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Atlantic Meridional Overturning Circulation: Towards a decade-long time series of observations at RAPID-MOCHA 26N

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Since 2004, the RAPID/MOCHA project has made observations in the Atlantic to estimate the strength of the Meridional Overturning Circulation at 26∫N. Transport is estimated as the geostrophic transport between end point moorings that measure profiles of density, and supplemented by an array of current meters in the shallow and deep western boundary currents. The Gulf Stream transport through Florida Straits is estimated using a telephone cable, and Ekman transport is estimated from satellite-derived winds. The initial calculation of overturning strength showed that there is large subannual variability with a mean and standard deviation of 18.7 -5.6 Sv (Cunningham, et al 2007). Strong compensation between different components (Ekman, Mid-Ocean, Gulf Stream) was also demonstrated (Kanzow, et al, 2007). More recently, eddy variability was shown to decrease rapidly towards the western boundary (Kanzow, et al 2009), while local barotropic fluctuations at the western boundary were shown to compensate baroclinic pressure gradients and the Gulf Stream (Bryden, et al, 2009). Seasonal cycles were dominated by eastern boundary upwelling resulting in a zonal tilt of the pycnocline (Chidichimo, et al, 2010; Kanzow et al, 2010). While we are beginning to understand the subannual and seasonal timescales of variability in the MOC, the records are not yet long enough to capture decadal timescales of climate variability.