



Comparison of MIPAS/ENVISAT observations to model results from KASIMA for the chemical effects of energetic particle precipitation

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The solar proton event in fall 2003 was observed by the MIPAS instrument on the ESA satellite ENVISAT and allowed to study energetic particle precipitation effects on atmospheric chemistry. Increases of HOX and NOX resulted in additional ozone loss, but also for other species as HNO₃, ClONO₂ etc. changes related to the event could be observed. We extend these observations to the weaker events in 2005 and 2006 and analyze the observations of several species for possible EEP effects.

In addition, we compare these observations with the results of our 3-D chemical transport model KASIMA which includes full stratospheric chemistry and a module describing HOX and NOX enhancements related to EEP effects.

Whereas the model simulates the increases of NOX and HOX in reasonable agreement with the observed changes in NO₂, NO and resulting O₃ changes, the increase in H₂O₂ due to the SPE seems to be overestimated in the model. The observed mesospheric N₂O can be explained by the addition of the reaction N + NO₂ qualitatively. A HNO₃ enhancement observed immediately after the SPE can be seen by MIPAS is much weaker in the model and can not be explained by neutral chemistry. For the SPEs in Jan 2005 and the weaker one in Dec 2006 we will show similar results.