Meteorological and Chemical Urban Scale Modelling for Shanghai Metropolitan Area

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Urban air pollution is a serious problem in megacities and major industrial agglomerations of China. Therefore, air quality information is important for public. In particular, the Shanghai metropolitan area is well known as megacity having severe air pollution episodes.

The Enviro-HIRLAM (Environment - HIgh Resolution Limited Area Model) is applied for on-line integrated meteorology and atmospheric composition forecasting for the Shanghai region of China. The model setup includes the urban Building Effects Parameterization module, describing different types of urban districts with its own morphological and aerodynamical characteristics. The model is running in downscaling chain from regional-to-urban scales for selected periods in summer and winter having both elevated pollution levels as well as unfavorable meteorological conditions.

For these periods, the effects of urbanization are analyzed for spatio-temporal variability of atmospheric and chemical/aerosols patterns. The formation and development of meteorological (air and surface temperature, relative humidity, wind speed, cloud cover, boundary layer height) and chemical/aerosol patterns (concentration and deposition) due to influence of the metropolitan area is evaluated. The impact of Shanghai region on regional-to-urban scales as well as relationship between air pollution and meteorology are estimated.