LEIBNIZ INSTITUTE FOR BALTIC SEA RESEARCH WARNEMÜNDE

RV *Maria S. Merian*
Short Cruise Report MSM 16/1ab
GEBGAS
Rostock-Visby-Emden

July 31st - August 22nd, 2010

edited by

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1. Mission summary

Leg MSM 16/1ab of RV Maria S. Merian addressed the methane cycle in the Baltic Sea, with research areas in Arkona Basin, the Bornholm Basin, the Baltic Proper, the Bothnian Bay and Bothnian Sea. The overarching goal was to gain quantitative and mechanistic insights into the generation, accumulation, and flux of methane from Baltic Sea sediments, in particular to understand their biogeochemical controls and potential change due to eutrophication and climate change. Shallow gas occurrences were mapped by various geoacoustic methods, and the diffusive methane flux as well as the rate of oxidation by sulphate were quantified based on geochemical analysis of long sediment cores. Investigations on sediments addressed the history of salt water inflows into the Baltic, as well as the temporal evolution of hypoxia. Areas of enhanced methane flux were investigated in detail using single and multibeam seismoacoustics, sediment geochemistry as well as water column chemical, microbiological, and hydro-graphic data. The cruise fullfilled important goals of the projects BALTIC GAS, HYPER, and INFLOW, all funded within the BONUS+ initiative

2. Participating organizations and Cruise participants

2.1 Particpating organizations

- AWI — Alfred-Wegener-Institute of Polar and Marine Research, Bremerhaven, Germany
- CfG — Center for Geomicrobiology, Aarhus University, Denmark
- GTK — Geological Survey of Finland, Finland
- IOW — Leibniz-Institut für Ostseeforschung Warnemünde an der Universität Rostock, Germany
- NERI — National Environmental Research Institute, Aarhus, Denmark
- MPI-Bremen — Max Planck Institut für Marine Mikrobiologie, Germany
- UBremen — University of Bremen, FB5 Geosciences, Bremen, Germany
- ULund — Lund University, Department of Geology, Lund, Sweden
- UStockholm — Stockholm University, Department of Stockholm, Germany of Geological Sciences, Stockholm, Sweden

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2.2. Participants

MSM 16/1 – Leg a Rostock – Visby July 31st, 2010 - August 8th, 2010

1.	Rehder, Gregor	Fahrtleiter / *Chief Scientist*	IOW
2.	Jorgensen, Bo Barker	Coring/Biogeochemistry	MPI/CfG
3.	Flury, Sabine	Pore water geochemistry	CfG
4.	Lapham, Laura	Pore water geochemistry	CfG
5.	Fossing; Henrik	Pore water methane	NERI
6.	Nguyen, Thang Manh	Incubation	MPI
7.	Oehler, Till	In situ pore water sampling	AWI
8.	Gülzow, Wanda	Water column/surface methane	IOW
9.	Jeschek, Jenny	Water column/surface methane	IOW
10.	Schmale Oliver	Water column/surface methane	IOW
11.	Lage, Susanne	Water column/surface methane	IOW
12.	Schneider, Jens	Multibeam	IOW
13.	Endler, Rudolph	Coring, Acoustics	IOW
14.	Nickel, Gerald	Acoustics	IOW
15.	Kurth, Jorn	Coring	IOW
16.	Frahm, Andreas	Coring	IOW
17.	Plewe, Sascha	Coring, core logging	IOW
18.	Krüger, Siegfried	CTD/Pump CTD	IOW
19.	Prien, Ralf	CTD/mooring recover	IOW
20.	Conley, Dan	Logging magnetics, Core description	ULund
21.	Lougheed, Bryan	Logging magnetics, Core description	ULund
22.	Toth, Zsuzsanna	Acoustics	UBremen

MSM 16/1 – Leg b Visby - Emden August 8th, 2010 – August 22nd, 2010

1.	Rehder, Gregor	Fahrtleiter / *Chief Scientist*	IOW
2.	Lapham, Laura	Pore water geochemistry	CfG
3.	Fossing; Henrik	Pore water methane	NERI
4.	Nguyen, Thang Manh	Incubation	MPI
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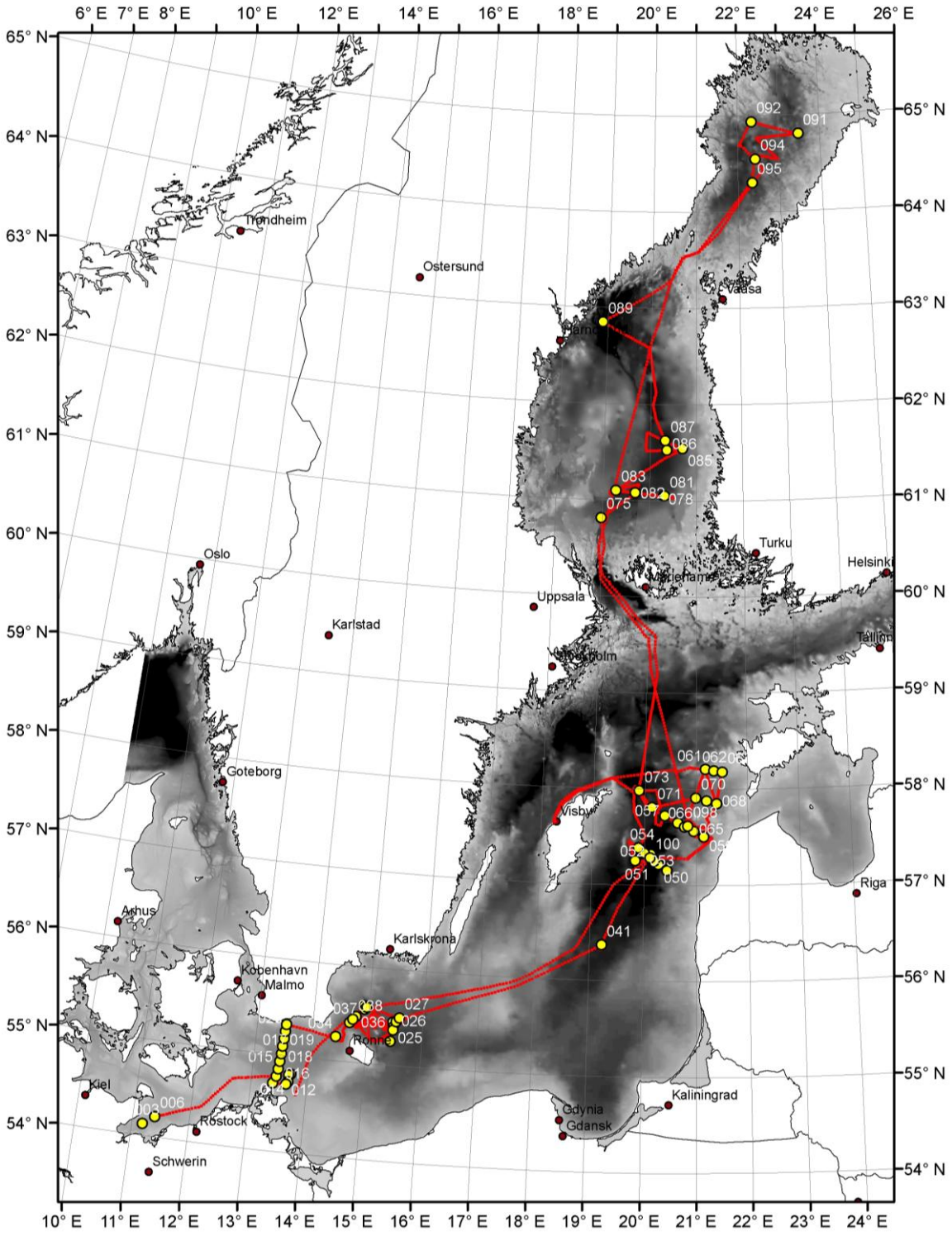
7.	Jeschek, Jenny	Water column/surface methane	IOW
8.	Lage, Susanne	Water column/surface methane	IOW
9.	Schneider, Jens	Multibeam	IOW
10.	Endler, Rudolph	Coring, Acoustics	IOW
11.	Nickel, Gerald	Acoustics	IOW
12.	Kurth, Jorn	Coring	IOW
13.	Pleve, Sascha	Coring, core logging	IOW
14.	Krüger, Siegfried	CTD/Pump CTD	IOW
15.	Lenz, Conny	Logging magnetics, Core description	ULund
16.	Reinholdsson, Maya	Logging magnetics, Core description	ULund
17.	Virtasalo, Joonas	Coring	UTurku
18.	Spiess, Volkhard	Multichannel seismic	MARUM / FB5
19.	Fekete, Noémi	Multichannel seismic	MARUM / FB5
20.	Keil, Hanno	Multichannel seismic	MARUM / FB5
21.	Toth, Zsuzsanna	Multichannel seismic	MARUM / FB5
22.	Brüchert, Volker	Biogeochemistry	UStockholm
23.	Gintes, Livia	Biogeochemistry	UStockholm

3. Map with cruise track



Overview map of Expedition MSM 16/1ab in the Baltic with bathymetry, cruise track and indication of individual stations

4. Cruise Narrative

Saturday, July 31st

RV *Maria S. Merian* left Rostock at 9.am local time on July 31st under friendly weather conditions to begin expedition MSM 16/1. Four containers of scientific equipment had been brought to the ship on July 29th, most of its content used to install the laboratories of the ship and secured for rougher seas, instruments were already up and running and chemicals prepared, as according to the science plan the ship was to hit its first station in Mecklenburg Bay after only 2h. However, an emergency call from RV *Alkor* asked for help after the ship had lost an ROV in the north of the island of Fehmarn. With a size of a little more than 1m, it appeared that the instrument could potentially be found by RV *Maria S.Merian*'s excellent shallow multibeam system. So the 2 h of steaming were used to define a grid for a Multibeam survey around the area of loss. While the survey clearly showed the ability of the instrument to reveal objects of this size at the seafloor, we were unable to help our colleagues from Kiel, as the seafloor was too rocky and the tremendous amount of rocks and boulders at the seafloor of a size similar to the dimension of the lost device hampered the effort.

