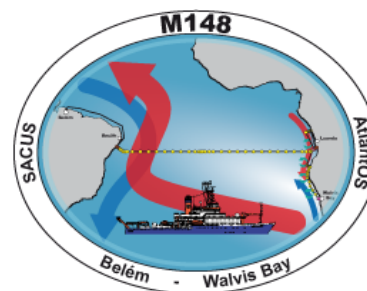


# FS METEOR Cruise M148

May 24 to June 29, 2018

Belém (Brazil) – Walvis Bay (Namibia)



## 5<sup>th</sup> Weekly Report, June 24, 2018

This week, our work program focused on the eastern boundary region and the upwelling area off Angola. A long-term mooring measuring the variability of the eastern boundary circulation at 11°S was successfully retrieved and redeployed. Station work along two hydrographic sections at 11°S and south of the Congo River inflow at 6°S were also successfully completed. A bottom shield, which was deployed in October 2016 on the continental slope at a depth of 500 m could not be recovered. We assume that the bottom shield was displaced or retrieved by fishing vessels as this region of the continental slope is intensively trawled by fisheries. During a 4-day upwelling process study conducted at the upper continental slope and the shelf region at 11°S, a mooring array was installed and two ocean gliders were deployed. High-resolution hydrographic and turbulence measurements complemented the measurement program of the process study. On Saturday afternoon and during this Sunday morning, all deployed instruments were successfully retrieved.



Fig. 1: Deployment of a lander (upper left), recovery of a long-term mooring from the continental slope at 11°S (upper right and lower left) and the recovery of an ocean glider after successfully completing its mission (lower right).

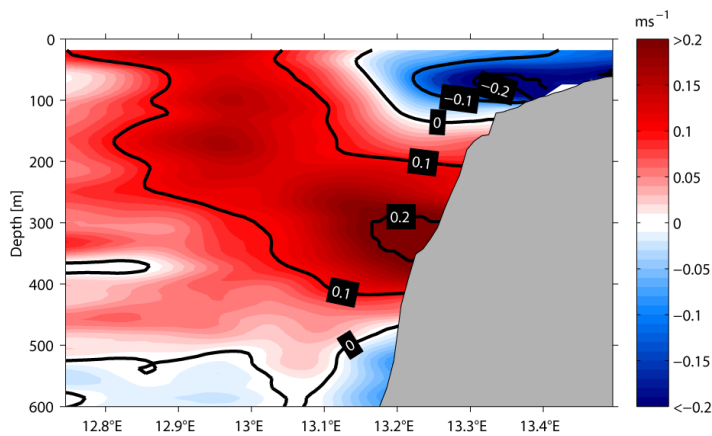


Fig. 2: Alongshore currents at 11°S. Blue contours mark poleward flow. The Angola Current is located near the coast in depths shallower than 120m.

The circulation along the continental margin of Angola is dominated by a southward flowing undercurrent, the Angola Current (Fig. 2). This current carries warm, oxygen-poor and nutrient-rich water masses from the eastward currents near the equator along the continental slope poleward. Our mooring program and the sections running perpendicular to the coastline aim at determining the variability of

the Angola Current intensity at intraseasonal to interannual time scales (Fig. 3). The Angola Current plays a key role in interannual climate variability in South West Africa, which is dominated by the irregular occurrence of Benguela Niños. Benguela Niños refer to a large-scale anomalous warming of the upper ocean by 2°-3°C that have a strong impact on precipitation patterns over adjacent countries as well as on the marine ecosystem and local fisheries.

