

SHORT CRUISE REPORT

Ship: R.V. METEOR Cruise 51, Leg 3
Dates: November 14. - December 10., 2001
Port Calls: Valletta / Malta to Istanbul / Turkey
Chief scientist Prof. Dr. Ch. Hemleben
Observer: Dr. V. Lykousis (Greece)

Participants

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|---|-------|-----------|
| University of Tübingen Inst. f. Geowissenschaften | GPITÜ | 8 Persons |
| Eidgenössische Techni. Universität Zürich | ETH | 1 Person |
| Institut für Genetik und Mikrobiologie München | LMU | 4 Persons |
| Institut für Ostseeforschung Warnemünde | IOW | 4 Persons |
| Freie Universität Berlin FB Geowissenschaften | FUB | 1 Person |
| School of Ocean and Earth Science Southampton | SOES | 2 Persons |
| Université de la Méditerranée Marseille | UMRS | 1 Person |
| Universität Bremen, FB5 Geowissenschaften | GeoB | 1 Person |
| Université Bordeaux I Geology and Ocanogr. | Ubord | 1 Person |
| University of Patras Griechenland | UPA | 1 Person |
| University of Ancona, Inst. di Scienze del Mare | ISM | 1 Person |
| Maden Fakultesi Geology Departments Istanbul | ITU | 1 Person |

Valletta to Rhodos (at Rhodos 4 Pers. off Bord * a. 5 Pers. on Bord) 26 Scientists

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| Université d´ Angers | LGUA | 1 Person |
| University of Patras | UPA | 1 Person |
| Maden Fakultesi Geology Departments Istanbul | ITU | 1 Person |
| National Centre of Marine Research, Athen | NCMR | 1 Person |
| Universität Tübingen, Inst. f. Geowissenschaften | GPITÜ | 1 Person |

Rhodos to Istanbul 27 Scientists

+ 2 Persons DWD

Project: Eastern Mediterranean Paleoclimate and
Microbiology of Sapropels

Research areas: Eastern Mediterranean Sea
Aegaen Sea, Sea of Marmara

Summary of RV "Meteor cruise M51 leg 3

During METEOR cruise M51/3 several long sediment cores were obtained from the Ionian Sea, Levantine Sea, Aegean Sea, and Sea of Marmara. The investigations focused on the reconstruction of climatic fluctuations during selected time intervals of the late Quaternary. Main objectives include the study of abrupt climate changes and their impact on the different marine ecosystems in the eastern Mediterranean Sea during glacial and interglacial boundary conditions. These paleoceanographic studies include

the reconstruction of temporal and spatial gradients of surface water temperature, salinity, productivity, nutrient distribution, and deep water ventilation. For the post-cruise paleoceanographic studies different proxies will be applied comprising geochemical (stable isotopes, alkenones, lignin), micropaleontological (foraminifera, coccoliths, siliceous plankton) and sedimentological (e.g., clay mineralogy) investigations. In addition to the paleoceanographic studies, the bacterial communities were investigated in the water column, the sediment surface, and selected sapropel layers to document the differences to results obtained during cruise M40/4. Furthermore, the distribution pattern of calcareous dinoflagellates in the water column and in the sediment was explored.

RV "Meteor" arrived at Valletta (Malta) harbour as scheduled and terminated cruise 51, Leg 2. A new scientific crew came on board to investigate mostly the sea floor as planned. The time in harbour was used to set up equipment, check for running and be prepared for the first station. In addition, captain, crew and chief scientists together with the German ambassador gave a reception and ship's tours were held for Maltese officials, colleagues from the university and diplomatic representatives.

