

Position description

1. Position identification

Title of post: post-doc in experimental volcanology (m, f, x)

Type of contract: fixed-term contract

Category (A,B or C): A

Contract/project period: 12 months (renewable)

Expected date of employment: End of October/November 2024 (subject to negotiation)

Proportion of work 100%

Workplace: ITES (Strasbourg, France)

Desired level of education: Ph.D

Experience required: Ph.D

Contact(s) for information on the position (identity, position, e-mail address, telephone): Prof. Michael Heap, professor, heap@unistra.fr

Date of publication: 09/09/2024

Closing date for the receipt of applications: 07/10/2024

2. Research project or operation

This post-doc position is within the framework of the European Research Council SYNERGY grant ROTTnROCK ("assessing the role of hydrothermal alteration on volcano morphology, instability, and unpredictable volcanic hazards"). ROTTnROCK is a collaborative project with four PIs: Michael Heap (Strasbourg, France), Claire Harnett (Dublin, Ireland), Thomas Walter (GFZ Potsdam, Germany), and Valentin Troll (Uppsala, Sweden). A summary of the ROTTnROCK project is as follows:

"More than 10% of the world's population are at risk to the direct impacts of volcanic eruptions. Volcano monitoring aims to detect and correctly interpret volcanic hazards and to provide early and accurate warnings of impending eruptions. Yet, despite technical and scientific advances, volcanoes still produce unexpected explosive eruptions or sudden flank collapses. Each year, such unpredictable events result in volcanic disasters that devastate unprepared communities and destroy unprotected infrastructures. Previous work by the PIs indicates that volcanic hazards are caused by hydrothermal alteration, which progressively and imperceptibly changes the chemical and physical state of rocks inside a volcano, creating a soft and unstable (or "rotten") interior. However, the link between "soft" volcanoes and unpredictable volcanic events remains enigmatic. The ROTTnROCK project aims to achieve a ground-breaking advance in our understanding of hydrothermal alteration processes that act inside active volcanic systems. Specifically, we will identify where and at which scales alteration occurs (WP1), explore the chemical fingerprint of alteration and effects on rock properties and strength using laboratory methods (WP2), and develop 4D volcano stability simulations and, therefore, an innovative and optimised hazard assessment workflow (WP3). The ROTTnROCK project combines innovative approaches from traditionally distinct geoscience disciplines (remote sensing, mineralogy and chemistry, rock mechanics, and modelling). This project will revolutionise our understanding of hydrothermal alteration and its effects on volcano hazards, and pave the way for strategies to forecast and mitigate unexpected volcanic events caused by hydrothermal alteration and circumvent disasters at volcanoes worldwide."

3. Activities

➤ **Description of the research activities:**

The successful candidate will work on WP2 of the ROTTnROCK project: exploring the influence of hydrothermal alteration on the physical and mechanical properties of volcanic rocks. To do so, the candidate will perform laboratory experiments (e.g., uniaxial and triaxial deformation experiments, measurements of porosity and permeability, etc.) on volcanic rocks. The candidate may also be expected to participate in, and organise, field work to conduct field measurements and to collect rock samples from field sites located inside and outside the EU, and to attend national and international conferences. The candidate will be expected to be able to write scientific abstracts and manuscripts in English.

➤ **Related activities:**

The successful candidate will be expected to participate in the wider ROTTnROCK project. Therefore, the candidate will be expected to exchange with other members of the ROTTnROCK team, and potentially participate in collaborative and multidisciplinary projects. The candidate may also be expected to attend ROTTnROCK meetings and participate in group ROTTnROCK fieldwork. Finally, the candidate will be expected to help with the organisation and reception of the new high-pressure, high-temperature triaxial machine that will be bought as part of the project. Because the project is funded by the EU, the candidate will be expected to abide by the rules outlined by the EU, as well as by the ROTTnROCK consortium, such as the filling of monthly timesheets.

4. Skills

➤ **Qualifications/knowledge:**

The successful candidate should hold a Ph.D in a topic related to the geosciences. Candidates with a Ph.D, or experience, in rock deformation/mechanics or volcanology will be favoured.

➤ **Operational skills/expertise:**

Candidates with a strong understanding of rock deformation/mechanics will be preferred. Candidates with experience performing laboratory deformation experiments (uniaxial, triaxial), or those experienced with rock physical property measurements, will be preferred. Candidates without such laboratory experience, but with a training in volcanology, will also be considered.

➤ **Personal qualities:**

The successful candidate should be comfortable working within an international team of scientists. The candidate should be comfortable working in a laboratory, as well as planning and conducting fieldwork. Candidates with experience in independent research, with a strong publication history, experience supervising research, and with excellent communication and organisation skills will be preferred.

5. Environment and context of work

➤ **Presentation of the laboratory/unity :**

The successful candidate will work at the "Strasbourg Institute of Earth & Environment" (ITES), part of the University of Strasbourg (Strasbourg, France). ITES is a research unit that is split into six research teams. The successful candidate will work within the "Geophysics and Image Processing" (GIP) team. The GIP team consists of 17 permanent teaching and research staff.

➤ **Hierarchical relationship :**

The head of the research unit (the ITES) is Renaud Toussaint, and the head of the GIP research team is Guy Marquis. The candidate will be under the supervision and direction of Michael Heap for the duration of the contract.

➤ **Special conditions of practice (notice attached):**

There are no special conditions.

**To apply, please send your CV, cover letter and diploma to : Prof. Michael Heap
(heap@unistra.fr)**