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**Observations of the boundary currents and AMOC at 11°S
- the TRACOS array -**

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Abstract

The upper-ocean circulation of the tropical Atlantic is a complex superposition of thermohaline and wind-driven flow components. The resulting zonally and vertically integrated upper-ocean meridional flow is referred to as the upper branch of the Atlantic Meridional Overturning Circulation (AMOC) — a major component of the global climate system. The northward AMOC branch in the tropics is superimposed by the shallower overturning associated with the wind-driven Subtropical cells, which connect the subduction sites of the subtropics with climate-relevant eastern equatorial upwelling regions. The TRACOS array aims at observing most of the Tropical Atlantic Circulation & Overturing at 11°S. At the western boundary five tall moorings were deployed off Brazil between 2000 and 2004 to monitor the variability of the strong western boundary current (WBC) system - more specifically, the North Brazil Undercurrent (NBUc) and the Deep Western Boundary Current (DWBC). Due to the success of this array, a similar mooring constellation has been installed off Brazil since July 2013 until now. In addition to the moorings, numerous ship-sections along 5°S and 11°S are accomplished. Interannual variability in the NBUc transport is consistent with hindcast simulations of a nested model, while long-term changes in water mass properties could be related to changes in remote areas. At the eastern side the Angola current is observed since 2013 with 1-2 moorings and shows weak mean circulation, whereas the variability seems dominated by remotely forced waves from the equatorial region. Simultaneously to the boundary observing systems, the observational program at 11°S was extended to observe the basin wide circulation: Bottom pressures sensors (BPRs) were deployed on both sides of the basin. The BPRs and all ship surveys are used to estimate AMOC variability at 11°S on seasonal to interannual time scales. Especially, in combination with other AMOC arrays or embedded in the TAOS or PIRATA programs, this array has great potential for understanding mechanisms relevant for tropical Atlantic variability, as well as meridional coherence and long-term changes of AMOC variability.