



Global climatology of the wind vector rotation - implications for the orographic gravity waves propagation

Petr Pisoft, Petr Sacha, and Ales Kuchar

Charles University in Prague, Faculty of Mathematics and Physics, Department of Atmospheric Physics, Praha 2, Czech Republic (petr.pisoft@mff.cuni.cz)

The gravity waves spectrum is shaped not only by different sources but it also reflects tropospheric background conditions contributing to filtering of various gravity waves. This could be most easily illustrated for the propagation of the orographic gravity waves that are critically filtered when the wind speed is zero. This condition is ensured in case of the directional shear exceeding 180° . Above regions where it is fulfilled, one can rule out the possibility of orographic GW modes contributing to the observed GW activity and vice versa regions of small wind rotation in the lower levels are often precursors of enhanced GW activity higher.

In this study, we have performed a global analysis of the background conditions with a focus on the rotation of the ground level winds. We have analyzed MERRA and JRA-55 time series. The results provided climatology of atmospheric regions with the conditions favorable for the upward propagation of the orographic gravity waves from the troposphere into the stratosphere. The regions are detected mainly over areas where tropospheric and stratospheric jets coincide. The study is supplemented by a global analysis of the fields of potential energy of disturbances as a proxy for gravity waves activity using COSMIC GPS RO data.