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High-resolution application of SILAM air quality modelling system in Estonia

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Since December 2010 the SILAM system (Sofiev et al., 2006) is running for routine air quality forecast for Estonia and neighbour areas (http://meteo.physic.ut.ee/silam), being the first application outside of Finland. A special feature of this application, developed by University of Tartu in cooperation with Estonian Institute of Meteorology and Hydrology, is its high spatial resolution: 0.03 meridional degrees or 3.3 km, driven by ETB-HIRLAM meteorological model with the same resolution. To make the model reliable for such a resolution, some improvements are made, the buoyancy rise of plumes from industrial stacks (according to Briggs) in particular. Currently the implementation of sea salt emission and full-chemistry (VOC-s, ozone, sulphuric compounds) modules, developed by Finnish Meteorological Institute (FMI), is going on.
The planned near-future developments include (1) implementation of detail database of pollution sources based on national inventories of Finland, Estonia and Latvia and (2) making the spatial resolution even finer, aimed at resolving the urban background levels.
Further developments include (1) implementation of SILAM with full aerosol dynamics currently developed by FMI, (2) downscaling application based on urban-scale model Aeropol, (3) intercomparison and integrated use of results (i.e. two-model "ensemble" approach) with MATCH model run by Estonian Environment Research Centre. The final goal of these developments is to fit the ETB HIRLAM with aerosol and chemical feedbacks from SILAM, the radiative forcing in particular.

References

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