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Short Cruise Report

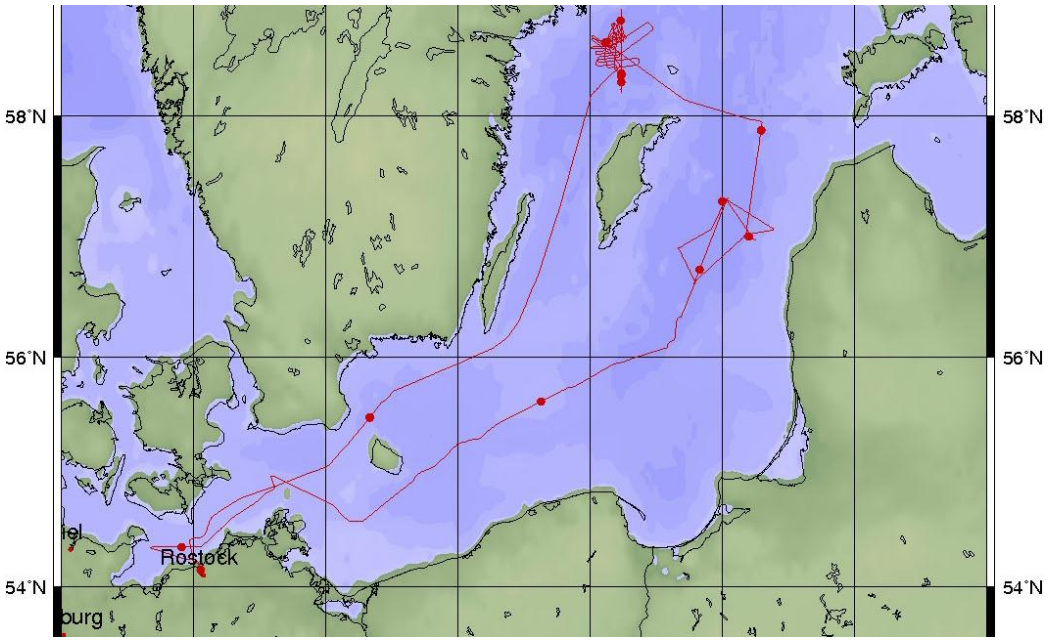
RV METEOR M87-3b

Rostock, Germany – Rostock, Germany

12.06.2012 - 25.06.2012

Chief Scientist: Prof. Dr. Klaus Jürgens

Captain: Michael Schneider



Objectives

The Baltic Sea with its natural gradients and strong reactions to climate change and anthropogenic activity can be used in an ideal way to examine basic ecological processes and their variability in marine ecosystems. The most striking characteristics of the Baltic Sea are 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.

Whereas leg M87/3a focussed on the impact of the salinity gradients on microbially mediated processes within the pelagic carbon cycle, leg M87/3b investigated the communities, biogeochemical processes and its regulation by abiotic and biotic forces in the vertical redox gradients of the deep basins of the central Baltic Sea. Research concentrated especially on the Gotland and the Landsort basins with the following aims:

(1) Assessment of hydrographical conditions in the stratified basins, and of the physical processes which impact the structure of the water column within the redox layer and oxic-anoxic interfaces (e.g., lateral intrusions, small-scale mixing). For achieving this, a combination of moorings (deployed for several days) and spatially and temporally high-resolution measurements of the physical structure and turbulence of the water column (with microstructure profilers and Scanfish) were conducted. This was done in the central stations of the basins as well on transects through the basins, from deep anoxic sites to the slopes where the oxic-anoxic interface meets the sediments.

(2) Investigating the impact of physical disturbances of the redox zonation by intrusion of lateral water masses on the microbial community structure, selected activities and biogeochemical processes. The aim was to test the hypotheses that intrusions and small-scale mixing processes result in a change, and presumably stimulation, of microbial activities within the redoxcline which have an impact on the overall biogeochemical transformation processes in this zone. For this, microbiological, chemical and biogeochemical parameters and processes were assessed in high spatial resolution and close temporal proximity to the physical measurements.

(3) Sampling the upper sediments along transects in the basins, from fully anoxic to oxic bottom water conditions, in order to perform biodiversity analysis of microeukaryotic communities.

