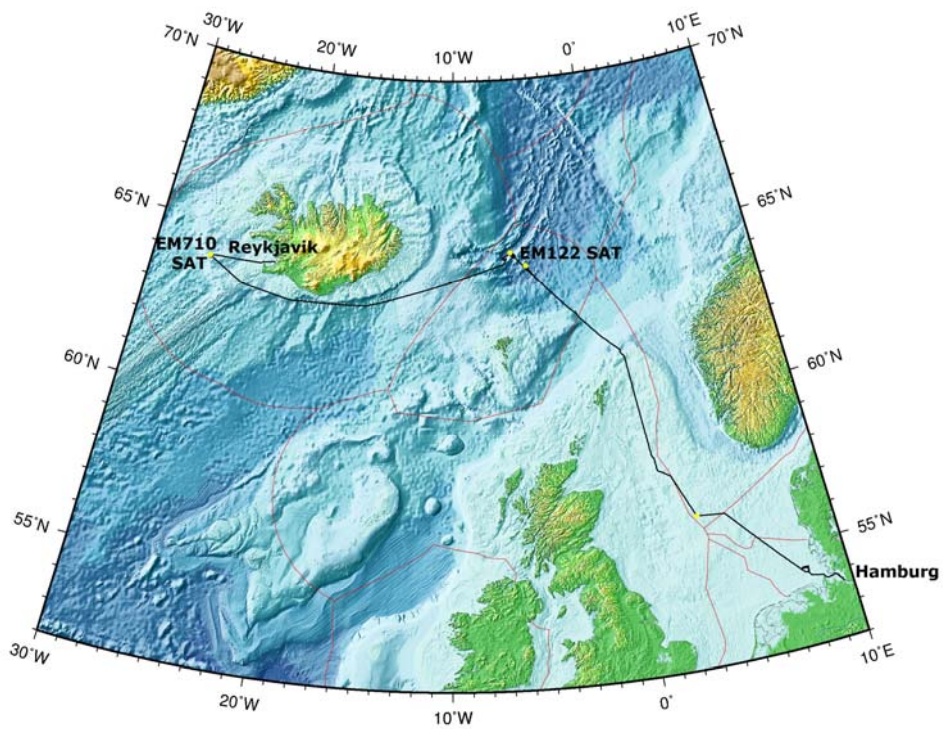


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## Short Cruise Report RV METEOR Cruise M82/0

Hamburg - Reykjavik  
21. June – 2. July 2010  
Chief Scientist: Wilhelm Weinrebe  
Captain: Thomas Wunderlich



*Ship track of RV METEOR cruise M82/0 with locations of sound velocity profiles (yellow circles) and the areas of the Sea Acceptance Tests (SAT) for the EM710 (shallow water) and the EM122 (deep water) multibeam echosounder.*

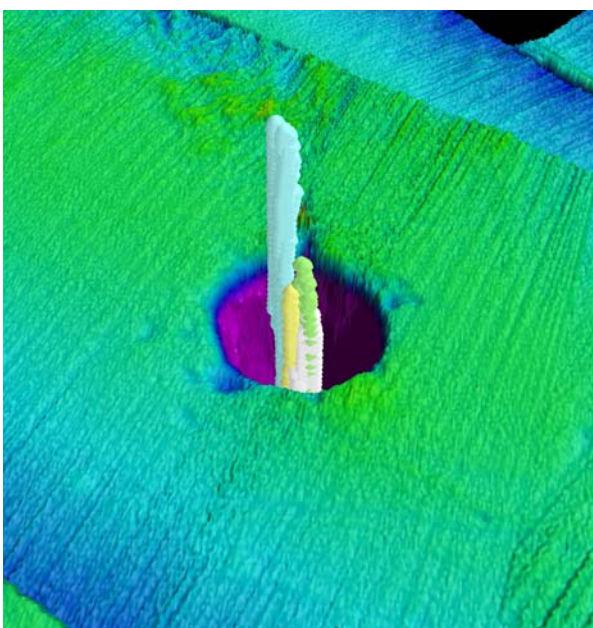
## Objectives

Leg 0 of the cruise M82 was the first cruise of R/V METEOR after a stay in the shipyard, during which METEOR had undergone routine maintenance, some restructuring and received new echosounder systems. So it was not a scientific but a technical test cruise, which is also documented by the number "0" of this leg.

