UP 9.4 Di 10:15 Poster TU HTF

Modellierung der chemischen Entwicklung von Schiffsemissionen — •Klaus Franke[1], Heinrich Bovensmann[1], Veronika Eyring[2] und John P. Burrows[1] — [1]Institut für Umweltphysik, Universität Bremen, Otto-Hahn-Allee 1,28359 Bremen, Deutschland — [2]DLR-Institut für Physik der Atmosphäre, Oberpfaffenhofen, 82234 Wessling, Deutschland

Im Rahmen der Arbeiten der Helmholz-Hochschul-Nachwuchsgruppe SeaKLIM werden die Auswirkungen von Schiffsemissionen auf die chemische Zusammensetzung der Atmosphäre untersucht. Ein Aspekt der Nachwuchsgruppe ist es, mit Hilfe von photochemischen Boxmodellstudien die Ausbreitung der Schiffsabgasfahnen in der maritimen Grenzschicht zu simulieren. Damit soll der Übergang von der lokalen Ausdehnung kurz nach dem Ausstoß aus dem Schornstein hin zur weiträumigen Verteilung mehrere Stunden danach vollzogen werden. Hierbei wird das Abgasgemisch unter Vermischung mit der Umgebungsluft chemisch umgewandelt. Ziel der Rechnungen ist es, die Lücke zwischen der lokalen Emission und der großflächigen Messerfassung durch Satelliten zu schließen. Erste Ergebnisse werden dargestellt und mit Messdaten verglichen.

UP 9.5 Di 10:15 Poster TU HTF

Atmospheric trace gas measurements in the tropics by ground-based FTIR-spectrometry — •Thorsten Warneke[1], Justus Notholt[1], Voltaire Velazco[1], and Otto Schrems[2] — [1]Institute of environmental physics, University of Bremen, Bremen — [2]Alfred Wegener Institute, Bremerhaven

The tropics play a central role in global climate. Emissions within the tropics, especially from biomass burning, contribute substantially to the global budgets of many important trace gases. These pollutants significantly influence tropospheric and stratospheric chemistry. Solar absorption-FTIR measurements have been performed in Paramaribo (Surinam) to study the composition of the whole atmosphere, including the Tropical Tropopause Layer (TTL) and the stratosphere.

UP 9.6 Di 10:15 Poster TU HTF

Zeitreihen stratosphärischer Spurengase aus bodengebundenen FTIR-Messungen in Kiruna (Schweden) — •Sabine Mikuteit, Thomas Blumenstock und Frank Hase — IMK-ASF, Forschungszentrum Karlsruhe, Postfach 3640, 76021 Karlsruhe

Im Rahmen des NDSC (Network for the Detection of Stratospheric Change) betreibt das IMK zusammen mit dem IRF (Institutet för Rymdfysik) in Kiruna (Schweden, 68°N, 20°E, 420 m NN) seit 1994 ein FTIR-Spektrometer (Fourier-Transformation-InfraRot).

Gemessen werden atmosphärische Absorptionsspektren mit der Sonne als Strahlungsquelle. Aus diesen Messungen werden Profile und Gesamtsäulen verschiedener stratosphärischer Spurengase (O3, HCl, HNO3, ClONO2, ClO und HF) bestimmt, welche an der Ozonchemie beteiligt sind. Die Daten der Station in Kiruna sind besonders interessant, da dort ab Mitte Januar solare Absorptionsmessungen durchgeführt werden können und der Polarwirbel bis Ende März zeitweilig über Kiruna liegt. Somit können sehr gut chemische Prozesse wie Chloraktivierung, Denitrifizierung und Ozonabbau beobachtet werden.

Die erstellten Zeitreihen erstrecken sich über den Zeitraum 1996-2004. Hierfür wurden ca. 900 Messtage ausgewertet. Mit dieser Zeitreihe wird unter Berücksichtigung der Lage des arktischen Polarwirbels die Variabilität der arktischen Winter untersucht. Aus den Sommermonaten werden erste Trends für die einzelnen stratosphärischen Gasen abgeleitet.

