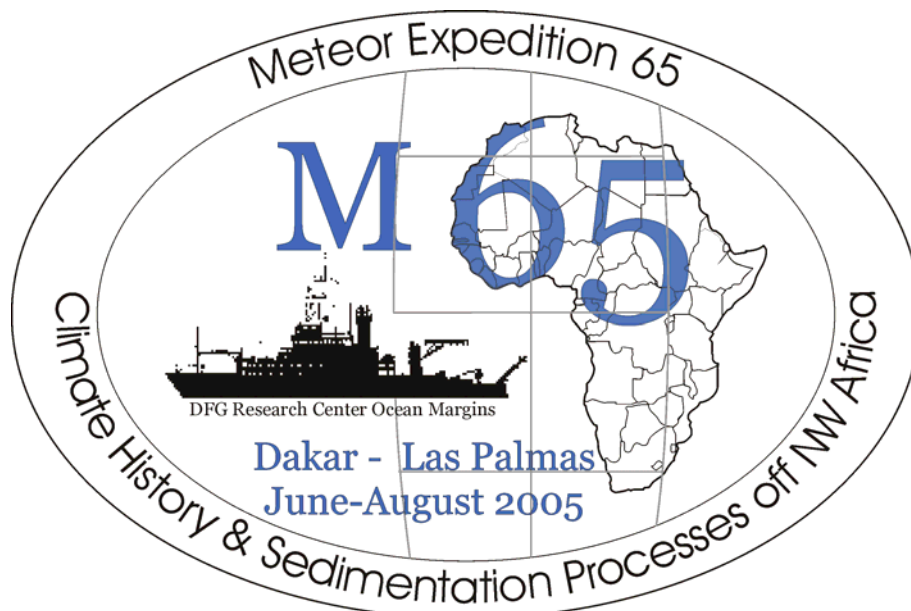


METEOR-CRUISE M65/3
Las Palmas – Las Palmas, 31.07.2005 - 10.08.2005

Short Cruise Report



Participants

Name	Discipline	Institution
Wefer, Gerold, Prof. Dr.	chief scientist	GeoB/RCOM
Bergenthal, Markus	MeBo	GeoB/RCOM
Buhmann, Sitta	MeBo	GeoB/RCOM
Diekamp, Volker	Geolab	GeoB/RCOM
Düßmann, Ralf	MeBo	GeoB/RCOM
Engemann, Greg	MeBo	SR
Freudenthal, Tim, Dr.	MeBo	GeoB/RCOM
Hemsing, Vanessa.	Geolab	GeoB/RCOM
Hill, Heinz-Günther	Meteorology	DWD
Kalweit, Holger	MeBo	GeoB/RCOM
Klar, Steffen	MeBo	GeoB/RCOM
Könnecker, Hans-Otto	MeBo	PB
Lunk, Thomas	MeBo	PB
Renken, Jens	MeBo	GeoB/RCOM
Rosiak, Uwe	MeBo	GeoB/RCOM
Schmidt, Werner	MeBo	GeoB/RCOM
Truscheit, Thorsten	MeBo	DWD
Warnke, Kerstin, Dr.	Biology	FUB

GeoB/RCOM Department of Geosciences / Research Center Ocean Margins,
University of Bremen

SR Schilling Robotics, Davis, California

DWD Deutscher Wetterdienst, German Weather Office, Hamburg

PB Prakla Bohrtechnik GmbH, Peine

FUB Freie Universität Berlin

Research Program

The main objective of METEOR-cruise M65/3 was to test a seabed drill rig in deep water. This drill rig is called MeBo (**M**eeresboden-**B**oehrgerät, German expression for Sea floor drill rig) and was developed by the Research Center Ocean Margins at the University of Bremen (RCOM) in cooperation with a consortium of commercial companies.

MeBo is able to get up to 50 m long cores from soft sediments and hard rocks in water depths up to 2000 m. The drill rig operates on the sea floor and is thus unaffected by vessel movements due to wind, waves or currents. It is controlled via an umbilical from the research vessel. The feeding system, the drill head, chucks and flushing pump are essential part of the drill that allow coring both by simple pushing in soft sediments and by rotary drilling in hard rocks. The core length for each push and rock barrel is 3 m. When the barrel has finished sampling it is recovered out of the drilled hole and stored by the loading arm in a magazine. The next barrel is lowered into the drill hole, a 3 m rod is added and the next 3 m can be sampled. This is a highly flexible procedure that allows immediate changes of the coring procedures for example in case of a sudden change in lithology. All operations are surveyed from the vessel by video cameras and different kind of sensors.

MeBo has a foot print of 2.2 x 2.6 m that is enlarged by movable legs. These individually adjustable legs are used to keep the drill in upright position even at rough topography. MeBo is 5.7 m high and weighs fully loaded about 10 t. The operation of such a large and complex system is a challenge for the vessel, crew and the MeBo-Team. MeBo was tested for the first time in the open ocean at water depths between 1000 and 2000 m during this leg. The goal of this leg was to collect information and experience for the handling of this system on large research vessels. The technical reliability and functionality in deep water were tested as well as the quality of the recovered cores in order to get hints for possible or required modifications of the system.

A second goal of the cruise was to collect species of the cephalopode *Spirula* with a deep towed net. *Spirula* has a coiled inner shell and is therefore unique among the modern cephalopods. *Spirula* could be the closest living relative of the extinct ammonites. Next to the clarification of their phylogeny by DNA-analyses, the embryology of *Spirula* will be investigated on the collected samples at the Freie Universität Berlin.

