

## 1<sup>st</sup> Weekly Report M98, Fortaleza - Walvis Bay

1.7.-28.7.2013

On 1 July 2013, the METEOR cruise M98 began in Fortaleza, Brazil. This research cruise is part of the BMBF Projects RACE "Regional Atlantic circulation and global change" and SACUS "Southwest African Coastal Upwelling System and Benguela Niños". The main goal of RACE is to study the variability of the western boundary current circulation from Brazil. With the help of ship-based measurements and a long-term mooring program, the strength and the water mass properties of the North Brazil Current in the upper 1000 m of the water column, as well as the deep western boundary current between about 1000 and 3500 m water depth, will be determined. These currents are an important indicator of changes to the Atlantic-wide circulation patterns due to natural and anthropogenic climate variability. As part of SACUS, the eastern boundary current circulation will be investigated off Angola during the second part of the research cruise. Fluctuations of the southward flowing Angola Current can have a strong impact on productivity in the coastal upwelling off Namibia. In extreme events, the so-called Benguela Niños, warm equatorial water spreads far to the south and suppresses the upwelling of cold nutrient-rich water, which causes dramatic consequences for fisheries and the economy of the coastal states. The research program of M98 is complimented by continuous measurements of near-surface concentrations of CO<sub>2</sub>, N<sub>2</sub>O, and O<sub>2</sub>, air-sea gas exchange measurements via turbulent gas fluctuation measurements in the atmosphere, sea surface temperature and salinity. The measurements for gas exchange are part of the Helmholtz Junior Research Group of Christa Marandino.

### *German-Brazilian cooperation*

Several events for scientific cooperation between different research groups from Brazil and Germany were planned around the M98 cruise. As early as 28 June, a joint meeting between Labomar, the Marine Research Institute of the Federal University of Ceará, Fortaleza (UFC), and GEOMAR took place to further develop cooperation. During the meeting, a scientific symposium on the subject "Ocean research on biochemical-physical interactions in the tropical Atlantic," in May 2014 was agreed upon, which could be a highlight of the then drawing to a close German-Brazilian Year (2013/2014). In addition, about 50 invited guests from science, politics and government came to a reception at METEOR on 29 June. There were many stimulating discussions on the role of science in society, but also related to specific research projects with our various Brazilian partners. Of course METEOR was again open for visits of students and we could hear admiration from all sides about the great opportunities that METEOR has to offer various research groups on board.

### *International Cooperation and Capacity Building*

The working group on board again reflects the strong international focus of the research programs. In addition to our colleagues from the Universities of Natal and Recife, Brazil, we have welcomed three scientists from Angola on board. They come from the Fisheries Institute INIP of Angola and are Partners in SACUS. This collaboration is further strengthened by the EU FP7 project PREFACE "Enhancing Prediction of Tropical Atlantic Climate and its impacts", which will officially begin in November 2013. This project brings together scientists from 17 European and 10 African institutions. Overall we were very happy that after many problems upon arrival with a general strike in Portugal, delayed flights and no luggage, as well as the late berthing after arrival in time of METEOR in Fortaleza, everyone and most equipment was on time to leave the harbor as scheduled.



**Fig. 1:** Participants from eight countries constitute the scientific team of M98 (Photos and compilation: Bendix Vogel).



**Fig. 2:** With (almost) all of the equipment on board, METEOR left the port of Fortaleza. Spare parts for the underway-CTD were obtained a few days later with a short stop off the Brazilian coast at Recife (Photo: Gerd Krahnmann).

### *Surveying of the western boundary current at 5°S*

One day after completion after departure from Fortaleza, the research program with measurements using the CTD (conductivity, temperature, depth) and LADCP (lowered acoustic Doppler current profiler) along 5°S began. Such measurements were carried out several times in the period from 1990 to 2004. With the new measurements, we want to demonstrate possible changes in the salinity of the North Brazil Current due to an increased influx from the Indian Ocean into the South Atlantic. All measurements carried out so far excellently and minor technical complications have been quickly resolved. After completion of measurements at 5°S and the transfer to the next work area, mooring work at 11°S has now begun.

The atmosphere on board is great – now, certainly, also because of the very good weather after initially continuous heavy rains - and the cooperation with captain Michael Schneider and the crew of METEOR has been great.

Greetings from the tropics,  
Peter Brandt and the cruise participants of M98