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RV METEOR-CRUISE M86/2

Cartagena – Brindisi, 27.12.2011 - 17.01.2011

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Master: Michael Schneider

Short Cruise Report

Research Program

The continental margins of southern Italy are located along converging plate boundaries, which are affected by intense seismicity and volcanic activity. Most of the coastal areas experienced severe earthquakes, landslides, and tsunamis in historical and/or modern times. The most prominent example is the Messina earthquake of Dec. 28, 1908 (Ms=7.3; 80,000 casualties), which was characterized by the worst tsunami Italy experienced in the historical time (~2000 casualties). It is, however, still unclear, whether this tsunami was triggered by a sudden vertical movement along a major fault during the earthquake or as a result of a giant marine slide initiated by the earth-quake. The recurrence rates of major landslides and therefore the risk associated with landslides is also unknown. Based on detailed bathymetric data sets collected by Italian colleagues in the frame of the MaGIC Project (MArine Geohazards along the Italian Coast), we collected seismic data (2D and 3D) and gravity cores in three working areas (The Messina Straits, off Eastern Sicily, the Gioia Basin). The main objectives is to identify seismogenic faults, to map and characterize volcanic and non-volcanic submarine slides, and to study tectonic control on canyon evolution. The new data will be the basis for a detailed risk assessment in the working areas.

Narrative of the cruise

The scientific party arrived in Cartagena on December 26th and directly boarded RV Meteor. The scientific crew of RV Meteor-CruiseM86/2 included 14 scientists from the Helmholtz Centre for Ocean Research Kiel (GEOMAR) and the Cluster of Excellence 'The Future Ocean' (Kiel), six scientists from Univesità di Roma "La Sapienza", two scientists from the 'National Research Council' in Rome, and one scientist each from the 'National Oceanography Centre Southampton', the 'Universitat de Barcelona', and the 'Dokuz Eylul Universty' in Izmir, as well as two technicians from the 'German Weather Service'.

RV Meteor left port on December 27th as scheduled at 10:00h under sunny skies and a light breeze. Weather on the transit to our first working area was variable with wind speeds up to force 7 reducing the speed of Meteor to 8 knots for some periods. The transit was used for meetings and setup of the equipment.

RV Meteor entered Italian waters on December 29th at 14:15h. This was the start of the scientific program by switching on the hyddroacoustic systems.

We arrived in our first working area (Gioia Basin) on December 30th at 10:00h. Work in this area started with a coring profile (Stations M862_01 to 03) across a landslide visible in bathymetric data. Two of the 5m-long gravity corers were completely filled, while the third recovered about 3,50m of sediments. Clear slide deposits were recovered in the first core; the undisturbed drape is only a few dm. The other two cores were taken next to the slide and above the headwall and show undisturbed deposits. The first station was also sampled with the giant box corer; in addition a sound velocity profile was collected for the hydroacoustic systems. The night was used for a first 2D-seismic survey with an 1.7 l GI-Gun and a 150m-long 128 channel streamer. Several canyons/channels were crossed at different locations. They show clear levee structures. Landslide deposits are widespread. We left this first working area on December 31st early morning. While collecting seismic data, we entered the Messina Straits. 2D-seismic data were collected across potential faults in the Messina Straits until January 1st in the afternoon. The main aim was to identify the fault being responsible for the 1908 earthquake. The support by local authorities, especially the traffic control, was outstanding and allowed us to run our survey as planned. The survey was shortly interrupted

in the morning of the December 31st due to problems with a fishing line, which was picked up by the streamer.

Seismic data collection was continued east of the Etna until January 3rd in the morning. A grid of 2D-seismic lines was collected in order to define targets for the 3D survey. Weather on January 1st and 2nd was very nice and allowed spectacular views of Etna volcano. Seismic data acquisition close to the coast line was limited to daytime due to intense fishing activities. The streamer picked up fishing lines twice during the survey.

January 3rd was used for sediment sampling while changing the seismic system to a 3D-mode. Three cores (M862-04 to 06) were taken in a small basin (ca. 5 km diameter) beneath a major landslide scarp. Hydroacoustic data show a complex pattern of landslide deposits of varying sizes. The cores were located with the aim to sample several of these deposits. Afterwards four cores (M862-07 to M862-10) were taken on and between elongated ridges in about 500m water depth. It is unclear whether these ridges represent deformation patterns as a result of the moving Etna flanks, landslide blocks, surface expressions of deeper tectonic features, or anything else. All cores brought good recoveries except for the one on the Chaincone Fan (M862-10), which was empty. The night was used for hydroacoustic surveys of small sedimentary basins.

The above mentioned ridges were also chosen as target for a 3D-survey with the so called P-Cable. The P-Cable is a cost-efficient low-fold high-resolution 3d-seismic acquisition system developed by VBPR, NOCS and the University of Tromsø and recently adapted and extended by GEOMAR. It uses the same streamer segments as the 2D-seismic system. Usually it consists of sixteen 12.5-m long streamer that are towed 10 m apart resulting in an inline separation of 5 m. Due to technical problems only 13 streamers could be deployed. Deployment was planned for January 4th in the morning but was delayed due to technical problems. Hence January 4th was used to collect additional sediment samples of a channel floor and a sedimentary basin (M862-11 to 13). Thereafter 4 Ocean Bottom Seismometers were deployed in the box for the 3Dd-survey. Due to further delays in preparation of the P-Cable, the night was used for an additional hydroacoustic survey extending the existing bathymetric data coverage.

