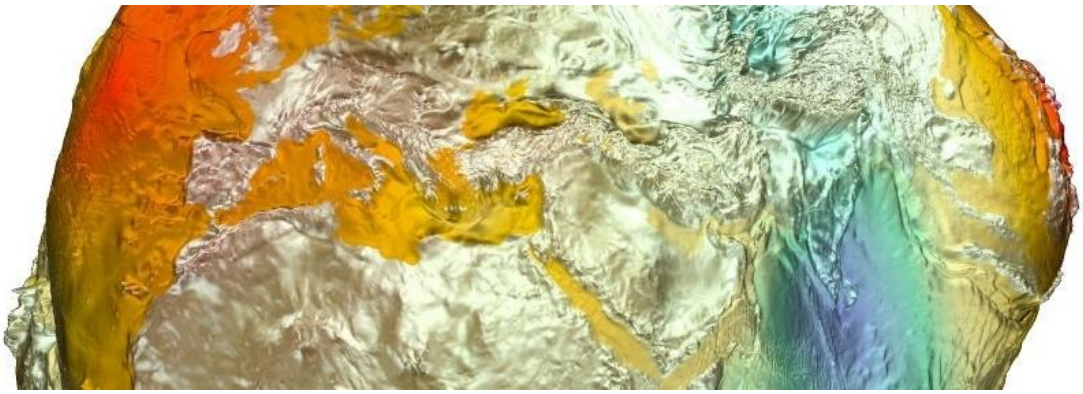
Postdoctoral researcher (f/m/x) – Continental to planetary scale modeling of Earth Surface Processes



The Helmholtz Centre Potsdam – GFZ German Research Centre for Geosciences is the national centre for geosphere research. As a member of the Helmholtz Association of German Research Centres (https://www.helmholtz.de/en/) we are part of the largest scientific organization in Germany. With approximately 1,300 (https://www.gfz-potsdam.de/en/about-us/organisation/facts-and-figures/) employees our key mission is to secure a profound understanding of the systems and processes of solid Earth, to develop strategies and options for action in addressing global change and its impacts on a regional level, to understand natural hazards and to minimize associated risks, to ensure the sustainable provision of energy and raw materials for a high-tech society and to evaluate the influence of human activity on system Earth.

The German Research Centre for Geosciences (GFZ) hosts a vibrant, international research community with broad interests in earth surface and solid earth sciences, with strong connections to partner institutions focused on climate, ecological, marine, and polar research. As a partner in Geo.X (https://www.geo-x.net/), the GFZ has access to an excellent network of other geoscience institutions in Potsdam and Berlin. This largest regional concentration of geoscientific competence in Europe offers first-class cooperation and development opportunities.

For section 4.7 "Earth Surface Process Modelling" (Department 4 “Geosystems”), we are looking for a:

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Earth’s history has been punctuated by episodes of enhanced and reduced tectonic activity. In particular, it is still not clear when and why subduction became the dominant mode of cooling of the Earth’s mantle. We are interested in studying the long-term couplings between Earth’s deep dynamics, including convection of its mantle, subduction of oceanic plates and upwelling of mantle plumes with the Earth’s surface erosion. In particular the lubrication of subduction zones by sediments throughout Earth’s 4.5 billion years history may have played a role in dictating the mode of mantle flow and how, in turn, this may relate to variations in Earth’s climate and its control on erosion efficiency, especially through glacial periods (see https://www.nature.com/articles/s41586-019-1258-4 (https://www.nature.com/articles/s41586-019-1258-4)).

The purpose of the ERC-funded MEET (Monitoring Earth Evolution Through Time) international project is to untangle these questions concerning Earth’s dynamic evolution using unique observational evidence from melt inclusions in olivine and zircon crystals and coupled mantle/surface/atmosphere numerical models (https://media.gfz-potsdam.de/gfz/sec25/doc/MEET.pdf (https://media.gfz-potsdam.de/gfz/sec25/doc/MEET.pdf)). The geochemical/petrological part of the MEET project is hosted by University of Grenoble, France, leaded by Alex Sobolev and by University of Madison, USA, leaded by John Valley. The modeling part of the MEET project is hosted by GFZ and is leaded by Stephan Sobolev from the Geodynamic Modeling Section. The post-doctoral researcher will become a member of the international MEET project team. The post-doctoral researcher's major role in the project will be to develop a large-scale surface

process model to be coupled to deformation caused by flow in the underlying mantle and to study how different modes of mantle flow may influence the routing of sediment at the Earth's surface under different climate settings representative of the Earth's deep past.

