



Assessment of decadal trends in tropospheric nitrogen dioxide over large European urban agglomerations by combining satellite measurements and model data

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Since the 1980s, more than 70% of the European population lives in cities, and since the beginning of the 21st century, more than 50% of the Earth's population. This development is closely related to highly increased growth rates of large urban agglomerations. Typical growth rates of European agglomerations lie around 1% per year. The resulting high traffic, energy use and industrial production make these large cities hot-spot areas in terms of pollution.

Satellite instruments have proven invaluable to obtain long and consistent time series of atmospheric trace gases with global coverage. They facilitate studying the temporal evolution of atmospheric pollutants, as they allow to apply identical measurement techniques to all investigated regions, yielding comparable results.

In this study, we present an assessment of the evolution of tropospheric NO₂ for the 1996-2010 time period. Satellite measurements from the GOME and SCIAMACHY instruments will be investigated for trends in tropospheric NO₂, the focus being on the large urban agglomerations. For the time period 1998-2007, these observations will then be compared to tropospheric NO₂ columns derived from the CHIMERE model.

Apart from a general assessment of decadal trends over European agglomerations, one focus of this paper will be the investigation of seasonal trends, as previous studies have shown stronger pronounced trends for winter than for summer months. Further consideration will be given to the possible correlations to population and economic growth.