The Institute for Physics of the Atmosphere at
Johannes Gutenberg-Universität Mainz invites applications for two

PhD positions (m/f/d)

funded within the Transregional Collaborative Research Centre 301

TPChange – The Tropopause Region in a Changing Atmosphere

by the German Research Foundation (DFG, Deutsche Forschungsgemeinschaft).

Within TPChange we aim to improve the understanding of relevant multiscale processes in the tropopause region and to specify their impact on composition, dynamics and ultimately on future climate and climate variability. The PhD candidates will work in project B08:

Lagrangian analysis of moisture, aerosols, trace gases and water isotope distribution in the extratropical UTLS

The distribution of moisture and clouds in the UTLS is highly relevant for the radiative budget of the UTLS with implications for tropopause-near thermodynamic and dynamic processes as well as surface climate. In particular, large vertical and horizontal gradients in the radiatively active substances are relevant, but the spatio-temporal variability of these gradients is still poorly understood and represented in numerical models. Cross-isentropic transport is thought to be of vital importance for the emergence of the spatial gradients, but the underlying diabatic processes are often poorly quantified and represented in numerical models. In this project we will use observational and modelling data on a variety of trace substances (including water vapor, ice particles, organic aerosols, and water isotopes) to characterize the spatio-temporal variability in the UTLS composition and trace gase gradients as well as the controlling physical processes. There will be two PhD students working on the project, which will be closely collaborating but focus on different aspects: One student will focus on the detailed numerical modelling of transport processes of the relevant species in warm-conveyor belts. The other student will focus on a climatological analysis of UTLS trace gas structure based on observations and reanalysis data.

The work will be supervised by Annette Miltenberger, who will provide extensive experience and expertise in moisture and cloud processes as well as modeling with ICON. The project will build on diagnostic frameworks developed in phase I of TPchange as well as modelling capabilities available in her group. Within TPChange, the project is well connected, close collaborations are planned with various observational groups (with respect to satellite data and aircraft data, research area A), modelling groups developing new parameterizations of UTLS relevant diabatic processes (research area B) and groups focused on climate timescales (research area C). Both students are furthermore expected to contribute to flight-planning efforts for the TPex II aircraft campaign in spring 2027.

Requirements

The successful candidates are required to hold an MSc (or equivalent) in Meteorology, Physics, or a closely related discipline. Excellent English skills, both written and spoken, are required. A strong background in atmospheric physics and demonstrated skills in scientific programming are distinct advantages as are a demonstrated experience for working in a collaborative environment, excellent analytical skills and good scientific writing skills.

Employment conditions

The wage classification of the job is EG 13 TV-L (75 %) and the place of employment will be Mainz. The targeted starting date is 1st January 2026 and the project will last until 30th June 2029.

Applications and deadline

Please send applications with reference to the code **B08-PHD-JGU** as one single pdf file to **tpc_jobs@uni-mainz.de**, including your CV, a motivation letter, copies of relevant certificates, contact information of two potential referees, and your preferred starting date.
Review of all applications will start on **27th November 2025** and will continue until the position is filled.
For further information, please contact amiltenb@uni-mainz.de.

TPChange offers a comprehensive and structured training for early career researchers. In addition to self-organised activities such as workshops, trainings and a guest program, the successful candidate will have the opportunity, if desired, to pursue international research visits. The consortium conducts an ambitious program to gradually enhance gender equality on all career levels.
Johannes Gutenberg-Universität Mainz actively supports equality, diversity and inclusion, and as an equal opportunity employer, Johannes Gutenberg-Universität Mainz explicitly encourages applications from women as well as from all others who will bring additional diversity to the university's research and teaching. Applicants with disabilities will be preferentially considered if suitably qualified.

We look forward to your application!