So, with some delay, the vessel approached the first scientific target of the expediton MSM 16/1, an area with a shallow methane transitions zone, where a series of Rumohr and Frahm cores were taken as first of a set of 3 stations to investigate changes in the imprint of methane oxidation processes in the sediments along the salinity- (and thus sulphate-)gradient of the Baltic (station 03).

A shallow water multibeam and Parasound survey was then used to seek for methane escaping into the water column as bubbles in an area where indications for this phenomenon existed (stations 04 - 05). After a CTD cast to sample for the methane distribution, FS *Maria S Merian* headed to the Arkona Basin over night and spent the early morning hours to map the size and shape of a pockmark structure formerly found by single beam echosounder system (station 08).

Sunday, August 1st

The daylight program of August 1st was mainly used to cover 4 stations, each with a program of a CTD cast to determine the water column structure as well as oxygen and methane content of the water column, and a series of Rumohr-, Frahm-, and gravity cores. While the first of these stations (station 009) was located in the center of the pockmark structure mapped in the early morning, the section of the remaining 3 coring positions (stations 10-12) was designed to investigate the geophysical and geochemical signature of the sediments along a section where the Holocene mud layer is potentially thinning out and containing an increasing fraction of sandy material.

The CTD casts revealed a methane content exceeding 100 nm in a saline, particle-rich bottom water layer, which had not been observed in casts at very similar positions taken in December 2009 on RV *Poseidon*. The coring showed considerable increase in methane concentrations up to several mM already in the upper m of the water column covered by the Rumohr-corer, and concentrations remained high all the way down to the end of the gravity cores with lengths of up to 11m.

The time from the evening to the next morning was spent on a hydrographic section consisting of 9CTD casts (stations 13-21) crossing the Arkona Basin from South to North, and was designed to determine the methane inventory across the westernmost basin of the Baltic Sea. With current data from hydrographic modeling, one of the aims is to estimate the in- and outflow of methane across this line. The section showed the existence of the methane and particle-enriched saline bottom layer all over the basin except for the very north, a result of the strong isopycnal showling towards the south.
With this, the scientific program in the Arkona Basin was ended.

Monday, August 2nd

The transit to the Bornholm Basin was used for a multibeam survey (shallow water MB EM 1002) of one of the main flow paths of deep saline water around Bornholm, a request of the hydrographic modelers of IOW to better constrain bottom shear stress and thus, boundary mixing. Smoothly operating from a scientific point of view (station 23), this station was a demanding task for the bridge, as the survey went into one of the main ship traffic routes of the Baltic, and close to the Danish-Swedish border. In the early afternoon, we sampled a station (024) by a series of a CTD, five Rumohr cores and 2 gravity cores. The site was selected as a key site showing the transition from the gas-rich Littorina mud layer to methane-poor Ancylus lake deposits and deeper strata already observed during Poseidon cruise P392 in December, 2009. On top of the standard geochemical program, methanogenesis and methane oxidation rate measurements as well as microbiological techniques will be used in particular to understand the processes behind the decreasing concentrations of methane towards the older post glacial and late glacial strata. It appears that methane consumption in the post glacial Ancylus clay might be driven by reduction by ferric iron which has not yet been completely sulphidized.

Due to the same scientific interest, a site some 7 nm to the north (025) was sampled, at the time only for the standard parameters, which would allow clarification whether further detailed sampling was required. At 10 pm ship time, the day program ended with the ship's labs overloaded with sediments and experiments to be started.

During the night, a couple of CTD stations served the purpose to map a permanent anomaly of the methane distribution in the water column around 60 m water depth already observed during the cruises Pos 392 and MSM 08, as well as to assess the extent of an extremely CH4-enriched bottom water layer observed at stations 024 and 025.

Tuesday, August 3rd

Closely after the date shifted, a series of long lines of single beam echosounder surveys was used to enhance our spatial coverage of data about the distribution of free gas in the sediments, followed by a multibeam track crossing the boundary between a zone of free gas and a zone without gas in the upper sediment. The scope of this station (029) was to test whether the distribution of free gas can be extracted from the backscatter signal of the MB system This proved extremely successful, and was ground-truthed by coring at two stations inside and outside the gassy area (stations 31 and 32).

The way back from this working area to the SE (station 33), where the pump-CTD was to be used for the first time during this cruise to get high-resolution insight into the enormously enriched methane boundary layer at this site, was used to further fill the gaps in the mapping of the gas distribution by single beam echosounding. During the following pump-CTD station (034), it was possible to reveal that the methane-rich layer with concentrations in the range of 1 micromol/L extended uniformly over several meters above the seafloor. The almost unlimited supply of water from single depth levels provided by the pump CTD allowed taking a set of samples for incubation experiments on top of the standard seawater program. These are dedicated to test the ad hoc hypothesis that the methane is partly produced within the fluffy layer with a high content of fresh organic material rather than in the sediments.

Wednesday, August 4th

The remainder of the night was spent with an additional single beam echosounder line (035), which ended at the first of three CTD stations (036-038) which were arranged to cover the main inflow paths of deep water from west into the Bornholm Basin north of Bornholm. The scope was to investigate whether this water already shows the permanent enrichment in about 60 m water depths, as well as to further constrain the lateral extent of the strongly enriched bottom waters. The gaining of additional cores of different lengths at the position partly sampled already on August 2nd (040 and 025 on same location) for enhanced studies and incubation experiments then completed the field work in the Bornholm basin and in the

early afternoon, RV *Maria S Merian* started its 140 nm mile transit to the next working area, the Stolpe Foredelta.

Thursday, August 5th

We arrived in the Stolpe Fordelta region 2 hours after midnight. A CTD cast (041) was used to obtain a sound profile from the water body in the area for the following MB survey, as well as to further map the methane-enriched bottom layer. In the following, a 5h multibeam (EM 1002) survey was dedicated to map an area where some channel-like structures appear to be "carved" into the upper sedimentary layer. These structures were first detected by single beam echosounding and interpreted as pockmarks, which are often a sign for gas ebullition from the seafloor. While a survey during Baltic Gas cruise P392 with RV Poseidon had already led to the impression that the features were connected, the high resolution bathymetric survey clearly revealed a system of scarps, which from a first glance can neither be assigned to trawled gear, nor to erosion from focused boundary currents. Though remaining enigmatic in their origin, we can exclude the presence of pockmarks in the area, and together with some earlier sedimentary and echo sounding work, we can conclude that this area is of neglible importance for the methane cycle of the Baltic Sea.

After moving 60 nm further north, we arrived at 55° 17' N, 19° 50' east, where a major task was awaiting us: the recovery of the new profiling mooring GODDESS (**Go**tland **D**eep **E**nvironmental **S**ampling **S**tation), which had been launched about 3 weeks earlier from RV *Alkor*. The system uses and underwater winch situated below the redoxcline to move a sensor unit at given time intervals through the water column. For this trial case, the system was set to take 4 CTD casts (with additional sensor for oxygen) every 4 hours. It was the first long-term deployment of the instrument, which is an integral part of the future long-term observation efforts of IOW in the Gotland Deep, where it will be almost permanently deployed in the near future. While the recovery of the mooring appeared to work smoothly at the beginning, the sensor package was ripped off during recovery. After getting the winch, rope, and bottom gear aboard, the profiling unit was secured using the ship's zodiac. A first glance at the data shows that the instrument seems to have worked flawlessly, a major step toward continuous high spatiotemporal data acquisition of water column properties in the Gotland Deep.

After the successful recovery of GODDESS, we headed toward a key station for sedimentary geochemical and biogeochemical work at a station dedicated to detailed work on the formation and destruction of barite in different strata of the sediments in the Gotland Basin. The sampling of this key station (045) comprised not less than 11 cores in total, finding their way into the different labs, isotope container, and the cool storage for further analysis ashore.The night was spent for a single beam echosounder survey first heading NW, continued by a section crossing the western part of the GD in NW-SE direction (046) and extending a line in the eastern part of the GD already recorded during cruise P392 of RV *Poseidon*. The remainder of the night was spent with a pump CTD cast in the central GD, where the upper 30 m of the water column were sampled with high resolution to address the still enigmatic process of methane production in the upper, well oxygenated water column (047).

Friday, August 6th

This day was dedicated to a transect of CTD and coring stations based on the echosounder transects of station 046 and its northeastward extension recorded during P 392. The six stations (049 to 054) extend from the SE from a position close to the point where the depth of the redoxcline "hits" the seafloor towards the NW until the seafloor is mostly free of organic-rich Littorina stage sediments, including the central Gotland Deep station (052). At this station, additional long cores were taken for paleomagnetic studies and a biomarker study to look at signs of methanotrophic processes. The water column methane distribution still shows a slight maximum at around 60 m, but is dominated by the known high concentrations in the anoxic part of the water column. The coring revealed high methane increase in some,

but not all of the stations and point to a strong dependence of the flux of methane from the thickness of the organic-rich Littorina mud deposits.

