



Characteristics, vertical structures and heat/salt transports of mesoscale eddies in the southeastern tropical Indian Ocean

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Satellite altimetry sea surface height measurements reveal high mesoscale eddy activity in the southeastern tropical Indian Ocean (SETIO). In this study, the characteristics of mesoscale eddies in the SETIO are investigated by analyzing 564 cyclonic eddy (CE) tracks and 695 anticyclonic eddy (AE) tracks identified from a new version of satellite altimetry data with a daily temporal resolution. The mean radius, lifespan, propagation speed and distance of CEs (AEs) are 149 (153) km, 50 (46) days, 15.3 (16.6) cm s⁻¹, and 651 (648) km, respectively. Some significant differences exist in the eddy statistical characteristics between the new-version daily altimeter data and the former weekly data.

Mean vertical structures of anomalous potential temperature, salinity, geostrophic current, as well as heat and salt transports of the composite eddies, are estimated by analyzing Argo profile data matched to altimeter-detected eddies. The composite analysis shows that eddy-induced ocean anomalies are mainly confined in the upper 300 dbar. In the eddy core, CE (AE) could induce a cooling (warming) of 2°C between 60 and 180 dbar and maximum positive (negative) salinity anomalies of 0.1 (-0.3) psu in the upper 50 (110) dbar. The meridional heat transport induced by the composite CE (AE) is southward (northward), whereas the salt transport of CE (AE) is northward (southward). Most of the meridional heat and salt transports are carried in the upper 300 dbar.