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## RV METEOR-CRUISE M78/3a

Montevideo – Montevideo, 19.05.2009 - 13.06.2009

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Master: Walter Baschek

### *Short Cruise Report*



## **Research Program**

The waters off Uruguay and Northern Argentina offer the possibility to study sediment transport processes from 'source-to-sink' in a relatively small area. Huge amounts of terrigenous sediments are deposited by the Rio de la Plata and other rivers on the shelf and at the continental margin. These quickly accumulated sediments are potentially unstable and might be transported downslope in canyons and/or on the open slope. Strong contour currents result in along-slope sediment transport. Within the scope of Meteor-Cruise M78/3a we investigated sediment transport and depositional patterns from the coast to the deep-sea by means of hydroacoustic and seismic mapping as well as geological sampling. Geotechnical investigations were carried out with the aim to analyze the controlling parameters for the destabilization of the slope and the succeeding failure of a sediment body. The investigations are related to projects of the DFG Research Center / Excellence Cluster 'The Ocean in the Earth System' with main emphasis on section SD (Sediment dynamics), University of Bremen, as well as to the project B4 (Submarine hazards at continental margins) within the Excellence Cluster 'Future Ocean', University of Kiel.

## **Narrative of the cruise**

The main group of the scientific party arrived in Montevideo on May 18<sup>th</sup>. It was originally planned to embark in Rio de Janeiro but due to problems with immigration authorities in Brazil it was decided to embark in Montevideo instead. All container handling, however, was done by the crew of RV Meteor in Rio. Due to some delay during port operations in Rio, RV Meteor arrived in Montevideo on May 19<sup>th</sup> in the morning. In total we lost about 2.5 working days as a result of the delay in Rio and the additional port call in Montevideo. We left the port of Montevideo on May 19<sup>th</sup> at 3:00h pm local time under blue skies and a light breeze. The morning in the port was used to set up the equipment, which was very quick due to the great support of the crew.

The scientific crew of Meteor-Cruise M78/3a included 18 scientists from the DFG Research Center and Cluster of Excellence 'The Ocean in the Earth System' at Bremen with scientists from Bremen University, the Max Planck Institute for Marine Micro-Biology, and the Alfred-Wegener-Institute for Polar and Marine Research, 5 scientists from the Leibniz-Institute of Marine Sciences (IFM-GEOMAR) and the Cluster of Excellence 'The Future Ocean' (Kiel), two scientists from Servicio Hidrografía Naval in Buenos Aires, one scientist each from Administracion Nacional de Combustibles Alcohol y Portland (ANCAP), Montevideo, Uruguay, Aarhus University, Denmark, and the National Institute for Space Research in Sao Jose dos Campos, Brazil, as well as two technicians from the German Weather Service.

The scientific program started with switching on the hydroacoustic systems of RV Meteor as soon as we left the 3 mile zone. We were heading to the outer shelf in order to take first geological samples. Several small sediment lenses were identified at the outer shelf. Seaward of the shelf break a 300-500 m deep terrace like feature shows thick sediment accumulations and seems to act as depositional center. The first core (GeoB13801) was taken at this terrace. The 9.5m long gravity core shows an interlayering of undisturbed and redeposited sediments indicating significant sediment transport across the shelf break. Core GeoB13802 was taken at the edge of an isolated sediment lens at the outer shelf. The 3.5m-long core mainly contains glauconite sand with indications of at least three major storm events.

Seismic profiling started in the evening of May 20<sup>th</sup> at the continental margin off Uruguay using two streamer systems and a small airgun. The slope is characterized by numerous

small to medium sized landslides and several features formed by strong contour currents. Based on the seismic data a small area with slid sediments and canyons was chosen for a detailed mapping and coring campaign. Daytime was used for coring while additional acoustic measurements were collected during night. We identified a blocky debrite, several small faults, which might act as future failure planes, and sedimentary features formed by bottom currents. Core 13808 is located directly beneath a headwall and first analyses indicate that we managed to core the glide plain of a debrite. Work in this area lasted until May 23<sup>rd</sup> in the evening (Cores 13803-13808) and was followed by a seismic survey of the upper slope off Uruguay until May 25<sup>th</sup> in the morning. The following day was used for a coring transect across another morphological step in ~1200m water depth identified in the bathymetry. The new data show that this step is not a simple headwall but formed by a complex interplay between gravitational and current induced sediment redeposition. The cored sediments are strongly consolidated. Varying sediment thickness landward of the morphological step will allow to investigate, if differential loading resulted in a destabilization of the slope.

