AMOC variability from satellite data and ocean state estimates

Rui M. Ponte
Atmospheric and Environmental Research (AER)
131 Hartwell Avenue
Lexington, MA 02421

Apart from dedicated in situ arrays at some latitudes in the Atlantic, efforts to estimate the Atlantic meridional overturning circulation (AMOC) variability have ranged from purely statistical methods using proxy space observations, to combinations of satellite and in situ data, to full blown model-data synthesis and state estimation using advanced optimization methods. A brief review of these efforts will be attempted, including a discussion of the usefulness and limitations of different state estimates and various satellite data —e.g., scatterometer winds, altimeter sea level, bottom pressure (GRACE), SST and most recently surface salinity (Aquarius, SMOS)— in constraining estimates of AMOC variability. In a broader sense, both space observations and state estimates provide basin-scale information necessary for physical understanding of any AMOC variability detected by in situ arrays, as well as quantitative measures of other important climate metrics such as upper ocean heat content. The talk will explore how the synergies between AMOC monitoring arrays and broader estimates of the 3-dimensional circulation are essential to determine causal links between AMOC changes and other parameters important for Atlantic climate variability.