

SHORT CRUISE REPORT
RV METEOR cruise M52/3, Red Sea

Dates: March 10 – March 27, 2002
Port calls: Limassol – Jeddah - Limassol
Chief scientist: Dr. Jürgen Pätzold, University Bremen

After three days in port, RV METEOR left Limassol on the morning of Sunday, March 10, 2002, beginning the third leg of Cruise M52/3. The scientific shipboard party (Tab. 1) included 18 colleagues from the Universities of Bremen, Kiel, Hamburg, Regensburg, and Bochum and two colleagues from the Deutscher Wetterdienst (DWD) in Hamburg. In addition, five guest scientists from Saudi Arabia joined the cruise in Suez, four scientists from King Abdulaziz University in Jeddah including the Saudi scientific coordinator Dr. Mustafa Moammar, and major Mohammed Al-Harbi from Riad as military observer.

The scientific aim of the cruise was to carry out geological and geochemical as well as geophysical surveys in five working areas in the northern Red Sea between about 27°N and 21°N (Fig. 1). All scientific studies were carried out in the territorial waters of the Kingdom of Saudi Arabia. A major focus of the cruise was to sample and study two brine basins located along the central axis of the northern Red Sea, namely the Shaban Deep (Area A) and the Kebrit Deep (Area F). The geophysical working group from the University of Hamburg carried out seismic, hydroacoustic, and bathymetric surveys along transects within the different working areas. The bathymetric surveys with the HYDROSWEEP system were very important for providing detailed mapping of the surveyed areas, while hydroacoustic subbottom surveys with PARASOUND revealed the sediment structures for geological sampling. The seismic surveys will help to better understand the crustal structures and the tectonic settings of the different profiles, especially in the areas of the two brine basins. The geochemical studies of the group from Kiel University mainly concentrated on the geochemical sampling of the brine/seawater boundary, including gas geochemistry and major and minor trace-element distribution. Investigations of microbiological activities under oxic and anoxic conditions completed the research program in the brine bodies. The geological sampling of the working group from Bremen University aimed at collecting undisturbed sediment cores from the Shaban and Kebrit Deep and surrounding hemipelagic sediments. Further sediment sampling was performed along the three profiles farther south (Areas G, H, and I). The set of sediment cores will be used to study the late Quaternary climatic and oceanographic conditions of the Red Sea in high spatial and thus temporal resolution. Plankton samples were also collected along a north-south profile determined by the five different working areas. These samples will be used to better understand the occurrence and distribution of diatoms and coccolithophores in the water column as a calibration set for sedimentological studies. Finally, a sampling program of the water column was carried out for Dr. Radwan Al-Farawati from King Abdulaziz University, Jeddah, for the analysis of total dissolved copper and nickel in the Red Sea.

After leaving the harbour, RV METEOR sailed south, passing through the southeastern Mediterranean toward the Suez canal. After passing through the canal on March 11, the group of five guests from Saudi Arabia joined the scientific shipboard party in the Suez port anchorage. During the next day we passed through the Gulf of Suez and reached the first working area in the northern Red Sea by the late evening of March 12. The scientific program of the cruise began with a geophysical survey of the Shaban Deep area and continued with geochemical sampling of the brine/seawater interface at three stations. Later, geological sampling

was performed with a multicorer and gravity corer at seven different stations that had been identified earlier during the detailed geophysical survey. For the first time, sampling of the very soft surface sediments of the Shaban Deep could be carried out quite successfully with a multicorer that had been modified by the addition of very large "feet". Sampling of the sediments also included two stations above the modern brine/seawater interface. Visual inspection of these multicorer cores also revealed darker laminated sediments in subsurface horizons, while the surface sediments are characterized by yellowish brown oxic sediments. This indicates that the brine/seawater interface varied through time. The sediment cores from the Shaban Deep were not opened during the cruise in order to avoid disturbing the soft sediments. Core descriptions and very detailed sampling of the sediments will be performed at the laboratories of the Geosciences Department at Bremen University. A stratigraphic chronology from the southern basin of Shaban Deep has been established on a sediment core that was collected during RV METEOR Cruise M44/3 in early 1999. It revealed alternating sections of laminated and non-laminated sediment units and will be used for correlation.

After three days, RV METEOR left the first working area and headed southeast toward the second sampling profile (area F), which included the Kebrit Deep. A two-day comprehensive working program was carried out in this area. After covering three different water stations along a transect for trace element analysis, the Kebrit Deep was studied by geophysical survey and geochemical sampling. Two stations were selected for geological sampling. A sediment core from the central Kebrit Deep retrieved 15 m of sediment. Surprisingly, the sediment core from the northern rim of the Kebrit Deep revealed reddish colored sediments indicating some hydrothermal influence on the sediments.

During the three following days scientific work was carried out in working areas G, H, and I. Hydrographic stations completed the collection of water samples for trace-element composition. HYDROSWEEP and PARASOUND surveys were used to identify possible sampling locations for paleostudies. The geophysical survey revealed a rough morphology and disturbed sediments along all three profiles. Geological sampling with the gravity corer failed in some locations due to the presence of carbonate crusts in subsurface layers.

On the morning of March 21 three of the guest scientists from King Abdulaziz University left RV METEOR in the Jeddah port anchorage with a set of scientific samples. Dr. Mustafa Moammar and major Mohammed Al-Harbi remained on board to attend to the scientific work of the cruise. After this short interruption RV METEOR sailed north to continue the scientific studies in Kebrit Deep. The new results from the Kebrit Deep encouraged us to continue sediment sampling along the northern rim of the basin in search of further indications of hydrothermal deposits. Three more sediment stations were sampled successfully. One of the cores definitely indicated a hydrothermal influence on the sediments by colorful deposits.

