

WHP Ref. No.: AR15
Last updated: 5 April 1993

EXPOCODE: 06MT22_3
Chief Scientist: T J. Mueller, IfM Kiel
Ship: F.S. METEOR cruise 22, leg 3
Ports of call: Recife (Brazil) - Santos
Cruise dates: Nov.18 - Nov. 30, 1992

Summarized cruise report

1. Research program

Research activities during this short leg were mostly devoted to physical oceanography in the international World Ocean Circulation Experiment (WOCE). As part of Core 3 (Gyre Dynamics) three current meter moorings had been deployed in January 1991 during METEOR cruise 15 in the Brazil Current on the Sao Paulo Plateau. These moorings were to be recovered after 22 months of recording, and the direct measurements of currents at fixed positions were to be complemented by indirect (geostrophic) calculations based on CTD stations distributed normal to the current as well as by direct shipborne ADCP current measurements down to 200 m.

Within the Deep Basin Experiment (DBE) of WOCE, a mooring carrying a sound source was to be deployed outside the 200-mile zone. Together with other sound source moorings, freely drifting neutral buoys (RAFOS floats) they can provide the pattern of flow at mid-depth (around ~00 m) and thus the pattern of the spreading of the Antarctic Intermediate Water. Also part of the DBE is a bathymetric survey in the westernmost channel across the Vitoria Trindade Ridge to determine the sill depth of this channel in order to answer the question whether Antarctic Intermediate Water can pass through.

2. The cruise

METEOR sailed from Recife on November 18, at 22:00 LT with 10 scientists and technicians from the Institut für Meereskunde at Kiel (IFMK), Germany, and with the Brazilian observer from the Diretoria Hidrografia e Navegacao (DHN), Niteroi, RJ, Brazil.

Heading south to the main working area on the Sao Paulo Plateau we did a test station with the vertically profiling CTD/rosette and a new acoustic release system on 13 57.4S, 36 16.6W. We then reached the Vitoria Trindade Ridge where the westernmost channel was surveyed with METEOR's multibeam echo sounding system HYDROSWEEP for its sill depth. It turned out that the channel is very narrow, 1 to 2 miles, and shallows from the northeast with more than 1~00 m towards the southwest with less than 1000 m. The channel ends here. And the sill located at 19 37S 38 26W has a depth less than 950 m. It is thus possible that Antarctic Intermediate water can pass over this sill and through the channel on its way north.

On an earlier cruise in 1991, an anticyclonic doming of the upper thermocline was observed just south of the Vitoria Trindade Ridge. If it were topographically controlled we would expect this to be a permanent feature. We used the opportunity to obtain another section with three CTD stations and some deep reaching XBTs (1300 m) with a nominal distance of 6 miles. Doming could be observed again, but was only very weak.

Proceeding further south to the Sao Paulo Plateau, we measured the large scale structure of the main thermocline with XBTs horizontally spaced at 20 miles. Most of these profiles were taken outside the 200-mile zone. On November 25, a mooring carrying a sound source was deployed outside the 200-mile zone. It is part of an array to study the flow field at mid-depth by neutrally drifting RAFOS floats.

After having launched the mooring, we began with the first of three CTD sections, each about 60 miles apart. With a total of 25 stations, they are all between the 3000 m and 200 m depth contour normal to the continental shelf.

On the first section, also the three Brazil Current meter moorings 333/BE, 334/BM and 3351BW were recovered on November 26 and 27.

Meteor finished the leg in Santos on November 30 at 0918.