UP 9.7 Di 10:15 Poster TU HTF

Spatial and temporal distribution of HCHO concentrations measured from space — •Folkard Wittrock, Andreas Richter, and John P. Burrows — University of Bremen, Institute of Environmental Physics, D-28359 Bremen

Formaldehyde (HCHO) indicates and supports photochemical activity in the atmosphere. Large amounts are expected to found in industrial areas and during biomass burning. HCHO is a major intermediate in the degradation of methane (and many other hydrocarbons). In the absence of heterogenous losses, essentially every methane molecule is converted to HCHO. Therefore it is found throughout the troposphere. It is destroyed via photolysis and reaction with OH. In continental boundary layers, non-methane hydrocarbons (NMHCs) emitted by biogenic and anthropogenic sources dominate over Methane also as a source of HCHO.

GOME and SCIAMACHY are the first satellite instruments, which allow observations of Formaldehyde on a global scale giving the opportunity to improve our knowledge about emission fluxes of Methane and NMHCs. This study presents GOME measurements of formaldehyde since launch of ERS-2 in 1995. Ground-based measurements are used to validate the GOME HCHO product. In addition time series for selected regions are shown to illustrate the general interannual and interseasonal variation of HCHO depending on the main sources.

UP 9.8 Di 10:15 Poster TU HTF

Spatial distribution of tropospheric NO_2: SCIAMACHY results — •Steffen Beirle, Ulrich Platt, and Thomas Wagner — IUP (Institut für Umweltphysik), Universität Heidelberg

Nitrogen oxides ($NO+NO_2=NO_x$) are important ozone precursors in the troposphere. Column densities of NO_2 are detectable from satellite platforms using differential optical absorption spectroscopy (DOAS). Tropospheric column densities can be retrieved by estimating and subtracting the stratospheric fraction. From GOME observations, a time series of 8 years (1996-2003) of NO_2 column densities is available on a global scale with a spatial resolution of 320*40km^2. Since March 2002, SCIAMACHY (onboard ENVISAT) provides the continuation of the GOME time series with a widely improved spatial resolution of 60*30km^2.

Here we present yearly and seasonal composites of the mean distribution of tropospheric NO_2 from SCIAMACHY data. The small SCIAMACHY ground pixels resolve details in the spatial distribution of tropospheric NO_2 and allow the identification of localized NO_x sources like large cities or power plants as well as estimates of the mean lifetime of tropospheric NO_x.

UP 9.9 Di 10:15 Poster TU HTF

Estimate of Global Carbon Monoxide Budget Derived From MOPITT Data — •Holger Bremer — Institut für Umweltphysik, Universität Bremen, Otto-Hahn-Allee 1, 28359 Bremen

Carbon monoxide influences the oxidizing capacity of the troposphere as the major sink of OH radicals. Thus it is very important to have an accurate estimate of the CO budget of the atmosphere. On the basis of measurements the general features of global CO distribution have been established and it is well known, that CO concentrations are higher in the northern hemisphere than in the southern hemisphere. However, another important source of CO is biomass burning, much of which takes place in the southern tropics. In particular the seasonal biomass burning in Africa and South America injects large plumes of CO into the atmosphere which in turn affect tropospheric ozone concentrations. Another very significant emission source is Indonesia, where land-use conversion projects among other reasons have resulted in large biomass burning in recent years. In this work, we used total atmospheric column measurements of carbon monoxide (CO) from the MOPITT (Measurement of Pollution in the Troposphere) instrument to study the CO burden of the atmosphere. The global budget of CO has been estimated from the satellite measurements for the first time. The total emission of CO is estimated to be 1900-2230 Tg/year which is near the lower end of the previous estimates from models and climate change assessment reports. We assumed the reaction with OH to be the primary sink of CO and neglected all others including surface deposition. This sink is estimated to be 1890-2185 Tg, which is also within the range estimated previously.