order of 1 Hz makes the SO2 camera a very promising technique for volcanic monitoring. However, we show here that the relationship between SO2 column density and measured signal is non-trivial. Due to the finite filter transmission window, the camera's sensitivity to SO2 depends on parameters such as the solar zenith angle, the total ozone column, the filter illumination angle, and even on the SO2 column itself.

UP 2.7 Tu 16:30 Lichthof

Sensitivity enhancement of an Er^{3+}-doped fiber laser to intracavity absorption — •Benjamin Löden, Peter Fjodorow, Klaus Sengstock, and Valeri Baev — Institut für Laserphysik, Universität Hamburg, Luruper Chaussee 149, 22761 Hamburg

The emission spectrum of a broadband Er^{3+}-doped fiber laser is very sensitive to intracavity absorption, which allows extremely sensitive spectroscopy [1]. The highest sensitivity can be achieved with a cw laser and it is limited by nonlinear mode coupling. With a proper choice of laser parameters the nonlinear mode coupling can be reduced allowing highest sensitivities. One of the most important nonlinear mode coupling mechanisms is the spatial inhomogeneity of the gain. It can be reduced by increasing the number of oscillating laser modes using longer laser cavities. With a 2-m-cavity the sensitivity to intracavity absorption is measured to be corresponding to the effective absorption path length of 50 km. The increase of the effective absorption path length over 1000 km is demonstrated with the cavity length of 80 m at low pump rates. Further enhancement of the sensitivity is possible by reducing the mode coupling with the application of a unidirectional ring laser. In this laser the complete elimination of the spatial gain inhomogeneity can be achieved. Besides that a reduction of stimulated Brillouin scattering in the fiber and a decrease of spectral noise is expected. A system with such a high sensitivity can be used for the detection of trace gases and for environmental or medical applications.

[1] A. Goldman, I. Rahinov, S. Cheskis, B. Löhden, S. Wexler, K. Sengstock, V.M. Baev, Chem. Phys. Lett 423, 147 (2006)

UP 2.8 Tu 16:30 Lichthof

Comparison of precipitation data between the Arctic and East Africa — •Naoki Itoh[1] and Jürgen Kurths[2] — [1]Interdisciplinary Center for Dynamics of Complex Systems, Potsdam, Germany — [2]Potsdam-Institut für Klimafolgenforschung e.V., Potsdam, Germany

The comparison of climate change between the Arctic land (71.25^{o}N and 179.75^{o}E) and the equatorial area (Kenya) is performed by singular spectrum analysis (SSA) which is applied to the monthly precipitation of 1900's. This method can be used to decompose the time series into some useful components. From the climate data such as precipitation trends, periodic-(annual cycle), quasi periodic and noise components can be extracted as information in the time series. Their results give us reasonable interpretation in the climate sense.

UP 2.9 Tu 16:30 Lichthof

Different wavelength evaluation ranges in the retrieval of trace gases with DOAS at the example of BrO — •Leif Vogel[1], Holger Sihler[1,2], Johannes Lampel[1], Ulrich Platt[1], and Thomas Wagner[2] — [1]Institut für Umweltphysik, Universität Heidelberg — [2]MPI für Chemie, Mainz

Optical remote sensing via scattered sunlight Differential Optical Absorption Spectroscopy (DOAS) is routinely used to determine various trace gases in the atmosphere. Different applications and platforms (e.g. DOAS of volcanic plumes, Satellite measurements, Zenith DOAS or Max-DOAS) differ in measurement conditions, cross correlations of absorptions of different trace gases and their respective concentrations. Here, we present a method to determine the optimal evaluation range at the example of Bromine Oxide (BrO).

With strongest absorption features of BrO between 315nm - 360nm, its retrieval results can depend on cross correlations with strong absorber like Ozone (O_3) or sulfur dioxide (SO_2). Whereas O_3 influences especially Satellite and stratospheric measurements, SO_2 cannot be neglected in the case of high volcanic gas emissions. Absorption features of both species are most pronounced at low wavelengths, but their diminished influence at higher wavelength ranges competes with a higher detection limit of BrO. The study is performed with artificial spectra and the results are compared with retrievals from real spectra of volcanic plumes, satellite and marine Max-DOAS measurements.

