

We will revisit the linkage of AMOC and sea-surface height (SSH) variability on interannual and longer time scales using satellite altimetry data and numerical model hindcasts and state estimates. This issue is quite timely now that the RAPID project has given an observational estimate of AMOC at 26.5N since 2004. While the behavior for the first few years is not unusual, in a time span of 2009 to 2010, the RAPID time series show a significant drop of several Sv in the MOC, and maybe poised to have another unusual seasonal minimum in early 2012. We will discuss our EOF analysis of altimetric SSH and preliminary model-simulated AMOC, both of which suggest abrupt behavior in late 2009, early 2010 in PC1 and in AMOC at 25N.

Invasions of warm subtropical water north to the subpolar gyre represent a connection with the warm, shallow branch of AMOC, described in our earlier works (e.g. JGR 2009, 2011). Atmospheric climate has a surprising relationship with these warm events. Winters with frequent atmospheric blocking are found to persist over several decades and correspond to a warm North Atlantic Ocean. This is evident in atmospheric reanalysis data, both modern and for the full 20th century. Blocking is approximately in phase with Atlantic multi-decadal ocean variability (AMV). Although blocking is a high-frequency phenomenon (days to a week), it comes in clusters and these are modulated over multidecadal timescales. The east-west position of wintertime blocks ranges from Greenland to western Europe, the latter corresponding to the cold winter of 2011/12 in southeastern Europe.