(4) Examing the structures, distribution and morphology of postglacial deposits in different basins (Mecklenburg Bay, Arkona Basin, Gotland Basin, Landsort Deep) by Parasound subbottom profiling and high resolution multi- beam echosounding.

Narrative

In the morning of June 12th RV Meteor left Rostock towards the first main working area, the Gotland Basin. Already before reaching the central station (Gotland Deep) a significant inflow of oxygen-containing water was detected at the monitoring station TF 260 (Fig.1). As this lateral inflow was close to the oxic-anoxic interface and the first appearance of sulfide (roughly indicated by the strong backscatter signal) an ideal site was encountered to test the initial hypothesis! Therefore a series of physical and biological measurements were taken at this station. Whereas the physical oceanographers used the microstructure profiler to examine fine-scale turbulence around this intrusion (which would foster mixing of the different water masses), microbiologists used for the first time since long a high-resolution

sampling device, a gradient syringe sampler, by which water samples could be gathered every 20 cm. The challenge was to exactly position the gradient sampler within the edges of this intrusion. Fortunately the weather conditions were ideal and several casts could be successfully launched so that samples for activity and community structure analysis within this intrusion can now be analysed.

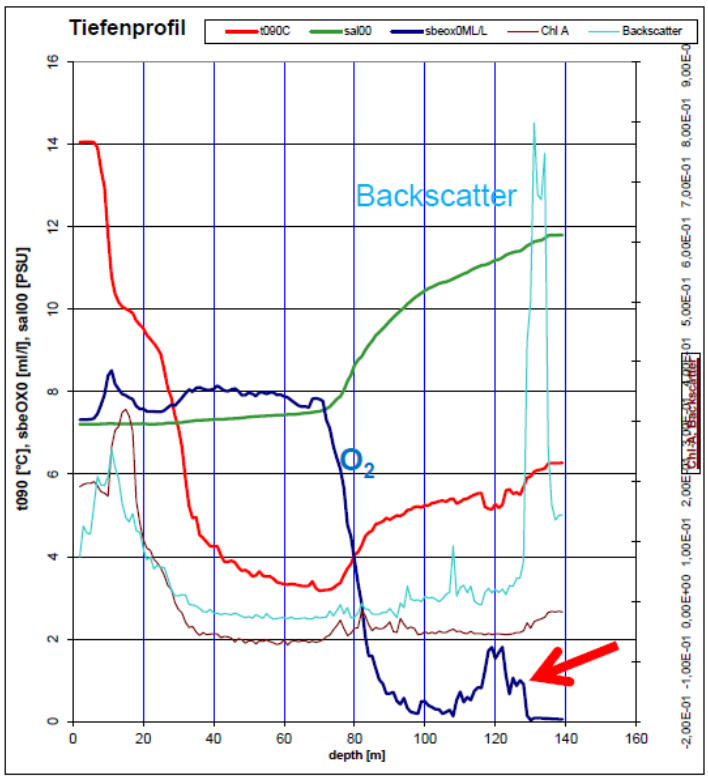


Figure 1: CTD profile at station TF260 where a significant inflow of water with higher oxygen and lower temperature into the redox layer was recorded (red arrow).

The physical program in the Gotland Basin and Landsort Deep was started with a basin-scale CTD transect, respectively, using a towed undulating instrument (ScanFish) that allows for high-resolution sampling at speeds of up to 6 kn. Based on the results from these initial surveys, mooring positions and the location of two cross-slope transects were determined. The cross-slope transects were performed with a shear-microstructure profiler, repeatedly deployed from the slowly (speed: < 2 kn) moving ship at a rate of 5-10 minutes per cast, thus providing a high-resolution picture of the structure of temperature, salinity, turbidity, oxygen, and, above all, the turbulence dissipation rate as one of the key mixing parameters. Goal of these investigations, conducted on two transects on the south-eastern slope of the Gotland Basin and on the slope of a small seamount south of the Landsort Deep, was to obtain an integrated view of the physical conditions in the vicinity of the redoxcline at its intersection point with the sloping topography. Using a transect located near the seamount in the Landsort Basin as an example (Fig.2) these measurements have revealed that stratification and mixing parameters were highly heterogeneous. Regions with high turbidity (upper panel) were generally found to be correlated with enhanced mixing, which may point at a possible impact of turbulence on biogeochemical and microbiological transformations in these regions. A moored CTD chain with an attached acoustic current profiler (ADCP), located

approximately at the center of the transect, provided additional data in order to evaluate the temporal variability during the microstructure transects, and to determine the physical processes that trigger mixing. These investigations near the slopes of the basins were complemented by high-resolution time series near the centers, as required to compare the redoxcline behavior under different mixing conditions.