Deployment of the P-Cable started on January 5th at 06:00h in the morning. Data acquisition started around 09:30h. The start was very smooth but during the night the wind increased with gusts up to force 8. Nevertheless data quality was good and the data acquisition was continued until January 6th in the evening. At this point the wind was so strong (gusts up to force 10) that it was impossible to keep the vessel on the profiles. During a turn, the wire running to the starboard trawl doors was entangled with the door itself thereby losing any shearing forces. At that point we decided to retrieve the entire system because even stronger winds were predicted for the night and the morning of January 7th. Indeed gusts up to Beaufort 10 were measured on January 7th. However, coring was still possible. Three cores were recovered crossing a landslide feature in the 3D-Box (M862-14 – 16). After that we tried to core some postulated mud volcanoes close to the shore (M862-17 and 18). We used a gravity corer and the giant box corer but the only material recovered from the sea floor was some heavily cemented sediments and/or volcaniclastics in a core catcher from a gravity core. Coring was shortly interrupted because the ship received a call from the coast guard to support a rescue operation for a surfer. After the surfer was picked up by a small fishing boat, we continued our work. In the mean time the wind was slightly calming down. Hence we decided to deploy the 3D-seismics despite some gust up to force 9. Deployment was quick and successful.

All components of the 3D-system worked without any problems until early morning on January 10th. At that time a problem with the GPS-receivers on the trawl doors and a gun error forced us to interrupt the survey. After finishing the gun repairs, the system worked again but an hour later (ca. 11:00h) parts of the streamer lost connection to the deck unit. The recovery of the system showed some broken eyelets at the t-connectors, which are used for the rope keeping tension from the data cable. As a result two of the data cables were heavily stretched and needed to be replaced. Afterwards the system was successfully deployed but another failure occurred around 20:00h the same day. Parts of the streamers again lost connection to the deck unit. This time the problem could be solved by replacing one t-connector. The entire system was back in the water around 22:30h. All tracks of the 3D-box were collected around noon on January 11th. However, due to strong winds during major parts of the survey some gaps were still open and we continued the seismic 3D-survey until January 12th at 08:30h in order to fill these gaps. In total we run about 700 km of profiles in the 3D-Box and fired more than 110.000 shots. Hence this part of the ocean floor and the underlying structures is one of the best imaged sections worldwide. Retrieval of the gear was fast; afterwards the Ocean Bottom Seismometer were released and picked up without any problems. A first quick look at the OBS section does not only show records of the shots but also prominent signals which seem to be correlated to the eruption of Mt. Etna on December 5th.

The early afternoon was used for sediment coring. A first core in a landslide scar (M862-19) brought more than 7 m sediments on deck. Two additional cores were taken on ridge structures of the 3D-box, both with core length between 4 and 5 m (M862-20 and 22), while a forth core (M862-21) immediately next to one of these ridges was empty. It is not easy to explain that the elevated ridge structures are covered by soft sediments, while the seafloor next to the ridges is very hard.

The 2D-seismic was deployed early evening on December 12th. Some additional profiles were collected east of the Etna in order to further analyze the regional deformation patterns. Seismic surveying was continued on January 13th with several crossings of a prominent morphological step at the southernmost part of the Messina Straits. This morphological step is the most prominent active fault in the entire survey area and can be traced for almost 20 km. The night and the following day were used for additional lines in the Messina Straits before we passed through the Straits in order to collect 2D-seismic data off Scilla and Gioia-Tauro. A subaerial landslide entering the sea occurred in February 1783 close to Scilla and triggered a local tsunami, which killed 1500 persons. The subaerial landslide may be related to submarine landsliding activity. The aim off the profiles off Gioia-Tauro was to investigate submarine canyons. The seismic gear was recovered on January 15th and we started a short transit through the Straits in order to take cores in the Messina Canyon. Only a very few positions were approved in the Messina Straits by the authorities due to abundant submarine cables. The Messina Canyon was very difficult to core. Three gravity cores (M862-23 to 25) did not result in any recovery and one of the cores was bent. Hence we took a final box corer (M862-26) recovering some sediments and human waste. The seismic 2D-system was deployed for the last time on January 15t at 17:00h. Some final profiles were shot in the southern most part of the Messina Straits. All equipment was successfully recovered on January 16th at 02:00h. Thereafter we started our transit to Brindisi. The hydroacoustic systems were switched off on January 16th at 07:40h. RV Meteor arrived in Brindisi on January 17th at 08:30h.

Meteor-Cruise M86/2 was a great success. We collected about 740 nm of seismic 2D-lines in exceptional quality. An 8 x 4 km large area was successfully surveyed in 3D with the P-Cable. About 80 m of cores were recovered at 26 stations. In addition hydroacoustic data were collected along all seismic profiles and transits. The new data will allow an in depth investigation of submarine hazards off Southern Italy.

Acknowledgements

The scientific party of Meteor Cruise M86/2 gratefully acknowledges the very friendly and most effective cooperation with Captain Schneider and his crew. Their perfect technical assistance in a difficult working area substantially contributed to make this cruise a scientific success. Local authorities including Messina VTS, Messina Pilots, Messina Harbor Master, Marisicilia, Compamare Catania, and the coast guard are thanked for the very good and efficient communication and support allowing us to run all lines as planned. We also appreciate the valuable support by the Leitstelle Meteor/Merian at the University of Hamburg. This expedition was funded by the Deutsche Forschungsgemeinschaft.

