

Inter-Annual Variations of Sea Surface Temperature in the Arabian Sea

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Abstract : Though both Arabian Sea and its counterpart Bay of Bengal is forced primarily by the semi-annually reversing monsoons, the spatio-temporal variations of surface waters is very strong in the Arabian Sea as compared to the Bay of Bengal. This study focuses on the inter-annual variability of Sea Surface Temperature (SST) in the Arabian Sea by analysing ERSST dataset which covers 152 years of SST (January 1854 to December 2002) based on the ICOADS in situ observations. To capture the dominant SST oscillations and to understand the inter-annual SST variations at various local regions of the Arabian Sea, wavelet analysis was performed on this long time-series SST dataset. This tool is advantageous over other signal analysing tools like Fourier analysis, based on the fact that it unfolds a time-series data (signal) both in frequency and time domain. This technique makes it easier to determine dominant modes of variability and explain how those modes vary in time. The analysis revealed that pentadal SST oscillations predominate at most of the analysed local regions in the Arabian Sea. From the time information of wavelet analysis, it was interpreted that these cold and warm events of large amplitude occurred during the periods 1870-1890, 1890-1910, 1930-1950, 1980-1990 and 1990-2005. SST oscillations with peaks having period of ~ 2-4 years was found to be significant in the central and eastern regions of Arabian Sea. This indicates that the inter-annual SST variation in the Indian Ocean is affected by the El Niño-Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD) events.

Keywords : Arabian Sea, ICOADS, inter-annual variation, pentadal oscillation, SST, wavelet analysis

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