Middle atmosphere localized gravity wave forcing: Formation, impact and long-term evolution PI: Christoph Jacobi, Leipzig University

The project focuses on the detection, analysis, and modelling of stratospheric gravity wave (GW) hotspots and their effect on the dynamics of the middle atmosphere. To this end, we will identify GW hotspots on the basis of observations, reanalysis data and model output by analysing different GW parameters, and also background conditions. From these analyses we will deduce possible GW sources as well as meteorological conditions that favour the generation of GW hotspots. Based on these results from the datasets partly covering several decades, we will also investigate the temporal development of these GW hotspots to investigate in how far the GW hotspot activity has changed during the last decades.

To analyse the interaction processes of these GW hotspots with the circulation of the middle atmosphere (the wave forcing itself as well as a compensation mechanism), experiments with the UA-ICON and ICON-NWP models and a further mechanistic circulation model will be performed. This will enable us to investigate (i) how the GW hotspots and their effects are reproduced in climate models, (ii) their influence on circulation changes in a changing climate, and (iii) how they react on a changing climate.

MATELO-FILE is a cooperation of Universität Leipzig, Institute for Meteorology, Leipzig, Germany (LIM) and the Department of Atmospheric Physics, Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic (DAP).