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Mesoscale variability within a cyclonic gyre in the Bay of Bengal

Jayu Narvekar and S.Prasanna Kumar

National Institute of Oceanography (CSIR-NIO), Physical Oceanography Division, Panjim, India (jnarvekar@nio.org, 91-832-2450608)

The Bay of Bengal (BoB) is a tropical basin located in the eastern part of the northern Indian Ocean. The circulation and hydrography of the waters of the BoB experience strong seasonality, which is driven by the semi-annually reversing monsoonal winds. Though seasonality is the dominant mode of variability in the BoB, an increasing number of recent studies showed the importance of mesoscale variability. In this paper we examine the physical and biogeochemical characteristics within a cyclonic gyre that occupies the central and western BoB during winter, with the help of in situ as well as remote sensing data to decipher the mesoscale variability. Using the monthly mean climatology of sea level anomaly (SLA), we describe the time evolution of seasonal cyclonic gyre that occupies the central and western BoB. This cyclonic gyre is fully developed in October, extending from the western boundary to 84oE at 8oN and up to 90oE at 19oN. It weakens in December and disintegrates in January. During 25 November to 14 December 2007, northern part of this cyclonic gyre was sampled at 33 locations using CTD and water samples were collected using Niskin samplers attached to the rosette. In addition to the spatial sampling, short time series measurements were also carried out at 2 locations within the gyre. The analysis showed that though the waters within the cyclonic gyre was colder compared to the surrounding waters, temperature within the gyre showed strong mesoscale variability, which was also reflected in the nutrient as well as chlorophyll fields. With the help of ocean-atmospheric processes we explain the observed mesoscale variability.