

**Postdoc Position Offer :** Water isotopic signature of vapor and snowflakes along a transect from coast to continental plateau in East Antarctica – Link with types of precipitation and clouds.

**Full/part time:** Full time for 2 years

**Start Date:** Between July 1st and September 1st 2025.

**Location:** LSCE, Orme des Merisiers, Paris-Saclay, 91100 Gif sur Yvette

**Salary Range:** 2600 to 2900€ net/month, depending on experience

**Closing application:** Review of applications will start 19 March 2025; the position will remain open until filled

**Contact and Application:** send a CV, motivation letter and references to Elise Fourré ([elise.fourre@lsce.ipsl.fr](mailto:elise.fourre@lsce.ipsl.fr)). Feel free to contact this email for further questions about the job offer.

**Context:**

This post-doctoral research position is part of the ERC Synergy (N°951596) AWACA project (Atmospheric Water cycle over Antarctica, past, present and future, <https://awaca.ipsl.fr/> ), which aims to enhance our knowledge of the water cycle over Antarctica by providing a combined observation and modelling framework to understand the fate of atmospheric water all along the tropospheric column. Specifically adapted/designed instruments have been combined to form observation platforms deployed at 5 sites along a 1100 km coast-to-plateau transect aligned with the typical moisture-carrying air mass trajectories. These fully autonomous platforms (water isotopes laser analyser, radars, microlidar and weather station) have been successfully deployed in the field in November 2024-January 2025, for three years. The resulting data set will make possible the study of the processes driving the water fluxes and composition to an unprecedented level, and the gained insights will be a strong basis to develop new physics parameterizations for regional and climate models.

Apart from LSCE (PI Valerie Masson-Delmotte), the project involves team from the LMD and LATMOS (PI Christophe Genton), from EPFL (PI Alexis Berne) and from Ecole Polytechnique (PI Thomas Dubos).

**Objective of the research position:**

The aim of this research position is to analyse and interpret the data from the water isotopes laser analysers involved in the project and make the link with snowfall and cloud characterizations from the other instruments running in parallel, with strong interaction with the modelling team.

There will be data from 5 locations along the targeted transect: Dumont d'Urville station, autonomous platforms at the so-called D17, D47 and D85 locations, and a platform also installed at Dome C Concordia station. The platforms are equipped with an OF-CEAS laser analyser for water isotopes but also a Micro Rain Radar, radars at 95GHz and 35 GHz, a  $\mu$ Lidar at 532nm and weather station including blowing snow measurements, SPC, radiometer...).

The first step will be to regularly retrieve and calibrate the data from the laser analysers to check the quality of the measurements and plan maintenance if necessary during the field summer seasons. Technical help will be provided by the team since such instruments have already been operating and first version of computing tools exist.

This set-up will provide a unique and comprehensive dataset both in time (all year round) and space (from coast to plateau) that will have to be analysed along with the LMDZiso atmospheric model simulations that will be performed in the project by the modelling team. A more detailed focus on cases where back trajectories indicate that the air mass was passing over the transect before reaching Concordia station will allow to investigate the distillation effect on the isotopic composition.

One challenge of the project is to directly measure the isotopic composition of snow flakes by regularly switching the laser analyser from a protected inlet (water vapor only) to an open slit one (to catch snow flakes as well). First proofs of concept experiments have been conducted in the lab and at DDU, but more work is required to confidently retrieve the isotopic signature.

The aim is to confront the isotopic composition of snow and surrounding water vapor with the characteristics of clouds and precipitation, local atmospheric conditions, large scale circulation patterns. This work will be done in close collaboration with PhD students and post doc researchers working on the characterization of clouds and precipitation in the AWACA project.

The candidate is likely to take part in a maintenance field campaign during the austral summer season.

#### **Applicant profile:**

The candidate should have a PhD degree in Earth Sciences, Climate Sciences, Physics or related field with a solid background in water isotopes geochemistry and/or atmospheric boundary layer physics. Experience in polar science will be appreciated.

The candidate should demonstrate experience in handling large observations data sets to derive physical processes. Skills in instrumentation, possibly with laser spectrometers, will be valued, as well as remote field work experience, especially to consider a field mission in Antarctica.

The work described above will be carried out in a large team environment involving people from different laboratories; the position requires a candidate with strong communication skills, being proactive to drive collaborations with the other members of the project. Experience in scientific writing is also required.

#### **Employer and work environment:**

The candidate will work at the Laboratoire des Sciences du Climat et de l'Environnement (LSCE), in the GLACIO team led by Amaëlle Landais (<https://www.lsce.ipsl.fr/en/archives-traceurs/glaccios/>). Our team conducts climate and hydrological cycle studies through the analysis of stable isotopes of water and air molecules (diazote, dioxygen, argon). The aim is to understand past (Quaternary) and present climatic variability from tropical to polar regions, and to better characterize the coupling between climate and the atmospheric water cycle.

The LSCE is a joint research unit of the CEA, the CNRS and the University of Versailles Saint-Quentin en Yvelines (UVSQ), based at l'Orme des Merisiers (Gif-sur-Yvette). It is part of the Institut Pierre Simon Laplace (IPSL), a federation of nine climate and environmental research institutes in the Paris region. The LSCE brings together more than 300 researchers, engineers and administrative staff, including 150 permanent staff from the 3 supervisory bodies and around fifty PhD students. (<https://www.lsce.ipsl.fr/en/home-public/>).