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Short Cruise Report RV METEOR M86-1B

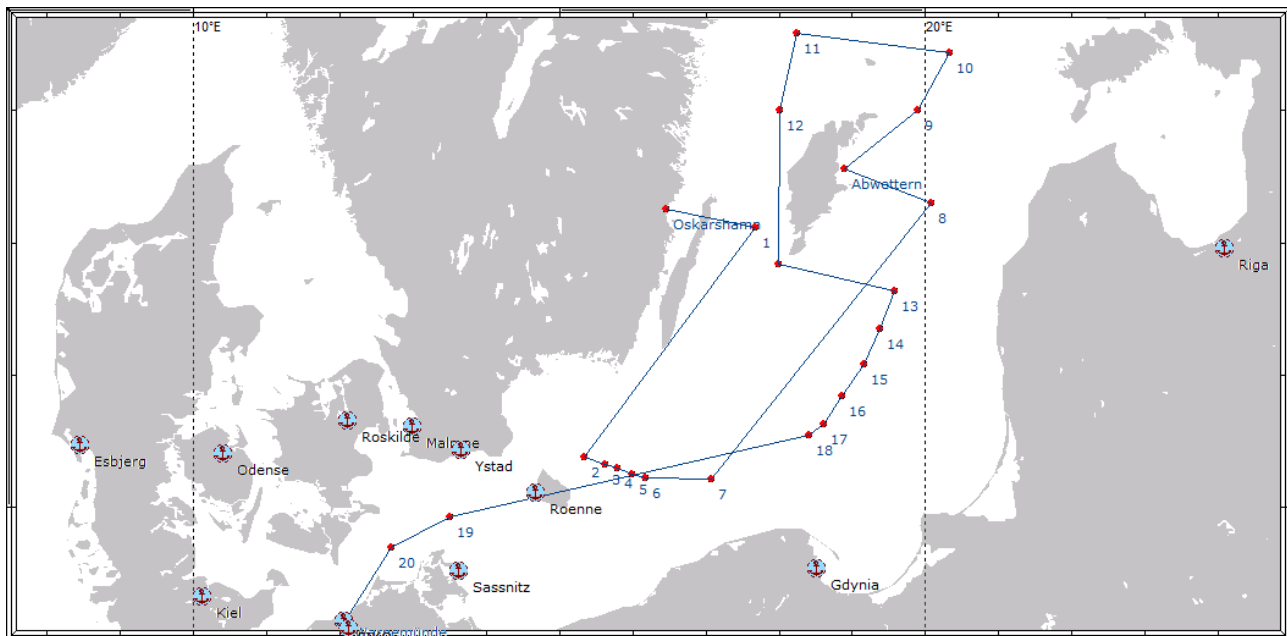
Oskarshamn, Sweden – Rostock, Germany

23.11.2011 - 03.12.2011

Chief Scientist: Prof. Dr. Klaus Jürgens

Captain: Stefan Schwarze

RV Meteor cruise M86-1B, ship track and stations



Objectives

Cruise M86-1B was a direct continuation of the approaches started in the leg before (M86-1A) but with an additional research programme in the anoxic Deeps of the central Baltic Sea. The natural gradients in salinity and oxygen of the Baltic Sea, with strong reactions to climate change and anthropogenic activities, can be used as a model system to examine basic ecological processes and their variability in marine ecosystems. The extended gradients in primary (topography, energy, salinity) and secondary (organisms, matter flux, oxygen, nutrients, sediments) environmental properties as a result of different dynamical processes. This and the previous cruise investigated the impacts of salinity and redox gradients on degradation of dissolved organic carbon of terrestrial origin (tDOC) and the interaction between microbial diversity and DOC composition. Both parameters will be examined at high-resolution using novel methods of mass spectrometry, high-throughput-sequencing and transcriptomics (for assessing gene expression) besides a range of routine microbiological parameters. The approaches included both ship-board experiments with microcosms containing water from three different stations of the horizontal salinity gradient (Fig. 1), and in situ assessments of microbial communities, DOC composition and stable isotope signatures of inorganic and organic components along the transect across the whole Baltic Sea from the Skagerrak to the Bothnian Bay.



Figure 1. Map of the Baltic Sea indicating the three sampling stations and the Kalix river.

The experiments, which were set up on RV Meteor during cruise M86-1A in the climate rooms, were further samples for DOC, nutrient chemistry and microbial parameters during this cruise. Altogether seven different research groups were simultaneously monitoring the experiments in order to investigate the influence of salinity on the tDOC degradation dynamics, combining different high resolution methods for the characterization of DOC and microorganisms, including Bacteria, Archaea and Fungi.

From these investigations we expect novel, comprehensive insights into the fate of tDOC exported into the oceans, its degradability and mechanisms of decomposition. Additionally, detailed process measurements were conducted on carbon and nitrogen biogeochemistry in the hypoxic regions of the central basins, as these are expected to play a crucial role in overall element cycles.

During the cruise the following major aims were in focus:

1. Assessment of structure and (selected) functions of pelagic prokaryotic communities (Bacteria, Archaea) and shifts along the salinity and redox gradients. It provides the general background for the more specific question of decomposition dynamics of imported terrigenous compounds.
2. Quantification, chemical characterization and decomposition dynamics of discharged tDOC from northern (arctic) soils in relation to microbial diversity, in order to assess the decomposition capacity for organic matter, particularly the degradation potential for introduced terrestrial carbon compounds.
3. The identification of microbial key organisms and the relation to their functional role within the carbon and nitrogen cycles, characteristic for the vertical pelagic oxygen gradients of the central Baltic (Gotland Basin, Landsort Deep)

The overall aim of these studies is to gain a comprehensive understanding of the effect of imported terrigenous and autogenous organic material on microbial decomposition processes within the salinity and redox gradients of the Baltic Sea.

