A PhD or mobility postdoctoral position on fish modelling in the Black Sea.

A PhD or postdoctoral mobility position is available under a joint supervision at the Liège University (MAST-FOCUS group, Department of Astrophysics, Geophysics and Oceanography), the Royal Netherlands Institute for Sea Research (NIOZ) in the Nederland and the University of Maryland Center for Environmental Science (US).

The research project aims at modelling the dynamics of selected fish species (e.g. anchovies, horse mackerel, sprat) in the Black Sea to assess the impact of past and projected environmental changes (e.g. deoxygenation, warming, fishing) on fish distribution and stocks. A Dynamic Energy Budget model will be coupled with an existing low trophic model that consists of a 3D hydrodynamical-biogeochemical model. The hydrodynamical model is the Nucleus for European Modelling of the Ocean (NEMO), the biogeochemical model is the BiogeochemicAl Model for Hypoxic and Benthic Influenced areas (BAMHBI). This coupled model is run in forecasting and reanalysis mode in the Black Sea in the frame of the marine Copernicus program (CMEMS).

The position is offered in the frame of the recently funded 4-year Horizon-Europe project **NECCTON** (New Copernicus Capability for Trophic Ocean Networks, 01/01/2023-31/12/2026).

Research activities
The candidate will have to develop and implement a model for the modelling of fish dynamics in the Black Sea and, in particular, to:

(1) Implement an existing Dynamic Energy Budget developed for anchovies (in the California current system) forced by a coupled physical-biogeochemical model;
(2) Finetune its parameterization for reproducing Black Sea's selected fish species (mainly anchovies but also, sprat and horse mackerel);
(3) Assess the impact of past environmental changes on fish stocks and distribution by performing multi-decadal simulations.
(4) Perform climate projection along the Fish-MIP protocol under two scenarios of changes (SSP1-2.6, SSP5-8.5) and assess the impact of warming and deoxygenation on fish stocks and distribution.
(5) At regional scales (i.e. the north-western shelf), assess the combined impact of environmental (e.g. eutrophication) and fishing effort changes (as provided by socio-economic analyses).

The outputs of the model will serve to support fishery management in the Black Sea at basin and regional scales in response to (over)fishing and the ongoing warming and deoxygenation processes. Interactions with a wide diversity of stakeholders (e.g. the FAO General Fisheries Commission for the Mediterranean and Black Sea, ICES, IUCN) are foreseen in the frame of **NECCTON** and other ongoing projects (e.g. the H2020 BRIDGE, the UN Decade Global Ocean Oxygen Decade program GOOD).

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

- <u>For PhD candidate</u>: Applicants must have completed a master's degree in a field closely related to geosciences, physics, engineering or equivalent.
- <u>For post-doc candidate</u>: Applicants must have a PhD in oceanography with an expertise in numerical modelling. Candidates must be non-Belgian citizens and should not have lived and/or worked in Belgium for more than 24 months during the past 3 years.
- Skill in programming in languages like R, FORTRAN, C, and/or Python is required. Also, knowledge of ecological modeling and population dynamics is beneficial.
- 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 3-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. The candidate will work closely with Profs. Marilaure Grégoire (ULiège), Karline Soetaert (NIOZ) and Kenneth Rose (University of Maryland) for fish modelling.

How to Apply: The candidate should send by e-mail his/her curriculum vitae, full transcripts of Bachelor and Master studies (including notes), 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 June 15th, 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.