

# Maxence LEFEVRE

## Curriculum Vitae

### Position

- 12/2023-11/2025 **Marie Skłodowska-Curie Postdoctoral Fellowships**, *LATMOS UMR 8190*, France.  
Venus Climate Theory and Simulation  
Supervisor : Franck LEFEVRE
- 12/2022-11/2023 **CNES Postdoctotal Research Assistant**, *LATMOS UMR 8190*, France.  
Venus Climate Theory and Simulation  
Supervisor : Emmanuel MARCQ
- 11/2018-10/2022 **Postdoctotal Research Assistant**, *AOPP, University of Oxford*, Oxford, UK.  
Exoplanet Climate Theory and Simulation  
Supervisor : Raymond PIERREHUMBERT

### Education

- 10/2015-09/2018 **Ph.D.**, *Laboratoire de Météorologie Dynamique (LMD) UMR 8539, Sorbonne Université*, Paris, FRANCE.  
Subject : Small scale Modeling of the atmosphere of Venus : Convection and gravity waves  
Supervisors : Sébastien LEBONNOIS and Aymeric SPIGA
- 2015 **Master's Degree in Planetary Science (Master 2 Planétologie d'Ile-de-France)**, *Université Paris-Sud, Orsay, FRANCE, With High Honors.*
- 2014 **Master's Degree in Optics (Master 2 Optique Matière Plasma parcours LuMMEx)**, *Université Paris-Sud, Orsay FRANCE, With Honors.*
- 2012 **Bachelor Degree with honours in Physics (Licence Mécanique Physique Matériaux parcours Physique)**, *Universite de Rouen, St Etienne du Rouvray, FRANCE, With Honors.*

### Experience

- 2015 **Master's degree internship**, *Laboratoire de Météorologie Dynamique (LMD) UMR 8539, Paris, FRANCE.*  
Subject : Modeling the turbulence in Venus cloud layer  
Duration : 4 month. Supervisor : Aymeric SPIGA and Sébastien LEBONNOIS
- 2014 **Master's degree internship**, *Laboratoire Interuniversitaire des Systemes Atmosphériques (LISA) UMR 7583, Créteil, FRANCE.*  
Subject : Measurement and modeling of CO<sub>2</sub> spectrum at low temperature in the VUV for the atmospheres of Mars and Venus  
Duration : 4 month. Supervisor : Yves BENILAN
- 2013 **Master's degree internship**, *Max-Planck-Institute für Astronomie, Heidelberg, GERMANY.*  
Subject : Characterization and development of methodology for prioritization of exoplanet  
Duration: 13 weeks. Supervisor : Lisa KALTENEGGER
- 2012 **Bachelor degree internship**, *Complexe de Recherche Interprofessionnel en Aerothermochimie (CORIA) UMR 6614, St Etienne du Rouvray, FRANCE.*  
Subject : Study of a high enthalpy plasma by optical methods  
Duration : 7 weeks. Supervisor : Pascal BOUBERT

## Teaching

- 2016-2018 **A.R.E. Télédetection Spatiale**, *Encadrement de TP*, Sorbonne Université.  
Responsables : Hélène Chepfer et Laurence Picon
- 2016-2018 **UE Calcul scientifique et modélisation**, *Encadrement de TP informatique*, Sorbonne Université.  
Responsable : Pacôme Delva

