Experiments outline

Due dates:

- One-step runs finalized — **February 8, 2025**
- Transient EPP run (CMIP7 SSI and particles)
  - First results — **February 8, 2025**
  - Final results — March 31, 2025
- Transient Reference, SSI, and noEEP — March 31, 2025
- Draft publications (SSI: Margit, EPP: Miriam) — July 30, 2024

SSI heating rates

- One step only
- Scenarios:
  - CMIP6 SSI, solar max
  - CMIP6 SSI, solar min
  - CMIP7 SSI, solar max
  - CMIP7 SSI, solar min
  - Same with SATIRE?
- Solar maximum SSI: mean of 2002
- Solar minimum SSI: mean of 2009
- Model date: January 1, 2002, branching off from CMIP6 reference
- Output:
  - short-wave and long-wave heating rates
  - heating rates separately for all species considered in models' RT code
  - densities or mixing ratios of all gases which go into the consideration of heating rates in the RT
  - temperature, pressure, altitude

Transient 12-year runs to evaluate SSI and particle impact on chemistry

- 2000-2012 with specified dynamics (MIPAS period), MERRA-2 or ERA5
- Scenarios:
  - **Reference:** CMIP6 SSI and particles
  - **SSI:** CMIP7 SSI, CMIP6 particles
  - **EPP:** CMIP7 SSI and particles
  - **noEPP:** CMIP7 SSI, no particle forcing (high-top models use auroral forcing)
- **First results (post-processed data):**
  - daily mean zonal mean NOy, 60-90°N area weighted, from 2002-2003 (solar max, Heppa I) and 2009-2010 (solar min, Heppa II and Heppa III periods) on model pressure grid
  - NOy daily data on model lat/lon/pressure for October 30-November 1, 2003 (Heppa I) and April 6 and 9 (Heppa III)
  - daily total hemispheric NOy for 2002-2003 and 2009-2010
  - **NOy: NO+NO2+HNO3+HNO4+2N2O5+ClNO3 (as MIPAS NOy)**
- Output:
  - Altitude if pressure is the vertical grid; pressure if altitude is the vertical grid
  - **daily mean zonal mean on model latitude/pressure grid** (all trace gases and dynamics properties):
    - Trace gases: NO, NOy, HNO_3, O_3, H_2O, OH, HO_2, electron density, charge density
    - Dynamics: u, v, w, gwdrag, dynamical tracers CO, CH_4, N_2O, TEM diagnostics (*EPP run only*)
  - **daily snapshot at 0:00 UT on model latitude/pressure grid** (heating rates, photolysis rates, short-lived species):
    - Bulk SW and LW heating rates
    - Trace gases: O_3, OH, HO_2, electron density, charge density
    - Photolysis rates of NO, O_3, O_2