The night was spent with a long single beam echosounder survey (055), which was used to first proceed northward and then to define a NW-SE trending section across the central Baltic from the Faro Depression to the Piltene Depression.

Saturday, August 7th

Based on the results of station 055, a section of 5 CTD/coring stations was selected, of which the three stations (56-58) furthest to the SE were sampled in the remaining time of the first cruise leg. Station 056 in the Piltene Depression was located above a shallow gas occurrence, and consequently showed a very strong methane gradient in the upper sediment column. The water column methane profile showed a distinct maximum in about 25m leading to enhanced surface concentrations, which confirms the observations of a continuous CH4 monitoring system installed by IOW on a ship-of-opportunity line between Helsinki and Travemünde. Further towards the NW, the methane concentrations in this depth layer gradually decrease (057-058). In the same direction, the methane gradients in the underlying sediments got less steep, with no detectable gradient measured in the upper meter of station 058. After another 4 h of echosounder surveys, the scientific program of MSM 16/1a ended at midnight and the ship headed towards the harbor of Visby (Gotland, Sweden).

Sunday, August 8th

At 8 am on August 8th, RV *Maria S Merian* went into the port of Visby, where seven members left the scientific party of MSM16/1, while eight new colleagues from Sweden and Germany joined us for the 2nd leg of the cruise. While the village of Visby was in the hands of vikings and knights armed with helmets, longbows, axes and swords because of the opening of the Medieval Festival, all members of crew and science party were back on the boat unharmed, the ship left port on schedule at 6 p.m., and we headed towards the eastern slope of the Gotland Deep at the latitude of the mouth of the Gulf or Riga

Monday, August 9th to Tuesday, August 10th

Here, we conducted a 26h program of 8 CTD casts and a series of transects inbetween (stations 060 – 070), covered with acoustic profiling by the single beam echosounder systems, but dedicated to a surface water equilibration system measuring the methane and carbon dioxide concentration continuously. The survey was initiated by data from a similar, continuously operating system on the ship of opportunity Finnmaid, which regularly show that this region acts as a source of methane of unknown origin. The survey revealed a clear pattern of methane oversaturations of up to 600%, apparently fed by enhanced sub-thermocline concentrations in about 25 m water depths and increasing towards the shore. Detailed analysis of T/S/methane relations and isotopic analysis will be used to further constrain whether this permanent source is driven by local geologic point sources or the interaction with the waters leaving the Gulf of Riga.

This survey ended at 4 a.m. on August 10th, and the program continued by two more CTD/coring stations (071, 073), completing the section started on August 7th (056-058). While station 071 was chosen to gather information about the pore water/methane distribution in an area where only very few organic younger sediments are deposited, station 73 was positioned in the high-accumulation region of the Faro depression. This station was designated extended biogeochemical sampling, which resulted in a total of 12 cores of different length to be taken, including 2 gravity cores of which the first, with 15m, was the longest core so far retrieved during this cruise. Between these two stations, the multichannel seismic equipment was tested (072), and successfully recorded along a part of an earlier acoustic survey (055). This approach will allow a combination and comparison of various acoustic methods optimized for different resolution and penetration, which is one of the key approaches followed within Baltic Gas. After resuming the coring program (073) at midnight, we headed north for our 180 nm transit to the southern extension of the Bothnian Sea.

Wednesday, August 11th
Parts of the transit to the Bothnian Sea were used for further acoustic lines in the northern part of the Gotland Deep and the southernmost part of the Bothnian Sea (074 and 076), before a 37 nm transect across the areas with highest deposition of Littorina sediments was covered by single beam echosounding and towed multichannel seismic during the night (077).

Thursday, August 12th.
Station 077 revealed that the distribution of organic-rich Littorina sediments is rather complex, with areas with several meter thickness of different size alternating with eroded sections with harder and less carbon containing strata. Two small patches with indication of free gas in the upper sediment layer were detected both in the Parasound as well as in the SE 96 echosounder data. The availability of both data sets facilitates the optimization of the positioning of 4 CTD/coring stations, and a total of five stations (078, 080-083) was selected. A striking contrast in the general water column properties is the lower salinity, the well oxygenated and cold bottom waters, all consequences of the lack of a permanent pronounced halocline and thus, better ventilation in wintertime. Four of the coring stations were aiming for varying thicknesses of the methanogenic Littorina mud layer, while one station almost devoid of these deposits (082) was chosen to prove the concept that the methane flux from these settings can be neglected for a budget of the methane flux for the Baltic.

Friday, August 13th
The night was used for to head north and gather subbottom acoustic information along 3 transects crossing the central Bothnian Sea (084), with the aim to have a data base for the selection of coring sites on the next day. Despite the fact that pronounced backscatter in the deeper layers of the water column could be detected, the methane concentrations in the water column of the Bothnian Sea stays very low (085-087). Sampling of the sediments included one station (085) where geochemical, physical and various rate measurements to be performed resulted in a total of 10 cores to be taken – a tedious work due to the very soft and nearly unretainable upper sediments. At the end of the day, the entire scientific crew was willed to believe in any tales dealing with Friday 13th as well as to leave the working region of the Bothnian Bay.

Saturday, August 14th
In the following night, FS *Maria S. Merian* headed north towards the northernmost basin of the Baltic, the Bothnian Bay. On its way, station US2 at the northern end of the Bothnian Sea was sampled in the morning on request of the INFLOW project (089). The core was taken right into a drift body in a depression some 40 m deeper (209 m) than the surrounding seafloor. After we reached the Bothnian Bay in the beginning of the night, the night from Saturday to Sunday was spend for a hydroacoustic survey (90) heading north, zigzagging across the main depositional basin for young Littorina sediments with the aim of having better information of the sub-seafloor for the CTD/coring program of the next day.

Sunday, August 15th
In an extended coring program from 8 am to midnight, five coring sites were sampled (091-095), of which three were requested coring sites of the INFLOW and/or HYPER projects (RR6, F9, BO3sed), one was suggested by our Finnish colleagues because of the known existence of shallow gas deposits (RR3), and one was selected as typical for a large deposition basin for postglacial young sediments based on the preceding survey (090). All of the stations except BO3sed (095) were sampled for all parameters needed to estimate the methane flux, while the shallow gas station (092, RR3) was used to end the sequence of cores taken to investigate the characteristics of biomarkers for methanotrophic processes along the salinity gradient of the Baltic (started with Station 03 in the Mecklenburg Bight and

continued with Station 56 on the eastern part of the Gotland Basin). Station F9 (093) was selected as site for detailed studies again, with a total of eleven cores taken.

Monday, August 16th
After using the transit back to the northern Bothnian sea for some additional acoustic profiling (096), a gravity core was taken at HYPER/INFLOW station US5B (97). After this short interruption, we directly headed further towards the eastern Gotland Basin.

Tuesday, August 17th
Upon arrival at the eastern Gotland Basin south of the Gulf of Riga, a CTD/rosette was taken for a test of different methods for the determination of methane in seawater. Due to the fast and positive reaction of the ministry of foreign affairs of Latvia to an urgent request to extend our working area towards the east, it was possible to map a large area of the Piltene depression by towed multichannel seismic in combination with Parasound and Multibeam backscatter recording (099). The area is characterized by a sedimentary filled basin with a widespread distribution of free gas, partly derived from deeper sedimentary strata.

Wednesday, August 18th
After ending the multichannel seismic survey of the Piltene Basin in the early morning, we headed further south towards the central Gotland Deep, where the last pump-CTD station of our expedition was dedicated to the task of the comparison of different analytic methods for methane in the water column, including a fully automated gas-water equilibration system which is usually used as an underway system, but here was fed by the water stream of the pump-CTD. With this, our work in the Gotland Basin ended in the afternoon and we headed further to the Bornholm Basin.

Thursdsay, August 19th
In the morning of August 19th, three stations in immediate vicinity were sampled by Rumohr corer in the northern Bornholm Basin (101-103) within the area of the earlier deep-water Multibeam backscatter survey across the boundary between gas and non gas-containing surface sediments (029). The scope of this survey was to correlate the strength of the backscatter data and the upper depth of the free gas zone directly with the geochemically estimated free gas zone based on methane gradient measurements. After this, a 24h multichannel seismic survey (with Parasound and EM120 backscatter survey, station 104) was used to complete some of the gaps of the shallow gas transition zone mapping during the first 2 hours, and then was dedicated to reveal deeper insight into the main gas accumulation areas in the Bornholm Basin.

Friday, August 20th
After ending the multichannel seismic work at 2p.m., RV *Maria S Merian* was bound to head towards Kiel Canal. The track was used for further gathering data on the methane and CO_2 surface water distribution (105), and after entering into Danish waters, the scientific program of MSM 16/1 ended at 00:00.

Saturday, August 21st to Sunday, August 22nd
RV *Maria S. Merian* met the pilot at Kiel Holtenau in time and went into the sleuth at 11a.m. Here, a larger fraction of the scientific party left the ship, while some guests of the science party as the first delegation of the shipyard entered the ship. With disembarkation of the guests and some additional people boarding the ship, we left Brunsbüttel at 8 p.m. and headed to our final destination, the shipyard in Emden where the ship arrived at former Blohm& Voss on Sunday, August 22nd, at 12:30.

