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A test of geomagnetic indices for a use in upper atmosphere density modelling

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In the frame of the FP7 European program ATMOP (Advanced Thermosphere Modelling for Orbit Prediction), we present a test of geomagnetic indices that are going to be used in a new version of the semi-empirical DTM thermosphere model, including an operational version. This new version of DTM will provide precise air drag computation, necessary for a precise tracking of space objects in low earth orbit.

Geomagnetic indices derived from ground based magnetic variation recordings will be used in this new version of DTM to characterize the geomagnetic forcing in the upper atmosphere. In the currently used semi-empirical density models (DTM, MSIS, JB2008) the geomagnetic forcing is characterized using Kp index or the DST index. In this work, we will test new geomagnetic indices, with a better representation of the geomagnetic activity, or an improved time resolution.

This test will be carried out using CHAMP and GRACE density data (accelerometer data in the 370-490 km) recorded during 3 major storm events that occurred in November 2003, November 2004, and December 2006.

Density data will be represented in a geomagnetic referential coordinates. The correlation between the variation of density and geomagnetic indices as the am index, or the new indices aλ and $\alpha\lambda$ (giving a better time and longitude resolution) will be tested.