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Preliminary Results from Sediment Sampling of the R. V. *Tansei-maru* Cruise KT04-20 in the Southwestern Marginal Part of the Okhotsk Sea and the Northeastern Marginal Part of the Japan Sea off Hokkaido, North Japan

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Abstract

Submarine surface sediment samples were collected from the southwestern marginal part of the Okhotsk Sea, north of Shiretoko Peninsula and the Kitami-Yamato Bank, from the northeastern marginal part of the Japan Sea south of Okushiri Island, off Hokkaido, Japan from the 12th to 19th of September 2004 during the R. V. *Tansei-maru* cruise KT04-20. This article describes the preliminary results of on-board observation of the sediments.

Key Words: submarine sediment, Japan Sea, Okhotsk Sea, Okushiri Island, Shiretoko Peninsula, R/V *Tansei-maru*

Ⅰ. Introduction

Marine geology and micropalaeontology were investigated in the southwestern marginal part of the Okhotsk Sea off Shiretoko Peninsula and the Kitami Yamato Bank, northeast Hokkaido and the northeastern marginal part of the Japan Sea south of Okushiri Island, Hokkaido from the 12th to 19th of September 2004 during the R. V. *Tansei-maru* cruise KT04-20 as a part in a series on pursuing time-spatial distribution of depositional facies and spatial distribution of present micro-organisms in the Japan Sea. This article reports the results of sediment sampling and on-board observation of the samples during the cruise. Preliminary results on modern ostracods in the surface sediments were already reported (Ozawa and Tsukawaki, 2008) and results from sedimentological and other micropalaeontological analyses in the laboratory of them will be published elsewhere.

Many geological, geophysical and micropalaeontological studies have been made in the Japan Sea mainly by the Hydrographic Department, M.S.A., Japan (*e. g.* Iwabuchi, 1968), the Geological Survey of Japan / AIST (*e. g.* Arita and Okamura, 1989; Ikehara and Okamura ed., 1999, 2000), Ocean Research Institute, the University of Tokyo (*e. g.*, Kobayashi ed., 1984), the DSDP / ODP (*e. g.* Ingle *et al*., 1990) and others (*e. g.* Oba *et al*., 1991; Tsukawaki *et al*., 2000, 2001, 2002,

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2003). On the other hand, these studies in the southwestern part of the Okhotsk Sea have recently started only by the Geological Survey of Japan / AIST (*e. g.* Kishimoto and Ikehara ed., 2001; Ikehara ed., 2002).

Taking these previous studies into account, surface sediment sampling sites were selected in; 1) continental shelf north of Shiretoko Peninsula and the southern slope of the Kurile Basin in the southwestern marginal part of the Okhotsk Sea, 2) continental shelf to the southern slope of the Kurile Basin on the east of the Kitami-Yamato Bank, and 3) continental shelf south of Okushiri Island, west off Hokkaido in the northeastern marginal part of the Japan Sea for the purposes of spatial distribution of bottom surface sediments and micro-organisms in these areas (Fig. 1).

An Okean-type grab sampler, 1,250 cm^2 in sampling area, with extra weights was used to obtain bottom surface sediments and benthic organisms during the cruise.

Ⅱ. Topography of Survey Areas

As stated-above, surface sediment samplings were carried out in the southern marginal part of the Okhotsk Sea and south of Okushiri Island in the north of the Japan Sea during the cruise.

Submarine topography of the former is divided into a rather wide continental shelf off Abashiri followed by a gentle slope of the Kurile Basin deepening north north-eastward, a narrow continental shelf followed by a steep slope around the Shiretoko Peninsula, and the Kitami Yamato Bank and its rather steep eastern slope (Fig. 1A). The Abashiri Submarine Canyon and the Notoro Spur are situated between the bank and the gentle slope off Abashiri. Two sediment sampling lines were set up 1) on the narrow continental shelf to the steep slope north of the Shiretoko Peninsula, and 2) on the flat top of the Kitami-Yamato Bank to its steep eastern slope.

On the other hand, submarine topography of the latter is divided into the shallow and flat Okushiri Spur

