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Interaction between gravity waves and planetary waves simulated using WKB method

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Gravity waves are the main driver of the global circulation in the mesosphere. They are also responsible for almost 50 percent of the predicted climate trend of the Brewer Dobson circulation and are known to be the prominent feature driving the quasi biennial oscillation. Still, many details of the interaction of gravity waves with the large scale background flow are not well understood. We investigate the propagation and momentum flux deposition of gravity waves by using the Gravity wave Regional or Global Ray Tracer (GROGRAT). For this reason, we calculated gravity wave trajectories and amplitudes in the northern hemisphere winter stratosphere and mesosphere. The launch distribution of the waves was inferred from satellite measurements and the background atmosphere for the simulations is taken from ECMWF and NOGAPS-ALPHA (navy operational global atmospheric prediction system - advanced level physics - high altitude) data. We examine the correlations between patterns in global gravity wave distributions with the presence of various planetary waves. Furthermore we demonstrate the influence of planetary waves on propagation and momentum flux deposition of gravity waves in the mesosphere and the drag excitation on the zonal mean flow due to Eliassen-Palm flux divergence.