Prof. Dr. Wolf Arntz

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Ms. Lisbeth W. Plassa
Mr. Eilif Sund
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09.09.2004

26.6.2003 Polarstern Jnr. 2003/9458

Dear Ms. Plassa,
dear Mr. Sund,

Enclosed please find our preliminary cruise report on work done near Bouvet Island with R/V "Polarstern". Please note that this is not the final report, which will be published in "Reports on Polar and Marine Research", but a preliminary report to comply with the conditions of the permit. You will receive the complete cruise report of voyage ANT XXI/2 (containing also research close to the Antarctic continent) immediately after publication. Further scientific publications are to follow.

In the name of Captain Udo Domke, the crew and the cruise participants I would like to thank you again for granting us permission to work round Bouvet Island.

With best wishes, yours sincerely

(Wolf Arntz)

Enclosures

Prof. Dr. Wolf Arntz, Head Benthic Ecosystems Div.

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09.09.2004

Report to the Norwegian Directorate of Fisheries on marine biological work near Bouvet Island carried out from board RV „Polarstern“ during cruise ANT XXI/2 („BENDEX“)

Subject: Relationships between Sub- and high Antarctic fauna: the role of Bouvet Island

Objectives. The study intended to clarify some biogeographic, phylogenetic and physiological traits of the marine fauna living at Bouvet Island, in relation to the fauna sampled during former cruises on the high Antarctic – Magellan latitudinal gradient. The focus was to be on fish (Zoarcidae and Notothenioidei) and decapod crustaceans; further fauna sampled was to be studied with respect to their biogeography and biodiversity.

Work at Sea. Sampling near Bouvet Island (54°26'S, 3°24'E) was done on the way to the Antarctic continent on November 24 and 25, 2003, and at Spiess Seamount (54°44'S,0°7 'E) on January 11, 2004, on the return to Cape Town (Figs. 1 & 2). The gear used was a small Agassiz trawl with the tiny Rauschert dredge tied to it, baited traps and a photosled near Bouvet, and a normal Agassiz trawl + Rauschert dredge, a stone dredge and the photosled at Spiess Seamount. For exact positions cf. Figs. 1 & 2 and the excerpt from the station list in Annex A.

Preliminary results. The seafloor around Bouvet (4 AGT stations, 100-550 m) turned out to be less rugged than we expected. Bottom topography was smooth (Fig. 3), obviously volcanic, with a thin layer of coarse sand or (AGT 3) lava pebbles on top. All four AGT returned on deck without damage and with interesting catches (Figs. 4-10). Conversely, bottom topography at the Spiess Seamount was extremely varied, with steep peaks and crevices, and despite the use of hydrosweep sonar the net of the second AGT was completely torn and a Rauschert dredge lost while the first AGT returned full of stones. For major taxa in the AGT see Annex B. The photosled yielded excellent picture transects at both sites (for examples, see Figs. 11-13).
At Bouvet echinoderms, in particular ophiuroids, were strongly dominant except echinoids, which were almost absent. Compared with the E Weddell Sea (high Antarctic), three-dimensionality of the benthic communities was low, however red macroalgae and hydroids were dominant at 130 m, soft bryozoans (Flustra type) at 250 m, and some large sponges and gorgonians added complexity to the assemblage at 370 m. Other dominant elements at 130 m were serpulid polychaetes, small amphipods incl. caprellids, small pycnogonids, and small notothenioid fish (mostly *Lepidonotothen larseni,* some *L. kempi)*.
No zoarcid fish and no lithodid decapods were caught at Bouvet, however, they might occur in deeper waters. No other reptant decapods were detected and only three single records of small caridean (hippolytid) shrimp species, all of which are probably new to science. Several typical high Antarctic faunal elements were missing, including the large epimerid and eusirid amphipods, large serolid isopods, the genus *Glyptonotus,* large pycnogonids, the mollusc families Trochidae and Limopsidae, and (with one exception) large polynoid and aphroditid polychaetes. Isopods were rare and most of

them (excl. *Antarcturus)*, as well as most amphipods, were very small. The baited amphipod traps yielded thousands of lysianassids as everywhere.
In some taxa the number of species known for Bouvet Island was increased substantially. Notable examples which could be checked on board are the benthic amphipods (from 5 to 67 spp., at least 7 new to science) and the molluscs (from 9 to 43 spp.); other taxa may present a similar relation indicating that further research would be rewarding.

In contrast to Bouvet, AGT sampling at the Spiess Seamount (570 m) yielded very little material including, however, 3 specimens of lithodid decapods (*Paralomis* cf. *formosa)* for which we had been looking in vain at Bouvet Island, and five deep-sea carideans *(Nematocarcinus lanceopes)*, which we had never found that shallow. A fourth specimen of *P.* cf. *formosa* was caught with the stone dredge.

The biogeographic relations of the deeper shelf fauna around Bouvet can be compared with high Antarctic, Peninsular and Magellan samples taken during former cruises (both nearshore shallow water and deep sea are not considered as we have no Bouvet samples from these areas). The general aspect of the Bouvet fauna resembles the Magellan region rather than the high Antarctic. In fact the motile peracarids and the molluscs seem to be related principally to the Antarctic Peninsula and the Scotia Arc, a distribution that could well be explained by the transport of adults, larvae and drift stages via the West Wind Drift/Circumpolar Current, but quite a few are also related to the high Antarctic. On the other hand, the sessile cnidarians (actinians, hydrozoans, gorgonians) show closer affinities to the high Antarctic Weddell Sea. An interesting find, at 270 m, was the gastropod *Calliotropis (Solaricida) antarctica* Dell, 1990, which had been described from 2700 m at the Antarctic Peninsula and found during the ANDEEP cruise at 775 m, thus showing considerable eurybathy. The decapods reveal both Scotia Arc relations (lithodid, hippolytids) and Weddell Sea affinities *(N. lanceopes)*; except for the hippolytids colonisation may be assumed via the deep sea. The two *Lepidonotothen* species are characteristic species of the Scotia Arc, but *L. kempi* juveniles also occur in the E Weddell Sea. We do not know whether the different populations are maintaining an active exchange. With respect to other taxa, the material has been sent out to specialists, who will hopefully determine the respective affiliations. Some of these biogeographic (and possibly, phylogenetic) relationships will be further elucidated after the analysis of the large material to be subjected to molecular genetic techniques at the home laboratories.

First results on the adaptive competence of the fish genus *Lepidonotothen,* which also occurs in the high Antarctic, indicate that hepatocytes of Subantarctic fish clearly differ from those of their high Antarctic relatives in terms of oxygen consumption, however at sufficient ambient oxygen concentrations the cellular energetic balance is held upright over a range between 0 and 15°C. Further physiological experiments with notothenioids are planned at the AWI.
No drowning incidents of seals or penguins occurred in the Agassiz Trawl or in the baited traps.

The participants of RV „Polarstern“ cruise ANT XXI/2 would like to express their sincere gratitude to the Norwegian Government for granting permission to study the fauna in the Bouvet region. Due to the short time available for this investigation, it could not be exhaustive, but it has definitely improved knowledge on this area, which during recent meetings has often been referred to as a „white spot“ in Subantarctic marine biology.