One of the major upgrades during the stay of RV METEOR at the shipyard in Bremerhaven was the upgrade of the old Kongsberg EM120 deep-water multibeam echosounder to a new EM122. In addition, the shallow water multibeam system EM710 received new firmware and software, and the motion sensor MRU-5 was upgraded to a GPS-augmented attitude determination system Sea-path 300. Consequently, the purpose of this cruise was extensive testing and calibration of the new systems and furthermore the accomplishment of the "sea acceptance tests" (SAT) of the EM122 and the EM710.

## Narrative

Following an "open-Ship" during the weekend METEOR left the "Überseebrücke" in Hamburg on Monday, June 21, 09:45 a.m. with about 60 guests on board who enjoyed a wonderful sightseeing cruise down the river Elbe to Cuxhaven. Poster exhibitions and demonstrations of scientific equipment, together with a remarkable sunny day made this an unforgettable event for many of the guests. At 3:30 p.m. METEOR reached the port of Cuxhaven and moored at the pier. After the guests left the vessel the equipment for the upcoming legs of METEOR had to be loaded. This work was finished on the following day at noon and METEOR left the port of Cuxhaven at 1:15 p.m. As several of the ship systems had undergone major upgrades and maintenance in the shipyard, additional testing, calibration and adjustments were necessary. This was done during the transit to the island of Helgoland until the evening and during the night. Technicians of the manufacturers who did this job eventually left the vessel in the morning of June 23 by a small boat to Helgoland and METEOR headed towards the test area in the North Atlantic.



*Fig. 1 Perspective view of the blowout and the uprising gas flare.*

A new feature of the multibeam systems is the ability to record, display and log not only the echoes from the seafloor but also the entire backscattered signal from the whole water column (WCI = water column imaging). This tool will be used e.g. by biologists for biomass assessment or by marine geologists for the detection and exploration of gas flares uprising from the seafloor. Consequently this feature can only be tested in areas with known gas expulsion sites. On a cruise with RV ALKOR in 2003 two sites in the Northern North Sea had been explored: a natural gas seep site and an abandoned drill site where methane gas is blowing out. As these constitute perfect sites to test the WCI functionality we decided to pass these locations en route to the deep sea test area. We arrived at Tommeliten field on Thursday,

June 24 at 3:00 a.m. In order to record reliable data though the system has not been finally calibrated, we first measured a sound velocity profile using the ship's AML profiler. Tommeliten field was surveyed at a speed of 2 kn and several uprising gas flares were perfectly recorded in the water column display. The "blowout" area was reached at 1:00 p.m. This site was once a production well which had been abandoned, however accidentally it had not been closed successfully. Thus a considerable stream of methane is continuously expulsing into the water. In calm seas this spot is recognizable even at the sea surface. To avoid any possible hazard we mapped this site along 4 profiles surrounding the spot. Impressive uprising flares in the water column were recorded by both echosounders in WCI mode (fig. 1).

An area north of the Faeroe Islands at 64°27'N, 5°06'W was chosen for the calibration and test of the deep-water echosounder EM122. Only here water depths in excess of 3,500 m are found. This site was reached after a transit of 45 h on June 26 in the morning. The entire "Sea Acceptance Test" (SAT) procedure comprised a noise test, the recording of a water sound velocity profile, calibration lines for roll, pitch, yaw and time delay as well as a test survey or patch test. At first a sound velocity profile was measured down to a water depth of 1,950 m. Following a strict procedure the calibration was accomplished until 5:00 a. m. in the morning of June 26. Before the calibration was verified by a test survey, maintenance work on winches and cables had to be done which were finished at noon. The calibration of the EM122 has to be verified by a test survey. In order to achieve data of best quality another cast of the sound velocity profiler down to a depth of 1,950 m was accomplished until 2:00 p.m. Subsequently a test survey of an area about 30 km by 20 km was run during the night and finished at 7:00 a.m. on June 28 (fig. 2).