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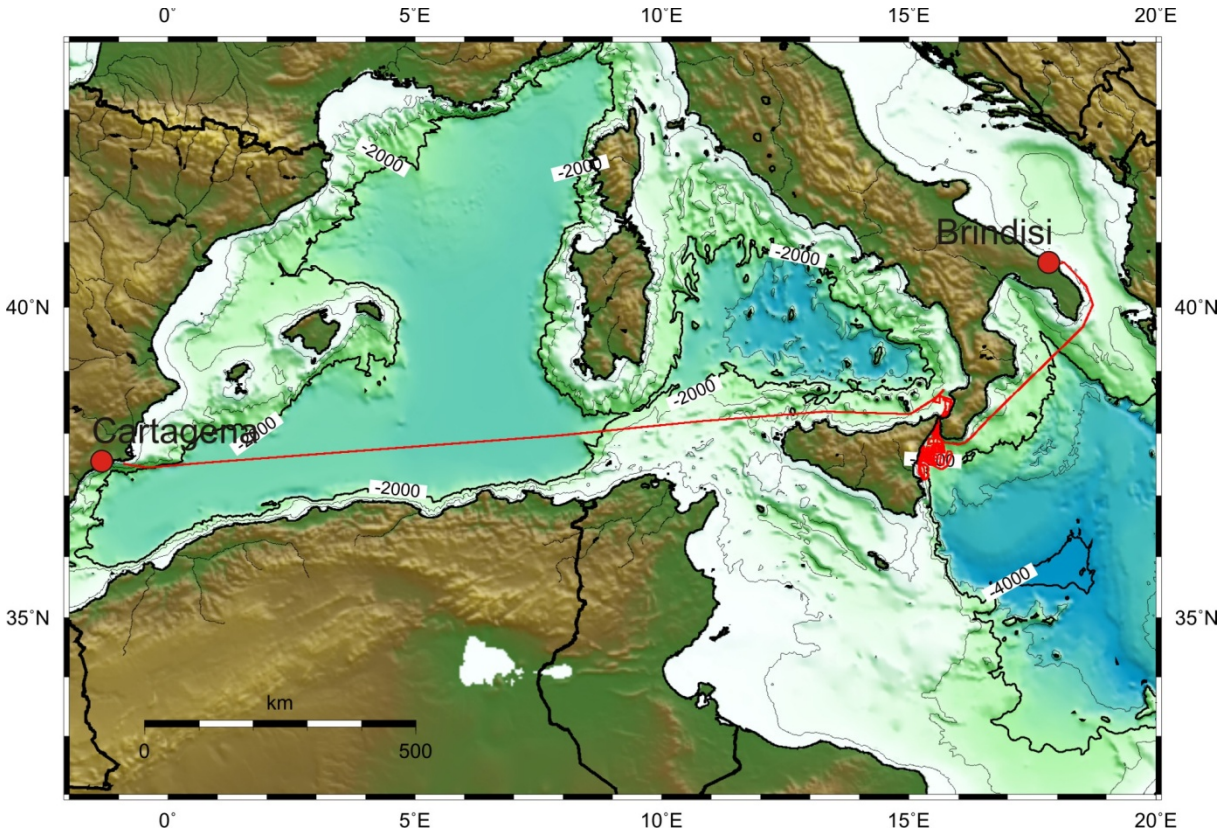

Fig. 1: Track chart of Meteor-Cruise M86/2.