5. Station list and device acronyms

CTD	CTD/Rosette
CTD SV	
CTD btl	
GC	Gravity corer
FL	Frahm corer
MB	Multibeam Echosounder (depth)
PS	Parasound Sediment Echosounder (depth)
RL	Rumohr corer
SES	Single Beam echosounder

Abbreviations used in attached station list

Stationlist of MSM 16/1 ab						Start of Station							Bottom	On deck	Recovery			
Cruise	Station	Cast	Shipstation	Cast	Device	Date/Time		Latitude [N]		Longitude [E]		Depth	Time	Time	Success	Operator	Remarks	PANGAEA-ID
			MSM16-			[UTC]		DEG	MIN	DEG	MIN	[meter]	[UTC]	[UTC]	Y/N - [m]	Name		
Saturday 31.07.10.																		
MSM16/1	001		697	01	CTD	31.07.10	10:07	54	22,597	11	20,206	20,6	10:09:00	10:11	yes	Krüger		
MSM16/1	002		698	01	MB	31.07.10	10:28	54	12,773	11	23,617	18	--	11:21	yes	Schneider		
MSM16/1	003	01	699	01	CTD	31.07.10	13:15	54	7,368	11	11,191	21,5	13:20:20	13:23	yes	Krüger		
		02		02	RL	31.07.10	13:31	54	7,369	11	11,191	25,6	13:32:00	13:34	yes			
		03		03	RL	31.07.10	13:37	54	7,368	11	11,189	26,1	13:39:30	13:41	yes			
		04		04	RL	31.07.10	13:43	54	7,368	11	11,19	26,9	13:44:35	13:46	yes			
				05	FL	31.07.10	13:49	54	7,368	11	11,19	26,3	13:51:01	13:52	no			
				06	FL	31.07.10	14:00	54	7,368	11	11,19	26,5	14:02:05	14:03	no			
		05		07	FL	31.07.10	14:06	54	7,368	11	11,19	24,2	14:08:00	14:09	yes			
MSM16/1	004		700	01	MB, PS	31.07.10	15:20	54	12,773	11	23,617	20	--	17:31	yes	Schneider		
MSM16/1	005		701	01	PS	31.07.10	17:56	54	12,773	11	23,617	20	--	18:13	yes			
MSM16/1	006		702	01	CTD	31.07.10	18:41	54	12,62	11	23,384	21	18:44:00	18:47	yes	Krüger		
Sunday 01.08.10.																		
MSM16/1	007		703	01	CTD	01.08.10	03:05	54	48,614	13	41,99	42,5	03:10:00	03:14	yes	Krüger		
MSM16/1	008		704	01	MB, SES	01.08.10	03:37	54	49,47	13	41,46	45	--	06:03	yes	Schneider		
MSM16/1	009	01	705	01	CTD	01.08.10	06:27	54	48,87	13	42,064	43,7	06:31:00	06:37	yes	Krüger		
				02	RL	01.08.10	06:46	54	48,865	13	42,096	39,8	06:48:54	06:50	no			
				03	RL	01.08.10	06:52	54	48,865	13	42,097	39,7	06:54:00	06:56	no			
		02		04	RL	01.08.10	06:58	54	48,865	13	42,095	39,7	07:00:01	07:01	yes			
		03		05	RL	01.08.10	07:05	54	48,865	13	42,097	39,7	07:07:40	07:09	yes			
		04		06	FL	01.08.10	07:14	54	48,865	13	42,097	39,7	07:16:37	07:19	yes			
				07	GC	01.08.10	08:09	54	48,864	13	42,097	39,7	08:11:20	08:19	no		12 m core, only 5 m sediment	
		05		08	GC	01.08.10	08:39	54	48,864	13	42,097	39,7	08:41:00	08:52	yes		only 4,5 m sediment, core used anyway	
MSM16/1	010	01	706	01	CTD	01.08.10	09:37	54	48,23	13	39,983	42,3	09:39:00	09:51	yes	Krüger	from station 010 onwards all depths from Ecosounder	
		02		02	RL	01.08.10	10:01	54	48,269	13	39,985	43,8	10:03:51	10:05	yes			
		03		03	RL	01.08.10	10:10	54	48,269	13	39,985	43,9	10:12:40	10:14	yes			
		04		04	FL	01.08.10	10:17	54	48,269	13	39,985	43,9	10:21:13	10:23	yes			
		05		05	GC	01.08.10	10:38	54	48,269	13	39,986	43,9	10:40:32	10:48	yes			
MSM16/1	011	01	707	01	CTD	01.08.10	11:56	54	44,049	13	39,905	39,4	12:04:00	12:12	yes	Krüger		
				02	RL	01.08.10	12:19	54	44,049	13	39,905	40,7	12:20:00	12:21	no			
		02		03	RL	01.08.10	12:22	54	44,049	13	39,905	40,7	12:23:09	12:25	yes			
				04	RL	01.08.10	12:27	54	44,049	13	39,905	40,7	12:29:35	12:31	no			
				05	RL	01.08.10	12:32	54	44,049	13	39,905	40,7	12:35:47	12:37	no			
				06	RL	01.08.10	12:39	54	44,049	13	39,905	40,7	12:41:18	12:43	no			
		03		07	RL	01.08.10	12:44	54	44,049	13	39,905	40,7	12:47:00	12:49	yes			
				08	FL	01.08.10	12:53	54	44,049	13	39,905	40,7	12:54:45	12:56	no			
		04		09	FL	01.08.10	12:57	54	44,049	13	39,905	40,7	12:59:07	13:01	yes			
		05		10	GC	01.08.10	13:17	54	44,041	13	39,905	40,7	13:20:01	13:27	yes			
MSM16/1	012	01	708	01	CTD	01.08.10	14:30	54	42,488	13	38,179	37,4	14:35:55	14:49	full	Prien		
		02		02	RL	01.08.10	14:59	54	42,488	13	38,18	38,8	15:00:35	15:02	yes			
				03	RL	01.08.10	15:04	54	42,487	13	38,18	38,8	15:07:10	15:09	no			
		03		04	RL	01.08.10	15:10	54	42,488	13	38,181	38,8	15:11:50	15:13	yes			
				05	FL	01.08.10	15:17	54	42,488	13	38,18	38,8	15:19:30	15:21	no			
		04		06	FL	01.08.10	15:28	54	42,489	13	38,181	38,8	15:30:45	15:32	yes			
		05		07	GC	01.08.10	16:10	54	42,489	13	38,181	38,8	16:11:40	16:17	yes			
MSM16/1	013		709	01	CTD	01.08.10	17:47	54	42,2141	13	23,7741	29	17:51:00	18:01	full	Prien		
MSM16/1	014		710	01	CTD	01.08.10	18:53	54	46,8221	13	26,6464	41,17	18:58:00	19:07	full	Prien		
MSM16/1	015		711	01	CTD	01.08.10	19:55	54	51,4685	13	28,0624	44,4	19:55:00	20:03	full	Prien	bottle 1 top lid not closed	
MSM16/1	016		712	01	CTD	01.08.10	21:01	54	56,2375	13	29,0055	45,4	21:06:00	21:15	full	Prien		
MSM16/1	017		713	01	CTD	01.08.10	22:14	55	0,997	13	29,6081	44	22:20:32	22:36	yes	Kurth		
MSM16/1	018		714	01	CTD	01.08.10	23:16	55	5,7791	13	30,0934	42,5	23:21:05	23:32	yes	Kurth		
Monday 02.08.10.																		
MSM16/1	019		715	01	CTD	02.08.10	00:28	55	10,5684	13	31,0628	41,9	00:33:52	00:48	yes	Kurth		
MSM16/1	020		716	01	CTD	02.08.10	01:54	55	15,0249	13	31,4013	38	01:59:10	02:13	yes	Kurth		
MSM16/1	021		717	01	CTD	02.08.10	02:57	55	19,4601	13	32,0118	21,6	03:01:08	03:11	yes	Kurth		
MSM16/1	022		718	01	CTD	02.08.10	06:31	55	12,9885	14	34,2322	42,4	06:35:00	06:37	yes	Krüger		
			719	02	MB, PS	02.08.10	06:59	55	12,65	14	33,74	40	--	09:13	yes	Schneider	shallow gas: 08:50	
MSM16/1	023		720	01	CTD	02.08.10	11:58	55	24,098	15	28,378	90,2	12:09:28	12:28	yes	Krüger		
MSM16/1	024	01	721	01	CTD	02.08.10	13:36	55	15,021	15	26,149	91	13:45:36	14:01	yes	Krüger		
		02		02	RL	02.08.10	14:08	55	15,021	15	26,149	93,7	14:11:24	14:17	yes			
		03		03	RL	02.08.10	14:20	55	15,021	15	26,149	93,7	14:23:45	14:27	yes			
				04	RL	02.08.10	14:30	55	15,021	15	26,148	93,7	14:33:50	14:40	no			
		04		05	RL	02.08.10	14:42	55	15,021	15	26,148	93,7	14:46:44	14:51	yes			
		05		06	RL	02.08.10	14:53	55	15,021	15	26,149	93,7	14:57:03	15:01	yes			
		06		07	RL	02.08.10	15:03	55	15,021	15	26,148	93,7	15:07:05	15:13	yes			
		07		08	GC	02.08.10	15:45	55	15,021	15	26,149	93,5	15:47:01	16:01	yes			
		08		09	GC	02.08.10	17:15	55	15,022	15	26,149	93,7	17:19:30	17:30	yes			
MSM16/1	025	01	722	01	CTD	02.08.10	18:43	55	22,201	15	27,903	91,6	18:53:12	19:10	yes	Krüger		
		02		02	RL	02.08.10	19:18	55	22,183	15	27,885	93,4	19:21:43	19:25	yes			
		03		03	RL	02.08.10	19:27	55	22,183	15	27,886	93,4	19:32:30	19:35	yes			
		04		04	GC	02.08.10	19:44	55	22,183	15	27,886	93,7	19:49:08	20:02	yes			
MSM16/1	026	01	723	01	CTD	02.08.10	21:01	55	27,516	15	31,013	82,9	21:08:41	21:21	yes	K		
MSM16/1	027	01	724	01	CTD	02.08.10	22:08	55	30,015	15	34,039	76,2	22:17:00	22:27	yes	K		
Tuesday 03.08.10.																		
MSM16/1	028	01	725	01	CTD	03.08.10	00:43	55	35,769	14	54,851	75,3	00:48:00	00:52	yes	Krüger		
MSM16/1	029	01	726	01	SES, PS	03.08.10	01:03	55	35,748	14	54,851		--	05:17	yes	Nickel		
		02		02	MB, PS	03.08.10	05:48						--	07:42	yes	Schneider		
		03		03	MB, PS	03.08.10	08:00	55	34	14	56,3		--	10:00	yes	Schneider		

