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DLR – DAAD Fellowships

Fellowship No. 622

Research Area: Space

Research Topic: **High-resolution modelling of gravity wave events in the middle to upper atmosphere**

DLR Institute: Institute of Atmospheric Physics (PA), DLR Oberpfaffenhofen, Germany

Position: Doctoral Fellow

Openings: 1

Job Specification: Earth's atmosphere is dynamically coupled through atmospheric waves of different scales, ranging from planetary waves to small-scale gravity waves. Gravity waves in particular can propagate from sources close to the ground into the upper atmosphere to altitudes above 100 km. The contribution of these waves to perturbations of the ionosphere ("space weather") is a recent research question. Space weather has important implications for our modern navigation and communication technologies. Therefore, it is of interest to study atmospheric wave disturbances in the height region of about 50 to 150 km and investigate whether these disturbances can be predicted in advance, and whether certain background conditions lead to a change in occurrence frequency of strong wave disturbances.

The simulation, understanding and prediction of the circulation in the middle to upper atmosphere has so far been held back by a lack of accurate modeling - in particular due to not resolving the small scales of gravity waves, which are very important for the circulation in this region. In this PhD project, high-resolution numerical simulations with the novel, extended version of the German Weather and Climate model (Upper Atmosphere ICON, UA-ICON) will be conducted to study the effect of gravity waves on the mean circulation, their variability and their predictability in the middle to upper atmosphere. The PhD candidate will work closely with a second PhD student who will evaluate the model by comparing it to Lidar observations over South America and the South pole. In the project, the occurrence of strong gravity wave events will be analyzed both from a statistical point-of-view (i.e., how often do strong wave events happen?), as well as focusing on specific observed events and analyzing if and for how long they can be predicted. Further, it is planned to analyze whether the occurrence frequency of strong wave events is changed under certain flow conditions (e.g. after sudden disruptions to the stratospheric flow).

Required Qualification:	Master degree in atmospheric science/meteorology, physics or a similar discipline. You have a high interest in atmospheric fluid dynamics, and you enjoy numerical modelling and data analysis. The candidate should have at least basic level programming skills.
Advantageous Skills:	Education in atmospheric science, in particular atmospheric dynamics would be of advantage, but is not necessary. Experience with working in a Linux environment and skills in data analysis (e.g., with Python) are also of advantage.
English competence:	See requirements on www.daad.de/dlr
Earliest Start Date:	January 2024
Application Deadline:	Open until filled
Further Information:	http://www.dlr.de http://www.daad.de/dlr **for further informations, please contact hella.garny@dlr.de**