Besides these major goals of both cruise legs (M86-1A and B) there are a number of specific research issues that were particularly dealt with in M86-1B:

- Quantification of methane fluxes and oxidation rates in the deep, anoxic basins
- Measurements of nitrification rates and identifying the main responsible microorganisms
- Development and testing of new sensors for assessing manganese distribution and transformations in the redox gradients
- Investigating the role of recently identified bacteria in sulfur transformations within the redox gradients
- Obtaining a first survey of microbial eukaryotes (protozoans) in different sediment types along the salinity gradient
- Sampling long-term monitoring stations, also for DOC and microbial parameters, for which background basic characteristics are measured within the Helcom monitoring program

Narrative

In the morning of the 24th November RV Meteor left, with a partial exchange of scientific and technical personnel, the port of Oskarshamn in Sweden. As the weather conditions drastically changed from cruise M86-1A to M86-1B, with the appearance of stormy winds which prevailed until the end of the cruise, the original cruise track had to be continuously adjusted to these conditions, including even a nearly 2-day break in the programme during the most intensive storms, when shelter in front of the island Gotland was required. However, all other planned samplings with CTD rosette and multicorer could proceed even at wind intensities of 7-8 bft. Because of the adjustments, the cruise started with the stations south of the Gotland Basin and approaching Gotland Deep, a major target for intensive process studies, from this side. The second major site for samplings and process studies was the Landsort Deep, close to the Swedish coast. The focus in both Deeps was on high-resolution sampling of the water column, especially of the redox gradient and the oxic-anoxic interface by means of CTD-Rosette. At these two sites also incubations experiments for assessing nitrification and chemoautotrophic production as well as casts with the newly developed manganese sensor were conducted. The continuous measurements of methane and carbon dioxide in surface waters, as well as regular samples for isotope analysis of dissolved inorganic carbon (DIC), that were started on leg M-86-1A were continued.

At several stations in the central Baltic Sea, surface sediment samples were obtained with the Multicorer (MUC), and slices frozen for later molecular analysis of the microbial communities.

In the frame of the ATKiM project („Abbaubarkeit von arktischem, terrigenem Kohlenstoff im Meer“ - decomposition of terrigenous carbon compounds in the sea), the extensive samplings of the water column and the measurements of the experimental incubations in the climate chambers were continued.

After finishing the process studies in the central Baltic Sea, sampling stations continued until short before Warnemünde. Due to the upcoming of another heavy storm, the journey ended already on December 3, arriving safely in the port of Rostock.

Acknowledgements

A major part of the scientific program of the cruise is embedded in the WGL-PAKT Project ATKiM funded by the German federal and regional governments. Funding comes also from EU-Bonus projects and grants from the German Research Funding Agency - DFG and the BMBF. We are grateful to the "DFG - Senatskommission für Ozeanographie" and the "Leitstelle Deutsche Forschungsschiffe" for making this cruise happen. We also acknowledge the permissions of Denmark, Sweden, Poland, and Latvia to conduct research in their territorial waters of the Baltic Sea. Finally, we thank Captain Stefan Schwarze and his crew for the overall success of the cruise M86-1B.

Teilnehmerliste

1	Jürgens, Klaus	Fahrtleiter / <i>Chief Scientist</i>	IOW
2	Labrenz, Matthias	Microbiological sampling	IOW
3	Kreuzer, Lars	Autoanalyzer, nutrient chemistry	IOW
4	Falk , Marianne	Nutrients/oxygen	MNB
5	Lage, Susanne	Nutrients/oxygen	IOW
6	Wlost, Peter	Instrumentation/CTD	IOW
7	Donath, Jan	Instrumentation/CTD	IOW
8	Meeske, Christian	Radioisotopes/respiration	IOW
9	Struck, Ulrich	Nat. Isotopes	MNB
10	Marina Nazarova	Nat. isotopes	MNB
11	Kießlich, Katrin	Sampling, filtrations	IOW
12	Maneck, . Markus	DOC chemistry	IOW/ ICBM
13	Julia Simon	Culturing	DSMZ
14	Henke, Petra	Culturing	DSMZ
15	Rieck, Angelika	Microbiology/experiments	IGB
16	Erdmann, Sabrina	Nutrients/oxygen/DOC	HRO
17	Berg, Carlo	Ammonia oxidation, microbiology	IOW
18	Becker, Katja	Radioisotopes	IOW
19	Glaubitz, Sabine	Microbiological sampling	IOW
20	Thomas, Stine	Methane dynamics	IOW
21	Jakobs, Gunnar	Methane dynamics	IOW
22	Meyer, David	Mn sensor + nutrient chem.	IOW
23	Klier, Julia	Protozoa, sediment+water sampling	IOW
24	Hoffmann, Ralf	Protozoa, sediment+water sampling	IOW
25	Brinks, Erik	Sampling, filtrations	IOW
26	Woelk, Jana	Sampling, filtrations	IOW
27	Knuth, Edmund	Meteorology	DWD

