

Short Cruise Report METEOR cruise 49, Leg 4.

Salvador da Bahia – Halifax, Nova Scotia, Canada (4.4. –5.5.2001)

During the last Leg of the METEOR cruise 49, we investigated particle sedimentation in the western equatorial Atlantic and in the Brazil Basin using bottom-tethered arrays equipped with sediment traps and current meters. Secondly, sediment cores were retrieved at a geological transect across the North Brazil Current off Surinam to reconstruct the transport of warmer water masses from the equatorial Atlantic into the Caribbean and the North Atlantic during the Quaternary. The third topic were seismic, echographic, bathymetric and geological investigations at the Demerara Rise off Surinam (Ocean Drilling Proposal of J. Erbacher, BGR). In addition, plankton material and surface water was continuously collected by means of the ship's pumping systems during the entire cruise to test specific proxies for paleoceanographic studies and to sample material for micropaleontological and trace element investigations.

RV METEOR departed from Salvador da Bahia, Brazil, on Wednesday, April 5, 2001 at 10:00 local time. Eighteen scientists were on board: two meteorologist, two geologists from the Federal Institute for Geosciences and Natural Resources (Hannover) and the Geological Institute of Bochum and 14 scientists from different departments of the University of Bremen. After leaving the 200 nm zone of Brazil, the echosystems PARASOUND and HYDROSWEEP were turned on. The ship's pumping systems for continuous sampling of surface water were switched on at April 6. Sampling of surface water for trace elements from surface waters started afterwards. On April 7, the first mooring WAB3 equipped with two sediment traps and one current meter was recovered successfully. Unfortunately, the cup rotators of the traps had stopped at the beginning of the year 2000. Later, we carried out water sampling with the Niskin sampler. After the deployment of a new mooring WAB4 with similar configuration than WAB3, the multicorer was used to obtain surface sediment samples. Finally, particle filtration with the in-situ pumps was carried out. We terminated the first station after about 20 hours of work.

We continued our cruise track 260 nm to the NNE and reached the next study site WA17 on late April 8. We launched the multicorer with the CTD first, followed by the in-situ pumps and two Niskin casts. In the early morning of April 9, we intended to recover the mooring

WA17. Unfortunately, the two releases did not respond nor release the weight to let the array drift up to the surface. We searched the area for about two hours but the mooring could not be found. We decided to deploy a short mooring array of about 800 m length with one sediment trap at this site.

We then sailed about two days with NE course to reach the third and last mooring position WA16, located close to the equator at about 23°W. We arrived on April 11 and started with the recovery of the mooring WA16 which was done in about two hours. We continued our station work with the multicorer and recovered carbonate oozes from 3700 m water depths from the mid-Atlantic Ridge. Two casts of Niskin samplers and one series of in-situ pumps were deployed later during the night. In the early morning of April 12, we deployed a 2800 m long mooring array with two sediment traps in about 3750 m water depths. This station was terminated at 8:30 p.a. local time on April 12.

We then began our transit of about 7 days to reach the Demerara Rise off Surinam. During this transit, we launched the rosette (two times at each station) and the in-situ pumps (one station) at three sites located at about 3°N/33°30'W, 5°N/40°W, and 7°N/46°30'W. We reached the NE Demerara Rise on the early morning of April 19, starting a series of NE-SW profiles with the echosystems PARASOUND and HYDROSWEEP perpendicular to the continental slope. The goal was to obtain a reasonable bathymetry of the NE Demerara Rise and to find suitable coring sites for the gravity corer and the multicorer. Only the detailed bathymetric survey enabled us to find suitable sites in particular between the slope and the outer edge of the plateau. Each instrument was used 5 times during the next 3.5 days and we obtained gravity cores between about 6 m and 8 m length between 1200 and 4600 m water depth. The multicorer was filled after each deployment with about 30 cm of surface sediment.

On Sunday 22, we terminated our survey with PARASOUND and HYDROSWEEP and retrieved a last core from about 1200 m water depths. We then sailed for about three hours to reach the starting point of the seismic survey of the NW Demerara Rise off Surinam. We launched a 700 m long streamer, an air gun and two GI-guns in about two hours and commenced with the measurements sailing with 6.5 knots in NE direction to cross former DSDP sites. After about 55 hours and 360 nm, we terminated the survey in the early morning of April 25 and recovered the equipment immediately. Afterwards we used the gravity corer at two sites at the edge of the plateau to recover sediments presumably of Oligocene and

Cretaceous age. We were able to retrieve Oligocene marls which helped us to explain complicated seismic structures in this area. Unfortunately, we were not able to retrieve sediments of Cretaceous age at the northern rim of the plateau which is relatively steep but which was nevertheless covered with Quaternary sediments. After terminating our coring activities, we completed our bathymetric survey (HYDROSWEEP and PARASOUND) with two profile lines at the northern edge of the plateau. In the very early Thursday morning, we started our 9-day transit to the port of Halifax, Nova Scotia. During this transect, five stations for the sampling of surface and subsurface waters with the rosette and for the collection of suspended particles with the in-situ pumps were planned. All scheduled sites could be done, the first on Friday, April 27, the second on early Sunday morning, April 29, the third on Monday morning, April 30, the fourth on Wednesday morning, May 2, and the last on Thursday, May, 3.

We arrived in Halifax, Nova Scotia, Canada, on May 5, 2001 at 8:00 LT. The 'METEOR' cruise 49 ended with this fourth leg.

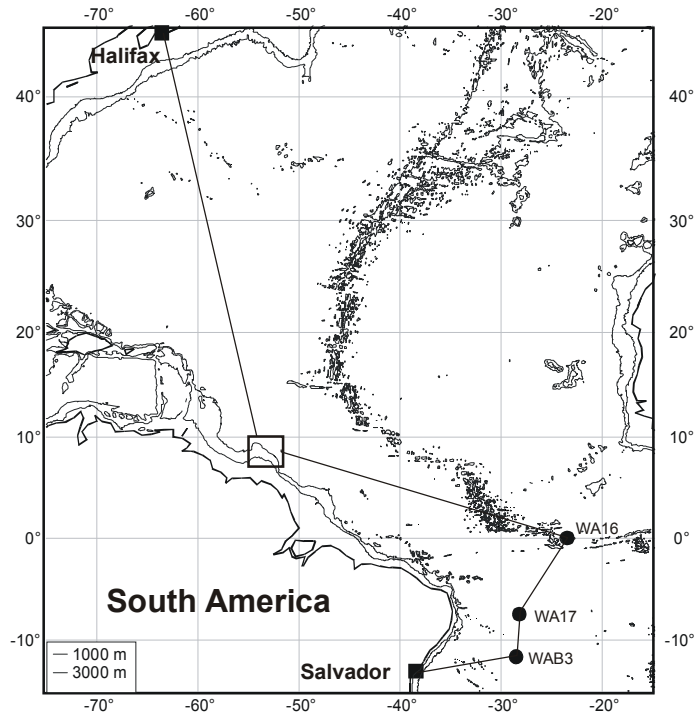


Figure 1. Cruise track of RV METEOR 49, Leg 4. Black dots show the mooring sites. The working area off Surinam (geological transect and seismic survey) is marked with a rectangle.