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Poster
The meridional overturning circulation (MOC) and meridional heat transport (MHT) in the South Atlantic from numerical models have shown differences from observational based estimates. Both the geostrophic and Ekman contributions to MOC/MHT estimated from XBTs, Argo floats, and satellite altimetry show significant seasonal variations, but the two components are out of phase. However, the seasonal variations of geostrophic component from models are minimal, and the seasonal cycle in modeled MOC/MHT is dominated by Ekman component. To better understand and to investigate the causes for those differences, same methodology is applied to temperature and salinity monthly climatology from observations and from models to estimate the MOC/MHT at 34?S. The MOC from model T/S fields show strong transport in the ocean interior region compared to the MOC estimated from Argo T/S fields. The geostrophic component of the MOC estimated from Argo data shows a seasonal variation with the maximum value in January and minimum value in August. However, the seasonal variations of the geostrophic contributions to the MOC from model T/S fields is very weak. Differences are seen in all three regions: western boundary, interior region, and eastern boundary, with the largest difference in the eastern boundary. Examination of the density field suggests that the difference in the eastern boundary is related to the vertical coherent density variations in the Argo measurements, which is not shown in the model field. Possible causes for those differences are discussed. Wind stress curl from models and observations show strong differences in the eastern boundary, which could explain why the models are unable to reproduce the seasonal variations in geostrophic component of the MOC. Another contributor for the Ekman-dominated seasonal variations in the models is that the seasonal variations in zonal winds is stronger than those from remote sensed ocean surface winds, which resulting in a stronger seasonal cycle in Ekman transport.
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