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Station list M86-1B

Date	Time	Board Station	IOW station	IOW index	Latitude	Longitude	Depth	Gear	Action	Remark
23.11.2011	11:09	ME861/1285-1	TF 245	1	57° 7,04' N	17° 40,01' E	106,4	CTD/RO	zu Wasser	W2
	11:20	ME861/1285-1			57° 7,04' N	17° 40,01' E	106,6	CTD/RO	auf Tiefe	SLmax=106m
	11:30	ME861/1285-1			57° 7,05' N	17° 40,01' E	107,1	CTD/RO	an Deck	
	11:48	ME861/1285-2			57° 7,04' N	17° 40,01' E	106,3	CTD/RO	zu Wasser	W2
	12:07	ME861/1285-2			57° 7,04' N	17° 40,01' E	106,9	CTD/RO	auf Tiefe	SLmax=106m
	12:15	ME861/1285-2			57° 7,04' N	17° 40,01' E	106,2	CTD/RO	an Deck	
	12:29	ME861/1285-3			57° 7,04' N	17° 40,02' E	106,2	CTD/RO	zu Wasser	W2
	12:45	ME861/1285-3			57° 7,04' N	17° 40,01' E	107,4	CTD/RO	auf Tiefe	SLmax=103m
12:53	ME861/1285-3			57° 7,04' N	17° 40,02' E	106,4	CTD/RO	an Deck		
24.11.2011	02:05	ME861/1286-1	TF 200	2	55° 23,09' N	15° 19,98' E	85	CTD/RO	zu Wasser	W2
	02:21	ME861/1286-1			55° 23,03' N	15° 20,04' E	84,6	CTD/RO	auf Tiefe	SLmax=83m
	02:28	ME861/1286-1			55° 23,01' N	15° 20,02' E	84,6	CTD/RO	an Deck	
	02:41	ME861/1286-2			55° 23,00' N	15° 20,00' E	84,8	CTD/RO	zu Wasser	W2
	02:55	ME861/1286-2			55° 23,00' N	15° 20,00' E	85,4	CTD/RO	auf Tiefe	SLmax=83m
	03:02	ME861/1286-2			55° 23,00' N	15° 20,00' E	84,8	CTD/RO	an Deck	
	04:16	ME861/1287-1	TF 211	3	55° 19,82' N	15° 36,99' E	95,4	CTD/RO	zu Wasser	W2
	04:30	ME861/1287-1			55° 19,81' N	15° 36,93' E	94,1	CTD/RO	auf Tiefe	SLmax=91m
	04:36	ME861/1287-1			55° 19,80' N	15° 36,91' E	95,1	CTD/RO	an Deck	
	05:38	ME861/1288-1	TF 212	4	55° 18,15' N	15° 47,91' E	94,7	CTD/RO	zu Wasser	W2
	05:54	ME861/1288-1			55° 18,12' N	15° 47,84' E	95,3	CTD/RO	auf Tiefe	SLmax=92m
	06:02	ME861/1288-1			55° 18,11' N	15° 47,82' E	93,8	CTD/RO	an Deck	
	07:24	ME861/1289-1	TF213	5	55° 15,01' N	15° 59,01' E	88,6	CTD/RO	zu Wasser	W2
	07:37	ME861/1289-1			55° 15,01' N	15° 59,01' E	89,1	CTD/RO	auf Tiefe	SLmax= 86 m
	07:42	ME861/1289-1			55° 15,01' N	15° 59,01' E	88,8	CTD/RO	an Deck	
	08:07	ME861/1289-2			55° 15,01' N	15° 59,01' E	87,3	CTD/RO	zu Wasser	W2
	08:17	ME861/1289-2			55° 15,01' N	15° 59,01' E	86,5	CTD/RO	auf Tiefe	SLmax=86m
	08:26	ME861/1289-2			55° 15,01' N	15° 59,01' E	89,1	CTD/RO	an Deck	
08:48	ME861/1289-3			55° 15,01' N	15° 59,01' E	89,1	CTD/RO	zu Wasser	W2	
09:02	ME861/1289-3			55° 15,01' N	15° 59,01' E	89,3	CTD/RO	auf Tiefe	SLmax= 86 m	

