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The Atlantic component of the Meridional Overturning Circulation (AMOC) is characterized by a northward flow of warm water in the upper layers from the South Atlantic into the North Atlantic, sinking and formation of North Atlantic Deep Water at high latitudes, and a southward return flow of cold water at depth. The AMOC carries a significant fraction of the total global ocean-atmosphere northward heat flux. The majority of this heat is lost to the atmosphere in the mid-latitudes where warm water meets cold, dry continental air masses. Several underway efforts involve in situ observations and numerical models seeking to design and establish a sustained observational system for the South Atlantic MOC. We incorporate satellite altimetry into these analyses to demonstrate how satellite measurements complement and expand the estimates of MOC from in situ observations in space and time in the South Atlantic. Of particular interest is to assess how well altimetry can be used to investigate the spatial and temporal variability of the MOC and Meridional Heat Transport (MHT) in this region. Previous results from hydrographic observations showed that the geostrophic component dominates the MOC/MHT at 35°S. We present here the time series of the geostrophic and Ekman components of the MOC/MHT between 20°S and 35°S estimated from altimetry observations and NCEP winds. The MOC/MHT time series show that the geostrophic component dominates the interannual variability of MOC/MHT during 1993-2005, with Ekman component plays a large role after 2005. The mean values of MOC (MHT) are 18.77 Sv (1.23 PW), 22.10 Sv (1.10 PW), 22.73 Sv (0.76 PW) and 23.06 Sv (0.72 PW) at 20°S, 25°S, 30°S, and 35°S respectively; denoting an increase in MHT towards the Equator, which is consistent with the very few estimates available in the region. The time series exhibit a long-period variability with high (low) values in the mid 2000's (1990's). The larger variability is observed at 20°S and 35°S, and it is lower in the center of the subtropical gyre. Consistent with previous results from XBT measurements, both geostrophic and Ekman components exhibit statistically significant annual cycle at 35°S with maximum anomalous values of approximately 4 Sv (0.5 PW). However, the seasonal cycles of the geostrophic and Ekman components are out of phase. Results for the other three latitudes are similar to that at 35°S, but with weak annual cycle.
OSTS session
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