Inter-annual Variation of Zonal Slope of the Thermocline in the Equatorial Indian Ocean Using Altimeter and Argo

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After the onset of the Indian southwest monsoon, a jet of water flows from west to east along the equatorial Indian Ocean (EIO) resulting in pilling up of water at the eastern end of the basin which in turn changes the slope of the thermocline. While the changes in the surface slopes can be studied from the sea surface height anomalies (SSHA) from altimeters, the deployment of Argo floats in the Indian Ocean gave an opportunity to study the seasonal changes in the thermocline in conjunction with these altimeter observations.

Thermocline has been estimated from the temperature profiles from Argo floats as the depth of the 20° C. These thermocline estimations have been used to develop the relationship between the slopes in SSHA and the thermocline changes. A west to east upslope in SSHA is observed during May-July and again during November-December, showing bimodal oscillations. The corresponding slopes in the thermocline are in the opposite direction. Up slopes (down slopes) in sea surface height (SSH) and down slopes (up slopes) in thermocline are maximum during June (September). Variations in SSH and thermocline are large at the eastern end of the basin compared with the western end due to the pilling up of water at the eastern end and the associated changes in the thermocline. Inter-annual and seasonal changes in the thermocline are studied in relation to the monsoon phenomenon.