



Global ray tracing simulations of the SABER gravity wave climatology

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Since February 2002 the SABER instrument on board the TIMED satellite has measured temperatures throughout the entire middle atmosphere. From these SABER data five years of gravity wave (GW) temperature variances for 20 km to 100 km altitude were deduced. A typical annual cycle is presented by calculating averages for the individual calendar months. Findings are consistent with previous results from various satellite missions. Based on July data and zonal mean GW momentum flux from CRISTA a homogeneous and isotropic launch distribution for the Gravity wave Regional Or Global RAY Tracer (GROGRAT) is determined. Global maps for different seasons and altitudes as well as time series of zonal mean GW squared amplitudes based on this launch distribution well match the observations. Based on this realistic, observation tuned model run, we can calculate quantities which cannot be addressed by measurements and which are speculated to be major uncertainty sources in current generation GW parameterization schemes. Two examples shown are the average cross-latitude propagation of GWs and the relative acceleration contributions provided by saturation and dissipation on the one hand and the horizontal refraction of GWs by horizontal gradients of the mean flow on the other hand.