



Retrieval and variability of stratospheric aerosols from SCIAMACHY limb-scatter

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SCIAMACHY was one of ten instruments onboard the Envisat spacecraft, detecting the sunlight in the wavelength range from 214 to 2386 nm with three different viewing geometries: nadir, limb and occultation. Limb-scatter measurements have the advantage of high vertical resolution, compared to nadir measurements, and a near-global coverage on the dayside of the Earth, in contrast to solar occultation measurements. We report on the stratospheric aerosol retrieval from SCIAMACHY limb-scatter observations.

Stratospheric aerosols are of scientific interest, as they primarily scatter solar radiation, and therefore increase the Earth's planetary albedo. The permanent aerosol background in the stratosphere is due to tropical injection of tropospheric air containing SO₂, COS and sulphate particles, which are precursors for stratospheric aerosols. An additional contribution is sporadically caused by an uplift of SO₂ after a strong volcanic eruption. Especially after strong volcanic eruptions, the consequential effect of stratospheric aerosols on the Earth's radiation budget is stratospheric warming and tropospheric cooling. Furthermore, they have an impact on stratospheric chemistry: Stratospheric aerosols are precursors for polar stratospheric clouds and thus support the destruction of ozone inside the polar vortex. They even lead to a halogen-driven ozone destruction outside polar vortices. On account of these properties, stratospheric aerosols concern to the so-called Essential Climate Variables.

The present SCIAMACHY aerosol product from 2002 to 2012 will be presented, including validation with co-located SAGE II solar occultation measurements from 2002–05, i.e. for background aerosol. From the data, interesting signatures of volcanic eruptions and bushfires as well as a seasonal cycle and biennial variation in the aerosol load can be identified. However, an improvement of the data quality is planned by using multi-wavelength observations from SCIAMACHY in order to optimize the used phase function, which turned out to be a very influential factor in the retrieval.