



Sounding the UTLS with MIPAS/ENVISAT and SCIAMACHY/ENVISAT limb measurements using a tomographic approach

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The role of upper troposphere-lower stratosphere (UTLS) is crucial in terms of radiative forcing and climate. However, the interconnection of dynamics, chemistry, radiation and microphysics makes it possibly the most complex and highly variable layer of the atmosphere.

Satellite missions, with their global and multi-year coverage, give unprecedented possibilities in studying the physical and chemical quantities of the atmosphere, as their distribution, variability and long term trends. However, high quality data are needed in order to understand with better details this region of the atmosphere in its multiple aspects. A tomographic approach is particularly important in regions characterized by high variability such as the UTLS, the polar vortex or the day-night terminator where strong horizontal gradients may be poorly reproduced by common 1-D retrievals.

Here we show a tomographic approach applied to the analysis of the limb measurements of two satellite instruments on board ENVISAT: the Michelson Interferometer for Passive Atmospheric Sounding, (MIPAS) operating in the infrared spectral range and the Scanning Imaging Absorption Spectrometer for Atmospheric CHartography, (SCIAMACHY) operating in UV/VIS spectral range.

In case of MIPAS, the two-dimensional capability of the limb observations has been investigated using the information load analysis [Carlotti, M. et al, 2010] and the GMTR retrieval code [Carlotti, M. et al, 2006]. In case of SCIAMACHY the horizontal sensitivity is investigated using latitude-dependent box-airmass factors and a tomographic code that exploits the DOAS technique [Papandrea, E. et al, 2010].

References

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