

using a Monte-Carlo-enhanced filtering process was presented 2006 in Heidelberg. The performance of the method will be demonstrated using simulated climate trend functions. The method will be applied at real climate series (1881 to 2006) of 38 stations. The calculations are made for yearly mean temperature and 12 monthly mean temperature. The results in temperature trends are compared with respect to the latitude. Using the temperature trend the change of net radiation energy input is calculated and discussed with respect to the latitude.

UP 1.7 Di 10:00 3B

Long-term scenarios for road transport's greenhouse gas emissions — HEIKE STELLER and ●JENS BORKEN — Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR) in der Helmholtz-Gemeinschaft, Verkehrsstudien, Rutherfordstr. 2, 12489 Berlin

Scenarios for road transport's emissions have been developed as a consistent interpretation of the four IPCC-SRES marker scenarios for the first time. Emissions of CO₂, CH₄, NMHC, CO, NO_x, SO₂, PM, BC and OC are calculated for 2025, 2050 and 2100. Our bottom-up approach is differentiated by vehicle categories and fuel types for passenger and freight transport each. Thus, we present here most comprehensive road transport's data for the whole globe, by world region and by country with a grid resolution of 1° longitude by 1° latitude.

In all scenarios global road transport's CO₂ emissions continue to increase up to 2050 while global emissions of other substances decrease latest from 2020 on. Strong transport and emission growth occurs in all developing regions while OECD regions may stabilize or decrease their emissions from high levels. The range between scenarios indicates considerable impact of economic and demand growth as well as technical measures. For instance in Western Europe, CO₂ emissions may decrease by as little as 70 Mt or as much as 350 Mt from 2000 to 2050. In the same period CO₂ emissions in South Asia increase at least by 200 Mt and maybe as much as 1000 Mt.

UP 1.8 Di 10:15 3B

Are IPCC SRES emission scenarios outdated? A recalculation for the road transport sector — ●JENS BORKEN¹ and GRIET DE CEUSTER² — ¹DLR - Verkehrsstudien, Berlin — ²TML Leuven/Belgium

Contribution has been withdrawn.

30 min. break

UP 1.9 Di 11:00 3B

Latitudinal and vertical distribution of ethane retrieved from ground-based solar absorption measurements — ●ANNA KATINKA PETERSEN¹, THORSTEN WARNEKE¹, JUSTUS NOTHOLT¹, and OTTO SCHREMS² — ¹Institut für Umweltphysik (IUP), Universität Bremen, Bremen — ²Alfred Wegener Institut (AWI), Bremerhaven

Measurements of the global variations of trace gases are important for the understanding of chemical and dynamical processes that control the distribution of these trace gases. Emissions within the tropics, especially from biomass burning, contribute substantially to the global budgets of many important trace gases. Currently large uncertainties in the budgets of many trace gases in the tropics exist, mainly due to a lack of measurements. Fourier Transform Infrared (FTIR) spectroscopy has been found to be one of the most suitable instruments for

the measurements of atmospheric trace gases

We performed solar absorption FTIR measurements onboard the German research vessel Polarstern during five cruises on the Atlantic between 1996 and 2005 and at the tropical site Paramaribo, Suriname (5.8°N, 55.2°W) between September 2004 and November 2006. Here we present volume mixing ratio profiles of ethane (C₂H₆) and compare our results with space-borne data from the ATMOS instrument and with measurements from balloon sondes. The combination of the FTIR-observations with space-borne measurements is used to study the long-range transport of pollutants from the tropics to mid- and high latitudes.

