

Post-doc in geochemistry: Multi-scale study of the source of volcanism on the island of Basse Terre (Guadeloupe, Lesser Antilles)

Job offer from the institut de physique du globe de Paris | CNRS UMR 7154

Researcher in	Isotopic geochemistry
Contract duration	24 months
Affectation	IPGP, volcanic systems
Salary	Salary depends on experience
Expected starting date	End 2025 – Early 2026
Location	IPGP, 1 rue Jussieu, 75136 CEDEX Paris

The Institut de physique du globe de Paris

A world-renowned geosciences organisation, the IPGP is associated with the CNRS and an integrated institute of the Université Paris Cité. Bringing together more than 500 people, the IPGP studies the Earth and the planets from the core to the most superficial fluid envelopes, through observation, experimentation and modelling.

The research areas are structured through 4 main unifying themes: Interiors of the Earth and Planets, Natural Hazards, Earth System and Origins.

The IPGP is in charge of labelled observation services in volcanology, seismology, magnetism, gravimetry and erosion. And the IPGP's permanent observatories monitor the four active French overseas volcanoes in Guadeloupe, Martinique, Réunion Island and Mayotte.

The IPGP hosts powerful computing resources and state-of-the-art experimental and analytical facilities and benefits from first-class technical support. The IPGP provides its students with geosciences training that combine observation, quantitative analysis and modelling, and that reflects the quality, richness and thematic diversity of the research conducted by the IPGP teams.

ANR UNREST

Much effort has been made to anticipate eruptive activity on volcanoes using approaches such as seismic and geodetic monitoring, or changes in gas composition. However, there is a growing need to understand what these signals mean in terms of magmatic evolution. This challenge is at the heart of the UNREST project, oriented towards the contributions of petrology and geochemistry for the anticipation and monitoring of unrest crises affecting volcanic systems. With this objective, the UNREST project will reconstruct mantle source and the magmatic system evolution beneath La Soufrière of Guadeloupe over time, based on the compositions and physical properties of the solid volcanic products. We will determine and characterize processes and their kinematics that lead to a magma reservoir destabilization, overpressure and ultimately failure, hence triggering magma ascent and the likelihood of a volcanic eruption. These results will then be integrated with real-time signals obtained by instrumental networks on La Soufrière of Guadeloupe to understand its thermal and geodesic unrest.

This project brings together several academic, institutional and private partners including: IPGP (OVSG et Paris), UCA-LMV, BRGM, Paris Saclay University, SEDISOR.



The successful applicant will be host at the Institut de physique du globe de Paris, a major institution for higher education and research located in Paris (<https://www.ipgp.fr/en/>), and will work in close collaboration with C. Berthod (IPGP-OVSG) and I. Vlastelic at Clermont Ferrand (UCA-LMV).

Context

Several geochemical studies coupled numerous K-Ar dating have been performed on Basse-Terre Island in the last years, providing a general evolution model for Basse-Terre and an understanding of the geochemical dynamics of its volcanic activity (Samper et al., 2007, 2009, Legendre et al., 2012, Ricci et al., 2017). These studies demonstrate the North to South temporal migration of volcanism throughout the whole island (Samper et al., 2007) with at least two different magmatic sources characterized by different partial melting rates and different continental contributions for Basse-Terre Island (Ricci et al., 2017). However, no isotopic analysis has been realized on the last 50 ka volcanic activity except on the 1976 phreatic products (Feuillard et al., 1983).

We are seeking a highly motivated postdoctoral researcher in isotopic geochemistry (1) characterize the mantle source of the Basse Terre and La Soufrière volcanism by identifying the number and nature of the different components, (2) model how the partial melting of the different mantle lithologies, mixing and extraction of silicate melts, lead to the formation of the magmas that feed Guadeloupe's volcanism, (3) assess the extent to which the mantle's properties and ability to melt influence magmatic production and eruptive activity at the surface. In particular, the objective is to identify the potential temporal evolution of the magma source, on the scale of the major phases of volcanism in Basse Terre and the Grande Découverte-La Soufrière volcanic complex, as well as within a single polyphase eruption.

Main function

- Carry out geochemical analyses (Sr, Nd \pm Hf, Pb isotopes; trace elements): cleanroom sample preparation (dissolution of rock powders, separation and purification of elements on ion exchange columns, dilution and chemical conditioning), analysis on solid-source and plasma mass spectrometers (TIMS, MC-ICPMS, Q-ICPMS), data processing and validation.
- Quantitative process modeling (mixing, melting, extraction, crystallization, assimilation, AFC).
- To review and synthesize existing research literature within the field
- Compile and synthesize published and unpublished data for Lesser Antilles volcanism
- To conduct research within isotope and trace geochemistry of Basse Terre Island and on the Grande Découverte-La Soufrière volcanic complex.
- To attend and or present at conferences/seminars at a local, national and international level as required.
- To disseminate results in peer-reviewed journals.
- Distribute data via a structured database with a DOI and associated metadata.

Knowledge, Skills and Experience

- An established expertise within the isotope and trace geochemistry research fields.
- Demonstrable experience with clean laboratory geochemistry protocols and analyses, experience with isotope geochemistry analyses using MC-ICP-MS, TIMS et ICPMS.
- Knowledge of mantle isotope geochemistry, in Earth sciences and in volcanology
- Knowledge of current status of research in specialist field of traditional isotope geochemistry.
- Proven ability to conduct independent research and disseminate results in peer-reviewed journals and conference proceedings.

Qualifications and Education

Doctoral degree in isotopic geochemistry or a related field.

Document requirements



- ❖ Curriculum Vitae - Your most recently updated C.V.
- ❖ Cover Letter - Describe how your research experience and interests relate to the isotopic geochemistry.

Documents should be sent to Ivan Vlastelic (vlastelic@ipgp.fr) et Carole Berthod (berthod@ipgp.fr)

Calendar

July – September 2025: Subject publication

Mid-October - November 2025: Interviews