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Mesosphere-lower thermosphere coupling through tidal features observed in OH(6,2) and O_2 atmospheric(0,1) nightglow emissions.

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Evidence of tidal features have been detected in simultaneous OH Meinel (6,2) airglow and O_2 atmospheric(0,1) brightness and rotational temperature measurements obtained at Adelaide, Australia (34.9 °S, 138.6 °E). The data was collected nightly over a period spanning two years, from 2002 to 2003, using a modified Czerny-Turner CCD spectrometer observing in the near infrared. O_2 atm(0,1) brightness and rotational temperatures were calculated by generating synthetic spectra of these band emissions at varying temperatures and obtaining a non-linear least squares fit between the synthetic and measured spectra. Hydroxyl airglow rotational temperatures were derived from the brightness of the individual rotational lines of the P branch of the OH(6,2) Meinel band. The rotational population distribution of the airglow OH and O_2 has been shown to be in thermal equilibrium with the ambient kinetic temperature of the neutral atmosphere.

Temperatures obtained from the OH(6,2) and the O_2 atm(0,1) are in general agreement and exhibit the same gross trends. Wavelike modulations and quasi-periodic fluctuations were simultaneously observed in the rotational temperatures for both bands. Because the OH(6,2) and the O_2 atm(0,1) bands peak at different altitudes ($\sim$87 km and 95 km respectively), the amplitudes and phases of the modulations will be analyzed to determine details about the vertical propagation of the waves, and to investigate coupling between the mesosphere and lower thermosphere.