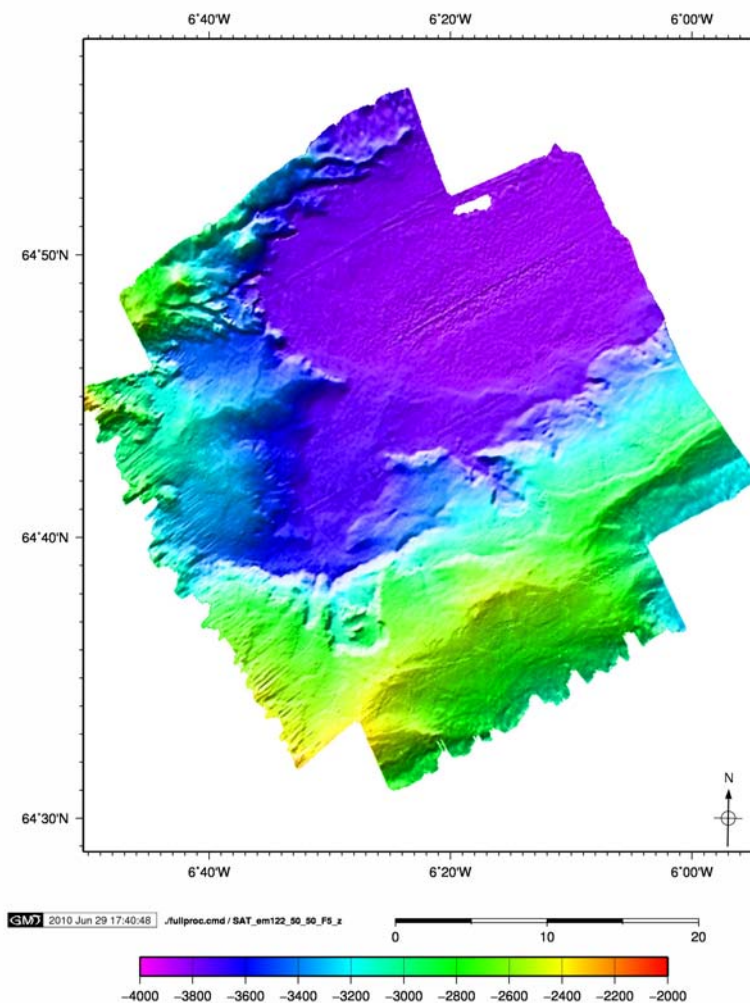
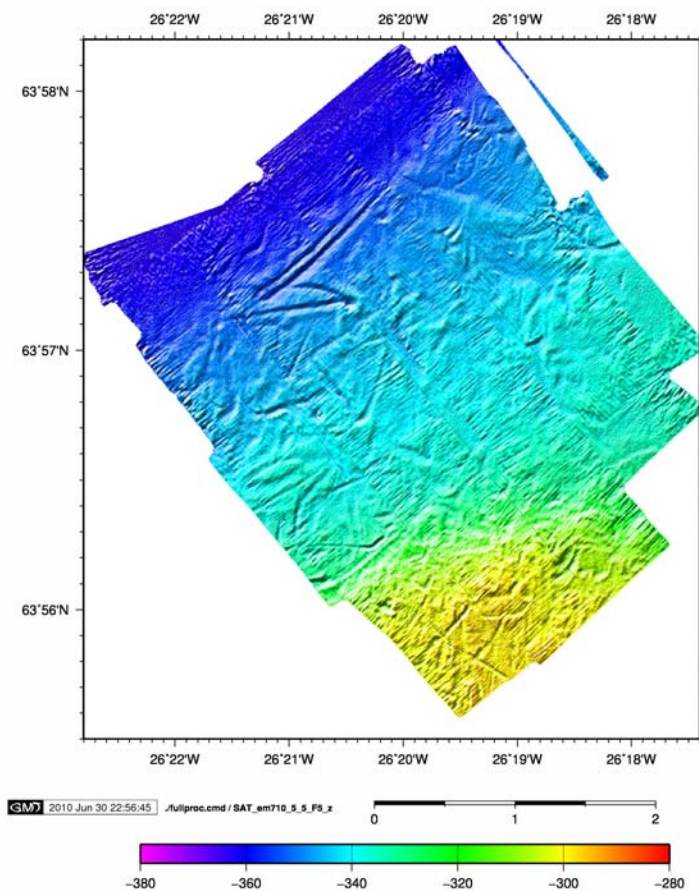


Fig. 2 EM122 test survey in deep water area.

Following the completion of the calibration of the deep-water multibeam EM122, METEOR headed towards shallower areas closer to the Icelandic coast for the calibration of the shallow water multibeam EM710. According to weather forecast a heavy storm with strong winds from Northeast was expected for the next days. Therefore an area South of Iceland at 63°59'N, 26°18'W was chosen for the shallow water test. METEOR reached this site on Wednesday, June 30 at 8:00 in the morning. Basically a similar procedure as for the deep water system had to be followed, i.e. starting with a sound velocity profile cast, followed by calibration lines and finally running a test survey. However, in shallow water the profiles to survey are considerably shorter. So the calibration and the test survey were finished at 4:00 p.m. on June 30 (fig. 3). METEOR started the transit to the port of Reykjavik. The pilot was met at 11:00 on July 1. At noon METEOR was moored at the pier.