Wolf Arntz
(Chief Scientist)

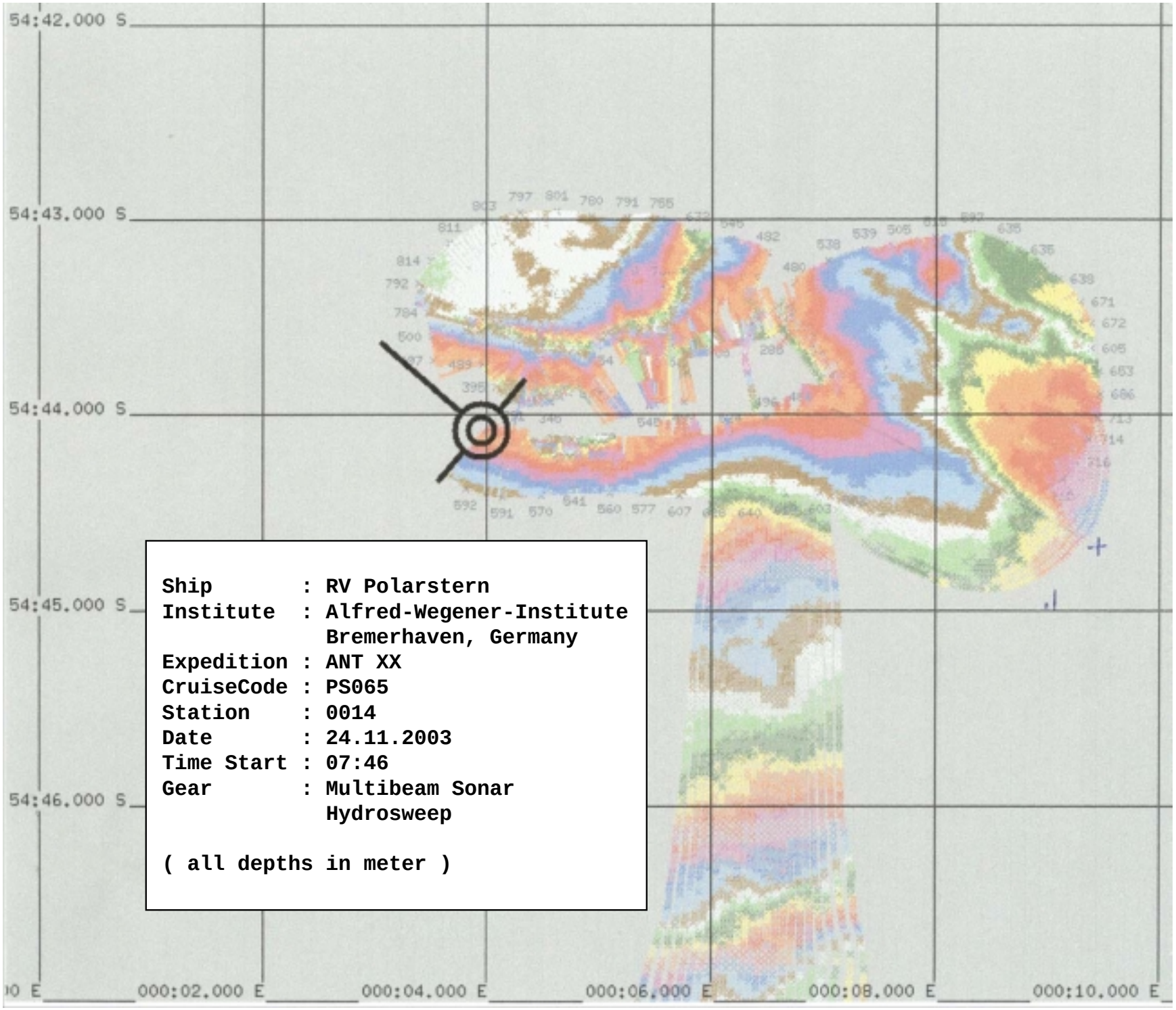
			Station	65-019	65-020	65-028	65-029	65-039	65-090	65-109	65-121	65-161	65-173	65-233	65-276	65-278	65-279	65-280	65-336	65-344	65-346
			Haul	AGT 1	AGT 2	AGT 3	AGT 4	AGT 5	AGT 6	AGT 7	AGT 8	AGT 9	AGT 10	AGT 11	AGT 12	AGT 13	AGT 14	AGT 15	AGT 16	AGT 17	AGT 18
Porifera				-	-	0	+	-	++	-	+	++	+	++	+	+	++	++	-	0	
Cnidaria	Hydroidea			-	0	+	-	+	0	0	-	-	-	0	-	+	-	-	-	0	
	Actiniaria			-	0	+	-	-	-	-	+	-	-	-	+	-	-	-	-	-	NO
	Gorgonaria			+	-	0	+	-	-	0	+	-	-	-	-	-	-	+	-	0	CATCH
	Pennatularia			+	-	0	-	0	0	-	0	0	0	0	-	0	0	0	0	0	
	Alcyonaria			0	0	+	-	0	0	0	-	0	0	-	0	0	0	0	0	0	NET
	Scleractinia			-	0	0	-	0	-	0	0	-	-	0	0	0	0	-	0	0	TORN
Nemertini				+	-	-	-	-	-	-	-	-	-	-	-	0	0	0	-	0	
Mollusca	Bivalvia			-	0	0	0	-	-	-	-	-	-	0	-	-	+	-	-	-	
	Aplacophora			0	0	0	0	0	-	0	-	0	0	0	-	0	0	0	0	0	
	Gastropoda	Prosobranchia		-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	
		Opisthobranchia		-	0	+	-	_	0	-	-	0	0	-	-	0	0	-	-	0	
	Polyplacophora			-	-	0	-	0	-	0	-	0	0	-	-	0	0	-	0	0	
	Cephalopoda			0	0	0	0	-	0	-	-	0	-	+	-	0	0	0	-	0	
	Scaphopoda			0	0	0	0	0	-	0	0	-	0	0	0	0	0	0	0	0	
Polychaeta	Sedentaria			-	0	++	-	-	-	0	-	-	-	-	-	-	0	-	-	0	
	Errantia			-	-	+	-	-	-	-	-	-	-	-	-	0	-	-	-	0	
Priapulida				0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	
Sipunculida				-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	-	
Echiurida				0	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	0	
Crustacea	Cirripedia			-	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	+	
	Amphipoda			-	0	+	-	++	-	0	-	-	-	-	++	-	+	-	-	-	
	Isopoda			-	-	-	-	+	-	0	-	-	-	-	-	0	0	-	-	0	
	Cumacea			0	0	0	0	0	-	0	0	0	0	0	-	0	-	0	0	0	
	Mysidacea			0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	0	
	Decapoda	Natantia		0	-	0	0	-	-	++	-	0	-	++	-	0	-	+	-	-	
		Reptantia		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
Pantopoda				-	-	+	-	+	+	-	-	-	-	+	+	-	-	+	-	0	
Bryozoa				++	-	-	-	++	-	0	+	+	-	-	++	0	-	+	-	-	
Brachiopoda				-	-	-	-	0	-	-	-	-	-	0	-	0	0	-	0	-	
Pterobranchia				0	0	0	0	0	-	0	+	0	-	0	-	0	0	-	-	0	
Echinodermata	Ophiuroidea			++	++	++	++	-	-	++	-	-	-	-	+	-	-	-	-	-	
	Asteroidea			-	-	++	+	-	-	-	+	-	-	-	-	0	0	+	-	-	
	Echinoidea	Regularia		0	-	0	0	-	+	-	+	-	+	-	+	-	-	-	-	-	
		Irregularia		0	0	-	0	-	-	-	0	-	-	0	-	0	0	-	0	0	
	Crinoidea			+	-	-	+	0	-	++	-	-	-	+	-	0	0	+	-	0	
	Holothuroidea			+	+	++	+	-	+	+	-	-	+	+	-	-	0	-	-	-	
Ascidiacea				-	-	-	-	-	+	0	-	-	+	-	-	0	-	-	-	0	
Pisces				-	-	+	-	+	-	-	-	0	0	-	-	0	0	+	-	-	

