

## **PoLand Air Quality Ensemble (PLAQE) - Improving air quality modeling with ensemble approach**

Air quality has strong impact on human health and life quality. The World Health Organization reported that in year 2016 c.a. 3 million deaths were attributed to ambient pollution. In Poland high concentrations of PM<sub>10</sub>, PM<sub>2.5</sub> and ozone (O<sub>3</sub>) that exceed the threshold values are observed each year at monitoring network operated by Chief Inspectorate of Environmental Protection. This is the reason why air quality has been a major concern since decades, with still large unresolved problems affecting the quality of every day life.

The aim of this project is to apply the multi-model ensemble for assessment of temporal and spatial variability of PM<sub>10</sub>, PM<sub>2.5</sub> and O<sub>3</sub> concentrations in Poland. The research will be done both using hindcast (for selected 5 years) and forecast. Three atmospheric transport models will be used in this study: WRF-Chem, EMEP and CAMx. Ensemble members will include different models, and the same model runs but with different emission inventories. This will address the source of large uncertainty in air quality modelling, which is related to spatial and temporal allocation of emission. The uncertainty related with emission is especially large in Poland, where coal has large share in residential combustion and there are no national regulations on coal quality.

The multi-model ensemble approach produces new response by itself. Previous studies, including pilot research undertaken for this proposal, show that by combining different model, we can improve the air quality forecast by reducing the errors. This is important for both – forecasts that warns the population of high concentrations of pollutants and for retrospective model runs, which are used to analyse long term effects of population exposure.