

# The 3D CCM SOCOL

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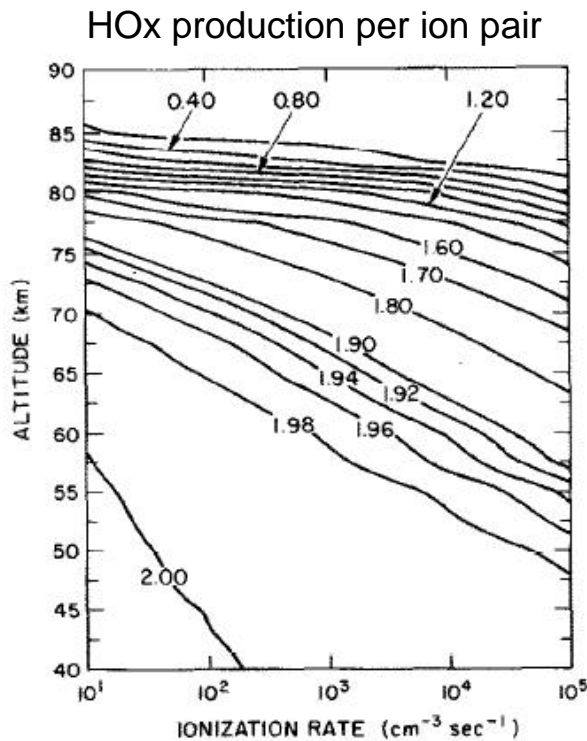
# Model

- Model

- The chemistry-climate model SOCOL (Schraner et al., 2008; Egorova et al., 2005) is based on GCM-ECHAM4 (Manzini et al., 1997) and a modified version of the atmospheric chemistry-transport model MEZON (Egorova et al., 2003)
- SOCOL has a horizontal resolution of T30 ( $3.75^{\circ} \times 3.75^{\circ}$ )
- The model has 39 levels, spanning the model atmosphere from surface to 0.01 hPa ( $\sim 80$  km)
- Chemistry, radiation and transport are calculated every 2 hours
- The model chemistry scheme treats 54 chemical species, 46 photolysis reactions and 16 heterogeneous reactions in/on aqueous sulfuric acid aerosols, water ice and NAT

# Model

- Production of HO<sub>x</sub> in the model
- We include HO<sub>x</sub> production by energetic particles in SOCOL by using a look-up table (Jackman et al., 2005b) invoking the computations of Solomon et al. (1981).
- Production of NO<sub>x</sub> in the model
- NO<sub>x</sub> is produced when energetic particles collide with and dissociate N<sub>2</sub>.
- Following Porter et al. (1976) it is assumed that **~ 1.25N atoms are produced by ion pair.**
- The impact with N<sub>2</sub> is further distinguished between **ground state (~ 0.55 per ion pair) and excited state (~ 0.7 per ion pair) nitrogen atoms.**



# Conclusion

- **SOCOL** is a state of the art 3D CCM which can reproduce nature with its dynamics and transport to show the behavior of several chemical species and their interaction with the atmosphere.
- Thus, the modeling with **3D CCM SOCOL** gives a **good insight view** at the impact of e.g. a solar proton event and the resultant consequences.



Thank you