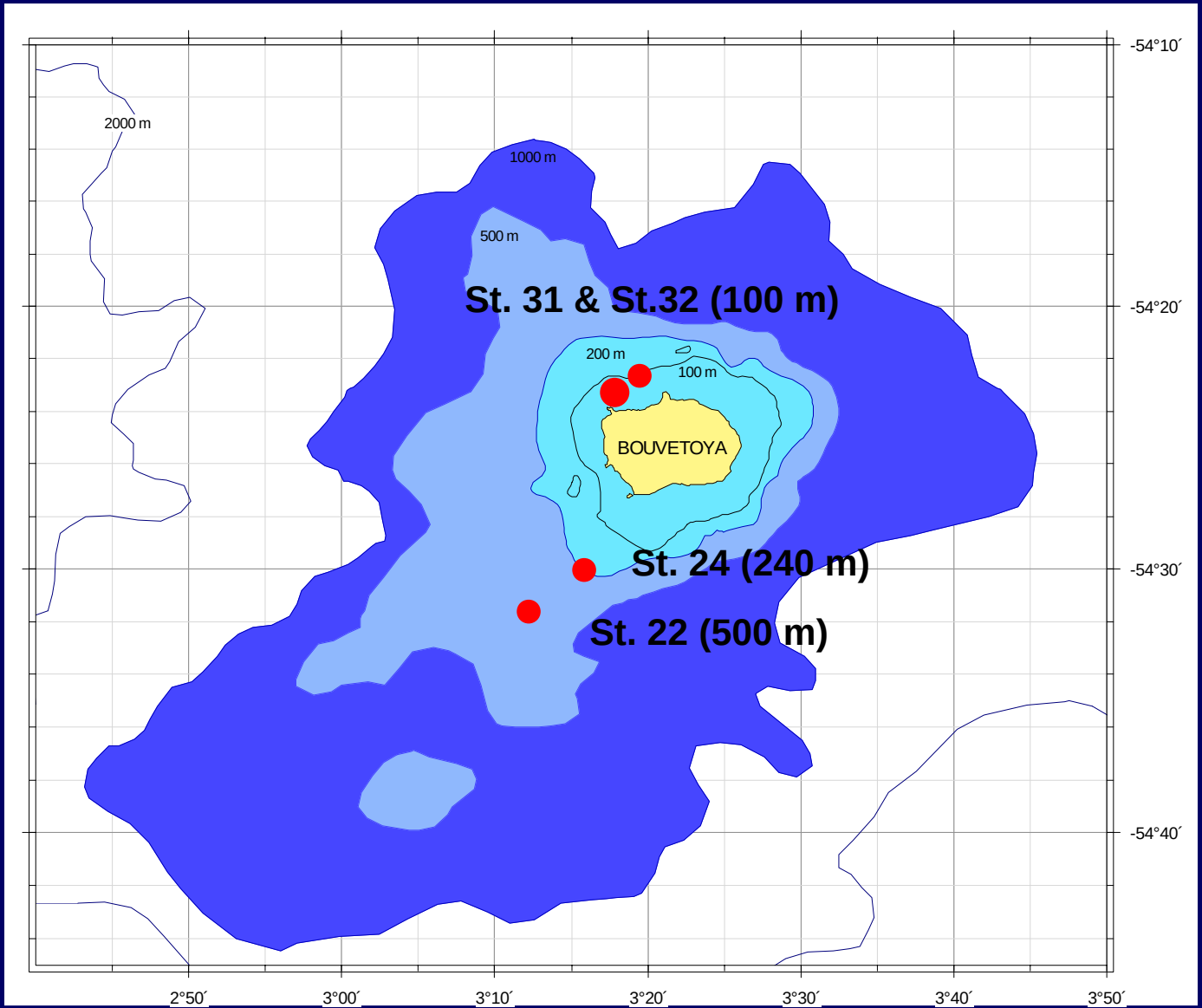
Station List Bouvet Island and Spiess Seamount, Cruise "Polarstern' och immer mit Fehlern!

Station	Date	Time	PositionLat	PositionLon	Depth [m]	Gear	Action
PS65/014-1	24.11.03	07:46	54° 24.90' S	003° 30.36' E	205,1	HydroSweep/ParaSound	start track
PS65/014-1	24.11.03	12:30	54° 36.98' S	003° 11.91' E	541,1	HydroSweep/ParaSound	profile end
PS65/014-1	24.11.03	13:09	54° 37.94' S	003° 06.80' E	515,3	Amphipod Trap	surface
PS65/015-1	24.11.03	13:40	54° 37.94' S	003° 07.31' E	516,6	Crab Trap	surface
PS65/015-1	24.11.03	13:56	54° 37.86' S	003° 07.08' E	515,0	Fish Trap	surface
PS65/015-1	24.11.03	13:57	54° 37.87' S	003° 07.08' E	515,2	Fish Trap	surface
PS65/015-1	24.11.03	14:12	54° 37.80' S	003° 06.92' E	511,4	Fish Trap	surface
PS65/016-1	24.11.03	15:16	54° 29.92' S	003° 12.04' E	280,5	Fish Trap	surface
PS65/017-1	24.11.03	15:35	54° 29.06' S	003° 10.98' E	305,8	Fish Trap	surface
PS65/018-1	24.11.03	15:50	54° 29.13' S	003° 10.83' E	296,6	CTD/rosette water sample	surface
PS65/018-1	24.11.03	16:10	54° 29.27' S	003° 10.59' E	301,7	CTD/rosette water sample	on deck
PS65/019-1	24.11.03	16:43	54° 30.22' S	003° 14.37' E	253,9	Agassiz trawl	surface
PS65/019-1	24.11.03	16:51	54° 30.09' S	003° 14.13' E	247,1	Agassiz trawl	AGT on ground
PS65/019-1	24.11.03	17:09	54° 30.01' S	003° 13.97' E	259,7	Agassiz trawl	AGT off ground
PS65/019-1	24.11.03	17:19	54° 30.15' S	003° 13.95' E	263,4	Agassiz trawl	on deck
PS65/020-1	24.11.03	18:29	54° 37.41' S	003° 13.37' E	611,4	Agassiz trawl	surface
PS65/020-1	24.11.03	18:50	54° 36.95' S	003° 12.42' E	553,4	Agassiz trawl	AGT on ground
PS65/020-1	24.11.03	19:10	54° 37.02' S	003° 12.18' E	549,8	Agassiz trawl	AGT off ground
PS65/020-1	24.11.03	19:32	54° 37.30' S	003° 12.60' E	572,4	Agassiz trawl	on deck
PS65/021-1	24.11.03	19:42	54° 37.38' S	003° 12.66' E	576,3	CTD	surface
PS65/021-1	24.11.03	19:54	54° 37.41' S	003° 12.84' E	582,1	CTD	at depth
PS65/021-1	24.11.03	20:14	54° 37.49' S	003° 12.99' E	596,0	CTD	on deck
PS65/022-1	24.11.03	20:39	54° 36.34' S	003° 12.24' E	533,6	Foto sledge	surface
PS65/022-1	24.11.03	20:55	54° 36.33' S	003° 12.58' E	538,1	Foto sledge	at sea bottom
PS65/022-1	24.11.03	21:28	54° 36.29' S	003° 12.75' E	539,6	Foto sledge	off sea bottom
PS65/022-1	24.11.03	21:40	54° 36.28' S	003° 12.80' E	538,5	Foto sledge	on deck
PS65/023-1	24.11.03	21:48	54° 36.29' S	003° 12.82' E	539,0	In situ pump	into water
PS65/023-1	24.11.03	22:04	54° 36.28' S	003° 12.89' E	539,3	In situ pump	pump at depth
PS65/023-1	24.11.03	23:31	54° 36.24' S	003° 12.89' E	540,4	In situ pump	on deck
PS65/024-1	25.11.03	00:26	54° 29.66' S	003° 14.08' E	244,0	Foto sledge	surface
PS65/024-1	25.11.03	00:34	54° 29.68' S	003° 14.04' E	246,3	Foto sledge	at sea bottom
PS65/024-1	25.11.03	01:16	54° 29.66' S	003° 13.92' E	244,8	Foto sledge	off sea bottom
PS65/024-1	25.11.03	01:21	54° 29.66' S	003° 13.92' E	244,4	Foto sledge	on deck
PS65/025-1	25.11.03	01:28	54° 29.68' S	003° 13.90' E	244,8	In situ pump	into water

