



The Meteor is regarded as one of the most sophisticated research vessels.

The Meteor Undertakes Research off Namibian Coast

On its last voyage in Namibian waters in 1996, the German oceanographic research vessel *Meteor* undertook work during two legs, from Cape Town to Walvis Bay (cruise M34/1) and at Walvis Bay – Walvis Bay (cruise M34/2).

The primary objectives of the geophysical program during leg M34/1 were seismic and echographic measurements along three series of profiles in the northern and southern parts of the Namibian upwelling system and in the southern Cape Basin as a site survey for the ocean drilling programme.

The two acoustic systems Hydrosweep and Parasound, which are permanently installed on the *Meteor* were used for the echographic profiles. Hydrosweep provided detailed records of the surface morphology, which, especially on the continental slope, allowed the identification of areas where the sedimentation is least disturbed by episode mass transport. Depending on the actual lithology, Parasound penetrates to between 20 and 150 m into the sediment column and achieves an acoustostratigraphic resolution of the near surface deposits in the centimetre range. This compares to the typical intervals that core material is sampled and measured.

In addition to the echographic profiling, high frequency multichannel digital seismic reflection lines were recorded, primarily to efficiently overcome inadequacies in depth

penetration by the Parasound system. The profiles were shot with one or several GI guns as seismic source and using a 600 m long streamer. With this instrumental configuration optimum results with regard to resolution and penetration have been obtained during a previous expedition with another research vessel, the *Sonne*.

The composite acoustical measurements were chiefly designed to produce the highest structural resolution in the uppermost 200 to 500 m of the unconsolidated sediment column. These data sets yielded comprehensive information about those sedimentary sequences which were penetrated without major disturbances by the available advanced hydraulic piston coring or extended core barrel, ODP coring techniques.

Data processing was done on board the *Meteor*. While system programmes were used for Hydrosweep, specially developed efficient programmes handled the Parasound records and seismic reflection measurements.

Marine geology

Suitable sites for sampling of the near surface sediments were selected based on the seismoacoustic results. These activities were fully integrated into the schedule of the echographic and seismic profiling programme. Following the

successful experience of many previous cruises, the combination of Hydrosweep and Parasound records provided an excellent basis for the definition and positioning of sampling sites. Sediments were recovered with large box corers, gravity cores and multicorers.

The large box corers were subsampled on board for biological or paleontological, sedimentological and geochemical analyses and for measurements of physical properties. The gravity cores and multicorer tubes were described, subsampled and prepared for conservation.

Marine geology, geochemistry and microbiology

The sampling of the sediments of the upwelling area off Namibia during the Walvis Bay – Walvis Bay let, M34'2, complemented the previous Meteor-cruises, M6/6 in 1988 and M20/2 in 1992. Various research facilities undertook the investigation of benthic remineralisation rates of organic substance.

The route of cruise M34/2 after leaving Walvis Bay followed a north south running profile along the coast in order to look at the intensity of decomposition processes within the sediment. At selected locations different methods for the determination of the remineralisation rates were compared.

In sediment regions displaying the highest benthic activities a profile perpendicular to the Namibian coastline was set up, covering a range of water depths from the deep Cape Basin to the shelf off Namibia. The cruise ended at Walvis Bay.



Aboard the Meteor various research facilities undertook the investigation of benthic remineralisation rates of organic substance.

Geophysics

The two acoustic shipboard systems Hydrosweep and Parasound were operated continuously during cruise M34/2 and, based on abundant previous successful experience, were routinely used to select optimal sites and positions for the sediment sampling. In this context basic questions were addressed as to how the narrow-beam Parasound system records a complex ocean floor topography compared to traditional wide-beam echosounders, and how detailed results of a theoretical study of this problem can be verified. The recovery of sediment cores at selected sites along the profiles allowed a quantitative interpretation of the digital echographic data using corelogs of several relevant physical properties.

Automatic Oceanographic Buoy Monitors Environment

By Chris Bartholomae

For the first time marine environmental data are collected continuously at a fixed coastal station in Namibian waters. In February 1992, the Ministry of Fisheries and Marine Resources has moored an automatic data buoy about 5 km west of Swakopmund to measure key oceanographic and meteorological conditions on a continuous basis.

The buoy collects data on coastal weather conditions including wind speed and direction, air pressure, temperature and relative humidity. It measures wave heights, wave periods, temperature, salinity, oxygen content and the turbidity of the water and current speed and direction. Information gathered from the sensors mounted on the buoy is transmitted by VHF radio in real time every ten minutes to a shore receiving station in the environmental section at the National Marine Information and Research Centre in Swakopmund. Here a computing unit converts the data into digital and graphical displays for the various parameters.

The analysis of the data is of great scientific value to

the oceanographers of the Ministry of Fisheries and Marine Resources and to international scientists interested in the coastal oceanographic processes of the Benguela Current. The information should help understanding the mechanisms that trigger the so-called "sulphur eruptions" and how these processes interact with the local fisheries resources. The Ministry will be able to monitor and predict local occurrences of algal blooms and red tides

The buoy was donated to the Ministry of Fisheries and Marine Resources by the German Agency for Technical Cooperation (GTZ) as part of the Namibian-German Marine Environmental Monitoring Project (Marenpro) to build capacity in marine environmental monitoring and research. It was manufactured in Norway by Aanderaa Instruments and installed by Namibia Positioning Services. The unit is powered by a battery pack and charged by solar cells mounted in the mast. It has a flashing light to warn approaching vessels of its position at night.