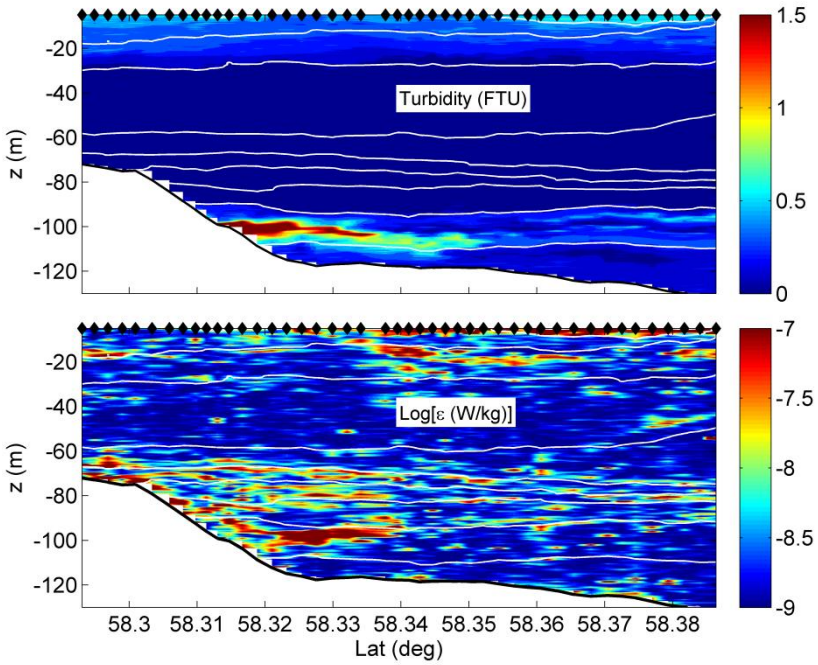


Figure 2. Meridional transect at 18°28.000'E of turbidity (upper panel) and decadal logarithm of the turbulence dissipation rate based on 45 full-depth microstructure profiles (cast positions are indicated by black markers at the top). White contour lines correspond to density plotted 0.5 kg m^{-3} intervals.

In parallel to the physical measurements along the transects, CTD profiles and sampling for chemical and microbiological (activity, community composition) parameters were taken at distinct station along the transects. This should allow to later correlate the biological and chemical data with the physical measurements. Such investigations on the physical-biological coupling have not been performed before and should give a first insight how turbulence within the oxic-anoxic transition zones might influence the microbial processing of organic matter and microbially mediated transformations within the nitrogen cycle.

Parallel to the water column work also samples of upper sediment layers from stations with anoxic and oxic bottom water were taken by multicorer. The geochemical and biological analysis should give first insights of the microeukaryotic biodiversity and how this relates to sediment properties and the penetration of oxygen.

Structures, distribution and morphology of postglacial deposits in Mecklenburg Bay, Arkona Basin, Gotland Basin and Landsort deep were investigated using Parasound subbottom profiling and high resolution multi- beam echosounding (EM710). Both devices worked very reliable and delivered good results during the whole cruise. High frequency (parasound phf) records of the water column were performed at selected MSS / CTD transects to get acoustical images of hydrographic structures. The results clearly displayed the layering of the different water masses.

All planned investigations, with a multitude of different sampling and measurement devices could be performed with great success, thanks to the continuous support of the crew of RV Meteor and favourable weather conditions during the cruise.

Acknowledgements
A 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 grants from the German Research Funding Agency - DFG. 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 Michael Schneider and his crew for the overall success of the cruise M87-3a.

