Geophysical Research Abstracts, Vol. 9, 00592, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-00592

First observations of atmospheric iodine oxide columns from satellite

A. Schoenhardt, A. Richter, F. Wittrock and J. P. Burrows

Institute for Environmental Physics, Bremen, Germany.
(schoenhardt@iup.physik.uni-bremen.de)

Measurements and model studies have revealed the possible relevance of iodine species in several areas of current atmospheric research. This includes the role of iodine in tropospheric ozone depletion and its influence on new particle formation, especially in the marine boundary layer. However, the importance of iodine compounds on a global scale is not yet known. Many iodine compounds rapidly photolyse to release atomic iodine. Via reaction with ozone, iodine monoxide (IO) radicals then form, leading to catalytic ozone destruction in the respective area of iodine release. IO has strong differential absorption structures in the visible wavelength range, making it suitable for DOAS (Differential Optical Absorption Spectroscopy) measurements. The objective of our recent work is to add IO to the detectable species of SCIAMACHY, an eight channel UV-vis-NIR spectrometer onboard the ENVISAT satellite. Atmospheric IO levels are comparably small and close to the detection limit of SCIAMACHY. The detection limit for the IO slant column lies at about $5 \cdot 10^{12}$ molec/cm^2, but strongly depends on the albedo, on the averaging of spectra, and on possible systematic errors. Nevertheless, in case of elevated IO levels, its absorption signal could be detected in the satellite data by the DOAS retrieval. Therefore, first global distributions of iodine monoxide retrieved from SCIAMACHY data can be presented. Alongside these results, prospects and constraints of IO retrieval from SCIAMACHY will be addressed. The largest amounts of IO are found near the springtime poles, where ground-based measurements have positively detected iodine compounds before. Close to the Antarctic continent the rise in IO level starts in September and reaches its maximum in October. The springtime maximum at the North Pole peaks in April but is less pronounced than in the South. First comparisons between IO retrieved from satellite with ground-based measurements show reasonably good agreement.