09:08	ME861/1289-3			55° 15,01' N	15° 59,01' E	89,1	CTD/RO	an Deck	
09:43	ME861/1289-4			55° 15,01' N	15° 59,01' E	86,6	CTD/RO	zu Wasser	W2
09:56	ME861/1289-4			55° 15,01' N	15° 59,01' E	89	CTD/RO	auf Tiefe	SLmax= 86 m
10:02	ME861/1289-4			55° 15,01' N	15° 59,01' E	87,3	CTD/RO	an Deck	
10:07	ME861/1289-5			55° 15,01' N	15° 59,01' E	88,8	PLA	zu Wasser	3 x per Hand
10:13	ME861/1289-5			55° 15,02' N	15° 59,01' E	87,2	PLA	an Deck	
10:14	ME861/1289-6			55° 15,02' N	15° 59,01' E	87,1	PLA	zu Wasser	W4
10:26	ME861/1289-6			55° 15,01' N	15° 59,01' E	89	PLA	auf Tiefe	SLmax=80m
10:34	ME861/1289-6			55° 15,01' N	15° 59,01' E	88,4	PLA	an Deck	
10:40	ME861/1289-7			55° 15,01' N	15° 59,01' E	86,5	PLA	zu Wasser	W4
10:45	ME861/1289-7			55° 15,01' N	15° 59,01' E	89	PLA	auf Tiefe	SLmax= 28 m
10:50	ME861/1289-7			55° 15,01' N	15° 59,01' E	89,1	PLA	an Deck	
10:55	ME861/1289-8			55° 15,01' N	15° 59,01' E	88,8	PLA	zu Wasser	W4
11:04	ME861/1289-8			55° 15,01' N	15° 59,01' E	89,2	PLA	an Deck	SLmax=28m
11:18	ME861/1289-9			55° 15,01' N	15° 59,01' E	89	MUC	zu Wasser	W11
11:24	ME861/1289-9			55° 15,01' N	15° 59,01' E	89,1	MUC	am Grund	SLmax=112m
11:30	ME861/1289-9			55° 15,01' N	15° 59,01' E	89,1	MUC	an Deck	
11:39	ME861/1289-10			55° 15,01' N	15° 58,99' E	88,7	MUC	zu Wasser	W11
11:45	ME861/1289-10			55° 15,01' N	15° 58,99' E	88,9	MUC	am Grund	SLmax=106m
11:52	ME861/1289-10			55° 15,01' N	15° 58,99' E	86,2	MUC	an Deck	
12:43	ME861/1290-1	TF 221	6	55° 13,29' N	16° 10,06' E	78,1	CTD/RO	zu Wasser	W11
12:54	ME861/1290-1			55° 13,29' N	16° 10,03' E	78,6	CTD/RO	auf Tiefe	SLmax=74m
13:03	ME861/1290-1			55° 13,29' N	16° 10,03' E	79	CTD/RO	an Deck	
13:17	ME861/1290-2			55° 13,29' N	16° 10,03' E	78,5	MUC	zu Wasser	W11
13:23	ME861/1290-2			55° 13,29' N	16° 10,03' E	78,2	MUC	am Grund	SLmax=86m
13:28	ME861/1290-2			55° 13,29' N	16° 10,03' E	78,6	MUC	an Deck	
13:38	ME861/1290-3			55° 13,29' N	16° 10,03' E	78,7	MUC	zu Wasser	W11
13:44	ME861/1290-3			55° 13,29' N	16° 10,03' E	78,2	MUC	am Grund	SLmax=86m
13:50	ME861/1290-3			55° 13,29' N	16° 10,03' E	78,4	MUC	an Deck	
16:48	ME861/1291-1	TF 222	7	55° 13,33' N	17° 4,16' E	84,5	CTD/RO	zu Wasser	W2
17:01	ME861/1291-1			55° 13,31' N	17° 4,09' E	84	CTD/RO	auf Tiefe	SLmax=88m
17:14	ME861/1291-1			55° 13,31' N	17° 4,03' E	84,8	CTD/RO	an Deck	
17:32	ME861/1291-2			55° 13,30' N	17° 4,00' E	84,3	CTD/RO	zu Wasser	W2
17:38	ME861/1291-2			55° 13,30' N	17° 4,00' E	84,6	CTD/RO	auf Tiefe	SLmax=10m

	17:42	ME861/1291-2			55° 13,30' N	17° 4,00' E	84,4	CTD/RO	an Deck	
25.11.2011	08:38	ME861/1292-1	TF 271 - At3	8	57° 19,22' N	20° 2,99' E	232,8	CTD/RO	zu Wasser	W2
	09:00	ME861/1292-1			57° 19,20' N	20° 3,01' E	232,4	CTD/RO	auf Tiefe	SLmax= 229 m
	09:18	ME861/1292-1			57° 19,21' N	20° 3,01' E	231,3	CTD/RO	auf Tiefe	SLmax= 145 m
	09:28	ME861/1292-1			57° 19,20' N	20° 3,01' E	231,6	CTD/RO	an Deck	
	10:07	ME861/1292-2			57° 19,20' N	20° 3,01' E	232,6	CTD/RO	zu Wasser	W2
	10:30	ME861/1292-2			57° 19,20' N	20° 3,01' E	230,8	CTD/RO	auf Tiefe	SLmax= 232 m
	10:47	ME861/1292-2			57° 19,20' N	20° 3,01' E	232,7	CTD/RO	an Deck	
	11:10	ME861/1292-3			57° 19,20' N	20° 3,01' E	233,3	CTD/RO	zu Wasser	W2
	11:17	ME861/1292-3			57° 19,20' N	20° 3,01' E	234	CTD/RO	auf Tiefe	SLmax=39m
	11:21	ME861/1292-3			57° 19,20' N	20° 3,01' E	232,8	CTD/RO	an Deck	
	11:52	ME861/1292-4			57° 19,20' N	20° 3,01' E	232,8	CTD/RO	zu Wasser	W2
	12:03	ME861/1292-4			57° 19,20' N	20° 3,01' E	232,1	CTD/RO	auf Tiefe	SLmax=100m
	12:09	ME861/1292-4			57° 19,20' N	20° 3,01' E	231,3	CTD/RO	an Deck	
	13:24	ME861/1292-5			57° 19,20' N	20° 3,01' E	233,4	CTD/RO	zu Wasser	W2
	13:30	ME861/1292-5			57° 19,20' N	20° 3,01' E	232,8	CTD/RO	auf Tiefe	SLmax=108m
	13:35	ME861/1292-5			57° 19,20' N	20° 3,01' E	233,5	CTD/RO	an Deck	
	13:52	ME861/1292-6			57° 19,20' N	20° 3,01' E	231,3	PLA	zu Wasser	per Hand
	14:07	ME861/1292-6			57° 19,20' N	20° 3,01' E	233,1	PLA	an Deck	
	14:18	ME861/1292-7			57° 19,20' N	20° 3,01' E	230,7	CTD/RO	zu Wasser	W2
	14:33	ME861/1292-7			57° 19,20' N	20° 3,01' E	230,3	CTD/RO	auf Tiefe	SLmax=232m
	14:47	ME861/1292-7			57° 19,20' N	20° 3,01' E	233,9	CTD/RO	an Deck	
	15:07	ME861/1292-8			57° 19,20' N	20° 3,01' E	233,2	CTD/RO	zu Wasser	w2
	15:52	ME861/1292-8			57° 19,20' N	20° 3,01' E	229,8	CTD/RO	auf Tiefe	SLmax=198m
	16:47	ME861/1292-8			57° 19,20' N	20° 3,01' E	233,6	CTD/RO	an Deck	
	18:34	ME861/1292-9			57° 19,20' N	20° 3,00' E	232,7	CTD/RO	zu Wasser	W2
	18:56	ME861/1292-9			57° 19,20' N	20° 3,00' E	232,8	CTD/RO	auf Tiefe	SLmax=147m
	19:03	ME861/1292-9			57° 19,20' N	20° 3,00' E	232,9	CTD/RO	an Deck	
	20:21	ME861/1292-10			57° 19,20' N	20° 3,00' E	231,9	CTD/RO	zu Wasser	w2
20:32	ME861/1292-10			57° 19,20' N	20° 3,00' E	233,2	CTD/RO	auf Tiefe	SLmax= 105 m	
20:44	ME861/1292-10			57° 19,20' N	20° 3,00' E	233,8	CTD/RO	an Deck		
21:30	ME861/1292-11			57° 19,20' N	20° 3,00' E	232,4	CTD/RO	zu Wasser	W2	
21:46	ME861/1292-11			57° 19,20' N	20° 3,00' E	231,4	CTD/RO	auf Tiefe	SLmax= 138 m	
21:53	ME861/1292-11			57° 19,20' N	20° 3,00' E	232,4	CTD/RO	an Deck		

