## Study of the Physical-biological-chemical Model of Biogeochemical Cycles in the Northern Indian Ocean

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Marine biogeochemical cycles play a significant role in the key environmental issues like, oceanic response to climate change, coastal eutrophication etc. To understand the present ocean biogeochemical state and predict the future responses of the ocean to anthropogenic perturbations, the existing mathematical models need improvements. The major challenges in the marine biogeochemical modelling are the identification of the ecosystem compartments, underlying biogeochemical processes and their parametrizations, the model-data comparisons and data assimilation studies.

A marine ecosystem model having variable Carbon: Nitrogen Ratio for different components of the ecosystem, detailed representation of Dissolved Organic Matter (DOM) with dynamic C/N, Nitrogen fixation and Calcification is incorporated into an Ocean General Circulation Model (MOM4). Several model simulations have been carried out by changing some of the processes and the values of a few model parameters. Results of these model simulations are evaluated using the available cruise data and satellite data in the Arabian Sea and Bay of Bengal.

It is noticed that spatial and seasonal variation of primary productivity obtained from model simulations is similar to the primary productivity derived from SeaWiFS Data. Seasonal variations of pCO2, primary productivity and chlorophyll integrated over depth, and profiles of some of the state variables and primary productivity, obtained from the coupled model simulations are compared with the US JGOFS Cruise data at a few stations in the Arabian Sea. Primary productivity, Chlorophyll and pCO2 from one of the model simulations compare well with the cruise data and buoy data during some of the seasons.