Theme- Emerging Pollutants in Aquatic Ecosystems

Sub-Theme- Identifying and assessing ecological risks

UNESCO-IWRA ONLINE CONFERENCE 17-19 JANUARY 2023 3rd IN THE IWRA ONLINE CONFERENCE SERIES

Assessment of Spatio-Temporal Variation of Chlorophyll-a Concentration in Gulf of Kutch, India using AQUA MODIS Sensor Data

INTRODUCTION

Water quality plays a very important role both for the healthy existence of human beings, aquatic and terrestrial ecosystems. In the past few decades, due to a lot of anthropogenic activities, water quality has degraded throughout the world. In India also, water quality has been affected by various anthropogenic activities. In the recent few years, researchers has used remote sensing technology to study various water quality parameters. One of such parameters is chlorophyll-a content in the water bodies. Chlorophyll-a is indicative of algal Bloom in water bodies. Algal blooms can decrease the dissolved oxygen concentration in water bodies. Low dissolved oxygen concentration is dangerous for aquatic plants and animals.

Algal bloom deplete the water quality status of a water body. Using remote sensing, near-surface concentration of the photosynthetic pigment chlorophyll-a can be estimated. Using the spatial distribution of chlorophyll-a concentration, concentration of phytoplankton and zooplankton can be correlated.

Materials & Methods

In the present study, the coastal region around the Gulf of Kutch has been selected as the study area (Fig.1). The Gulf of Kutch is in India, and is spread along the coastal regions up to an approximate length of 150 km. In the present study, AQUA-MODIS sensor has been used to estimate Chlorophyll-a content in the Gulf of Kutch. Level-2 data from the period 2015 to 2022 has been acquired and processing of data has been done using SeaWiFS Data Analysis System (SeaDAS) software, developed by NASA. SeaDAS has been used for processing and analyzing ocean color data.

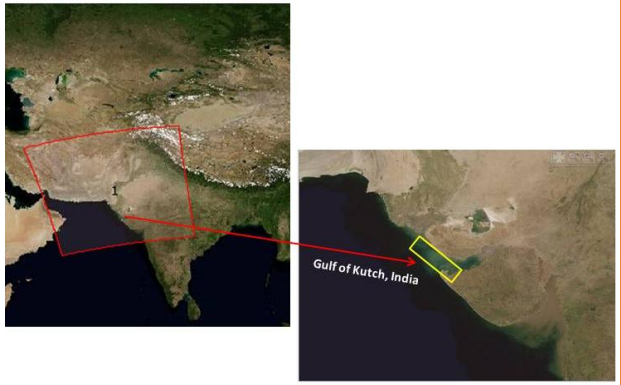

Fig.1. Study area: Gulf of Kutch

Results & Discussion

The results revealed that chlorophyll-a concentration varied from 3 mg/m^3 to 25 mg/m^3 for the study area (Fig.2, Fig.3). Also as one moves from gulf of Kutch towards Arabian sea, the concentration keep on decreasing and reached at 0.4 mg/m^3. The pixel to pixel statistics of study area is shown in Fig. 4. The results also suggested that regions where chlorophyll concentration was high, the phytoplankton concentration might also be high in those regions. Thus, near to coastal regions, phytoplankton concentration also dominate.

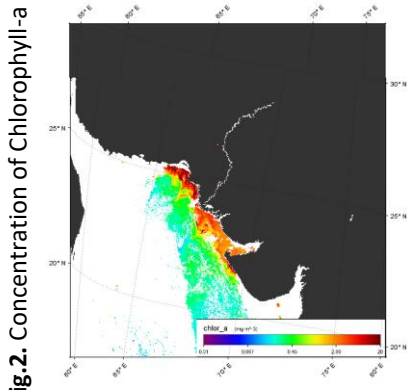

Fig.2. Concentration of Chlorophyll-a

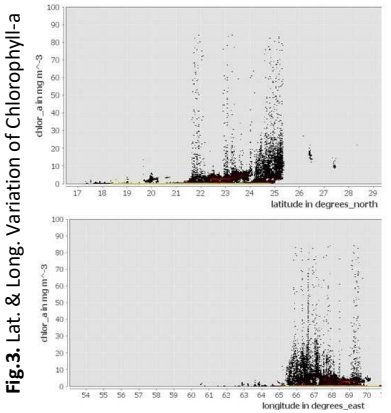

Fig.3. Lat. & Long. Variation of Chlorophyll-a

#Pixels tot...	172
Minimum:	0.2025
Maximum:	25.9995
Mean:	8.2343
Sigma:	5.9595
Median:	4.8976
Coef Varia...	1.3153
ENL:	0.5781
P75 thres...	14.1587
P80 thres...	15.9645
P85 thres...	16.6868
P90 thres...	17.1511
Max error:	0.0258

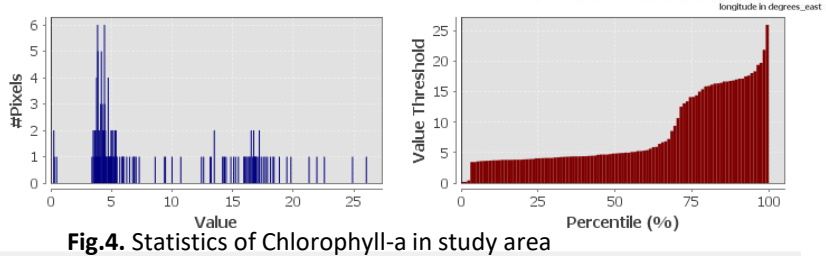

Fig.4. Statistics of Chlorophyll-a in study area

Conclusion: Near the coastal regions of Gulf of Kutch, the concentration of Chlorophyll-a ranges from 3-25 mg/m3. The concentrations decreases as one moves away from coastal regions into the ocean.

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