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Hydro-climatic variations analysis with remote sensing data on Sri Lankan ocean waters

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This study investigated the physical, chemical and biological changes caused by climate changes in the Indian ocean area within 73.8281E, 4.2188N, 85.0781E, 10.5469N to compare their similarities and differences and to model the future trends in order to take the adaptation measures in response to climate change. AIRS, GLDAS, MERRA, MODIS, NOBM, OCTS, SeaWiFS and TRMM data were used for this study. The expert modeller, PCA and canonical correlation analysis were used in data analysis. Time series graphs within past 30 years clearly show, sea surface temperature, sea salt surface mass concentration, specific humidity, CO emission, Iron concentration, UV aerosol index have a clear increasing trend other than seasonal changes. SO_4 extinction, SO_4 column mass density, SO_2 surface mass concentration, Methane total column concentration, CO_2 emission show extreme increments. According to the expert modeller predictions, carbon dioxide (0.0058 mole fraction month^{-1}), organic carbon surface mass concentration (1E^{-13} kgm^{-3} month^{-1}) has drastic increments in the future. According to canonical correlation analysis the study found that Eastward surface winds, sea salt surface concentration, open water net downward long wave radiation and evaporation from turbulence are highly positively related and upwelling long wave flux at Top of the atmosphere negatively related with other atmospheric and oceanic changes. The variables with seasonally and annually increasing trends may have a major impact on reproduction, migration and redistribution of fish and other organisms and may affect to the fisheries in Sri Lanka.

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