

**Meso-scale Eddy Variability and its linkage to the Deep Convection
over the Bay of Bengal using Satellite Altimetric observations**

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Abstract

In the Bay of Bengal (BoB), surface circulation is strongly influenced by the Indian Monsoon and notable local eddying that intensifies/weakens the East India Coastal Current (EICC). In this study, we apply an eddy tracking algorithm to 25 years (1993-2018) of satellite altimetric observations to identify, analyze, and track meso-scale eddies in the BoB from their generation to dissipation. We compare the characteristics and trajectories of these eddies during the southwest (SW) and northeast (NE) monsoon seasons and during the pre- and post-SW monsoon periods to better understand the seasonality of the local eddy field. We find high eddy generation in the eastern BoB associated with instability induced by coastal Kelvin waves and the westward propagating Rossby Waves, but we found the most robust eddies (with large radii, amplitudes, and eddy kinetic energies) in the western BoB around the EICC. We also compared the eddy field during strong and weak SW monsoon forcing and with varying Indian Ocean Dipole and El Niño-Southern Oscillation conditions. To understand the impact of these eddies on local atmospheric convection (which is of critical significance to the Indian Monsoon rainfall), we found the composite surface structure of anticyclonic and cyclonic eddies of warm-core and cold-core sea surface temperatures (SSTs), having a close relationship between the eddy-composite SSTs and composites of Outgoing Longwave Radiation (OLR), a proxy to the local precipitation.