Predicting marine deoxygenation from earth observation data using machine learning

A 4-year PhD or a 2-year postdoctoral position is available at the Liège University (MAST group, Department of Astrophysics, Geophysics and Oceanography) to develop prediction tools of deoxygenation. The developed approach will combine earth observation (EO), ARGO and mechanistic model products with machine learning to predict coastal hypoxia and sub-surface oxycline variability. The position is offered in the frame of the "Multiple Threats on Ocean Health" (MiTHo) research project funded by the European Space Agency.

Research activities

The objective of the work is to assess the potential of machine learning tools fed by EO data in combination with different levels of model products and in-situ data to monitor O_2 changes in the coastal and deep ocean at different scales. More specifically, the aim is to investigate the potentiality of satellite products to predict two types of deoxygenation events: bottom hypoxia in the coastal zone and subsurface oxycline variability in the deep sea. Different levels of prototypes that differ on the data products they ingest (e.g. satellite, ARGO, mechanistic model) will be compared. The main questions that will be addressed are 1) what is the current capability of satellite data to assess subsurface deoxygenation, in combination with other data platforms and modelling products 2) how to optimize the in-situ observing system to support the prediction of oxycline variability from space data?

The approach will be developed and tested in the Black Sea, the largest euxinic environment in the world that is affected by coastal bottom hypoxia and deep sea deoxygenation.

In addition to the scientific project described here above, the successful candidate will have to:

- Travel to project and international scientific meetings
- For the PhD candidate, to follow the Doctoral Formation mandatory for obtaining a PhD.
- To help in the supervision of master students and teaching activities performed by the group.

Requirements for application

- For PhD candidate: Applicants must have completed a master's degree in a field closely related to geosciences, physics, engineering, computer sciences or equivalent.
- For post-doc candidate: Applicants must have a PhD in geosciences, engineering, data sciences or equivalent. An expertise in machine learning and/or numerical modelling is an added value.
- A capacity and interest to work in different fields of marine science including physics, biogeochemistry, big data analysis, ecology and modelling.
- Good to very good written and verbal English communication skills are required.
- Good communication skills for communicating results to different audiences.

Our offer

- A 4-year (for the PhD) and 2-year (for the post-doc) full time contract starting as early as possible
- An attractive salary.

- The successful candidate will benefit from a dynamic working environment benefiting from the research projects of the groups in different fields of oceanography connecting modelled predictions with observations and end-users requirements (e.g., Horizon Europe NECCTON, the Copernicus Marine Service, H2020 BRIDGE, UN Decade GOOD program, EU Digital JPI Ocean and Climate CE2COAST).
- Enjoyable living and working conditions. The Liège University offers comprehensive and innovative training programs, which enable early-career scientists to carry out their research in the best possible conditions, in compliance with the European Charter for Researchers.
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How to Apply: The candidate should send by e-mail his/her curriculum vitae, a covering letter of motivation, together with two references (name and email address), to **Marilaure Grégoire** (email: mgregoire@uliege.be).

The position will remain open until filled; but the selection will start from November 20th, 2023.

ULiege is strongly committed to promoting equality and diversity, and is labelled HRS4R for Human Resources 'Excellence in Research Award' for institutions (https://euraxess.ec.europa.eu/jobs/hrs4r). All appointements will be made on merit.