



How to apply :

Send your cover letter and detailed resume with the following reference 2023-10/OO/Validation-MHW1 to recruitment@mercator-ocean.fr

Deadline for applications: 01/12/2023

Date of publication : 25/10/2023

Project title: The North Atlantic 2023 Marine Heatwaves

Marine HeatWaves (MHWs) – episodic events during which ocean waters suffer anomalously high temperatures – are becoming more ubiquitous in the ocean, more intense, more widespread and lasting longer, with devastating consequences for ecosystems and marine services. MHW events signature at the surface is now well documented, namely due to long satellite time series of surface temperature observations. In our days, little is known about MHWs at the sub-surface, as satellite only capture the ocean surface but where nonetheless much of marine life resides.

At Mercator Ocean International (MOI), the ocean 3D reconstruction over the last decades (called reanalyses) is carried out thanks to a combination of numerical modelling / in-situ and satellite observations / and data assimilation techniques. So, the ocean reanalysis recreates the ocean circulation over a long time period (>30 years) in 3 dimensions. The MOI Ocean reanalysis covers the global ocean between 1993-2022 and together with an optimized algorithm of MHW detection, it represents tools ready to start unravelling MHWs activity at surface but also below the surface.

In a first part, this master project will investigate and document the tropical north Atlantic basin in 2023 where an unprecedented MHW has been observed at the surface (intensity, duration, etc ...). In a second instance focus will be set on its characteristics occurring at depth.

From its development stage to its dissipation in order to understand the impact of different physical processes on the dynamics of this MHW

Internship progress:

- Month 1: bibliography and handling of tools (python language, MHW algorithm detection, model output format)
- Month 2-3: Surface and sub-surface characterization of the 2023 north tropical Atlantic MHW
- Month 4-5: processes study and manuscript redaction

Supervisors:

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Useful references:

Marine Heatwaves. Eric C.J. Oliver, Jessica A. Benthuyssen, Sofia Darmaraki, Markus G. Donat, Alistair J. Hobday, Neil J. Holbrook, Robert W. Schlegel, Alex Sen Gupta Annual Review of Marine Science 2021 13:1, 313-342

Seasonal forecasting of subsurface marine heatwaves. McAdam, R., Masina, S. & Gualdi, S. Seasonal forecasting of subsurface marine heatwaves. Commun Earth Environ **4**, 225 (2023). <https://doi.org/10.1038/s43247-023-00892-5>

Websites:

www.marineheatwaves.org/tracker.html

www.climatereanalyzer.org/clim/sst_daily/

Who are we?

Mercator Ocean International has been developing operational oceanography activities for nearly 25 years, as part of its public interest mission to preserve the ocean.

Many scientific and societal challenges must be met to ensure a sustainable ocean, whether they concern the environment, biodiversity, climate change, the blue economy or education. To meet these challenges, Mercator Ocean designs, develops, operates and maintains state-of-the-art digital systems capable of describing, analysing and forecasting the state of the ocean in 3D, continuously and in real time. The scientific information is then translated to be accessible to all, whether they are public or commercial services, political decision makers, industrialists, associations, NGOs, teachers or citizens. Mercator Ocean International thus combines scientific excellence and social commitment on a daily basis.

As a non-profit company under multinational governance (ES, FR, GB, IT, NO), we work in a climate of trust with our ten shareholder partners, all key players in the development of European oceanography.

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