LIM
Institute for Meteorology

Universität Leipzig

Faculty of Physics and Earth Sciences

22.01.2019

The Institute for Meteorology (LIM), Universität Leipzig, Germany, invites applications for an

Open Post-doctoral Position

"Wave coupling processes of the middle and upper atmosphere: Interannual and long-term variability"

The position (100% TV-L E13) funded by the German Research Foundation (DFG, Deutsche Forschungsgemeinschaft) is awarded for 3 years. The project will be run in cooperation with the Leibniz-Institute of Atmospheric Physics e.V., Kühlungsborn, and the Department of Earth and Planetary Sciences, Kyushu University (KU), Fukuoka, Japan. The work includes numerical circulation modeling and global dataset analyses. For further details, please contact

Prof. Christoph Jacobi
Institute for Meteorology
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Requirements

We expect strong interest in middle and upper atmosphere physics. Applicants should have a PhD in meteorology, geophysics, physics, or mathematics. Experience in either global circulation modeling or high-level scientific programming for global data analysis is highly desirable.

Applications

Interested candidates should send a CV; a cover letter describing background, training and research interests; certificates; and the contact information of two referees to

jacobi[at]uni-leipzig.de.

Reviews of applications will begin immediately and continue until the position has been filled.

Selection

The selection for the positions will be based solely on merit without regard to gender, religion, national origin, political affiliation, marital or family status or other differences. Among equally qualified candidates, handicapped candidates will be given preference.

Project details

The long-term variations of the upper atmosphere are influenced by dynamical processes in the underlying atmosphere. These meteorological influences are mainly due to atmospheric waves propagating from the lower atmosphere to the thermosphere. Transferring energy and momentum, they modify thermospheric and ionospheric parameters. Atmospheric waves not only reflect dynamical features of the lower/middle atmosphere, but also exhibit long-term trends. Consequently, not only the widely known greenhouse gas cooling contributes to thermospheric long-term changes, but atmospheric wave trends also, and a comprehensive description of upper atmosphere trends will have to include this wave variability and trends.

To quantify the effect of lower and middle atmosphere wave coupling on upper atmosphere dynamics, VACILT aims at observing, modeling, and rigorously quantifying interannual and long-term changes of lower and middle atmosphere waves and their effects in the upper atmosphere. To this end, long-term (> 30 years) radar observations will be analyzed with respect to waves and mean circulation trends. These analyses will be compared with results of a long-term, lower atmosphere driven simulation of the GAIA Earth System Model, which in turn will be supported by the analysis of thermospheric observations.

From the GAIA analyses, the lower atmosphere forcing on the thermosphere due to waves will be quantified. The variability of this forcing will be determined and interpreted in the context of lower atmosphere variability. To substantiate the results, sensitivity experiments with a mechanistic model will be performed.

Main goals of VACILT are (1) a quantitative description of interannual and long-term variability and trends in the middle atmosphere and thermosphere by analyzing the mean circulation and wave parameters from Earth System Model, supported by ground-based and satellite observations (2) quantitative estimates of the degree of wave coupling effects in the upper atmosphere (3) a comprehensive analysis of the role of middle-upper atmosphere wave coupling in forcing upper atmosphere long-term trends and variations, in relation to other drivers like greenhouse gas cooling. The achievement of these goals will clarify the role of lower atmosphere forcing on the upper atmosphere variability, directly contributing to ionospheric modeling and prediction, which is closely related to performances of modern communication and navigation systems.

The research within VACILT will be performed jointly by Universität Leipzig, Institute for Meteorology, Leipzig, Germany, Leibniz-Institute of Atmospheric Physics, Kühlungsborn, Germany, and Department of Earth and Planetary Sciences, Kyushu University, Japan. This will bring together resources of long-term radar observations and mechanistic models (Germany) and Earth system modeling and global satellite observations (Japan), which complements each other effectively to reach the project goal.

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