



## **Remote sensing of tropospheric aerosol extinction vertical profile using a ground based UV and Vis hyperspectral sensor and its application for retrieval of trace gas profiles**

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The capability of Multi-Axis Differential Optical Absorption spectroscopy (MAX-DOAS) of retrieving information on atmospheric aerosol extinction based on O<sub>4</sub> measurement has been recently investigated. For determination of O<sub>4</sub> Slant Column Density (SCD), its absorption bands in UV (343nm, 360 nm, and 380nm) or visible (477 nm, 532 nm, 577 nm and 630 nm) regions are utilized. This study presents the aerosol retrieval results based on O<sub>4</sub> data obtained by MAX-DOAS instrument at UV and Vis absorption bands (338, 367, 380, and 470 nm) at highly populated urban sites; Beijing, China (16 August ~ 10 September 2006), Seoul, Korea (April 15 ~ June 15 2007), Gwangju, Korea (22 February ~ 26 April 2008), and Fresno, U.S.A (7 ~ 15 December 2009). MAX-DOAS based aerosol extinction coefficient and aerosol optical depth (AOD) obtained for the lower surface layers were compared with those obtained by lidar and sunphotometer measurements. The advantages and shortcomings of UV MAX-DOAS measurement for aerosol extinction retrieval are also discussed in detail. This study also discusses the feasibility of improvement in retrieval of NO<sub>2</sub> and HCHO profiles from MAX-DOAS data by utilizing the retrieved aerosol extinction profiles in the radiative transfer model (RTM) calculations.