Geophysical Research Abstracts
Vol. 12, EGU2010-11179, 2010
EGU General Assembly 2010

Measurements of HONO during the OASIS campaign in Barrow, Alaska

Guillermo Villena Tapia (1), Peter Wiesen (1), Jörg Kleffmann (1), and the Guillermo Villena Tapia Team

(1) Bergische Universität Wuppertal, Physikalische Chemie/ FB C, 42097 Wuppertal, Germany (kleffman@uni-wuppertal.de / +49-(0)202-439-2505), (2) National Center Atmospheric Research (NCAR), 1850 Table Mesa Drive Boulder, CO 80305, U.S., (3) University of California Davis, Department of Land, Air and Water Resources, Davis CA 95616, U.S., (4) Environment Canada, 4905 Dufferin St., Toronto, ON M3H 5T4, Canada

Nitrous acid (HONO) is an important precursor of the hydroxyl radical (OH). Recent polar studies indicate the existence of a strong surface source of HONO over snow and ice surfaces which can affect the oxidation capacity of the polar atmosphere. However, the mechanism of nitrous acid formation is still under discussion. In addition, from modelling of experimental field data it was recently proposed that high measured HONO levels may be caused, at least in part, by strong interferences of chemical instruments used in polar studies.
In the present study mixing ratios of HONO were measured during the OASIS campaign in Barrow, Alaska from 13th March - 14th April, 2009. The measurements were done with an optimized ultra sensitive Long Path Absorption Photometer (LOPAP), which has two channels in series, correcting for the significant chemical interferences under polar conditions, in contrast to other chemical instruments. In addition, sampling artefacts in sampling lines are minimized by the use of an external sampling unit.
Mixing ratios were in the range from below detection limit (DL= 0.4 pptV) to ∼500 pptV with an average of 27 pptV. The very high concentrations observed were caused by strong emissions from combustion sources close to the field site (the city of Barrow and the BARC research complex). For typical clean days the diurnal profile during the campaign was as expected, i.e. low mixing ratios close to the detection limit during the night and higher mixing ratios (ca. 10 ppt) during the day. Daytime concentrations were higher than the photo-stationary state (PSS) which can be explained by photochemical sources which were found to correlate very well with J(NO2).