Post Doc on Volcanic products as CO_2 sinks

Applications are invited for a Post Doc fellowship at the Nordic Volcanological Center (NordVulk), University of Iceland, in collaboration with DTU, Denmark and GEUS, Denmark. The position is available from June 1st 2021, and no later than August 1st, 2021.

Title:
Volcanic products as CO_2 sinks

Research area:

Geochemistry

Project description:

Enhanced Rock Weathering (ERW) has been suggested as an important method for carbon dioxide removal from the atmosphere, and as an essential pathway for making global agriculture carbon negative in the second half of this century (IPCC 2018; Hartmann et al. 2014; Beerling et al. 2020). It involves amending soils with crushed fast-reacting Ca-Mg-silicate rocks, such as basalt. Field experiments have resulted in enhanced crop vigor and health, higher soil organic and sometimes inorganic carbon storage and less degassing of N2O, which is a strong greenhouse gas (Beerling et al. 2020).

The annual load, of reactive surface areas of the crushed basalt in these ERW-field experiments, is of the same order as, the one of the airborne fine grained dust load within the volcanic zones of Iceland (Linke et al., 2021; Arnalds et al. 2014). This dust is mostly re-suspended volcanic ash of basaltic composition. This makes the vegetated "dusty" Icelandic river catchments ideal natural analogues to define the short and long term effect of "Enhanced Rock Weathering" applications.

We are looking for a candidate with expertise in geochemistry of soil solutions and soil alteration minerals, and proficiency in methods used to characterise fine grained and partly amorphous secondary weathering products. The successful applicant will do a detailed geochemical characterization of solid and liquid samples in Reykjavík and Copenhagen, and field measurements in Iceland of CO2, CH4 and N2O gas fluxes and river transported dissolved inorganic and organic carbon fluxes, in the the dustiest wetlands/peat areas in southern Iceland, and those receiving the least amount of volcanic ash dust in NW-Iceland.

References:

Arnalds, O., et al. 2014. Quantification of iron-rich volcanogenic dust emissions and deposition over the ocean from Icelandic dust sources. Biogeosciences 11, 6623–6632.

Beerling, D.J. et al. 2020. Potential for large-scale CO2 removal via enhanced rock weathering with croplands. Nature 583, 242-248.

Hartmann, J. et al. 2013. Enhanced chemical weathering as a geoengineering strategy to reduce atmospheric carbon dioxide, supply nutrients, and mitigate ocean acidification. Reviews of Geophysics 51, 113-149.

IPCC, 2018: Summary for Policymakers. In: Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [V. Masson-Delmotte et al. (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp.

Linke, T. et al. 2021. Chemical evolution of peat water interacting with airborne basaltic glass - Natural analogue for Enhanced Rock Weathering and carbon storage. In preparation.

Qualifications and specific competences:
PhD degree in geology. Expertise in geochemistry of soil solutions and soil alteration minerals is preferred, and proficiency in methods used to characterise fine grained and partly amorphous secondary weathering products. Mobility of the selected candidate for this position is required.

Place of employment and place of work:
The candidate will join the NordVulk team within the Institute of Earth Sciences, University of Iceland for a period of two years. During the project short periods will be spent at DTU and/or GEUS for analytical work. Field campaigns will be carried out in Iceland.

Collaborators:

Sigurður Reynir Gíslason, NordVulk, Institute of Earth Sciences, University of Iceland, Iceland.

Knud Dideriksen, Geological Survey of Denmark & Greenland (GEUS), Denmark.

Susan Stipp, Technical University of Denmark (DTU), Denmark.

Application procedures

All information in the application must be in English or a Scandinavian (i.e. Norwegian, Swedish or Danish) language, preferably English. A certified English translation is required for documents written in languages other than English or one of the Scandinavian languages languages.

The application must contain the following information:

As a minimum all applications must include (pdf-files only, max. 10 MB, no zip):

- Personal information
- Academic background

- Names on two references. The reference letters may be sent directly to rikke@hi.is
- Curriculum vitae of applicant, including list of publications
- Motivation letter (max. 2 pages)
- PhD diploma.
- Transcripts, grade point averages and diploma(s) for both Bachelor's and Master's degree. If the original documents are not in English or one of the Scandinavian languages then copies of the original documents as well as a certified English translation must be attached.

After submission of the application, you will receive a confirmation e-mail.

Please be aware that you must scan/merge all documents into one large PDF file and send as an attachment to rikke@hi.is. If you wish to refer to scientific papers, large reports, theses and the likes, please indicate a URL where the information is available.

NordVulk reserves the right to verify the authenticity of your educational diploma and transcripts:

- Request additional information to verify an application.
- Reject the application if it is proven, or if the Programme Comittee has reasonable belief, that the information provided is false or if the applicant refuses to provide the requested information, whether or not an offer has already been made.

Please note:

- The Programme Committee may request further information or invite the applicant to attend an interview.

All interested candidates are encouraged to apply, regardless of their personal background.

Applicants seeking further information are invited to contact:

NordVulk leader Rikke Pedersen, phone +354 525 5483 , e-mail: rikke@hi.is.