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Solar occultation with SCIAMACHY: algorithm description and first validation

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Abstract. This presentation concentrates on solar occultation measurements with the spaceborne spectrometer SCIAMACHY in the UV-Vis wavelength range. Solar occultation measurements provide unique information about the vertical distribution of atmospheric constituents. For retrieval of vertical trace gas concentration profiles, an algorithm has been developed based on the optimal estimation method. The forward model is capable of simulating the extinction signals of different species as they occur in atmospheric transmission spectra obtained from occultation measurements. Furthermore, correction algorithms have been implemented to address shortcomings of the tangent height pre-processing and inhomogeneities of measured solar spectra. First results of O_3 and NO_2 vertical profile retrievals have been validated with data from ozone sondes and satellite based occultation instruments. The validation shows very promising results for SCIAMACHY O_3 and NO_2 values between 15 to 35km with errors of the order of 10% and 15%, respectively.

◰ Final Revised Paper (PDF, 1385 KB)   ◰ Discussion Paper (ACPD)

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