom with thin sand cover.

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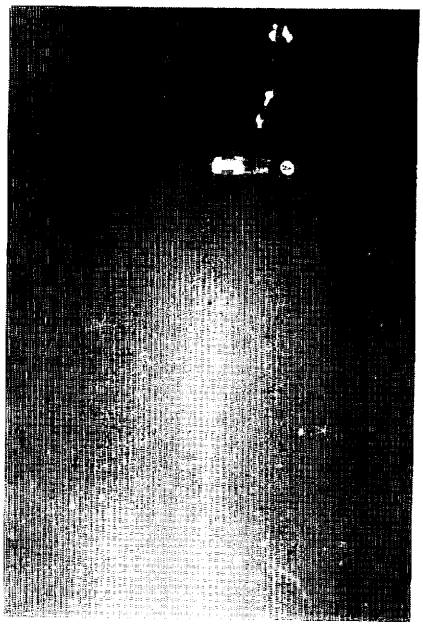

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5. St. 1710, 190 m in depth, gravelly bottom.
6. St. 1708, 112 m in depth, sandy bottom.
7. St. 1748, 65 m in depth, sandy bottom with concentrated shell fragments.
8. St. 1687, 1,555 m in depth, ophiuoroids on muddy bottom.

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9. St. 1675, 152 m in depth, sinuous ripples.
10. St. 1685, 482 m in depth, sinuous ripples.
11. St. 1738, 105 m in depth, symmetric linguoid ripples.
12. St. 1740, 62 m in depth, linguoid ripples with reticulate faces.