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Title: *Thermosphere Consequences of Equatorial Plasma Bubbles*

Cluster: *Cross-Theme Theory and Data Analysis/SECTP*

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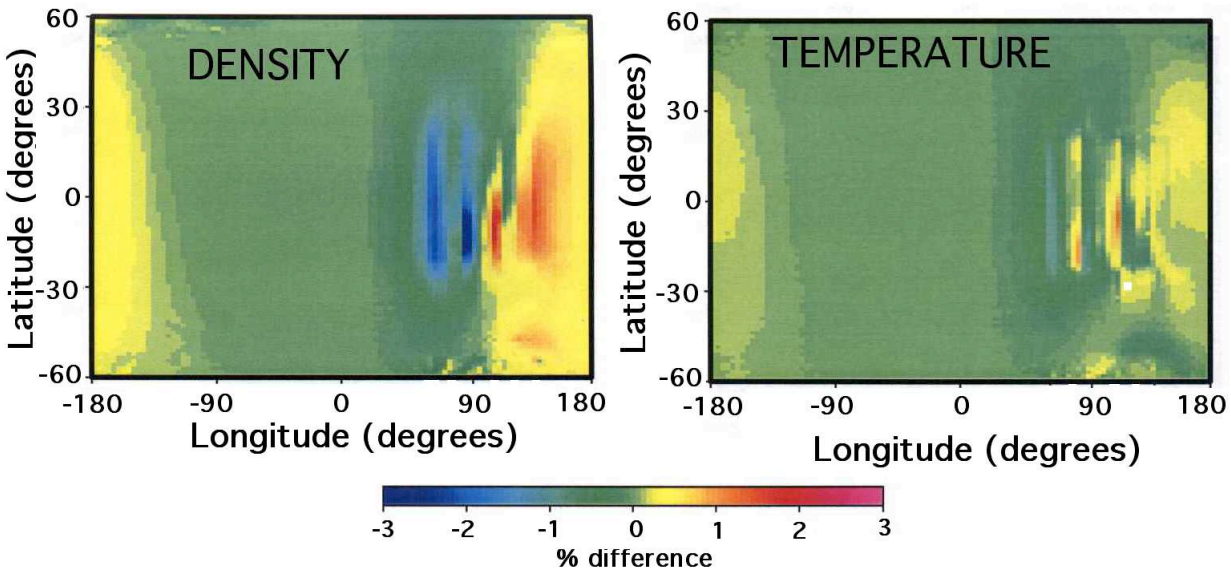
- **Plasma Bubbles Included in Thermosphere Circulation Model for the First Time**

Plasma bubbles, forming on the bottomside of the main ionosphere layer, are common in the low latitude ionosphere near and after the dusk terminator. They drift upward and eastward taking the form of vertically elongated wedges of depleted (by factors of 10-1000) plasma. Using relatively simple bubble configurations in the background ionosphere, the Utah State University SEC Theory group ran their 3-dimensional, time dependent, high resolution Thermosphere General Circulation Model. In this model the momentum and energy exchanges between the thermosphere and ionosphere occur through ion-drag and ion-neutral frictional heating. The presence of the bubbles produced changes in the neutral temperature up to 35 degrees and as much as 6% changes (both positive and negative) in the neutral density. Although these relative numbers seem small, they are measurable changes and represent large energy and momentum quantities.

This was the first time that the potential effects of ionospheric bubble structures on the atmosphere were considered. The study provides a new measurable aspect of ionosphere-thermosphere coupling that future NASA missions like the Geospace Electrodynamic Connections (GEC) mission and the LWS I-T Storm Probes can explore.

Modeled density and temperature changes at 300 km resulting from the introduction of 3 bubbles with density depletions of 1000. The figure is for 5 hours after the bubble introduction.



Reference: Schunk, R. W. and H. G. Demars, Effect of Equatorial Plasma Bubbles on the Thermosphere, in Press, **J. Geophys. Res.**, 2003.