

POST-DOCTORAL POSITION IN CLIMATE-AEROSOL INTERACTIONS
at the National Centre for Meteorological Research (CNRM)
Météo-France, Toulouse, France

Context

Météo-France is seeking **a researcher in climate-aerosol interactions to take part of the EU-funded Horizon 2020 project “ESM2025 — Earth system models for the future”** focusing on the development of a novel generation of Earth system models. This position is opened for a duration **between 18 and 24 months** (depending on the experience of the candidate), and might offer opportunity for extension. The position will be based in Toulouse at CNRM, the National Centre for Meteorological Research, a joint research unit of Météo-France and CNRS.

About the project

ESM2025 (01/06/2021 – 31/05/2025) is a multidisciplinary project that will develop the next generation of European Earth System Models which include improved representations of climate response to anthropogenic emissions and land use. Results will feed developments in integrated assessment models and the self-consistency of their coupling with climate components to provide Paris-Agreement compatible pathways to better inform mitigation capacity and potential climate impacts.

The knowledge acquired through the improvement of Earth System Models and Integrated Assessment Models will allow a better assessment of high mitigation scenarios (in terms of geophysical constraints, rate of climate warming and climate reversibility, etc.).

ESM2025 consortium is composed by 20 partners and 1 non-European partner (Australian partner).

Work environment

The position will be based at CNRM (42 avenue Gaspard Coriolis, Toulouse, France, <http://www.umr-cnrm.fr/?lang=en>). The successful candidate will join the climate group of CNRM (<https://www.umr-cnrm.fr/spip.php?rubrique89&lang=en>), focusing on understanding scale interactions, interactions between the various components of the climate system, the response of the climate system to anthropogenic forcing, and sources of variability and long-term predictability.

Salary

Salary will be provided according to Météo-France salary rates. Depending on the experience of the selected candidate, the gross monthly salary shall amount from 3280 to 4025€.

Tasks

The successful candidate will contribute to ongoing developments in CNRM-ESM (Séférian et al. 2019) in order to:

- improve the representation of aerosol absorption in CNRM-ESM. This absorption is currently poorly reproduced in most climate models, notably in Asia and in biomass burning areas (Samset et al., 2018; Brown et al., 2021). Developments concerning in particular brown carbon aerosol properties will contribute to the reduction of this bias.

- introduce and evaluate the scattering of coarse aerosols in the longwave spectrum through the use of the ecRad module (Hogan and Bozzo, 2018). The scattering in longwave radiation by coarse aerosols (Dusfresne et al., 2000), notably by dust and primary sea salt particles, has often been neglected in

climate models. The objective is to take it into account, and thus better estimate the aerosol radiative forcing in the LW spectrum for such aerosols.

The work required therefore consists of numerous developments and numerical simulations. These numerical simulations will be evaluated by relying in particular on different reference datasets (satellite products, in-situ measurements, etc.), and by comparing the results with those of the partner models.

Requirements and qualification

A PhD in atmospheric sciences is required. A solid experience in numerical modelling is also required, an experience in climate-aerosol studies would also be appreciated. A good practise of written and spoken English is required. All the tasks require good skills in Fortran and Unix, as well as scientific writing.

Application and timeline

For full consideration, an application letter including a detailed statement of research interest, along with a curriculum vitae (including research experience, publications and conferences and computing skills) and the names, telephones and email addresses of 2 referees should be sent by email before 27th March 2021 to:

pierre.nabat@meteo.fr, marc.mallet@meteo.fr and martine.michou@meteo.fr

After examination of the applications, a shortlist of candidates will be auditioned in early April, making it possible to start between July, 1st and September, 1st 2021.

References

Brown, H., Liu, X., Pokhrel, R. *et al.* Biomass burning aerosols in most climate models are too absorbing. *Nat Commun* **12**, 277 (2021). <https://doi-org.insu.bib.cnrs.fr/10.1038/s41467-020-20482-9>

Dufresne, J.-L., C. Gautier, P. Ricchiazzi, and Y. Fouquart (2002). Longwave scattering effects of mineral aerosols. *Journal of the Atmospheric Sciences*, 59:1959–1966, [https://doi.org/10.1175/1520-0469\(2002\)059<1959:LSEOMA>2.0.CO;2](https://doi.org/10.1175/1520-0469(2002)059<1959:LSEOMA>2.0.CO;2).

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Samset, B.H., Stjern, C.W., Andrews, E. *et al.* Aerosol Absorption: Progress Towards Global and Regional Constraints. *Curr Clim Change Rep* **4**, 65–83 (2018). <https://doi.org/10.1007/s40641-018-0091-4>

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