

Space Studies of the Upper Atmospheres of the Earth and Planets including Reference Atmospheres (C)
7th Thermospheric-Ionospheric-Geospheric (TIGER) Symposium (C12)

GLOBAL-SCALE OBSERVATIONS OF THE LIMB AND DISK: A KEY MISSION FOR UNDERSTANDING THERMOSPHERE-IONOSPHERE FORCING.

Dr Alan Burns, aburns@ucar.edu

National Center for Atmospheric Research, High Altitude Observatory, Boulder, Colorado, United States

Alan Burns, aburns@ucar.edu

National Center for Atmospheric Research, High Altitude Observatory, Boulder, Colorado, United States

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R. Eastes, A. G. Burns, W. McClintock, A. Aksnes, D. Anderson, L. Andersson, S. Budzien, M. Codrescu, R. Daniell, S. England, K. Dymond, F. Eparvier, J. Harvey, T. Immel, A. Krywonos, M. Lankton, J. Lumpe, A. D. Richmond, D. Rusch, O. Siegmund, S. C. Solomon, D. Strickland and T. Woods

Global-scale Observations of the Limb and Disk (GOLD) is a proposed Mission of Opportunity to perform remote-sensing measurements of the Earth's thermosphere and ionosphere, using an ultraviolet imaging spectrograph on board a commercial, geosynchronous satellite. The goal of the mission is to provide answers to key elements of an overarching question for Heliophysics science: what is the global-scale response of the thermosphere and ionosphere to forcing in the integrated Sun-Earth system? GOLD will advance our understanding of Thermosphere-Ionosphere forcing by providing neutral densities and temperatures in the thermosphere as well as densities in the nighttime ionosphere. The Thermosphere-Ionosphere region is one in which there is a transition between a plasma dominated regime and a neutral, fluid dominated atmosphere. It is also primarily externally forced rather than being forced by internal processes. The relative importance of this forcing varies by geographic location and height, so the impact of this forcing must be understood on a global rather than a local scale. GOLD will provide the first large-scale "snapshot" of temperature that can be compared with a simultaneous "snapshot" of composition changes to understand how these two major parameters simultaneously react to these various forcing mechanisms. The relationship between universal time, local time and longitudinal changes in these key parameters can be unambiguously separated by the GOLD observations to enable us to address these interactions. GOLD will resolve some of the important issues related to how the forcing drives this transition region and the interaction between these parameters by addressing four key science questions which are subsets of this overarching problem: 1. How do geomagnetic storms alter the temperature and composition structure of the thermosphere; how does the low-latitude, nighttime ionosphere respond to geomagnetic storms; and is the initial state of the thermosphere-ionosphere system a key deter-

minant of geomagnetic storm effects? 2. What is the global-scale response of the thermosphere to solar extreme-ultraviolet variability? 3. Do atmospheric waves and tides have a significant effect on thermospheric temperature structure? 4. Do vertical ion drifts, as manifested in the structure of the equatorial anomaly, affect the occurrence of ionospheric irregularities?