Analysis of stratospheric NO_2 trends above Kiruna using ground-based zenith sky DOAS observations

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Stratospheric NO_2 not only destroys ozone but acts as a buffer against halogen catalyzed ozone loss by converting halogen species into stable nitrates. To a better understanding of the impacts of stratospheric NO_2 and O_3 chemistry, we need long-term measurement data. In this study, ground-based zenith sky DOAS has successfully monitored trace gases related to stratospheric ozone chemistry since 1997.

In this study, we shows the trend in stratospheric NO_2 vertical column densities (VCDs) at Kiruna, Sweden (68.84°N, 20.41°E) as derived from ground-based zenith sky DOAS over the period 1997 to 2015. The results will be compared with satellite data measured from GOME on ERS-2, SCIAMACHY on EnviSAT, and GOME-2 on METOP-A. To calculate the trends, we apply a multiple linear regression model including variables to describe effects caused by the quasi-biennial oscillation (QBO), solar activity, and stratospheric aerosol amount.