UP 1.10 Di 11:15 3B

A Seasonal Cycle of Stratospheric Water Vapour above Mérida, Venezuela — ●SVEN H W GOLCHERT¹, MATHIAS PALM¹, CHRISTOPH HOFFMANN¹, PEDRO HOFFMANN², GERD HOCHSCHILD³, and JUSTUS NOTHOLT¹ — ¹Institut für Umweltphysik, Universität Bremen, Germany — ²Facultad de Ciencias, Universidad de Los Andes, Mérida, Venezuela — ³Institut für Meteorologie und Klimaforschung, Universität und Forschungszentrum Karlsruhe, Germany

The authors report on the first ground-based microwave radiometer being permanently operated in the tropics for the detection of middle-atmospheric water vapour distribution. The 22 GHz receiver WaRAM2 is continuously recording data above Mérida, Venezuela, since December 2006. It is set up at Mérida Atmospheric Research Station on top Pico Espejo (8°N, 72°W, 4760 m).

Water vapour plays a key role in atmospheric processes, both chemical and dynamical. It exhibits strong radiative activity, owing to its large infrared resonance, and forms a source gas for the highly reactive OH radical. It also substantially contributes to atmospheric heat transfer. Yet the processes governing water vapour distribution, variability, and trends are still not sufficiently understood. Mitigating these uncertainties presents a pressing issue for future climate modelling. The presentation demonstrates the suitability of WaRAM2 measurements for such an effort. An overview is given of the instrument performance and the retrieval of geophysical parameters from the data. Cross comparisons with other data round off the discussion.

UP 1.11 Di 11:30 3B

Optimized regularization for retrieval of partial column profiles from ground-based solar FTIR spectrometry — ●TOBIAS BORSBORFF and RALF SUSSMANN — Research Center Karlsruhe, IMK-IFU, Kreuzackbahnstr. 19, 82467 Garmisch-Partenkirchen, Germany

The retrieval of vertical profiles from ground based solar infrared spectra is an ill posed problem and regularization is the major tool to stabilize the solution. Whenever a suitable climatology is missing the optimal estimation approach is not applicable and soft constrains like the Tikhonov regularization are used. An example CO profile retrieval of solar infrared FT spectra is used to show that a sub-optimal regularization can already lead to a significant loss of vertical information. The relation between the chosen retrieval grid, the regularization matrix and the unit of the state vector is discussed in detail. The altitude resolved smoothing error and the vertical resolution due to different Tikhonov regularizations is examined. Finally it is discussed what kind of vertical information can be extracted from the derived retrieval results.

UP 2: Bodenphysik und Ozeanographie

Zeit: Dienstag 11:45–12:45

Raum: 3B

UP 2.1 Di 11:45 3B

Detection of rare noble gas radioisotopes by atom trap trace analysis (ATTA) — ●JOACHIM WELTE¹, ANNA WÖNNEBERGER², MARKUS OBERTHALER¹, and WERNER AESCHBACH-HERTIG² — ¹Kirchoff-Institut für Physik, Universität Heidelberg — ²Institut für Umweltphysik, Universität Heidelberg

The noble gas radioisotopes ³⁹Ar, ⁸¹Kr and ⁸⁵Kr have a great potential as dating tools in hydrology and oceanography, but are extremely rare and thus difficult to measure. Atom trap trace analysis (ATTA) provides a new way to detect these isotopes. The resonant scattering of many photons in laser cooling results in superb isotopic selectivity. Single atoms are trapped in a magneto-optical trap (MOT) and counted by detection of their fluorescence. The feasibility of ATTA for

⁸¹Kr dating of groundwater has been demonstrated.

The aim of our project is to develop ATTA for the detection of ³⁹Ar, an isotope that opens an otherwise inaccessible time window for water dating. ³⁹Ar has successfully been used for the dating of groundwaters and oceanic deep waters, but its application has been severely limited by the excessive sample size required for ultra low-level counting. ATTA promises to overcome this limitation. We have realised a test setup based on an existing laser cooling system for metastable ⁴⁰Ar atoms and have successfully detected single atoms. We now plan to build a dedicated system optimised for the efficient trapping and detection of ³⁹Ar. Furthermore, new efficient methods for water degassing by membrane contactors as well as for the separation of Ar from the extracted gas are currently being developed.