



Postdoctoral position

Studies of Venus upper atmosphere with IPSL Venus GCM

Laboratoire de Météorologie Dynamique, Sorbonne Université, Paris, France

The LMD Planetary Science team (Paris, France) is happy to announce an open postdoctoral position, starting in autumn 2020, for two years. This position is opened in the context of the development of the Venus Climate Database (VCD) funded by ESA, a new reference model for the atmosphere of Venus, based on the simulations done with the IPSL Venus GCM.

The IPSL Venus GCM has been used recently to investigate all regions of the Venusian atmosphere, as it covers the surface up to the thermosphere (150 km). It involves a photochemical module with a simplified cloud scheme that enables the study of the composition and the coupling with the upper atmosphere, where composition plays a crucial role on the non-LTE and EUV heating processes. Other relevant physical processes in the thermosphere (e.g. molecular diffusion and thermal conduction) are taken into account. Below 100 km, the infrared energy budget is computed based on a Net Exchange Rate formalism. The cold collar structure has been modeled when taking into account the latitudinal distribution of the cloud structure. Globally averaged profiles (e.g. spatially and temporally) extracted from the state-of-the-art IPSL Venus GCM provide realistic templates of the atmosphere of Venus. In the context of the VCD project, the IPSL Venus GCM will be extended up to the exobase (near 250 km) before the start of the postdoctoral position.

The successful applicant will contribute to the VCD project, aiming at providing a new reference model of the Venusian atmosphere. This tool will be available to the worldwide community of researchers and engineers who need such a model for their works and to design the next missions to Venus. Well-known to the Mars Science community, the Mars Climate Database is also developed by our team, and we will build the VCD using this experience. The VCD will be available to the community in September 2021.

The studies proposed for this postdoctoral position will focus on the upper atmosphere of Venus, from the cloud-top to the thermosphere. The contribution to the VCD project will include tuning and validating the reference simulations against available observations, and propose diagnostics of the variability in the Venusian upper atmosphere. The successful applicant will be working on the interpretation of these observations, and investigate the physical processes controlling dynamics from the upper mesosphere to the exobase. A specific attention will be given to the role of convectively-generated gravity waves and their impact on zonal wind and temperature in the region of aerobraking. Comparison studies with other thermospheric GCMs could be proposed, to assess the robustness of these investigations.

A PhD in planetary science, atmospheric science, or geophysical fluid dynamics is required by the time of starting the position. The following skills will be considered in the evaluation process:

- working knowledge in planetary science (especially Venus atmosphere)
- expertise in atmospheric dynamical modelling (including model development)
- experience of exploring datasets acquired by space missions

The successful applicant will join a team dedicated to the modelling of the Venusian atmosphere, comprising Dr Sébastien Lebonnois (position advisor, research director at LMD), Dr Ehouarn Millour (research engineer at CNRS), Dr Aymeric Spiga (senior Lecturer at Sorbonne Université), and Dr François Forget (research director at LMD). The successful applicant will benefit from a dynamic and stimulating research environment, with the possibility to interact with scientists in the LMD team involved with atmospheric modeling and observations of terrestrial and planetary atmospheres, as well as French collaborators at LATMOS. Funding has been secured for travel to attend international conferences (at least 2 per year). Benefits include complete health insurance coverage and social security, as required by French law. Salary level as a function of post-PhD experience follows the rules and amounts set on a national basis by the French law.

Applicants should submit in a single PDF document a curriculum vitae with a list of publications, a short review of previous works, and statement of research interest and contribution to the project. Applicants should arrange for either two reference letters to be sent independently or include two contacts that can be contacted for reference.

Applications and information requests should be sent via email to Dr Sébastien LEBONNOIS (sebastien.lebonnois@lmd.jussieu.fr). The closing date is July 31th, 2020. Late applications might be considered, until the position is filled.