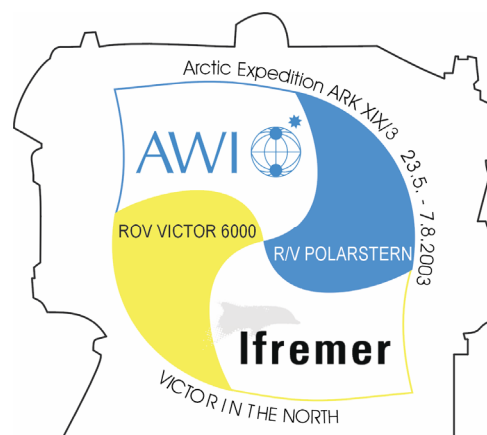


## Preface

The expedition ARK XIX/3 with the German icebreaking RV "Polarstern" was jointly organized between the Alfred Wegener Institute for Polar and Marine Research (AWI) and the Institut Français de Recherche pour l'Exploitation de la mer (IFREMER), the latter providing the unmanned deep-sea submersible "Victor 6000".

AWI and IFREMER offered this unique combination of infrastructure in 2003 to European scientists to permit access on advanced technology in marine research to a broader community. Therefore, this cruise was not only a milestone in the Franco-German cooperation but also an important contribution to the European marine research initiatives.

All still pictures and videos taken with "Victor 6000" during the expedition "VICTOR IN THE NORTH" are joint property of AWI and IFREMER with copyright by IFREMER. This material can be used for scientific purposes with the indication of IFREMER's copyright. It would be very much appreciated if the joint effort of AWI and IFREMER in organising the cruise ARK XIX/3 would be mentioned in the acknowledgements of any future publication written on the basis of material collected during the expedition. Any commercial or other than scientific use of either pictures or videos collected with "Victor 6000" needs the written formal approval of IFREMER.



The entire cruise report is also available in digital format on a CD-ROM attached to this booklet because many of the pictures and graphs are in colour. All hand written dive log files are permanently stored at the AWI. For a certain period of time the cruise diary will be still accessible via the internet at [www.polarstern-victor.de](http://www.polarstern-victor.de).

## Table of contents

The ARK XIX/3 expedition .....	4
A. 1 Itinerary and summary ARK XIX/3 .....	4
A. 2 Meteorological observations .....	21
A. 2.1 Weather situation during the cruise leg ARK XIX/3a.....	21
A. 2.2 Weather situation during the cruise leg ARK XIX/3b.....	22
A. 2.3 Weather situation during the cruise leg ARK XIX/3c.....	24
A. 3 The Remotely Operated Vehicle (ROV) "Victor 6000" .....	26
A. 3.1 High resolution seabed mapping with "Victor 6000" .....	28
A. 4 Cruise leg ARK XIX/3a.....	31
A. 4.1 Deep-water corals along the Irish continental margin: multidisciplinary studies on the Porcupine Seabight and Porcupine Bank – an introduction .....	31
A. 4.2 Microbathymetry surveys along deep-water canyons (Gollum Channel) in the Porcupine Seabight .....	33
A. 4.3 Sedimentary and hydrodynamic processes and interactions in the "Belgica Mound" province, Porcupine Seabight.....	44
A. 4.3.1 Introduction to the "Belgica Mound" setting .....	44
A. 4.3.2 Variation in sedimentary facies in the "Belgica mound" area .....	45
A. 4.3.3 Benthic Faunal Sampling in the Belgica mound province .....	50
A. 4.3.4 Influence of mound topography on water masses.....	72
A. 4.3.5 Photo lander deployment on the "Galway mound" .....	74
A. 4.3.6 Influence of hydrodynamics on sedimentary processes: "Belgica mounds" and "Moirra mounds".....	79
A. 4.4 Mound development on the Porcupine Bank: the influence of hydrodynamics on geological and biological processes.....	83
A. 4.4.1 Introduction to the carbonate mounds on the Porcupine Bank .....	83
A. 4.4.2 Biogeoprocesses along the "Twin mounds" transect .....	87
A. 4.4.3 Biogeoprocesses along the Giant Mound transect.....	94
A. 4.4.4 Biogeoprocesses along the "Scarp mounds" transects.....	104
A. 4.4.5 Biogeoprocesses along the "Hedge mounds" transects .....	115
A. 4.4.6 Biological and geological processes shaping the Porcupine Bank north-west margin .....	118
A. 4.5 Box-coring suspected carbonate mound targets.....	121
A. 4.6 Hydrodynamics and coral communities .....	123
A. 4.7 Water mass properties and intra-province variation.....	125
A. 4.8 Deep water coral ecology and fisheries impact in the Porcupine Seabight and NW Porcupine Bank.....	130
A. 4.8.1 Living deep-water coral distribution patterns in the Porcupine Seabight and NW of Porcupine Bank.....	130
A. 4.8.2 Alcyonacean forests of Ireland's continental margin .....	131
A. 4.8.3 Scientific Fisheries Echosounder Survey .....	140
A. 4.8.4 Fisheries Impact Studies on the Porcupine Seabight and Bank .....	143
A. 4.9 Modelling biodiversity patterns and dynamics in coral assemblages: a feasibility study.....	147
A. 4.10 Feasibility study on live ROV video transmission.....	148

