



Multiple wavelengths retrieval of aerosol profiles from MAX-DOAS observations

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Since the MAX-DOAS method was applied to obtain the aerosol extinction profile, several different retrieval algorithms has been proposed in last few years, in which most of them are based on the Optimal-Estimation-Method (OEM). In this work, O_4 absorptions of one clear day during the second Cabauw Intercomparison campaign for Nitrogen Dioxide measuring Instruments (CINDI-2) at Cabauw, Netherland was used to investigate the differences between aerosol retrieval with single O_4 absorption band and the combination of multiple O_4 bands. Firstly, aerosol retrieval based on the O_4 absorption bands at 360 and 477 nm was carried out by HEIPRO (HEidelberg PROfile) algorithm and 3M (Munich Multiple wavelength MAX-DOAS inversion algorithm), respectively. These two algorithms show high consistence in aerosol retrieval at single wavelength band. Both of them can provide useful aerosol information, which can be further validated by ancillary measurements, e.g. sun photometer, nephelometer and LIDAR. However, the aerosol extinction profiles retrieved from different O_4 absorption bands show different vertical profile shapes. Therefore, we propose to combine multiple O_4 absorption bands to retrieve the aerosol profile. The retrieved results are consistent with the single wavelength retrieval. The proposed inversion algorithm can potentially retrieve the aerosol optical properties, e.g., Ångström exponent.