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Decadal variations of sea surface temperature in the eastern Arabian Sea and its impacts on the net primary productivity

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Abstract Ten-year satellite derived data (January 2007 to December 2016) were used to investigate the variability of Chlorophyll-a (Chl-a), sea surface temperature (SST), net primary production (NPP) in the eastern Arabian Sea (AS). This study is aimed to show the coupling of physical and biological processes to understand how temporal, annual and inter-annual variations occur and the forcing mechanisms behind these variations in the ocean environments. This work is linked to Indian Ocean Dipole and the El Niño/Southern Oscillation, which frequently co-occur and drives inter-annual changes within the AS. Vertically Generalized Production Model was used to estimate NPP using chl-a, Photosynthetically Available Radiation, euphotic depth, and maximum photosynthetic rate from SST. The relationship between NPP and SST showed change in the pattern over the study period. The NPP in the AS is characterized by an unusual decline during El Niño events. AS is more productive during summer monsoon (June–September) due to coastal upwelling, wind driven mixing and lateral advection processes. There was decline in NPP after 2014 and this trend continued in the following years. The present investigation revealed that the strong El Niño condition was observed in 2015 and productivity of AS declined by ~ 19%, while SST increased by ~ 2% from an overall average of 2007–2016. Increased SST and

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