



SCIAMACHY long-term measurements of NO in the mesosphere and lower thermosphere

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Solar, auroral, and radiation belt electrons and soft solar X-rays produce nitric monoxide (NO) in the mesosphere and lower thermosphere (MLT, 50–150 km). Thus, the NO content in this atmospheric region reveals how solar activity and variability impacts the atmospheric composition. NO downward transport during polar winters then influences the lower atmosphere, in particular by catalytically depleting ozone. This in turn changes the heating and cooling rates and eventually the atmospheric circulation.

We present ten years of SCIAMACHY measurements of NO in the MLT region. We combine the special MLT data (50–150 km, one day every two weeks from 07/2008 until 04/2012) and the nominal data (0–90 km, daily from 08/2002 until 04/2012) to a ten-year daily global NO density data set from 60 km to 90 km. From this data set, we extract solar and geomagnetic forcing parameters using two different statistical approaches. One method is the superposed epoch analysis and the other is multi-linear regression. With the derived parameters, we aim to build a simple model of the NO content in the mesosphere driven by solar and geomagnetic activity. Eventually, this helps improving models of solar variability in climate and chemistry-climate models.