Participants

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23	Christin	Laudan	Nutrients	IOW
24	Christian	Burmeister	Nutrients	IOW
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26	Carlo	Berg	Nitrogen isotopes	IOW
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28	Julia	Klier	Sediment microbiology	IOW
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Station list

Date	Time	Station	Alias	Position	Position	Depth	Gear	Action	Comment
UTC	UTC	M87/3b	IOW	Lat	Lon	m			
12.06.2012	08:00			54° 14,73' N	11° 54,57' E	13,7	MB-PS	Begin Profile	rwK=288°, v=9,5kn
13.06.2012	06:40	1	TF0213	55° 15,03' N	15° 58,99' E	86,1	MB-PS	end of profile	d=226sm
	06:51	1	TF0213	55° 14,99' N	15° 58,99' E	86	CTD/RO	surface	W3
	07:24	1	TF0213	55° 15,01' N	15° 59,08' E	86	MSS	surface	
	07:33	1	TF0213	55° 15,09' N	15° 59,34' E	85,9	MSS	surface	
	18:18	2	TF0250	56° 4,98' N	19° 10,02' E	121,3	CTD/RO	surface	W3
	20:58	3	TF0263	56° 20,80' N	19° 22,62' E	130,6	CTD/RO	surface	W3
	23:29	4	TF260	56° 37,99' N	19° 34,94' E	141,2	CTD/RO	surface	clean ship, W3
14.06.2012	01:52	5	GB1	56° 54,98' N	19° 19,92' E	170	CTD/RO	surface	clean ship, W3
	02:31	5	GB1	56° 54,98' N	19° 19,93' E	169,9	MUC	surface	W11
	03:18	5	GB1	56° 54,98' N	19° 19,92' E	170,2	MUC	surface	W11
	03:58	5	GB1	56° 54,98' N	19° 19,91' E	170,4	FC	surface	W2
	06:06	6	TF272	57° 4,31' N	19° 49,77' E	209,6	CTD/RO	surface	W3
	08:15	7	TF0271	57° 19,19' N	20° 2,99' E	238,4	CTD-AFIS	surface	über Heckgalgen
	09:18	7	TF0271	57° 19,19' N	20° 3,00' E	239,9	CTD/RO	surface	W3
	10:32	7	TF0271	57° 19,18' N	20° 2,96' E	239,2	MSS	surface	eigene Winde
	10:47	7	TF0271	57° 19,04' N	20° 2,47' E	238	MSS	surface	
	12:00	7	TF0271	57° 18,17' N	19° 59,91' E	234,4	MSS	surface	
	13:03	7	TF0271	57° 19,21' N	20° 3,02' E	477,6	CTD-AFIS	surface	
	13:57	7	TF0271	57° 19,19' N	20° 3,03' E	265,3	SCF	into the water	eigene Winde
	19:03			57° 4,67' N	20° 45,90' E	68,7	SCF	on deck	
	20:31	8	go0001	57° 1,63' N	20° 21,14' E	109,7	CTD/RO	surface	W3
	21:18	8	go0001	57° 1,54' N	20° 21,03' E	109,2	MOORST	surface	ADCP
	21:54	8	go0001	57° 1,41' N	20° 21,02' E	107,7	MOORST	surface	Releaser + Kopfboje
	22:26	8	go0001	57° 1,63' N	20° 21,17' E	109,3	CTD-AFIS	surface	eigene Winde
	23:48	8	go0001	57° 1,62' N	20° 21,13' E	109,5	MUC	surface	W10
15.06.2012	00:20			57° 1,61' N	20° 21,19' E	108,8	MSS	surface	eigene Winde, FüG=1,5kn rwK = 301, v= 1,0 kn,
	04:16			56° 58,81' N	20° 29,92' E	34,1	MSS	surface	Fahren auf gleichem Profil zurueck
	09:02	9	go0001	57° 1,64' N	20° 21,13' E	109,7	CTD-AFIS	surface	über Heckgalgen
	10:33	10	GT1-2	57° 0,71' N	20° 24,00' E	89,4	CTD-AFIS	surface	eigene Winde, clean ship
	11:15	10	GT1-2	57° 0,71' N	20° 23,99' E	89,7	MUC	surface	W11
	11:58	10	GT1-2	57° 0,73' N	20° 23,94' E	89,7	MSS	surface	eigene Winde, FüG=1,0kn
	13:01	11	GT1-3	56° 59,54' N	20° 27,62' E	79,7	CTD-AFIS	surface	clean ship, eigene Winde
	13:37	11	GT1-3	56° 59,55' N	20° 27,60' E	79,9	MUC	surface	W11
	13:56	11	GT1-3	56° 59,55' N	20° 27,59' E	80,1	MSS	surface	FüG=1,0kn

