



Definition of new geomagnetic activity proxies and their use in thermosphere density modeling in the framework of the ATMOP project (invited)

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In the framework of the FP7 European program ATMOP (Advanced Thermosphere Modelling for Orbit Prediction), we present a test of new geomagnetic indices, that we propose to use in the new version of the semi empirical DTM thermosphere model. This new version of the DTM model will provide in quasi real time a precise air drag computation, necessary for accurate tracking of space objects in low earth orbit.

To characterize the geomagnetic forcing in the upper atmosphere geomagnetic indices derived from ground based magnetic variation recordings are used. In the currently used semi-empirical density models (DTM, MSIS, JB2008) the geomagnetic forcing is characterized using the Km or Kp index with a 3 hour time resolution or the DST index with a 1 hour time resolution.

We define new geomagnetic indices, based on ground based magnetic variations recorded in the am network observatories at sub-auroral latitudes to achieve a better temporal resolution (α_m indices) or a better spatial representation of the local time dependency of the solar wind/magnetosphere interaction (am-MLT and α_m -MLT sector indices).

This test will be carried out using CHAMP and GRACE densities (inferred from accelerometer data in the 370-490 km range) between years 2002-2006.

Correlations between the variation of density and geomagnetic indices will give information on the geomagnetic indices to be used, taking into account constraints for an operational version of the DTM model.