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Investigation of the vertical and horizontal spatial distributions of NO_2 in Brussels area using MAX-DOAS measurements.

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Tropospheric NO_2 is an important anthropogenic pollutant emitted by combustion processes associated to traffic, industrial activity and domestic heating. Because its lifetime is short (typically a few hours close to the surface), it displays a large variability in time and space. NO_2 is generally seen as a proxy of air pollution, as high concentration of NO_2 are often associated with high concentrations of other pollutants such as tropospheric O_3 and aerosols. For this reason, its continuous monitoring is of major importance.
In the present study, MAX-DOAS measurements from the BIRA-IASB research grade spectrometer operated in Uccle (Brussels, Belgium) are used to develop and demonstrate new approaches for investigating the vertical and horizontal spatial distributions of NO_2 under moderate to high pollution conditions, such as encountered in Brussels and its suburban area. More precisely, we describe how multi-angle static MAX-DOAS measurements can be combined with ancillary in-situ observations from the regional air-quality telemetric network and meteorogical data (mostly wind speed and direction) in order to study the horizontal and vertical gradients of NO_2 and to identify the most important emission source areas in and around Brussels. The link between surface concentrations and vertical columns of tropospheric NO_2 will be also investigated and, together with the observed horizontal gradients, will support the validation of TROPOMI NO_2 satellite observations.