

Postdoctoral Position in Ocean Modelling – Climate Change Downscaling

Laboratoire de Physique des Océans
UMR 6523 CNRS-IFREMER-IRD-UBO, Brest, France

We invite applications from talented and motivated candidates interested in pursuing their research in coastal oceanography and meteorology, with focus in downscaling global climate change scenarios in relation with regional environmental and ecosystems evolutions. The successful applicants will participate in a new project funded by the European Community.

The European FP7 MEECE (Marine Ecosystem Evolution in a Changing Environment) project will address global change, the result of natural and anthropogenically induced climate change impacts upon the structure and function of marine ecosystems via a number of abiotic and biotic drivers.

The specific goals of MEECE are :

- To improve the knowledge base on marine ecosystems and their response to climate and anthropogenic driving forces ;
- To develop innovative predictive management tools and strategies to resolve the dynamic interactions of the global change driver, i.e. changes in ocean circulation, climate, ocean acidification, pollution, overfishing and alien invasive species on the structure and functioning of marine ecosystems.

To achieve these goals, MEECE will employ a combination of data synthesis, numerical simulations and targeted experimentation. An increase in the knowledge base and predictive capacities regarding the influence of the drivers is central to the successful fulfillment of the goals of the European Marine Strategy.

The offered post-doctoral position is part of this MEECE project led by Dr Icarus Allen at Plymouth Marine Laboratory, United Kingdom, which will extend from late 2008 till late 2012.

Within the “Ecosystem response to climate scale drivers” Work Package, the candidate will have to perform a dynamical downscaling of the regional climate in the ocean domain that includes the Benguela upwelling area. The common methodology in dynamical regional climate downscaling employs a continuous integration of a limited-area model. The study will particularly focus on the regional impact of climate change on the oceanic component of the system. Nonetheless, due to the common low resolution used in climate scenarios runs and the highly dependency of the coastal upwelling dynamics to synoptic-scale atmospheric forcings, we will implement the downscaling technique to both, the atmosphere and ocean components of the climate system. We will start with the realization of forced atmospheric and oceanic simulations. Coupled air-sea downscaling experiments could be implemented as final operational step of the work in collaboration. In this study we will use the Weather Research and Forecasting (WRF) model to dynamically downscale the atmosphere. The ROMS ocean physical model will be used to simulate the hydrodynamics and thermal structure. The SAfE (South African Experiment) configuration ($1/4^\circ$) in which is embedded a refined zoom ($1/12^\circ$) of the Benguela upwelling system will be run in scenarios (Penven et al. 2006, Rouault et al. 2009).

The post-doctoral work will be intended to develop the best « downscaling » techniques to regionalize the climate change signal simulated by the IPCC AR4

climate models. Preliminary tests have been already performed and the following on approaches will be discussed with the successful candidate.

Here are some questions to be addressed:

- What are the consequences of the climate changes on the physical behaviour of the regional atmosphere?
- What is the impact on the open-ocean and local upwelling system?
- What is the sensitivity to climate change for the different components of the system and their sensitivity to the applied downscaling method ?

A recent PhD in meteorology, atmospheric sciences, physical oceanography or a related field is required. The applicant should have a strong background in geophysical fluid dynamics and numerical modelling.

Letters of application, a C.V., a short statement of research interests and the name of two referees should be sent by 15 August, 2009 to sabrina.speich@univ-brest.fr (S. Speich, Laboratoire de Physique des Océans (LPO), UMR6523 CNRS/IFREMER/IRD/UBO, <http://www.ifremer.fr/lpo/speich>, Université de Bretagne Occidentale - UFR Sciences, 6, av Le Gorgeu C.S. 93837, 29238 Brest Cedex 3 France).

Appointment will be for a 12-month duration and may start October 1st, 2009 or later. Annual income will be 24,000 Euros.

References:

- Penven, P., J. Lutjeharms and P. Florenchie, Madagascar: a pacemaker for the Agulhas Current system ? 2006, *Geophys. Res. Lett.*, 33, L17609, doi:10.1029/2006GL026854.
- Rouault, M., P. Penven, and B. Pohl, Warming in the Agulhas Current system since the 1980's, 2009, *Geophys. Res. Lett.*, doi:10.1029/2009GL037987, in press.