



Interpretation of Global Satellite Observations of PAN and Acetone

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Peroxyacetyl nitrate (PAN) is a key species in tropospheric chemistry. It acts as a reservoir for NO_x, allowing it to be transported over large distances in the cold upper troposphere (UT). When UT air masses descend and warm PAN breaks down and the NO_x released can lead to O₃ production. PAN therefore plays an important role in the long-range transport of pollution to remote clean areas. Acetone, a PAN precursor, also has a strong influence on tropospheric oxidising capacity. Large uncertainties still exist regarding the role of the oceans as an acetone source or sink as well as the magnitudes of other acetone sources. This uncertainty also impacts on our understanding of acetone as a source of OH in the UT. Therefore, global observations of both PAN and acetone are critical to improving our understanding of these species and consequently our understanding of the oxidising capacity of the troposphere.

Recently, the first global measurements of upper tropospheric PAN and acetone have been retrieved from the Michelson Interferometer for Passive Atmospheric Sounding (MIPAS) instrument on board ENVISAT. MIPAS is a Fourier transform spectrometer which detects limb emission spectra in the middle and upper atmosphere for the retrieval of atmospheric trace gases. We will present these new observations (along with other available species such as C₂H₆) and compare them to simulated PAN and acetone from the TOMCAT 3-D chemical transport model (CTM), which has recently been updated to include new temperature-dependent quantum yields for acetone photolysis.