Work on the shelf off Uruguay started on May 26<sup>th</sup>. Main target was a mud belt north of the mouth of the Rio de la Plata. Mud belts offer the possibility to sample a continuous sedimentary shelf record of the current sea level high stand. Detailed mapping of the mud belt started in the afternoon with the hydroacoustic systems of RV Meteor and the novel electromagnetic sea floor profiler 'GEM Shark', which was developed at Bremen University. Unfortunately the 'GEM Shark' was lost at an unknown underwater barrier in 45m water depth. Usually it is possible to recover the sledge with a rescue rope but this rope broke during rescue operations. Dredging for the 'GEM Shark' was also not successful, hence the instrument is lost. The night was used for additional hydroacoustic mapping. Based on the results, a coring profile with giant box corer and gravity corer was collected on May 27<sup>th</sup>. It was possible to recover a 10m-long gravity core from the center of the mud belt (Core 13813). Seismic and acoustic profiling was continued during night time and additional cores were collected the next day. An 11.5m-long gravity corer at the northern part of the mud belt (Core 13817) shows laminated sediments in its lower part. Investigations after the cruise will show whether the laminated sediments are of marine or lakustrine origin. Pore water data show extremely high concentrations of dissolved iron in the laminated sediments. The biogeochemical processes being responsible for the high iron content will be analyzed in detail in the future.

May 29<sup>th</sup> and 30<sup>th</sup> was used to collect a long seismic profile to the south along the 70m contour between 36°00'S and 37°15'S. Main objective was to search for incised valleys, which would represent a direct connection between canyons on the slope and rivers on land during times of sea-level-low stands. We did not find clear indications for incised valleys; therefore we concluded that canyons on the slope including the deeply incised Mar de la Plata Canyon originated at an upper slope location. The night was used for a bathymetric profile along the axis of the Mar de la Plata canyon and was followed by a short transit to the southernmost location of our cruise at 39°30'S, 53°43'W (Stations 13819 and 13820). These cores were mainly taken for geochemical analyses. Ikaites were recovered during previous cruises at these locations. Small amounts of ikaites were recovered again and the ~10m-long cores offer most promising possibilities for investigating diagenetic processes especially at the sulphate-methane transition zone. The water column was sampled with CTD/rosette water sample and insitu pumps at this location.

On the way back to the distal Mar de la Plata Canyon the wind was increasing up to force 8-9. Station work on June 1<sup>st</sup> was stopped because it was not possible to keep the vessel on position due to strong currents and winds. Therefore we continued bathymetric mapping of the Mar de la Plata Canyon. The canyon originates at ~900m water depth, is deeply incised (more than 1000m) and runs relatively straight up to 3500m water depth. Slightly decreasing winds on June 3<sup>rd</sup> allowed to recover three gravity cores of the distal part of the canyon. Several sandy turbidites and small debrites were identified in the cores. A combined analysis of these cores and cores from the proximal part of the canyon will allow to reconstruct canyon activity through time. Increasing winds forced us to stop the coring program again and also prohibited the deployment of the seismic system. Hence the night was used for additional bathymetric profiling of the canyon.

A short period with wind forces less than 6 in the morning of June 4<sup>th</sup> allowed to deploy the seismic system. Seismic profiling was continued until June 6<sup>th</sup> in the morning despite increasing winds up to force 9 again. Contouritic deposits north of the Mar de la Plata Canyon were the main target of the seismic survey. The new data show that the contouritic deposits are more complicated than previously assumed and build out of individual sedimentary bodies separated by small gullies. The new seismic net is dense enough for a reconstruction of the sedimentary history of this area. June 6<sup>th</sup> was used for collecting 4 gravity cores of the contourites (13825-13828). The cores are characterized by an interlayering of sandy and clayey layers and are partly laminated, hence indicating changing current intensities.

Additional seismic profiles of the head region of the Mar de la Plata Canyon were collected during the night. The data prove an upper slope origin of the canyon. June 7<sup>th</sup> was used for coring the thalweg of the canyon (Cores 13829-13833). The upper part of the thalweg could only be cored with a box corer, which recovered coarse grained sediments including large rock fragments. Two gravity corers further downslope are characterized by fine grained sediments and numerous turbidites. These two cores completed our work in the southern working area.