*Fig. 3 EM710 test survey in shallow water area.*

## Acknowledgements

We warmly thank master Thomas Wunderlich and his crew for their excellent support in all the work done and for the splendid working atmosphere throughout the entire cruise.

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## Cruise Participants

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## List of Stations

Station	Date	Time	Latitude	Longitude	Depth [m]	Gear	Action	Comment
ME815/310-1	24.06.2010	01:59	56° 29.60' N	3° 0.11' E	70.4	Sound Velocity Profiler	to water	
ME815/310-1	24.06.2010	02:10	56° 29.60' N	3° 0.14' E	70.2	Sound Velocity Profiler	at depth	WT 74 m
ME815/310-1	24.06.2010	02:12	56° 29.60' N	3° 0.14' E	70.2	Sound Velocity Profiler	on deck	
ME815/311-1	24.06.2010	02:46	56° 29.75' N	2° 59.96' E	68.6	Multibeam-Profil	begin profile	
ME815/311-1	24.06.2010	03:09	56° 30.30' N	2° 59.08' E	68.3	Multibeam-Profil	end profile	
ME815/312-1	24.06.2010	11:45	57° 55.25' N	1° 37.98' E	89.8	Multibeam-Profil	begin profile	EM 710
ME815/312-1	24.06.2010	12:29	57° 55.33' N	1° 37.85' E	90.3	Multibeam-Profil	end profile	
ME815/313-1	26.06.2010	09:35	64° 26.65' N	5° 6.02' W	3340	Sound Velocity Profiler	to water	
ME815/313-1	26.06.2010	10:12	64° 26.65' N	5° 6.02' W		Sound Velocity Profiler	at depth	SLmax: 1950 m
ME815/313-1	26.06.2010	11:30	64° 26.65' N	5° 6.02' W	3331.8	Sound Velocity Profiler	on deck	
ME815/314-1	26.06.2010	12:54	64° 26.65' N	5° 6.02' W	3426.3	Multibeam-Profil	begin profile	heading 138°
ME815/314-1	26.06.2010	14:47	64° 26.65' N	5° 6.02' W	3280.6	Multibeam-Profil	alter course	Change course from 138° to 318°
ME815/314-1	26.06.2010	15:04	64° 26.65' N	5° 6.02' W	3151.2	Multibeam-Profil	information	Track cont.
ME815/314-1	26.06.2010	17:09	64° 19.92' N	5° 1.89' W	3430.8	Multibeam-Profil	end profile	
ME815/315-1	26.06.2010	20:16	64° 46.47' N	5° 56.66' W	3035.7	Multibeam-Profil	begin profile	
ME815/315-1	27.06.2010	04:50	64° 46.09' N	5° 48.33' W	3138.3	Multibeam-Profil	end profile	total profile length: 62 nm
ME815/316-1	27.06.2010	12:15	64° 51.41' N	6° 6.18' W	3858.1	Sound Velocity Profiler	to water	W2
ME815/316-1	27.06.2010	13:00	64° 51.41' N	6° 6.18' W	3858.3	Sound Velocity Profiler	at depth	SLmax.: 1950 m
ME815/316-1	27.06.2010	13:48	64° 51.42' N	6° 6.21' W	3857.5	Sound Velocity Profiler	on deck	
ME815/317-1	27.06.2010	14:06	64° 51.33' N	6° 6.50' W	3850.5	Multibeam-Profil	begin profile	heading 240°
ME815/317-1	28.06.2010	07:00	64° 42.55' N	6° 25.28' W	2388.6	Multibeam-Profil	end profile	total profile length 125 nm
ME815/318-1	30.06.2010	08:01	63° 58.72' N	26° 17.28' W	341.1	Sound Velocity Profiler	to water	W2
ME815/318-1	30.06.2010	08:15	63° 58.72' N	26° 17.28' W	341.4	Sound Velocity Profiler	at depth	SLmax: 320m
ME815/318-1	30.06.2010	08:31	63° 58.72' N	26° 17.28' W	341.1	Sound Velocity Profiler	on deck	
ME815/319-1	30.06.2010	09:43	63° 58.67' N	26° 18.14' W	356.2	Multibeam-Profil	begin profile	
ME815/319-1	30.06.2010	15:45	63° 56.23' N	26° 21.32' W	328.8	Multibeam-Profil	end profile	total profile length: 27 nm