



Near Real-Time Air Quality Mapping Using Data Fusion Techniques and Sentinel-5P Data

Jana Doubalova (1,2), Jan Horalek (1), Roman Juras (1), and Ondrej Vlcek (1)

(1) Czech Hydrometeorological Institute, Prague, Czech Republic (jana.doubalova@chmi.cz), (2) Dpt. of Atmospheric Physics, Charles University, Prague, Czech Republic

Air quality mapping plays an important role in informing the public about air pollution levels as well as in the assessment of air quality in areas not covered by measuring stations. For this purpose various data sources can be utilized, in particular in-situ measurements, air quality models and Earth observation data. Within the scope of the ESA funded project SAMIRA (SATellite based Monitoring Initiative for Regional Air quality) we have been testing data fusion techniques that combine these data sources to provide more accurate information within air quality mapping.

The methodology of the data fusion is based on multiple linear regression followed by the interpolation (kriging) of its residuals. The response in the multiple linear regression is the in-situ measurement and the explanatory variables are mainly outputs from a chemical transport model (CTM) and satellite observations. This methodology was first tested on historical data for hourly, daily and annual time steps.

The final goal of the project was to utilize the method in near real-time. Therefore, we have set up a model to combine up-to-date in-situ measurements with the outputs of a pre-operational air quality forecast using the CAMx model and near real-time measurements from Sentinel-5P. Using this system, hourly air quality maps of NO₂ are produced. Each map is also evaluated automatically by cross-validation to assess its uncertainties.