



Postdoc position in Glacial Biogeochemical Modelling

available from July 2022 at the Department of Ecology, Faculty of Science, Charles University in Prague, Czechia.

The Cryosphere Ecology group (www.cryoeco.eu) at the Department of Ecology, Charles University, in Prague is seeking a highly motivated postdoctoral research assistant (PDRA) to use reaction-transport modelling to estimate CH₄ export from the Greenland ice sheet (GrIS) and its potential impact on the global CH₄ cycle, as part of the project “Microbial Production and Release of Methane from the Greenland Ice Sheet” (MARCH4G).

The basal environments of ice sheets produce and store large reserves of CH₄, which have the potential to raise atmospheric CH₄ concentration and thus further climate warming, if released during periods of deglaciation. The Greenland Ice Sheet (GrIS) is retreating rapidly, losing mass at over 400 km³ per year. Recent field measurements have shown subglacial CH₄ of microbial origin is released at the ice sheet margin; however, no estimate of the CH₄ footprint of the entire GrIS currently exists.

The principal aim of MARCH4G is to quantify the potential of the GrIS bed to produce and release CH₄ and affect the global CH₄ cycle. The underlying hypothesis is that global climate change and resulting increasing melting of the GrIS causes export of subglacial CH₄ of microbial origin to the atmosphere. To test this hypothesis, MARCH4G combines mapping of CH₄ efflux around the ice sheet using portable high-precision gas measurement technology and determining its origin and age through using radio- and stable isotope techniques, direct access the Greenland ice sheet basal ecosystem via hot-water drilling and retrieval subglacial sediment unaffected by the contact with the atmosphere, constraining the biological sources and sinks of subglacial CH₄ and their environmental controls using a combination of field measurements and laboratory experiments, and biogeochemical modelling to upscale obtained field and experimental data to estimate CH₄ cycling beneath and export from the GrIS and its significance for the global CH₄ budget. MARCH4G integrates formerly separated aspects of Greenland ice sheet research into a large-scale multidisciplinary project aiming to provide a major leap in our understanding of the fast-changing Arctic ecosystem.

The PDRA will apply a reaction-transport model to estimate CH₄ export from the GrIS and its impact on the global CH₄ cycle. The model, developed in the group of Professor Sandra Arndt at Université Libre de Bruxelles (ULB), Brussels, Belgium, is a two-dimensional reaction-transport model that simulates advective and dispersive transport, as well as consumption and production processes in a seasonally evolving drainage system of subglacial channels and cavity. The model has been set up and is currently being tested for the Leverett Glacier catchment (SW GrIS) over the period 2012-2020, but can be easily transferred to other catchments and scaled up using the results

of MARCH4G field work measurements and laboratory experiments as parameters.

The PDRA will be based primarily at the Department of Ecology, Charles University, Prague, but is expected to spend some time at ULB with project partner Sandra Arndt. The PDRA is expected to lead the modelling work, present the results at international conferences, and lead publications in top interdisciplinary and/or biogeoscience journals. The successful applicant will have a PhD in glaciology, physical geography and/or biogeochemistry and a background in glaciological, hydrological, and/or biogeochemical modelling, and will possess basic programming skills and feel comfortable with numerical tools. Good knowledge of written and spoken English is essential for candidates of any nationality (this language is fully sufficient for living in Prague and working at the department, and Czech candidates must be equally able to fluently communicate with their foreign colleagues). The position is available for three years, starting in July 2022, with a monthly income of CZK 75,000 (€36,000/year).

For further information please contact project PI Dr Marek Stibal (marek.stibal@natur.cuni.cz). Please include a CV, a short statement of relevant research experience, and the contact information for two referees.