				56°	20° 28,46'				
	16:33	12	GT1-4	59,27' N	E	67,8	CTD-AFIS	surface	
				56°	20° 28,46'				
	17:13	12	GT1-4	59,26' N	E	68,4	MUC	surface	W11
				56°	20° 27,86'			Begin	
	17:55	12	GT1-4	59,73' N	E	78,5	MB-PS	Profile	rwK = 325
				57°	20° 2,92'			end of	
	19:58	13	TF0271	19,19' N	E	237,8	MB-PS	profile	d=24sm
				57°	20° 2,91'				
	20:01	13	TF0271	19,20' N	E	238	CTD/RO	surface	W3
				57°	20° 2,89'				
	21:57			19,19' N	E	237,9	MSS	surface	
				57°	20° 5,04'				
16.06.2012	04:15			19,58' N	E	241	MSS	surface	
				57°	20° 2,97'				
	06:35	14	TF0271	19,20' N	E	238	CTD/RO	surface	W3
				57°	20° 3,00'				
	07:24	14	TF0271	19,21' N	E	238,1	CTD-AFIS	surface	eigene Winde
				57°	20° 3,25'			Begin	
	08:37			19,12' N	E	238,4	MB-PS	Profile	rwK=201°
				56°	19° 39,58'			end of	
	11:56	15	TF0260	44,92' N	E	138,2	MB-PS	profile	d=36,7sm
				56°	19° 34,98'				
	12:51	15	TF0260	38,02' N	E	141,1	CTD-AFIS	surface	clean ahip, W3
				56°	19° 34,99'				
	14:13	15	TF0260	37,98' N	E	141,5	MSS	surface	rwK = 188, v= 1kn
				56°	19° 35,70'				
	15:41	15	TF0260	39,04' N	E	140,4	MSS	surface	
				56°	19° 35,01'				
	17:01	15	TF0260	38,01' N	E	141,5	CTD-AFIS	surface	W3
				56°	19° 35,64'				
	17:58	15	TF0260	38,96' N	E	140,5	MSS	surface	
				56°	19° 35,00'				
	18:57	15	TF0260	38,01' N	E	141,7	CTD-AFIS	surface	W3
				56°	19° 34,95'				
	19:42	15	TF0260	37,90' N	E	141,6	MSS	surface	
				56°	19° 34,32'				
	20:40	15	TF0260	37,06' N	E	141,3	MSS	surface	
				56°	19° 34,99'				
	21:16	15	TF0260	38,00' N	E	141,4	CTD-AFIS	surface	W3
				56°	19° 35,02'				
	22:11	15	TF0260	38,03' N	E	141,4	MSS	surface	
				56°	20° 4,50'			Begin	
17.06.2012	05:20			53,17' N	E	157,4	MB-PS	Profile	rwK = 048
				57°	20° 21,03'			end of	
	06:20			1,63' N	E	110,2	MB-PS	profile	d=12sm
				57°	20° 21,16'			mooring	
	07:20			1,47' N	E	107,8	MOR	on deck	ADCP an Deck
				57°	20° 20,96'			Begin	
	07:34			1,67' N	E	121,7	MB-PS	Profile	rwK=008°
				57°	20° 36,04'			end of	
	12:21			56,99' N	E	92,1	MB-PS	profile	d=57,sm
				58°	18° 52,08'			Begin	
	17:53			20,44' N	E	158,9	MB-PS	Profile	rwK = 306
				58°	18° 14,01'			end of	
	20:02	16	TF284	35,01' N	E	436,8	MB-PS	profile	d=25sm
				58°	18° 14,01'				
	20:07	16	TF284	35,01' N	E	436,8	CTD-AFIS	surface	W3
				58°	18° 14,01'			Begin	
	21:30	16	TF284	35,00' N	E	436,8	MB-PS	Profile	rwK=287°, v=8-9kn
				58°	18° 21,58'			end of	
18.06.2012	03:54	17	LT1	44,00' N	E	100,6	MB-PS	profile	Dist. gesamt = 57nm
				58°	18° 21,57'				
	03:57	17	LT1	43,99' N	E	101	CTD-AFIS	surface	W3
				58°	18° 21,60'				
	04:34	17	LT1	44,01' N	E	99,2	MUC	surface	W11
				58°	18° 21,61'				
	05:04	17	LT1	44,01' N	E	99,2	MUC	surface	W11
				58°	18° 21,62'				
	05:30	17	LT1	44,01' N	E	99,1	MUC	surface	W11
				58°	18° 21,60'				
	05:47	17	LT1	44,01' N	E	100,5	MUC	surface	w11
				58°	18° 21,59'				
	06:09	17	LT1	44,01' N	E	100,3	FC	surface	W2
				58°	18° 21,58'				
	06:30	17	LT1	44,01' N	E	101	FC	surface	W2
	07:00			58°	18° 21,17'	93,9	MB-PS	Begin	rwK=204°, v=10kn

