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Changes in tropospheric NO_2 as observed by GOME and SCIAMACHY

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Nitrogen Dioxide is a key species in tropospheric chemistry. It is essential for photochemical ozone smog formation, is involved in acid rain formation and also contributes to radiative forcing.

Anthropogenic emissions of nitrogen oxides (NO_x) are mainly related to combustion of fossil fuels for transport, energy production, heating or industrial processes. Increasing use of fossil fuels in particular in rapidly developing economies leads to strong increases in NO_x emission, while at the same time improvements in emission reduction technologies and the change to cleaner fuels have the potential to significantly reduce NO_x emissions.

Tropospheric NO_2 can be measured from space by the two satellite instruments GOME (Global Ozone Monitoring Experiment) and SCIAMACHY (Scanning Imaging Spectrometer for Atmospheric Chartography). The combined time series of the two instruments provides a unique data set of the global tropospheric NO_2 burden covering nearly one decade.

In this study, we report on large increasing trends of NO_2 over the industrialised areas of China, while at the same time significant negative changes are observed over parts of Europe and North America. These and other changes will be quantified and discussed.