Maxime Maurice

Curriculum vitae

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Current Position

2023–Present **Postdoctoral research associate**, Laboratoire de Météorologie Dynamique (LMD, CNRS), Paris, France, Advisor: Dr. François Forget.
Research Topics: Early Mars Climate

Education

2015–2020 **PhD in Planetary Sciences**, *Technical University Berlin, Germany*, Advisor: Dr. Nicola Tosi, Thesis Title: The influence of magma ocean crystallization on mantle dynamics.
Suma cum Laude

2010–2014 **Engineer's Degree**, *ISAE Supaero, Toulouse, France*, Specialization: Space Engineering, Space Sciences, Applied Mathematics.

2008–2010 **Preparatory Class**, *Lycée Marceau, Chartres, France*, Intensive two-years course for preparation to entrance exams of French engineering schools, Specialization: Mathematics, Physics, Engineering Science (MPSI/MP).

Research Experience

2021–2023 **Postdoctoral research associate**, Rice University, Houston, Texas, USA, Advisors: Pr. Rajdeep Dasgupta and Pr. Pedram Hassanzadeh.
Research Topics: Magma oceans-atmosphere couplings

2019–2020 **Research fellow**, Institute of Planetology, Westfälische Universität Münster, Germany, Advisor: Pr. Thorsten Kleine.
Research Topics: Isotope Geochemistry

2015–2019 **PhD Candidate**, Institute of Planetary Research, German Aerospace Center (DLR), Berlin Germany
Center for Astronomy and Astrophysics, Technical University Berlin, Germany, Advisor: Dr. Nicola Tosi.
Research Topics: Planetary Sciences, Computational Geodynamics

Summer 2014 **Research Assistant**, Institute of Planetary Research, German Aerospace Center (DLR), Berlin Germany, Advisor: Dr. Nicola Tosi.
Research Topics: Planetary Sciences, Computational Geodynamics

Summer 2012 **Research Assistant**, Institute of Space Sciences, Barcelona, Spain, Advisor: Dr. Josep Maria Trigo-Rodríguez.
Research Topics: Mineralogy, Meteoritic Sciences

Honours and Awards

SBF-TRR 170 (DFG-funded collaborative research consortium): research fellowship

SBF-TRR 170: 2020 best paper award for: **Maurice M.** *et al.* A long-lived magma ocean on a young Moon

Publications

Submitted manuscripts

Braude, A., Kerber L., Lefèvre F., Jaziri A. Y., Hamid S. S., Lefèvre M., **Maurice M.**, Millour E., Forget F. Modelling the effect of volcanic outgassing of sulphur on early Martian surface temperatures using a 3-D Global Climate Model (*submitted to Icarus*)

Drant, T. *et al.* (12 authors inc. **Maurice M.**) Photochemistry of volcanic CO_2-H_2 atmospheres explored through experimental and numerical simulations (*in review at Astronomy and Astrophysics*)

Peer-Reviewed Journal Articles

Cortes-Zuléta, P. *et al.* (37 authors inc. **Maurice M.**) (2024) Gl 725A b: a potential super-Earth detected with SOPHIE and SPIRou in an M dwarf binary system at 3.5 pc (*accepted by Astronomy and Astrophysics*)

Maurice M., Dasgupta R. and Hassanzadeh P. (2024) Atmospheres of Magma Ocean Exoplanets, *Astronomy and Astrophysics*, **688**, A47

Haupt C., Renggli C., Rohrbach A., Bernd J., Schwinger S., **Maurice M.**, Breuer D., Klemme S. (2024) New experimental trace element partition coefficients between clinopyroxene, plagioclase, pigeonite, and melts at reducing conditions, with implications for the evolution of the lunar magma ocean, *Contributions to Mineralogy and Petrology*, **179**, 45

Dasgupta R., Pathak D. and **Maurice, M.** (2024) A Framework of Deep Volatile Cycles in Rocky Exoplanets, *Reviews in Mineralogy and Geochemistry*, **90** (1), 323–373

Maurice M., Tosi N. and Hüttig C. (2024) Small-scale overturn of high-Ti cumulates promoted by the long lifetime of the lunar magma ocean, *Journal of Geophysical Research: Planets*, **129**, 2

Steinbrügge G. *et al.* (inc. **Maurice M.**) (2021) PRIME—a passive radar sounding concept for Io, *Bulletin of the American Astronomical Society*, **53** (4), 1–8

Maurice M., Tosi N., Schwinger S., Breuer D. and Kleine T. (2020) A long-lived magma ocean on a young Moon. *Science Advances*, **6** : eaba8949.

Yu S., Tosi N., Schwinger S., **Maurice M.**, Breuer D. and Xiao L. (2019) Overturn of ilmenite-bearing cumulates in a rheologically weak lunar mantle. *Journal of Geophysical Research: Planets*, **124**, pp 418–436.