B. 1	Cruise leg ARK XIX/3b: An introduction into multidisciplinary investigations on methane fluxes and related processes at the Håkon Mosby Mud Volcano .....	153
B. 2	Microbathymetry on ROV "Victor 6000" .....	158
B. 3	Geochemistry, geophysics and sedimentology of the Håkon Mosby Mud Volcano .....	164
B. 3.1	<i>In-situ</i> temperature measurements at Håkon Mosby Mud Volcano .....	164
B. 3.1.1	Heat probe measurements down to 3 m depth .....	164
B. 3.1.2	Shallow measurements with mini temperature lance .....	168
B. 3.1.3	Temperature measurements with long gravity corers .....	169
B. 3.2	Physical properties of gravity cores .....	171
B. 3.3	PARASOUND sediment echosounding .....	175
B. 3.4	Marine Geology .....	177
B. 4	Water column investigations above the Håkon Mosby Mud Volcano .....	186
B. 5	Biological investigations at the Håkon Mosby Mud Volcano (HMMV) .....	190
B. 5.1	Geomicrobiology of sediments and bottom waters of the Håkon Mosby Mud Volcano .....	190
B. 5.2	Microscale analysis of the surface sediments .....	200
B. 5.3	Methane in gas hydrate bearing sediments – turnover rates and microorganisms (MUMM).....	212
B. 5.4	Video Mosaicking on Håkon Mosby Mud Volcano .....	215
B. 5.5	Mapping of (fish) habitats at the Håkon Mosby Mud Volcano .....	220
B. 5.6	The macro- and microscale patchiness of meiobenthos associated with the Håkon Mosby Mud Volcano.....	224
C.	Cruise leg ARK XIX/3c: Interdisciplinary research at the deep-sea long-term station AWI-"Hausgarten" – an Introduction.....	228
C. 1	Particle flux and phytoplankton .....	230
C. 2	Geochemical and hydrodynamic investigations at the sediment-water interface .....	233
C. 3	Sedimentation at the western Svålbard margin .....	236
C. 4	Marine Geology.....	242
C. 5	Ice-rafted material in box cores from the eastern Fram Strait .....	251
C. 6	Debris on the seafloor at "Hausgarten" .....	260
C. 7	Activity and biomass of the small biota .....	263
C. 8	Notes on benthic mega-/epifauna and small-scale habitat diversity in the long-term observation area .....	263
C. 9	Small- and large-scale distribution of macrobenthic invertebrates .....	266
C. 10	Vertical distribution of benthic fauna in sediments along the water depth gradient.....	267
C. 11	Distribution patterns and carbon demand of epibenthic megafauna.....	269
C. 12	Temporal variations in the meiobenthos along a bathymetrical gradient ("Hausgarten", Arctic): impact of climate oscillations .....	277
C. 13	Biodiversity, molecular phylogeny and trophic ecology of amphipod crustaceans in the polar deep sea: a bipolar comparison .....	281
C. 14	Experimental approaches to study causes and effects of environmental gradients at the deep seafloor .....	285

Appendix

D.	Station list .....	289
E.	Participating institutes / companies .....	346
F.	Participants .....	350
G.	CD-ROM	

C. 6 Debris on the seafloor at “Hausgarten”  
Galgani, F, Lecornu, F.

*Introduction*

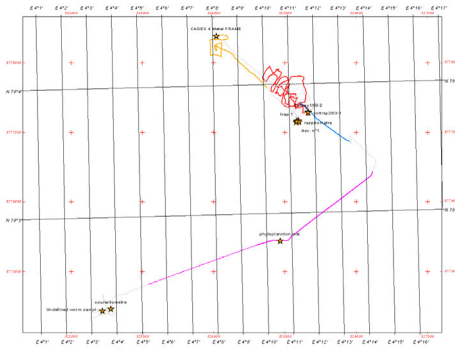
The presence of litter has been evaluated since 1992 along the European coasts at different locations (Baltic Sea, North Sea, Celtic Sea, French coasts and Adriatic Sea). Some high densities were found in different areas especially where the currents are eddying and in coastal canyons where they can accumulate. Fram Strait is of special interest because of the currents enabling the transportation of debris through the different water masses such as the Norwegian and the north Atlantic currents (deep and intermediate) coming from the North Sea and along the Norwegian coast. Beside, the presence of geomorphological factors in Fram Strait that could lead to an accumulation of debris is of special interest. The Molloy Deep is about 5500 m deep and could retain debris.

In this context, debris were observed and counted during dives of the ROV "Victor 6000" to demonstrate the presence of debris in “Hausgarten”. In addition, dives from the 1999 "Polarstern" expedition with the ROV onboard were also analysed in order to compare data and demonstrate the expected accumulation of debris in the Molloy deep.

