



Gravity waves resolved in ECMWF and measured by SABER

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The limited resolution of most global circulation models (GCMs) is not sufficient to simulate gravity waves (GWs) explicitly. ECMWF (European Centre for Medium-Range Weather Forecasts) data have now a grid resolution of 25km so part of the mesoscale GWs can be resolved but most source processes are still subgrid phenomena. Therefore we validate the GW spectrum contained in ECMWF with a measured global data set. We simulate measurements of the infrared limb sounder SABER and compare them in a study with real measurements of this instrument. During this simulation we consider the radiative transfer, retrieval and the separation the GW spectrum from the background atmosphere. Global variations of the GW distribution can be attributed to several GW sources and the modulation of the GW spectrum by the background winds.

This study indicates that mountain waves e.g. over the southern tip of south America or over Scandinavia are resolved as well as GWs over the polar vortex at the winter hemisphere. Also GWs from equatorial sources associated with convective systems are included in the data sets. The vertical distribution of temperature amplitudes indicates that in ECMWF data the waves are damped at altitudes above 50km.