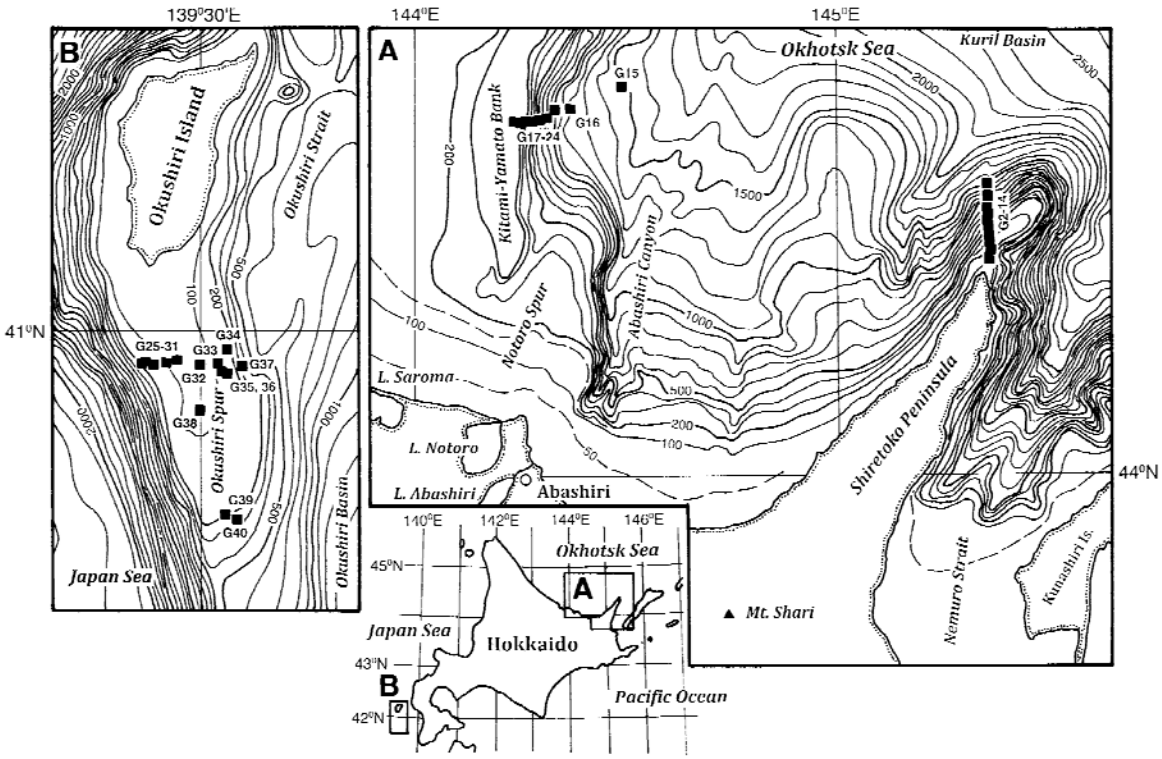

Fig. 1 Submarine topography of the studied areas and surface sediment sampling sites of the R. V. *Tansei-maru* Cruise KT04-20 in the southwestern part of the Okhotsk Sea off Northeast Hokkaido (A), and the northeastern part of the Japan Sea south off Okushiri Island (B), based on Hydrographic Department, M. S. A., Japan, 1980).

which is the southern extension of Okushiri Island, and its gentle eastern and steep western slopes which deepen to the Okushiri Basin and the Japan Basin, respectively (Fig. 1B). Sediment sampling sites were located south of the island in and around the spur.

Ⅲ. Results of Sediment Samplings and Onboard Observation of Sediments

Fourteen and 11 grab surface sediment samples were successfully obtained from off Shiretoko Peninsula and the Kitami-Yamato Bank area, respectively, and 20 samples were recovered from the Okushiri Spur area in the north of the Japan Sea (Fig. 1, Table 1).

1) Continental Shelf and Slope North of Shiretoko Peninsula

Surface sediments of the continental shelf north off Shiretoko Peninsula consist of molluscan shell fragment- and pebble-bearing medium-grained sand at the shallowest site G-2 at a water depth of 76 m, and molluscan shells and shell fragment-bearing fine- to medium-grained sand at the sites G-3 and G-4 at water depths of 100 and 130 m, respectively (Plate 1, fig. 1). Sponge spicules are frequently recognised in these sediments.

On the other hand, pebble- to cobble-gravels of andesite with a little amount of fine-grained sand were recovered from the site G-5 at a water depth of 185 m (Plate 1, fig 2). Olive grey fine-grained sand or muddy sand with a little amount of molluscan shell fragments was found at the sites G-6, G-7 and G-8 in the uppermost slope area at water depths of 170, 215 and 248 m (Plate 1, fig. 3). The surface sediments at the site G-9, 315 m deep, and G-10, 505 m deep, from the upper slope are composed of olive grey compact homogeneous mud covered by thin brownish grey soft mud (Plate 1, fig. 4), but only a little amount of olive grey soft or soupy mud with semi-consolidated mudstone gravels were recovered from the sites G-11, 844 m deep, and G-12, 987 m deep of the middle slope.

About 5 cm thick soft olive grey homogeneous mud underlain by dark olive grey compact sticky mud was recovered from the sites G-13 and G-14 from water depths of 1,234 and 1,500 m of the lower slope, respectively (Plate 1, fig 5). A certain number of serpent stars (Ophiuroidea) were recognised on the surface of the sites G-9 to G-12.

2) Kitami-Yamato Bank and Its Eastern Slope

In the flat top of the Kitami-Yamato Bank, surface sediments are composed mainly of poorly sorted and rounded granule- to pebble-gravel-bearing olive grey sticky mud with sponges and other benthic organisms at the sites G-22, G-23 and G-24 at water depths of 202, 180 and 155 m, respectively (Plate 2, figs. 1 and 2). Same sediments were found in the sites of G-19, G-20 and G-21 of the upper eastern slope at water depths of 535, 355 and 233 m (Plate 1, fig. 8), respectively, but the sediments of the sites G-17 and G-18 at water depths of 1,001 and 778 m from the middle slope area, consist of pale olive compact sandy mud or sticky mud overlain by thin soft yellowish mud (Plate 1, fig. 7).

