



## What Causes the Indian Ocean Warming?

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The sea surface temperature (SST) in the Indian Ocean shows a warming trend in recent decades. In tropics, studies report that the warming is extended to subsurface at least to the depth of 700 m. The cause of the warming is not clearly understood and can not be explained by the two known processes, which regulate the heat in the tropical Indian Ocean. A couple of processes regulate the seasonal heat transport in the basin. On the annual mean the northern part of the basin gains heat through the net surface heat fluxes. The heat is transported southward by Ekman transport. Analysis of data shows an increase in the evaporation which actually could cool the SST. There is also no clear evidence of weakening of the Ekman transport. From the analysis of the observed data it is also found that the warming is not uniformly distributed in the tropics. The western side of the tropical Indian Ocean has warmed more than the eastern side. The zonal gradient suggests that the heat transport from the western to eastern Indian Ocean has been decreasing. The seasonal changes in the upper ocean stratification and the ocean dynamics are playing important roles in the basin wide warming and the regional distribution of the heat. Besides, the interannual climate anomalies such as the Indian Ocean Dipole and the El Nino/Southern Oscillation also contribute to the warming. Mechanisms contributing to the mixed layer depth change and SST warming are discussed.