Geophysical Research Abstracts
Vol. 13, EGU2011-1239, 2011
EGU General Assembly 2011

ROFLEX: Resonance and Off-Resonance Fluorescence by Lamp Excitation for in situ detection of atomic and molecular iodine.

Juan Carlos Gómez Martín (1), Janis Blahins (2), Uldis Gross (2), Trevor Ingham (3,4), Andrew Goddard (3), Anoop Sharad Mahajan (1), Arnolds Ubelis (2), and Alfonso Saiz-López (1)

(1) Laboratory for Atmospheric and Climate Science (CIAC), CSIC, Toledo, Spain, (2) Institute for Atomic Physics and Spectroscopy (ASI), University of Latvia, Riga, Latvia, (3) School of Chemistry, University of Leeds, Leeds, UK, (4) National Centre for Atmospheric Science, School of Chemistry, University of Leeds, UK

We present a new instrument for monitoring in situ atmospheric iodine atoms and molecules based on the detection of UV fluorescence excited by atomic lines radiated by a lamp. The ROFLEX system combines a robust, light weighted and efficient radio-frequency discharge light source with two high sensitive photon counting modules. Calibration of I_2 off-resonance fluorescence at 300 - 340 nm is achieved via quantitative detection of the molecule by Incoherent Broad Band Cavity-enhanced Absorption Spectroscopy. The atomic iodine resonance fluorescence signal at 183.038 nm is calibrated by broad band photolysis of known I_2 concentrations. The instrument has been characterised and optimised in laboratory experiments to reach detection limits of 1.2 pptv for I atoms and 13 pptv for I_2 (S/N=1 and 10 minutes of integration time). Finally, results will be presented from the ROFLEX deployment in a field campaign in the Galician coast (Spain), representing the first concurrent observation of ambient mixing ratios of iodine atoms and molecules in the 1-350 pptv range.