

5.2.2	Phytoplankton and Primary Productivity	62
5.2.2.1	Vertical Distribution of Chlorophyll <i>a</i>	62
5.2.2.2	Primary Productivity and its Control by the Light and Nutrient Regimes: A Comparative Study Between the Gulf of Aqaba and the Northern Red Sea	63
5.2.2.3	Regulation of Photosynthetic Energy Fluxes in the Gulf of Aqaba and the Red Sea During Winter-Spring Time	69
5.2.2.4	Grazing Versus Nutrients as Limitating Factors of Phytoplankton Growth	72
5.2.2.5	Characterization of Prokaryotic Picoplankton in the Northern Red Sea	73
5.2.3	The Importance of the Microbial Loop	74
5.2.3.1	Bacterioplankton Dynamics	74
5.2.3.2	Microbial Food Web	78
5.2.4	Zooplankton	80
5.2.4.1	Distribution and Ecophysiology of Zooplankton	80
5.2.4.2	Mesozooplankton as Grazers	84
5.3	Preliminary Results of Leg M44/3	85
5.3.1	Very High Resolution Multichannel Reflection Seismics	85
5.3.1.1	Introduction	85
5.3.1.2	Instruments	85
5.3.1.2.1	Trigger Unit	85
5.3.1.2.2	Seismic Sources and Compressor	85
5.3.1.2.3	Streamer	87
5.3.1.2.4	MultiTrak Bird Controller	87
5.3.1.2.5	Data Acquisition System	88
5.3.1.3	Base Maps and First Results	88
5.3.2	PARASOUND and HYDROSWEEP	108
5.3.2.1	Introduction	108
5.3.2.2	Instruments	108
5.3.2.2.1	PARASOUND	108
5.3.2.2.1	HYDROSWEEP	109
5.3.2.2.1	First Results	109
5.3.3	Sediment Sampling	115
5.3.3.1	Giant Box Corer	115
5.3.3.2	Multicorer	115
5.3.3.3	Gravity Corer	117
5.3.3.3.1	Sampling	117
5.3.3.3.2	Core Description, Smear Slide Analysis, and Color Scanning	118
5.3.3.3.2.1	Methods	118
5.3.3.3.2.2	Results	118
5.3.3.3.3	Stratigraphy	120
5.3.3.3.3.1	Methods	120
5.3.3.3.3.2	Results	121
5.3.3.4	Piston Corer	122
5.3.4	CTD Profiling	124
5.3.4.1	Methods	124
5.3.4.2	Preliminary Results	125

5.3.5	Sampling of Plankton in the Water Column	128
5.3.5.1	Dinoflagellate Investigations	128
5.3.5.1.1	Introduction	128
5.3.5.1.2	Samples	128
5.3.5.1.2.1	Water Samples	128
5.3.5.1.2.2	Sediment Samples	130
5.3.5.1.2	Preliminary Results	130
5.3.5.2	Plankton and Water Sampling	130
5.3.5.2.1	Multiple Closing Net	130
5.3.5.2.2	Pumped Net Samples	131
5.3.6	Geochemistry in the Brine filled Shaban Deep	133
5.3.6.1	Introduction	133
5.3.6.2	Objectives	133
5.3.6.3	First Results	134
5.3.6.3.1	Sampling the Sea Water/Brine Interface at Shaban Deep with Interface-Water-Sampler	134
5.3.6.3.1.1	Introduction	134
5.3.6.3.1.2	Construction Details	134
5.3.6.3.1.3	Handling Onboard the Vessel	136
5.3.6.3.2	Water and Sediment Samples from the Northern Red Sea	136
5.3.7	Microbiology of the Highly Saline Brine Sediments of the Shaban Deep	143
5.3.7.1	Introduction	143
5.3.7.2	Sampling	143
5.3.7.3	Sample Treatment	143
5.3.7.4	Enrichment Attempts and First Results	143
5.3.8	Organic Matter Remineralization in Carbonate and Quartz Sands of the Gulf of Aqaba, Red Sea, Jordan	144
5.3.8.1	Summary	144
5.3.8.2	Introduction	144
5.3.8.3	Material and Methods	145
5.3.8.4	Results	145
5.3.8.5	Discussion	147
5.3.8.5.1	Incubation Experiments	147
5.3.8.5.2	Pore Water Analysis	149
5.4	Preliminary Results of Leg M44/4	150
5.4.1	Physics and Air-Sea Interface Parameters	150
5.4.2	Tracer Measurements	163
5.4.3	Dissolved Oxygen and Nutrients (o-phosphate, nitrate, nitrite, silicic acid)	165
5.4.4	Diversity and Abundances of Bacteria in the Oligotrophic Eastern Mediterranean Sea	168
5.4.5	Interrelationship Between Primary Productivity and Microbial Activity in the Eastern Mediterranean Sea	174
5.4.6	Ultraplankton	180
5.4.7	Genesis of Aggregates and Structure, Function and Ecology of Protozooplankton in the Oligotrophic Eastern Mediterranean Sea	180
5.4.8	Copepod Gut Fluorescence and Egg Production Rates	186

