

Proposed Internship : Evolution of surface Chlorophyll concentration as a function of short-term light intensity history

Rationale:

We developed an original way of analyzing surface chlorophyll concentrations measured by satellites to investigate the correlation between light history and chlorophyll concentrations evolution over the course of a few days. We used the Ocean Color data from the ESA Globcolour project (<http://www.globcolour.info/index.html>). The fields used are daily surface chlorophyll I and daily cloud fraction and on a 100 km grid. The time period considered spans June 2002 to December 2007, where all 3 sensors (SeaWiFSS, MERIS and MODIS) were operational. At each grid point, using the cloud fraction index (CF) we first identified periods of high light intensity (sunny periods) that were following periods of low light intensity (cloudy periods). We then calculated the average relative daily change in surface chlorophyll concentration during sunny periods at each grid point (figure 1). A clear pattern emerges some areas of the Pacific are characterized by consistent decrease in chlorophyll during sunny periods (South west Pacific, North Pacific subtropical gyre), some areas are characterized by consistent increase in chlorophyll during sunny periods (coastal upwelling area of North and South America), and some areas show no clear response of the chlorophyll concentrations to light history (central and eastern equatorial Pacific).

Internship objectives

The goal of the internship is to formalize and confirm the methods used to obtain these observations and formulate and eventually confirm or reject hypothesis that could explain these observations. Existing literature and additional datasets of chlorophyll timeseries from ships or mooring will also be used (for example data from Station ALOHA in the North Pacific, or data from the MOISE mooring in New Caledonia).

Internship supervisors and roles

The intern will be supervised locally in Nouméa by 3 IRD researchers :

- Jerome Aucan, IRD/LEGOS : main supervisor, data analysis techniques.
- Cecile Dupouy, IRD/MIO : Optics specialists
- Martine Rodier. IRD/MIO : Biogeochemistry specialist

In addition, international collaborators may assist based on their expertise in the field. They include :

- John Casey (PhD student) and David Karl (Professor) : University of Hawaii, Department of Oceanography.
- Robert Frouin, Scientist : Scripps Institution for Oceanography.

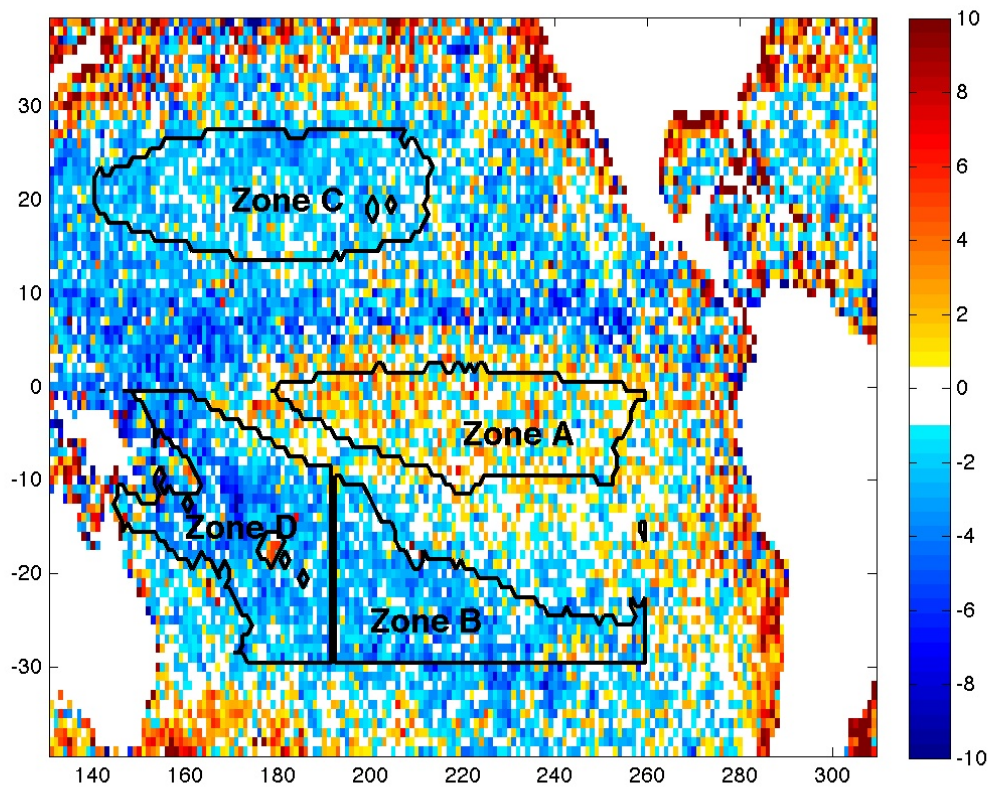


Figure (1) Relative daily change (in %) in chlorophyll concentration during sunny periods at each grid point, averaged over the period 2002-2008.