MSM16/1	030	01	727	01	iPWS	03.08.10	11:06	55	35,32	14	53,638	78,1	11:10:00	11:23	yes	Oehler		
MSM16/1	031	01	728	01	CTD	03.08.10	12:17	55	33,4996	14	55,4032	75,8	12:31:00	12:55	yes	Prien		
		02		02	RL	03.08.10	13:05	55	33,499	14	55,401	77,9	13:08:35	13:14	yes			
					RL	03.08.10	13:16	55	33,5	14	55,401	77,9	13:20:20	13:25	no			
		03		03	RL	03.08.10	13:27	55	33,5	14	55,401	77,9	13:30:01	13:32	yes			
MSM16/1	032	01	729	01	CTD	03.08.10	14:04	55	34,92	14	57,4891	76,4	14:10:00	14:28	full	Prien		
		02		02	RL	03.08.10	14:30	55	34,92	14	57,49	78,4	14:33:56	14:35	yes			
		03		03	RL	03.08.10	14:42	55	34,92	14	57,49	78,4	14:45:10	14:47	yes			
		04		04	FL	03.08.10	15:01	55	34,92	14	57,49	78,4	15:05:00	15:12	yes			
		05		05	GC	03.08.10	15:20	55	34,921	14	57,491	78,4	15:24:00	15:32	yes			
MSM16/1	033	01	730	01	SES, PS	03.08.10	15:54	55	34,921	14	57,491	78	--	19:20	yes	Endler, Nickel		
MSM16/1	034	01	731	01	pCTD	03.08.10	19:26	55	14,95	15	26,16	90,7	19;55		yes	Krüger		
		02			pCTD	03.08.10	20:07	55	14,95	15	26,16	90,7	22:42:00		yes	Krüger		
		03			pCTD	03.08.10	22:48	55	14,96	15	26,16	90,7	00:08:00	00:25	yes	Krüger		
Wednesday 04.08.10.																		
MSM16/1	035	01	732	01	SES	04.08.10	00:28	55	14,96	15	26,15	90,7	--	03:40	yes	Nickel		
MSM16/1	036	01	733	01	CTD	04.08.10	03:42	55	28,6165	14	46,4394	73,7	03:50:00	04:08	full	Prien		
MSM16/1	037	01	734	01	CTD	04.08.10	05:02	55	24,5972	14	40,323	75,7	05:12:00	05:23	full	Prien		
MSM16/1	038	01	735	01	CTD	04.08.10	06:16	55	26,7186	14	43,4811	67,8	06:24:00	06:37	full	Prien		
MSM16/1	039	01	736	01	SES	04.08.10	06:43	55	26,72	14	43,48	68	--	09:49	yes	Endler		
MSM16/1	040	01	737	01	RL	04.08.10	10:07	55	22,18	15	27,29	93,6	10:09:10	10:12	yes			
				02	RL	04.08.10	10:19	55	22,18	15	27,29	93,6	10:21:30	10:24	no			
				03	RL	04.08.10	10:29	55	22,18	15	27,29	93,6	10:31:25	10:33	no			
		02		04	RL	04.08.10	10:40	55	22,18	15	27,29	93,6	10:42:24	10:47	yes			
				05	RL	04.08.10	10:50	55	22,18	15	27,29	93,6	10:53:00	10:56	no			
				06	RL	04.08.10	10:59	55	22,18	15	27,29	93,6	11:03:00	11:07	no			
		03		07	RL	04.08.10	11:10	55	22,18	15	27,29	93,6	11:13:19	11:16	yes			
		04		08	RL	04.08.10	11:22	55	22,18	15	27,29	93,6	11:25:10	11:28	yes			
		05		09	GC	04.08.10	11:40	55	22,18	15	27,29	93,6	11:43:01	11:50	yes			
MSM16/1	041	01	738	01	CTD SV	04.08.10	23:45	55	22,145	19	13,905	126,6	00:00:00	00:21	yes	Krüger		
Thursday 05.08.10.																		
MSM16/1	042	01	739	01	MB, PS	05.08.10	01:08	55	19,53	19	13,92	120	--	06:15	yes	Schneider		
MSM16/1	043	01	740-741		MOR	05.08.10	06:22						--	13:00	yes			
MSM16/1	044	01	742	01	CTD SV	05.08.10	13:13	57	19,339	20	7,817	237	13:22:00	13:33	yes	Krüger		
MSM16/1	045	01	743	01	CTD	05.08.10	15:32	57	15,003	19	50,012	210	15:40:06	15:50	yes	Krüger		
				02	RL	05.08.10	15:54	57	15,003	19	50,012	210	16:05:00	16:12	no			
		02		03	RL	05.08.10	16:13	57	15,003	19	50,012	210	16:20:35	16:28	yes			
		03		05	RL	05.08.10	16:35	57	15,003	19	50,012	210	16:42:48	16:50	yes			
		04		06	RL	05.08.10	16:55	57	15,003	19	50,012	210	17:01:55	17:09	yes			
		05		07	RL	05.08.10	17:13	57	15,003	19	50,012	210	17:19:03	17:25	yes			
		06		08	RL	05.08.10	17:28	57	15,003	19	50,012	210	17:33:55	17:39	yes			
		07		09	RL	05.08.10	17:41	57	15,003	19	50,012	210	17:47:39	17:53	yes			
				10	FL	05.08.10	17:58	57	15,003	19	50,012	210	18:04:13	18:09	no			
		08		11	FL	05.08.10	18:13	57	15,003	19	50,012	210	18:21:20	18:25	yes			
		9a		12	FL	05.08.10	18:28	57	15,003	19	50,012	210	18:36:03	18:41	yes			
		9b		13	FL	05.08.10	18:46	57	15,003	19	50,012	210	18:52:17	18:57	yes			
		10		14	GC	05.08.10	19:10	57	15,003	19	50,012	210	19:15:09	19:21	yes			
		11		15	GC	05.08.10	20:54	57	15,003	19	50,012	210	20:59:15	21:07	yes			
MSM16/1	046	01	744	01	SES	05.08.10	21:50	57	15	19	50		--	00:54	yes	Nickel		
Friday 06.08.10.																		
MSM16/1	047	01	745	01	pCTD	06.08.10	01:07	57	17,027	20	7,132	30	--	01:12	yes	Krüger		
		02				06.08.10	01:22	57	17,027	20	7,132	30	--	04:38	yes	Krüger		
MSM16/1	048	01			SES	06.08.10	04:40	57	17	20	7,2	240	--		yes	Nickel		
MSM16/1	049	01	746	01	CTD	06.08.10	06:09	57	9,0983	20	26,4637	123,8	06:21:00	06:37	full	Prien		
		02		02	RL	06.08.10	06:44	57	9,099	20	26,464	126,7	06:46:50	06:50	yes			
		03		03	RL	06.08.10	07:00	57	9,099	20	26,465	126,7	07:03:17	07:06	yes			
		04		04	FL	06.08.10	07:11	57	9,099	20	26,465	126,7	07:15:10	07:20	yes			
MSM16/1	050	01	747	01	CTD	06.08.10	08:35	57	12,8555	20	16,8492	172,5	08:54:00	09:15	full			
				02	RL	06.08.10	09:22	57	12,856	20	16,851	172,5	09:26:58	09:32	no			
		02		03	RL	06.08.10	09:38	57	12,855	20	16,851	172,5	09:43:42	09:47	yes			
		03		04	RL	06.08.10	09:51	57	12,855	20	16,852	172,5	09:56:53	10:00	yes			
				05	FL	06.08.10	10:02	57	12,855	20	16,851	172,5	10:07:00	10:11	no			
		04		06	FL	06.08.10	10:15	57	12,855	20	16,851	172,5	10:19:00	10:23	yes			
MSM16/1	051	01	748	01	CTD	06.08.10	11:08	57	14,9367	20	12,1638	236	11:22:22	11:46	full			
		02		02	RL	06.08.10	11:51	57	14,937	20	12,165	235	11:58:53	12:05	yes			
				03	RL	06.08.10	12:06	57	14,937	20	12,165	235	12:10:00	12:17	no			
		03		04	RL	06.08.10	12:20	57	14,937	20	12,165	235	12:26:00	12:30	yes			
				05	FL	06.08.10	12:35	57	14,937	20	12,165	235	12:40:00	12:44	no			
		04		06	FL	06.08.10	12:49	57	14,938	20	12,163	235	12:54:00	12:59	yes			
MSM16/1	052	01	749	01	CTD	06.08.10	13:44	57	16,997	20	7,183	238	14:00:57	14:24	yes	Krüger		
				02	RL	06.08.10	14:29	57	16,998	20	7,181	242	14:35:40	--	no			
		02			RL	06.08.10	14:42	57	16,998	20	7,182	242	14:48:14	14:55	yes			
		03		03	RL	06.08.10	14:57	57	16,998	20	7,182	242	15:02:20	15:08	yes			
		04		04	FL	06.08.10	15:10	57	16,998	20	7,182	242	15:16:34	15:21	yes			
				05	FL	06.08.10	15:24	57	16,998	20	7,182	242	15:29:30	15:34	no			
		5a		06	FL	06.08.10	15:49	57	16,993	20	7,203	242	15:54:50	16:00	yes			
		5b		07	FL	06.08.10	16:10	57	16,995	20	7,205	242	16:16:08	16:23				
		06		08	GC	06.08.10	16:30	57	16,993	20	7,204	241,9	16:34:40	16:42	yes			
		07		09	GC	06.08.10	16:53	57	16,993	20	7,204	241,9	16:54:50	17:00	yes			
MSM16/1	053	01	750	01	CTD	06.08.10	17:52	57	19,886	20	0,8089	230	18:08:35	18:34	yes	Krüger		
				02	RL	06.08.10	18:44	57	19,888	20	0,809	234,5	18:48:40	18:52	no			
				03	RL	06.08.10	18:53	57	19,884	20	0,812	234,5	19:00:00	19:04	no			

