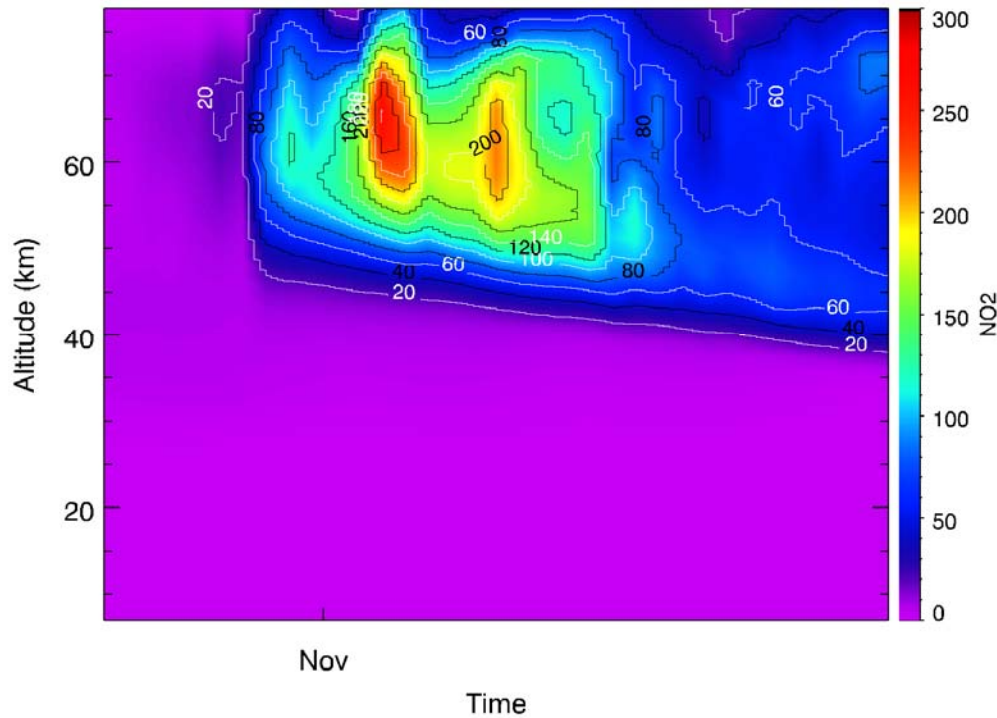


Short description of KASIMA model as used for HEPPA

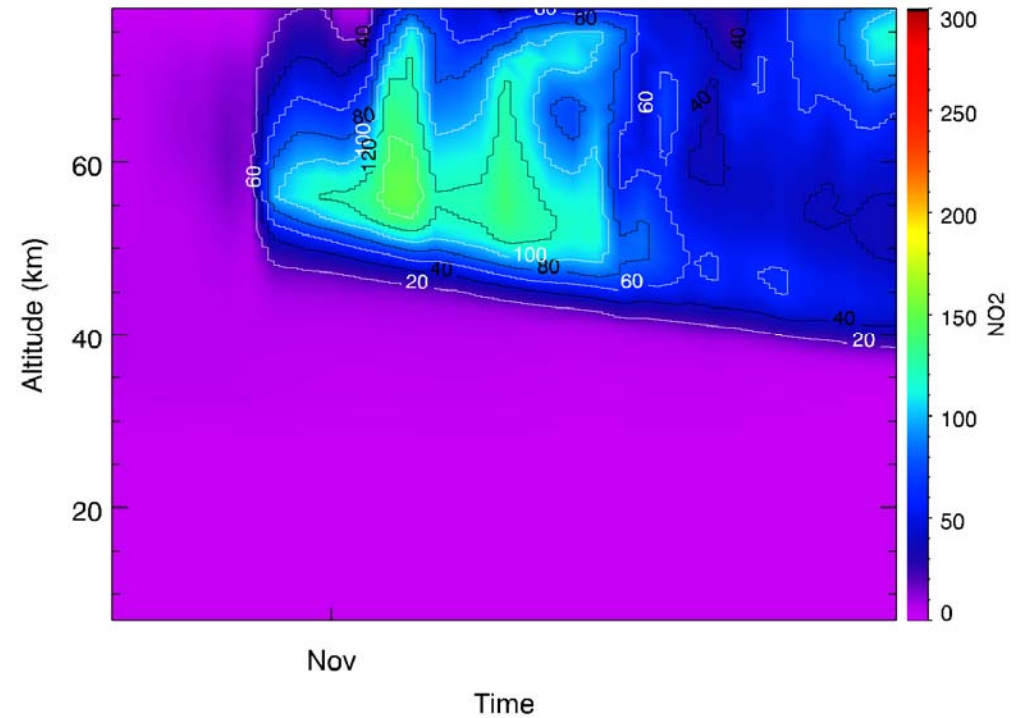
Effect of AIMOS e- in KASIMA

NO2



AIMOS p + e

NO2



AIMOS p only

Basic

- Mechanistic model solving primitive equation in spectral form
- Vertical domain ~7 km – 120 km, resolution altitude dependent (750 m - ~3 km)
- Horizontal resolution for HEPP-Intercomp T21 (corresponding ~5.6°); in add. T42 simulation
- Parameterization of heating/cooling rates (O_2 , O_3 , CO_2 , H_2O , (NO)) including non-LTE for CO_2
- O_3 and H_2O from climatology or on-line chemistry

Chemistry

- Stratospheric chemistry scheme extended
- ~40 species in ~100 reactions
- Including heterogeneous reaction on sulfate and NAT particles
- Family concept in stratosphere but family members of Ox, NOx, HOx are individually transported in the mesosphere
- Additional reactions included which could be relevant for mesospheric chemistry (HOx family, HNO₃)

Particles

- p ionization rates calculated via simple Bethe-Bloch using GOES data fitted with two spectral indices
- AIMOS data set (M. Wissing and M. Kallenrode) for e- and p
- For HEPPA09 e- + p from AIMOS
- Combinations of both
- Simply parameterized GCR component
- Altitude dependent HOx gain according to Jackman et al