Pale olive compact and sticky mud overlain by soupy thin reddish brown mud was recovered from the sites G-15 and G-16 at water depths of 1,499 and 1,244m in the lower slope area (Plate 1, fig. 6).

3) Okushiri Spur South of Okushiri Island

Surface sediments of the flat top of the Okushiri Spur south of Okushiri Island are composed of molluscan shell fragment-rich olive grey fine- to medium-grained sand in the shallow sites G-31, G-32 and G-38 at water depths of 65, 100 and 100 m (Plate 2, fig. 7), but molluscan shell fragment-bearing well sorted very fine- to fine-grained sand at the site G39, 205 m deep, and a little amount of molluscan shell fragment-bearing fine- to medium-grained sand in the deepest site G40, 375 m deep (Plate 2, fig. 8).

The sediments from the uppermost part of the western slope of the spur such as the sites G-25, G-26, G-27, G-28 and G-29 at water depths of 250, 200, 175, 143, and 127 m are composed mainly of molluscan shell fragment-bearing well sorted olive grey fine- to medium-grained sand (Plate 2, figs. 3 and 4). Serpent stars and sponges were frequently recognised on these surfaces.

Table 1 Results of sampling on the R. V. Tansei-maru Cruise KT04-20 in the southwestern part of the Okhotsk Sea and the northeastern part of the Japan Sea, off Hokkaido, North Japan.

