Recent Insights into the Thermosphere-Ionosphere Response to External Forcing from the Global-scale Observations of the Limb and Disk (GOLD) Mission

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Observations by the GOLD mission are able to follow spatial and temporal changes in the composition, density and temperature of Earth’ s thermosphere, providing fundamental information for understanding the Thermosphere-Ionosphere system. GOLD images the Earth from geostationary orbit at 47.5 degrees W longitude, observing on a 30-minute cadence from 06:10 to 0:40 UT (03:00-21:3 LT at the satellite). The observations performed include limb scans; stellar occultations; and images the sunlit and nightside disk. These data provide simultaneous, synoptic daytime imaging of the composition and temperature near 160 km for the first time. Repeated observations of peak densities in the low-latitude, nighttime equatorial ionization anomaly (EIA) and the depletions within it also provide a new perspective on that region. These observations are providing significant tests of current models, tests that may lead to advances in the capabilities of global-scale models of the thermosphere and ionosphere system. Observations also clearly indicate the presence of waves in the thermosphere. There are also clear indications of waves and tides propagating from lower altitudes. Examples of these observations, as well as their potential for advancing models of the thermosphere-ionosphere system, will be presented and discussed.

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