

Coupled Physical Processes in the Bay of Bengal and Monsoon Air-Sea Interaction

*Debasis Sengupta¹

1. Indian Institute of Science

The Bay of Bengal (BoB) receives about 4000 km³ of freshwater every year from summer monsoon rainfall and river discharge. The freshwater persists in the northern BoB for about three seasons, resulting in a near-surface stratified layer (usually less 30 m deep) with warm subsurface water. The meso-scale eddy flow and wind-driven shallow Ekman flow play major role in dispersing the riverwater in the Bay. The pathways of the riverwater can have significant year-to-year changes. The freshwater further strengthens the near-surface currents by squeezing the Ekman layer. As part of the OMM-ASIRI initiative, in the last four years we made intense fine-scale observations of near-surface temperature, salinity and currents in the north BoB from various platforms like moorings, research ships and other autonomous instruments including gliders, Lagrangian floats. Our ship-based observations suggest presence of strong submesoscale (order 10 km) fronts, which could set the near-surface stratification by slumping the denser water under the light water. The shallow mixed layer influences the air-sea interaction on diurnal to subseasonal timescales. The monsoon active-break spells modulate the mixed layer depth, winds, air temperature and humidity just above the ocean surface. We discuss the relevance of these processes in observations and model simulations.

Keywords: Salinity, Near-surface stratification, Freshwater dispersal, Air-sea interaction