Station	Locality	Date (D/M/Y)	Sampler	Time Hit	Longitude (E)	Latitude (N)	Water Depth (m)	Sediment Recovery (%)	Sediment Type
KT04-20 G-10	off Shiretoko P.	13/09/04	Okean L	03:31	145 21.2200	44 25.2110	505	70%	olive grey homogeneous mud covered by thin brownish grey soft mud, serpent stars on the surface
KT04-20 G- 9	off Shiretoko P.	13/09/04	Okean L	04:35	145 21.2750	44 23.6460	315	15%	olive grey homogeneous mud covered by thin brownish grey soft mud, a little serpent stars on the surface
KT04-20 G- 8	off Shiretoko P.	13/09/04	Okean L	05:07	145 21.1760	44 23.2990	230	5%	*a little amount of olive grey homogeneous sandy mud, no sampling due to opend a lid*
KT04-20 G- 8'	off Shiretoko P.	13/09/04	Okean L	05:21	145 21.4150	44 23.2670	248	20%	olive grey homogeneous muddy sand, no marked difference of the surface, sueprnt stars
KT04-20 G- 6	off Shiretoko P.	13/09/04	Okean L	06:14	145 21.0350	44 22.5870	170	50%	olive grey fine-grained well sorted compact sand, no marked surface layer, shell fragments
KT04-20 G- 7	off Shiretoko P.	13/09/04	Okean L	06:32	145 21.0940	44 22.9300	215	30%	olive grey fine-grained well sorted compact sand, no marked surface layer, shell fragments and s. stars
KT04-20 G-11	off Shiretoko P.	14/09/04	Okean L	04:06	145 21.1980	44 27.0300	844	5%	a little amount of olive grey soft mud, slightly sandy, consolidated mudstone lower, tiny serpent stars
KT04-20 G-12	off Shiretoko P.	14/09/04	Okean L	04:35	145 20.9120	44 27.4450	987	5%	a little amount of olive grey soft and soupy mud, tiny serpent stars
KT04-20 G-13	off Shiretoko P.	14/09/04	Okean L	06:05	145 20.9340	44 28.0650	1,234	95%	soft olive grey homogeneous mud, lower dark olive grey sticky compact mud, serpent stars, lugworms
KT04-20 G-14	off Shiretoko P.	15/09/04	Okean L	10:11	145 21.4950	44 30.4210	1,500	100%	upper 5cms very soft olive grey homogeneous mud, lower dark olive grey sticky compact mud, a little s. stars
KT04-20 G- 5	off Shiretoko P.	15/09/04	Okean L	11:47	145 21.8380	44 22.5140	185	5%	a little amount of dark green basaltic f.- m. grained-sand, well sorted, two basaltic gravels, lids opened due to the gravels
KT04-20 G- 4	off Shiretoko P.	15/09/04	Okean L	12:25	145 21.8870	44 21.9760	130	5%	a little amount of dark olive basaltic f. - m. grained-sand, well sorted, sponges
KT04-20 G- 3	off Shiretoko P.	15/09/04	Okean H	12:51	145 21.5690	44 21.8240	100	40%	molluscan shell fragment-bearing f. - m. grained- well sorted sand
KT04-20 G- 2	off Shiretoko P.	15/09/04	Okean H	13:16	145 20.9370	44 21.5690	76	30%	molluscan shell fragment- and rounded pebble-bearing black well sorted basaltic sand
KT04-20 G- 1	off Shiretoko P.	15/09/04	Okean H	13:41	145 20.3540	44 21.0910	48	0%	*no recovery due to a wire trouble*
KT04-20 G-1 (2)	off Shiretoko P.	15/09/04	Okean H	13:48	145 20.3560	44 21.0870	47	0%	*no recovery*
KT04-20 G-1 (3)	off Shiretoko P.	15/09/04	Okean H	14:01	145 20.3840	44 21.1520	49	0%	*no recovery due to probably an exposed rock on the sea-floor*
KT04-20 G-15	Kitami-Yamato B.	15/09/04	Okean L	18:49	144 28.5260	44 39.4540	1,499	90%	olive grey / pale olive compact sticky mud covered by thin soupy reddish brown mud
KT04-20 G-16	Kitami-Yamato B.	15/09/04	Okean L	20:25	144 21.9730	44 37.5340	1,244	100%	olive grey / pale olive compact sticky mud covered by thin soupy reddish brown mud
KT04-20 G-17	Kitami-Yamato B.	15/09/04	Okean L	21:29	144 19.2830	44 37.0720	1,001	95%	olive grey / pale olive compact sticky mud covered by thin soft yellowish brown mud, a serpent star
KT04-20 G-18	Kitami-Yamato B.	15/09/04	Okean L	22:24	144 17.6400	44 36.2880	778	95%	olive grey / pale olive compact sticky sandy mud covered by thin soft yellowish brown mud
KT04-20 G-19	Kitami-Yamato B.	15/09/04	Okean L	23:05	144 16.8990	44 35.8750	535	70%	rounded and poorly sorted granule- to pebble-gravel (up to 3 cms long)-bearing olive grey soft mud
KT04-20 G-20	Kitami-Yamato B.	15/09/04	Okean L	23:41	144 16.4050	44 35.6240	355	60%	rounded and poorly sorted granule- to pebble-gravel (up to 5 cms long)-bearing olive grey soft mud
KT04-20 G-21	Kitami-Yamato B.	16/09/04	Okean L	00:06	144 15.9730	44 35.5010	233	40%	rounded and poorly sorted granule- to pebble-gravel (up to 6 cms long)-rich olive grey soft mud
KT04-20 G-23	Kitami-Yamato B.	16/09/04	Okean L	00:28	144 15.8180	44 35.4890	180	30%	rounded and poorly sorted granule- to pebble-gravel (up to 3 cms long)-rich olive grey sticky mud
KT04-20 G-22	Kitami-Yamato B.	16/09/04	Okean L	00:59	144 15.9330	44 35.5430	207	50%	*no sampling due to loss of the surface a lid opened completely*
KT04-20 G-22 (2)	Kitami-Yamato B.	16/09/04	Okean L	01:11	144 15.9140	44 35.5470	202	60%	organic-rich, rounded and poorly sorted granule- to pebble-gravel (up to 3 cms long)-rich olive grey sticky mud
KT04-20 G-24	Kitami-Yamato B.	16/09/04	Okean L	01:46	144 14.8950	44 35.4980	155	30%	sponge-rich, rounded and poorly sorted granule- to pebble-gravel (up to 3 cms long)-rich olive grey highly sticky mud
KT04-20 G-31	Okushiri Spur	17/09/04	Okean L	15:20	139 29.7210	41 58.2980	65	0%	a mass of sponge with a very little amount of fine-grained sand and molluscan shell fragments
KT04-20 G-31 (2)	Okushiri Spur	17/09/04	Okean L	15:31	139 29.6990	41 58.3900	65	0%	a very little amount of fine-grained sand with molluscan shell fragments and fragments of sponges
KT04-20 G-38	Okushiri Spur	17/09/04	Okean L	16:21	139 30.8730	41 56.1800	100	5%	fine- to medium-grained shelly sand, a serpent star and a hermit crab
KT04-20 G-39	Okushiri Spur	17/09/04	Okean L	17:44	139 33.3690	41 51.1170	205	10%	molluscan shell fragment-bearing well sorted v.f.- to fine-grained sand
KT04-20 G-40	Okushiri Spur	17/09/04	Okean L	18:37	139 34.0460	41 50.8310	375	15%	a little amount of molluscan shell fragment-bearing well sorted fine- to medium-grained olive grey sand
KT04-20 G-25	Okushiri Spur	17/09/04	Okean L	20:38	139 26.9010	41 58.3290	250	40%	molluscan shell fragment-bearing well sorted dark olive compact fine-grained sand
KT04-20 G-26	Okushiri Spur	17/09/04	Okean L	21:01	139 27.0030	41 58.4760	210	0%	*a little amount of molluscan shell fragment-bearing fine-grained sand, no samplings due to lids openend by a sponge*
KT04-20 G-26 (2)	Okushiri Spur	17/09/04	Okean L	21:25	139 27.0300	41 58.3310	200	20%	molluscan shell fragment-bearing well sorted dark olive compact fine-grained sand, serpent stars and sponges
KT04-20 G-27	Okushiri Spur	17/09/04	Okean L	21:47	139 27.0470	41 58.3750	175	25%	molluscan shell fragment-bearing well sorted dark olive compact fine-grained sand, serpent stars and seaweeds
KT04-20 G-28	Okushiri Spur	17/09/04	Okean L	22:10	139 27.1420	41 58.3450	143	30%	molluscan shell fragment-bearing well sorted olive grey compact fine-grained sand, serpent stars and sponges
KT04-20 G-29	Okushiri Spur	17/09/04	Okean L	22:31	139 27.4410	41 58.2460	127	20%	molluscan shell fragment-bearing well sorted olive grey fine- to medium-grained sand
KT04-20 G-30	Okushiri Spur	17/09/04	Okean L	22:53	139 28.4440	41 58.3320	100	10%	molluscan shell fragment-rich, granule- to pebble-gravel-bearing well sorted olive grey fine- to medium-grained sand
KT04-20 G-32	Okushiri Spur	17/09/04	Okean L	23:22	139 31.0940	41 58.3140	100	10%	molluscan shell fragment-rich well sorted olive grey fine- to medium-grained sand
KT04-20 G-33	Okushiri Spur	17/09/04	Okean L	23:43	139 32.1810	41 58.4010	125	10%	molluscan shell fossils and shell fragment-bearing dark olive fine-grained sand
KT04-20 G-34	Okushiri Spur	18/09/04	Okean L	00:03	139 32.6560	41 58.3770	150	0%	*no recovery due to probably by a lid opened*
KT04-20 G-34 (2)	Okushiri Spur	18/09/04	Okean L	00:14	139 32.6169	41 58.3350	148	5%	rounded pebble- to cobble-gravel- and molluscan shell fragment-bearing dark olive well sorted fine-grained sand
KT04-20 G-35	Okushiri Spur	18/09/04	Okean L	00:39	139 32.7610	41 58.3540	174	0%	only a small amount of molluscan shell fragment-bearing fine-grained sand
KT04-20 G-35 (2)	Okushiri Spur	18/09/04	Okean L	00:53	139 32.7580	41 58.3220	174	10%	rounded pebble- to cobble-gravel- and molluscan shell fragment-bearing dark olive well sorted fine-grained sand
KT04-20 G-36	Okushiri Spur	18/09/04	Okean L	01:12	139 32.8800	41 58.2450	196	15%	rounded pebble- to cobble-gravel- and molluscan shell fragment-bearing dark olive well sorted fine-grained sand
KT04-20 G-37	Okushiri Spur	18/09/04	Okean L	01:38	139 33.2270	41 58.2600	251	30%	molluscan shell fragment-bearing dark olive well-sorted fine-grained sand with a little amount of pebble-gravels

