

Investigating the interaction between life and the atmosphere on the early Earth and on Earth-like planets

This position is concerned with basic scientific research investigating the interaction between life and the atmosphere on the early Earth and on Earth-like planets. During the evolution of the Earth, cycles linking the geophysics of the planetary interior and surface with the atmosphere likely played an important role. This study involves the implementation of these processes as well as the analysis of exoplanet scenarios with the Coupled Atmosphere Biogeochemistry (CAB) model and validation of model results via the use of an M-dwarf star lamp at DLR laboratories.

The department "Extrasolar Planets and Atmospheres" (EPA) at the Institute of Planetary Research of DLR deals with the detection of extrasolar planets as well as the numerical modeling of habitability and atmospheric biosignatures on terrestrial planets. On the subject of planetary structure and interior, it works closely with the "Planetary Physics" department. EPA is a leading participant in the European satellite missions for the search and characterization of extrasolar planets (CHEOPS, PLATO) as well as in ground-based instruments/telescopes.

Modelers in the PF-EPA group are developing a radiative-convective climate model with coupled photochemistry to study the atmospheric temperature structure and chemical composition of rocky exoplanets and gas-rich sub-Neptunes. In particular, the work focuses on modeling small exoplanets in the habitable zone around cooler central stars. Such stars are particularly common in the solar neighborhood and are favorable targets for exoplanet observations with missions such as CHEOPS and PLATO.

Your tasks:

- implementation of carbon (C)-nitrogen (N)-sulfur (S) biogeochemistry cycles in the coupled Atmosphere Biogeochemistry (CAB) model available at EPA
- validation of the implementation with laboratory data
- analysis of exoplanet scenarios with the model, use of the M-dwarf star lamp at the DLR laboratory

You can find the required qualification and the application procedure under the following link https://www.dlr.de/dlr/jobs/en/desktopdefault.aspx/tabid-10596/1003_read-46360/