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Global distributions of gravity wave momentum flux measured by satellites: Some implications for the dynamics of the strato- and mesosphere

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The satellite instruments HIRDLS and SABER both provide long-term high spatial resolution data sets of temperature altitude profiles that allow gravity wave (GW) parameters like wave amplitudes, horizontal and vertical wavelengths, and, consequently, also absolute values of GW momentum flux to be determined. HIRDLS covers the years 2005-2007 and SABER the years 2002-2010 (almost a whole 11-year solar cycle). We present estimates of GW momentum flux from both instruments. Seasonal, interannual, and spatial variations, as well as implications for GW parameterizations will be discussed. For the first time global distributions of GW momentum flux in the mesosphere are derived from SABER measurements. Results show that non-vertical propagation of GWs is a significant effect. In particular, GW momentum flux originating from convective sources in the subtropics during the monsoon seasons is the main contribution of GW momentum flux at midlatitudes in the summer hemisphere around 70 km altitude. This means that GWs generated in the subtropics likely contribute significantly to the reversal of the summertime mesospheric jet.