Variability of the Boundary Circulation Systems at 11°S

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The western boundary current system off Brazil is a key region for variations of the Atlantic Meridional Overturning Circulation (AMOC) and the southern Subtropical Cell. In July 2013 a mooring array was installed off the Brazilian coast at 11°S similar to an array operated between 2000 and 2004 at the same location. Four research cruises (between 2013 and 2016) and the ongoing moored observations starting in 2013 are analyzed in comparison to the observations a decade ago. Average transports of the North Brazil Undercurrent and the Deep Western Boundary Current (DWBC) have not changed between July 2013 and May 2014 compared to the former observations from 2000-2004. DWBC eddies, which are predicted to disappear with a weakening AMOC, are still present with similar characteristics. Interannual transport variability as assessed between 2000-2004 from observations is consistently found in the output of a forced ocean model. Upper layer changes in salinity and oxygen within the last decade are consistent with an increased Agulhas leakage, while at depths water mass variability is likely related to changes in the North Atlantic as well as tropical circulation. The update of the moored observations until October 2016 will give further insight into possible changes of the Western Boundary Circulation. The Eastern Atlantic Boundary system is also investigated based on ship-board measurements and a moored array, which was also installed in 2013. Additionally, bottom pressure sensors were deployed at 300m and 500m depth on both sides of the Atlantic basin, in order to estimate the interior mid-ocean transport. Together, the boundary transport estimates, the mid-ocean transport and the Ekman contribution will be combined to give a comprehensive AMOC estimate for the tropical Atlantic at 11°S.