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Key factors controlling air quality of cities in Southern Poland

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Large number of greenhouse gas and air pollution sources occurring in Poland are only partially responsible for concentration of methane carbon dioxide and carbon monoxide as well as PM2.5 and PM10 in centres of Polish cities. Orography and atmospheric dynamics are evenly important and air pollution map reflects its influence on abundance of atmosphere constituents.
Measurements of atmospheric concentration of greenhouse gases has been conducted since 1995 in Kraków and multiple cities over Silesia area. In 2016 larger campaigns were conducted with mobile platform under $MEMO_2$ EU H2020 project. Moreover, during last year growing network of monitoring points allowed for increase of modelling resolution. The main aim of the presentation is to focus on comparison of measurements results with both database inventories and modelled concentration fields of greenhouse gases and aerosols. In particular the spatial and temporal distribution of volatile substances in vicinity of large release sources was studied and led to identification of major parameters impacting the air quality and gas concentration in urbanised area over Southern Poland:
- Wind pattern, barometric and frontal weather occurrence, breeze winds influence on atmospheric transport,
- Orography character – height of valley, steepness of its border,
- Thermal conditions – insolation, PBL height,
- Density of the sources and their efficiency.

All these parameters seems to be internally dependent and cross-correlated but are relevant both in microscale and regional scale as well as in diurnal and seasonal temporal scales.
Increase of low cost sensor availability allowed for acquisition of supplementary data for validation of existing private networks of outdoor and indoor air quality with mobile platform and official environmental protection stations.

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