Institut de Ciències del Mar

Pg. Marítim de la Barceloneta, 37-49
08003 Barcelona
+34 932 309 500
www.icm.csic.es

PhD fellowship: Volatile Sulfur Cycling in the Ocean

We offer a **4-year PhD position**, starting in early 2024, to work on ocean biogeochemistry in the framework of the project **GOOSE: Gaps in the Observation of Ocean Sulfur Emission and its modeling** (PID2022-140872NB-I00). The successful candidate will work at the Institut de Ciències del Mar (ICM-CSIC) in Barcelona, a vibrant multidisciplinary research center, joining the Simó Lab (https://simolab.icm.csic.es; @simolab_ on Twitter/X) under the co-supervision of Rafel Simó and Martí Galí.

Research topic

Marine sulfur emissions can regulate climate through their role in aerosol and cloud formation over the oceans. However, current Earth System Models struggle to simulate these emissions, and projections of future sulfur emissions under global warming are uncertain. This is mainly because significant production and removal pathways of volatile organosulfur compounds are missing from current conceptual and mechanistic models. Moreover, current models focus solely on dimethylsulfide (DMS), the most abundant sulfur volatile emitted by the ocean. Recent observations, however, have revealed that methanethiol (MeSH), a compound related to DMS yet hitherto ignored by models, can make a sizable contribution to marine sulfur emissions.

Proposed work

The PhD candidate will address pressing knowledge gaps in the marine sulfur cycle through experimental studies, both in the laboratory and on oceanographic cruises. Incubations of seawater samples and microbial plankton cultures will be used to disentangle the role of microbial metabolism and abiotic processes (e.g. photochemistry) in the budgets of plankton-made organosulfur compounds. Naturally occurring compounds and added tracers (labeled with stable isotopes) will be measured using a standard Gas Chromatograph-Mass Spectrometer (GC-MS) and also a Proton Transfer Reaction Time of Flight Mass Spectrometer (PTR-ToF-MS), which allows for highly sensitive continuous measurements. The candidate will

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contribute to, and benefit from, ongoing international programs such as SOLAS and DMS-PRO.

Candidate profile

We are seeking highly motivated candidates with a Masters' degree in biology, microbiology, chemistry, marine sciences, environmental sciences, or related disciplines. Excellent command of oral and written English is a key requisite. The willingness to work aboard oceanographic vessels and to travel to remote locations during weeks-long periods, and a collaborative and curious mindset, are also important requisites. Previous experience with MS and stable isotope measurement techniques is an asset but not a requisite.

Application procedure

Applications can be sent no later than 15 September 2023 by email to Rafel Simó (rsimo@icm.csic.es) and Martí Galí (mgali@icm.csic.es) and should include:

- A CV
- A motivation letter.
- The academic transcripts of your bachelor's and master's degrees*.

Recommendation letters are optional. Informal pre-contact is also welcome. In case you are shortlisted, we will contact you to set up a videoconference interview.

* If you obtained your degree(s) outside of Spain, you must be able to provide your official academic transcripts in either Spanish or English. Please obtain these documents as soon as possible because, if shortlisted, you will be asked to upload them through an application form.