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Altimetry-derived South Atlantic Meridional Overturning Circulation between 20S and 35S Since 1993

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Altimetry-derived synthetic temperature and salinity profiles between 20S and 35S are used to estimate the Meridional Overturning Circulation (MOC) and meridional heat transport (MHT), which are assessed against estimates obtained from expendable bathythermograph (XBT) measurements. Consistent with studies from XBTs and Argo data, both the geostrophic and Ekman contributions to the MOC exhibit annual cycles and play an equal role in the MOC seasonal variations. The strongest variations on seasonal and interannual time scales in our study region are found at 35S. The interannual variations in the MOC between 20S-30S are statistically correlated, however, their correlations with MOC at 35S are relative low. The dominance of the geostrophic and Ekman components on the interannual variations in the MOC and MHT varies with time and latitude. At 35S the geostrophic component dominates over majority of the time except during 2002-2003 and 2010-2011 when the Ekman component dominates. Whereas at 20S, the Ekman component plays a relatively larger role. This indicates the importance of continuous monitoring the MOC.Those altimetry-derived MOC estimates have been used to evaluate numerical models to improve our understanding of the impact of the South Atlantic MOC on climate and weather.