UP 13: Methoden - Fernerkundung, Messverfahren und Datenauswertung

Zeit: Donnerstag 9:00–10:00 Raum: HS 5

Hauptvortrag UP 13.1 Do 9:00 HS 5

From SCIAMACHY to the next generation of remote sensing instrumentation. — •John Burrows — Institut für Umweltphysik der Universität Bremen, Postfach 330440, 28334 Bremen

In the past three decades, the remote sensing of atmospheric trace constituents has passed through a pioneering age. SCIAMACHY (SCanning Imaging Absorption spectrometer for Atmospheric CHartography), which flew on ENVISAT from 2002 to 2012 when contact was lost with ENVISAT, and its spin off GOME, which flew on ERS-2 until it was was decommissioned by ESA , are now being succeeded by a new generation such as GOME-2 on the Metop series. However much has been lost with the end of Envisat. There is an urgent need for new instrumentation. This talk will address some of the past successes and point out the needs and opportunities for the coming years. This will include the potential use of the International space station.

UP 13.2 Do 9:30 HS 5

2.7μm open-path TDL-spectrometer for simultaneous in situ $H_2\,^{18}O/H_2\,^{16}O$ measurements in clouds — •Benjamin Kühnreich[1,2], Jan Habig[3], Steven Wagner[2], Harald Saathoff[3], Liz Moyer[4], and Volker Ebert[1,2] — [1]Physikalisch-Technische Bundesanstalt, Bundesallee 100, 38116 Braunschweig — [2]Center of Smart Interfaces, Technische Universität Darmstadt, Petersenstr. 32, 64287 Darmstadt — [3]Karlsruhe Institute of Technology, Herrmann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen — [4]Department of Geophysical Sciences, University of Chicago

Isotopic tracers are widely used to investigate environmental processes. Recently there has been interest in using changes in the isotopic composition of water vapour to investigate microphysical cloud formation processes. We report here on the development of a new instrumentation for the measurement of isotopic composition changes in clouds in the DFG/NSF funded ISOCLOUD project. In situ open-path TDLAS provides a non-invasive, sampling free measurement technique appropriate for this purpose. We describe one of the ISOCLOUD instruments, an open-path TDL around 2.7μm, and show preliminary data from its first application in the cloud simulation chamber AIDA for the measurement of the isotopic ratio of $H_2\,^{18}O/H_2\,^{16}O$. We discuss current and future in situ detection limits. Current data based on 280 m absorption path indicate detection limits of 0.2 ppb for $H_2\,^{18}O$ and 80.6 ppb for $H_2\,^{16}O$.

UP 13.3 Do 9:45 HS 5

Microwave Remote Sensing of Sea Ice Thickness - Retrieval and Validation — •Marcus Huntemann and Georg Heygster — Institut für Umweltphysik, Universiät Bremen

Sea ice has been requested by WMO (World Meteorological Organization) as one of the essential variables for climate and weather modeling and prediction. The sea ice concentration has been observed since over three decades by satellite based microwave radiometers, while obtaining the sea ice thickness is more complicated. The SMOS (Soil Moisture and Ocean Salinity) satellite, operating since January 2010, works at 1.4 GHz (L-band), the lowest microwave frequency currently used in satellite remote sensing. SMOS employs a aperture synthesis technique and observes a single location at different incident angles during one overflight with a spatial resolution of about 50 km. By comparison of thermodynamic ice growth data with SMOS brightness temperatures in the Kara Sea we found a high correlation of sea ice thickness with the intensity and an anti correlation of sea ice thickness with the difference of horizontally and vertically polarized brightness temperatures. From that we developed an empirical retrieval algorithm for the sea ice thickness of up to 50 cm during the freeze-up period. In the validation against in-situ measurements, satellite data and regional models our SMOS sea ice thickness retrieval achieves high correlations in several different regions.