## Publication

- Lefèvre M.**, Marcq E. and Lefèvre F., *Impact of the Turbulent Vertical Mixing on Chemical and Cloud Species in the Venus Cloud Layer*. Submitted to Geophysical Research Letters, 2024.
- Leconte J., Spiga A., Noé C., Guerlet S., Selsis F., Milcarek G., Cavalié T., Moreno R., Lellouch E., Carrión-González Ó., Charnay B., **Lefèvre M.**, *A 3D picture of moist-convection inhibition in hydrogen-rich atmospheres: Implications for K2-18 b*. Accepted in Astronomy & Astrophysics, 2024.
- Marcq E., Bézard B., Reess J.-M., Henry F., ĀLrard S., Robert S., Montmessin F., Lefèvre F., **Lefèvre M.**, Stolzenbach A., Bertaux J.-L., Piccioni G., and Drossart P. *HDO and SO<sub>2</sub> Minor species in Venus' night side troposphere as observed by VIRTIS-H/Venus Express Icarus*. Astronomy & Astrophysics, 2023
- Encrenaz T., Greathouse T. K., Giles R., Widemann T., Bézard B., **Lefèvre M.** and Shao W., *HDO and SO<sub>2</sub> Thermal mapping on Venus. VI. An anomalous SO<sub>2</sub> behavior during Autumn 2021*. Astronomy & Astrophysics, 2023
- Lefèvre M.**, Marcq E. and Lefèvre F., *The Impact of Turbulent Vertical Mixing in the Venus Clouds on Chemical Tracers*. Icarus, 86, 115148, 2022.
- Lefèvre M.**, *Venus boundary layer dynamics: eolian transport and convective vortex*. Icarus, 387, 115167, 2022.
- Lefèvre M.**, Tan X., Lee E. K. H and Pierrehumbert R. T., *Cloud-convection feedback in brown dwarfs atmosphere*. The Astrophysical Journal, 929, 153, 2022.
- Lefèvre M.**, Turbet M. and Pierrehumbert R. T., *3D cloud-convection model of temperate, tidally-locked exoplanets*. The Astrophysical Journal, 13(2):101, 2021.
- X. Tan, **Lefèvre M.**, and Pierrehumbert R. T., *Convection Modeling of Pure-steam Atmospheres*. The Astrophysical Journal Letters, 923, L15, 2021.
- Fauchez T, et al., *TRAPPIST Habitable Atmosphere Intercomparaison (THAI) workshop report*. Planetary Science Journal., 2(3):106, 2021.
- Silva J. E., Machado P., Peralta, J., Brasil F., Lebonnois S, **Lefèvre M.**, *Characterising atmospheric gravity waves on the nightside lower clouds of Venus: a systematic analysis*. Astronomy & Astrophysics, 649, A34, 2021.
- Mahapatra G., **Lefèvre M.**, Rossi L. and Stam D. *Polarimetry as a tool for observing orographic gravity waves on Venus*. The Planetary Science Journal, 2(3):96, 2021.
- Lefèvre M.**, Spiga A. and Lebonnois S., *Mesoscale modeling of Venus' bow-shape waves*., Icarus, 335-113376, 2020.
- Lefèvre M.**, Lebonnois S. and Spiga A., *Three-dimensional turbulence-resolving modeling of the Venusian cloud layer and induced gravity waves. Inclusion of complete radiative transfer and wind shear*, Journal of Geophysical Research (Planets), 123, 2018

O. Venot, Y. Bénilan, N. Fray, M.-C. Gazeau, F. Lefèvre, Et. Es-sebbar, E. Hébrard, M. Schwell, C. Bahrini, F. Montmessin, **M. Lefèvre**, and I. P. Waldmann, *VUV-absorption cross section of carbon dioxide from 150 to 800 K and applications to warm exoplanetary atmospheres*, Astronomy and Astrophysics, 2018.

**Lefèvre M.**, Spiga A. and Lebonnois S., *Three-dimensional turbulence-resolving modeling of the Venusian cloud layer*, Journal of Geophysical Research (Planets), 2017.