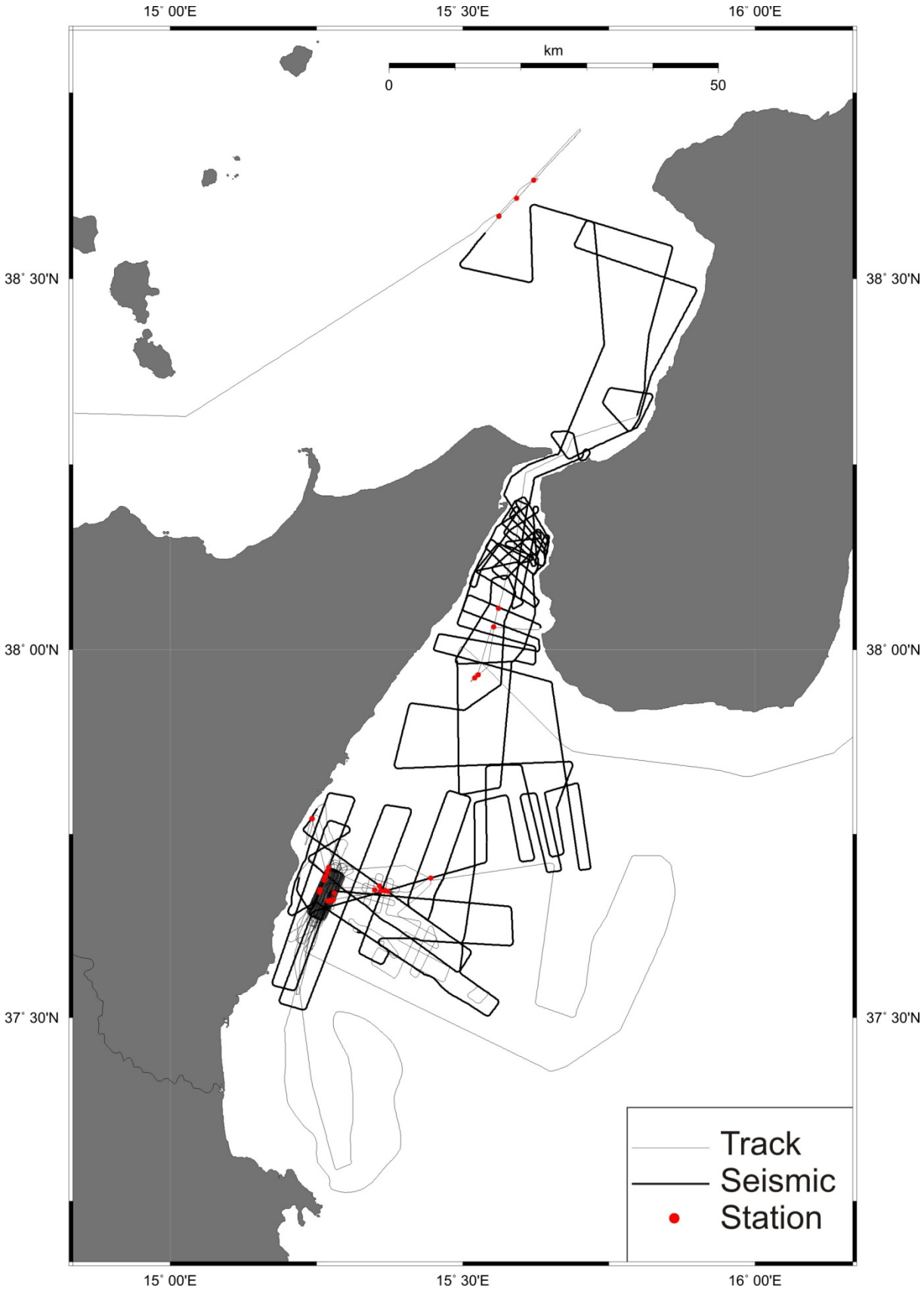

Fig. 2: Detailed track chart of working area of Cruise M86/2.

Participants

Name	Discipline	Institution
Krastel, S., Prof. Dr.	Chief Scientist	GEOMAR
Adamai, C.	Seismic	La Sapienza
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CNR	National Research Council, Roma, Italy
DEU	Dokuz Eyül University, Izmir, Turkey
DWD	Deutscher Wetterdienst – Seewetteramt, Hamburg
GEOMAR	Helmholtz-Zentrum für Ozeanforschung Kiel (GEOMAR)
La Sapienza	Università "La Sapienza", Roma, Italy
NOCS	National Oceanography Centre Siuthampton, UK

