Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09547, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09547
EGU General Assembly 2008

Trends in European trace gases in the GEOMON project

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The GEOMON (Global earth Observation and Monitoring) project is looking to harmonize data from ground-based measurement stations from a variety of regional, national and European air quality networks (e.g. EMEP, GAW). Investigations into instrumental calibration standards and data quality have been carried out in order to make comparison between the sites as accurate as possible for a long time-scale trend analysis.

Ozone seasonal cycles at the sites have been compared, showing characteristic cycles according to latitude, elevation, vicinity to coastal areas and pollution sources and population nearby. A de-trending of this seasonal cycle revealed long-term variations in ozone and a considerable difference between background and peak ozone trends between sites. Trends of ozone with varying NO2 reveal distinct O3-NO2 regimes that vary between sites.

Anomalies in the ozone seasonal cycle were studied to reveal instrumental errors or ozone episodes and the effectiveness of this method was investigated further in order to provide a means of detecting errors or events within long-term time series. Analysis of similarities in trace gas trends between neighbouring stations was investigated in order to note the same air masses arriving at multiple sites.

This work aims to test and study the representativeness of long-term ground-based

measurement sites and attributing the role of super-sites to certain of these. In order to detect and predict European and global trace gas trends, this network of sites has been used to test representatives in Europe and will focus future measurements on key sites.