Narrative of the Cruise

The MeBo system and a special Launch and Recovery System for MeBo were mobilized in the harbour of Las Palmas, Spain from July 26 to July 29. A first test of the launch and recovery procedure was conducted in the harbour at July 29 and 30.

Meteor departed from Las Palmas on July 31 at around 13:00 (UTC) with about 18 scientists and technicians from the RCOM, the Freie Universität Berlin, the Prakla Bohrtechnik GmbH located in Peine, the Californian company Schilling Robotics, and the Deutsche Wetterdienst in Hamburg on board. In the early morning of August 1 we arrived at our first test location (Fig. 1) at the continental slope off Morocco near to Cape Yubi (27°32N, 13°44W). We started our research program with the collection of the cephalopode *Spirula* using the Isaacs-Kid midwater trawl (IKMT) followed by the first deployment of MeBo in 1070 m water depth. Within the next 7 days another 13 deployments of the IKMT and 5 deployments of the MeBo were conducted at this location. Although two deployments of the MeBo had to be aborted due to a failure in the high voltage system we were able to test the drill system including drill string handling and push coring on Holocene and Pleistocene

hemipelagic nanofossil ooze. While the first three successful deployments were used to optimize the coring procedure we operated the MeBo during the last deployment at this station for 24 hrs and reached a sediment depth of 23.55 m.

In the late evening of August 7 we left for the second test location (Fig. 2) in 1700 m water depth at the old DSDP drilling site 369 (26°35N, 14°60W). This location is characterized by only thin quaternary sediment coverage (about 5 m) above consolidated Pliocene and Miocene marls. At this site we drilled with MeBo within 24 hrs down to 20.65 m sediment depth. The upper 5 m were sampled by push core technique. Casing was used to stabilise the drilled hole in the upper soft layers. We continued sampling by rotary drilling. A core recovery of 98.7 % was reached at this site. Another haul with the IKMT for the cephalopode *Spirula* completed the research program at the second test location in the evening of August 9. The cruise M65-3 ended with the arrival in Las Palmas on August 10 at about 7:00 (UTC).

MeBo performed well during this cruise, complied with all requirements and proofed to be a reliable system. A total length of 69.85 m was drilled at 5 deployments. 15 hauls were performed with the IKMT and 13 *Spirulas* were captured. Further 15 cephalopods from five families of the orders Sepiolida and Teuthoida were caught.

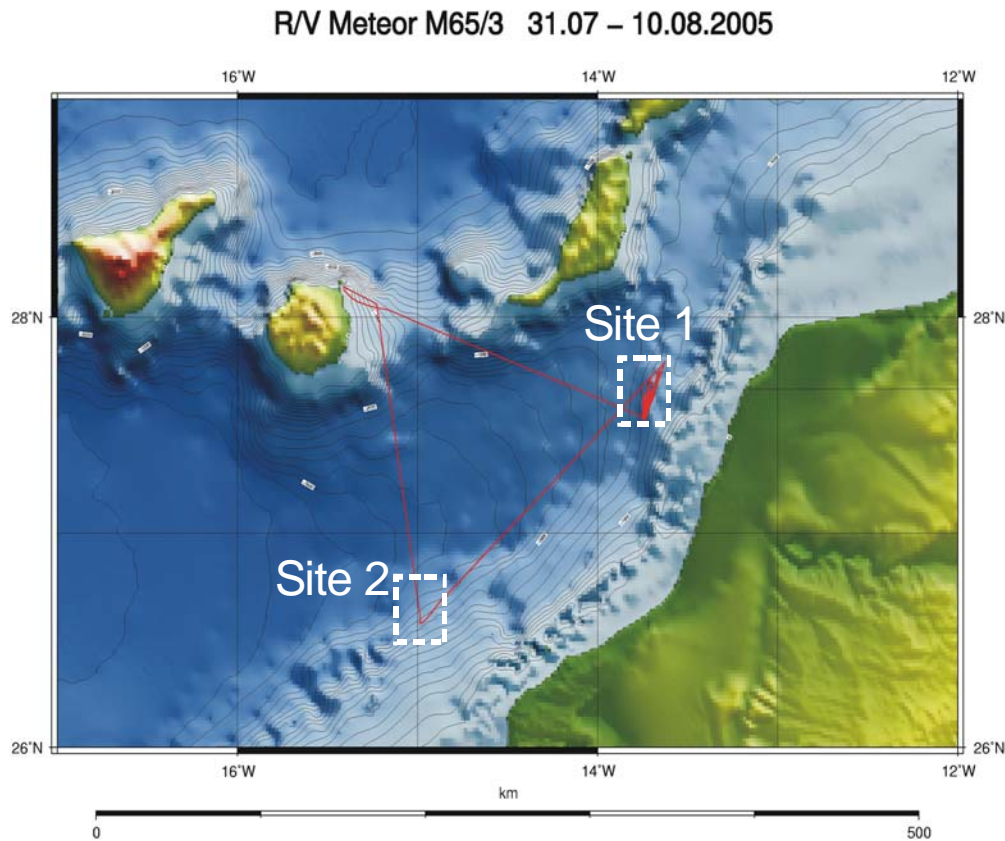


Figure 1 Track of R/V METEOR Cruise M65/3