

Post-doctoral position

**Adaptation strategies to heat waves during the 21st century:
impact on air quality**

Hosting laboratory: Laboratory of Geophysical and Industrial Flows (LEGI), University Grenoble Alpes, Grenoble, France

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Keywords: Climate change - Heat waves - Urbanized valley - Temperature mitigation scenarios - White city, green city - Air quality

Project duration: 18 months

Closing date for application: 15 March 2025 (application will remain open after this date if the position is not filled)

Expected start date: April or May 2025

PROPOSAL

The frequency and intensity of heatwaves will increase in the future because of climate change. This leads cities to develop strategies to reduce local temperatures, in order to maintain their habitability. These strategies generally consist in increasing the albedo of the roofs ("white city"), to green these roofs and to increase the green areas ("green city"). A key requirement of these adaptation strategies is to mitigate temperature while preserving air quality. Indeed, albedo increase also increases solar radiation reflection which may promote ozone formation thereby worsening air quality. As well, the increase of green areas may stabilize the atmosphere, reducing vertical pollutant transport. The effect on air quality of adaptation strategies to climate change during heat waves should therefore be assessed.

The Grenoble metropolis is considered in this project. Grenoble is located at the bottom of an alpine valley implying that, during heat waves, the valley configuration leads to a further intensification of the local temperatures. Strategies of temperature mitigation in the Grenoble valley have been designed and simulated by a PhD student, for projected heat waves towards 2050. The strategies were designed in collaboration with the urban planning agency and with the environment and climate service of the Grenoble metropolis.

The first objective of the present project is to assess the impact of these temperature mitigation strategies on air quality for different emission scenarios. Numerical modelling with the Weather Research and Forecast (WRF) model coupled with chemistry will be used for this purpose. The emission scenarios will be conceived in collaboration with the local air quality agency and with the Grenoble metropolis. The second objective is to design and simulate new temperature mitigation strategies towards 2050 aimed at reducing social inequalities in terms of exposure to heat, and to assess the impact of these strategies on air quality.

This proposal is part of the [ClimAir](#) project supported by the French Research Agency (ANR) which started in October 2022 for a period of 4 years.

Knowledge and skills required from the applicant

- atmospheric boundary layer dynamics
- air quality
- numerical modelling of atmospheric dynamics (preferably with the WRF model) coupled with chemistry (Chem or CHIMERE models)
- very good command of English
- experience in writing articles

Applicants should send their CV (including a link to their PhD manuscript, a list of publications and the names of 2-3 reviewers) and a motivation letter to chantal.staquet@univ-grenoble-alpes.fr