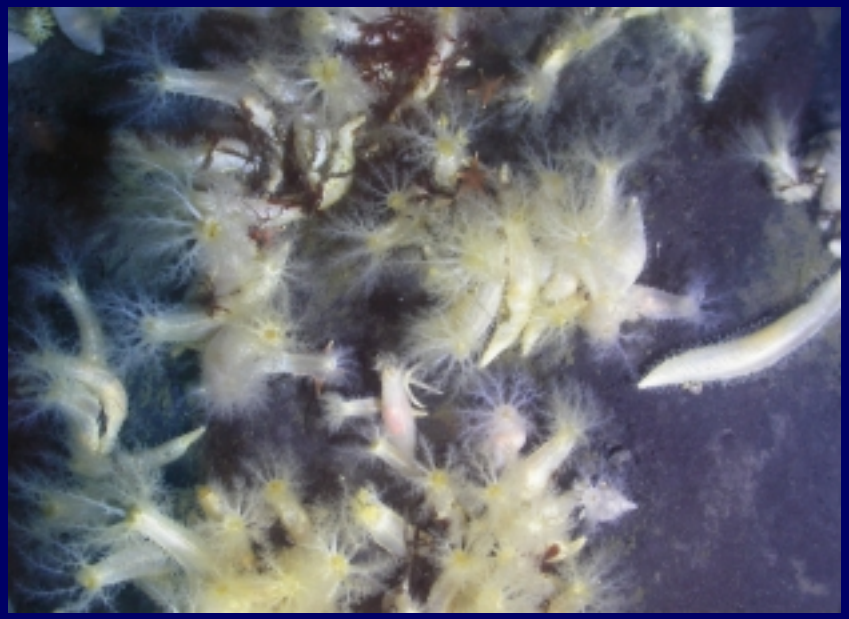
PS65/025-1	25.11.03	01:38	54° 29.72' S	003° 13.89' E	251,0	In situ pump	pump at depth
PS65/025-1	25.11.03	02:53	54° 29.81' S	003° 13.76' E	256,3	In situ pump	Information
PS65/025-1	25.11.03	03:00	54° 29.85' S	003° 13.73' E	263,7	In situ pump	on deck
PS65/026-1	25.11.03	04:00	54° 21.75' S	003° 15.23' E	192,6	HydroSweep/ParaSound	start track
PS65/026-1	25.11.03	04:45	54° 22.09' S	003° 21.06' E	264,1	HydroSweep/ParaSound	profile break
PS65/026-1	25.11.03	05:00	54° 21.83' S	003° 23.16' E	174,7	HydroSweep/ParaSound	alter course
PS65/026-1	25.11.03	05:55	54° 24.21' S	003° 13.69' E	199,3	HydroSweep/ParaSound	alter course
PS65/026-1	25.11.03	07:03	54° 21.52' S	003° 23.25' E	191,8	HydroSweep/ParaSound	profile end
PS65/027-1	25.11.03	07:30	54° 22.29' S	003° 19.02' E	118,7	CTD	surface
PS65/027-1	25.11.03	07:38	54° 22.32' S	003° 19.09' E	113,6	CTD	at depth
PS65/027-1	25.11.03	07:45	54° 22.36' S	003° 19.07' E	112,0	CTD	on deck
PS65/028-1	25.11.03	08:05	54° 22.33' S	003° 18.20' E	139,1	Agassiz trawl	surface
PS65/028-1	25.11.03	08:13	54° 22.49' S	003° 17.58' E	134,0	Agassiz trawl	AGT on ground
PS65/028-1	25.11.03	08:29	54° 22.54' S	003° 17.21' E	122,1	Agassiz trawl	AGT off ground
PS65/028-1	25.11.03	08:37	54° 22.52' S	003° 17.20' E	122,2	Agassiz trawl	on deck
PS65/014-1	25.11.03	11:13	54° 37.86' S	003° 06.86' E	515,1	Trap	released
PS65/014-1	25.11.03	11:36	54° 37.77' S	003° 06.78' E	510,3	Trap	on deck
PS65/015-1	25.11.03	13:07	54° 37.84' S	003° 07.72' E	516,5	Trap	on deck
PS65/016-1	25.11.03	14:42	54° 29.92' S	003° 12.38' E	276,2	Trap	released
PS65/016-1	25.11.03	15:14	54° 29.79' S	003° 11.83' E	275,0	Trap	on deck
PS65/017-1	25.11.03	15:33	54° 28.99' S	003° 11.38' E	308,4	Trap	released
PS65/017-1	25.11.03	15:56	54° 29.14' S	003° 10.78' E	300,9	Trap	on deck
PS65/029-1	25.11.03	16:45	54° 31.45' S	003° 13.99' E	370,4	Agassiz trawl	surface
PS65/029-1	25.11.03	16:59	54° 31.59' S	003° 13.05' E	376,8	Agassiz trawl	AGT on ground
PS65/029-1	25.11.03	17:19	54° 31.51' S	003° 12.84' E	364,8	Agassiz trawl	AGT off ground
PS65/029-1	25.11.03	17:32	54° 31.56' S	003° 12.92' E	369,3	Agassiz trawl	on deck
PS65/030-1	25.11.03	17:50	54° 31.99' S	003° 12.04' E	419,8	Giant water sampler	surface
PS65/030-1	25.11.03	18:09	54° 32.06' S	003° 12.10' E	431,2	Giant water sampler	on deck
PS65/031-1	25.11.03	19:30	54° 23.15' S	003° 15.92' E	118,1	Foto sledge	surface
PS65/031-1	25.11.03	20:25	54° 23.06' S	003° 16.25' E	113,5	Foto sledge	off sea bottom
PS65/031-1	25.11.03	20:29	54° 23.06' S	003° 16.25' E	114,4	Foto sledge	on deck
PS65/032-1	25.11.03	20:54	54° 22.56' S	003° 17.40' E	119,3	Foto sledge	surface
PS65/032-1	25.11.03	21:48	54° 22.65' S	003° 17.67' E	111,4	Foto sledge	on deck
PS65/033-1	25.11.03	23:34	54° 33.33' S	003° 09.56' E	423,8	In situ pump	into water
PS65/033-1	26.11.03	00:05	54° 33.22' S	003° 09.39' E	417,5	In situ pump	pump at depth
PS65/033-1	26.11.03	01:18	54° 33.11' S	003° 09.67' E	408,3	In situ pump	Information

