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Fort de France – Fort de France

First Weekly Report, period 01.12.-07.12.2006

After embarking and and setting up most scientific systems, the ship sailed on 01st December 2006 at 09:00 l.t. from Fort de France, Martinique for cruise MSM04/1. The general scientific goal is to measure the fluctuations of North Atlantic Deep Water (NADW) transport across roughly 16°N in the deep western North Artlantic. The southward transported NADW is the most important cold water branch of the world's oceanic thermohaline circulation, and it is expected from numerical modelling that fluctuations or, in the worst, a break-down would have significant impact on climate. It is well known that the strongest signal of associated currents within NADW transports can be observed in the deep western boundary current off the Americas. However, within the large deep basins, recirculation cells can induce large transport fluctuations even when currents are weak. IFM-GEOMAR in 2000 initially set up an instrumental array along 16°N in the western basin within the experiment MOVE to measure such fluctuations using cross-basin integral methods, namely geostrophic moorings with a number self recording Conductivity-Temperature-Depth (CTD) instruments (MicroCat, MC) and acoustic tomography. Surface elevations are measured using inverted echosounders in combination with high precision pressure sensors (PIES) which data are to be compared with gravity data from the GRACE satellite mission. Within the deep boundary current, self recording current meters were moored to estimate directly transports. The geographical distribution can be looked at on the web (www.ifm-geomar.de, keywords *epeditions* and *MOVE*).

The main aim during cruise MSM04/1 is to recover or directly read out the moored instruments, supplemented by a final high resolution CTD section along16°N. The moored component will from now on be continued in the western basin by the Scripps Institution of Oceanography (SIO), La Jolla, CA, U.S.A.) and complemented in the eastern basin by IFM-GEOMAR through its new time series station off the Cape Verde Islands . The scientific party during MSM04/1 consists of 11 scientists and technicians from IFM-GEOMAR, three from SIO, one participant from the University of Bremen, and a guest from the Fishery Research Institute of the Cape Verde Islands (INDP).

Shortly after sailing, we reached the western moorings which were recovered successfully besides two of three transponders. The tomograph recorded a complete data set. All but one MC show good data. According to **Johannes Karstensen**, the mooring dived at least three times by up to 700 m, the third time at the end of the recording period. Such divings probably are caused by rings which had spun off from the North Brazil Current. This hypothesis is supported by the structure of CTD data which were mainly taken for *in-situ* calibration purpose, and which show intensive fine structure as a signature of water mass mixing.

Data from the moored western PIES, although still in site, could not be read out acoustically. Before deciding whether to pick up this instrument when returning to Fort de France or to leave it in site, we want to check the other four instruments for possible systematic malfunction in the *read-out* mode. The current meter mooring and the geostrophic mooring at the western edge of the deep basin were launched without problems, and since today noon we are heading to the northern PIES, located at ca. 20.5°N, 56.5°W. The ship's track maybe followed in the web using the meteological station data that are transmitted into the World Meteorlogical Organization's data net (www.sailwx.org , then use the ship's call sign DBBT).

Embarking in a Caribbean port, usually let people expect fair and sunny wheather. During this winter season, a picture shot during our mooring work on deck two days ago, let us believe the navigator had mixed up latitude and longitude (16°N, 60°W) to sail with wap speed to the Irminger Sea (60°N, 16°W). However, temperatutes are high, the wheather slowly gets better, and all participants are in good mood.

Last not least the new ship with its master and helpful crew let us feel well and look forward optimistically for the next mooring array.

At sea, 07-Dec-2006

Thomas J. Müller
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