					RL	06.08.10	19:07	57	19,884	20	0,81	234,5	19:12:20	19:19	no		
		02			RL	06.08.10	19:19	57	19,884	20	0,81	234,5	19:27:52	19:34	yes		
		03			RL	06.08.10	19:36	57	19,884	20	0,81	234,5	19:40:26	19:44	yes		
		04		04	FL	06.08.10	19:47	57	19,885	20	0,812	234,5	19:53:50	19:57	yes		
MSM16/1	054	01	751	01	CTD	06.08.10	20:54	57	23,066	19	53,565	200,7	21:11:15	21:25	yes	Krüger	
					RL	06.08.10	21:32	57	23,066	19	53,564	204,4	21:36:50	21:39	no		
		02			RL	06.08.10	21:40	57	23,066	19	53,564	204,4	21:45:00	21:50	yes		
		03			RL	06.08.10	21:55	57	23,066	19	53,564	204,4	22:00:00	22:05	yes		
		04			FL	06.08.10	22:09	57	23,066	19	53,566	204,4	22:14:00	22:20	yes		
MSM16/1	055	01	752	01	SES	06.08.10	22:38	57	23,69	19	54,29	200	--	08:16	yes	Nickel	
Saturday 07.08.10.																	
MSM16/1	056	01	753	01	CTD	07.08.10	08:38	57	30,0944	21	9,1797	66	08:45:00	08:54	full		
		02		02	RL	07.08.10	09:01	57	30,09	21	9,18	66	09:04:00	09:07	yes		
		03		03	RL	07.08.10	09:09	57	30,1	21	9,18	66	09:11:00	09:14	yes		
		04		04	RL	07.08.10	09:18	57	30,1	21	9,18	66	09:20:00	09:22	yes		
		05		05	FL	07.08.10	09:31	57	30,1	21	9,18	66	09:33:00	09:35	yes		
		06		06	FL	07.08.10	09:38	57	30,09	21	9,18	66	09:39:00	09:41	yes		
		07		07	GC	07.08.10	09:55	57	30,1	21	9,18	66	09:58:00	10:05	yes		
		08		08	iPWS	07.08.10	10:22	57	30,11	21	9,2	66	10:27:00	10:30	yes		
MSM16/1	057	01	754	01	CTD	07.08.10	13:43	57	38,884	20	38,751	136	13:54:13	14:46	yes		
		02		02	RL	07.08.10	14:18	57	38,883	20	38,752	139,3	14:22:00	14:26	yes		
		03		03	RL	07.08.10	14:27	57	38,883	20	38,752	139,3	14:31:00	14:35	yes		
		04			RL	07.08.10	14:37	57	38,883	20	38,752	139,3	14:41:00	14:45	no		
		05		04	FL	07.08.10	14:47	57	38,883	20	38,752	139,3	14:50:00	14:54	yes		
		06		05	GC	07.08.10	15:06	57	38,883	20	38,752	139,3	15:09:00	15:20	yes		
MSM16/1	058	01	755	01	CTD	07.08.10	16:41	57	43,259	20	23,534	140,2	03:41:00	17:04	yes		
		02		02	RL	07.08.10	17:08	57	43,259	20	23,534	140,2	17:12:00	17:17	yes		
		03		03	RL	07.08.10	17:18	57	43,259	20	23,534	140,2	17:22:00	17:26	yes		
		04		04	FL	07.08.10	17:28	57	43,259	20	23,534	140,2	17:28:00	17:32	yes		
MSM16/1	059	01	756	01	SES	07.08.10	18:06	57	43,06	20	23.30	143	--	22:34	yes		
Sunday 08.08.10.																	
Visby						08.08.10											
Monday 09.08.10.																	
MSM16/1	060	01	757	01	MB, PS, SES	09.08.10	00:00	58	13,5	20	53,5	50	--	01:40	yes		
MSM16/1	061	01	758	01	CTD	09.08.10	01:45	58	12,285	21	10879	31	--	01:55	yes		
		02		02	CTD btl	09.08.10	01:56	58	12,285	21	10879	31	01:59:43	02:05	yes		
MSM16/1	062	01	759	01	CTD	09.08.10	03:10	58	11,375	21	21,033	31	--	03:20	yes		
		02		02	CTD btl	09.08.10	03:20	58	11,374	21	21,035	31	03:23:00	03:26	yes		
MSM16/1	063	01	760	01	CTD	09.08.10	04:24	58	10.631	21	30,93	34	--	04:31	yes		
		02		02	CTD btl	09.08.10	04:31	58	10,632	21	30,923	34	04:35:00	04:37	yes		
MSM16/1	064	01	757	01	MB, PS, SES. Equi	09.08.10	04:48	58	10,631	21	30,93	34	--		yes	Schneider	
MSM16/1	065	01	761	01	CTD	09.08.10	12:39	57	33,615	20	57,433	46,6	--	12:47	yes	Krüger	
		02		02	CTD btl	09.08.10	12:47	57	33,61	20	57,435	46,6	12:53:26	12:58	yes	Krüger	
MSM16/1	066	01	762	01	CTD	09.08.10	14:17	57	36,413	20	46,754	41,5	--	14:23	yes	Krüger	
		02		02	CTD btl	09.08.10	14:23	57	36,41	20	46,756	41,7	14:26:27	14:28	yes	Krüger	
MSM16/1	067	01	757	01	MB, PS, SES	09.08.10	14:35	57	36,413	20	46,754	41	--		yes	Endler, Schneider	
MSM16/1	068	01	763	01	CTD	09.08.10	22:52	57	50,764	21	24,239	60	--	22:59	yes	Krüger	
				02	CTD btl	09.08.10	22:59	57	50,766	21	24,24	60	23:03:37	23:07	yes	Krüger	
Tuesday 10.08.10.																	
MSM16/1	069	01	764	01	CTD	10.08.10	00:14	57	52,689	21	12,552	75	--	00:23	yes	Krüger	
		02		02	CTD btl	10.08.10	00:24	57	52,69	21	12,533	75,25	00:30:00	00:34	yes	Krüger	
MSM16/1	070	01	765	01	CTD	10.08.10	01:44	57	54,502	20	59,825	81	--	01:54	yes	Krüger	
		02		02	CTD btl	10.08.10	01:54	57	54,503	20	59,825	81	01:59:35	02:03	yes	Krüger	
MSM16/1	071	01	766	01	CTD SV	10.08.10	05:02	57	48,536	20	8,806	140,5	--	05:15	yes	Krüger	
		02			CTD btl	10.08.10	05:12	57	48,538	20	8,805	140	05:25:35	05:31	yes	Krüger	
				02	RL	10.08.10	06:05	57	48,538	20	8,806	140	06:10:00	06:15	no		
		03		03	RL	10.08.10	06:20	57	48,538	20	8,806	140	06:24:00	06:28	yes		
		04		04	RL	10.08.10	06:30	57	48,538	20	8,806	140	06:34:00	06:41	yes		
		05		05	FL	10.08.10	06:43	57	48,538	20	8,806	140	06:48:00	06:53	yes		
		06		06	GC	10.08.10	07:07	57	48,537	20	8,806	140	07:11:00	07:22	yes		
MSM16/1	072	01	767	01	MCS	10.08.10	09:02	57	48,357	20	4,013		--	11:45	yes		
MSM16/1	073	01	768	01	CTD	10.08.10	12:22	57	58,758	19	53,346	190	--	12:41	yes	Krüger	
		02			CTD	10.08.10	12:42	57	58,754	19	53,331	190	12:53:56	13:01	yes	Krüger	
				02	RL	10.08.10	13:08	57	58,754	19	53,330	193,5	13:13:00	13:19	no		
				03	RL	10.08.10	13:24	57	58,754	19	53,331	193,5	13:29:00	13:34	no		
					RL	10.08.10	13:34	57	58,754	19	53,330	193,5	13:39:00	13:44	no		
		03a		04	RL	10.08.10	13:47	57	58,754	19	53,330	193,5	13:54:00	13:58	yes		
				05	RL	10.08.10	14:00	57	58,755	19	53,330	193,5	14:07:00	14:11	no		
				06	RL	10.08.10	14:17	57	58,755	19	53,329	193,5	14:23:00	14:28	no		
		04		07	RL	10.08.10	14:37	57	58,755	19	53,331	193,5	14:43:00	14:48	yes		
		05		08	RL	10.08.10	14:50	57	58,754	19	53,332	193,5	14:57:00	15:02	yes		
				09	RL	10.08.10	15:04	57	58,754	19	53,330	193,5	15:10:00	15:15	no		
		06		10	RL	10.08.10	15:17	57	58,755	19	53,330	193,5	15:24:00	15:28	yes		
		07		11	RL	10.08.10	15:31	57	58,754	19	53,330	193,5	15:37:00	15:43	yes		
				12	RL	10.08.10	16:24	57	58,755	19	53,331	193,5	16:30:00	16:34	no		
		08		13	RL	10.08.10	16:35	57	58,755	19	53,331	193,5	16:41:00	16:46	yes		
				14	FL	10.08.10	16:51	57	58,755	19	53,331	193,5	16:57:00	17:01	no		
		10		15	RL	10.08.10	17:05	57	58,755	19	53,331	193,5	17:11:00	17:15	yes		
				16	RL	10.08.10	17:18	57	58,755	19	53,331	193,5	17:24:00	17:30	no		
				17	RL	10.08.10	17:32	57	58,755	19	53,327	193,5	17:39:00	17:44	no		
				18	RL	10.08.10	17:45	57	58,756	19	53,336	193,5	17:50:00	17:55	no		
		11		19	RL	10.08.10	17:56	57	58,756	19	53,334	193,5	18:01:00	18:07	yes		