PS65/033-1	26.11.03	01:29	54° 33.13' S	003° 09.68' E	409,3	In situ pump	on deck
PS65/342-1	11.01.04	05:00	54° 53.73' S	0° 0.08' W	1469,0	HydroSweep/ParaSound	start track
PS65/342-1	11.01.04	08:34	54° 44.05' S	0° 7.85' E	583,3	HydroSweep/ParaSound	profile end
PS65/343-1	11.01.04	08:53	54° 43.92' S	0° 6.73' E	446,6	Foto sledge	surface
PS65/343-1	11.01.04	09:01	54° 43.89' S	0° 6.80' E	441,0	Foto sledge	at sea bottom
PS65/343-1	11.01.04	09:38	54° 44.00' S	0° 7.34' E	511,4	Foto sledge	off sea bottom
PS65/343-1	11.01.04	09:47	54° 43.98' S	0° 7.47' E	535,9	Foto sledge	on deck
PS65/344-1	11.01.04	10:18	54° 44.58' S	0° 9.55' E	783,8	Agassiz trawl	surface
PS65/344-1	11.01.04	10:43	54° 44.40' S	0° 8.38' E	574,5	Agassiz trawl	AGT on ground
PS65/344-1	11.01.04	10:55	54° 44.32' S	0° 8.11' E	573,5	Agassiz trawl	Start hoisting
PS65/344-1	11.01.04	11:13	54° 44.29' S	0° 8.13' E	567,5	Agassiz trawl	AGT off ground
PS65/344-1	11.01.04	11:36	54° 44.20' S	0° 8.22' E	564,2	Agassiz trawl	on deck
PS65/345-1	11.01.04	12:06	54° 44.19' S	0° 8.95' E	703,5	Dredge, Rauschert	surface
PS65/345-1	11.01.04	12:40	54° 44.12' S	0° 8.31' E	629,4	Dredge, Rauschert	start dredging
PS65/345-1	11.01.04	12:46	54° 44.12' S	0° 8.19' E	627,7	Dredge, Rauschert	stop dredging
PS65/345-1	11.01.04	13:43	54° 43.93' S	0° 8.57' E	701,7	Dredge, Rauschert	on deck
PS65/346-1	11.01.04	14:04	54° 44.18' S	0° 8.16' E	571,7	Agassiz trawl	surface
PS65/346-1	11.01.04	14:22	54° 43.95' S	0° 7.21' E	500,1	Agassiz trawl	AGT on ground
PS65/346-1	11.01.04	14:42	54° 43.83' S	0° 6.90' E	440,9	Agassiz trawl	AGT off ground
PS65/346-1	11.01.04	14:59	54° 43.73' S	0° 6.77' E	427,3	Agassiz trawl	on deck
PS65/347-1	11.01.04	15:13	54° 43.70' S	0° 6.85' E	450,2	Dredge, chain bag	surface
PS65/347-1	11.01.04	15:43	54° 43.67' S	0° 6.60' E	405,8	Dredge, chain bag	start dredging
PS65/347-1	11.01.04	16:00	54° 43.60' S	0° 6.49' E	413,2	Dredge, chain bag	stop dredging
PS65/347-1	11.01.04	16:10	54° 43.60' S	0° 6.63' E	445,6	Dredge, chain bag	on deck

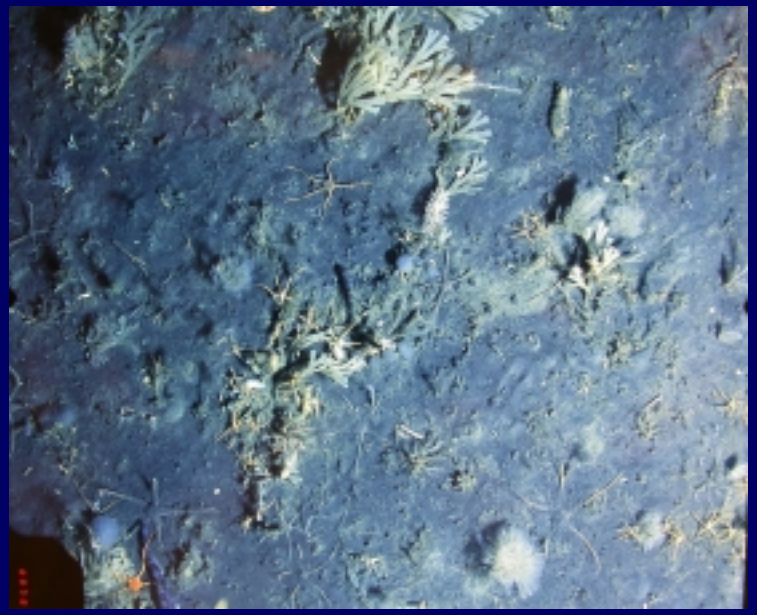

54:42.000 S
54:43.000 S
54:44.000 S
54:45.000 S
54:46.000 S
000:02.000 E
000:04.000 E
000:06.000 E
000:08.000 E
000:10.000 E
Ship : RV Polarstern
Institute : Alfred-Wegener-Institute
Bremerhaven, Germany
Expedition : ANT XX
CruiseCode : PS065
Station : 0014
Date : 24.11.2003
Time Start : 07:46
Gear : Multibeam Sonar
Hydrosweep
(all depths in meter)

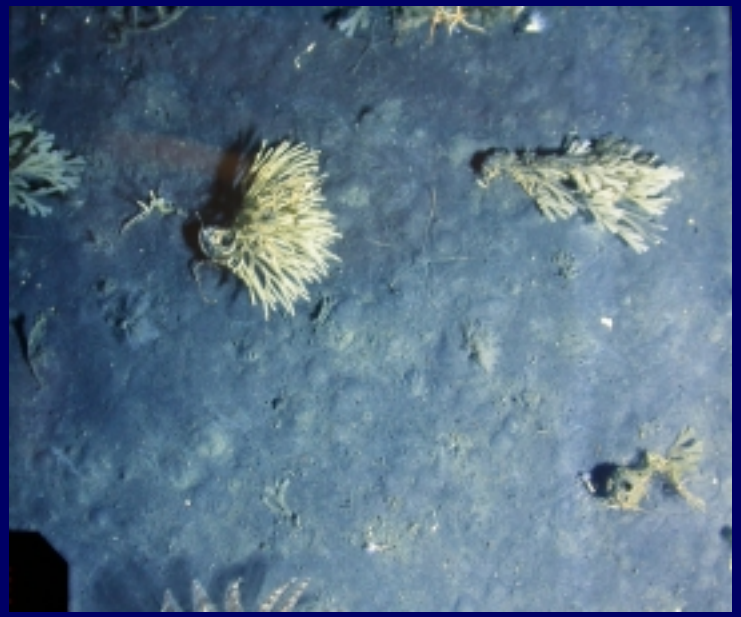

2000 m
1000 m
500 m
St. 31 & St.32 (100 m)
200 m
100 m
BOUVETOYA
St. 24 (240 m)
St. 22 (500 m)
-54°10´
-54°20´
-54°30´
-54°40´
2°50´
3°00´
3°10´
3°20´
3°30´
3°40´
3°50´

