



Variability of shallow and deep western boundary currents off the Bahamas during 2004-2005: First results from the 26° N RAPID-MOC array

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Results from an array of 6 moorings deployed east of Abaco, Bahamas along 26.5°N during March 2004 to May 2005 are presented. These moorings formed the western boundary array of a trans-basin observing system designed to continuously monitor the meridional overturning circulation and meridional heat flux in the subtropical North Atlantic, under the framework of the joint U.K./U.S. RAPID-MOC (Rapid Climate Change – Meridional Overturning Circulation) program. Important features of the western boundary circulation include the southward-flowing Deep Western Boundary Current (DWBC) below 1000 m, and the northward-flowing “Antilles” Current in the upper 1000 m. The net southward transport of the DWBC across this region, inclusive of northward deep recirculation, is -26.5 Sv, which is divided nearly equally between Upper (-13.9 Sv) and Lower (-12.6 Sv) North Atlantic Deep Water (NADW). In the top 1000 m, 6.0 Sv flows northward in a thermocline-intensified jet near the western boundary. These transports are found to agree well with historical current meter data in the region collected during 1986 to 1997. Variability in both the shallow and deep components of the circulation is large, with transports above 1000 m varying between -15 to +25 Sv and deep transports varying between -60 to +3 Sv. Much of this transport variability occurs on relatively short time scales of several days to

a few weeks associated with barotropic fluctuations. Upon removal of the barotropic fluctuations, slower baroclinic transport variations are revealed, including a temporary stoppage of the lower NADW transport in the DWBC during November 2004.