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Combined use of car based and satellite observations for the characterisation and quantification of large emission source like megacities

R. Shaiganfar, O. Ibrahim, S. Beirle, and T. Wagner
(shaigan@mpch-mainz.mpg.de)

Abstract. Megacities are localized, heterogeneous and variable sources of various air pollutants, having impact on air quality and ultimately on climate. Within the European project MEGAPOLI we will characterise and quantify these emissions using spectroscopic observations using satellite instruments and ground based instruments mounted on cars.
The car observations are conducted on circles around localised emission sources or even whole cities. From these observations, together with meteorological information, the total emissions of trace gases like NO2, HCHO, and Glyoxal can be quantified. The car measurements are also used for validation of the satellite observations.
Satellites provide long time series with global cover, which is an important advantage to study the satellite measurements. From the satellite observations the link from local to regional and global scales can be made. Especially the impact of important sources like megacities on the surrounding areas and also over longer distances can be studied. The combination with the car measurements adds valuable information on the diurnal cycles, which is not well captured from satellite observations.
Here we present first results from car-based Multi-Axis-DOAS (MAX-DOAS) observations of NO2 and relate them to the results from satellite observations. For selected megacities, we analyzed temporal patterns like annual or weekly cycles and trends, as well as spatial patterns. We provide an overview on our future activities within the MEGAPOLI project.