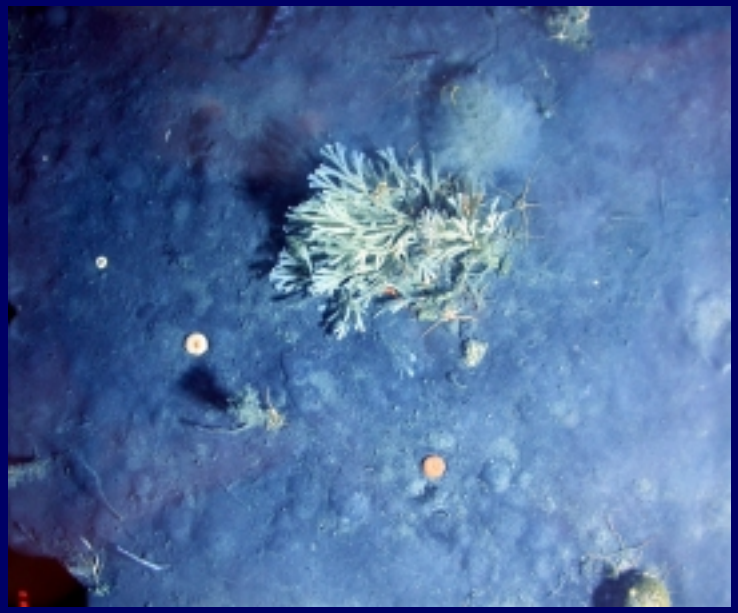
St. 31 & St. 32 (100 m)



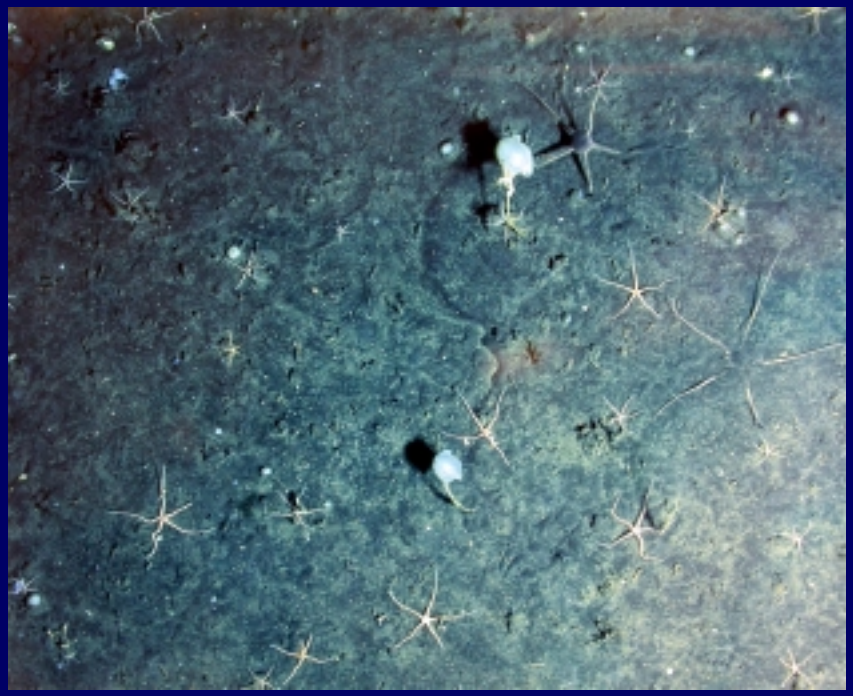
St. 24 (240m)

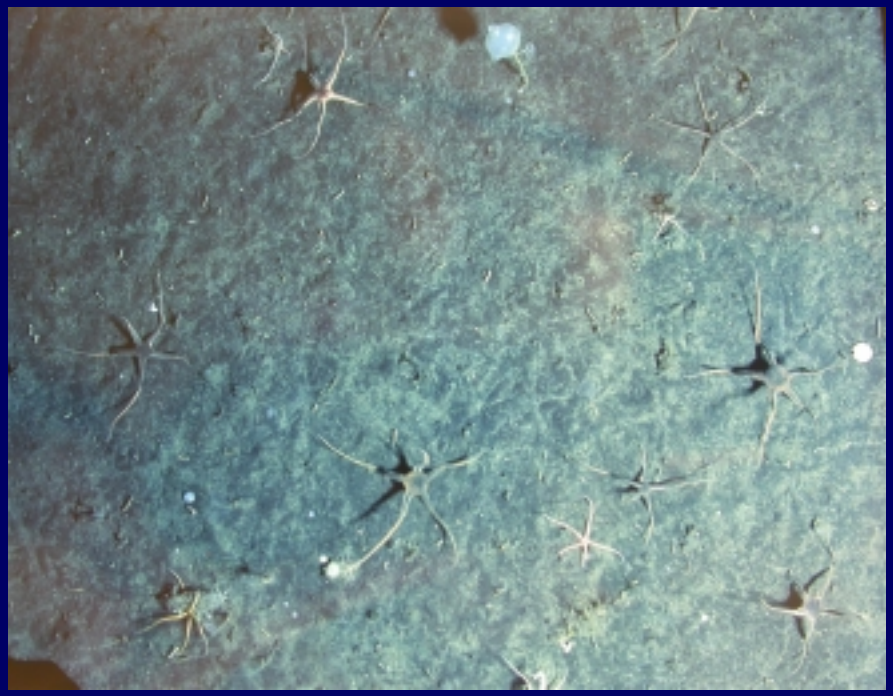






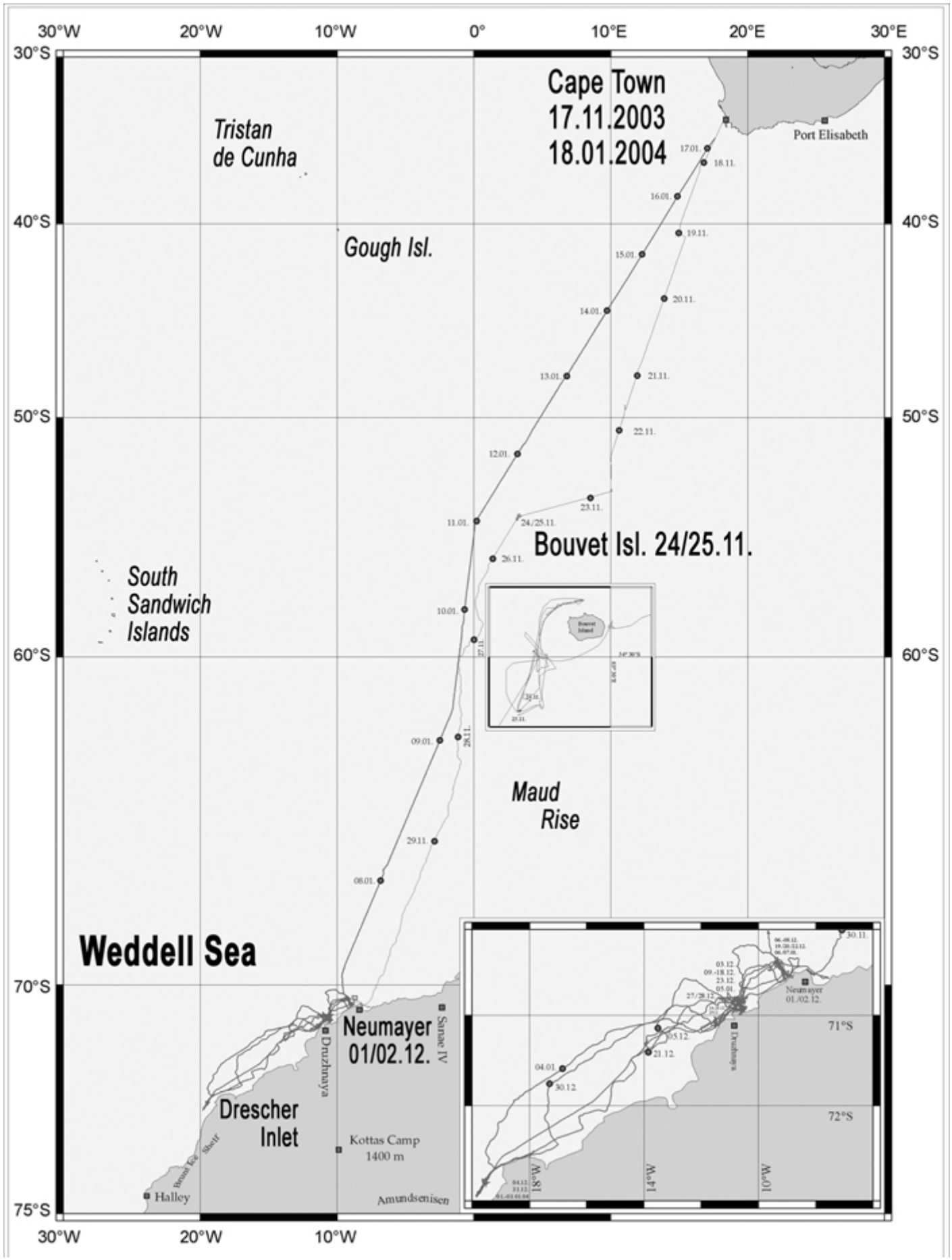
St. 22 (500m)

