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Influence of gravity wave parameterisation on temperature and NO_y descent

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External forcing by high-speed solar wind streams and solar coronal mass ejections (so-called geomagnetic forcing) incfluences composition and circulation of the lower thermosphere. Essential processes are photoionisation, particle ionisation and Joule heating. Hereby produced changes in the thermosphere also effect other atmospheric layers. Enhanced nitrogen monoxide (NO) due to auroral ionisation subsides and influences atmospheric layers below (e. g. ozone layer). Gravity waves, excited in the lower thermosphere by e. g. geomagnetic storms, can propagate upwards and influence the environment of low-Earth orbit satellites. To correctly reproduce this coupling with models, it is important, to describe these processes in the lower thermosphere as precisely as possible.

For our investigations we use a vertical extended version of the EMAC (ECHAM5 MESSy Atmospheric Chemistry) model. In this presentation we show the impact of different gravity waves parameterisations (different parameter settings of the Hines scheme and Yigit-Medvedev scheme) on temperature and downward transport in the polar MLT-region. Our focus will be on the three elevated stratopause events in the time period from 2003 to 2010. We compare our results to standard EMAC results and satellite observations from MIPAS and MLS.