



FS METEOR Cruise M 100/1

First weekly report

Walvis Bay – Walvis Bay

1st September to 1st October 2013

The three research cruises M99, M100/1 and M100/2 are thematically related: They investigate the upwelling phenomenon off the SE-African coast. The third voyage will add research on transport processes from the South Atlantic into the Indian Ocean. Moreover, all three cruises are combined research and on-the-job training cruises for students and young scientists of universities and marine institutes/stations of the Benguela Current neighbouring countries Angola, Namibia and South Africa, capacitating being an integral objective. Vice versa is the knowledge of and the interaction with local scientists of the region a good basis for common innovative research in this highly productive marine area. Financial support is granted by the German Federal Ministry of Education and Research (BMBF), which supports the project GENUS II: „Geochemistry and Ecology of the Namibian Upwelling System“.

With the cruise M 100/1 a multidisciplinary science group continues studies of the status and development of the Northern compartment of the Benguela Current region off Namibia, aiming at assessments of changes of productivity of the ecosystem and associated impacts on greenhouse gas emissions in future scenarios of expected effects of Global Change. The current cruise NamBo is tuned to the seasonal maximum of upwelling in early spring in September 2013 and is planned to be complemented by NamuFil to cover the seasonal minimum in early 2014. The current cruise will investigate the formation and succession of processes within filaments of upwelled coastal water which transport coastal communities westward into the open ocean. The abiotic and biotic dynamics and fluxes along and across the boundaries of developing filaments, as well as exchanges between water column and sediments will be studied within and associated to these conspicuous and characteristic structures of the Benguela upwelling region.

The cruise aims at furnishing concepts and data to develop and iterate a suite of models within the following themes:

- 1) Retrospective analyses of physical boundary conditions and biogeochemical cycles.
- 2) Identification of key processes/species and analysis of key rates of physical, biogeochemical and biological ecosystem components
- 3) Energy flows and feedback of trophic structures on biogeochemical cycles
- 4) Simulations of interactions between shelf ecosystem – open ocean – atmosphere

We expect to be able to contribute to prognosis of the development of shelf-systems and their resources within the coming decades under the impact of anthropogenic and natural variations of the marine environment.

The cruise takes place in September 2013 during the pronounced seasonal maximum of upwelling activity in the Northern Benguela Current area. Initially, an onshore/offshore transect off Walvis Bay was sampled. Another such transect will start close to the Kunene river mouth. These

transects were already worked upon during GENUS I and the sampling programme will be continued to allow temporal analyses of the associated time series. This is performed in close coordination with our Namibian partners. In addition to GENUS I, frontal boundary zones as well as vertical boundary zones in the oxygen minimum zone (OMZ) and the benthic boundary layer (BBL) are being investigated. The special focus of NamBo lies on the investigation of upwelling filaments and the associated frontal and boundary zones within the Northern Benguela current system. Filaments are responsible for the transport of large biomass and quantities of material from the shelf into the open ocean.

Upwelling filaments occur regularly in the region. We already localized a suited filament detected by satellite images using SST and fluorescence signals close to latitude 20°S, extending across the 200 m, 500, and 1000 m depth. Currently we use all our modern equipment, plankton nets, ROV, CTD, Scanfish, Catamaran - ADCP and Microstructure-Sonde, for integrated study of the physical and biological processes throughout the water column. The filament study consists of one section along the filament near the coast and two transects towards the oceanic end of the filament. Later, sufficient time will be devoted to the study of internal waves and ROV-inspections of the near bottom water-column. Our subsequent cruise to the area is scheduled for January and February 2014 and tuned to the seasonal upwelling minimum in order to be able to compare the two most contrasting conditions.

Outstanding event of the first week was the celebration of the one hundredth cruise of the RV METEOR, M100/1, being initiated by Three Cheers in the bar: we are proud of our able and handsome ship and consider it a great privilege to be allowed to use such a perfect, so to say "living instrument" for our research, solidly founded on the experience and unlimited support of the ship's command and crew: we are a perfect team!



Foto: D. Peterke

Group photo from the one hundredth cruise of RV METEOR, M 100/1. It is a rare occasion that within the tight schedule of shifts crew and scientists can meet all at once. However, the above picture demonstrates the close spline of technical and scientific cooperation, typical and perfect on our able ship, to the benefit of international marine research.

Our thanks are due to the tax payer, the ministry, the senate commission, the steering office and the ship's agency!

Cordially, Fred Buchholz, chief scientist M 100/1, 8 September 2013.