Assessment of Chlorophyll-a Concentration from Satellite Remote Sensing and In-situ Observations

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Ocean colour remote sensing provides information about the spatial and temporal variability of near-surface ocean water constituents from the spectrum of the solar reflected radiation from the ocean waters. OCEANSAT-2 satellite was launched on September, 23, 2009 from Shriharikota by Polar Satellite Launch Vehicle (PSLV) C14 rocket having three main instruments namely i) Ocean Colour Monitor (OCM) ii) Ku band pencil beam scatterometer and iii) ROSA sensor of Italy. The Ocean Colour Monitor (OCM) has been designed to provide continuity to the OCEANSAT-1 OCM observations and to obtain quantitative information of ocean colour variables e.g. chlorophyll-a and total suspended matter (TSM) concentration, vertical diffuse attenuation of the light (*Kd*) characterized at 490-nm for open and coastal waters.

For studying the global oceanic processes and their implications on climate, periodic and synoptic observations of various parameters like surface temperature, surface winds, humidity, precipitation, sea water salinity, bio-physical properties like chlorophyll-*a* concentration etc., over global oceans are important. Chlorophyll is a single cell organism, which floats on ocean surface and forms the basis for the marine food web. Chlorophyll-a plays a major role in global climatic studies like global carbon cycle and nitrogen fixation. Ocean colour remote sensing is important for studying the various applications like ocean primary productivity, global carbon cycle, nitrogen fixation, fisheries, sediment dynamics and bio-geo-chemical cycles on spatial and temporal sacels. However, all the satellite observations have to be assessed from the simultaneous measurements of *in-situ* data.

In view of this, a coastal cruise was organised during November 2009 off Paradeep waters covering Mahanadi, Dhamra and Haladia regions. The *in-situ* data such as chlorophyll-*a*, *b*, *c* and other accessory pigments of phytoplankton and turbidity were collected simultaneously at surface, 10m, 30, and 50m depth. A chlorophyll-*a* concentration of 1.36 μ g/l at Mahanadi, 3.95 μ g/l for Dhamra and 1.09 μ g/l for Haladia regions were observed respectively. The turbidity values near the surface were observed as 4.61 for Mahanadi, 10.5 for Dhamra and 1.16 for Haladia regions. The total surface chlorophyll-*a* concentration varies from a minimum value of 0.76 μ g/l and a maximum value of 4.5 μ g/l with a minimum turbidity value of 0.79 and a maximum value of 15.3 respectively in the study area. A linear relationship between the turbidity and

chlorophyll-a concentration has been observed. These estimations are used to validate the satellite observations from OCM-2 data.