On the other hand, the sediments from the uppermost part of the eastern slope of the spur consist mainly of modern molluscan shell fragment- and molluscan fossil fragment-bearing dark olive fine-grained sand at the shallowest site G-33 at a water depth of 125 m, rounded pebble- to cobble-gravel- and molluscan shell fragment-bearing well sorted dark olive fine-grained sand at the sites G-34, G-35 and G-36 at water depths of 148, 174 and 196 m (Plate 2, figs. 6 and 7), and molluscan shell fragment-bearing well-sorted dark olive fine-grained sand with a little amount of pebble-gravels at the deepest site G-37, 251 m deep. Serpent stars were frequently observed on these surfaces.

Ⅳ. Discussion

A limited number of marine geological studies had been made in the southern part of the Okhotsk Sea, since intergovernmental tension had mounted in the area up to recent years (Tsukawaki *et al*., 2003). After its relaxation, Kishimoto and Ikehara ed. (2001) and Ikehara ed. (2002) carried out systematic surface sediment sampling in the southwestern part of the sea which includes the area of the present study, but their spatial grid-sampling bearing no relation with water-depths is insufficient for sedimentological and micropalaeontological studies in the shallow-sea area, because it is well known that spatial distribution of benthic micro-organisms is in close association with both water- depth and bottom sediment types.

Although sediment sampling of the present study was carried out along only two lines off Shiretoko Peninsula and the Kitami-Yamato Bank, and observation of the samples was short of a preliminary perception on their compositional features, a sufficient number of samples was recovered first from various water-depths shallower than 200 m for further micropalaeontological and sedimentological studies. As described above a clear fining of surface sediments was recognised among the samples as water deepens.

On the other hand, despite the Geological Survey of Japan made systematic surface sediment samplings in the northeastern marginal part of the Japan Sea, around the Okushiri Island in particular with reference to the 1993 Southwest-off Hokkaido Earthquake (*e. g.* Okamura and Inouchi, 1995), their grid-sampling is also insufficient for micropalaeontological studies as stated above.

