The Institute for Atmospheric Physics at Johannes Gutenberg University Mainz invites applications for a

PhD position (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 candidate will work in project B06

Impact of small-scale dynamics on UTLS transport and mixing

Project leaders: Dr. Daniel Kunkel, in collaboration with Prof. Ulrich Achatz and Prof. Juerg Schmidli

Zonal-mean tracer transport through the UTLS is characterized by the mean residual Brewer-Dobson circulation (BDC) and it is modified by mixing due to turbulence and partly gravity waves (GWs). Both GWs and turbulence occur on scales which require to be parameterised in weather and climate models. However, available parameterisations fail to reliably describe the effects on tracers. The project B06 within TPChange aims to improve this situation by addressing the several objectives. Other positions within this project will focus on the development and improvement of

(1) the GW model MS-GWaM with a focus on the description of the spontaneous-imbalance source,
(2) the coupling of MS-GWaM to tracer transport, and
(3) the turbulent mixing parameterisation in the UTLS.

The position to be filled here will focus on the validation of the objectives (1)-(3). This will be completed by following a synergistic approach using high-resolution airborne measurements of trace gases and state parameters from recent research campaigns as well as GW-resolving simulations of idealized baroclinic life cycles of varying complexity in ICON. These data sets will be analysed for GW properties and occurrence frequency in the lower stratosphere to further improve our understanding of the role of GW on the formation and maintenance of the extratropical mixing layer.

The PhD position is at the interface between atmospheric dynamics and trace gas composition and is hosted within the group Airborne measurements and UTLS transport processes (Dr. Daniel Kunkel) at the Institute for Atmospheric Physics at Johannes Gutenberg University in Mainz. The position is in close collaboration with positions in the groups Theory of Atmospheric Dynamics and Climate (Prof. Ulrich Achatz) and Boundary Layer Meteorology (Prof. Juerg Schmidli) at the Institute for Atmospheric and Environmental Science at Goethe University Frankfurt as well as with project B04 of TPChange.

Requirements

The ideal candidate holds an MSc in Meteorology, Physics, or a closely related discipline and has a strong background in atmospheric dynamics and an interest or first experiences in gravity wave dynamics at the tropopause and their effect on tracer transport. Experience with Eulerian models, especially ICON, is desirable as well as prior knowledge in scientific programming (e.g. fortran, python, cdo) and in working on a high performance computer.

Employment conditions

The position is offered for 4 years and the place of employment will be the Johannes Gutenberg University (JGU) Mainz. The targeted starting date is 1 July 2021.

Applications and deadline

Please send applications with reference to the code **B06_PHD_JGU** as one single pdf file to tpc_jobs@uni-mainz.de, including (i) a letter of motivation for your preferred project and preferred starting date, (ii) a curriculum vitae, (iii) copies of all relevant certificates as well as names, addresses, phone numbers, and email addresses of at least two references.
Review of all applications will start on **1 June 2021** and will continue until the position is filled.
For further information, please contact dkunkel@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.
JGU actively supports equality, diversity and inclusion, and as an equal opportunity employer, JGU 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!

Notes on Data Protection

https://www.verwaltung.personal.uni-mainz.de/files/2020/09/Datenschutz-BewerberInnen.pdf