2012 Project Summary

Western Boundary Time Series

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The objective of this project is to maintain the 25+ year time-series of the western boundary warm-upper limb and cold-deeper limb components of the MOC at 27°N in the Atlantic. Nearly continuous records of Florida Current transport and water mass properties have been made since 1982, while volume transport and water mass measurements of the Deep Western Boundary Current and the Antilles Current have been made since 1984.

Recent Results
(1) A paper (Baringer et al. 2011) was published describing the state of the Meridional Overturning Circulation (MOC) for 2010 relative to the long-term climatology. The paper reviews recent findings on the MOC in the North Atlantic, including the demonstration of a significant seasonal cycle to the MOC at 26.5°N and the attribution of that seasonal cycle to changes in the basin interior as due to direct wind-driven upwelling changes off Africa.

(2) A paper (Meinen et al., 2010) was published detailing time scales and structure of Florida Current transport variability during 1964 through 2007 using a variety of observing systems. It was shown that only long-term continuous observations will allow for the evaluation of long-term trends or low frequency oscillations of this key MOC pathway. From 1964 to the present there is no indication of a statistically significant trend in Florida Current transport, and interannual and longer time scale variations represent 10% or less of the total variance.

(3) A paper (Meinen et al., 2011) was submitted detailing the time variability of the Deep Western Boundary Current (DWBC) at 26.5°N. The DWBC is thought to carry the bulk of the cold lower limb of the MOC at this latitude, and the paper details the surprisingly energetic flow in the deep layer in the western basin. The paper demonstrates that the deep variability in the western sub-basin exceeds that of the upper layer across the entire basin during 2004-2009, and it illustrates the crucial need for continuous time series measurements to understand the MOC.

Bibliography