Geophysical Research Abstracts,
Vol. 11, EGU2009-2110, 2009
EGU General Assembly 2009

Modulation of the Inflow into the Caribbean Sea by North Brazil Current Rings

C. Mertens, M. Rhein, M. Walter, and K. Kirchner

Institute of Environmental Physics, University of Bremen, Germany (cmertens@physik.uni-bremen.de)

A two–year long record from a triangular mooring array between the Lesser Antilles islands Tobago, Barbados, and St. Lucia is used to investigate the variability of the inflow into the Caribbean Sea, the amount of South Atlantic Water (SAW) carried with the inflow, and the role of North Brazil Currents rings in the observed variability. The data set consists of time series from temperature/conductivity recorders and current meters at the moorings, bottom–mounted inverted echo sounders at the Tobago and St. Lucia mooring positions, supplemented by additional shipboard measurements. The travel time measurements of the inverted echo sounders and the conductivity/temperature time series are used for continuous estimation of dynamic height profiles and geostrophic currents between the surface and 1000 dbar as well as the amount of water from the South Atlantic.

The observations show a domination of intraseasonal variability between 0 and 15 Sv, superimposed on the long–term fluctuations. With time scales of one to three months, these represent the signature of the North Brazil Current rings. During the observational period, nine transits of rings where observed to interact with the Lesser Antilles Arc, with no marked seasonality. The arrival of a ring leads to a weakening of the inflow into the Caribbean, although the rings carry large amounts of SAW into the area. The immediate increase of the transport towards the end of a ring event suggests a subsequent flow of this SAW–rich water into the Caribbean. At St. Lucia, rings may also cause a short-term decrease of SAW content, indicative of an influx of northern hemispheric water and a blocking situation. The average transport of SAW into the Caribbean during the observations amounted to 5.5 Sv, with no statistical significant seasonal cycle, but a small positive trend in SAW fraction as well as in transport of about 15% and 1 Sv, respectively; a corresponding trend in the baroclinic volume transport was not observed.