				43,56' N	E			Profile	
	08:05	18	TF284	58° 35,02' N	18° 14,02' E	436,3	MB-PS	end of profile	d=10sm
	08:07	18	TF284	58° 35,00' N	18° 14,01' E	436,4	CTD-AFIS	surface	W3
	09:57	18	TF284	58° 35,00' N	18° 14,01' E	420,9	CTD/RO	surface	W3
	10:58			58° 35,67' N	18° 14,75' E	353,7	MB-PS	Begin Profile	rwK=035°
	12:27			58° 50,09' N	18° 28,00' E	78,7	MB-PS	end of profile	d=17sm
	12:42			58° 50,31' N	18° 28,02' E	111,4	SCF	into the water	eigene Winde
	19:17			58° 11,08' N	18° 27,99' E	39,5	SCF	on deck	
	20:19	19	Lars-LB	58° 20,28' N	18° 27,98' E	112,6	CTD-AFIS	surface	W3
	21:36	20	MSS-LB	58° 23,24' N	18° 27,98' E	128,7	CTD-AFIS	surface	W3
	22:13			58° 23,20' N	18° 27,97' E	127,7	MSS	surface	FüG=1,5kn, rwK=180°
19.06.2012	02:37			58° 16,93' N	18° 28,02' E	61,1	MSS	surface	rwK = 360
	04:08			58° 18,76' N	18° 27,96' E	95,8	MSS	surface	
	06:26			58° 19,18' N	18° 28,03' E	106	MOR	surface	ADCP
	07:00			58° 19,07' N	18° 27,92' E	103,3	MOR	slipped	
	07:32	21	X_0021	58° 18,79' N	18° 27,98' E	97	CTD-AFIS	surface	W3
	08:12	22	X_0022	58° 18,40' N	18° 27,98' E	77,7	CTD-AFIS	surface	W3
	08:42	23	X_0023	58° 18,39' N	18° 27,98' E	77,6	MUC	surface	W11
	09:45	23	X_0023	58° 18,80' N	18° 27,99' E	97,7	CTD-AFIS	surface	W3
	10:37			58° 18,85' N	18° 28,05' E	99,6	MSS	surface	
	11:33			58° 20,26' N	18° 27,98' E	491,1	MSS	on deck	
	11:57	24	LT1-2	58° 19,20' N	18° 28,05' E	106,2	CTD-AFIS	surface	W3
	12:44			58° 19,30' N	18° 28,02' E	108,2	MSS	surface	
	13:33			58° 20,02' N	18° 26,88' E	111,7	MSS	on deck	
	13:51	25	LT1-3	58° 20,42' N	18° 28,06' E	112,2	CTD-AFIS	surface	W3
	14:35			58° 20,41' N	18° 28,01' E	113,1	MSS	surface	
	15:20			58° 20,50' N	18° 25,92' E	119,1	MSS	on deck	
	15:37	26	LT1-4	58° 21,64' N	18° 28,04' E	116,3	CTD-AFIS	surface	W3
	16:26			58° 21,76' N	18° 28,00' E	117,5	MSS	surface	
	17:06			58° 22,93' N	18° 28,02' E	125,6	MSS	on deck	
	17:15	27	LT1-5	58° 23,00' N	18° 28,03' E	125,9	CTD-AFIS	surface	W3
	18:20			58° 22,99' N	18° 27,97' E	125,2	MB-PS	Begin Profile	rwK=328°
	19:45			58° 34,93' N	18° 14,00' E	435,2	MB-PS	end of profile	d=14sm
	19:53	28	TF0284	58° 34,99' N	18° 13,99' E	437,8	CTD/RO	surface	W3
	20:57	28	TF0284	58° 35,00' N	18° 13,99' E	437,4	CTD-AFIS	surface	W3
	21:36	28	TF0284	58° 34,44' N	18° 14,72' E	289,9	MB-PS	Begin Profile	rwK=140° , v=9kn
20.06.2012	06:08			58° 38,39' N	18° 32,34' E	207	MB-PS	end of profile	d=75sm
	06:39			58° 36,70' N	18° 27,38' E	160	MUC	surface	W11
	07:08			58° 36,70' N	18° 27,38' E	160	FC	surface	W2