Continuing northward, the Shaban Deep was revisited on March 23 and 24. Two more geological stations were added in the southeastern area outside the brine basin to better reconstruct historical changes of the brine interface. Additional PARASOUND and HYDROSWEEP surveys completed the geophysical survey in Shaban Deep. All scientific station work and recording of data was finished at 11:00 on March 24, 2002 at 26°18,9'N/035°16,8'E. RV METEOR passed through the Gulf of Suez and reached the port of Suez in the early morning of March 26 where Dr. Mustafa Moammar and major Mohammed Al-Harbi left the vessel. The same morning RV METEOR passed northward through the Suez Canal. RV METEOR Cruise M52/3 ended on the afternoon of March 27, 2002, in Limassol.

Table 1 M52/3 scientific party

University Bremen, Geoscience Department	GeoB	8 persons
University Kiel, Institute for Geosciences	IfGK	7 persons
University Hamburg, Institute for Geophysics	IfGHH	2 persons
University Bochum, Institute for Geology	UniBo	1 person
University Regensburg, Institute for Microbiology	UniRe	1 person
Deutscher Wetterdienst, Hamburg	DWD	2 persons
King Abdulaziz University, Jeddah,	KAU	4 persons
Kingdom of Saudi Arabia, Guest scientists		
Military observer, Riad, Kingdom of Saudi Arabia		1 person
Scientific participants		25 persons

Table 2 Statistics of scientific work

<u>Equipment</u>	<u>deployments</u>
Rosette water sampler with CTD	12
Interface water sampler	7
Gravity corer	22
Multicorer	24
Multinet	10
Seismic profiles with airguns and streamer including PARASOUND and HYDROSWEEP	29 profiles; 42,5 h; 198 nm
<u>additional Hydrosweep and Parasound surveys</u>	<u>37,8 h; 345 nm</u>

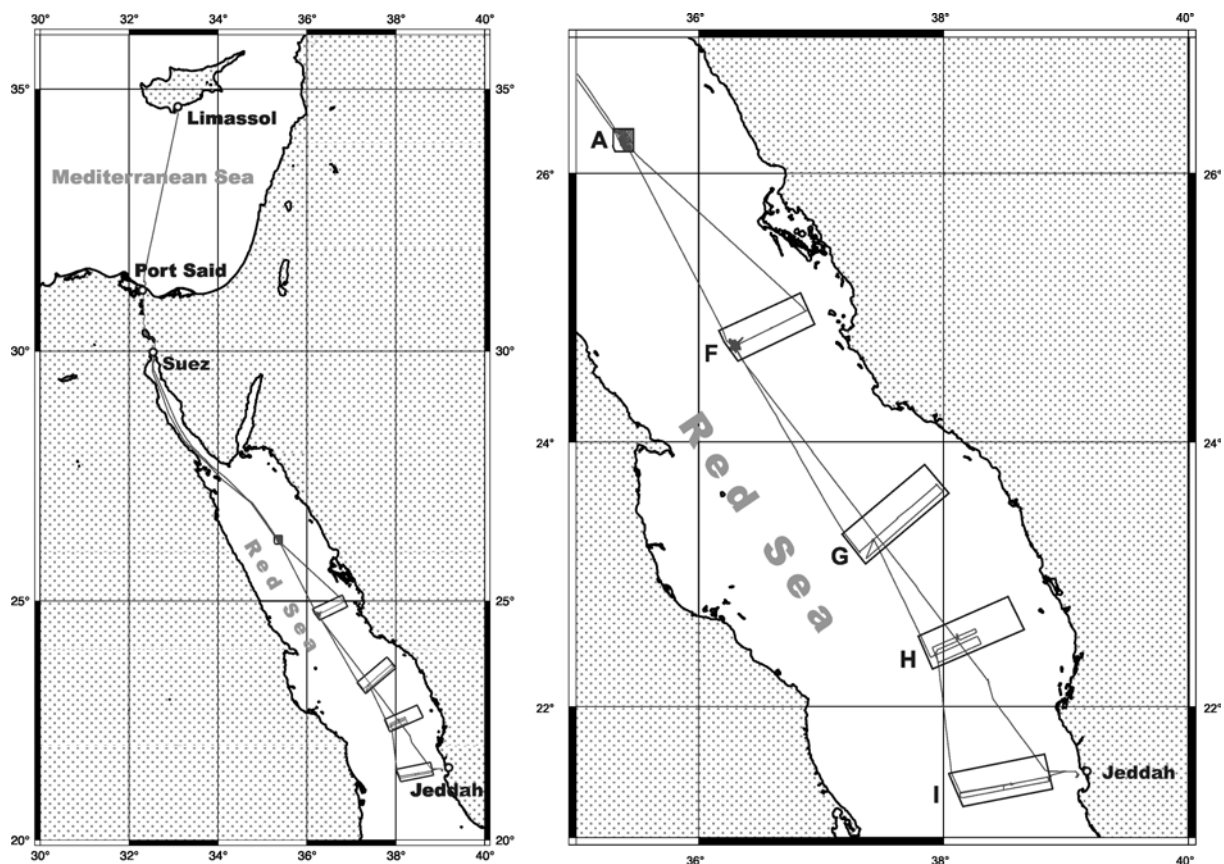


Fig. 1 Track line and working areas of RV METEOR cruise during M52/3.