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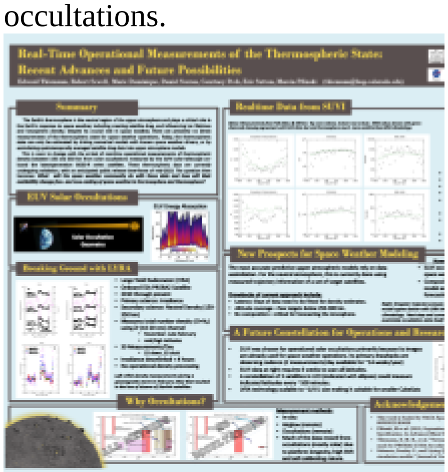
Poster
The Earth's thermosphere is the neutral region of the upper atmosphere, playing a critical role in the Earth's response to space weather and satellite drag in particular. The relationship between thermospheric variability and satellite drag is relatively straightforward: A hotter thermosphere results in higher densities at all altitudes, directly increasing satellite drag. Despite its crucial role in space weather, there are presently no operational direct measurements of the thermospheric state. Instead, today, the thermospheric state can only be estimated by driving numerical models with known space weather drivers, or by assimilating spatiotemporally averaged satellite drag data into such models.

This is soon to change with the arrival of real-time operational measurements of thermospheric density between 150 and 350 km from solar occultations measured by the SUVI solar telescope on-board the latest-generation GOES-R series satellites. These thermospheric data are currently undergoing validation, with an anticipated public release time-frame of mid-2023. The question then becomes: What will the space weather community do with these data and how will their availability change fore- and now-casting of space weather in the ionosphere and thermosphere?

SUVI measurements are made twice daily, due to the GOES-R Geostationary orbit, seeing only one eclipse period per day, limiting their use in tracking the rapid changes during geomagnetic storms. On the other-hand, the LYRA instrument onboard the PROBA2 satellite measures solar occultations of the thermosphere every 100 minutes, owing to its LEO orbit, and can rapidly track storm-induced changes in density and temperature from 150 to 350 km. The drawback for LYRA is its data have a latency of four hours and its thermospheric data processing is not automated.

In this presentation, we review the SUVI and LYRA measurements and show the technology can be readily miniaturized and optimized for thermospheric density measurements. We make the case that model developers and space weather forecasters need to determine how these data should be used, and mission planners should request funding agencies to invest in targeted instruments for measuring thermospheric density via solar occultations.


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