	22:37	ME861/1292-12			57° 19,20' N	20° 3,00' E	232	CTD/RO	zu Wasser	W2
	22:51	ME861/1292-12			57° 19,20' N	20° 3,00' E	231,7	CTD/RO	auf Tiefe	SLmax= 233 m
	23:02	ME861/1292-12			57° 19,20' N	20° 3,00' E	230,2	CTD/RO	an Deck	
	23:54	ME861/1292-13			57° 19,20' N	20° 3,00' E	232,2	CTD/RO	zu Wasser	W2
26.11.2011	00:07	ME861/1292-13			57° 19,20' N	20° 3,00' E	232,6	CTD/RO	auf Tiefe	SLmax=122m
	00:13	ME861/1292-13			57° 19,20' N	20° 3,00' E	232,4	CTD/RO	an Deck	
	01:11	ME861/1292-14			57° 19,20' N	20° 3,00' E	231,2	CTD/RO	zu Wasser	W2
	01:58	ME861/1292-14			57° 19,20' N	20° 3,00' E	230,8	CTD/RO	auf Tiefe	SLmax=200m
	02:43	ME861/1292-14			57° 19,20' N	20° 3,00' E	232,3	CTD/RO	an Deck	
	07:30	ME861/1292-15			57° 19,20' N	20° 3,00' E	232,7	CTD/RO	zu Wasser	W2
	07:53	ME861/1292-15			57° 19,21' N	20° 3,00' E	231,7	CTD/RO	auf Tiefe	SLmax= 231 m
	08:05	ME861/1292-15			57° 19,20' N	20° 3,00' E	232,4	CTD/RO	an Deck	
	11:18	ME861/1292-16			57° 19,21' N	20° 3,00' E	231,4	CTD/RO	zu Wasser	W2
	11:27	ME861/1292-16			57° 19,20' N	20° 3,00' E	231,5	CTD/RO	auf Tiefe	SLmax=59m
	11:32	ME861/1292-16			57° 19,21' N	20° 3,00' E	233,1	CTD/RO	an Deck	
	11:35	ME861/1292-17			57° 19,21' N	20° 3,00' E	232,1	CTD/RO	zu Wasser	W2
	11:45	ME861/1292-17			57° 19,21' N	20° 3,00' E	232,9	CTD/RO	auf Tiefe	SLmax=158m
12:15	ME861/1292-17			57° 19,21' N	20° 3,00' E	232,1	CTD/RO	an Deck		
28.11.2011	11:24	ME861/1293-1	TF 286	9	57° 59,95' N	19° 54,08' E	189	CTD/RO	zu Wasser	W2
	11:41	ME861/1293-1			57° 59,95' N	19° 54,07' E	188,2	CTD/RO	auf Tiefe	SLmax=187m
	11:58	ME861/1293-1			57° 59,95' N	19° 54,07' E	192,1	CTD/RO	an Deck	
	12:13	ME861/1293-2			57° 59,95' N	19° 54,07' E	192,3	CTD/RO	zu Wasser	W2
	12:21	ME861/1293-2			57° 59,95' N	19° 54,07' E	189,7	CTD/RO	auf Tiefe	SLmax=60m
	12:26	ME861/1293-2			57° 59,95' N	19° 54,07' E	192,2	CTD/RO	an Deck	
	12:40	ME861/1293-3			57° 59,95' N	19° 54,07' E	192,4	CTD/RO	zu Wasser	W2
	12:56	ME861/1293-3			57° 59,95' N	19° 54,07' E	191,3	CTD/RO	auf Tiefe	SLmax=187m
	13:06	ME861/1293-3			57° 59,95' N	19° 54,07' E	191,4	CTD/RO	an Deck	
	13:21	ME861/1293-4			57° 59,95' N	19° 54,07' E	191,3	CTD/RO	zu Wasser	W2
	13:45	ME861/1293-4			57° 59,95' N	19° 54,07' E	192,1	CTD/RO	auf Tiefe	SLmax=137m
	13:52	ME861/1293-4			57° 59,95' N	19° 54,07' E	189,9	CTD/RO	an Deck	
	14:15	ME861/1293-5			57° 59,95' N	19° 54,07' E	187,1	CTD/RO	zu Wasser	W2
14:22	ME861/1293-5			57° 59,95' N	19° 54,07' E	191	CTD/RO	auf Tiefe	SLmax=36m	
14:26	ME861/1293-5			57° 59,95' N	19° 54,07' E	186,3	CTD/RO	an Deck		

