Geophysical Research Abstracts
Vol. 17, EGU2015-1571, 2015
EGU General Assembly 2015

Enviro-HIRLAM Applicability for Black Carbon Studies in Arctic

Roman Nuterman (1,2), Alexander Mahura (3), Alexander Baklanov (3,4), Alexander Kurganskiy (1,5,6), Bjarne Amstrup (3), and Eigil Kaas (1)

(1) Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark (nuterman@nbi.ku.dk), (2) Tomsk State University, Tomsk, Russia, (3) Danish Meteorological Institute, Research and Development Department, Copenhagen, Denmark (ama@dmi.dk), (4) World Meteorological Organization, Geneva, Switzerland (abaklanov@wmo.int), (5) Russian State Hydrometeorological University, St.Petersburg, Russia , (6) Institute of Northern Environmental Problems, Kola Science Center, Apatity, Russia

One of the main aims of the Nordic CarboNord project ("Impact of black carbon on air quality and climate in Northern Europe and Arctic") is focused on providing new information on distribution and effects of black carbon in Northern Europe and Arctic. It can be done through assessing robustness of model predictions of long-range black carbon distribution and its relation to climate change and forcing.
In our study, the online integrated meteorology-chemistry/aerosols model – Enviro-HIRLAM (Environment – HIgh Resolution Limited Area Model) – is used. This study, at first, is focused on adaptation (model setup, domain for the Northern Hemisphere and Arctic region, emissions, boundary conditions, refining aerosols microphysics and chemistry, cloud-aerosol interaction processes) of Enviro-HIRLAM model and selection of most unfavorable weather and air pollution episodes for the Arctic region. Simulations of interactions between black carbon and meteorological processes in northern conditions for selected episodes will be performed (at DMI's supercomputer HPC CRAY-XT5), and then long-term simulations at regional scale for selected winter vs. summer months. Modelling results will be compared on a diurnal cycle and monthly basis against observations for key meteorological parameters (such as air temperature, wind speed, relative humidity, and precipitation) as well as aerosol concentration. Finally, evaluation of black carbon atmospheric transport, dispersion, and deposition patterns at different spatio-temporal scales; physical-chemical processes and transformations of black carbon containing aerosols; and interactions and effects between black carbon and meteorological processes in Arctic weather conditions will be done.