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EPP-climate link by reactive nitrogen polar winter descent: MIPAS v8 reprocessing and NOy UBC for climate models

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Polar winter descent of reactive nitrogen (NOy) produced by energetic particle precipitation (EPP) in the mesosphere and lower thermosphere affects polar stratospheric ozone by catalytic reactions. This, in turn, may have implications for regional climate via radiative and dynamical feedbacks. NOy observations taken by the MIPAS/Envisat instrument during 2002–2012 have provided observational constraints on the solar-activity modulated variability of stratospheric EPP-NOy amounts. These constraints have allowed to formulate a chemical upper boundary condition (UBC) for whole-atmosphere chemistry–climate models in the context of solar forcing recommendations for CMIP6.

Recently, a reprocessed MIPAS version 8 dataset has been released. Here we present the derived NOy and EPP-induced NOy amounts, and compare them to the previous version. In particular, we assess what impact the changes in this new data version have on the EPP-NOy quantification, and we assess its impact on the formulation of chemical upper boundary conditions for climate models. We also present an updated version of the UBC from the updated data set which is about to be included in the upcoming solar forcing recommendations for CMIP7.

Solicited or Contributed

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