The final preparations for research in Maltese waters were done prior to the departure of RV "Meteor" on November 14. Thanks to the excellent efficiency of the Maltese administration and the German embassy we could start our geological survey already during the afternoon at the same day, subsequently we sampled successfully at station 560 the sea floor by multicorer and gravity corer. The following day we surveyed within Italian waters (Station 561). sampled and continued to stations off the Libyan coast (Station 562 thru 564). This area was new to us comprising sediments deriving from the Sahara dust regions, thus colouring the sediments in a typical way, different from most other regions of the eastern Mediterranean Sea. Special investigations will be set up to explore these cores after the cruise. The next sites to be visited were in Greek waters, south of Crete (Station 565-568). Here, we obtained excellent cores of which one showed laminations due to totally undisturbed sedimentation within the sapropelitic sequence. Sapropels are organic rich sediments deposited under little or missing oxygen conditions. The water column was also sampled for planktic forams, dinoflagellates and bacteria. Although a gale of up to 10 bf. was blowing at the time, we could finish all planned work.

On November 21 we left Greek waters heading for Station 569 and 570 at the Eratosthenes Seamount. This area is already famous for excellent sediments to study on the background of abrupt climatic changes. Unfortunately, due to restriction we could not obtain cores from the plain but from the seamount itself. During the transfer of almost 24 hours, scientists held seminars with presentations over the diverse research objectives of the cruise.

Station 571 and 572 were dedicated to earlier (M44-3) findings where we observed a different paleocurrent system during the last warm period, approximately 125 thousand years ago, compared to the recent situation. These findings called for additional core material to substantiate our results. In addition, we obtained an excellent Holocene core which will be evaluated together with our Israeli colleagues.

From offshore Haifa we sailed towards Cyprus (Station 573 and 574) to obtain material which might give us the opportunity to establish a north-south gradient in the Levantine basin. Two other stations (Station 575 and 577) were added to this system from west of Cyprus, off Turkey and West of Rhodes.

On Tuesday, November 27 we reached the roads of Rhodes, where we were scheduled early in the morning to exchange some of the scientists. Later that day, a video live interview was set up to talk to people waiting in the Museum of Natural History (Senckenberg Museum) at Frankfurt in Germany.

The next station were dedicated to the gateway, which connects the Aegaen Sea with the Levantine. Three stations (578 thru 580) were successfully worked out. In addition, we cored two sites west of Karpathos to study the role of this gateway. However, the cores were rather short because of the low sedimentation rate and intercalated tephra layers.

The following sites 584 thru 602 covering the Aegaen Sea from south to north were dedicated to the question of freshwater flux from the Black Sea/Sea of Marmara into the eastern Med. A large amount of melt water might have come after the last ice age from the northern regions. At least some scientist believe in this which may have changed the circulation pattern and the water mass layers of the entire eastern Med. However, our newest findings point towards a diachronous development and rather small influences by these freshwater masses on the eastern Med. In order to evaluate a salinity and/or temperature gradients from north to south we cored all these stations between north of Crete and south of Chalkidiki. Furthermore, our microbiological crew was very happy to corroborate results which they obtained earlier on Meteor cruise 40/4 by measuring high bacterial activities in these organic rich sediments (Sapropels). This suggests that living bacterial cells occur in deep sediments possibly living there since this sediment was deposited.

The last sites for taking cores were selected in the Sea of Marmara where we obtained excellent cores from five stations (Sta. 603-607). All cores showed a clear color change when the environment turned from a freshwater lake into the saline Sea of Marmara. A so called Sapropel1 –equivalent was always present, thus we should be able to reconstruct the freshwater flux from the Black Sea into the eastern Med region.