## International Conferences and Workshop

- 2024 **Dynamics of the near-surface of Venus in the context of seismicity detection**, *Seismicity On Venus: Detecting Seismicity ISSI Workshop*.
- 2023 **Cloud-convection feedback in brown dwarfs atmosphere (Poster)**, *Exoclimes VI*.
- 2023 **Impact of the turbulent vertical mixing on the Venus cloud chemistry**, *EnVision workshop*.
- 2022 **The case of HCl (invited)**, *DAVINCI VTLS Round table*.
- 2022 **Mesoscale modelling of the Venus atmosphere (invited)**, *Venus Atmosphere workshop/GFD Dennou Club (Japan)*.
- 2021 **Venus: Evolution through Time (invited)**, *ISSI Workshop, Bern*.
- 2021 **Turbulence in the Venus atmosphere**, *Venus Science Conference*.
- 2021 **Cloud-convection feedback in brown dwarfs atmosphere**, *EPSC*.
- 2021 **Turbulent vertical mixing of H<sub>2</sub>O and SO<sub>2</sub> in the Venus cloud layer**, *EPSC*.
- 2021 **Diurnal cycle of the Venus near-surface dynamics**, *EPSC*.
- 2020 **3D cloud-resolving model of temperate tidally-locked exoplanet (invited)**, *THAI workshop*.
- 2020 **3D cloud-resolving model of temperate tidally-locked exoplanets (Poster)**, *Exoplanets III*.
- 2020 **Turbulent Vertical Mixing of H<sub>2</sub>O and SO<sub>2</sub> in Venus Cloud Layer**, *EnVision Conference*.
- 2019 **Three-dimensional turbulence-resolving modeling of tidally-locked exoplanetary atmosphere**, *EPCS/DPS*.
- 2019 **Turbulence modelling in Titan's zonal wind collapse (Poster)**, *EPCS/DPS*.
- 2019 **Subgrid parametrization of the venusian cloud convective activity and associated gravity waves. (Poster)**, *EPCS/DPS*.
- 2019 **Three-dimensional turbulence-resolving modeling of Proxima-B exoplanetary atmosphere**, *Exoclimes V*.
- 2019 **Organization of the convection of the Venusian cloud layer**, *International Venus Conference*.
- 2018 **3D mesoscale modeling of the turbulence of Venus atmosphere. (Poster)**, *Astrosim*.
- 2018 **3D Mesoscale Modeling of the Venus Atmosphere (invited)**, *CPS/WTK Mini-Workshop on Planetary Atmospheres II*.
- 2017 **Three-dimensional turbulence-resolving modeling of the Venusian cloud convective layer**, *EPSC*.
- 2017 **Mesoscale Modeling of the Atmosphere of Venus: Convection and Gravity Waves. (Poster)**, *Venus Modeling Workshop*.
- 2017 **Three-dimensional turbulence-resolving modeling of the Venusian cloud layer and induced gravity waves**, *EGU*.

- 2016 **Three-dimensional turbulence-resolving modeling of the Venusian cloud layer and associated gravity waves (Poster)**, *EPSC/DPS*.
- 2016 **Three-dimensional mesoscale modeling of the Venusian cloud layer and associated gravity waves (Poster)**, *Venus International Conference*.

## Summer School

- 2022 **OWL Summer Program**, *Santa Cruz, USA*.  
Jonathan Fortney
- 2017 **Diversity of planetary circulation regimes, in our solar system and beyond**, *Les Houches winter school, France*.  
Nicolas IRO
- 2015 **Modélisation numérique en modélisation océan-atmosphère (modnumOA)**, *Brest, France*.  
Guillaume ROULLET, Frédéric HOURDIN and Thomas DUBOS

## Outreach

- 2024 **EGU 2024**, *Session co-convener*.  
PS1.3/GD3 Venus: models, observations, (ancient) Earth- and exoplanet analogue
- 2023 **Titan Through Time VI**, *LOC member*.  
Organiser: Sébastien Rodriguez and Léa Bonnefoy
- 2023 **EGU 2023**, *Session co-convener*.  
PS4.2/GD3.3 Venus: models, observations, exoplanet analogue
- 2022 **Rocky Worlds II**, *LOC member*.  
Organiser: Tim Lichtenberg
- 2019 **Exoclimes V**, *LOC member*.  
Organiser: Ray Pierrehumbert

## Computer skills

- Operating Systems GNU/Linux, Microsoft Windows
- Languages Python, Fortran,  $\LaTeX$ , Bash, html
- Software Vim, Git, SVN, LibreOffice suite
- Models WRF, CM1, LMDz, ExoFMS, SOCRATES
- Computing High-performance computing : CINES, TGCC, ARC, MeSU

## Languages

- French Mother tongue
- English Fluent
- Spanish Intermediate
- Portuguese Intermediate
- Japanese Beginner