Southwest Atlantic Meridional Overturning Circulation Array

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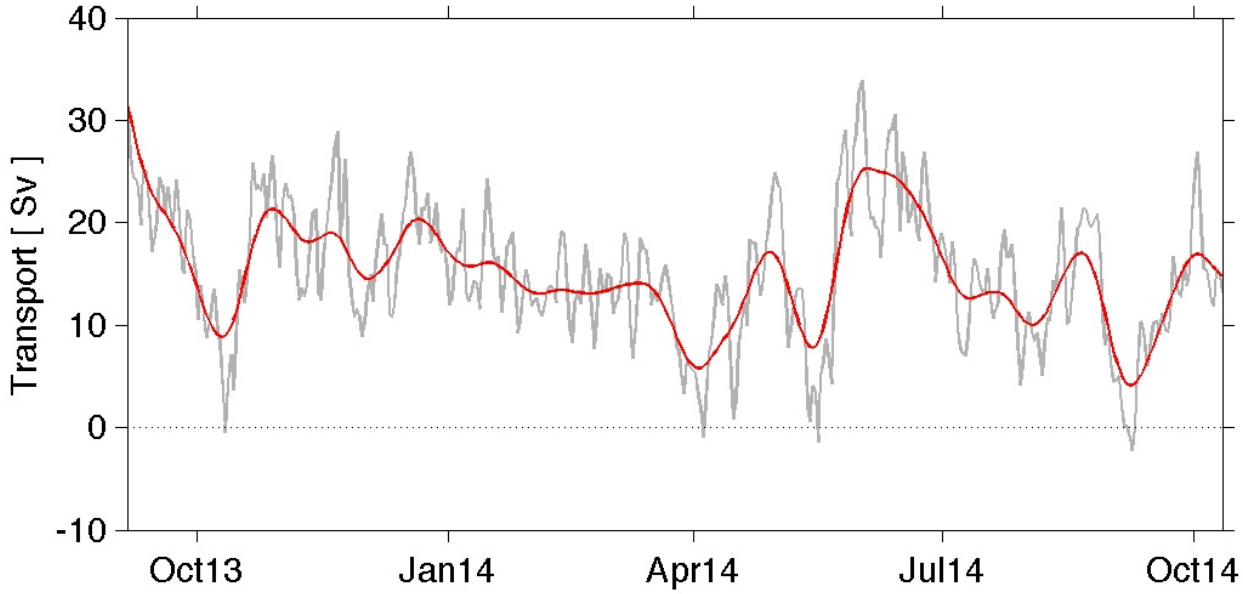
Variations in the Atlantic Meridional Overturning Circulation (AMOC) in both the North and South Atlantic have been shown to relate to changes in important climate variables including precipitation and surface air temperatures as well as hurricane intensification, heat waves, and other extreme weather events. The AMOC consists primarily of vertical and north-south flow in the oceans, with new deep waters forming in the high latitudes, particularly in the northern North Atlantic, and surface waters flowing from around the globe to replace the sinking deep waters. Direct knowledge of how the AMOC varies is limited due to the difficulty in making the necessary basin-wide measurements. Scientists in PhOD have been at the forefront of this challenging field, working with national and international partners to develop and implement several critical measurement systems that provide data on the AMOC at important locations. One such project is the Southwest Atlantic Meridional Overturning Circulation ("SAM") array; the SAM project involves a line of moored pressure-equipped inverted echo sounders ("PIES") deployed along 34.5°S near the continental slope of South America. This project, funded by the NOAA Climate Program Office – Climate Observations Division, has been measuring the key western boundary components of the AMOC at 34.5°S since March 2009. AOML-PhOD has been maintaining the SAM PIES array together with partners in Argentina and Brazil, and the initial successes have led to a broader coalition of countries including France and South Africa who have augmented the SAM array with both additional western boundary moorings and with eastern boundary moorings, producing a true trans-basin AMOC array.



Time series of the volume transport of the upper limb of the AMOC across 34.5°S calculated following the methods described in Meinen et al. (2013). Data from the AOML-PhOD SAM project are used together with the parallel French-South African "GoodHope" project to produce these daily (gray) and 30-day low-pass filtered (red) time series. Other data from the global ocean observing system, including Argo profiles and satellite observations, are used to augment the moored instruments in creating this time series.