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IMPACT OF ENSO ON MARINE PHYTOPLANKTON ABUNDANCE IN SRI LANKA: INSIGHTS USING SATTELITE DATA

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ENSO (El Niño Southern Oscillation) events lead to ocean warming specifically affect marine phytoplankton abundance in the ocean by altering water temperature, and stratification, thereby impacting phytoplankton growth and distribution. This study analyzed a time series of satellite-derived Chlorophyll-a (Chl-a) concentration data, to investigate the mechanisms driving phytoplankton variability in the maritime zone of Sri Lanka. Although the impact of ENSO on marine phytoplankton is indirectly felt, scanty research is available for Sri Lanka. Thus, the objectives of this study were to investigate the Sea Surface Temperature (SST), and Chl-a concentration of sea using remotely sensed spatial data especially gathered using the MODIS satellite in the maritime zones of Sri Lanka. NASA's Ocean Color Web images, obtained using SeaDAS Explorer (which utilizes data from MODIS), used for this study. The analysis focused on the period from 2004 to 2023, particularly the influence of the ENSO events and annual average values of Chl-a and SST in 0-12 and 12-24 nautical miles (nmi) shoreline bands in maritime zones subjected geostatistical analysis. Nearly 3000 points selected for the assessment of Landsat images in ArcMap 10.8 to validate the observational data. Chl-a exhibited a significant negative correlation with SST, with notable time lags, while showing a positive correlation with ENSO events. These findings enhance the understanding of the complex interplay between ENSO events, SST, and phytoplankton dynamics, highlighting the need for continued monitoring of seasonal ocean currents and climate-related changes in the ocean.

Keywords: *Chlorophyll-a concentration, ENSO (El Niño Southern Oscillation), Marine phytoplankton health, MODIS satellite, SeaDAS*