Estimation of Ocean Primary Production using MODIS Satellite Data in Straits of Malacca

N. S. Mat Nor, A.W. Rasib, K. D. Kanniah, M. Z. A. Rahman, W. H. W. Kadir, A. R. M. Yusoff, A. L. M. Shin, A. Ariffin and S. Amerudin

TropicalMap Research Group, Department of Geoinformatic, Faculty of Geoinformation & Real Estate, Universiti Teknologi Malaysia, 81310 Johor, Malaysia.

abdwahid@utm.my

Abstract: The increasing of CO_2 in ecosystem has lead to the rapid increase of temperature and acidity in Straits of Malacca. This phenomenon will affect to the marine life and other biological processes. The study was conducted in order to estimate primary production over the Straits of Malacca using Moderate Resolution Imaging Spectroradiometer (MODIS) data. Vertical Generalized Production Model (VGPM) will be applied into MODIS data in order to extract the primary production concentration on the ocean surface. Five major input parameters such as chlorophyll-a, daily photosynthetically active radiation (PAR), euphotic depth, optimal carbon fixation rate and photoperiod obtained from MODIS products will be used in VGPM model. Multi-temporal MODIS images used in the study was representing ordinarily different monsoon occurrence at Straits of Malacca. The results obtained was successful indicates the highest concentration of primary production due to abundance of phytoplankton bloom and upwelling occurrences along the coastline during Northeast monsoon (November to February). The lowest primary production was recorded during Southwest monsoon (May to August). However, the study was indicated no variation of primary production in straits of Malacca during transitional period of monsoon (March and September). The main parameters contributed to the variation of ocean primary production using VGPM model is chlorophyll-a concentration and euphotic depth with $r^2 \geq 0.7$ respectively. The study was concluded that, the average of primary production in Straits of Malacca during March, June, September and December 2012 derived from VGPM model is 1227.46, 2000.06, 997.52, and 2240.0 mgC/m^2 respectively.

Keywords: CO_2, Primary production, MODIS, VGPM model, Straits of Malacca

.