



Meteor cruise

97: Oxygen Supply Tracer Release Experiment SFB754

2nd Weekly report for the Meteor cruise M97, 3-9 June

Mindelo (Cape Verde) – Fortaleza (Brazil), May 25 – June 28, 2013

This Meteor cruise is one component of the collaborative research project SFB754; Climate – Biogeochemistry interactions in the tropical ocean, funded by the German Science Foundation (DFG). This project is particularly interested in the areas of low oxygen concentrations that are found in the eastern part of the tropical oceans. Relevant for this project are, for instance: How does subsurface dissolved oxygen in the tropical ocean respond to variability in ocean circulation and ventilation? What is the role of zooplankton in the biogeochemical cycles, and, in particular, how important is the diurnal migration of zooplankton for transport of organic matter? With cruise M97 we attempt to provide more data to be able to answer these and other questions relevant for the dynamics of the Oxygen Minimum Zone in the Tropical North Atlantic.

This week of the M97 cruise saw a dense grid of CTD stations within a “control volume”, i.e. a 4°x4° box in which we want to map the distribution of the tracer that we released in December as well as at all possible in order to better understand horizontal movements of water and oxygen. This dense sampling grid also allows us to map the small scale variability in salinity, temperature and oxygen. The hard work already started to pay off as we now start to see a pattern to the tracer distribution, we have found tracer on more than half of all stations.

Within the framework of another, related, project – AWA (Ecosystem Approach to the management of the fisheries and the marine environment in West African waters) a cooperation between German, French and Senegalese scientists – we also deployed a glider that will move in the waters east of the Cape Verde islands. The deployment of the glider went well, although while waiting for it to resurface after a test-dive, we mistakenly took two sea-turtles for the glider, as they surfaced very close to the glider position. The mistake was clear as soon as the “glider” started to wave with its fins... Gliders don't wave with their fins.



The ridged inflatable boat of Meteor leaves the “mother-ship” with the load of a glider to be deployed. Photo M. Schneider.

Unfortunately, two days later we had to recover the glider since it was not too heavy (i.e. dense) for the low density water found at the surface close to the equator. The glider could not reach the surface so that it, by itself, decided to drop the “emergency weights” and go to the surface. Gliders are autonomous vehicles, equipped with sensible instruments, that slowly “glides” up and down through the water column and at the same time moves forward. When they reached the surface, they “call home” via satellite phone and transfers data and current position. Our glider send us a “distress message” that it is drifting on the surface. Fortunately, we were able to, with only minor changes in the cruise track, to recover the glider, and we plan to redeploy it later during the cruise.



The glider ready for its mission in front of the Meteor. Photo T. Tanhua.

The week ended with a transit to Dakar; we went there to pick up an observer from Senegal. An observer on board the research vessel is a requirement from several nations in order to conduct research within their territorial boundaries; Senegal is one of those countries. In the morning of June 8 Meteor arrived to the roadstead anchorage outside of Dakar, and within shortly the observer arrived on a small boat to the Meteor. Soon Meteor was underway again.



View of Ile de Gorée in front of Dakar. This island was a center for the French slave-trade where slaves were brought from all over Africa waiting for a ship to take them to the colonies on the other side of the Atlantic. Photo M. Schneider.

The goal of the Meteor and its research party was now to complete a section along 14°30'N across the Atlantic. This section was started during the previous cruise, M96, but was, as planned, not completed by that cruise due to logistical considerations. The Meteor is now doing CTD casts along the eastern part of this section, and we are also conducting underway CTD casts (uCTD). This is a small CTD-Probe that is attached to a thin rope and launched from the stern of the Meteor when the ship is moving ahead. We reduce the speed of the ship from about 11 knots to 9 knots so that this probe can reach our target depth of 500 meter. This is a new and unfamiliar instrument for most of us on board, but we soon “got the hang of it” and are measuring one uCTD profile every half hour.



The CTD team is learning how to conduct uCTD measurements from the Meteor. Photo T. Tanhua.

In the name of all the participants, best regards from the Meteor,

Toste Tanhua

Meteor, Sunday June 9, 2013