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MAX-DOAS retrieval of aerosol extinction properties in Madrid, Spain

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We present Multi-axis differential optical absorption spectroscopy (MAX-DOAS) measurements performed in the urban environment of Madrid, Spain, from March to September 2015. The O4 absorption in the ultraviolet (UV) spectral region was used to retrieve the aerosol extinction profile using an inversion algorithm. The results show a good agreement between the hourly retrieved aerosol optical depth (AOD) and the correlative Aerosol Robotic Network (AERONET) product. Higher AODs are found in the summer season due to the more frequent occurrence of Saharan dust intrusions. The surface aerosol extinction coefficient as retrieved by the MAX-DOAS measurements was also compared to in situ PM2:5 concentrations. The level of agreement between both measurements indicates that the MAX-DOAS retrieval has the ability to characterize the extinction of aerosol particles near the surface. The retrieval algorithm was also used to study a case of severe dust intrusion on 12 May 2015. The capability of the MAX-DOAS retrieval to recognize the dust event including an elevated particle layer is investigated along with air mass back-trajectory analysis.