After one day of transit we continued the work on the shelf north of the mouth of the Rio de la Plata. Due to much better weather conditions, it was now possible to take cores with vibro corer and giant box corer on the shelf on June 9<sup>th</sup> and 10<sup>th</sup>. Seismic data collected during night time shows a complex pattern of erosion and deposition on the shelf. June 11<sup>th</sup> was used for collecting cores of the uppermost slope in order to reconstruct sediment transport from the shelf across the shelf edge. Two gravity cores were taken on terraces in 240m and 280m water depth. One additional core was taken from a contourite in 1500m water depth. This contourite was mapped with the seismic system until June 12<sup>th</sup> early morning. Two vibro corer stations in close proximity to the mud belt off Uruguay and some surface water samples in the outflow area of the Rio de la Plata concluded the scientific program of Meteor-Cruise M78/3. At 19:00h on June 12<sup>th</sup> we started our short transit to Montevideo, where we arrived on June 13<sup>th</sup> at 08:30h.

During Meteor-Cruise M78/3a more than 1050 nm of seismic profiles were collected off Uruguay and Argentina, mostly in exceptional quality. Almost 275m of cores were recovered from 43 stations. Despite the weather conditions, the cruise was a great success. The new data will allow to reconstruct sediment transport processes from 'source-to-sink' in the working area. The scientific party of Meteor Cruise M78/3a gratefully acknowledges the very friendly and most effective cooperation with Captain Baschek and his crew. Their perfect technical assistance even under difficult (stormy) conditions substantially contributed to make

this cruise a scientific success. We also appreciate the valuable support by the Leitstelle Meteor/Merian at the University of Hamburg. This expedition was funded by the Deutsche Forschungsgemeinschaft.