				58°	18° 26,88'				
	07:51	29	LT5	37,30' N	E	180,2	CTD-AFIS	surface	W3
				58°	18° 26,88'				
	08:47	29	LT5	37,30' N	E	180,3	MUC	surface	W11
				58°	18° 26,87'				
	09:18	29	LT5	37,30' N	E	180,4	MUC	surface	W11
				58°	18° 26,87'				
	09:44	29	LT5	37,30' N	E	180,6	FC	surface	W2
				58°	18° 26,85'			Begin	
	10:15			37,31' N	E	206,5	MB-PS	Profile	rwK=251°
				58°	18° 13,94'			end of	
	11:01			35,04' N	E	438,6	MB-PS	profile	d=7sm
				58°	18° 13,91'				
	11:03	30	TF0284	35,02' N	E	438,8	CTD/RO	surface	W3, clean ship
									mit
				58°	18° 13,99'				Spritzenwasserschöpfer,
	11:54	30	TF0284	35,00' N	E	396	CTD-AFIS	surface	W3, claen ship
				58°	18° 14,00'				W3, clean ship, mit
	13:09	30	TF0284	35,00' N	E	436,8	CTD-AFIS	surface	Spritzwasserschöpfer
				58°	18° 13,97'				
	13:39	30	TF0284	34,99' N	E	437	MSS	surface	
				58°	18° 13,30'				
	14:34	30	TF0284	34,49' N	E	308,9	MSS	on deck	
				58°	18° 14,00'				
	16:07	30	TF0284	35,00' N	E	437,3	CTD-AFIS	surface	W3
				58°	18° 14,38'			Begin	
	16:48			35,01' N	E	412,7	MB-PS	Profile	rwK = 058
				58°	18° 25,69'			end of	
	17:30	31	LT4	38,82' N	E	445	MB-PS	profile	Dist. = 7nm
				58°	18° 25,70'				
	17:43	31	LT4	38,82' N	E	285,5	CTD/RO	surface	W3
				0° 0,00'					
	19:00	31	LT4	N	0° 0,00' E	0	MUC	surface	W11
				58°	18° 25,70'				
	19:36	31	LT4	38,82' N	E	228,4	MUC	surface	W11
				58°	18° 25,69'				
	20:10	31	LT4	38,81' N	E	228,8	FC	surface	W2
				58°	18° 25,24'				
	22:02	32	LT3	39,42' N	E	281,7	MUC	surface	W11
				58°	18° 25,25'				
	22:38	32	LT3	39,42' N	E	281,8	FC	surface	W2
				58°	18° 27,99'				
21.06.2012	00:53			23,19' N	E	127,8	MSS	surface	
				58°	18° 28,00'				
	05:13			17,41' N	E	62,6	MSS	surface	rwK = 360
				58°	18° 28,00'				
	08:08	33	LT2-5	22,81' N	E	124,5	CTD-AFIS	surface	W3
				58°	18° 27,98'				
	09:03			22,80' N	E	124,2	MSS	surface	
				58°	18° 28,00'				
	09:58			22,36' N	E	120,2	MSS	on deck	
				58°	18° 28,00'				
	10:24	34	LT2-4	21,02' N	E	113,8	CTD-AFIS	surface	W2, clean ship
				58°	18° 27,98'				
	11:04			20,99' N	E	113,7	MSS	surface	
				58°	18° 28,00'				
	11:52			20,53' N	E	113,2	MSS	on deck	
				58°	18° 28,00'				
	12:01	35	LT1-3	20,39' N	E	113,1	CTD-AFIS	surface	W2, clean ship
				58°	18° 28,00'				
	12:37	35	LT1-3	20,39' N	E	113,1	MSS	surface	
				58°	18° 28,00'				
	13:28			19,91' N	E	111,8	MSS	on deck	
				58°	18° 28,00'				
	13:36	36	LT2-2	19,81' N	E	112,3	CTD-AFIS	surface	W2, clean ship
				58°	18° 28,00'				
	14:06			19,80' N	E	112,3	MSS	surface	
				58°	18° 27,57'				
	14:47			19,08' N	E	100,1	MSS	on deck	
				58°	18° 27,99'				
	14:56	37	LT1-1	18,79' N	E	98,1	CTD-AFIS	surface	W2
				58°	18° 28,02'			Begin	
	15:26			18,93' N	E	101,1	MB-PS	Profile	rwK = 334
				58°	18° 21,39'			alter	
	16:06			25,97' N	E	152,5	MB-PS	course	rwK = 009
				58°	18° 24,51'				
	17:25	38	LT2	40,33' N	E	345,7	CTD-AFIS	surface	W2