List of seismic Profiles

Ship's number	Profil-Nr.	Date	Time Start UTC	Time End UTC	Latitude Start xx° x.x‘N	Longitude Start xx° x.x‘E	Latitude End xx° x.x‘N	Longitude End xx° x.x‘E	FFN Start	FFN End
ME862/1316-1	101	30.12.2011	18:47	19:31	38:33.60	15:32.30	38:31.23	15:29.76	364	781
ME862/1316-1	102	30.12.2011	19:36	20:51	38:30.87	15:30.10	38:29.72	15:36.76	885	1762
ME862/1316-1	103	30.12.2011	21:00	22:18	38:30.10	15:37.15	38:35.65	15:36.92	1872	2807
ME862/1316-1	104	30.12.2011	22:25	23:35	38:35.94	15:37.45	38:34.22	15:43.51	2894	3775
ME862/1316-1	105	31.12.2011	23:35	01:50	38:34.22	15:43.51	38:24.60	15:44.50	2895	5347
ME862/1316-1	106	31.12.2011	01:53	04:04	38:24.50	15:44.40	38:15.81	15:39.76	5379	6942
ME862/1316-1	107	31.12.2011	04:04	05:27	38:15.81	15:39.76	38:12.52	15:34.25	6942	7943
ME862/1316-1	108	31.12.2011	05:27	06:38	38:12.52	15:34.25	38:07.86	15:38.61	7943	8787
ME862/1316-1	109	31.12.2011	06:38	06:50	38:07.86	15:38.61	38:06.83	15:38.28	8787	8940
ME862/1316-1	110	31.12.2011	06:50	06:52	38:06.83	15:38.28	38:01.83	15:37.66	8940	8990
ME862/1316-1	111	31.12.2011	06:52	07:20	38:01.83	15:37.66	38:08.00	15:37.76	8990	9263
ME862/1316-1	201	31.12.2011	09:03	09:31	38:07.11	15:37.41	38:09.20	15:38.39	10120	10447
ME862/1316-1	202	31.12.2011	09:31	09:39	38:09.20	15:38.39	38:08.99	15:38.84	10447	10504
ME862/1316-1	203	31.12.2011	09:39	09:52	38:08.99	15:38.84	38:07.87	15:38.63	10504	10699
ME862/1316-1	204	31.12.2011	09:52	10:48	38:07.87	15:38.62	38:10.77	15:34.85	10699	11365
ME862/1316-1	205	31.12.2011	10:51	10:59	38:11.05	15:34.96	38:11.56	15:35.45	11398	11508
ME862/1316-1	206	31.12.2011	11:06	11:40	38:11.20	15:35.67	38:09.59	15:34.28	11570	11890
ME862/1316-1	207	31.12.2011	11:45	12:27	38:09.30	15:34.39	38:07.09	15:37.53	11926	12436
ME862/1316-1	208	31.12.2011	12:43	13:13	38:07.22	15:36.85	38:09.45	15:37.37	12527	12892
ME862/1316-1	209	31.12.2011	13:27	13:56	38:09.00	15:37.78	38:08.75	15:34.58	13052	13421
ME862/1316-1	210	31.12.2011	14:04	14:30	38:08.38	15:34.55	38:07.64	15:37.02	13495	13808
ME862/1316-1	211	31.12.2011	14:38	14:48	38:07.20	15:36.82	38:07.03	15:35.88	13905	14024
ME862/1316-1	212	31.12.2011	14:53	15:50	38:07.33	15:35.81	38:11.71	15:36.60	14080	14768
ME862/1316-1	213	31.12.2011	15:50	16:02	38:11.71	15:36.60	38:12.10	15:35.49	14768	14911
ME862/1316-1	214	31.12.2011	16:02	16:25	38:12.10	15:35.49	38:10.29	15:34.04	14911	15188
ME862/1316-1	215	31.12.2011	16:30	17:16	38:10.05	15:34.28	38:07.38	15:37.72	15235	15819
ME862/1316-1	216	31.12.2011	17:16	17:32	38:07.38	15:37.72	38:06.15	15:37.41	15819	16000
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ME862/1316-1	220	31.12.2011	20:05	20:12	38:04.06	15:37.69	38:03.46	15:37.44	17845	17937
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ME862/1316-1	223	31.12.2011	21:15	21:51	38:07.41	15:36.46	38:08:58	15:33.76	18664	18993
ME862/1316-1	224	31.12.2011	21:55	22:27	38:08.45	15:33.42	38:06.43	15:31.35	19164	19557
ME862/1316-1	225	31.12.2011	22:33	23:30	38:06.21	15:31.52	38:03.90	15:36.15	19601	20264
ME862/1316-1	226	31.12.2011	23:33	23:43	38:03.59	15:35.39	38:03.35	15:35.10	20325	20444
ME862/1316-1	227	01.01.2012	23:47	00:30	38:03.63	15:35.05	38:07.00	15:35.63	20503	21014
ME862/1316-1	228	01.01.2012	00:35	01:00	38:07.03	15:35.21	38:06.32	15:31.23	21051	21551
ME862/1316-1	229	01.01.2012	01:05	01:50	38:06.10	15:31.11	38:03.50	15:30.08	21554	21993
ME862/1316-1	230	01.01.2012	01:53	03:16	38:03.08	15:30.31	38:00.83	15:37.78	22060	23003
ME862/1316-1	231	01.01.2012	03:33	05:10	37:59.89	15:37.46	38:01.25	15:27.61	23200	24368

Ship's number	Profil-Nr.	Date	Time Start	Time End	Latitude Start	Longitude Start	Latitude End	Longitude End	FFN Start	FFN End
			UTC	UTC	xx° x.x'N	xx° x.x'E	xx° x.x'N	xx° x.x'E		
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ME862/1316-1	233	01.01.2012	05:31	07:31	37:59.89	15:27.31	37:57.38	15:39.02	24621	26083
ME862/1316-1	234	01.01.2012	07:31	10:45	37:57.38	15:39.02	37:42.15	15:41.96	26083	28388
ME862/1316-1	235	01.01.2012	10:45	10:59	37:42.15	15:41.96	37:42.36	15:43.10	28388	28568
ME862/1316-1	236	01.01.2012	10:59	12:24	37:42.36	15:43.10	37:49.05	15:41.81	28568	29583
ME862/1316-1	237	01.01.2012	12:28	12:59	37:49.07	15:41.41	37:48.43	15:38.60	29630	29997
ME862/1316-1	238	01.01.2012	13:02	14:17	37:48.16	15:38.44	37:42.25	15:40.07	30014	30916
ME862/1316-1	239	01.01.2012	14:23	14:35	37:41.96	15:39.82	37:41.87	15:38.80	30983	31126
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ME862/1316-1	245	01.01.2012	23:23	23:44	37:31.11	15:11.57	37:30.65	15:13.63	37460	37718
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ME862/1316-1	301	02.01.2012	11:00	11:58	37:36.80	15:19.91	37:39.37	15:15.07	44083	44760
ME862/1316-1	302	02.01.2012	12:04	12:26	37:39.30	15:14.37	37:38.38	15:12.54	44827	45107
ME862/1316-1	303	02.01.2012	12:36	14:39	37:38.83	15:12.13	37:48.17	15:16.16	45233	46693
ME862/1316-1	304	02.01.2012	14:45	15:05	37:48.30	15.16.65	37:47.99	15:18.67	46761	47005
ME862/1316-1	305	02.01.2012	15:11	17:02	37:47.63	15:18.87	37:38.94	15:14.57	47075	48404
ME862/1316-1	306	02.01.2012	17:09	17:28	37:38.97	15:14.05	37:40.29	15:13.04	48492	48718
ME862/1316-1	307	02.01.2012	17:31	17:50	37:40.50	15:12.98	37:41.53	15:13.25	48752	48983
ME862/1316-1	401	02.01.2012	19:31	22:01	37:41.14	15:16.83	37:33.76	15:29.47	50002	51800
ME862/1316-1	402	02.01.2012	22:05	22:23	37:33.92	15:29.81	37:35.24	15:30.82	51854	52070
ME862/1316-1	403	02.01.2012	22:29	23:43	37:35.57	15:30.63	37:39.04	15:24.53	52132	53010
ME862/1316-1	404	03.01.2012	23:53	01:52	37:39.71	15:24.60	37:48.36	15:28.40	53122	54553
ME862/1316-1	405	03.01.2012	01:58	02:17	37:48.46	15:28.94	37:48.00	15:30.67	54630	54843
ME862/1316-1	406	03.01.2012	02:23	05:17	37:47.58	15:30.63	37:38.00	15:26.38	54922	56423
ME862/1316-1	407	03.01.2012	05:20	08:10	37:38.06	15:26.23	37:45.25	15:13.68	56463	58521
ME862/1316-1	408	03.01.2012	08:16	08:41	37:45.53	15:13.80	37:47.16	15:15.13	58587	58880
ME862/028-1	601	12.01.2012	16:03	16:31	37:41.45	15:16.26	37:42.91	15:14.20	100	619
ME862/028-1	602	12.01.2012	16:35	17:22	37:43.22	15:14.33	37:45.21	15:18.40	686	1394
ME862/028-1	603	12.01.2012	17:30	17:48	37:45.60	15:18.21	37:46.08	15:16.41	1504	1784
ME862/028-1	604	12.01.2012	17:53	20:35	37:45.86	15:16.10	37:32.99	15:10.49	1854	4308
ME862/028-1	605	12.01.2012	20:41	21:01	37:32.60	15:10.73	37:32.23	15:12.57	4400	4673
ME862/028-1	606	12.01.2012	21:06	22:46	37:32.51	15:12.94	37:40.23	15:16.51	4746	6250
ME862/028-1	701	13.01.2012	22:56	01:42	37:40.31	15:17.42	37:39.06	15:34.83	6500	8166
ME862/028-1	702	13.01.2012	01:47	02:19	37:38.76	15:35.00	37:36.06	15:35.10	8216	8537