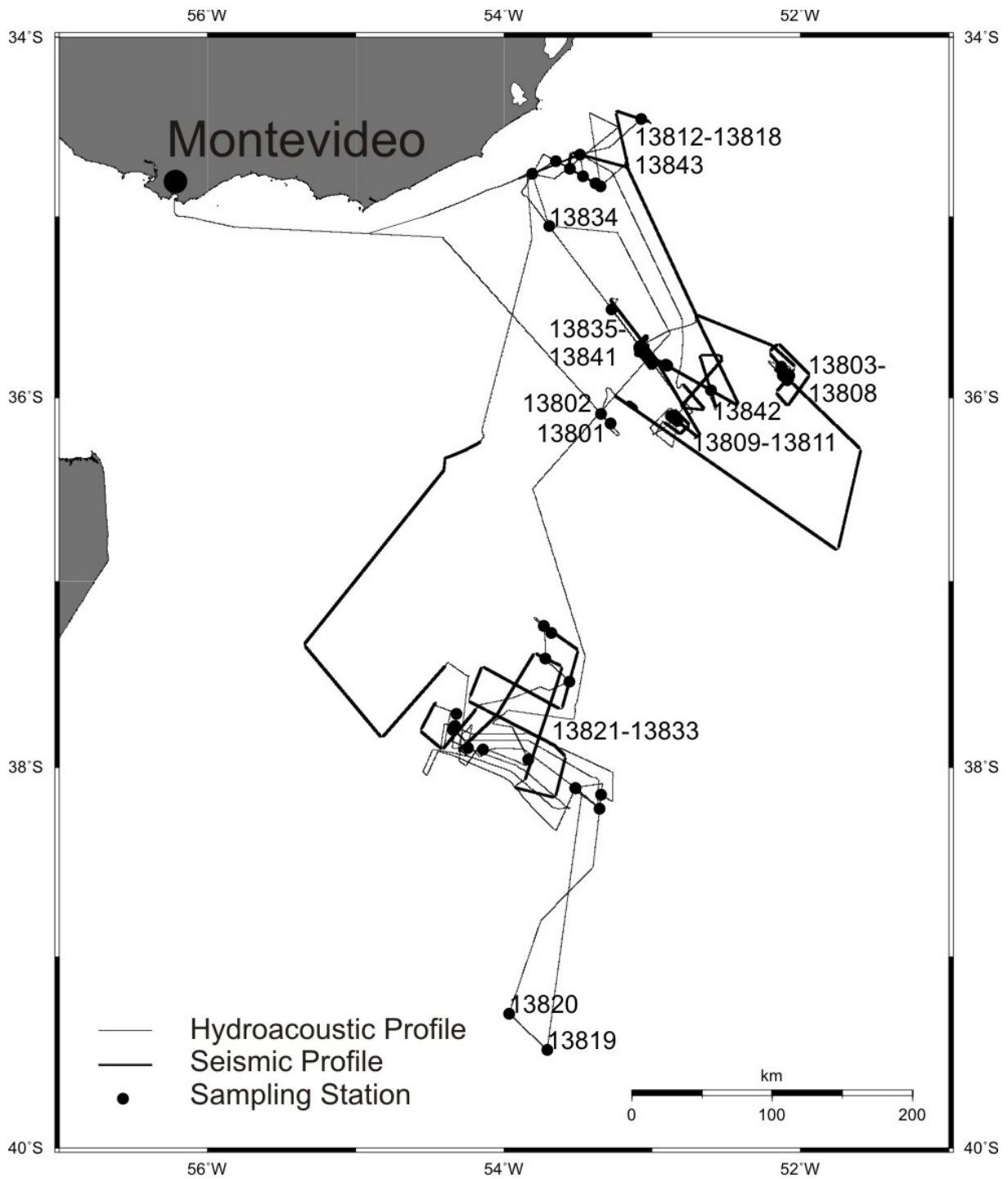


Figure: Cruise track, seismic lines and stations during Meteor Cruise M78/3a.

## Participants

Name	Discipline	Institution
1. Krastel, Sebastian, Prof. Dr.	Chief Scientist	IFM-GEOMAR
2. Anasetti, Andrea	Seismics	IFM-GEOMAR
3. Bozzane, Graciella, Dr.	Sedimentology	SHN
4. Chiessi, Cristiano Mazur, Dr.	Marine Geology	INPE
5. Domnia, Yana	Seismics	Marum/GeoB
6. Fekete, Noemi, Dr.	Seismics	Marum/GeoB
7. Fink, Christina	Micropaleontology	Marum/GeoB
8. Formolo, Michael J., Dr.	Bio-Geochemistry	MPI
9. Greif, Gabi	Micropaleontology	Marum/GeoB
10. Hanebuth, Till, Dr.	Sedimentology	Marum/GeoB
11. Henkel, Susann	Geochemistry	AWI
12. Henrich, Rüdiger, Prof. Dr.	Sedimentology	Marum/GeoB
13. Hilgenfeld, Christian	Geophysics	Marum/GeoB
14. Kasten, Sabine, Dr.	Geochemistry	AWI
15. Kokisch, Brit	Sedimentology	Marum/GeoB
16. Lantzsich, Hendrik	Sedimentology	Marum/GeoB
17. Lindhorst, Katja	Seismics	IFM-GEOMAR
18. Meyer, Mathias	Seismics	IFM-GEOMAR
19. Mill, Simon	Deck Technician	Marum/GeoB
20. Müller, Hendrik	Geophysics	Marum/GeoB
21. Preu, Benedict	Seismics	Marum/GeoB
22. Raeke, Andreas	Meteorology	DWD
23. Riedinger, Natascha, Dr.	Bio-Geochemistry	MPI
24. Schwenk, Tilmann, Dr.	Seismics	Marum/GeoB
25. Strasser, Michael, Dr.	Geotechnics	Marum/GeoB
26. Tomasini, Pablo	Geochemistry	ANCAP
27. Truscheit, Thorsten	Meteorology	DWD
28. Violante, Roberto, Dr.	Sedimentology	SHN
29. Vossmeier, Antje	Bio-Geochemistry	UA
30. Winkelmann, Daniel, Dr.	Sedimentology	IFM-GEOMAR

### Participating Institutions:

DWD	Deutscher Wetterdienst – Seewetteramt, Hamburg
IFM-GEOMAR	Leibniz Institute of Marine Sciences (IFM-GEOMAR), Kiel
Marum/GeoB	MARUM, Fachbereich Geowissenschaften, Universität Bremen
UA	Center for Geomicrobiology, Aarhus University,
SHN	Servicio Hidrografía Naval, Ciudad Autónoma de Buenos Aires
INPE	Center for Earth System Science, National Institute for Space Research, Sao Jose dos Campos SP
MPI	Max Planck Institute for Marine Micro-Biology, Bremen
AWI	Alfred-Wegener-Institut für Polar- und Meeresforschung, Bremerhaven
ANCAP	Administración Nacional de Combustibles Alcohol y Portland, Exploración y Producción, Montevideo, Uruguay

