

Postdoctoral researcher – geochemical evolution of the hydrothermal system of La Soufrière de Guadeloupe

Job offer from the Institut de Physique du Globe de Paris | CNRS UAR 3454

Researcher	Geochemistry of gases and hydrothermal fluids
Contract duration	24 months
Affectation	OVSG – IPGP (+ in collaboration with UA)
Salary	Salary depends on experience (+ cost-of-living allowance in Guadeloupe)
Project	SOUFRIERE FACTORY – Guadeloupe Region /FEDER
Expected starting date	This position, funded as part of a FEDER project, will remain open until it is filled.
Working place	Observatoire Volcanologique et Sismologique de Guadeloupe Institut de physique du globe de Paris, Le Houelmont - 97113 Gourbeyre - La Guadeloupe

The Guadeloupe Volcanological and Seismological Observatory (OVSG) — Institut de Physique du Globe de Paris (IPGP)

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, experiments, and modelling (<https://www.ipgp.fr/>). 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. IPGP's permanent observatories monitor the four active French overseas volcanoes in Guadeloupe, Martinique, Réunion Island and Mayotte.

The Guadeloupe Volcanological and Seismological Observatory (<https://www.ipgp.fr/observation/ovs/ovsg/>) is in charge of monitoring (1) the activity of La Soufrière de Guadeloupe volcano, on the island of Basse-Terre and (2) the regional seismicity (Guadeloupe and its neighbouring islands) linked to the tectonic activity of the Lesser Antilles arc. The OVSG consisting of 12 people, operates a dense seismic and geodetic network, as well as analytical facilities and portable measuring instruments to monitor the composition and temperatures of La Soufrière fumarolic gases and hot springs (Multi-Gas, quadrupole mass spectrometry, ion chromatography).

The LARGE laboratory from the Antilles University

The person hired will collaborate with the LARGE laboratory is a Geosciences and Energy research team at the Antilles University, located in Guadeloupe (French West Indies). Its members work on scientific themes related to natural and anthropogenic risks, renewable energies, and more broadly, environmental issues. It therefore brings together specialists in the physics of the oceans, the atmosphere, and the solid Earth, as well as specialists in energy and process engineering. (<http://www.univ-ag.fr/recherche/structures-de-recherche/large-laboratoire-recherche-en-geosciences-energies>)

The SOUFRIERE FACTORY project



SOUFRIERE FACTORY is a French State - Guadeloupe Region - FEDER project funded for the period 2025-2029 as part of the Guadeloupe Convergence and Transformation Contract (CCTG). This project proposes an integrated approach to all the processes operating in the La Soufrière volcanic system in Guadeloupe, from its magmatic source and hydrothermal system to the surface. The Soufrière volcano in Guadeloupe is both the most active hydrothermal system on French territory and an explosive stratovolcano showing increasing unrest. Understanding this system is a major challenge for scientists and authorities due to (1) the risks associated with the resumption of eruptive activity, (2) the geothermal potential associated with high heat flow, and (3) the impacts of hydrothermal and volcanic activity on water resources, the environment, and health.

Missions

The researcher will model the structure and evolution of the hydrothermal system of La Soufrière de Guadeloupe using :

- time series of geochemical data acquired by OVSG on fumarolic gases (major and minor species), Tarissan boiling lake and hot springs (major cations and anions, trace elements, Eh-pH...), soil diffuse degassing (CO₂), gas plume composition (SO₂/H₂S and C/S ratios) ...
- and/or, established isotopic tracers providing complementary constraints on the hydrothermal system (e.g. O and H) or deeper magmatic forcing (³He/⁴He).
- and/or, thermodynamic models constraining the conditions (P, T, redox state) under which hydrothermal gases or fluids equilibrate
- and/or, new methods and geochemical tracers providing complementary constraints on the hydrothermal system and/or the deep magmatic source

A major objective is to use geochemical data, together with available seismic, geodetic (GNSS) and rainfall data, to characterize the ongoing volcanic unrest, which started in 1992 and accelerated in 2007. Scientific issues include, but are not limited to, the following:

- the relative influence of internal (magmatic) and external (meteorological) forcing processes on the current unrest
- the origin of magmatic gases feeding La Soufrière hydrothermal system: dynamic (rising/decompressing magma) versus static degassing (second boiling of a slowly cooling and crystallizing magma intrusion)
- structure and dynamic of the hydrothermal system: connection between the central (Tarissan lake) and peripheric systems (hot springs), water-mineral chemical disequilibrium and residence time of thermal waters

Main function

- > Field work on La Soufrière volcano: sampling of fumarolic gas and hot springs, in-situ measurement (plume composition, fumarole temperature, soil CO₂ outgassing...)
- > Chemical analysis of gas and fluid samples in OVSG and LaRGE laboratories
- > Conduct or supervise more complex analyses in other laboratories
- > Complement existing time series in WebObs (IPGP integrated web-based system for data monitoring and networks management)
- > Data modelling and interpretation
- > Disseminate results in peer-reviewed journals, workshop and conferences
- > Interact with other scientists from IPGP in Paris, the Observatoire Volcanologique et Sismologique de Martinique (OVSM) and other volcano observatories from the Caribbean region (Montserrat Volcano Observatory, UWI Seismic Research Centre)

Knowledge, Skills and Experience

- > expertise in geochemistry of volcanic gas and fluids
- > expertise in volcanology, hydrothermal systems
- ± gas sampling methods
- ± in situ analysis of volcanic plume
- ± soil diffuse CO₂ degassing



- ± thermal monitoring of fumaroles
- ± thermodynamics of hydrothermal systems
- ± field work in difficult conditions (volcanic fumaroles, wet tropical climate)

Education

- > Doctoral degree in volcanology
- > Previous experience on active fumarolic field

How to apply

- > Send your curriculum vitae and a cover letter to Carole Berthod (berthod@ipgp.fr) and Ivan Vlastelic (ivan.vlastelic@uca.fr)

Calendar

May – september 2026: Subject publication

Autumn 2026: Interviews

Contract start date: first semester 2027