The investigations and long-term mooring observations along the continental margin and the coastal region off Angola are carried out in close cooperation with the

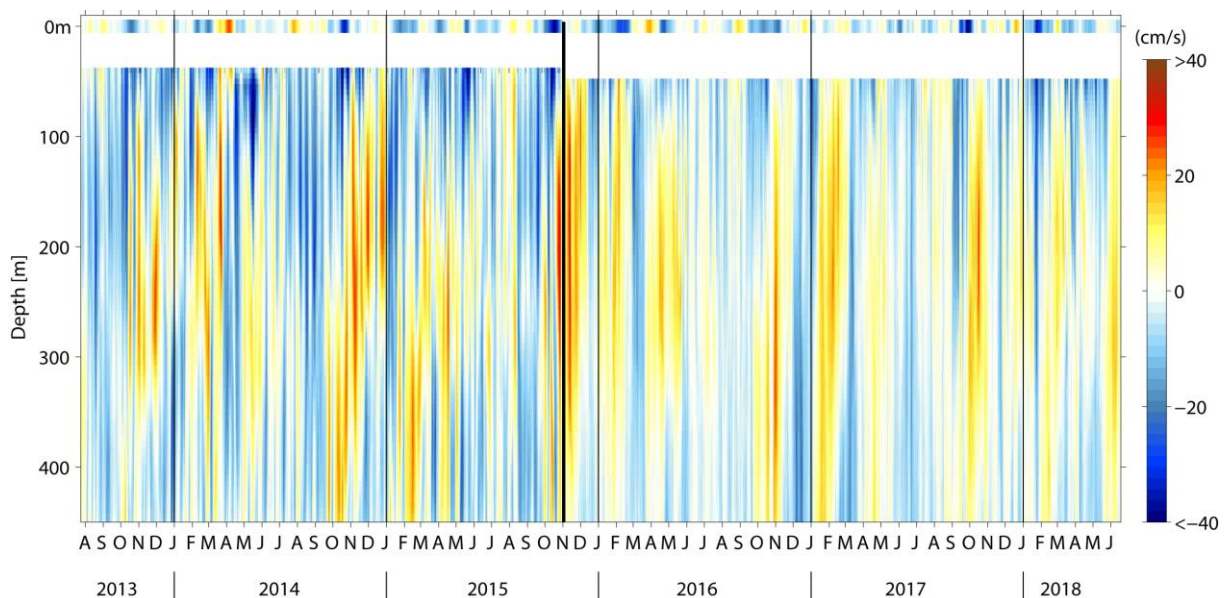


Fig. 3: Time series of alongshore currents in the upper 500m of the water column at the continental slope at 11°S recorded by the long-term mooring (October 2016 to today). Velocity data from previous mooring recoveries (July 2013 to October 2015 and October 2015 to October 2016) are also displayed. Negative values mark poleward flow. The elevated variability of the eastern boundary circulation on intraseasonal time scales originates from poleward propagating coastally trapped waves. These waves are predominately excited by wind fluctuations within the western equatorial Atlantic.

Angolan institution *Instituto Nacional de Investigação Pesqueira* (INIP). INIP is responsible for ocean observing and monitoring of Angolan waters and advises the Angolan government on issues related to the sustainable development of its marine resources, in particular fisheries. The cooperation between INIP and GEOMAR, which started in 2013, focusses on the development of expertise in the field of physical oceanography at INIP. It is being implemented through the participation of Angolan scientists in research cruises, as well as through training of Angolan scientists at GEOMAR during month-long visits and the education of scientists, graduate students and PhD students during short courses lectured by GEOMAR scientists at INIP. A focus of the training program is the joint analysis of oceanographic datasets, which also includes historical Angolan data. The excellent cooperation between the two institutes is illustrated by several joint publications in renowned scientific journals.

On board, our collected data are continuously evaluated and analyzed, which at the same time constantly monitors the ocean observatories used. The data evaluation is also part of the individual training programs of colleagues from Angola and the fellows from South America and Benin, who regularly report on their progress in the seminars on board. After the cruise, 4 of the 6 fellows will continue their training program at GEOMAR in Kiel during a month-long visit. For most of them, it will be the first visit to Europe.



Fig. 4: Participants of FS METEOR cruise M148

In 5 days we will have reached Walvis Bay harbor. A successful but also very work-intensive research cruise has nearly come to completion. We are grateful to Capitan Hammacher and his crew for the excellent collaboration and the pleasant working atmosphere during the cruise. The crew of FS METEOR greatly contributed to the success of the cruise. Likewise, I am grateful to the dedication and commitment of the scientists, the technical staff and the students who equally contributed to the success.

Best regards from the tropical South Atlantic,  
Marcus Dengler and the participants of M148