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**UNIVERSITÄT
BERN**

Bern, 30 April 2021

Physics Institute
**Climate and Environmental
Physics**

The Division of Climate and Environmental Physics, Physics Institute, University of Bern opens a position for a

PostDoc (30 months)

Modeling past changes in CO₂ and ocean biogeochemistry

A topical research area is to understand changes in atmospheric CO₂ and climate over the past millions of years. Investigating the past helps to improve our understanding of carbon cycle-climate feedbacks relevant under human-caused global warming. We offer the opportunity to investigate variability in CO₂ and ocean biogeochemistry using the Bern3D ocean-atmosphere model.

Reconstructions of atmospheric CO₂, marine biogeochemistry, and climate reveal a fascinating, yet still enigmatic, spectrum of variability. During the Mid-Pleistocene Transition, ice age cycles changed the periodicity from 41,000 to 100,000 years without a corresponding change in orbital forcing. CO₂ jumps, which originate from a pulse-like CO₂ release on centennial time scales, were recently detected, expanding the variability spectrum from glacial-interglacial and the well-known millennial-scale CO₂ maxima. The PostDoc will investigate forcing-response sensitivities by varying forcing mechanisms with a fixed periodicity in simulations with the Bern3D model. Glacial-interglacial simulations will be performed to elucidate the role of individual mechanisms on CO₂ and multi-proxy evolution. The response of CO₂ and ocean biogeochemistry to perturbations in freshwater or wind stress will be probed for different states of the model ocean. Model outcomes will be analyzed in the light of proxy data for a broad set of parameters, including carbon isotopes, nutrients, oxygen, carbonate ion, preformed, remineralized, ideal age and dye tracers, noble gases, and isotopes of rare earth elements in the ocean, opal, calcium carbonate, organic matter in sediments, and CO₂ and N₂O in the atmosphere. The work will be carried out in collaboration with members from the division and benefit from in-house expertise in ice core sciences and land biosphere modeling.

The research is funded by the Swiss National Science Foundation (SNF) and linked to the Oeschger Centre for Climate Change Research of the University of Bern and two H2020 EU projects. Bern3D is run on the Linux clusters of the division and the University. The salary is according to the guidelines of the SNF. The project duration is initially 30 months. The project start is preferentially in 2021.

We require a Ph.D. in Physics, Environmental Sciences, or similar disciplines. Experience in numerical modeling, excellent writing skills, and the ability to fruitfully collaborate with others are essential.

More information can be found on <http://www.climate.unibe.ch> (follow link Research->Research groups->Earth System Modeling: Biogeochemical Cycles) and <http://climatehomes.unibe.ch/~joos/>

Please send your complete application (CV, certificates, grades of courses, letter of motivation, contact details of references) as a single pdf file to Fortunat Joos (fortunat.joos@climate.unibe.ch). A pdf of your Ph.D. thesis is welcome.

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