	20:05	ME861/1294-1	TF 285	10	58° 26,49' N	20° 19,99' E	120,6	CTD/RO	zu Wasser	W2
	20:20	ME861/1294-1			58° 26,49' N	20° 19,98' E	119,3	CTD/RO	auf Tiefe	Slmax= 117 m
	20:28	ME861/1294-1			58° 26,49' N	20° 19,99' E	119	CTD/RO	an Deck	
	20:48	ME861/1294-2			58° 26,49' N	20° 19,98' E	120,8	CTD/RO	zu Wasser	W2
	21:02	ME861/1294-2			58° 26,49' N	20° 19,98' E	119,7	CTD/RO	auf Tiefe	Slmax= 117 m
	21:10	ME861/1294-2			58° 26,50' N	20° 19,99' E	123,2	CTD/RO	an Deck	
	21:25	ME861/1294-3			58° 26,49' N	20° 19,98' E	120,6	CTD/RO	zu Wasser	W2
	21:39	ME861/1294-3			58° 26,49' N	20° 19,99' E	122,3	CTD/RO	auf Tiefe	Slmax= 117 m
	21:45	ME861/1294-3			58° 26,49' N	20° 19,99' E	120,6	CTD/RO	an Deck	
	22:03	ME861/1294-4			58° 26,49' N	20° 19,98' E	121,6	MUC	zu Wasser	W11
	22:08	ME861/1294-4			58° 26,49' N	20° 19,98' E	118,7	MUC	am Grund	Slmax= 128 m
	22:14	ME861/1294-4			58° 26,49' N	20° 19,98' E	120,4	MUC	an Deck	
29.11.2011	06:00	ME861/1295-1	TF 284	11	58° 34,94' N	18° 14,15' E	433,7	CTD/RO	zu Wasser	W2
	06:19	ME861/1295-1			58° 34,98' N	18° 14,09' E	436,2	CTD/RO	auf Tiefe	SLmax=432m
	06:59	ME861/1295-1			58° 35,01' N	18° 14,03' E	437,6	CTD/RO	an Deck	
	07:26	ME861/1295-2			58° 35,01' N	18° 14,03' E	437,8	CTD/RO	zu Wasser	W2
	07:59	ME861/1295-2			58° 35,01' N	18° 14,03' E	437,6	CTD/RO	auf Tiefe	SLmax= 436 m
	08:17	ME861/1295-2			58° 35,01' N	18° 14,03' E	437,7	CTD/RO	an Deck	
	08:46	ME861/1295-3			58° 35,01' N	18° 14,03' E	437	CTD/RO	zu Wasser	W2
	08:58	ME861/1295-3			58° 35,01' N	18° 14,03' E	437,6	CTD/RO	auf Tiefe	Slmax= 114
	09:07	ME861/1295-3			58° 35,01' N	18° 14,04' E	437,4	CTD/RO	an Deck	
	09:54	ME861/1295-4			58° 35,01' N	18° 14,03' E	437	CTD/RO	zu Wasser	w2
	10:00	ME861/1295-4			58° 35,01' N	18° 14,04' E	437,1	CTD/RO	auf Tiefe	SLmax=90m
	10:13	ME861/1295-4			58° 35,01' N	18° 14,03' E	436,9	CTD/RO	an Deck	
	11:02	ME861/1295-5			58° 35,01' N	18° 14,04' E	437,8	CTD/RO	zu Wasser	W2
	11:14	ME861/1295-5			58° 35,01' N	18° 14,03' E	437,2	CTD/RO	auf Tiefe	SLmax=152m
	11:21	ME861/1295-5			58° 35,01' N	18° 14,04' E	437,2	CTD/RO	an Deck	
	11:54	ME861/1295-6			58° 35,01' N	18° 14,04' E	437,1	CTD/RO	zu Wasser	W2
	12:25	ME861/1295-6			58° 35,01' N	18° 14,04' E	436,9	CTD/RO	auf Tiefe	SLmax=434m
	12:41	ME861/1295-6			58° 35,01' N	18° 14,04' E	437	CTD/RO	an Deck	
	13:39	ME861/1295-7			58° 35,01' N	18° 14,03' E	436,9	CTD/RO	zu Wasser	W2
	14:13	ME861/1295-7			58° 35,01' N	18° 14,04' E	437,1	CTD/RO	auf Tiefe	SLmax=172m
	14:56	ME861/1295-7			58° 35,01' N	18° 14,04' E	436,8	CTD/RO	an Deck	

