

Spatial variability of mixed layer, isothermal layer and barrier layer of northern Bay of Bengal area

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Barrier Layer Depth (BLD) is the distance between the bottom of the mixed Layer (ML) and the isothermal layer (IL). Data of Underway Conductivity Temperature and Depth profiler (UCTD) of US research vessel “R/V Roger Revelle” collected during a cruise in the northern Bay of Bengal (BoB) (5.193⁰N, 84.897⁰E and 7.073⁰N, 85.399⁰E) from 29th November to 11th December 2013 were used to understand the spatial variability of mixed Layer, isothermal layer and Barrier layer (BL). Satellite altimetry data were collected from the AVISO database to visualize the Sea Surface Height anomalies. Recorded MLD ranged between 10-60m and the minimum MLD value was recorded in the observed freshwater plume, added by the Indian major rivers. ILD varied between 21-93m. BL and IL were deepest in the fresh water plume recording a range of 60-79m and 50-75m respectively. Satellite altimetry data has showed that there was a positive sea surface height in this plume, depicting a divergence in the area making ILD deep. The ship passed the cyclonic storm ‘Madi’ during 06th and 07th December. Calculated wind Stress (τ) was maximum (11.7 Nm⁻²) during this period. Wind stress had significantly impacted on ILD, MLD and BLD ($r = -0.218, 0.212$ and -0.299 respectively, $p < 0.01$) along the cruise track, even in the storm period. This study reveals that fresh water in BoB, forces for deepening of BLD by shoaling MLD. Surface heat fluxes, Ekman drift and surface geostrophic currents should be studied further to understand the spatial variability of MLD, ILD and BLD.

Key words: Mixed Layer Depth, Isothermal Layer Depth, Barrier Layer Depth, Ekman Drift, Geostrophic currents.

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