Open Internship in the ESA Advanced Concepts Team in 2016
on

Regional Modelling of Algal Blooms using Earth Observation Data

Topic description

Over the past decades harmful algal blooms (HABs) have increased in both, their number and the geographical areas that they affect [e.g. 1 and references therein]. With possible negative implications of HABs for fisheries and ultimately human health, it is important to recognise the development of algae blooms at an early stage and predict which areas would be affected by the bloom. Regional climate models are useful tool to support the research into HABs and their spread. This project will use the Regional Ocean Modelling System, which is one of the state-of-the-art models widely used in the research community [2]. In order to apply ROMs to the prediction of HABs it is essential to assess the model's ability to reproduce past algal blooms and track them starting from different stages of their evolution.

Candidate's tasks

The successful candidate will use satellite data of past algal blooms, including ocean colour, surface wind fields etc to force a regional climate model (ROMS) to evaluate the model's ability to reproduce the development and spread of HABs. In detail, the candidate will:

- set up a catalogue of satellite observations of past algae blooms;
- select a representable subset of algae blooms to reproduce using ROMS;
- generate model grid for the specific regions;
- collect necessary forcing fields from EO data product that coincide with the selected blooms;
- feed forcing fields into ROMS and run the model;
- compare model output with EO data to assess model performance.

The ideal candidate

Mandatory

- Excellent programming skills (FORTRAN and Matlab essential)
- Interest in physical oceanography/ocean dynamics

Desirable

- Experience with ROMS or other regional ocean models
- Model development/coding

References

[1] Moore, S. K., Trainer, V. L., Mantua, N. J., Parker, M. S., Laws, E. A., Backer, L. C., and Fleming, L. E. (2008). Impacts of climate variability and future climate change on harmful algal blooms and human health. Environmental Health, 7(2), S4.http://www.biomedcentral.com/content/pdf/1476-069X-7-S2-S4.pdf

[2] ROMS webpage: https://www.myroms.org/