

## Numerical Study of Atmospheric Composition in Urban Areas – Some Preliminary Results for the City of Sofia

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**Abstract.** Some extensive numerical simulations of the atmospheric composition fields in the city of Sofia have been recently performed and an ensemble, comprehensive enough as to provide statistically reliable assessment of the atmospheric composition climate of Sofia – typical and extreme features of the special/temporal behavior, annual means and seasonal variations, etc. has been constructed.

The simulations were carried out using the US EPA Models-3 system. As the NCEP Global Analysis Data with 1 degree resolution was used as meteorological background, the system nesting capabilities were applied for downscaling the simulations to a 1 km resolution over Sofia.

The national emission inventory was used as an emission input for Bulgaria, while outside the country the emissions were taken from the TNO inventory. Special pre-processing procedures are created for introducing temporal profiles and speciation of the emissions. The biogenic emissions of VOC are estimated by the model SMOKE. For describing the ambient pollutant mix, an overall air quality index (AQI) is constructed, which makes it possible to describe the air quality in a simple, understandable for the general public way.

The air pollution pattern is formed as a result of interaction of different processes, so knowing the contribution of each for different meteorological conditions and given emission spatial configuration and temporal behaviour could be interesting. Therefore the CMAQ “Integrated Process Rate Analysis” option was applied to discriminate the role of different dynamic and chemical processes for the air pollution formation in the city of Sofia.

Different characteristics of the numerically obtained concentration fields of as well as of the contribution of processes will be demonstrated in the presentation.