The surface sediment samples obtained from both southwestern marginal part of the Okhotsk Sea off Shiretoko Peninsula and the Kitami-Yamato Bank, and northeastern marginal part of the Japan Sea south off Okushiri Island hold out a promising prospect for investigations of micro-organisms inhabiting in these areas.

Ⅴ. Concluding Remarks

The preliminary results from sediment sampling on the R. V. *Tansei-maru* KT04-20 cruise in the southwestern marginal part of the Okhotsk Sea and the northeastern marginal part of the Japan Sea are summarized as follows:

1. Surface sediments of the southwestern marginal part of the Okhotsk Sea off Shiretoko Peninsula are composed generally of molluscan shell fragment- and gravel-bearing fine- to medium-grained sand in the shelf (76 to 130 m), olive grey fine-grained sand or muddy sand in the uppermost slope (170 to 248 m), olive grey homogeneous mud in the upper slope (315 to 505 m), and soft olive grey homogeneous mud in the middle to lower slope (1,234 to 1,500 m). Semi-consolidated mudstone exposes in the middle slope (844 to 987 m).
2. Surface sediments of the Kitami-Yamato Bank in the southwestern marginal part of the Okhotsk consist chiefly gravel-bearing olive grey mud in its top (155 to 202 m) and the upper eastern slope (233 to 535 m), pale olive sandy mud or mud in the middle slope (778 to 1,001 m), and pale olive compact and sticky mud in the lower slope (1,244 to 1,499 m).
3. Surface sediments of the Okushiri Spur area south of Okushiri Island are composed mainly of molluscan shell fragment-rich or –bearing fine- to medium-grained sand in the shallow top of the spur (65 to 100 m), shell fragment-bearing very fine- to fine-grained sand (205 m) and fine- to

medium-grained sand (375 m) in its deeper area, molluscan shell fragment- bearing well sorted fine- to medium-grained sand in the western slope (127 to 250 m), and molluscan- shell fragment- and/or molluscan shell fossil fragment- and gravel-bearing fine-grained sand in the eastern slope (125 to 251 m).

4. The surface sediment samples collected with attention to the water-depths from both southwestern part of the Okhotsk Sea and northeastern marginal part of the Japan Sea during the cruise provide important material for micropalaeontological studies in these areas.

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Explanation of Plate 1

The grab surface sediments recovered from off Shiretoko Peninsula (figs. 1 to 5) and in the Kitami-Yamato Bank (figs. 6 to 8) in the southwestern marginal part of the Okhotsk Sea. The sample bottle, 40 mm in diameter, gives scale.

Fig. 1 Molluscan shells and shell fragment-bearing fine- to medium-grained sand at the site G-3 at a water depth of 100 m off Shiretoko Peninsula.

Fig. 2 Recovered andesitic gravels, about 14 cm (right) and about 4 cm (left) in diameter at the site G-5 at a water depth of 185 m off Shiretoko Peninsula.

Fig. 3 Olive grey fine-grained sandy mud at the site G-8 at a water depth of 248 m off Shiretoko Peninsula. Serpent stars on the surface.

Fig. 4 Olive grey homogeneous mud overlain by thin soft brownish grey mud at the site G-10 at a water depth of 505 m off Shiretoko Peninsula. Serpent stars on the surface.

