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Comparison of H2O2 model results with different reaction rates to MIPAS observations

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H, OH and HO_2 (collectively called HO_x) are fast-reacting radicals in the middle atmosphere. These radicals are efficient catalysts for destroying ozone and play an important role in atmospheric chemistry. An important reservoir gas for HO_x is Hydrogen Peroxide (H_2O_2). The main reactions for H_2O_2 are:
$HO_2 + HO_2 \rightarrow H_2O_2 + O_2$,
$OH + H_2O_2 \rightarrow H_2O + HO_2$,
$H_2O_2 + h\nu \rightarrow OH + OH$.
Many of the corresponding reaction rates have high uncertainties. We performed model simulations with our CTM KASIMA with different sets of reaction rates for the main reactions. Mixing ratios from these simulations are compared to H_2O_2 observations of the Michelson Interferometer for Passive Atmospheric Sounding (MIPAS) for standard conditions and during the Solar Proton Event in Oct./Nov. 2003. The KASIMA model overestimates H_2O_2 concentration using the standard set of reaction rates, but can qualitatively reproduce H_2O_2 enhancements as observed after the SPE event. We further take a look at the differences in H_2O_2 mixing ratios in this time period using the different reaction rates.