Ship's number	Profil-Nr.	Date	Time Start	Time End	Latitude Start	Longitude Start	Latitude End	Longitude End	FFN Start	FFN End
			UTC	UTC	xx° x.x'N	xx° x.x'E	xx° x.x'N	xx° x.x'E		
ME862/028-1	703	13.01.2012	02:24	04:31	37:35.88	15:34.71	37:36.36	15:21.45	8593	9864
ME862/028-1	704	13.01.2012	04:38	06:44	37:35.92	15:21.54	37:30.17	15:32.39	9926	11180
ME862/028-1	705	13.01.2012	06:47	07:02	37:30.24	15:32.78	37:31.19	15:33.64	11222	11366
ME862/028-1	706	13.01.2012	07:07	07:23	37:31.54	15:33.43	37:32.30	15:32.08	11419	11576
ME862/028-1	801	13.01.2012	08:24	08:48	37:32.15	15:32.34	37:33.23	15:30.44	12180	12425
ME862/028-1	802	13.01.2012	08:59	10:40	37:33.91	15:29.72	37:42.26	15:31.21	12538	13543
ME862/028-1	803	13.01.2012	10:43	11:40	37:42.55	15:31.24	37:47.45	15:31.23	13576	14157
ME862/028-1	804	13.01.2012	11:44	12:12	37:47.63	15:31.52	37:48.15	15:34.34	14197	14487
ME862/028-1	805	13.01.2012	12:17	13:20	37:47.85	15:34.68	37:42.85	15:35.91	14542	15135
ME862/028-1	806	13.01.2012	13:23	13:33	37:42.75	15:36.25	37:42.86	15:37.17	15180	15277
ME862/028-1	807	13.01.2012	13:38	14:36	37:43.17	15:37.31	37:47.99	15.35.92	15322	15903
ME862/028-1	808	13.01.2012	14:41	14:54	37:48.27	15:36.59	37:48.20	15:37.56	15955	16075
ME862/028-1	809	13.01.2012	14:57	15:54	37:48.02	15:37.63	37:43.30	15:38.94	16114	16691
ME862/028-1	810	13.01.2012	16:13	16:54	37:43.62	15:40.34	37:47.12	15:39.64	16878	17290
ME862/028-1	811	13.01.2012	16:58	17:38	37:47.73	15:39.74	37:50.57	15:41.26	17323	17725
ME862/028-1	812	13.01.2012	17:43	20:23	37:50.89	15:40.87	37:50.34	15:23.30	17781	19394
ME862/028-1	900	13.01.2012	20:31	21:29	37:50.93	15:23.07	37:55.46	15:24.50	20000	20675
ME862/028-1	901	13.01.2012	21:34	22:20	37:55.61	15:24.96	37:55.06	15:30.71	20736	21292
ME862/028-1	902	13.01.2012	22:24	23:02	37:55.20	15:30.41	37:56.90	15:33.49	21338	21800
ME862/028-1	903	14.01.2012	23:07	00:04	37.57.43	15:33.93	38:02.22	15:34.26	21840	22556
ME862/028-1	904	14.01.2012	00:05	00:34	38:02.23	15:34.30	38:04.52	15:35.39	22560	22913
ME862/028-1	905	14.01.2012	00:36	00:51	38:04.63	15:35.37	38:05.88	15:34.62	22929	23117
ME862/028-1	906	14.01.2012	00:55	01:06	38:05.99	15:34.16	38:05.79	15:33.14	23170	23295
ME862/028-1	907	14.01.2012	01:10	01:30	38:05.53	15:32.95	38:03.78	15:32.80	23344	23591
ME862/028-1	908	14.01.2012	01:32	02:44	38:03.70	15:32.75	37:59.01	15:34.77	23602	24436
ME862/028-1	909	14.01.2012	02:44	03:28	37:58.83	15:29.82	37:59.01	15:34.77	24436	24981
ME862/028-1	910	14.01.2012	03:28	03:49	37:59.01	15:34.77	38:00.12	15:36.31	24981	25233
ME862/028-1	911	14.01.2012	03:49	04:23	38:00.12	15:36.31	38:02.92	15:37.43	25233	25644
ME862/028-1	912	14.01.2012	04:23	04:58	38:02.92	15:37.43	38:05.87	15:37.19	25644	26062
ME862/028-1	1000	14.01.2012	05:01	05:46	38:06.16	15:37.32	38:09.60	15:38.73	27000	27681
ME862/028-1	1001	14.01.2012	05:46	06:32	38:09.60	15:38.73	38:12.28	15:36.37	27681	28376
ME862/028-1	1002	14.01.2012	06:46	07:33	38:11.74	15:35.55	38:08.53	15:38.48	28597	29306
ME862/028-1	1003	14.01.2012	07:42	07:54	38:08.94	15:38.65	38:09.72	15:37.82	29436	29612
ME862/028-1	1004	14.01.2012	07:58	08:51	38:09.62	15:37.42	38:06.69	15:33.11	29676	30462
ME862/028-1	1005	14.01.2012	08:57	09:08	38:06.26	15:33.21	38:05.70	15:34.32	30559	30713
ME862/028-1	1006	14.01.2012	09:11	09:48	38:05.84	15:34.55	38:07.83	15:37.52	30787	31346
ME862/028-1	1007	14.01.2012	09:51	10:32	38:08.12	15:37.50	38:11.46	15:37.25	31401	32013
ME862/028-1	1008	14.01.2012	10:44	11:18	38:11.05	15:37.49	38:09.52	15:34.64	32186	32670
ME862/028-1	1009	14.01.2012	11:18	12:04	38:09.52	15:34.64	38:06.42	15:31.85	32670	33355
ME862/028-1	1010	14.01.2012	12:04	12:19	38:06.42	15:31.85	38:05.15	15:31.30	33355	33589
ME862/028-1	1011	14.01.2012	12:51	13:35	38:06.62	15:31.41	38:09.95	15:33.50	33622	34316
ME862/028-1	1012	14.01.2012	13:35	14:24	38:09.95	15:33.50	38:11.79	15:36.82	34316	35043
ME862/028-1	1013	14.01.2012	14:24	14:54	38:11.79	15:36.82	38:13.90	15:37.38	35043	35495

