Geophysical Research Abstracts
Vol. 15, EGU2013-9604, 2013
EGU General Assembly 2013

Simulation of convectively forced gravity waves in comparison with SABER satellite measurements.

Silvio Kalisch (1), Thai Trinh (1), Hye-Yeong Chun (2), Manfred Ern (1), Peter Preusse (1), Young-Ha Kim (2), Steven Eckermann (3), and Martin Riese (1)

(1) Forschungszentrum Jülich, IEK-7:Stratosphere, Jülich, Germany (s.kalisch@fz-juelich.de), (2) Lab of Atmospheric Dynamics, Yonsei University, Seoul, South Korea, (3) Naval Research Laboratory, Washington D.C., U.S.

Gravity waves (GW) are a known coupling mechanism between lower, middle, and upper atmosphere. They are responsible for driving large scale circulations like Brewer-Dobson circulation and contribute almost 60% to the QBO of the inner tropics. Convection is the dominant source for tropical GWs, but deep convection is also one of the most difficult to understand sources of GWs. Especially, the development of atmospheric general circulation models (AGCM) suffers from improvements in the parameterization of convectively forced GWs (cGWs). In this study we present the results of GW ray-tracing calculations of cGWs. For this, we used the Gravity Wave Regional Or Global RAy-tracer (GROGRAT) and the convective source scheme from Yonsei University (South Korea). Furthermore, we used MERRA heating rates, cloud data, and background data for both the calculation of the convective forcing by deep convection and for the atmospheric background of the ray-tracing calculations afterwards. Also, we compare our results with satellite measurements of squared temperature amplitudes as well as momentum flux by the SABER instrument in order to validate our findings over a 10 years period. For the comparison the observational filter of the instrument is taken into account, the influence discussed. The modulation of GW momentum flux by the background winds and in particular the influence of the QBO is investigated. GW drag at various altitudes is calculated and compared to the drag required for the forcing of the QBO.