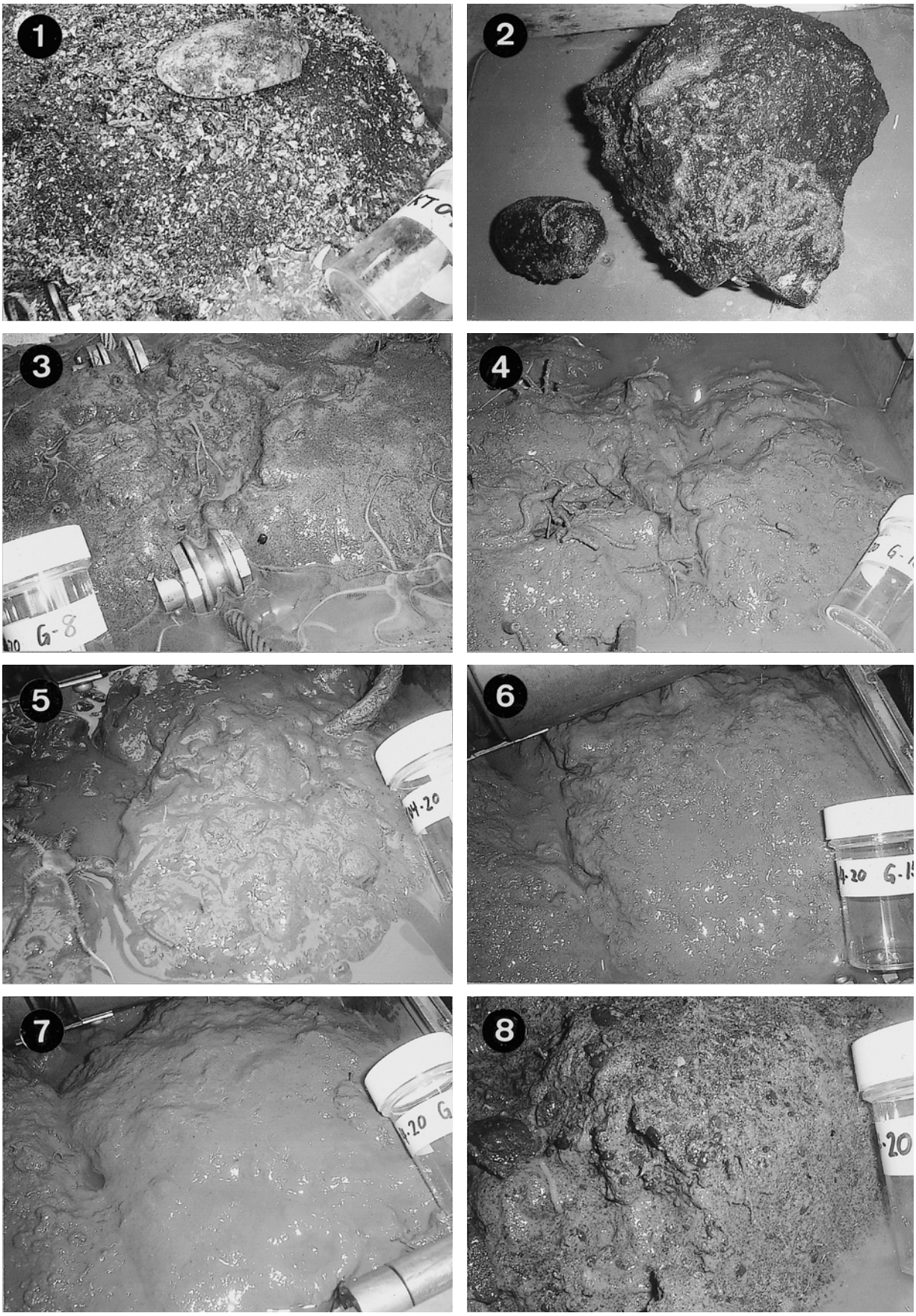
Fig. 5 Olive grey soft homogeneous mud at the site G-13 at a water depth of 1,234 m off Shiretoko Peninsula. Serpent stars on the surface.

Fig. 6 Olive grey compact sticky mud overlain by thin soupy reddish brown mud at the site G-15 at a water depth of 1,499 m in the eastern slope of the Kitami-Yamato Bank.

Fig. 7 Olive grey compact sticky mud overlain by thin soupy yellowish brown mud at the site G-17 at a water depth of 1,001 m in the eastern slope of the Kitami-Yamato Bank.

Fig. 8 Rounded granule- to pebble-gravel-bearing olive grey soft mud at the site G-20 at a water depth of 355m in the eastern slope of the Kitami-Yamato Bank.

Plate 1



Explanation of Plate 2

The grab surface sediments recovered from the Kitami-Yamato Bank in the southwestern marginal part of the Okhotsk Sea (figs. 1 and 2), and from the Okushiri Spur area south of Okushiri Island in the northeastern marginal area of the Japan Sea, off Hokkaido, Japan. The sample bottle, 40 mm in diameter, gives scale.

Fig. 1 Rounded granule- to pebble-gravel-rich olive grey sticky mud at the site G-22 at a water depth of 202 m in the eastern slope of the Kitami-Yamato Bank.

Fig. 2 Rounded granule- to pebble-gravel-rich olive grey sticky mud at the site G-24 at a water depth of 155 m in the flat top of the Kitami-Yamato Bank. Sponges are frequently observed in the sediments.

Fig. 3 Molluscan shell fragment-bearing well sorted dark olive fine-grained sand at the site G-25 in the western slope of the Okushiri Spur at a water depth of 250 m.

Fig. 4 Molluscan shell fragment-bearing well sorted dark olive fine-grained sand at the site G-27 in the western slope of the Okushiri Spur at a water depth of 175 m. Serpent stars on the surface.