UP 2.10 Tu 16:30 Lichthof

Daytime ozone and temperature variations in the mesosphere: A comparison between SABER observations and HAMMONIA model — •Sebastian Dikty[1], Hauke Schmidt[2], Mark Weber[1], Christian von Savigny[1], and Martin Mlynczak[3] — [1]Institute of Environmental Physics, Bremen, Germany — [2]Max Planck Institute for Meteorology, Hamburg, Germany — [3]Langley Research Center, NASA, U.S.A.

The scope of this paper is to investigate the latest version 1.07 SABER (Sounding of the Atmosphere using Broadband Emission Radiometry) tropical ozone and temperature data with respect to daytime variations in the upper mesosphere. For a better understanding of the processes involved we compare these daytime variations to the output of the three-dimensional general circulation and chemistry model HAMMONIA (Hamburg Model of the Neutral and Ionized Atmosphere). The results show good agreement for ozone. The amplitude of daytime variations is in both cases approximately 60 % of the daytime mean. During equinox the daytime maximum ozone abundance is for both, the observations and the model, higher than during solstice, especially above 80 km. We also use the HAMMONIA output of daytime variation patterns of several other different trace gas species, e.g., water vapor and atomic oxygen, to discuss the daytime pattern in ozone. In contrast to ozone, temperature data show little daytime variations between 65 and 90 km and their amplitudes are on the order of less than 1.5 %. In addition, SABER and HAMMONIA temperatures show significant differences above 80 km.

UP 2.11 Tu 16:30 Lichthof

Comparison of nanoaerosol sources and their applications. — •Svetlana Khasminskaya[2], Jan Meinen[1,2], Markus Eritt[2], Andreas Comouth[1,2], and Thomas Leisner[1,2] — [1]Karlsruhe Institute of Technology (KIT), Institute for Meteorology and Climate Research, Atmospheric Aerosol Research (IMK-AAF), Karlsruhe, Germany — [2]Institute for Environmental Physics (IUP), Ruprecht-Karls-University, Heidelberg, Germany

A variety of sources for atmospheric aerosols in the nanometer range (electrospray ionization, microwave plasma reactor, atomizer and soot generator) are presented. Different materials, such as silicon oxides, iron oxides and soot, were tested with helium or air as carrier gas. The aerosol size distribution (SMPS, TEM, TOF, PMS) and the fraction of charged particles (Quartz Crystal Microbalance) are shown. The influence of different source parameters such as carrier gas and pressure and finally the applicability for laboratory experiments with atmospheric relevance and nano-toxicological topics is discussed.

UP 2.12 Tu 16:30 Lichthof

Crystal structures and microcrystal distributions resulting from efflorescence of ternary aerosols — •Lennart Treuel, Alice Sandmann, and Reinhard Zellner — Universität Duisburg-Essen, Essen, Germany

The behaviour of aerosols towards changes in the ambient RH is normally described by their deliquescence and efflorescence. It is established that the addition of organic components may change the deliquescence relative humidity (DRH) of internally mixed salt/organic/water aerosols relative to the pure salt. The deliquescence of complex atmospheric aerosols will inevitably depend on the crystal structures of the effloresced components present in the aerosol. Since the efflorescence process leads to a kinetically controlled crystallisation from highly supersaturated solutions the resulting crystal structures differ greatly from the crystals formed under thermodynamically controlled conditions and hence they may show very different thermodynamic properties. Scanning electron microscopy and the X-ray diffractometry, were used for investigations of crystal structures resulting from the kinetically controlled crystallisation (efflorescence) of highly supersaturated binary and ternary solution droplets. Moreover, scanning Raman microscopy was used to determine the spatial distribution of crystals formed during the efflorescence process within the aerosol particle. The results show a very diverse behaviour of organic and inorganic components, a finding that presents fundamentally new challenges to the pursuit of understanding the very basic principles governing the phase behaviour of complex solutions.

UP 2.13 Tu 16:30 Lichthof

Statistical Analysis of Aerosol Optical Thickness from Satellite Retrievals using BAER and AERONET over Several Regions — •jongmin yoon, wolfgang von hoyningen-huene, alexander a. kokhanovsky, marco vountas, and john p. burrows — IUP, University of Bremen, Bremen, Germany