THE EFFECT OF CYCLONE ON THE OCEAN PRIMARY PRODUCTIVITY IN BAY OF BENGAL

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INTRODUCTION

The understanding about ocean primary productivity is very important as it is a key component of the Earth's biogeochemical carbon cycles, as well as in predicting the response of marine biota to possible changes in radiative or other physical forcing because of global warming (Wang et al., 2009). Chlorophyll-a has been known as the most important indicator for ocean productivity estimation (Nagamani et al., 2011). Many studies have been conducted to determine the variation of chlorophyll-a concentration due to several factors such as cyclone (Tripathy et al., 2012). This study focuses on examining the effect of various cyclone events on the ocean primary productivity in Bay of Bengal (BOB). BOB is the largest bay in the world with unique semi-enclosed tropical basin, monsoon variation, and experienced high rainfall and frequent cyclone (Reddy et al., 2008).

Tripathy et al., 2012 had found the frequent occurrence of cyclonic events causes short-term nutrient enrichment of upper-stratified ocean resulting in enhanced biological productivity. Upwelling and entrainment processes due to strong winds associated with cyclone will bring up nutrients and causes phytoplankton bloom (Reddy et al., 2008). Chlorophyll concentration is increased under the cyclone track and the blooms of phytoplankton were covered wide area (Smitha et al., 2006).

Although many research have been done to study about the effect of cyclone on chlorophyll-a concentration, there is a limitation in how far the chlorophyll-a concentration dispersed from the cyclone track and how long the chlorophyll maintains high for a specific cyclone event. Moreover, the variation of SST due to the cyclone event is investigate in this study for further analysis on the relationship between cyclone, SST, and chlorophyll-a in BOB.

Chlorophyll-a concentration values were extracted from Level 2 SeaWiFS daily data and MODIS level 3 daily data are used to determine the SST values. Both datasets were download from 'http: //oceancolor.gsfc.nasa.gov' website from 2001 to 2010 coincide with the cyclone event. Apart from satellite data, date and location of cyclone events (from year 2001 to 2010) were acquired from Indian Meteorological Department (IMD). Several transect line were illustrated in parallel with the cyclone track for certain distance on different date of chlorophyll image (pre-, during, and post-cyclone).

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Analysis of this study includes the variation of chlorophyll-a concentration in term of spatial and temporal distribution due to the different type of cyclone event. The similar approach applies for SST image to analyze the effect of cyclone on the spatial and temporal distribution of SST in BOB.

This study shows that various type of cyclone occur in different season (pre-, monsoon, and post-monsoon) (from 2001 to 2010) at BOB has unique spatial and temporal affect to the variation of chlorophyll-a and SST. Preliminary result is shown in Figure 1 below.
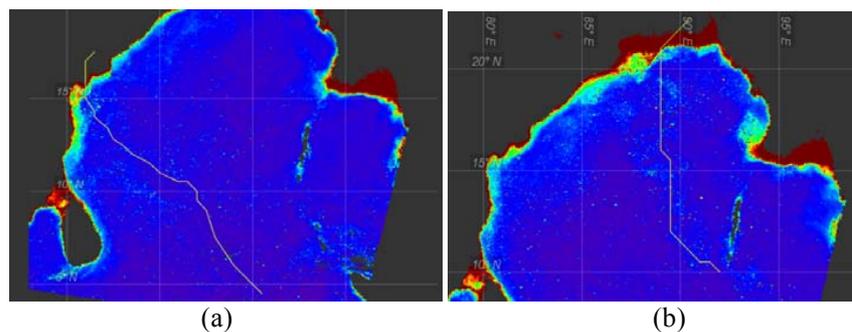

| (a) | (b) |

Figure 1. Chlorophyll-a concentration along cyclone track at BOB for (a) Severe Cyclonic Storm on December 2003, and (b) Very Severe Cyclonic Storm on November 2007.

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