

## **Meridional overturning estimates using pilot array data at 34.5°S in the Atlantic**

Christopher S. Meinen<sup>1</sup>, Sabrina Speich<sup>2</sup>, Alberto R. Piola<sup>3</sup>, Renellys C. Perez<sup>4,1</sup>, Shenfu Dong<sup>4,1</sup>, Silvia L. Garzoli<sup>4,1</sup>, Molly Baringer<sup>1</sup>, and Edmo Campos<sup>5</sup>

<sup>1</sup>Atlantic Oceanographic and Meteorological Laboratory, Miami, Florida

<sup>2</sup>Laboratoire de Physique des Océans, Brest, France

<sup>3</sup>Servicio de Hidrografía Naval, and Universidad de Buenos Aires, Buenos Aires, Argentina

<sup>4</sup>Cooperative Institute for Marine and Atmospheric Studies, University of Miami, Miami, Florida

<sup>5</sup>University of Sao Paulo, Sao Paulo, Brazil

### **Theme:**

Seasonal-to-interannual time scales

### **Abstract:**

Approximately twenty months of data from two boundary current arrays are used to produce the first direct, continuous, time series estimates of the basin-wide meridional overturning circulation (MOC) at 34.5°S in the South Atlantic. Data were collected using pressure-equipped inverted echo sounders (PIES) deployed on the western and eastern continental slopes. This analysis will focus on the key instruments deployed near the top of the continental slopes in the 1000-1350 dbar range. These arrays are designed to measure the boundary currents on either side of the basin, however together the data from the PIES can also provide an estimate of the time variability of the absolute transport of the upper limb of the MOC. The MOC is defined here as the absolute northward upper layer transport integrated from the surface down to the depth where the flow reverses (typically around 1125 m). These results indicate that the upper limb of the MOC has a peak-to-peak range of 45 Sv ( $1 \text{ Sv} = 10^6 \text{ m}^3 \text{ s}^{-1}$ ) and a standard deviation of 8 Sv. Strong variations are found with periods of 10-20 days and around 60 days. The observed MOC estimates from the PIES compare well with estimates from concurrent trans-basin hydrographic sections and estimates from high-resolution ocean general circulation models.