Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10858, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10858
EGU General Assembly 2008

Measuring acetone and PAN with the MIPAS instrument on Envisat

D. P. Moore (1), J. J. Remedios (1), N. A. D. Richards (2) and M. P. Chipperfield (2)

(1) Earth Observation Science, Dept. Physics and Astronomy, University of Leicester, University Road, Leicester, UK, (2) School of Earth and Environment, University of Leeds, Leeds, UK (dpm9@le.ac.uk / Fax: +44(0)116 2525262 / Phone: +44(0)116 2523521)

Emissions of anthropogenic pollution, from biomass burning events in particular, inject a wide range of volatile organic compounds (VOCs) into the atmosphere in significant amounts. VOCs affect both the oxidation capacity and ozone production in the troposphere but current upper troposphere (UT) measurements of acetone and PAN are generally limited to sporadic in situ sampling during specialised measurement campaigns with errors of around 30%. Better observation of the distribution of VOCs in the UT requires global measurements provided by space instruments such as the Michelson Interferometer for Passive Atmospheric Sounding onboard ENVISAT (MIPAS-E). This paper presents global retrievals of acetone and PAN volume mixing ratios (vmrs) in the UT with a full error analysis. Acetone photolysis enhances PAN formation and therefore it is desirable to measure both gases simultaneously.

Infrared signatures of PAN (787-790 cm^{-1}) and acetone (1216-1218 cm^{-1}) have already been detected in MIPAS-E thermal emission spectra. These measured spectra are inverted into volume mixing ratios using an offline retrieval scheme developed at the University of Oxford (MORSE). Both spatial and zonal mean distributions of acetone and PAN will be shown. Correlations between these gases show that the sources which impact the distribution of acetone have a substantial impact on PAN. Further, we compare results in the UT in April 2003 from two regions: Europe, where VOC concentrations are expected to be typical of the northern hemisphere mid-latitudes and South East Asia, which may be expected to show enhanced VOC concentrations in convective outflow, typical in Springtime. We also evaluate the consistency between

our results and calculations from global chemical transport models such as TOMCAT.