Geophysical Research Abstracts,
Vol. 10, EGU2008-A-01712, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-01712
EGU General Assembly 2008

Satellite chlorophyll observations and how to interpret them: a case study about the Mozambique Channel

A.W. Omta (1), J. Llido (2), J. Bruggeman (1), S.A.L.M. Kooijman (1), V. Garçon (3) and H.A. Dijkstra (2)

(1) Institute for Molecular Cell Biology, Vrije Universiteit Amsterdam (anne.willem.omta@falw.vu.nl)
(2) Institute for Marine and Atmospheric Research Utrecht (IMAU), Universiteit Utrecht (H.A.Dijkstra@phys.uu.nl)
(3) Laboratoire d'Etudes en Geophysique et Oceanographie Spatiales, Toulouse

The surface chlorophyll concentration measured by satellites is commonly interpreted as a direct measure of phytoplankton biomass. However, one problem with this interpretation is that the amount of chlorophyll per amount of algal biomass (the Chl:C ratio) is not constant (Falkowski & Raven, 1997). In this contribution, we show that the interpretation 'chlorophyll=biomass' can in fact even lead to erroneous conclusions. We use a simple plankton model coupled to a water column model (GOTM) and to the Modular Ocean Model (MOM) to simulate the seasonal chlorophyll dynamics in the Mozambique Channel and we compare these simulations with satellite observations of the seasonal variation of the chlorophyll concentration in this region. When we take the Chl:C ratio in our plankton model fixed, the agreement between the simulated seasonal chlorophyll dynamics and the observations is not very good: in the simulations, the minimum chlorophyll concentration occurs a few months later than in the observations. However, if we include an empirical relationship between the light intensity and the algal Chl:C ratio (Geider, 1987), the agreement improves strongly. We obtain the best agreement if we assume that the biomass concentration stays constant throughout the year; variations in the chlorophyll concentration are purely caused by variations in the Chl:C ratio in that case. Hence, our results indicate that the seasonal variation in chlorophyll that is observed in the Mozambique Channel reflects a variation in the Chl:C ratio of phytoplankton, rather than a variation in the amount of phytoplankton

biomass.

References:

R.J. Geider, Light and temperature dependence of the carbon to chlorophyll a ratio in microalgae and cyanobacteria: implications for physiology and growth of phytoplankton, New Phytologist 106, 1-34 (1987)
P.G. Falkowski and J.A. Raven, Aquatic photosynthesis, Blackwell Science (1997)