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The effect of surface wind forcing on sea surface chlorophyll-a distribution in the ocean waters surrounding Sri Lanka for the period 1999 – 2003

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Ocean color and surface wind data derived from SeaWiFS (Sea viewing Wide Field of view Sensor) were examined to understand the relationship between the biological parameter, chlorophyll-a and the physical parameter, surface wind. Satellite data of 1 km resolution for the period 1999-2003 were processed and mapped to produce daily maps of chlorophyll-a, wind speed, meridional and zonal wind speeds. The days with heavy clouds were disregarded. Period composites of chlorophyll-a and wind speed for each month within the area of latitudes between 2.0N - 13.5N and longitudes between 76.5E – 88.0E, were produced. The northeast and southwest monsoon periods, are defined roughly as June-September and December-March, respectively. The waters around the island were divided into six sub areas of varying sizes mainly in the directions covering northeast (NE), east, southeast (SE), south, southwest (SW) and west and the mean of each box was used in the analysis.

The change in chlorophyll concentrations shows a very strong relationship to the monsoonal pattern in the Indian Ocean region. Waters in the East and northeast regions exhibit very low chlorophyll concentrations throughout the year (< 0.3 mg m^{-3}), except in the peak of northeast monsoon period in which the average values are nearly 1.0 mg m^{-3}, in the months of December and January. Higher chlorophyll values (period average between 1.5 - 3.0 mg m^{-3}) can be observed in the south, southwest and western regions during the southwest monsoon period. The most productive waters are the western waters during the months of June – September. Wind speed averages reach about 9 ms^{-1} during the peak of the southwest monsoon. Meridional and zonal wind speeds show reversal of direction during northeast monsoon period. Zonal wind speeds are much stronger than the meridional components. Strong co-variability can be found between the wind speed and its components with chlorophyll concentrations, especially in the west and southwestern oceanic regions. The correlation coefficient is between 60 % - 80 % for chlorophyll-a with the three wind speed parameters in these regions.