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Features in the vertical structure of the meridional flow field over the continental rise east of Abaco, the Bahamas.

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Since Spring 2004, the RAPID-MOC mooring array (Monitoring the Atlantic Meridional Overturning Circulation at 26.5N) and the MOCHA array (Meridional Overturning Circulation and Heat-flux Array), have been a system continuously monitoring the Atlantic Meridional Circulation (MOC) in the subtropical North Atlantic. Using two year long current meter records (2004-2006), along with historical data (1986 – 1997), as decribed by Lee *et.al.* (1990) and Lee *et.al.* (1996) of the western boundary moorings, we analyze the vertical structure of the complex flow field in the Antilles Current (AC)/ Deep Western Boundary Current (DWBC) regime.

The upper northward flowing AC is decoupled from the southward DWBC and the regime shows variability on a semi-annual timescale (as Rosenfeld *et.al*., 1989). The combination of (1) proximity to the continental rise resulting in boundary effects as well as (2) bathymetry causing recirculation, affect the observations of the meridional flow. Observed in the vertical structure of several moorings are correlated events which could be propagating features, normal meandering or bifurcation under the Gulf Stream (Pickart, 1994), or recirculation (Lee *et.al*., 1996). When using satellite altimeters to track features in longitude/time plots of SSH anomalies, we do observe westward propagation. When studying these events further in most moorings, over 90% of the meridional velocity variance can be explained by the first 3 EOF modes. The high relative amplitudes of the principal components from the 1^{st} and 2^{nd} modes also coincide with the events. When comparing these with vertical modes from normal mode analysis (framework including quasi-geostrophic dynamics) to provide a description of the vertical distribution of the time variable flow, results (when normalized) indicate similar pattern of vertical modal structure.

References:

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