

**Solar Cycle and Trend of Global Gravity Waves Derived from 14 Years of SABER Temperature Observations (2001-2015)**

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Gravity waves (GWs) are disturbances of the atmosphere with horizontal wavelengths of several kilometers to several thousand kilometers. GWs can be generated by many sources, e.g., wind jets, deep convection, and flow over topography. The global GW potential energy (PE) per unit mass is derived from SABER (Sounding of the Atmosphere using Broadband Emission Radiometry) temperature profiles over the past 14 years (2002–2015). We find a significant positive trend of GW PE at around 50°N during July from 2002 to 2015. Both the monthly and the deseasonalized trends in of GW PE are significant near 50°S. Specifically, the deseasonalized trend of GW PE has a positive peak of 12–15% per decade at 40°S–50°S and below 60 km, which suggests that eddy diffusion is increasing in some places. The response of GW PE to solar activity is negative in the lower and middle latitudes. The response of GW PE to QBO (as indicated by 30 hPa zonal winds over the equator) is negative in the tropical upper stratosphere and extends to higher latitudes at higher altitudes. The response of GW PE to ENSO (as indicated by the MEI index) is positive in the tropical upper stratosphere.