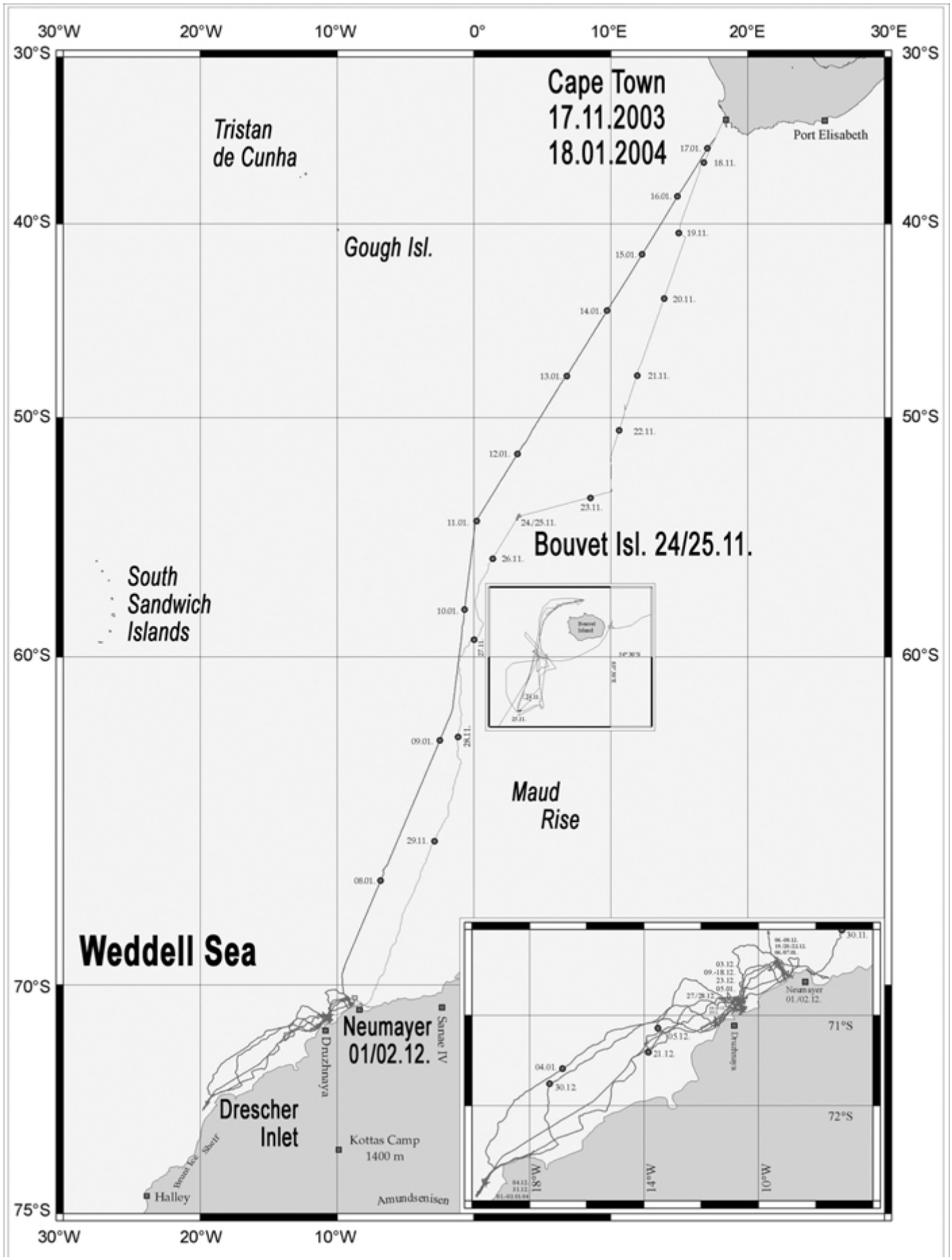




Legend to figures:

Sea-bed photographs at Bouvet Island show local dominance of mobile macrobenthic taxa, e.g. brittle stars (stn 022, 538 m, photo 051) and sea-cucumbers (stn 031, 115 m, photo 034) on coarse sediments. A more diverse and mixed benthic assemblage is depicted at stn 024 (245 m) where photo 107 shows sessile bryozoans, seastars, brittle stars, an ascidian, and a sponge. In close vicinity, only brittle stars, a seastar and a fish are visible on the soft bottom (stn 024, 245 m, photo 107b). At the Spiess seamount, on hard substratum (stn 343, 470 m), patches of sessile fauna (sponges and ascidians, photo 050) and one unknown stone crab of the genus *Paralomis* (photo 068, carapace length about 10 cm) were photographed. The stone crab is covered with gooseneck barnacles (Scalpellum sp.).


30°W
20°W
10°W
0°
10°E
20°E
30°E
30°S
40°S
50°S
60°S
70°S
75°S
Cape Town
17.11.2003
18.01.2004
Port Elisabeth
Tristan
de Cunha
Gough Isl.
South
Sandwich
Islands
Bouvet Isl. 24/25.11.
Maud
Rise
Weddell Sea
Neumayer
01/02.12.
Druzhnaya
Drescher
Inlet
Kottas Camp
1400 m
Halley
Amundsenisen
Sanae IV
Neumayer
01./02.12.
71°S
72°S
8°W
14°W
10°W


30°W
20°W
10°W
0°
10°E
20°E
30°E
30°S
40°S
50°S
60°S
70°S
75°S
Cape Town
17.11.2003
18.01.2004
Port Elisabeth
Tristan
de Cunha
Gough Isl.
South
Sandwich
Islands
Bouvet Isl. 24/25.11.
Maud
Rise
Weddell Sea
Neumayer
01/02.12.
Druzhnaya
Drescher
Inlet
Kottas Camp
1400 m
Halley
Amundsenisen
Brunt Ice Shelf
Sanae IV
71°S
72°S
8°W
14°W
10°W