	17:25	38	LT2	58° 40,33' N	18° 24,51' E	345,7	MB-PS	end of profile	22nm
	18:30	38	LT2	58° 40,29' N	18° 24,54' E	344,8	MUC	surface	W11
	19:05	38	LT2	58° 40,29' N	18° 24,54' E	345,3	MUC	surface	W11
	19:43	38	LT2	58° 40,29' N	18° 24,55' E	345,2	FC	surface	W3
	20:36	38	LT2	58° 40,29' N	18° 24,61' E	345	MB-PS	Begin Profile	
	21:30			58° 35,00' N	18° 13,96' E	437,5	MB-PS	end of profile	d=8sm
	21:44			58° 35,00' N	18° 14,00' E	436,2	MSS	surface	
	23:20			58° 35,55' N	18° 15,44' E	214,1	MSS	on deck	Aufdampfen, 2sm
	23:45			58° 34,76' N	18° 12,11' E	136,9	MSS	surface	
22.06.2012	02:21			58° 35,18' N	18° 15,32' E	206,1	MSS	on deck	
	02:48			58° 34,80' N	18° 13,13' E	225,9	MSS	surface	rwK = 066
	05:19			58° 35,33' N	18° 15,34' E	211,4	MSS	on deck	
	06:00			58° 34,81' N	18° 13,21' E	290,3	MSS	surface	
	06:55			58° 34,99' N	18° 13,97' E	436,6	MSS	on deck	
	07:08	39	TF0284	58° 35,00' N	18° 14,00' E	436,7	CTD/RO	surface	W2
	10:44	39	TF0284	58° 35,00' N	18° 14,00' E	437,2	CTD/RO	surface	W2, clean ship
	11:29	39	TF0284	58° 35,00' N	18° 14,00' E	436,9	CTD-AFIS	surface	clean ship, W2, mit Spritzwasserschöpfer
	12:13			58° 35,33' N	18° 14,16' E	440,3	MB-PS	Begin Profile	rwK=015°, v=9-10kn
23.06.2012	08:02			58° 18,87' N	18° 28,23' E	101	MB-PS	end of profile	d=179sm
	08:03			58° 18,87' N	18° 28,22' E	101,1	MOR	Hydrophone in water	Recovery
	09:19			58° 19,00' N	18° 28,18' E	103,2	MOR	on deck	ADCP
	09:55	40	X_0040	58° 19,09' N	18° 28,01' E	103,9	CTD-AFIS	surface	W2
	10:59			58° 14,49' N	18° 28,04' E	55,7	MSS	surface	
	16:18			58° 23,80' N	18° 27,99' E	130,5	MSS	on deck	
	16:33			58° 23,05' N	18° 25,97' E	132,7	MB-PS	Begin Profile	rwK = 224, Dist. = 19nm
	18:01			58° 10,64' N	18° 2,02' E	132,2	MB-PS	end of profile	d=19sm