				20	RL	10.08.10	18:09	57	58,756	19	53,333	193,5	18:14:00	18:19	no		
		03b		21	RL	10.08.10	18:20	57	58,757	19	53,334	193,5	18:25:00	18:31	yes		
		09		22	FL	10.08.10	18:33	57	58,757	19	53,334	193,5	18:43:00	18:51	yes		
		12		23	GC	10.08.10	19:04	57	58,757	19	53,333	193,5	19:12:00	19:28	yes		
		13		24	GC	10.08.10	21:16	57	58,757	19	53,335	193,5	21:21:00	21:39	yes		
MSM16/1	074	01	769	01	SES, PS	10.08.10	22:34	57	58,79	19	53,26		--				
Wednesday 11.08.10.																	
MSM16/1	075	01	770	01	CTD SV	11.08.10	15:01	60	48,775	18	59,112	74,7	--	15:12	yes		
		02			CTD btl	11.08.10	15:03	60	48,775	18	59,112	74,7	15:22:32	15:26	yes		
MSM16/1	076	01	771	01	SES, PS	11.08.10	15:36	60	48,77	18	59,12	77	--	20:37	yes	Endler	
MSM16/1	077	01	772	01	MCS, PS	11.08.10	21:38	61	3,8418	19	12,363		--	06:45	yes		
Thursday 12.08.10.																	
MSM16/1	078	01	773	01	CTD	12.08.10	07:56	61	2,924	20	18,315	99,4	--	08:07	yes	Krüger	
		02			CTD btl	12.08.10	08:07	61	2,923	20	18,316		08:13:35	08:12	yes	Krüger	
				02	RL	12.08.10	08:25	61	2,918	20	18,327		08:30:00	08:34	no		
				03	RL	12.08.10	08:36	61	2,918	20	18,327		08:39:00	08:44	no		
		03		04	RL	12.08.10	08:46	61	2,918	20	18,328		08:51:00	08:56	yes		
				05	RL	12.08.10	08:59	61	2,918	20	18,327		09:03:00	09:07	no		
		04		06	RL	12.08.10	09:11	61	2,918	20	18,327		09:15:00	09:19	yes		
		05		07	RL	12.08.10	09:24	61	2,917	20	18,326		09:27:00	19:32	yes		
		06		08	iPWS	12.08.10	09:41	61	2,917	20	18,327		09:53:00	10:33	yes		
MSM16/1	079	01	774	01	MB, PS, SES	12.08.10	11:00	61	2,877	20	17,435	100	--	13:06	yes	Schneider	
MSM16/1	080	01	775	01	GC	12.08.10	13:14	61	2,907	20	18,352		13:18:00	13:34	yes	Plewe	
				02	FL	12.08.10	13:38	61	2,907	20	18,342		13:41:00	13:44	yes	Plewe	
				03	FL	12.08.10	13:48	61	2,905	20	18,349		13:51:00	13:55	no		
				04	FL	12.08.10	13:59	61	2,906	20	18,349		14:03:00	14:06	yes	Plewe	
MSM16/1	081	01	776	01	CTD	12.08.10	14:47	61	2,880	20	19,431	95,1	14:53:20	14:57	yes	Krüger	
		02			CTD btl	12.08.10	14:57	61	2,881	20	19,431	95,2	15:02:53	15:06	yes	Krüger	
		03		02	RL	12.08.10	15:12	61	2,879	20	19,429		15:15:00	15:18	yes		
		04		03	RL	12.08.10	15:21	61	2,879	20	19,428		15:25:00	15:29	yes		
		05		04	FL	12.08.10	15:32	61	2,879	20	19,428		15:35:00	15:38	yes		
MSM16/1	082	01	777	01	CTD	12.08.10	17:51	61	4,611	19	41,93	128	18:01:00	18:07	yes	Krüger	
		02			CTD btl	12.08.10	18:07	61	4,61	19	41,93	128	18:17:21	18:23	yes	Krüger	
				02	GC	12.08.10	18:29	61	4,609	19	41,929	128	18:34:00	18:48	no	Endler	
				03	GC	12.08.10	19:03	61	4,609	19	41,929	128	19:09:00	19:15	no	Endler	
		03		04	GC	12.08.10	19:37	61	4,610	19	41,940	128	19:43:00	19:54	yes		
				05	RL	12.08.10	20:00	61	4,610	19	41,940	128	20:06:00	20:10	no		
		04		06	RL	12.08.10	20:15	61	4,609	19	41,941	131,3	20:17:00	20:22	yes		
		05		07	RL	12.08.10	20:25	61	4,610	19	41,941	131,3	20:29:00	20:33	yes		
		06		08	FL	12.08.10	20:37	61	4,610	19	41,941	131,3	20:41:00	20:41	yes		
MSM16/1	083	01	778	01	CTD	12.08.10	22:07	61	5,908	19	16,894	98,6	--	22:18	yes	Krüger	
		02			CTD btl	12.08.10	22:18	61	5,908	19	16,893	98,6	22:24:42	22:31	yes	Krüger	
				02	RL	12.08.10	22:34	61	5,908	19	16,894		22:37:00	22:41	no		
				03	RL	12.08.10	22:43	61	5,908	19	16,894		22:46:00	22:50	no		
		03		04	RL	12.08.10	22:45	61	5,914	19	16,896		22:57:00	23:00	no		
		04		05	FL	12.08.10	23:06	61	5,922	19	16,893		23:09:00	23:12	yes		
		05		06	FL	12.08.10	23:20	61	5,919	19	16,909		23:23:00	23:27	yes		
Friday 13.08.10.																	
MSM16/1	084	01	779	01	SES, PS	13.08.10	00:29	61	5,91	19	16,95		--		yes	Nickel	
MSM16/1	085	01	780	01	CTD	13.08.10	12:01	61	32,398	20	42,.343	85	--	12:11	yes	Krüger	
		02			CTD btl	13.08.10	12:11	61	32,397	20	42,343	85	12:18:22	12:23	yes	Krüger	
				02	RL	13.08.10	12:28	61	32,398	20	42,342		12:30:00	12:33	no		
				03	RL	13.08.10	12:37	61	32,398	20	42,343		12:39:00		no		
				04	RL	13.08.10	12:43	61	32,398	20	42,343		12:46:00	12:49	no		
		03		05	FL	13.08.10	12:54	61	32,397	20	42,343		12:46:00	12:59	yes		
				06	FL	13.08.10	13:08	61	32,398	20	42,343		13:10:00	13:13	no		
		04		07	FL	13.08.10	13:17	61	32,398	20	42,343		13:19:00	13:22	yes		
		05		08	FL	13.08.10	13:27	61	32,398	20	42,343		13:29:00	13:33	yes		
		06		09	GC	13.08.10	13:41	61	32,398	20	42,343		13:45:00	13:50	yes		
		07		10	FL	13.08.10	14:00	61	32,398	20	42,343		14:02:00	14:05	yes		
		08		11	FL	13.08.10	14:17	61	32,398	20	42,343		14:20:00	14:24	yes		
				12	FL	13.08.10	14:30	61	32,398	20	42,343		14:32:00	14:36	no		
				13	FL	13.08.10	14:39	61	32,398	20	42,343		14:41:00	14:45	no		
				14	FL	13.08.10	14:49	61	32,398	20	42,343		14:50:00	14:55	no		
		09		15	FL	13.08.10	14:57	61	32,398	20	42,343		14:59:00	15:02	yes		
		10		16	GC	13.08.10	15:14	61	32,398	20	42,348		15:19:00	15:25	yes		
		11		17	FL	13.08.10	15:33	61	32,398	20	42,349		15:36:00	15:39	yes		
		12		18	FL	13.08.10	15:45	61	32,398	20	42,348		15:47:00	15:50	yes		
MSM16/1	086	01	781	01	CTD	13.08.10	17:04	61	31,539	20	22,126	124,2	--	17:17	yes	Krüger	
		02			CTD btl	13.08.10	17:17	61	31,539	20	22,126	124,1	17:25:04	17:30	yes	Krüger	
		03		02	FL	13.08.10	17:36	61	31,539	20	22,126		17:40:00	17:44	yes		
					FL	13.08.10	17:49	61	31,539	20	22,126		17:53:00	18:00	no		
					FL	13.08.10	18:01	61	31,539	20	22,126		18:04:00	18:11	no		
					FL	13.08.10	18:12	61	31,539	20	22,126		18:16:00	18:24	no		
					FL	13.08.10	18:26	61	31,539	20	22,126		18:30:00	18:35	no		
		04			FL	13.08.10	18:37	61	31,539	20	22,126		18:40:00	18:45	yes		
					FL	13.08.10	18:49	61	31,539	20	22,126		18:53:00	18:57	no		
		05			FL	13.08.10	19:01	61	31,539	20	22,126		19:05:00	19:11	yes		
		06			GC	13.08.10	19:22	61	31,539	20	22,126		19:28:00	19:36	yes		
		07			GC	13.08.10	19:53	61	31,539	20	22,126		19:59:00	20:14	yes		
MSM16/1	087	01	782	01	CTD	13.08.10	21:09	61	37,322	20	19,995	117	--	21:23	yes	Krüger	
		02			CTD btl	13.08.10	21:23	61	37,321	20	19,994	117	21:31:56	21:37	yes	Krüger	