Ship's number	Profil-Nr.	Date	Time Start	Time End	Latitude Start	Longitude Start	Latitude End	Longitude End	FFN Start	FFN End
			UTC	UTC	xx° x.x‘N	xx° x.x‘E	xx° x.x‘N	xx° x.x‘E		
ME862/028-1	1014	14.01.2012	14:54	16:01	38:13.90	15:37.38	38:15.54	15:42.22	35495	36484
ME862/028-1	1015	14.01.2012	16:01	16:09	38:15.54	15:42.22	38:16.10	15:42.41	36484	36590
ME862/028-1	1016	14.01.2012	16:17	16:25	38:15.88	15:43.02	38:15.39	15:42.59	36713	36836
ME862/028-1	1017	14.01.2012	16:25	16:31	38:15.39	15:42.59	38:15.34	15:42.07	36836	36919
ME862/028-1	1018	14.01.2012	16:35	17:02	38:15.59	15:41.86	38:17.37	15:41.36	36983	37400
ME862/028-1	1019	14.01.2012	17:02	17:24	38:17.37	15:41.36	38:17.60	15:39.28	37400	37728
ME862/028-1	1020	14.01.2012	17:30	17:57	38:17.23	15:39.15	38:15.49	15:40.84	37805	38210
ME862/028-1	1021	14.01.2012	18:00	18:20	38:15.51	15:41.55	38:16.25	15:43.04	38263	38562
ME862/028-1	1022	14.01.2012	18:20	19:08	38:16.25	15:43.04	38:18.13	15:48.02	38562	39307
ME862/028-1	1023	14.01.2012	19:12	19:37	38:18.23	15:48.08	38.20.30	15:49.41	39440	39743
ME862/028-1	1024	14.01.2012	19:43	20:20	38:20.73	15:49.07	38:21.18	15:45.24	39859	40394
ME862/028-1	1025	14.01.2012	20:25	20:37	38:20.94	15:44.89	38:19.92	15:44.41	40471	40652
ME862/028-1	1026	14.01.2012	20:40	21:13	38:19.75	15:44.58	38:17.76	15:46.89	40692	41161
ME862/028-1	1027	14.01.2012	21:20	21:29	38:17.87	15:47.40	38:18.62	15:48.03	41259	41404
ME862/028-1	1028	14.01.2012	21:32	22:11	38:18.78	15:48.11	38:22.15	15:49.31	41437	42020
ME862/028-1	1029	14.01.2012	22:13	23:40	38:22.29	15:49.39	38:29.01	15:53.96	42055	43376
ME862/028-1	1030	15.01.2012	23:46	01:40	38:29.32	15:53.64	38:32.58	15:41.53	43455	45165
ME862/028-1	1031	15.01.2012	01:45	02:07	38:32.88	15:41.51	38:34.61	15:42.67	45233	45560
ME862/028-1	1032	15.01.2012	02:10	03:29	38:34.65	15:42.99	38:32.65	15:51.34	45619	46795
ME862/028-1	1033	15.01.2012	03:33	06:14	38:32.34	15.51:47	38:18.86	15:47.79	46854	49273
ME862/033-1	1101	15.01.2012	16:00	17:59	38:01.74	15:37.96	38:04.38	15:30.60	50010	51456
ME862/033-1	1102	15.01.2012	18:06	18:30	38:04.10	15:30.36	38:02.20	15:29.48	51525	51831
ME862/033-1	1103	15.01.2012	18:36	19:46	38:01.92	15:29.82	38:00.24	15:37.31	51900	52754
ME862/033-1	1104	15.01.2012	19:49	20:01	37:59.95	15:37.44	37:58.82	15:37.31	52801	52970
ME862/033-1	1105	15.01.2012	20:08	20:23	37:58.82	15:36.82	37:59.10	15:35.24	53020	53198
ME862/033-1	1106	15.01.2012	20:28	22:21	37:58.79	15:34.99	37:47.88	15:33.84	53258	54594
ME862/033-1	1107	15.01.2012	22:25	22:58	37:48.72	15:33.48	37:48.21	15:29.81	54640	55043
ME862/033-1	1108	16.01.2012	23:02	01:02	37:48.47	15:29.59	37:59.16	15:29.43	55106	56524