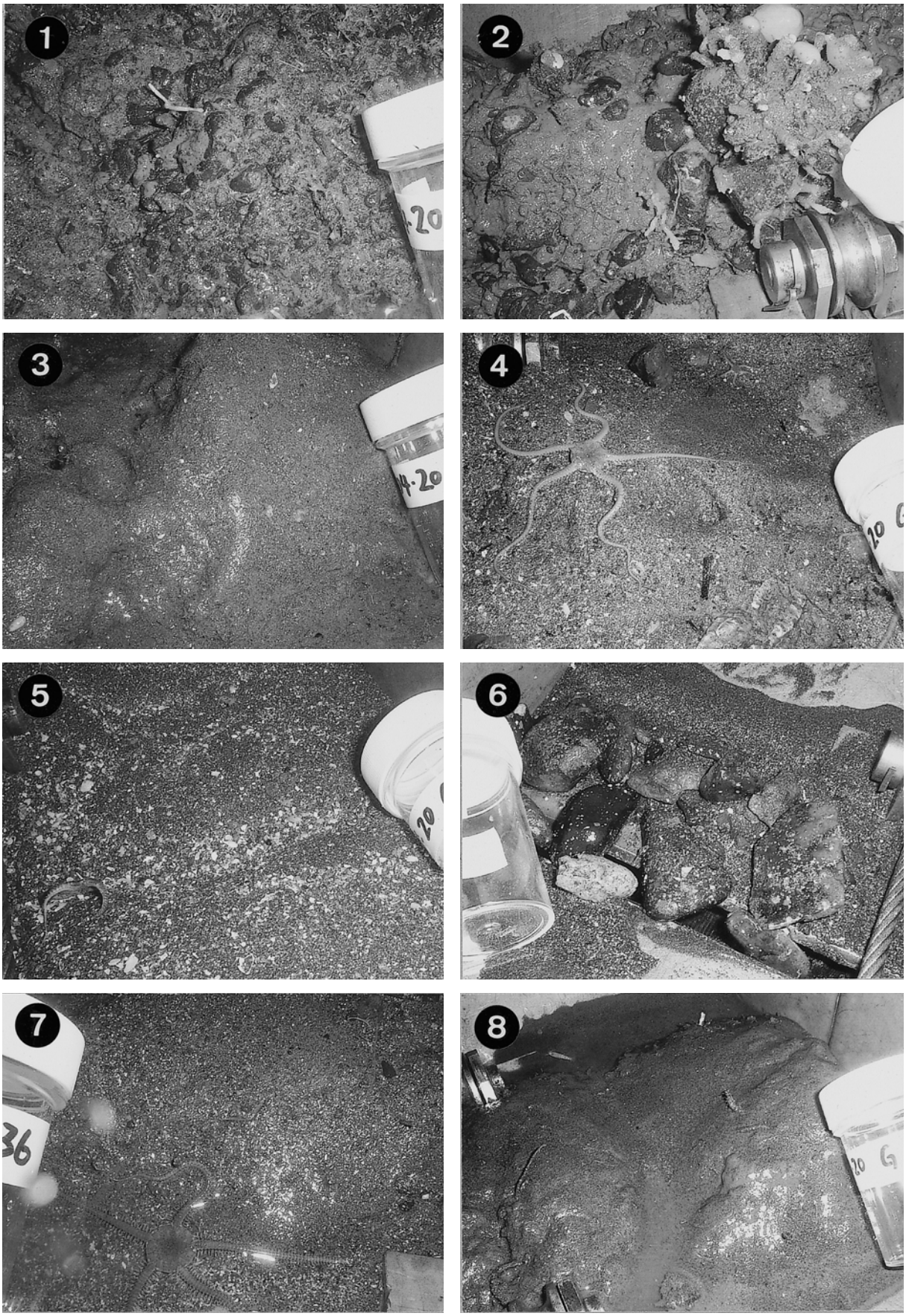
Fig. 5 Molluscan shell fragment-rich well sorted olive grey fine- to medium-grained sand at the site G-32 in the Okushiri Spur at a water depth of 100 m.

Fig. 6 Rounded pebble- to cobble-gravels and molluscan shell fragments with dark olive fine-grained sand at the site G-34 in the eastern slope of the Okushiri Spur at a water depth of 148 m.

Fig. 7 Rounded granule- to pebble-gravel- and molluscan shell fragment-bearing dark olive well sorted fine-grained sand at the site G-36 in the eastern slope of the Okushiri Spur at a water depth of 196 m.

Fig. 8 Molluscan shell fragment-bearing fine- to medium-grained olive grey sand at the site G-40 in the south of the Okushiri Spur at a water depth of 375 m.

Plate 2



オホーツク海南西縁部ならびに日本海北東縁部における青丸KT04-20次航海の採泥結果

塚脇真二[1]・小沢広和[2]・陰地章仁[3]

要　旨

2004年9月13日～19日に実施したオホーツク海南西縁部の北海道知床半島沖ならびに北見大和堆，および日本海北東縁部となる奥尻島南方の奥尻海脚での海洋研究船淡青丸の研究航海KT04-20において，知床半島沖から14点，北見大和堆から11点，奥尻海脚から20点の海底表層試料をそれぞれ採取した。

知床半島沖の海底表層堆積物は，陸棚域では貝殻片や礫をともなう細～中粒砂，最上部斜面域では細粒砂あるいは砂質泥，上部斜面域では緑灰色の泥，そして中～下部斜面域では緑灰色の軟泥からそれぞれ構成される．北見大和堆付近の海底堆積物は，堆の頂部から斜面上部にかけては含礫の泥，中部斜面域では緑灰色砂質泥または泥，下部斜面域には緻密な緑灰色泥からなる．一方，奥尻海脚付近では，海脚頂部ならびに海脚西側斜面には貝殻片に富む細～中粒砂が分布するが，貝殻片ならびに礫を含む細粒砂が東側斜面には分布する。

キーワード：海底堆積物，日本海，オホーツク海，奥尻島，知床半島，淡青丸

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