

## Post-doctoral position in Ocean Biogeochemical modelling

LPO/LEMAR/IRD – Brest, France

### Framework

The project EPURE (trace-metal Elements, climatic Perturbations, Upwelling and Resources) founded by the french National Research Agency (ANR) is aiming to better understand the future of Metallic Trace Elements (MTEs) which accumulate in the aquatic food chain, in molluscs and fish and then in top consumers such as birds and humans. MTE like cadmium which is considered toxic to animals and humans show a distribution in the sea similar to that of major nutrients such as nitrates and phosphates, and their life cycle in the ocean is controlled by biological activity. Complex changes in the upwelling, induced by climate change, have an undeniable effect, but currently little known, on coastal currents.

EPURE is wishing to contribute to these investigations by the concerted analysis of the case study of the Moroccan upwelling area where there is a risk of transmission of micro-contaminants from the marine environment to the fishing industry.

### Description of work

Within this project, a coupled physical-biogeochemical model (ROMS-PISCES) will be implemented on this oceanic region in order to represent the effect of the hydrodynamic circulation on the spatial and temporal distribution of water masses enriched in cadmium. As a first step, we will evaluate the abiotic factors responsible for the future of these water masses using Lagrangian tools (Ichtyp or Ariane). In a second step, we will use simultaneously the modelling tool and the information available about cadmium to derive proxies of flux towards and from the sediments.

At the moment, the limited knowledge of the Cd cycle in the marine environment prevents a parameterization within existing biogeochemical models. Nevertheless, an important effort of observation will be conducted throughout the project to understand the key mechanisms of accumulation within the marine foodweb. Hence, the possibility to take this MTE into account in a development of the biogeochemical model is left opened.

### Affiliation

Institute Research for Development (Department Environment and Resources)

**Official research unit affiliation:** LPO, *Laboratoire de physique des océans* (1R197)

LPO develops research programmes in oceanography around three main themes: 1) Impact of small scale processes on oceanic circulation, 2) Circulation associated to continental shelves and margins and 3) the interactions between physics, biogeochemistry and marine ecosystems. <http://wwz.ifremer.fr/lpo>

**Physical affiliation:** LEMAR, *Laboratoire des sciences de l'Environnement MARin* (1R195)

LEMAR regroups biologists, chemists and physicists to understand and model marine ecosystems within the biosphere, to define the characteristics of the environment and the organisms and describe their interactions. <http://www-iuem.univ-brest.fr/UMR6539>

LEMAR and LPO are both members of IUEM (Institut Universitaire Européen de la mer) which is labeled as LABoratory of EXcellence in Marine Sciences at the French level and which provide a stimulating multidisciplinary environment. <http://www-iuem.univ-brest.fr/>

## Skills

The candidate should :

- Have a background (PhD) in physical oceanography and/or in marine biogeochemistry
- Know how to use computing facilities in academic research
- Master the concepts of numerical modeling in oceanography
- Master programming techniques, informatics environment (Unix/Linux, shell scripts) and languages (Fortran, Matlab or Ferret, and Java)
- Have a good English understanding and writing

The candidate should be autonomous and enjoy working in a team. The work will be conducted with Moroccan partners and the candidate might collaborate in the training of the partners as well as the transfer of technology. Stays of medium duration could be planned within the duration of the project.

Letters of application, a C.V., a short statement of research interests and the name of two referees should be sent by December 1<sup>st</sup>, 2011 to Eric.Machu@ird.fr (E. Machu, LPO/IRD, IFREMER, BP 70, 29280 Plouzané, France) and Bruno.Blanke@univ-brest.fr (B. Blanke, LPO/IRD, IFREMER, BP 70, 29280 Plouzané, France). Appointment will be for a minimum of **24 month duration** and should preferentially start on January 2<sup>nd</sup>, 2011. Net annual income will be ~24,000 Euros.