Station list (Geological Sampling)

SVP: Sound Velocity Profiler
GKG: Giant Box Corer
SL: Gravity Corer

Ship's number	Core Station	Lat	Lon	Water Depth [m]	Gear	Recovery [m]
ME862/1313-1	M86/2-001-01	38:35.04	15:33.71	930	SVP	
ME862/1313-2	M86/2-001-02	38:35.04	15:33.73	939	GKG	0.53
ME862/1313-3	M86/2-001-03	38:35.03	15:33.73	936	SL	3.82
ME862/1314-1	M86/2-002-01	38:36.48	15:35.51	885	SL	4.91
ME862/1315-1	M86/2-003-01	38:37.95	15:37.28	742	SL	3.82
ME862/002-1	M86/2-004-01	37:40.36	15:21.99	1554	SL	3.38
ME862/003-1	M86/2-005-01	37:40.77	15:21.47	1560	SL	3.89
ME862/004-1	M86/2-006-01	37:40.33	15:22.33	1546	SL	4.77
ME862/005-1	M86/2-007-01	37:39.58	15:16.48	689	SL	4.33
ME862/006-1	M86/2-008-01	37:39.63	15:16.71	650	SL	4.95 (surface missing (~8cm)
ME862/007-1	M86/2-009-01	37:39.57	15:16.34	680	SL	2.21
ME862/008-1	M86/2-010-01	37:39.53	15:16.14	724	SL	only core catcher
ME862/010-1	M86/2-011-01	37:41.41	15:26.71	1877	SL	2.23
ME862/011-1	M86/2-012-01	37:40.35	15:21.59	1562	SL	2.66
ME862/012-1	M86/2-013-01	37:40.44	15:21.00	1565	SL	4.35
ME862/017-1	M86/2-014-01	37:41.23	15:15.76	486	SL	4.51
ME862/018-1	M86/2-015-01	37:41.56	15:15.90	460	SL	3.56
ME862/019-1	M86/2-016-01	37:41.91	15:16.08	448	SL	5 (surface missing)
ME862/020-1	M86/2-016-02	37:41.91	15:16.08	447	SL	7.84
ME862/020-2	M86/2-017-01	37:46.24	15:14.57	84	SL	0.00
ME862/020-3	M86/2-017-02	37:46.23	15:14.50	83	GKG	0.00
ME862/020-4	M86/2-017-03	37:46.23	15:14.50	82	GKG	0.00
ME862/021-1	M86/2-018-01	37:46.24	15:14.51	85	SL	0.00
ME862/024-1	M86/2-019-01	37:42.25	15:16.25	462	SL	7.53
ME862/025-1	M86/2-020-01	37:40.25	15:15.27	609	SL	4.52
ME862/026-1	M86/2-021-01	37:40.46	15:15.39	613	SL	0.00
ME862/027-1	M86/2-022-01	37:40.17	15:16.80	630	SL	4.60
ME862/029-1	M86/2-023-01	38:03.35	15:33.66	1088	SL	0.00
ME862/030-1	M86/2-024-01	37:57.94	15:31.57	1333	SL	0.00
ME862/031-1	M86/2-025-01	37:57.71	15:31.24	1307	SL	0.00
ME862/032-1	M86/2-026-01	38:01.85	15:33.17	1175	GKG	0.30