## List of seismic lines

Profil-Nr.	Date	Time Start	Time End	Latitude Start	Longitude Start	Latitude End	Longitude End
				[S] xx° xx.x'	[W] xx° xx.x'	[S] xx° xx.x'	[W] xx° xx.x'
09-069	21.05.2009	00:05	20:22	35°47,94	52°57,36	35°47,94	52°57,36
09-070	21.-22.05.2009	22:31	02:59	35°47,94	52°57,36	35°47,94	52°57,36
09-071	22.05.2009	03:08	11:27	35°47,94	52°57,36	35°47,94	52°57,36
09-072	23.05.2009	03:00	04:13	35°47,94	52°57,36	35°47,94	52°57,36
09-073	23.05.2009	04:27	05:02	35°47,94	52°57,36	35°47,94	52°57,36
09-074	23.05.2009	05:12	08:00	35°47,94	52°57,36	35°47,94	52°57,36
09-075	23.05.2009	08:02	10:23	35°47,94	52°57,36	35°47,94	52°57,36
09-076	23.05.2009	10:23	11:29	35°47,94	52°57,36	35°47,94	52°57,36
09-077	23.05.2009	11:38	13:00	35°47,94	52°57,36	35°47,94	52°57,36
09-078	24.05.2009	04:00	04:36	35°47,94	52°57,36	35°47,94	52°57,36
09-079	24.05.2009	05:02	05:40	35°47,94	52°57,36	35°47,94	52°57,36
09-080	24.05.2009	08:16	10:16	35°47,94	52°57,36	35°47,94	52°57,36
09-081	24.05.2009	10:19	15:29	35°47,94	52°57,36	35°47,94	52°57,36
09-082	24.05.2009	15:40	22:00	35°47,94	52°57,36	35°47,94	52°57,36
09-083	24.-25.05.2009	22:11	04:17	35°47,94	52°57,36	35°47,94	52°57,36
09-084	25.05.2009	04:26	09:30	35°48,43	52°57,90	36°12,17	52°40,70
09-085	25.05.2009	09:41	12:02	36°12,89	52°41,61	36°05,99	52°52,57
09-086	25.05.2009	12:14	12:31	36°05,44	52°52,46	36°04,18	52°52,46
09-087	25.05.2009	12:32	13:40	36°04,38	52°51,52	36°08,77	52°45,16
09-088	25.05.2009	13:46	14:26	36°09,36	52°45,50	36°11,62	52°49,16
09-089	25.05.2009	14:27	16:01	36°11,60	52°49,20	36°08,21	52°54,97
09-090	28.05.2009	00:07	01:14	34°44,50	53°33,88	34°38,87	53°32,89
09-091	28.05.2009	01:21	05:10	34°38,75	53°32,32	34°43,60	53°10,04
09-092	28.05.2009	05:14	08:50	34°43,33	53°9,85	34°25,53	53°14,68
09-093	28.05.2009	09:04	11:19	34°25,90	53°14,12	34°28,47	53°01,09
09-094	29.05.2009	09:58	13:17	36°14,30	54°09,62	36°19,80	54°23,71
09-095	29.-30.05.2009	13:22	05:08	36°20,14	54°23,86	37°20,19	55°20,69
09-096	30.05.2009	05:17	12:55	37°20,92	55°20,56	37°50,02	54°50,00
09-097	30.05.2009	13:05	18:20	37°49,92	54°48,83	37°27,42	54°23,91
09-098	04.06.2009	12:11	12:21	37°54,77	54°17,36	37°54,36	54°18,05
09-098b	04.06.2009	12:23	19:47	37°54,16	54°18,08	37°23,52	53°47,91
09-099	04.06.2009	19:58	21:34	37°23,38	53°46,83	37°27,32	53°39,91
09-100	04.-05.06.2009	21:43	04:41	37°28,04	53°36,61	38°3,91	53°51,50
09-101	05.06.2009	06:22	08:42	38°6,29	53°55,33	38°09,45	53°39,79
09-102	05.06.2009	08:51	11:12	38°08,97	53°39,06	37°56,72	53°35,15
09-103	05.06.2009	11:20	18:15	37°56,07	53°35,56	37°38,77	54°14,04
09-104	05.06.2009	18:39	20:22	37°36,76	54°13,54	37°28,00	54°09,14
09-105	05-06.06.2009	20:32	01:38	37°27,77	54°08,23	37°41,09	53°37,57
09-106	06.06.2009	01:54	05:36	37°40,56	53°36,38	37°22,64	53°30,14
09-107	06.06.2009	05:45	08:30	37°21,99	53°30,36	37°13,92	53,44,80
09-108	07.06.2009	02:20	05:30	37°41,23	54°11,51	37°30,807	54°24,53
09-109	07.06.2009	05:39	07:16	37°53,86	54°25,45	37°48,40	54°33,63
09-110	07.06.2009	07:25	09:15	37°47,83	54°33,60	37°39,07	54°27,83
09-111	09.-10.06.2009	22:27	09:12	34°42,64	53°10,72	35°33,76	52°41,70
09-112	10.-11.06.2009	21:39	02:37	35°27,84	53°16,84	35°78,40	52°57,59
09-113	11.06.2009	02:41	03:13	35°45,57	52°57,72	35°50,61	53°00,17
09-114	11.06.2009	03:19	04:58	35°50,51	53°00,64	35°43,57	53°07,24
09-115	11.06.2009	05:02	06:05	35°43,27	53°07,11	35°39,35	53°02,38

