

# **LESSONS LEARNED ABOUT THE THERMOSPHERE-IONOSPHERE SYSTEM FROM THE CHAMP MISSION**

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The recent years have brought enormous progress for our understanding of the characteristics and the variability of the thermosphere. This is mainly based on the high-resolution measurements of the accelerometer on board the CHAMP satellite. It sampled the air drag from the solar maximum in 2001 to the minimum in 2008. This long data set enabled a lot of dedicated studies.

One important finding is the close relation of thermospheric features to the geomagnetic field geometry. Here the ionised component has to take the role of the mediator between magnetic field and neutral gas. Examples of that are the equatorial mass density anomaly, the cusp density anomaly and the high-speed wind channel along the dip equator.

The thermosphere reacts quite differently to solar and magnetic forcing. This is particularly evident when comparing the mass density on the day and night side at low latitudes. We were able to delineate the variations due to solar flux, season, and magnetic activity. It turns out that the controlling parameters, e.g. F10.7, Day-of-Year or Am influence the thermosphere in a linear fashion.

Recently a lot of interest has been put in the tidal modulation of the high atmosphere. Also in the thermosphere at 400 km altitude the signatures of migrating and non-migrating tides have been identified. These are again well correlated with ionospheric signatures. On the evening and morning side terminator waves are identified which still wait for their proper interpretation.

Representative examples of the listed effects will be presented.

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