The post-doctoral position will be hosted at the GFZ in Potsdam in the Earth Surface Process Modelling (ESPM) group (https://www.gfz-potsdam.de/en/section/earth-surface-process-modelling) of Jean Braun, where numerical models are developed and used to investigate a wide range of physical, chemical and biological processes and interactions occurring at the Earth's surface that are driven by tectonic processes and modulated by climate (https://github.com/fastscape-lem (https://github.com/fastscape-lem)). The ESPM section hosts approximately 20 researchers (PhD students, Post-docs and senior scientists) from diverse backgrounds and with varied research interests. The postdoc is also expected to closely collaborate with members the Stephan Sobolev's MEET group at the Geodynamic Modeling Section at the GFZ and Georg Feulner's ESMO group at the PIK (Potsdam Institute for Climate Impact Research).

Your responsibilities:

- To develop a large-scale surface process model based on the FastScape algorithm (https://www.sciencedirect.com/science/article/pii/S0169555X12004618) using a non-uniform spatial discretization and including the parallel implementation proposed by Barnes (https://www.sciencedirect.com/science/article/abs/pii/S0169555X19300029);
- Calibration and validation of the model using present-day estimates of riverine flux to the ocean;
- To couple the model to regional-scale and planetary-scale models of mantle flow/dynamics;
- To couple the model to an intermediate-complexity climate model;
- Using the model to determine how different modes of mantle dynamics may affect uplift and therefore erosion and transport of sediment at the Earth's surface under various past climatic conditions;
- Collaborating with other members of the MEET project;
- To interact with other members of the Earth Surface Process Modeling Section at weekly group meetings and in other informal ways;
- Presentation of results at scientific meetings and in publications in peer-reviewed journals

Your qualifications:

- Master`s degree (or equivalent) and a PhD in Physics, Applied Mathematics, Engineering or in Earth Sciences;
- Experience and knowledge in the development and use of numerical models based on the solution of partial differential equations;
- Knowledge and, preferentially, experience in parallel programming (OpenMP, PMI, …);
- Preferentially, knowledge in Earth surface process modelling, mantle dynamics and/or Earth system behavior on geological time scales;
- Proven ability to work in a collaborative and multi-disciplinary environment;
- Creativity and critical thinking skills and the ability to publish, as demonstrated by a record of original and innovative publications;
- Capacity for international teamwork, and excellent communication skills;
- Proficiency in spoken and written English

Start date: As soon as possible
Fixed-term: 3 years
Salary: The position is classed as salary group 13 according to "TVöD Bund (Tarifgebiet Ost)". The salary group is determined on the basis of the Collective Wage Agreement and the respective personal qualifications.
Working hours: Full-time (currently 39 h/week); The position is, in principle, suitable for part-time employment.
Place of work: Potsdam

What we offer:

- Ambitious and varied tasks in a dynamic and international research environment
- State-of-the-art equipment
- Public service benefits
- Extensive training opportunities
- Professional career advice offered by our in-house Career-Centre
- Flexible working hours and conditions
- Support with finding a good work-life balance offered by benefit@work
- Institute day-care centre on site
- Working at the Albert Einstein science park on the Telegrafenberg in Potsdam
- Work place within walking distance of Potsdam main train station, or just a short ride on the shuttle bus

Have we piqued your interest?

If so, we look forward to receiving your application by **29th August 2021**. Please use our online application form

only.

Diversity and equal opportunities are integral components of our human resources policy. The GFZ actively promotes diversity and explicitly welcomes applications from all qualified individuals, regardless of ethnic and social origin, nationality, gender, sexual orientation and identity, religion/belief, age and physical characteristics. Anyone who has been recognized as severely disabled, will be given preferential consideration in the event of equal suitability and qualification in accordance with the provisions of the German Social Code IX. If you have any questions, please contact our representative for the severely disabled at sbv@gfz-potsdam.de (mailto:sbv@gfz-potsdam.de), who will be happy to assist you in the further application process. In case of further queries regarding gender equality, please do not hesitate to contact our Equal Opportunities Officer at gba@gfz-potsdam.de (mailto:gba@gfz-potsdam.de).

Your personal data will be processed for the purpose of conducting the selection procedure on the basis of Art. 6 para. 1 b, Art. 88 GDPR in conjunction with Art. 26 of the Data Protection Act for the State of Brandenburg. After completion of the procedure, application documents will be deleted in compliance with data protection regulations.

In case of any further queries relating to the field of activity, please contact Prof. Jean Braun via email at jean.braun@gfz-potsdam.de (mailto:jean.braun@gfz-potsdam.de). If you have any general questions about the application process, please contact Ms Buge on +49 (0)331-288-28787.