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Heating of the thermosphere in the polar cap region during magnetic storms

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The heating of the ionosphere-thermosphere system at high latitudes is a rather common phenomenon. Particular in the cusp region a mass density enhancement can be observed almost every day. In contrast to that the polar cap is usually free of density anomalies. This configuration changes markedly during magnetic storms.
The CHAMP satellite with its complementary payload and long-duration mission provides an excellent dataset for studying the storm-related heating of the upper atmosphere. Based on accelerometer measurements large mass density enhancements appear in the polar cap. Simultaneously, the density anomalies associated with the auroral region shift, as expected, equatorward. In this presentation we are focusing on the heating in the polar cap. For identifying the relevant heating mechanism we consider additional quantities like field-aligned currents, plasma density and temperature and neutral winds. Finally, a scenario will be proposed for the process that transports the energy into the polar cap region during storms.