Post-doc Remote sensing of sea surface salinity: what can we learn from 10 years of satellite measurements?

Contract duration: 12 months renewable

Expected hiring date: mid January, 2020 or later

Work share: Full time

Remuneration: about 2700 € gross monthly (commensurable with experience)

Desired level of study: PhD

Desired experience: 1 to 4 years

Missions:

- Advance the understanding of the phenomena influencing L-band radiometric satellite measurements, in particular SMOS (Soil Moisture and Ocean Salinity) measurements; propose improvements to model brightness temperatures and retrieve salinity over the ocean

- Collaborate with various research teams in order to acquire a synthetic vision of the strengths and weaknesses of the satellite salinities acquired since 2010

Activities:

Nearly 10 years of satellite salinity are now available thanks to the SMOS (2010-), SMAP (2015-) and Aquarius (2011-2015) missions. Based on the spatial and temporal variability of the differences between salinities retrieved from each of the three missions and in relation to in situ measurements, the candidate will seek to identify, in collaboration with other team members, the potential causes of the differences: natural variability of salinity at scales not sampled by the different types of measurements, imprecision of auxiliary measurements (e.g. surface temperature, wind speed), direct models (e.g. sea surface roughness model), calibration procedures. He will seek to explain and/or correct the main identified differences, based on physical considerations. Through his knowledge of the strengths and weaknesses of the data, he will help to highlight the contribution of the (2010-2019) time series, to detecting variability at the ocean surface in relation to ocean circulation and air-sea exchanges. He will assist in the scientific coordination of the CCI (Climate Change Initiative) Sea Surface Salinity project.

Competences

- Satellite remote sensing
- Environmental sciences
- Data analysis and critical interpretation of results
- English fluent
- Autonomy and teamwork skills
- Python / Matlab; LINUX

Working context

The Laboratoire d’Oceanographie et du Climat – Expérimentation et Approches numériques (LOCEAN), part of Institut Pierre Simon Laplace (IPSL), is a joint research laboratory between French CNRS, IRD, Sorbonne Université and Museum national d’histoire naturelle, dedicated mostly to physical and biogeochemical oceanographic research and the role of the ocean in climate variability. These studies are tackled both by observational and experimental means (oceanographic campaigns, merchant ships, buoys, instrument development, satellite measurements) and by modelling, theoretical and numerical (3-dimension ocean general circulation model). It includes almost two hundred scientists, engineers and technicians, mostly in the Paris area. It carries numerous cruises for scientific research or monitoring purposes, and has also experience in different ocean observing systems, in particular drifters, which it has contributed to develop, as well as gliders and other observing platforms. LOCEAN is actively participating in University teaching and supervision of PhD students. The candidate will join the PROTEO team.

SMOS (Soil Moisture and Ocean Salinity) is the first Earth observation satellite mission to carry an L-band interferometric radiometer. Launched at the end of 2009, it has now acquired nearly 10 years of data, demonstrating the feasibility of satellite surface salinity measurement and the contribution of interferometric technology. LOCEAN teams have been working on measurement optimization since 1999 and use satellite salinities for scientific purposes. This new type of measurement appeared particularly innovative to characterize tropical instability waves, river plumes, rain signatures, tropical mesoscale ocean structures, signatures related to El Niño events. This postdoctoral fellowship is part of the projects of the CNES and the European Space Agency aimed at consolidating and enhancing the measures acquired. J. Boutin coordinates the SMOS-Ocean CNES/TOSCA project and is the Scientific Co-Lead of the ESA CCI+Sea Surface Salinity project.

Additional information:

This postdoctoral fellowship, with an initial duration of one year, may be renewed for one or two years.

Please answer with a CV, letter of motivation and the name of two references to Jacqueline Boutin (jb@locean-ipsl.upmc.fr)