Maureen Beaudor, Ph.D.

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Research Experience - BGC Modeling in Earth System Models

12-2023 – now **Postdoctoral Research Associate** High Meadows Environmental Institute (Princeton University, NJ, USA). Resolving nitrogen-gaseous pathways in the atmosphere-plant-microbial-soil continuum in the NOAA/GFDL Earth System Modeling Framework. Implementation of soil microbial N dynamics based on the MIMICS (MIcrobial-MIneral Carbon Stabilization) scheme in the Land Model of the NOAA/GFDL ESM. Integration of other biotic and abiotic processes and related N emissions (nitrification, denitrification losses, and volatilization). PI: Elena Shevliakova (Geophysical Fluid Dynamics Laboratory, NJ, USA)

05-2023 – 10-2023 **Postdoctoral Research Associate** LSCE (Laboratoire des Science du Climat et de l'Environnement; Gif-sur-Yvette, France). Impact of a future large-scale hydrogen economy on atmospheric composition and climate with the use of an Earth System Model. Assessing the climate and environmental impacts of green ammonia by exploiting the IPSL Earth System Model. Development of an offline model for H_2 soil uptake with key environmental output from the ORCHIDEE model. PI: Didier Hauglustaine (CNRS-LSCE, FRANCE)

Education

2019 – 2023 **Ph.D., Université Paris Saclay** LSCE (Gif-sur-Yvette, France).
Thesis title: *Global modelling of ammonia emissions from agriculture and impact on atmospheric chemistry*. Congratulations from the jury commission.
Advisors: Didier Hauglustaine, Nicolas Vuichard and Juliette Lathière.

2017 – 2019 **M.Sc. Environmental Science, AgroParisTech** (Paris, France) in Climate Land-Use and Ecosystem Services.
Thesis title: *Natural emissions of pollutants during drought and impact on air quality during Summer 2018 in Europe*.
Advisor: Solène Turquety (LMD-IPSL, Paris)

2016 – 2017 **B.Sc. Environmental Science, Université Paris Saclay** (Paris, France) in Biodiversity of Organisms and Ecology.

2014 – 2016 **Classes Préparatoires, Lycée François 1er** (Fontainebleau, France) in Biology, Chemistry, Physics, Geology; Undergraduate program to prepare for the French agronomy and veterinary schools.

Research Publications

1. **M. Beaudor**, A. Pouyaei, and R. Wang, "How could fire emissions reshape the nitrogen cycle in a changing climate?" *Invited Commentary for Geophysical Research Letters (under review)*,
2. Ø. Hodnebrog, C. Jouan, D. Hauglustaine, ..., **M. Beaudor**, ..., *et al.*, "Multi-model estimates of global climate effects of anthropogenic reactive nitrogen," *Nature Matters Arising (under review)*,
3. **M. Beaudor**, D. Hauglustaine, J. Lathière, M. Van Damme, L. Clarisse, and N. Vuichard, "Evaluating present-day and future impacts of agricultural ammonia emissions on atmospheric chemistry and climate," *Atmospheric Chemistry and Physics*, vol. 25, no. 4, pp. 2017–2046, 2025. DOI: 10.5194/acp-25-2017-2025.

4 **M. Beaudor**, N. Vuichard, J. Lathiere, and D. Hauglustaine, "Future trends of agricultural ammonia global emissions in a changing climate," *Journal of Advances in Modeling Earth Systems*, vol. 17, 2025. DOI: 10.1029/2023MS004186.

5 P. Kumar, G. Broquet, D. Hauglustaine, **M. Beaudor**, ..., B. Revilla Romero, *et al.*, "Global atmospheric inversion of the nh_3 emissions over 2019–2022 using the lmdz-inca chemistry-transport model and the iasi nh_3 observations," *EGUsphere*, vol. 2025, pp. 1–32, 2025. DOI: 10.5194/egusphere-2025-162.

6 M. Lee, A. C. Stock, E. Shevliakova, S. Malyshev, **M. Beaudor**, and N. Vuichard, "Uneven consequences of global climate mitigation pathways on regional water quality in the 21st century," *Nature Communcations*, 2024. DOI: 10.1038/s41467-024-49866-x.

7 **M. Beaudor**, "Global modelling of ammonia emissions from agriculture and impact on atmospheric chemistry," Ph.D. dissertation, Université Paris-Saclay, 2023.

8 **M. Beaudor**, N. Vuichard, J. Lathière, *et al.*, "Global agricultural ammonia emissions simulated with the ORCHIDEE land surface model," *Geoscientific Model Development*, vol. 16, no. 3, pp. 1053–1081, Feb. 9, 2023, Publisher: Copernicus GmbH, ISSN: 1991-959X. DOI: 10.5194/gmd-16-1053-2023. (visited on 05/12/2023).

Oral Communications

02-2025 **ReCLEAN-ETH monthly online seminars** Invited Talk. The terrestrial N cycle in Earth System Models, what we can learn and what we are still lacking.

12-2024 **AGU** conference (Washington DC, USA) - Poster. Novel Representation of the Nitrogen Gaseous Pathways in the Atmosphere-Plant-Microbial-Soil Nexus in the terrestrial component of the NOAA/GFDL Earth System Model.

04-2024 **EGU** conference (Vienna, Austria) - Talk. Resolving nitrogen gaseous pathways in the atmosphere-plant-microbial-soil continuum in the NOAA/GFDL Earth System Modeling Framework

08-2023 **Research visit at GFDL** (Princeton, USA) - Invited Talk: Global Modelling of ammonia emissions from agriculture and impacts on atmospheric chemistry.

06-2023 **GEIA** conference (Brussels, Belgium) - Poster. Interactive ammonia emissions from feed and food production within the IPSL coupled model.

H2020- AMMONIA Project Kickoff Meeting (online) - Talk. Global modelling of ammonia emissions from agriculture within the IPSL-ESM.

09-2022 **IGAC-ICACGP** conference (Manchester, UK) - Poster. Ammonia emissions from feed and food production : contribution of an integrated module within a couple Land Surface - Chemistry Transport model and evaluation using the IASI spaceborne observations.

2022 **General Assembly of the ESM2025 Project** (Paris, France) - Talk. Global ammonia emissions from livestock management: Development of an agricultural module within a land surface model and the impacts on atmospheric chemistry.

EGU conference (Vienna, Austria) - Talk.

Oral Communications (continued)

2021

- **IGAC** conference (online) - Poster.
- **IASI** conference (Evian, France) - Talk. Global ammonia emissions from livestock management : implementation of a dynamical module within a land surface model and validation of the impacts on atmospheric chemistry using atmospheric ammonia columns measured by IASI

Miscellaneous Experience

Reviewer for the following journals:

- Environmental science & technology, Geophysical Research Letters, Agricultural and Forest Meteorology, Geoscientific Model Development, IEEE JSTARS.

Associative Activities

2017 - **Member of the association "Agromigrateur"**. Conversation sessions in French with Afghan refugees.

2016 - **Ecovolunteer experiences**. Development of agroecology in local communities (Kenya, Ecuador, Galapagos Islands).

Skills

Languages - Strong reading, writing and speaking competencies for French (native speaker), English and Spanish. Basic level of Italian and beginner in German.

Coding - Python, R, Bash, FORTRAN, CDO/ NCO (Netcdf file processing), LaTeX.

Misc. - Academic research, LaTeX typesetting and publishing.