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Stratospheric aerosol extinction profile retrievals from SCIAMACHY limb-scatter observations

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Stratospheric aerosol extinction profiles are retrieved from SCIAMACHY/Envisat limb-scatter observations in the visible and near infrared spectral range. The retrieval algorithm is based on a colour-index approach using the normalized limb-radiance profiles at 470 nm and 750 nm wavelength. An optimal estimation scheme in combination with the radiative transfer model SCIATRAN is employed for the retrievals.
This study presents a description of the retrieval algorithm and a sensitivity analysis investigating the impact of the most important parameters that affect the aerosol extinction profile retrievals. It is found that the parameter affecting the aerosol profile retrievals the most is surface albedo, particularly for SCIAMACHY observations in the southern hemisphere. The effect of errors in the assumed ozone and neutral density profiles on the aerosol profile retrievals is with generally less than 6 % relatively small. The aerosol extinction profiles retrieved from SCIAMACHY are compared with co-located SAGE II solar occultation measurements of stratospheric aerosol extinction during the period 2003 - 2005. The mean aerosol extinction profiles averaged over all co-locations agree to within 20 % between 15 and 35 km altitude. However, larger differences are observed at specific latitudes.