



# VOLTAIRE Post Doctoral Positions

*The Laboratory of Excellence (LabEx) VOLTAIRE 2 in Orleans (France) will fund post-doctoral positions including in the following field:*

## Impacts of reactive emissions from volcanoes and fires up to the upper troposphere and lower stratosphere

This postdoctoral work will be localized at **LPC2E/CNRS** (<https://www.lpc2e.cnrs.fr/en/>) in **Orleans, France**.

It will focus on the emissions by extreme events, i.e. volcanoes and vegetation fires, which both release highly reactive gases and particles, affecting the composition and the radiative balance up to the upper troposphere and lower stratosphere (UTLS). Measurements (ground-based, balloons, aircrafts and satellites) and numerical modelling (regional and global) will be combined to fully characterise these sources of gases and their impacts.

The two main targets are thus:

1 – **Volcanic emissions**: explosive volcanic eruptions of moderate intensity, through direct injections of sulphur up to the UTLS and the associated formation of sulphuric acid droplets, have been shown to regularly modulate the aerosol content of the atmosphere since the beginning of the 21<sup>st</sup> Century and will be the main focus of this post-doctoral work. Satellite (UV-visible-IR spectrometers), ground-based and balloon-borne measurements (from light optical particle counters, and small gas sensors, IR spectrometers and OF-CEAS managed by LPC2E) elucidating the physico-chemical interactions of volcanic emissions entering the atmosphere will underpin the use of a chain of numerical models (expectedly WACCM-CARMA and WRF-Chem) of the plume gas-particle processing and chemical/radiative impacts up to the UTLS on regional and global scales. Investigations will be based on regular observations conducted by LPC2E over the past decade and on future field campaigns planned around the world using ground-based facility, balloons and aircrafts: western and northern Europe, north and south America, tropical southern hemisphere, India).

2 – **Vegetation fires**: their number has increased over the past few decades due to global warming and land use change, with several events since 2017 having reached the UTLS with long residence times once in the stratosphere and with potential significant impact on the atmospheric radiative balance.

Balloon and aircraft campaigns during fire periods in Africa, south America, India, Canada and Russian polar regions (CNES-INSU programs and the H2020 European project HEMERA) are planned using the new instruments developed in VOLTAIRE. Measurement campaigns will involve the instruments of LPC2E for aerosol detection (light optical particle counters for aerosol size distributions and concentration profiles and small sensors for gases) and/or gaseous species observations (OFCEAS technique for the detection of CH<sub>4</sub>, CO, CO<sub>2</sub>, O<sub>3</sub>, N<sub>2</sub>O and NO). A collaboration with NASA and the ISRO Indian Space Agency is ongoing for observations in India during summer monsoon, a period during which primary aerosols, gaseous precursors from anthropogenic activities (including domestic fires) are likely to be transported to the UTLS to form the so-called ATAL layer in the tropopause region. Also, a campaign in the Amazonian intertropical zone is foreseen from 2022 by CNES due to the importance and specificity of this region in terms of vegetation type, global anthropogenic threat and convective activity. A collaboration with LaCy/University of la Reunion is also under way to study



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fire emissions from Africa impacting the southern hemisphere. Observations can be conducted in Europe to investigate fire plumes spreading out in the northern hemisphere.

These datasets will be combined with global modelling to contribute to the assessment of the overall impact of seasonal (summer) fires occurring each year on the dynamic and chemical functioning of the global atmosphere, in relation with climate change and stratospheric ozone balance.

Applicants with significant experience in 1) data analysis of gases and/or aerosol particles (from airborne, space-borne, balloon-borne or ground-based instruments) and/or 2) chemistry-transport model experiments (either at global or regional scales) are particularly appreciated, as well as a strong scientific interest in the atmospheric impacts of volcano or fire emissions.

This call forms part of the WP3 of the second phase of the VOLTAIRE LabEx (called VOLTAIRE2) extending from 2020 to 2024 (see the description of the workpackages at <https://labex-voltaire.prod.lamp.cnrs.fr/project-voltaire-2/>). Several postdoc positions should be available for the VOLTAIRE2 general atmospheric science topics (i.e. encompassing WP2 and WP3) but **the number of final postdoc recruitments will depend on the quality of the applications**. The executive committee of the LabEx will make the selection procedure based on previous achievements of candidates, and compatibility of proposed projects with labex's topics. **Interviews for selected applicants for will be conducted in November 2020. Positions will start in early 2021.**

The details of labex organisation and scientific activities can be found at:

<http://labex-voltaire.prod.lamp.cnrs.fr/home-page/>

<https://labex-voltaire.prod.lamp.cnrs.fr/project-voltaire-2/>

<https://labex-voltaire.prod.lamp.cnrs.fr/wp-3-impacts-of-reactive-emissions-from-volcanoes-and-fires-on-the-atmosphere/>

Along with their CV and track record, candidates should propose a research project (2-3 pages) which includes the methodology(ies) they want to implement. They should also provide names of scientists for reference. Projects are expected to use the various experimental and analytical facilities hosted by the laboratory partners and address one of the scientific issues listed above. Positions are for 1+1 year, and depending on results, can be prolonged (expected to lead to CNRS or University permanent positions).

In addition to salary (fixed according to candidate's experience and French's rules), the LabEx will provide funding to carry out research activities (laboratory expenses, participation to meetings, etc..).

Applicants are invited to contact Dr. Gwenaël Berthet ([gwenael.berthet@cnrs-orleans.fr](mailto:gwenael.berthet@cnrs-orleans.fr); aerosol observations and chemistry-transport modelling in the UTLS), Prof. Valéry Catoire ([valery.catoire@cnrs-orleans.fr](mailto:valery.catoire@cnrs-orleans.fr); in situ observations of chemical species), Dr. Gisèle Krysztofiak ([Gisele.Krysztofiak@cnrs-orleans.fr](mailto:Gisele.Krysztofiak@cnrs-orleans.fr); in situ observations of chemical species and transport modelling), Dr. Fabrice Jégou ([fabrice.jegou@cnrs-orleans.fr](mailto:fabrice.jegou@cnrs-orleans.fr); satellite observations and chemistry-transport modelling), Dr. Tjarda Roberts ([tjarda.roberts@cnrs-orleans.fr](mailto:tjarda.roberts@cnrs-orleans.fr); in-situ measurements of gases and particles by small sensors, and emissions and plume chemistry modelling), or Dr. Jean-Baptiste Renard ([jean-baptiste.renard@cnrs-orleans.fr](mailto:jean-baptiste.renard@cnrs-orleans.fr); aerosols observations) with whom the



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recruited postdoc researcher(s) will collaborate, if they look for more details about the science conducted at LPC2E and fitting with this postdoc call.

**Applications should be sent to Bruno Scaillet, head of the VOLTAIRE2 LabEx ([bruno.scaillet@cnrs-orleans.fr](mailto:bruno.scaillet@cnrs-orleans.fr)) before the end September 2020. The selection of candidates will take place in two stages. Firstly, a selection will be made on the quality of the scientific project sent and secondly the selected candidates will be auditioned for a final decision. The ideal start of the postdoctoral position is planned for January 2021.**