Profil-Nr.	Date	Time Start	Time End	Latitude Start [S]	Longitude Start [W]	Latitude End [S]	Longitude End [W]
		UTC		xx° xx.x'	xx° xx.x'	xx° xx.x'	xx° xx.x'
09-116	11.06.2009	06:20	07:36	35°40,10	53°01,77	35°45,17	53°07,15
09-117	11.06.2009	07:42	07:58	35°45,33	53°07,02	35°46,40	53°06,00
09-118	11.06.2009	08:04	08:58	35°46,29	53°05,41	35°42,75	53°01,56
09-119	11.06.2009	17:31	21:06	36°3,39	52°34,13	35°46,07	52°40,63
09-120	11.06.2009	21:10	22:24	35°45,97	52°40,356	35°45,95	53°32,67
09-121	11.06.2009	22:27	22:40	35°46,14	52°32,45	35°47,24	52°31,65
09-122	11.-12.06.2009	22:46	02:42	35°47,60	52°31,85	36°02,88	52°48,30
09-123	12.06.2009	02:51	04:13	36°03,32	52°47,86	36°3,9*4	52°39,39
09-124	12.06.2009	04:20	06:20	36°3,4	52°39,21	35°55,72	52°47,45

### Station list

GeoB #	Date	Time (UTC)	PositionLat	PositionLon	Depth [m]	Device	Recovery Remarks
13801-1	20.05.09	15:25	36° 8.50' S	53° 16.98' W	243	MUC-12	7xL, 3xS, 35 cm
13801-2	20.05.09	16:10	36° 8.49' S	53° 17.16' W	240	GC-12	955 cm
13802-1	20.05.09	17:23	36° 5.30' S	53° 20.72' W	142	GBG	4xsurface, 2xL, 28 cm
13802-2	20.05.09	18:59	36° 5.30' S	53° 20.72' W	141	VC-5	345 cm
13803-1	22.05.09	15:30	35° 52.67' S	52° 7.17' W	2465	MUC-12	7xL, 3xS, 21 cm
13803-2	22.05.09	18:00	35° 52.65' S	52° 7.19' W	2462	GC-12	321 cm
13804-1	22.05.09	20:08	35° 54.30' S	52° 5.42' W	2593	GC-12	608 cm
13804-2	24.05.09	01:19	35° 54.26' S	52° 5.43' W	2593	MUC-12	7xL, 2xS, 23 cm
13805-1	22.05.09	22:19	35° 53.02' S	52° 6.78' W	2523	CTD/RO	failure at 2000 m WD
13805-2	23.05.09	00:05	35° 53.02' S	52° 6.79' W	2522	GC-6	196 cm
13806-1	23.05.09	14:52	35° 52.82' S	52° 4.61' W	2586	GC-12	944 cm
13807-1	23.05.09	17:00	35° 52.29' S	52° 5.15' W	2540	GC-12	476 cm
13808-1	23.05.09	18:58	35° 49.85' S	52° 7.76' W	2300	GC-12	467 cm
13808-2	23.05.09	20:44	35° 49.85' S	52° 7.76' W	2295	GC-12	
13808-3	23.05.09	22:37	35° 49.85' S	52° 7.76' W	2296	GC-12	182 cm
13809-1	25.05.09	19:38	36° 7.67' S	52° 49.90' W	1400	GC-12	942 cm
13809-2	26.05.09	00:22	36° 7.67' S	52° 49.90' W	1397	MUC-12	7xL, 1xS, 36 cm
13809-3	26.05.09	02:25	36° 7.29' S	52° 50.64' W	1335	CTD/RO	100 m WD
13810-1	25.05.09	21:20	36° 6.04' S	52° 52.49' W	1149	GC-12	124 cm, core bent
13811-1	25.05.09	22:39	36° 6.61' S	52° 51.56' W	1210	GC-12	216 cm, core bent
13812-1	27.05.09	15:29	34° 41.61' S	53° 38.97' W	32	MBG	25 cm
13812-2	27.05.09	15:52	34° 41.61' S	53° 38.97' W	32	GBG	empty
13812-3	27.05.09	16:04	34° 41.61' S	53° 38.97' W	33	GBG	16 cm
13813-1	27.05.09	17:02	34° 44.21' S	53° 33.29' W	58	GBG	3xsurface, 2xL, 40 cm
13813-2	27.05.09	17:23	34° 44.21' S	53° 33.29' W	57	SVP	
13813-3	27.05.09	22:00	34° 44.22' S	53° 33.28' W	56	GC-6	565 cm, overpenetrated
13813-4	27.05.09	22:44	34° 44.22' S	53° 33.27' W	57	GC-12	1028 cm
13814-1	27.05.09	18:09	34° 46.68' S	53° 28.11' W	40	GBG	3xsurface, 3xL, 32 cm
13814-2	27.05.09	21:05	34° 46.68' S	53° 28.10' W	39	GC-6	64 cm, core bent
13814-3	09.06.09	18:20	34° 46.68' S	53° 28.19' W	39	VC-5	507 cm
13815-1	27.05.09	18:58	34° 49.04' S	53° 23.08' W	47	GBG	3xsurface, 4xL, 40 cm



