PREFACE Milestone Report

Milestone#: MS16

Milestone name: Cruise 2016

WP#: WP4

Lead beneficiary: GEOMAR

Delivery date from annex I: 31.10.2016

Milestone achieved: Yes

Comments:

The research cruise Meteor 131 from Recife, Brazil to Walvis Bay, Namibia (Oct. 7 to Nov. 11), was conducted as planned. The measurement program is an integral component of the EU collaborative project PREFACE ("Enhancing prediction of tropical Atlantic climate and its impacts", schedule: 11/2013-11/2017) as well as of the BMBF-Verbundvorhaben SACUS ("Southwest African Coastal Upwelling System and Benguela Niños"). The two goals of the cruise were (1) to quantify the physical processes controlling the mixed layer heat and freshwater balance in the region of the eastern boundary of the South Atlantic including the loss of heat due to turbulence at the base of the mixed layer and in the thermocline; (2) to evaluate variability of eastern boundary current transport, variability in the advection of anomalous water masses along the eastern boundary and wave propagation along the coastal wave guides. The work programme that involved the recovery and redeployment of moorings and bottom shields, deployment and recovery of 4 autonomous measurement platforms (gliders) and 7 conductivity-temperature-depth/oxygen (CTD/O2) and microstructure (MSS) transects could be performed as planned. Only one mooring from an eastern boundary current meter and hydrography array at 11°S could be recovered. One mooring and one bottom shields was deployed again. The acquired velocity dataset at 11°S acquired by to upward looking ADCPs (acoustic Doppler current profilers) covers the full second deployment period from November 2015 to October 2016. The mooring surveyed the inflow of equatorial water masses into the South Atlantic coastal upwelling system and successfully captured the variability of the Angola Current. South of the Angola-Benguela Front, three more moorings on the Namibian shelf (18°S, 20°S and 23°S) were recovered and redeployed. These moorings survey the southward penetration of low-oxygen South Atlantic Central Water in the thermocline and allow investigation of the propagation of coastal-trapped waves along the eastern boundary. The gliders were used to sample hydrographic variability and oceanic turbulence off Angola at 11°S and off Namibia at 23°S during the cruise period. The data will contribute to determining mixed layer and fresh water heat balance. The CTD/O2 sections together with shipboard acoustic Doppler current profiler measurements were performed as planned and will be used to determine the horizontal structure of the along-shore flow at key locations within the eastern boundary current system, while the microstructure data will contribute to evaluating mixed layer heat and freshwater balances along the continental margins. In addition to a scientific program, the proposed cruise included a capacity building component for scientists and graduate students from our Angolan, Namibian, and South African project partner institutes.

Milestone 14 contributes to the WP4 objectives 1 and 4, and to task 4.2: Monitoring variability along the southern hemisphere coastal wave-guide.