ANT XX
24.11.03

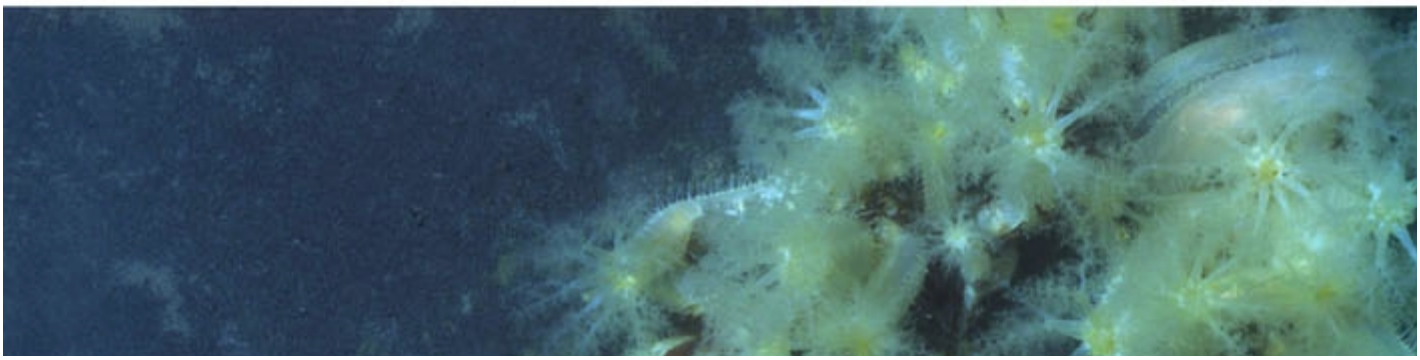

ANT XXI/2


ANT XXI-2
PS65-20
25.11.03
100 m
AGT3

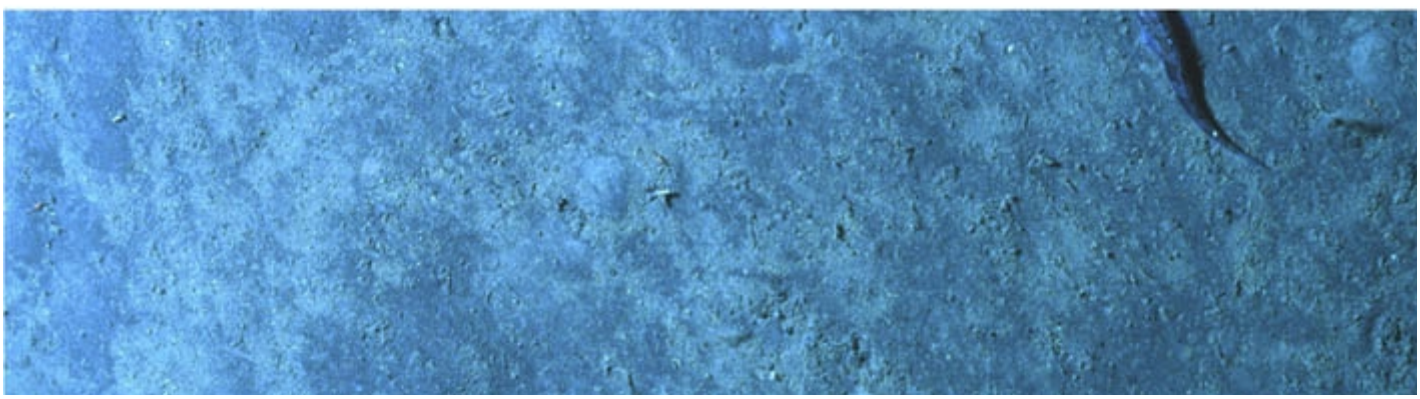

ANT XXI/2

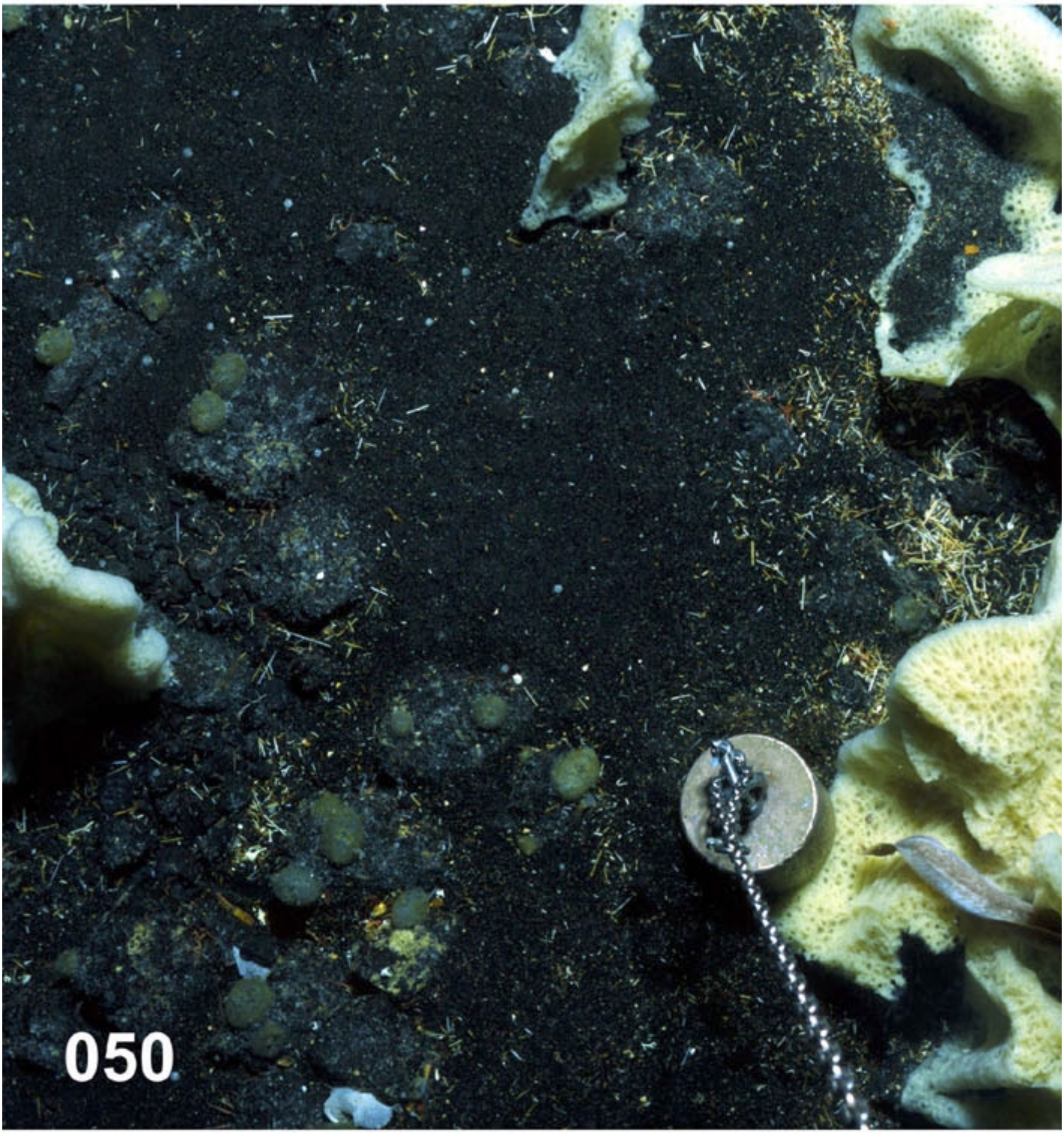

POLARSTERN


051




107




050