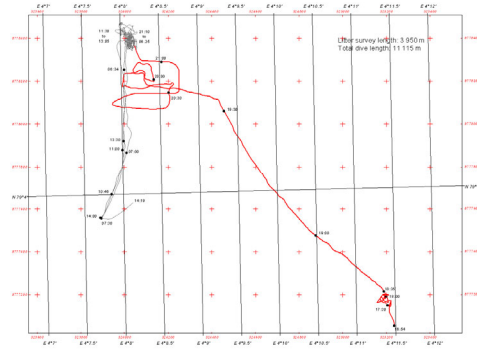
*Methods*

Litters were counted by observers during 5 dives (No.s 227, 228, 229, 230 and 232) performed during the ARK XIX/3c cruise (Fig. C6-1). Most of the dives were in central “Hausgarten”, except dive 230 located at “Hausgarten”-South. Dives data were computed using the ADELIE software (F. Lecornu, IFREMER). Counts were performed only during survey (routes) from the "Victor 6000" ROV with distance on the bottom varying from 1.150 to 12.670 meters. Densities of litters were calculated per km route. Additional data were obtained from the 1999 ARK XIV cruise.

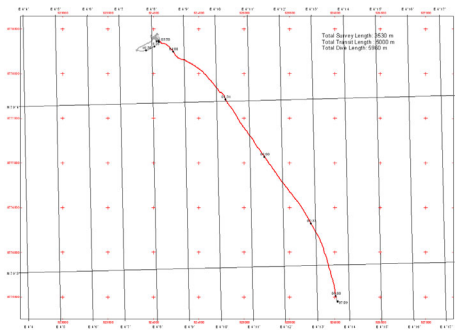
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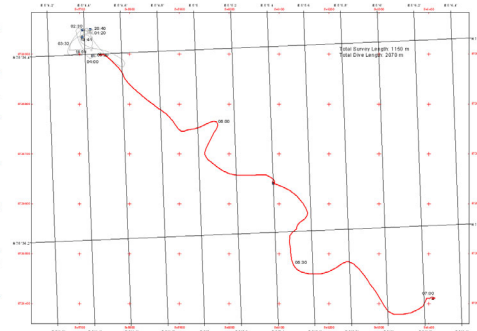
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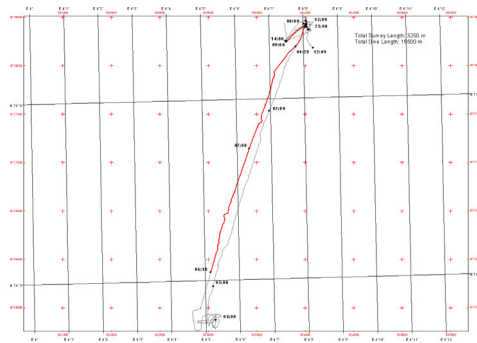


Fig. C6-1: Routes of the ROV dives 227, 228, 229, 230 and 232 during ARK XIX/3c; surveys for litters were performed only along ROV transits.

## Results

A summary of the results is given in Tab. C6-1. Total amount of debris found during the 5 dive was 17 for a total distance of 25.020 m. Density per km was ranging from 0.20 to 0.92 with a total percentage of plastic of 76 %.

Tab. C6-1: Litter on transits of the ROV "Victor 6000" during dives at AWI-"Hausgarten".

Dive	Date	Position (lat N / lon E)	Depth (m)	Transits (km)	Debris (no. of items)	plastics	debris/ km
102	30/06/1999	79 04.0 / 04 10.0	2365-2517	15.42	1	0	0.06
103	01/07/1999	79 03.8 / 04 11.1	2392-2458	1.89	1	1	0.52
104	03/07/1999	79 07.0 / 02 50.0	5339-5552	6.77	15	13	2.21
105	08/07/1999	79 28.1 / 03 00.1	2813-3410	13.95	7	2	0.50
106	10/07/1999	74 19.7 / 10 37.8	3154-3167	14.10	5	1	0.35
227	22/07/2003	79 03.8 / 04 11.6	2395-2453	12.67	9	7	0.71
228	24/07/2003	79 04.0 / 04 05.0	2415-2445	3.95	3	2	0.75
229	26/07/2003	79 04.0 / 04 10.0	2336-2485	5.00	1	1	0.20
230	29/07/2003	78 36.4 / 04 05.0	2284-2294	1.15	1	1	0.86
232	31/07/2003	79 04.0 / 04 07.0	2334-2344	3.25	3	2	0.92

## Discussion and Conclusions

The density of litters at "Hausgarten" is low when compared to some European basins (Baltic Sea, North Sea, NW Mediterranean and Adriatic Sea) but significant since such densities remains in the same range than some European deep sea and costal areas (Celtic Sea, Bay of Seine, Bay of Biscay). Plastic account for the larger part of debris as commonly observed in other European areas. Analysis of dive 104 (1999) demonstrate a higher density of debris in the Molloy Deep. From these results, we can conclude that debris is present at "Hausgarten" and could accumulate on deeper part of the area. Extrapolation to the entire Fram Strait (76.40 N/ 80.50 N; between Svålbard and Greenland) is not possible with insufficient data but could lead to total amount of debris of more than 10 millions.