	15:48	ME861/1295-8			58° 35,01' N	18° 14,03' E	436,2	CTD/RO	zu Wasser	W2
	16:07	ME861/1295-8			58° 35,01' N	18° 14,03' E	436,9	CTD/RO	auf Tiefe	SLmax=435m
	16:18	ME861/1295-8			58° 35,01' N	18° 14,04' E	436,1	CTD/RO	an Deck	
	20:20	ME861/1295-9			58° 35,01' N	18° 14,03' E	436,1	CTD/RO	zu Wasser	W2
	20:44	ME861/1295-9			58° 35,01' N	18° 14,03' E	436,6	CTD/RO	auf Tiefe	SLmax= 133 m
	20:50	ME861/1295-9			58° 35,01' N	18° 14,04' E	436,7	CTD/RO	an Deck	
	21:00	ME861/1295-10			58° 35,01' N	18° 14,04' E	437,1	CTD/RO	zu Wasser	W2
	21:19	ME861/1295-10			58° 35,01' N	18° 14,03' E	436,3	CTD/RO	auf Tiefe	SLmax= 125 m
	21:30	ME861/1295-10			58° 35,01' N	18° 14,03' E	436,4	CTD/RO	an Deck	
	21:40	ME861/1295-11			58° 35,01' N	18° 14,03' E	437,7	ISP	zu Wasser	W2, Pumpe bei 11 m
	21:49	ME861/1295-11			58° 35,00' N	18° 14,04' E	436,6	ISP	Pumpe auf Tiefe	SLmax= 105 m
30.11.2011	01:34	ME861/1295-11			58° 35,00' N	18° 14,04' E	436,1	ISP	an Deck	
	01:43	ME861/1295-12			58° 35,01' N	18° 14,03' E	436,3	CTD/RO	zu Wasser	W2
	02:22	ME861/1295-12			58° 35,01' N	18° 14,04' E	436,7	CTD/RO	auf Tiefe	SLmax=201m
	02:49	ME861/1295-12			58° 35,00' N	18° 14,03' E	437,3	CTD/RO	an Deck	
	02:58	ME861/1295-13			58° 35,00' N	18° 14,03' E	436,8	ISP	zu Wasser	W2
	03:04	ME861/1295-13			58° 35,00' N	18° 14,04' E	437,5	ISP	Pumpe auf Tiefe	SLmax=96m
	07:00	ME861/1295-13			58° 35,00' N	18° 14,03' E	437,5	ISP	an Deck	
	07:13	ME861/1295-14			58° 35,01' N	18° 14,04' E	437,8	CTD/RO	zu Wasser	W2
	07:34	ME861/1295-14			58° 35,00' N	18° 14,04' E	437	CTD/RO	auf Tiefe	SLmax= 176 m
	08:05	ME861/1295-14			58° 35,00' N	18° 14,04' E	437,1	CTD/RO	an Deck	
	08:50	ME861/1295-15			58° 35,01' N	18° 14,03' E	437,7	CTD/RO	zu Wasser	W2
	09:21	ME861/1295-15			58° 35,01' N	18° 14,04' E	436,8	CTD/RO	auf Tiefe	SLmax= 436 m
	09:38	ME861/1295-15			58° 35,01' N	18° 14,03' E	436,9	CTD/RO	an Deck	
	09:49	ME861/1295-16			58° 35,01' N	18° 14,04' E	437,2	ISP	zu Wasser	w2, Pumpe bei 10 m
	10:00	ME861/1295-16			58° 35,01' N	18° 14,04' E	436,8	ISP	Pumpe auf Tiefe	SLmax= 100 m
	13:49	ME861/1295-16			58° 35,01' N	18° 14,03' E	437	ISP	an Deck	
	13:53	ME861/1295-17			58° 35,01' N	18° 14,03' E	437,5	CTD/RO	zu Wasser	W2
	14:12	ME861/1295-17			58° 35,01' N	18° 14,03' E	437,3	CTD/RO	auf Tiefe	SLmax=438m
	14:25	ME861/1295-17			58° 35,01' N	18° 14,03' E	437,4	CTD/RO	an Deck	
	14:48	ME861/1295-18			58° 35,01' N	18° 14,03' E	436,7	CTD/RO	zu Wasser	W2
	15:32	ME861/1295-18			58° 35,01' N	18° 14,03' E	436,9	CTD/RO	auf Tiefe	SLmax=199m
	15:50	ME861/1295-18			58° 35,01' N	18° 14,03' E	437	CTD/RO	an Deck	
	22:49	ME861/1296-1	TF 240	12	58° 0,00' N	18° 0,00' E	164,5	CTD/RO	zu Wasser	W2

