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Transport of pollen to and from a Central European forest

M. Piringer (1), E. Polreich (1), S. Schüler (2), and K. Robitschek (2)

(1) Central Institute for Meteorology & Geodynamics, Environmental Meteorology, Vienna, Austria (martin.piringer@zamg.ac.at, 0043-1-360 26 74), (2) Federal Research and Training Centre for Forests, National Hazards, and Landscape, Vienna, Austria(silvio.schueler@bfw.gv.at, 0043-1-87838 2250)

The scientific project “ROSALIA”, carried out in co-operation between ZAMG and the Austrian Federal Research and Training Centre for Forests, Natural Hazards, and Landscape, investigated the meteorological impacts on pollen emission and spread in a typical Central European forest of mixed deciduous and coniferous trees. The study area is the “Lehrforst Rosalia” of BOKU University approx. 60 km south of the city of Vienna in undulating terrain (300 – 750 m altitude). Pollen counts are conducted on three levels of a meteorological tower situated in a narrow tree-covered valley at 370 m height for the flowering period of spring flowering tree species in 2009. The tower is located directly within the crowns of a mixed stand of European beech, Sessile oak, Norway spruce, Silver fir and Common ash. The first upper sampling unit measures the pollen concentration above the canopy, the second sampling unit is installed in the crown sphere of the stand, and the third sampling unit measures the pollen concentration at the forest ground. In order to sample pollen from all directions and to account for the potential turbulence within the canopy, a cylindrical pollen separator as suction device and the conventional Burkhard pollen impactor with a 24 hour drive as impactor and detection device are applied.

In order to estimate the meso- and large scale influx of pollen into the study area as well as pollen dispersion from the forest, simulations of the regional-scale wind field and Lagrangian modeling will be undertaken. The calculation of backwards trajectories will give the origin of the air masses involved. Forward trajectories are used to estimate the future position of the locally emitted pollen. The time scale is after or before 12 to 24 hours depending on ambient wind speed. The Lagrangian dispersion model LASAT will be used to simulate pollen dispersion on selected pollen emission days using the available meteorological information in the investigation area, especially data of ultrasonic anemometers on top of two meteorological towers in the area, as input. LASAT will provide hourly pollen fields from which the impact of the pollen emission on the surroundings (e. g. possibly preferred areas of pollen impact) will be deduced.