Université de Bretagne Occidentale

Call of interest for welcoming MSCA post-doc

Job Title	Postdoc : Submesoscale Ocean Dynamics in the Arabian Sea and adjacent gulfs
Main Research Field	Environment and Geosciences (ENV)
Sub Research Field	Physical and dynamical oceanography
Key words	Process studies, role of topography and surface currents on dense outflows, submesoscale vortex formation and interactions with mesoscale features, numerical modeling, in situ and satellite data analysis.
Job Description	The Marie Curie Fellowship aims at understanding and at quantifying the physical processes underlying the submesoscale surface and subsurface dynamics in the Arabian Sea and adjacent gulfs. Specifically, the interactions of submesoscale structures and their interactions with mesoscale ones, the role of the marginal sea outflows and of topography in the dynamics will be analysed. The objective is to understand the physical processes at scales ranging from 1 to 300 km, underlying the variability of hydrology and currents for further biological applications. The context of the project is a major effort to understand and forecast hydrological and current conditions in the region for various applications (red algae blooms, fisheries, desalination plant efficiency, safety of commercial navigation). The fellow will work on nested runs of the HYCOM model implemented in the region, on in situ data collection (Physindien experiments) and analysis, and on the analysis of satellite data and of other in situ data (Argo floats, in particular). The fellow will implement and run the HYCOM model at increasing resolution (500 and 150 m) using existing simulations at 5 and 1.5 km resolution. He/she will analyse the model results for submesoscale feature generation and interactions, via energy, vorticity and heat budgets and water mass diagnostics. He/she will also study the various types of interactions between two or several submesoscale vortices with a non-hydrostatic model in a simple configuration. The data have been collected at sea during 4 cruises in 1999, 2001, 2011 and 2014 and a fifth cruise is planned for 2019. The SST data from high resolution satellite sensors and 1/8th degree SSH data (from a constellation of 4 altimetric satellites) will be used. A large dataset will thus be available for process studies and for model validation. The analysis of surface features in the model will also contribute to the preparation of the SWOT mission. The fellow will carry out his/her research with the supervisor and a doctoral student, and in collaboration with colleagues at the University of St Andrews (Scotland), at RSMAS (Miami) and at FSU (Tallahassee). The French hosting team has a long-standing record for the study and modelling of outflow and vortex dynamics and has experience with the Arabian Sea (both for modeling and for data collection and analysis). *C. Vic, G. Roullet, X. Capet, X. Carton, M.J. Molemaker and J. Gula, 2015: Eddy-topography interactions and the fate of the Persian Gulf Outflow. J. Geophys. Res., 120, 6700-6717.* *P. L'Hegaret, X. Carton, S. Louazel, G.Boutin, 2016: A submesoscale lens of Persian Gulf Water off the Omani coast in Spring 2011. Ocean Sci., 12, 687-701.*

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Supervisor	***Xavier Carton**, PhD, ScD, professor UBO* https://www.researchgate.net/profile/Carton_Xavier Expertise in vortex dynamics, and marginal sea outflow dynamics Director of 8 oceanographic cruises in the Gulf of Cadiz and in the Arabian Sea; about 100 refereed papers, 100 contributions to international conferences; 15 PhD and 20 Msc students supervisions ; supervision of 2 post-doctoral fellows *X. Carton, 2001: Hydrodynamical modeling of oceanic vortices. Surveys in Geophysics, 22, 3, 179-263.* *P. L'Hegaret, X. Carton, I. Ambar, C. Menesguen, B.L. Hua, L. Cherubin, A. Aguiar, B. Le Cann, N. Daniault, N. Serra, 2014: Evidence of Mediterranean Water dipole collision in the Gulf of Cadiz. J. Geophys. Res., 119, 8, 5337-5359.*
Department/ Research lab	**LOPS** is a joint research unit between UBO, CNRS and Ifremer. LOPS is recognized at the international level for its expertise in the field of physical oceanography especially in Geophysical fluid dynamics, numerical modeling, cruises, data analysis. With more than 40 scientists, the LOPS has the scientific potential to guide and train the recruited experienced researcher in its objectives. Thematic : Submesoscale ocean dynamics, vortex and outflow dynamics Infrastructure available : local computers for data analysis ; clusters and IFREMER supercomputer for model simulations Related projects : - ANR program DYNED Atlas (classification of oceanic eddies) with A. Stegner (LMD) - SHOM contract on the regional modeling of the Arabian Sea - INSU/LEFE/OA proposal: Generation of submesoscale vortices by topography; impact on vertical mixing in the ocean, with J. Sommeria (LEGI), A. Stegner (LMD).
Suggestion for secondments	*Potential secondments could be scheduled with :* *-in France : Dr Remy Baraille SHOM* *-in Scotland : Dr Jean Reinaud Univ St Andrews*
Skills Requirements:	*Skill Specific Requirements:* PhD in physical oceanography or dynamical meteorology; experience with primitive equation models and with HYCOM preferentially *Required Languages:* English *Others :* interest for numerical modeling of the ocean and process studies *Publications:* at least 2 during the PhD and at least 1 per year since the PhD (in ISI WOS referenced journals)

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