		03		02	RL	13.08.10	21:43	61	37,321	20	19,995		21:48:00	21:52	yes			
		04		03	RL	13.08.10	21:58	61	37,320	20	19,993		22:02:00	22:06	yes			
		05		04	FL	13.08.10	22:10	61	37,322	20	19,995		22:14:00	22:18	yes			
		06		05	GC	13.08.10	22:28	61	37,322	20	19,995		22:31:00	22:39	yes			
MSM16/1	088	01	783	01	SES, PS	13:08.10	22:46	61	37,33	20	20,02	120	--	07:23	yes	Nickel		
Saturday 14.08.10.																		
MSM16/1	089	01	784	01	CTD	14:08.10	08:13	62	50,709	18	53,374	197	--	08:35	yes	Krüger		
		02			CTD btl	14:08.10	08:35	62	50,713	18	53,373	197	08:47:29	08:57	yes	Krüger		
		03		02	GC	14:08.10	09:11	62	50,712	18	53,375		09:18:00	09:33	yes			
MSM16/1	090	01	785	01	MB, PS, SES	14:08.10	17:03	63	48,29	21	34,84	180	--	05:10	yes	Nickel		
Sunday 15.08.10.																		
MSM16/1	091	01	786	01	CTD	15.08.10	05:21	64	48,005	23	28,803	83,5	--	05:29	yes	Krüger		
		02			CTD btl	15.08.10	05:29	64	48,002	23	28,803	83,5	05:35:01	05:39	yes	Krüger		
				02	RL	15.08.10	05:59	64	48,005	23	28,798		06:02:00	06:06	no			
		03		03	RL	15.08.10	06:09	64	48,005	23	28,803		06:12:00	06:16	yes			
		04		04	RL	15.08.10	06:19	64	48,005	23	28,801		06:21:00	06:25	yes			
		05		05	FL	15.08.10	06:30	64	48,007	23	28,800		06:33:00	06:39	yes			
		06		06	GC	15.08.10	06:51	64	48,006	23	28,803		06:55:00	07:03	yes			
		07		07	FL	15.08.10	07:05	64	48,003	23	28,799		07:10:00	07:15	yes			
MSM16/1	092	01	787	01	CTD	15.08.10	10:16	64	56,018	22	20,753	91,5	--	10:30	yes	Krüger		
		02			CTD btl	15.08.10	10:30	64	56,018	22	20,754	91,5	10:36:42	10:42	yes	Krüger		
		03		02	RL	15.08.10	10:51	64	56,018	22	20,753		10:54:00	10:59	yes			
		04		03	RL	15.08.10	11:02	64	56,017	22	20,752		11:05:00	11:09	yes			
		05		04	FL	15.08.10	11:13	64	56,017	22	20,754		11:16:00	11:21	yes			
		06		05	GC	15.08.10	11:35	64	55,957	22	20,751		11:38:00	11:49	yes			
		07		06	FL	15.08.10	11:57	64	55,957	22	20,746		12:00:00	12:05	yes			
		08		07	FL	15.08.10	12:05	64	55,956	22	20,745	91,5	12:10:00	12:15	yes			
		09		08	RL	15.08.10	12:20	64	55,956	22	20,745	91,5	12:25:00	12:30	yes			
MSM16/1	093	01	788	01	GC	15.08.10	14:17	64	41,999	22	3,719	130	14:22:00	14:28	yes			
		02		02	RL	15.08.10	14:39	64	42,003	22	3,745	122	14:43:00	14:48	yes			
		03		03	RL	15.08.10	14:54	64	42,005	22	3,745		14:57:00	15:01	yes			
		04		04	RL	15.08.10	15:04	64	42,005	22	3,744		15:04:00	15:12	yes			
		05		05	RL	15.08.10	15:15	64	42,005	22	3,745		15:15:00	15:21	yes			
		06		06	RL	15.08.10	15:24	64	42,004	22	3,745		15:24:00	15:31	yes			
		07		07	RL	15.08.10	15:35	64	42,004	22	3,745		15:35:00	15:42	yes			
		08		08	GC	15.08.10	16:13	64	42,01	22	3,743		16:18:00	16:34	yes			
		09		09	FL	15.08.10	16:36	64	42,01	22	3,745		16:40:00	16:43	yes			
		10		10	FL	15.08.10	16:46	64	42,011	22	3,744		16:51:00	16:54	yes			
		11		11	FL	15.08.10	16:58	64	42,01	22	3,745		17:01:00	17:04	yes			
	094	01	789	01	CTD	15.08.10	18:30	64	32,7	22	25,5	91,5	--	18:42	yes			
		02			CTD btl	15.08.10	18:42	64	32,8	22	25,5	91,5	18:48:23	18:52	yes			
				03	RL	15.08.10	18:59	64	32,728	22	25,616		19:00:00	19:04	no			
					RL	15.08.10	19:06	64	32,729	22	25,65		19:09:00	19:11	no			
					RL	15.08.10	19:19	64	32,731	22	25,644		19:20:00	19:24	no			
					RL	15.08.10	19:27	64	32,734	22	25,627		19:31:00	19:35	no			
		03			FL	15.08.10	19:39	64	32,745	22	25,656		19:42:00	19:46	yes			
					FL	15.08.10	19:48	64	32,755	22	25,677		19:51:00	19:55	no			
		04			FL	15.08.10	19:58	64	32,76	22	25,633		20:00:00	20:05	yes			
MSM16/1	095	01	790	01	CTD	15.08.10	21:38	64	18,073	22	20,555	106,8	--	21:50	yes	Krüger		
		02			CTD btl	15.08.10	21:50	64	18,075	22	20,583	107,2	21:57:18	22:02	yes	Krüger		
		03		02	GC	15.08.10	22:11	64	18,081	22	20,619		22:15:00		yes			
MSM16/1	096	01	791	01	MCS, PS, MB	15.08.10	22:42	64	18,3	22	20,4		--	02:30	yes			
Monday 16.08.10.																		
MSM16/1	097	01	792	01	GC	16.08.10	12:03	62	35,157	19	58,113	210	12:09:00	12:23	yes			
Tuesday 17.08.10.																		
MSM16/1	098	01	793	01	CTD btl	17.08.10	14:17	57	36,93	20	50,634	58,25	14:23:00	14:34	yes			
MSM16/1	099	01	793	02	MCS, PS, MB	17.08.10	17:39	57	36,844	20	58,573		--	04:17	yes			
Wednesday 18.08.10.																		
MSM16/1	100	01	794	01	pCTD prof	18.08.10	06:52	57	17,038	20	7,087	233,5	--	07:42	yes	Krüger		
		02			pCTD const	18.08.10	07:43	57	17,014	20	7,06	233,3	--	07:59	yes	Krüger		
		03			pCTD const	18.08.10	08:08	57	17,022	20	7,012	6,25	--	11:57	yes	Krüger		
		04			pCTD const	18.08.10	12:01	57	17,016	20	6,997	85,5	--	13:16	yes	Krüger		
		05			pCTD const	18.08.10	13:21	57	17,021	20	7,007	186	--	15:29	yes	Krüger		
Thursday 19.08.10.																		
MSM16/1	101	01	796	01	CTD	19.08.10	09:47	55	34,05	14	56,295	76,25		09:53	yes	Krüger		
		02		02	RL	19.08.10	10:00	55	34,058	14	56,303		10:03:00	10:06	yes			
		03		03	RL	19.08.10	10:09	55	34,054	14	56,311		10:12:00	10:15	yes			
MSM16/1	102	01	797	01	RL	19.08.10		55	34,059	14	56,333	78	10:35:00	10:39	yes			
					RL	19.08.10	10:41	55	34,045	14	56,321		10:43:00	10:45	no			
		02		02	RL	19.08.10	10:47	55	34,052	14	56,307		10:49:00	10:53	yes			
MSM16/1	103	01	798	01	RL	19.08.10	11:08	55	33,960	14	56,222	79	11:11:00	11:14	yes			
		02		02	RL	19.08.10	11:16	55	33,958	14	56,209		11:19:00	11:22	yes			
MSM16/1	104	01	799	01	MCS, PS	19.08.10	12:01	55	34,08	14	57,43	91,7	--	12:07	yes			On deck 20.08.10
Friday 20.08.10.																		
Saturday 21.08.10.																		
	End of data aquisition					20.08.10	09:00	54	23,07	10	11,48							