

**Researcher or Engineer Position in Atmospheric Chemistry Modelling  
at the National Centre for Meteorological Research (CNRM)  
Météo-France, Toulouse, France**

### **Context**

**Météo-France is seeking an early-career researcher or a senior engineer in atmospheric chemistry modelling 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 48 months, 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 in Toulouse, at CNRM (<http://www.umr-cnrm.fr/?lang=en>). The successful candidate will join the COMETS team (<http://www.umr-cnrm.fr/spip.php?article371>) which is the Météo-France research team in charge of the study of the chemical composition (reactive gases, aerosols and green-house gases) of the troposphere and of the stratosphere from the global scale to the regional scale.

He/she will also work in close collaboration with the MOSCA and ATMO teams, who are in particular in charge of the development of the climate model.

### **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 new developments in CNRM-ESM (Séférian et al. 2019) in order to :

- introduce and validate the representation of the chemical evolution of tropospheric gaseous species on the basis of already existing chemical schemes, in particular those used in the CNRM MOCAGE(Guth et al,2016) chemistry-transport model and those present in CNRM-ESM.
- introduce and validate the representation of the formation of secondary aerosols produced in interaction with gases.
- introduce and validate the different processes concerning the evolution in the atmosphere of these gaseous species and secondary aerosols (surface emissions through the SURFEX interface (Decharme et al. 2019), dry and wet deposition, large-scale and sub-grid transport).
- set up a coupling between the chemical scheme and the interactive methane emissions developed in the other work packages of the ESM2025 project.

The work required therefore consists of numerous developments and numerical simulations. These numerical simulations will be evaluated by relying in particular on twin simulations carried out with MOCAGE (off-line), and by comparing the results with those of the partner models.

### **Requirements and qualification**

Depending on the applications received, the successful candidate may be a research engineer or an early-career researcher. Candidates must hold a PhD in Atmospheric Chemistry/Climate Science.

- Strong numerical skills (Linux, Fortran, Python) are required.

- A good knowledge of atmospheric chemistry and its representation (for gases and/or aerosols) is highly desirable.

- Experience in numerical modelling of the atmosphere and/or in the use of complex codes on High Performance Computers (HPC) would be a clear asset.

Good reading and communication skills in English are also essential (reading of scientific documents and participation in a large European project with a large number of partners).

### **Application and timeline**

Interested candidates should submit their application by email to [Beatrice.Josse@meteo.fr](mailto:Beatrice.Josse@meteo.fr), [Sophie.Belamari@meteo.fr](mailto:Sophie.Belamari@meteo.fr) and [Pierre.Nabat@meteo.fr](mailto:Pierre.Nabat@meteo.fr) no later than March, 27<sup>th</sup> 2021. The subject of the email must include the statement "ESM2025 / Atmospheric Chemistry Modelling Candidacy"

The application must include

- a curriculum vitae (including research experience, scientific publications and proceedings, computing skills and different language practice, ...),
- a brief statement of research or engineer interests and motivations for the job,
- the names and contact details (email + telephone number) of two academic referees.

Please note that attachments larger than ~5 Mo are not supported by our e-mail server and should be made available via a repository box (e.g. Dropbox, WeTransfer, ...)

After examination of the candidacies, short-listed candidates will be interviewed in early April, making it possible to start on July, 1<sup>st</sup> 2021.

## References

Decharme B., Delire C., Minvielle M., Colin J., Vergnes J.-P., Alias A., Saint-Martin D., Séférian R., Sénési S., Voltaire A., (2019). Recent changes in the ISBA-CTRIP land surface system for use in the CNRM-CM6 climate model and in global off-line hydrological applications. *Journal of Advances in Modeling Earth Systems*, 11. <https://doi.org/10.1029/2018MS001545>

Guth, J., Josse, B., Maréchal, V., Joly, M., and Hamer, P. :[First implementation of secondary inorganic aerosols in the MOCAGE version R2.15.0 chemistry transport model](#), *Geosci. Model Dev.*, 9, 137-160, doi:10.5194/gmd-9-137-2016, 2016.

Séférian, R., Nabat, P., Michou, M., Saint-Martin, D., Voltaire, A., Colin, J., et al (2019). Evaluation of CNRM Earth-System model, CNRM-ESM2-1: role of Earth system processes in present-day and future climate. *Journal of Advances in Modeling Earth Systems*, 11, 4182– 4227. <https://doi.org/10.1029/2019MS001791>