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## Effect of mesoscale eddies on subtropical mode water formation and ocean heat storage

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Mode water formation results from air-sea exchange processes in association with the dynamics and thermodynamics of ocean currents or fronts in every ocean basin. Here, a new algorithm is applied to the Argo global array to define surface mixed layer depths and to detect mode waters with homogeneous properties underneath. Specifically, we revisit the spatial and temporal evolution of South Atlantic subtropical mode water (SASTMW) using this new algorithm and find that our set of criteria is more precise than previous detections of mode water. With satellite altimetry measurements and eddy tracking algorithms (Laxenaire et al., 2018), the colocalization between mesoscale eddies and mode waters can be achieved. We then test how much the profiles indicative of mode water are matched with locations of mesoscale eddies and to what extent these eddies influence mode water variability. In addition, we investigate the relationship between the temporal integral of surface heat flux with the heat stored within the layers of the SASTMWs during the formation periods. Nearly all Argo profiles indicate that mode water formation occurs at the time and within the region where loss of latent heat flux from ocean to the atmosphere is significant. Anticyclonic eddies, specifically, play a crucial role in heat redistribution associated with mode waters advected by the subtropical gyre.