Maurice M., Tosi N., Samuel H., Plesa A.-C., Hüttig C. and Breuer D. (2017) Onset of solid-state mantle convection and mixing during magma ocean solidification. *Journal of Geophysical Research: Planets*, **122**, pp 577–598.

Dehant V., *et al.*, (35 authors incl. **Maurice M.**) (2016) PLANET TOPERS: Planets, tracing the transfer, origin, preservation and evolution of their reservoirs. *Origin of Life and Evolution of Biospheres*, **46**, pp 369–384.

Book Chapter

Plesa A.-C., Hüttig C., **Maurice M.**, Breuer, D. and Tosi N. (2016) Large scale numerical simulations of planetary interiors. In *High performance computing in sciences and engineering '15*, edited by W. Nagel, D. Kröner and M. Resch, pp 675–688.

Invited contributions

Maurice M., Tosi N., Schwinger S., Hüttig C., Breuer D. and Kleine T. (2024) Influence of the lunar differentiation on its internal dynamics and geochronology. *GeoAzur Seminar*, Sophia-Antipolis, France.
Maurice M., Tosi N., Schwinger S., Hüttig C., Breuer D. and Kleine T. (2024) Lunar mantle overturn conditioned by magma ocean crystallization (and vis-versa). *ENS Seminar*, Lyon, France.

Maurice M., Dasgupta R. and Hassanzadeh P. (2023) Redox evolution of the terrestrial magma ocean and influence on atmosphere outgassing. *MPIA exocoffee*, hosted online by the Max Planck Institute, Heidelberg, Germany.

Maurice M., Dasgupta R. and Hassanzadeh P. (2023) Magma ocean redox evolution and its influence on atmosphere outgassing. *IPGP Seminar*, Paris, France.

Maurice M., Dasgupta R. and Hassanzadeh P. (2023) Magma ocean redox evolution and its influence on atmosphere outgassing. *DLR Seminar*, Berlin, Germany.

Maurice M., Tosi N., Schwinger S., Breuer D. and Kleine T. (2022) A long-lived magma ocean on a young Moon. *Lunar Reconnaissance Orbiter Camera (LROC) team seminar*, Online (Hosted by Arizona State University).

Maurice M., Tosi N., Schwinger S. and Breuer D. (2021) (Very) early lunar mantle dynamics. *German-Swiss Geodynamics Workshop*, Bad Belzig, Germany.

Maurice M., Tosi N., Schwinger S. and Breuer D. (2021) Thermal evolution of the lunar magma ocean. *TSU-Mini-Moon Seminar*, Online (Hosted by Taiwan Space Union).

Conference Abstracts

Participation in 20 international conferences. Short list of selected abstracts:

Maurice M., Dasgupta R. and Hassanzadeh P. (2023) Outgassed atmospheres of magma ocean exoplanets. *Goldschmidt*, Lyon, France (oral).

Maurice M., Dasgupta R. and Hassanzadeh P. (2022) Redox evolution of the terrestrial magma oceans and its influence on atmosphere outgassing. *AGU Fall Meeting*, Chicago, USA (oral).

Maurice M., Dasgupta R. and Hassanzadeh P. (2022) Magma ocean redox evolution and its influence on an outgassed atmosphere. *Lunar and Planetary Science Conference*, The Woodlands, USA (oral).

Maurice M., Tosi N., Schwinger S., Breuer D., Kleine T. (2018) A long-lived magma ocean on a young Moon. *AGU Fall Meeting*, Washington D.C., USA (oral).

Maurice M., Tosi N., Schwinger S., Breuer D., Kleine T. (2018) A long-lived lunar magma ocean. *EPSC*, Berlin, Germany (oral).

Community and Outreach

Outreach

Maurice M. (2020) A neighborhood in space: finding the Moon's age to understand Earth's evolution. https://thesciencebreaker.org/

Participation in the science outreach (middle school level) with the French association f93 and the European association LEWIBO.

Convener Activity

Organization of a 2-day workshop on Magma Oceans gathering 55 scientists from the French community (2024, Paris, France)

Co-convener of the session *Origin and evolution of volatile elements in the solar system and on the terrestrial planets (session in honor of Pr. Bernard Marty)* at the Goldschmidt 2023 conference

Co-organizer of the Fall 2021, Spring 2022 and Fall 2022 CLEVER Planets seminar series

Reviewer Activity

EGU Solid Earth, Nature Communications, Journal of Geological Research: Planets, Geophysical Research Letters, Earth and Planetary Science Letters, the Astrophysical Journal Letters, the Planetary Science Journal, Icarus, NASA NSPIRES Program

Community effort

Observer for a 1-week observation run (radial velocity measurements for exoplanets detection) at Observatoire de Haute Provence using instrument SOPHIE (2023)