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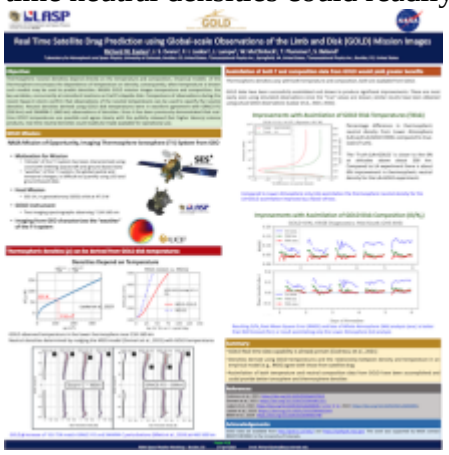
Poster
Thermospheric neutral densities depend directly on the temperature and composition. The thermosphere can be closely modeled as an ideal gas, for which the relationships between the density of the gas is directly derivable from the temperature, composition and a constant. NASA’s GOLD mission images temperature and composition, the key variables, concurrently at coincident locations on Earth’s dayside disk. Comparisons of observations during the recent Space-X storm confirm that neutral densities can be well specified using observations of the neutral temperatures, a current empirical model of the thermosphere and the ideal gas law relationship between densities and temperature. Using only the GOLD disk measurements of temperatures to guide/nudge MSIS model temperatures, the resulting neutral densities extrapolated to higher altitudes were in excellent agreement with GRACE-FO (500 km) and SWARM-C (460 km) observations of densities. Using the neutral composition (O/N2 ratio) data from GOLD should further improve the ability to specify and even predict neutral and ionospheric densities because GOLD has shown that the composition changes slowly, with perturbations persisting for days. Since it has been previously demonstrated that a real-time version of the GOLD data is possible and agrees closely with the publicly released (but higher latency) science products, real-time neutral densities could readily be made available for operational use.



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