GeoB #	Date	Time (UTC)	PositionLat	PositionLon	Depth [m]	Device	Recovery Remarks
13815-2	09.06.09	19:22	34° 49.05' S	53° 23.10' W	46	VC-5	507 cm
13816-1	27.05.08	19:35	34° 50.04' S	53° 20.92' W	44	MBG	empty
13816-2	27.05.09	19:38	34° 50.04' S	53° 20.92' W	44	MBG	
13816-3	27.05.09	19:55	34° 50.04' S	53° 20.92' W	44	GKG	1xsurface, 3xL, 41 cm
13816-4	09.06.09	20:05	34° 50.06' S	53° 20.93' W	44	VC-5	508 cm
13817-1	28.05.09	12:32	34° 27.54' S	53° 4.52' W	63	GC-6	556 cm, overpenetrated
13817-2	28.05.09	13:23	34° 27.55' S	53° 4.52' W	61	GC-12	1111 cm
13817-3	28.05.09	14:01	34° 27.54' S	53° 4.51' W	62	GBG	3xsurface, 4xL, 49 cm
13818-1	28.05.09	18:05	34° 39.41' S	53° 29.36' W	40	GBG	1xsurface, 2xL, 17 cm
13818-2	09.06.09	16:13	34° 39.41' S	53° 29.36' W	40	VC-5	108 cm
13818-3	09.06.09	17:11	34° 39.41' S	53° 29.36' W	40	VC-5	271 cm
13818-4	12.06.09	15:27	34° 39.41' S	53° 29.36' W	40	VC-5	
13819-1	31.05.09	12:52	39° 29.45' S	53° 42.54' W	4278	CTD/RO	4100 m WD
13819-2	31.05.09	15:42	39° 29.44' S	53° 42.56' W	4274	GC-12	792 cm
13819-3	31.05.09	17:07	39° 29.28' S	53° 42.49' W	4275	CTD/RO	100 m WD
13819-4	31.05.09	21:40	39° 29.44' S	53° 42.56' W	4273	MUC-12	5xL, 2xS, 31 cm
13820-1	01.06.09	03:12	39° 18.06' S	53° 58.03' W	3613	GC-15	966 cm
13821-1	01.06.09	14:59	38° 6.58' S	53° 31.07' W	3749	GC-6	565 cm, overpenetrated
13821-2	03.06.09	19:55	38° 6.57' S	53° 31.02' W	3761	GC-12	737 cm
13822-1	02.06.09	16:03	37° 53.70' S	54° 14.63' W	1384	GC-6	core bent
13823-1	03.06.09	10:06	38° 8.69' S	53° 20.65' W	3783	GC-6	570 cm, overpenetrated
13823-2	03.06.09	12:47	38° 8.68' S	53° 20.64' W	3780	GC-12	938 cm
13824-1	03.06.09	15:36	38° 13.14' S	53° 21.29' W	3821	GC-12	1066 cm
13825-1	06.06.09	10:36	37° 16.72' S	53° 40.80' W	1230	GC-6	573 cm, overpenetrated
13825-2	06.06.09	11:42	37° 16.72' S	53° 40.80' W	1233	GC-12	749 cm
13826-1	06.06.09	14:33	37° 14.44' S	53° 43.83' W	1223	GC-6	475 cm
13827-1	06.06.09	17:16	37° 24.92' S	53° 43.32' W	1154	GC-12	581 cm
13827-2	06.06.09	18:24	37° 24.93' S	53° 43.33' W	1154	GC-12	631 cm
13828-1	06.06.09	21:20	37° 32.39' S	53° 33.54' W	1730	GC-12	494 cm
13829-1	07.06.09	11:10	37° 42.79' S	54° 19.19' W	949	GC-6	empty
13829-2	07.06.09	12:11	37° 42.79' S	54° 19.19' W	950	GBG	3xsurface, 3xL, 27 cm
13830-1	07.06.09	13:49	37° 46.66' S	54° 19.83' W	1261	GBG	1xsurface, 2xL, 22-25cm
13831-1	07.06.09	15:15	37° 47.83' S	54° 20.76' W	1087	GBG	1xsurface, 2xL, 20 cm
13832-1	07.06.09	18:54	37° 54.14' S	54° 8.47' W	2229	GBG	1xsurface, 2xL, 30 cm
13832-2	07.06.09	20:54	37° 54.15' S	54° 8.44' W	2204	GC-6	560 cm
13833-1	08.06.09	01:11	37° 57.45' S	53° 50.21' W	3369	GBG	3xsurface, 4xL, 41 cm
13833-2	08.06.09	03:46	37° 57.45' S	53° 50.21' W	3404	GC-12	805 cm
13833-3	08.06.09	06:34	37° 57.10' S	53° 50.17' W	3358	CTD/RO	75m WD
13834-1	09.06.09	09:05	35° 3.27' S	53° 41.74' W	16	GKG	1xsurface, 2xL, 12-16 cm
13834-2	09.06.09	10:00	35° 3.29' S	53° 41.74' W	16	VC-5	486 cm
13835-1	10.06.09	11:52	35° 43.10' S	53° 5.13' W	131	GBG	1xsurface, 2xL, 28 cm
13835-2	10.06.09	17:21	35° 43.10' S	53° 5.13' W	131	VC-5	506 cm
13835-3	11.06.09	09:49	35° 43.11' S	53° 5.14' W	131	GC-12	435 cm
13836-1	10.06.09	12:33	35° 44.72' S	53° 3.66' W	134	GBG	1xsurface, 3xL, 32 cm
13836-2	10.06.09	16:28	35° 44.72' S	53° 3.66' W	134	VC-5	507 cm

