EMS7/ECAM8 Abstracts,
Vol. 4, EMS2007-A-00026, 2007
7th EMS Annual Meeting / 8th ECAM

Contribution of Remote Sources in Elevated Birch Pollen Events in Denmark

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The purpose of this study was to investigate the relation between possible long-range transport of birch pollen and episodes of elevated concentrations in Denmark. Analyzing a 26 years (1980-2006) time-series of birch pollen counts from two sites (Copenhagen and Viborg) the events of elevated concentrations (larger than 100 grains per m^3) were identified in less than 2% of the cases. Trajectory analysis showed that elevated events are primarily associated with long-range transport from the Eastern European and Scandinavian countries.

During this long-term period, in 43% and 33% of the cases such atmospheric transport occurred from the eastern and northern sectors, which are consisted of from one side by the Eastern European countries, Baltic States, Ukraine, Belarus and Russia, and from another by the Scandinavian Peninsula countries. The latter is represented by the fast and slow atmospheric transport to the sites. The means (maxima) are 213 (1080) and 187 (647) grains per cubic meter for the eastern and northern sectors, respectively. The lowest contribution was found to originate over the British Aisles. Long-term episodes (as in 1993 and 2006) were found to occur when atmospheric conditions favors long-range transport from several source regions in succession.

Although the Danish sites are located not far from each other (220 km), the atmospheric transport associated with elevated concentration events showed some differences between the sites. It is especially seen for the northern sector where the slow atmospheric transport dominates over the fast ones by approximately factor of 3 for the Viborg site compared with Copenhagen, and vise versa.