

Satellite and ground based Measurements of Wave Interactions above Antarctica

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Wave interactions are an important mechanism for the coupling of different regions in the middle atmosphere. This study investigates the coupling of gravity waves, planetary waves and tides in the stratosphere, mesosphere and lower thermosphere above Antarctica using satellite and radar data. CHAMP (Challenging Minisatellite Payload) radio occultation measurements is used to measure gravity wave activity in the Antarctic lower stratosphere, while data from the EOS microwave limb sounder is employed to study waves with longer periods in the middle atmosphere. These datasets are complemented by measurements from an MF radar at Scott Base which yields measures of gravity waves, planetary waves and tides. Wave activity is presented as a function of time, altitude and geographic location and interactions are then investigated with a focus on coupling with atmospheric tides. Amplitude changes and the generation of secondary waves are among the observed effects. Climatologies based on periodogram analysis of MF radar winds are used to identify periods of strong wave-wave interactions.