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MAXDOAS measurements and profile retrieval of trace gases and aerosols in Madrid (Spain): a study on HCHO, HONO, glyoxal and aerosol extinction

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Despite their low concentration (typically 1% of the total amount, or even lower) in the atmosphere, trace gases stand as one of the main actors in atmospheric chemistry, especially in urban, polluted areas. Therefore, the evaluation of trace gases concentration profiles and their temporal evolution is key in order to gain knowledge on the tropospheric mechanisms.
To carry out the measurements we used a MAXDOAS (Multi-AXis Differential Optical Absorption Spectroscopy) instrument, which was located in the city center of Madrid (41.44° N, 3.69° W). Once the spectra were collected, a DOAS analysis and an inversion algorithm were applied: QDOAS and bePRO, respectively. In a first step, the aerosols extinction coefficients profiles were retrieved, and once the aerosol extinction influence was subtracted, profiles of HCHO, HONO and glyoxal were obtained. One complete year of measurements (2016) was available, thus allowing us to perform long-term analysis of these trace gases.