

Birch pollen forecasting for Denmark

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Until 2006 DMI routinely provided birch pollen forecasting during pollinating seasons using a simple phenological model. Recently DMI started to test a system consisting of the DMI High Resolution Limited Area Model (HIRLAM)-BP5 combined with the DMI-TRACER module for short-term birch pollen forecasts. This system is also a part of the on-going DMI-ENVIRO-HIRLAM Programme development and applications.

The formulation of the model for dispersion and deposition of pollen particles, methodology and approaches for birch pollen forecasting are discussed.

The physiographical and phenological data reflecting the spatial distribution and emissions of birch trees over the modelling domain as well as their temporal dependences are used as input. The meteorological fields are simulated by the DMI-HIRLAM-BP5 (resolution of 5 km, 40 vertical levels). The modified DMI-TRACER module takes into account advection, diffusion, and deposition of birch pollen particles. Both dry and wet deposition processes are considered as particle size dependent.

For two sites (Copenhagen and Viborg) of pollen measurements in Denmark an analysis of pollen seasons for the recent years (2001-2005) showed a strong diurnal variability in pollen counts as well as significant differences between years. Several specific dates (when elevated concentrations of birch pollen were recorded) were used for testing and verification of the developed system. The forecasted and analyzed birch pollen output includes two dimensional concentration and deposition fields, maximum, elevated above threshold values, tendencies, and others.

Further developments of the system are focused on improving quality of birch pollen emission data, land use classification with respect to areal distribution of birch trees, higher resolution for simulated meteorological fields, and incorporation of the influence of urban related features.