Training Opportunity for Portuguese Trainees

Reference	Title	Duty Station
PT-2016-EOP-SA(2)	**Satellite-based estimation of water masses formation rates and areas**	ESRIN

Overview of the Unit missions:

The Science Strategy, Coordination and Planning Office within the Science, Applications and Future Technologies Department (EOP-S) supports the development of the overall Earth Observation Programme strategy, manages the mission selection procedures, coordinates all science and preparatory studies, and manages interfaces to major international scientific programmes. The office is also managing activities of the Earth Science Advisory Committee.

This training opportunity is part of the Support to Science Element (STSE), whose main objective is the reinforcement of the scientific component within the ESA Living Planet Programme. STSE covers scientific support for both future and on-going missions, by taking a proactive role in the formulation of new mission concepts and of the related scientific agenda, by offering a multi-mission support to scientific use of ESA Earth Observation mission data and to the promotion of the achieved results.

Overview of the field of activity proposed:

Recent work linking satellite-based measurements of sea surface salinity (SSS) and sea surface temperature (SST) with traditional physical oceanography [1] has demonstrated for the first time the capability of generating routinely satellite-derived surface T-S diagrams and analyze the distribution/dynamics of SSS (and its relative surface density) with respect to in-situ measurements. This has been a diagnostic framework to assess satellite capabilities in estimating geophysical signals at the ocean-atmosphere interface not detected/resolved by ground-truth measurements.

Even more recently [2,3], this framework has been extended by computing surface density flux and water masses (water bodies with physical properties distinct from the surrounding water) formation areas for two ocean basins over an annual timeframe.

The objectives of these studies follow-on are to extend them along different avenues:
- Expand systematically the spatial and temporal domain of the study (additional ocean basins over longer time lags)
- Provide a better quantitative estimation of water masses formation rates for specific areas
- Perform a thorough error propagation to assess how errors in satellite SSS and SST translate into errors in water masses formation rates and geographical areas extent
- Explore the different options to connect the surface information to the vertical buoyancy structure (e.g., Turner angle)

The work consists in numerical coding and geophysical interpretations of the results. Reporting activities are through weekly/fortnightly meetings and monthly presentations/reports.

[1] R. Sabia, M. Klockmann, D. Fernández-Prieto, and C. Donlon (2014), A first estimation of SMOS-based ocean surface T-S diagrams, J. Geophys. Res. Oceans, 119, 7357–7371, doi:10.1002/2014JC010120.

[2] M. Klockmann, R. Sabia, D. Fernández-Prieto, C. Donlon, J. Font; Towards an estimation of water masses formation areas from SMOS-based T-S diagrams; EGU general assembly 2014, April 27–May 2, 2014.

[3] M. Klockmann, R. Sabia, D. Fernández-Prieto, C. Donlon, Linking satellite SSS and SST to water mass formation; Ocean salinity science and salinity remote sensing workshop, Exeter, UK, November 26-28, 2014.

Required Education:
- Applicants should have just completed (conclusion not older than two years) or be in their final year of a university course at Master's level in a technical or scientific discipline.
- Candidates must be fluent in English or French, the official languages of the agency
- Candidates should have good interpersonal and communication skills and should be able to work in a multi-cultural environment, both independently and as part of a team.
- Knowledge of remote sensing is mandatory, while knowledge of oceanography and SMOS mission are relevant assets.
- Experience with Matlab/IDL or similar software is also mandatory.