GeoB #	Date	Time (UTC)	PositionLat	PositionLon	Depth [m]	Device	Recovery Remarks
13837-1	10.06.09	13:06	35° 46.18' S	53° 2.31' W	167	GBG	1xsurface, 3xL,30 cm
13837-2	10.06.09	15:38	35° 46.18' S	53° 2.29' W	140	VC-5	314 cm
13838-1	10.06.09	13:50	35° 48.69' S	52° 59.97' W	148	GBG	1xsurface, 3xL, 16 cm
13838-2	10.06.09	14:32	35° 48.69' S	52° 59.97' W	150	VC-5	508 cm
13839-1	10.06.09	19:20	35° 30.87' S	53° 16.43' W	66	VC-5	492 cm
13939-2	10.06.09	20:12	35° 30.87' S	53° 16.43' W	67	GKG	1xsurface, 2xL, 18 cm
13840-1	11.06.09	11:13	35° 49.21' S	52° 54.56' W	232	GC-6	387 cm
13841-1	11.06.09	11:55	35° 49.53' S	52° 53.88' W	285	GC-6	568 cm, overpenetrated
13841-2	11.06.09	12:45	35° 49.53' S	52° 53.87' W	285	GC-12	817 cm
13842-1	11.06.09	15:35	35° 57.57' S	52° 36.30' W	1555	GC-12	1002 cm
13843-1	12.06.09	17:54	34° 45.88' S	53° 48.51' W	37	VC-5	389 cm

CTD/RO – Multi-water sampler with CTD

GBG -Giant Box corer

GC – Gravity Corer

MBG – Mini Box Corer

MUC – Multicorer

VC – Vibro Corer