5.4.9	Changes in Deep-Sea Zooplankton and Micronekton	194
5.4.10	Taxonomic Composition and vertical Distribution of Planktonic and Micronektonic Cephalopoda in the Levantine Sea (Eastern Mediterranean)	206
5.4.11	Biogeochemical Fluxes in the Deep Water	207
6	Ship's Meteorological Station	209
6.1	Weather and Meteorological Conditions During Leg 44/1	209
6.2	Weather and Meteorological Conditions During Leg 44/2	213
6.3	Weather and Meteorological Conditions During Leg 44/3	213
6.4	Weather and Meteorological Conditions During Leg 44/4	214
7	Lists	215
7.1	Leg M44/1	215
7.1.1	Station Lists	215
7.1.2	Fluid samples with Mn ²⁺ and S ²⁻ data	218
7.2	Leg M44/2	222
7.2.1	Station Lists	222
7.3	Leg M44/3	224
7.3.1	Station Lists	224
7.4	Leg M44/4	228
7.4.1	Station Lists	228
8	Concluding Remarks	234
9	References	235

Abstract

From January 22, to May 16, 1999 the German research vessel *METEOR* performed cruise M 44, which was divided into four different legs. Two of them were carried out in the eastern Mediterranean and two in the northern Red Sea. The cruise started in Cádiz (Spain) and continued with stops in Istanbul (Turkey), Aqaba (Jordan), Safaga (Egypt), Port of Dubá (Saudi Arabia), and Haifa (Israel) to its final destination Malaga (Spain). This expedition was conducted by scientists from different German institutions including a large number of guest scientists from the countries visited. The research projects in the Mediterranean focussed on geoscientific studies in the Marmara Sea and on oceanographic and biological studies in the eastern Mediterranean. The two legs in the northern Red Sea were closely linked and dealt with biological and oceanographic studies on one hand and geophysical, geological, and geochemical surveys on the other hand. This report summarizes the main goals of the different working groups, a complete list of all stations and gears employed on each leg and the preliminary results as obtained during the cruise. The cruise was funded by the Deutsche Forschungsgemeinschaft (German Science Foundation).

Zusammenfassung

Vom 22. Januar bis zum 16. Mai 1999 fand die Reise M 44 des Forschungsschiffes *METEOR* mit insgesamt vier Fahrtabschnitten statt. Zwei Fahrtabschnitte wurden im östlichen Mittelmeer und zwei im nördlichen Roten Meer durchgeführt. Die Expedition begann in Cádiz (Spanien) und setzte mit Stopps in Istanbul (Türkei), Aqaba (Jordanien), Safaga (Ägypten), Port of Dubá (Saudi Arabien), Haifa (Israel) bis zum Zielhafen Malaga (Spanien) fort. Die Reise wurde von Wissenschaftlern aus verschiedenen deutschen Instituten unter der Beteiligung einer Reihe von ausländischen Gastwissenschaftlern der besuchten Länder durchgeführt. Die Arbeiten im Mittelmeer konzentrierten sich auf geowissenschaftliche Untersuchungen im Marmara Meer und aktuelle ozeanographische und biologische Prozesse im östlichen Mittelmeer. Die beiden Fahrtabschnitte im nördlichen Roten Meer waren eng verknüpft und hatten zum einem biologische und ozeanographische zum anderen geowissenschaftliche Fragestellungen zum Ziel. Dieser Bericht fasst die wichtigsten Arbeitsziele und die ersten, an Bord erzielten Ergebnisse der einzelnen Arbeitsgruppen zusammen. Er enthält weiterhin eine vollständige Übersicht über die bearbeiteten Stationen und die dabei eingesetzten Geräte. Die Expedition wurde durch die Deutsche Forschungsgemeinschaft gefördert.