	23:07	ME861/1296-1			58° 0,00' N	18° 0,00' E	165,7	CTD/RO	auf Tiefe	SLmax=156m
	23:14	ME861/1296-1			58° 0,00' N	18° 0,00' E	164,5	CTD/RO	an Deck	
	23:36	ME861/1296-2			58° 0,00' N	18° 0,00' E	165,6	CTD/RO	zu Wasser	W2
	23:46	ME861/1296-2			58° 0,00' N	18° 0,00' E	165,6	CTD/RO	auf Tiefe	SLmax=156m
	23:55	ME861/1296-2			58° 0,00' N	18° 0,00' E	165	CTD/RO	an Deck	
01.12.2011	11:47	ME861/1297-1	TF 260	13	56° 38,03' N	19° 35,16' E	139,9	CTD/RO	zu Wasser	W2
	12:00	ME861/1297-1			56° 38,03' N	19° 35,08' E	140,4	CTD/RO	an Deck	techn. Problem
	12:14	ME861/1297-2			56° 38,01' N	19° 35,02' E	137,6	CTD/RO	zu Wasser	W2
	12:26	ME861/1297-2			56° 38,01' N	19° 35,02' E	137,7	CTD/RO	auf Tiefe	SLmax=137m
	12:32	ME861/1297-2			56° 38,01' N	19° 35,02' E	137,7	CTD/RO	an Deck	
	12:56	ME861/1297-3			56° 38,01' N	19° 35,02' E	137,7	CTD/RO	zu Wasser	W2
	13:04	ME861/1297-3			56° 38,01' N	19° 35,02' E	144,1	CTD/RO	auf Tiefe	SLmax=137m
	13:11	ME861/1297-3			56° 38,01' N	19° 35,02' E	142,8	CTD/RO	an Deck	
	15:33	ME861/1298-1	TF 263	14	56° 20,90' N	19° 22,71' E	131,4	CTD/RO	zu Wasser	W2
	15:45	ME861/1298-1			56° 20,86' N	19° 22,71' E	130,7	CTD/RO	auf Tiefe	SLmax=123m
	15:56	ME861/1298-1			56° 20,84' N	19° 22,71' E	127	CTD/RO	an Deck	
	16:12	ME861/1298-2			56° 20,84' N	19° 22,71' E	127	CTD/RO	zu Wasser	W2
	16:20	ME861/1298-2			56° 20,84' N	19° 22,71' E	130,9	CTD/RO	auf Tiefe	SLmax=123m
	16:28	ME861/1298-2			56° 20,84' N	19° 22,71' E	126,5	CTD/RO	an Deck	
	20:12	ME861/1299-1	TF 250	15	56° 5,00' N	19° 10,00' E	117,6	CTD/RO	zu Wasser	W2
	20:26	ME861/1299-1			56° 5,00' N	19° 10,00' E	117,2	CTD/RO	auf Tiefe	SLmax= 119 m
	20:36	ME861/1299-1			56° 5,00' N	19° 10,00' E	118,6	CTD/RO	an Deck	
	20:57	ME861/1299-2			56° 5,00' N	19° 10,00' E	117,2	CTD/RO	zu Wasser	W2
	21:12	ME861/1299-2			56° 5,00' N	19° 10,01' E	117,2	CTD/RO	auf Tiefe	SLmax= 118 m
	21:20	ME861/1299-2			56° 5,00' N	19° 10,01' E	116,6	CTD/RO	an Deck	
	02.12.2011	00:41	ME861/1300-1	TF 253	16	55° 50,46' N	18° 52,04' E	94,6	CTD/RO	zu Wasser
00:52		ME861/1300-1			55° 50,42' N	18° 52,04' E	94	CTD/RO	auf Tiefe	SLmax=94m
00:57		ME861/1300-1			55° 50,41' N	18° 52,03' E	96,1	CTD/RO	an Deck	
01:12		ME861/1300-2			55° 50,41' N	18° 52,03' E	94,7	CTD/RO	zu Wasser	W2
01:18		ME861/1300-2			55° 50,41' N	18° 52,03' E	96,4	CTD/RO	auf Tiefe	SLmax=95m
01:24		ME861/1300-2			55° 50,41' N	18° 52,03' E	94,8	CTD/RO	an Deck	
02:01		ME861/1300-3			55° 50,41' N	18° 52,03' E	94,6	MUC	zu Wasser	W11

	02:06	ME861/1300-3			55° 50,41' N	18° 52,03' E	94,6	MUC	am Grund	SLmax=105m
	02:12	ME861/1300-3			55° 50,41' N	18° 52,03' E	95,2	MUC	an Deck	
	02:30	ME861/1300-4			55° 50,41' N	18° 52,03' E	95,8	MUC	zu Wasser	W11
	02:35	ME861/1300-4			55° 50,41' N	18° 52,03' E	94,8	MUC	am Grund	SLmax=105m
	02:41	ME861/1300-4			55° 50,41' N	18° 52,03' E	95,4	MUC	an Deck	
	05:20	ME861/1301-1	TF 255	17	55° 38,05' N	18° 36,03' E	89	CTD/RO	zu Wasser	W2
	05:32	ME861/1301-1			55° 38,03' N	18° 36,01' E	89,2	CTD/RO	auf Tiefe	SLmax=92m
	05:42	ME861/1301-1			55° 38,01' N	18° 36,01' E	89,1	CTD/RO	an Deck	
	06:50	ME861/1302-1	TF 259	18	55° 33,01' N	18° 24,04' E	89,2	CTD/RO	zu Wasser	W2
	07:03	ME861/1302-1			55° 33,01' N	18° 24,04' E	85	CTD/RO	auf Tiefe	SLmax=85m
	07:09	ME861/1302-1			55° 33,01' N	18° 24,04' E	89	CTD/RO	an Deck	
	07:39	ME861/1302-2			55° 33,01' N	18° 24,04' E	84,1	CTD/RO	zu Wasser	
	07:51	ME861/1302-2			55° 33,01' N	18° 24,04' E	88,8	CTD/RO	auf Tiefe	Slmax= 87 m
	07:59	ME861/1302-2			55° 33,01' N	18° 24,04' E	84,4	CTD/RO	an Deck	
03.12.2011	01:41	ME861/1303-1	TF 113 - S5	19	54° 55,50' N	13° 30,00' E	41,4	CTD/RO	zu Wasser	W2
	01:47	ME861/1303-1			54° 55,50' N	13° 30,00' E	41,1	CTD/RO	auf Tiefe	SLmax=39m
	01:52	ME861/1303-1			54° 55,50' N	13° 30,00' E	41,1	CTD/RO	an Deck	
	02:06	ME861/1303-2			54° 55,50' N	13° 29,99' E	41,4	CTD/RO	zu Wasser	W2
	02:14	ME861/1303-2			54° 55,50' N	13° 30,00' E	41,2	CTD/RO	auf Tiefe	SLmax=44m
	02:17	ME861/1303-2			54° 55,50' N	13° 30,00' E	41,2	CTD/RO	an Deck	
	05:42	ME861/1304-1	TF 001	20	54° 42,10' N	12° 43,14' E	1160,1	CTD/RO	zu Wasser	W2
	05:51	ME861/1304-1			54° 42,10' N	12° 43,15' E	1485,4	CTD/RO	auf Tiefe	SLmax=19m
	05:52	ME861/1304-1			54° 42,10' N	12° 43,15' E	1158,3	CTD/RO	an Deck	

CTD/RO = Rosette-Watersampler with Conductivity-Temperature-Depth-Profiler

MUC = Multicorer (4 tubes)

PLA = Plankton net

ISP = self contained in-situ pump device