

# Summary Report

## Enviro-HIRLAM

### Research Training

(25-29 Oct 2010)



Young scientists – Ekaterina Khoreva and Anna Filippenko (Russian State Hydrometeorological University; St. Petersburg, Russia), Adomas Mažeikis (Nature Research Center, University of Vilnius; Vilnius, Lithuania), Iratxe Gonzalez (Tecnalia Research and Innovation; Bilbao, Spain), and Brian Sørensen (University of Copenhagen; Copenhagen, Denmark) – had attended practical research training on the technical support, research and development topics of the Enviro-HIRLAM (Environment - High Resolution Limited Area Model) in the Research Department of the Danish Meteorological Institute (RD DMI). The item of this visit was a joint work/ research/ discussions/ consulting/ co-advising/ etc. of young researches.

On 25 Oct 2010, students had attended the invited lectures “*Development and Application of Global-Through-Urban and Mesoscale Weather Research and Forecast Model with Chemistry (WRF/Chem)*” given by Prof. Yang Zhang (North Carolina State University, Raleigh, NC, USA) and “*Recent Developments in Air Quality Modelling at CERE: Secondary Organic Aerosols and Air Quality Forecasting*” given by Prof. Christian Seigneur (CERE Atmospheric Environment Center Joint Laboratory, École des Ponts ParisTech / EDF R&D Université Paris-Est). The invited lectured were organized by the CEEH (with assistance of the CEEH manager Marie-Louise Siggaaard-Andersen) at the Niels Bohr Institute of the University of Copenhagen; and further seminar with presentations and joint round table discussions continued at the RD DMI. DMI researches presented current aspects of the Enviro-HIRLAM developments:

- Alexander Baklanov “*Research in Environmental Meteorology Modelling*”;
- Kristian P. Nielsen “*Aerosol Directs Effects*”;
- Ulrik S. Korsholm “*Parameterization of Arosol Indirect Effects*”;
- Ashraf Zakey “*Overview of the Climate-Chemistry Interaction from Air-Quality Perspective*”;
- Roman Nuterman “*Air Quality Forecast Downscaling from Regional- to Street-Scale*”;
- Alexander Mahura “*Urban Scale Modelling*”.

On 26 Oct 2010, students have presented recent progress on research they have done so far:

- Anna Filippenko (MSc): “*Chemical Transport Models and coupling with Regional Weather Forecast Models*”;
- Adomas Mažeikis (PhD): “*Exchange of aerosols between surface water bodies and urban territories*”;
- Ekaterina Khoreva (PhD): “*Modelling of feedback mechanisms of physical and chemical processes in the atmosphere at the regional scale*”;
- Brian Sorensen (PhD): “*Locally mass-conserving dynamical core*”;
- Iratxe Gonzalez (PhD): “*Climate change projections to assess meteorological and air quality fields in megacities and medium size cities using an online NWP model*”.

The DMI scientists – Ashraf Zakey, Roman Nuterman, Kristian P. Nielsen, Ulrik S. Korsholm, Bent H. Sass, Yang Xiaohua, Alexander Baklanov, Alexander Mahura – were involved into discussions on related technical aspects and research themes for the Enviro-HIRLAM. The relevant

topics included general discussions on progress made so far by young researchers, topics of the aerosols feedbacks implementation, radiation scheme; chemistry schemes; urbanization aspects of the model; pre-processing of emission data reflecting different types of transport related sources; HIRLAM Chemistry Branch, versions setups for applications; links with boundary conditions; land-use datasets; specific tasks of further collaboration, and others.

During this training week, the special attention had been paid to urbanization aspects of the Enviro-HIRLAM model. The practical tasks (lead by Iratxe Gonzalez) related to urbanization of the model were realised and included: aspects of technical implementation of the building effect parameterization (BEP) module into the Enviro-HIRLAM; preparation (using GIS technique) of detailed input data for different types of urban districts with re-classification of the land-use datasets for the urban grid cells; urban module testing and previous experience with the BEP module verification; modification of the scripts and adaptation to run on laptops; at the last day of the training week the implementation of indirect aerosol effects modules into Enviro-HIRLAM had been discussed.

Funding was provided by the following projects:

MUSCATEN – *Towards Multi-Scale Modelling of the Atmospheric Environment*

(<http://muscaten.ut.ee>);

EU TEMPUS QualiMET – *Development of Qualification Framework in Meteorology*

(<http://qualimet.net>);

FP7 EC MEGAPOLI – *Megacities: Emissions, urban, regional and Global Atmospheric POLLution and climate effects, and Integrated tools for assessment and mitigation*

(<http://megapoli.info>).

CEEH – *Center for Environment, Energy, and Health*

(<http://ceeh.dk>).