



## **Dynamical perturbations of the thermosphere at Southern midlatitudes inferred from satellite observations of O(1D) nightglow and TEC**

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The Midnight Temperature Maximum (MTM) is a large scale neutral temperature anomaly with a wide-ranging effect on the nighttime thermospheric dynamics at low latitudes. The focus of the current study is an investigation of the extent of the MTM to southern midlatitudes (20°S – 40°S) employing multi-year observations of O(1D) airglow volume emission rates (VER), Doppler temperatures (DoT), and neutral winds over the altitude range of 190–300 km by the Wind Imaging Interferometer (WINDII) experiment on board the Upper Atmosphere Research Satellite. The MTM dependence on longitude, season, local time and altitude has been examined. Midnight maxima were observed both in the O(1D) VER and DoT with peaks at ~21 LT and 2 LT during summer solstice; 21 LT, 24 LT and 2 LT in O(1D) VER and 21 LT and 1 LT in DoT for fall equinox; 21 LT and 2 LT in O(1D) VER and 21LT and 3LT in DoT for spring equinox. The observed perturbations in the O(1D) VER and temperature were out-of-phase with respect to longitude. Latitude/longitude maps of the VER and DoT revealed wave-1 signatures most persistently seen after local midnight in summer, with very little day-to-day variation in phase, while the amplitude varied with time. WINDII meridional wind observations, as well as correlative in time TOPEX TEC (Total Electron Content) data have been employed to investigate the mechanisms underlying the observed enhancement in O(1D) VER and DoT, including the possible relationship to the Weddell Sea Anomaly in the observed perturbations.