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**UNIVERSITÄT
BERN**

Climate and Environmental Physics, Sidlerstrasse 5, CH-3012 Bern

Faculty of Science
Physics Institute
Climate and Environmental Physics

The Division of Climate- and Environmental Physics, Physics Institute, University of Bern opens positions for

2 PhD students, 1 Postdoctoral Researcher

to model the marine biological carbon cycle under future global warming

The marine biological carbon pump is a key component of the global carbon cycle. It regulates Earth's past and present climate and provides energy for organisms living in the mesopelagic and deep ocean. Marine organisms transport carbon to depth via the formation of sinking particles of organic matter, production of suspended particles, and due to active migrating behavior of zooplankton. Changes in the organic carbon transport to the deep sea may have significant consequences for the future climate, for fisheries and ecosystem services, and may be related to past atmospheric CO₂ concentration changes. Yet, our current understanding of the biological pump is incomplete and simplistic, and consequently its response to anthropogenic stressors, in particular climate change, remains highly uncertain.

The first PhD Student will create and analyze a database of bio-optical Argo float data. The findings of the database will inform the refinement of a 1D model of particle flux, embedded in Bern3D (an Earth System model of intermediate complexity). The second PhD student will focus on mixotrophy and dissolved organic carbon generation in the upper ocean. Possible tasks include CMIP6 model comparisons of dissolved organic matter, developing parameterizations for mixotrophy building on recent laboratory constraints, and implementing mixotrophy into a global Earth System model. The postdoctoral researcher will develop and implement parameterizations for zooplankton migration into a global Earth System Model to investigate the impact on the carbon cycle.

The PhD candidates will have the opportunity to go on a 2-3 month research visit to the National Oceanography Center in Southampton (PhD 1) and the University of California, Santa Barbara (PhD 2) to collaborate with project partners. The PostDoc will also have

opportunities for international research visits at the Geophysical Fluid Dynamics Laboratory, Princeton, NJ or as desired. It is expected that the candidates will communicate their results at international scientific meetings and publish in the peer-reviewed literature. During the semester, the candidates will be involved in the teaching responsibilities of the Climate and Environmental Physics Division in Bern.

The research is closely linked to the activities of the Oeschger Centre for Climate Change Research of the University of Bern. The salary is according to the guidelines of the Swiss National Science Foundation and the University of Bern, with funding guaranteed for 4 years (PhD positions) or 3 years (PostDoc).

We are looking for highly-motivated students with a strong interest in oceanography, ocean biogeochemistry and plankton dynamics, and with excellent numerical skills. Applicants should have a Master in Computer Science, Physics, Environmental/Climate Sciences, or similar disciplines. Requirements for the positions are experience in programming (preferably knowledge in Fortran) and statistical data analysis, innate curiosity, enthusiasm for reading scientific literature, excellent communication skills in English (both verbal and written), and willingness to closely collaborate with colleagues at the University of Bern and internationally. Experience with satellite or climate model data and with tools to analyze climate data (Python, Matlab, Ferret or similar) is advantageous.

In order to receive full consideration, applications must be submitted before September 20, 2022, but the positions will stay open until filled. Applications should include a CV, a statement of research experience and interests (max. 2 pages), an academic transcript of your studies, a web link to the master thesis/PhD thesis and the names and addresses of at least 2 references. Please send the application to: charlotte.laufkoetter@unibe.ch

The earliest possible start date of the PhD and PostDoc positions is November 2022, the latest start date will be in early summer 2023.

Bern, 15 July, 2022