



Multi-Scale Enviro-HIRLAM Forecasting of Weather and Atmospheric Composition over China and its Megacities

Alexander Mahura (1), Bjarne Amstrup (1), Roman Nuterman (2,3), Xiaohua Yang (1), Alexander Baklanov (4,1)
(1) Danish Meteorological Institute, Research and Development Department, Copenhagen, Denmark (ama@dmi.dk), (2) Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark, (3) Tomsk State University, Mechanics and Mathematics Faculty, Tomsk, Russia, (4) World Meteorological Organization, Geneva, Switzerland

Air pollution is a serious problem in different regions of China and its continuously growing megacities. Information on air quality, and especially, in urbanized areas is important for decision making, emergency response and population. In particular, the metropolitan areas of Shanghai, Beijing, and Pearl River Delta are well known as main regions having serious air pollution problems.

The on-line integrated meteorology-chemistry-aerosols Enviro-HIRLAM (Environment - High Resolution Limited Area Model) model adapted for China and selected megacities is applied for forecasting of weather and atmospheric composition (with focus on aerosols). The model system is running in downscaling chain from regional to urban scales at subsequent horizontal resolutions of 15-5-2.5 km. The model setup includes also the urban Building Effects Parameterization module, describing different types of urban districts (industrial commercial, city center, high density and residential) with its own morphological and aerodynamical characteristics. The effects of urbanization are important for atmospheric transport, dispersion, deposition, and chemical transformations, in addition to better quality emission inventories for China and selected urban areas.

The Enviro-HIRLAM system provides meteorology and air quality forecasts at regional-subregional-urban scales (China - East China – selected megacities). In particular, such forecasting is important for metropolitan areas, where formation and development of meteorological and chemical/aerosol patterns are especially complex. It also provides information for evaluation impact on selected megacities of China as well as for investigation relationship between air pollution and meteorology.