

# **GLOBAL AND REGIONAL SCALE STUDIES OF ATMOSPHERIC GRAVITY WAVE ENERGY USING CHAMP AND COSMIC**

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The multi-year CHAMP temperature datasets were used to construct a climatology of stratospheric gravity wave potential energy (PE) in the polar regions. The CHAMP data were then compared with the Eliasson Palm flux. These results show that wave activity associated with geostrophic adjustment of the polar jet in both hemispheres contributes to total PE in some locations. Planetary wave activity in the Antarctic region was also found to be an important source of PE. Topography played a regional scale role in wave generation, with intermittently large PE observed east of the Andes.

Data from the six new COSMIC (Constellation Observing System for Meteorology, Ionosphere & Climate) satellites allow a more detailed investigation of the CHAMP climatology on shorter time scales than was previously possible. The COSMIC temperature profiles were used in order to obtain tropospheric and stratospheric PE around the globe with a grid resolution of  $20 \times 5$  degrees.

Equatorial Western Pacific Upper Troposphere and Lower Stratosphere (UTLS) PE doubled from  $\sim 5$  J/kg to  $\sim 10$  J/kg during periods with deep convective activity and active MJO conditions. This increase can be attributed to enhanced convective wave generation and therefore increased temperature variance. This source of large PE contrasts with the Eastern Pacific region, where most UTLS PE is associated with intermittently strong Walker circulation zonal winds. The stratospheric PE decreases with height around the equator, suggesting wave filtering by the background winds.

Initial COSMIC results from the Antarctic region will also be presented, with the focus on the austral spring of 2006. These results reveal regions of large potential energy generated by topography (e.g. Antarctic Peninsula) and wave generation due to readjustment of the polar stratospheric jet, especially above the Eastern Antarctic region.