

Spatial variation analysis of chlorophyll concentration using Sentinel-3 OLCI Imagery in the Bay of Bengal along the shores of the Chennai district, India

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In the present time, marine pollution occurring due to anthropogenic activities and global climate change is one of the most concerning environmental issues related to the degradation of the marine ecosystem. As it not only affects the marine ecosystem but also impacts a human being. There are several parameters which can be measured using satellites to provide an in depth observation of marine pollution and changes occurring in ocean, sea, rivers with time. Author has chosen chlorophyll detection of a specific marine area in the Bay of Bengal sea in the current study.

The Bay of Bengal covers around 2.172 million square kilometers of area, across India, Bangladesh, and Myanmar, with great river deltas like river Ganga and Brahmaputra. The present study aimed to determine the distribution pattern of chlorophyll concentrations as a factor of phytoplankton abundance in the selected area of Chennai District, and its spatial variability.

Also, the study aimed to evaluate the potential of Sentinel-3 Ocean and Land Color Instrument (OLCI) satellite data for monitoring algal blooms. It's a satellite from the ESA Copernicus group. Chlorophyll-a (Chlorophyll) related products were tested and monitored for the entire year 2018) using the plug-in with SNAP tool, which assessed for their ability to estimate chlorophyll concentration.

The results showed that the concentration of chlorophyll was able to relate to the phytoplankton blooms in the study area. The areas with massive phytoplankton blooms showed high chlorophyll values (mg/m^3). The radiance spectrum with a MERIS heritage wavelength shows quite high reflectance values. Simultaneously, bands 11,8,6,4 provided the best results. Also, the analysis of chlorophyll made on the basis of Sentinel-3A OLCI satellite images could be used for detection, tracking, and delineating phytoplankton blooms in a given area.

The techniques used in this study will be useful in enhancing the ability to track chlorophyll concentration in marine coastal areas and will also help local coastal aquaculture operators, and fishing purposes to receive timely and accurate information that can be scientifically and commercially of great importance. This study demonstrated that the new satellite sensors, OLCI, can play a significant role in the monitoring of chlorophyll concentration in a large area.