Detection of tropical stratospheric transport barriers from the long term NO$_2$ data set measured by SCIAMACHY

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The SCanning Imaging Absorption spectroMeter for Atmospheric CHartographY (SCIAMACHY) on the EN-VISAT satellite probes the atmosphere at the day side of Earth in alternating sequences of nadir and limb measurements. Combining measurements of the same air volume from different viewing positions allows retrieving stratospheric profiles of various trace gases on a global scale. Also a tomographic approach can be applied and 2D distribution fields of stratospheric trace gases can be acquired by combining all measurements of an orbit in one simultaneous inversion.

In this presentation, the SCIAMACHY NO$_2$ dataset will be used to estimate the locations of tropical stratospheric transport barriers and the associated horizontal gradient strengths. Because of its correlation to the long lived N$_2$O concentration and processes that are separated by the transport barriers, NO$_2$ distributions are related to the boundaries of these barriers.

For the estimation, the methods of probability density functions (PDFs) and of the steepest gradient will be applied. The results will be compared with data of long lived proxies for transport barriers like N$_2$O and methane. Also comparison with aerosol information retrieved from SCIAMACHY limb observations will be performed.