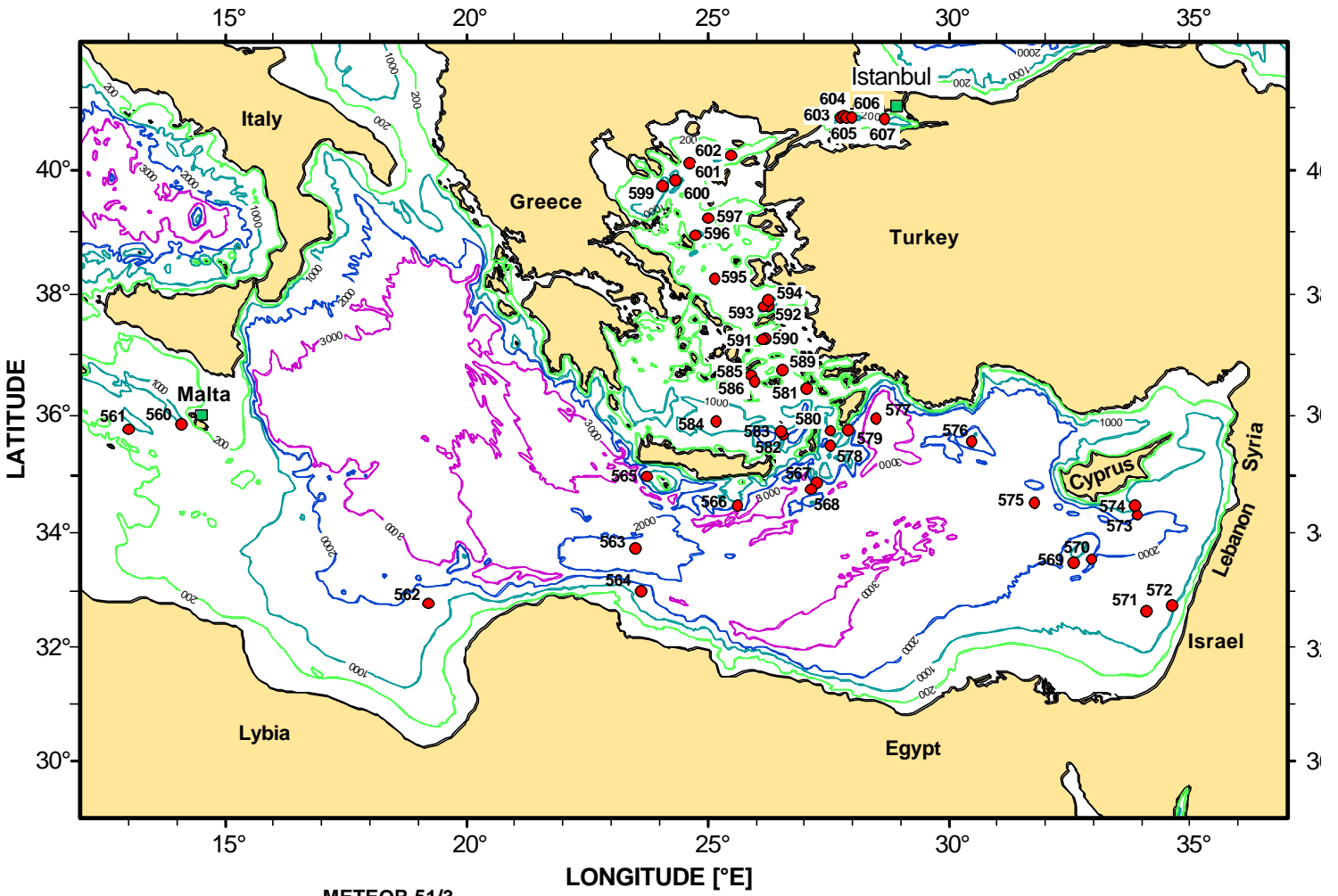
We left this region during the day on December 9 towards Istanbul where we terminated Meteor cruise 51 Leg 3 on December 10. In total, despite lots of wind and low temperatures, it was a very successful leg with many new data and a core set of ca. 360 m sediments from the eastern Mediterranean Sea region. Thus all neighboring geo-scientists may be invited to participate in the evaluation of this material.

On December 10 shortly before the "great snow" started, we terminated RV "Meteor cruise 51, leg 3 in Istanbul and a new crew took over.

February, 18, 2002

Chief Scientist: Ch. Hemleben

METEOR 51/3



METEOR 51/3

