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High Ambrosia pollen concentrations in Poland respecting the long distance transport (LDT)

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Abstract

High Ambrosia pollen concentrations in Poland rather rarely come from the local sources. The aim of this study was to define the temporal and spatial differences of the high Ambrosia pollen concentrations by creating models for the pollen transport from the distant sources. This study was thought to determine the direction of the air masses inflow into Poland, carrying Ambrosia pollen, from areas of the bordering countries with the pollen concentrations higher than iSTOTEN_n Poland. Pollen and meteorological datasets at 8 monitoring sites in Poland, and daily pollen concentrations at 11 sites in the Czech Republic, 5 sites in Slovakia and 3 sites in Ukraine were analysed recently. Days with concentrations ≥ 10 Pollen/m³ and concurrent meteorological situations were analysed in great deal. The HYSPLIT model was applied to compute backward trajectories up to 4 days backward (96 h) and at three altitudes: 20, 500 and 1000 m above ground level (a.g.l.). High pollen concentrations occur most frequently when the air masses inflow into Poland from southerly (S, SE, SW, 44%) and easterly (E, 6%) directions and in no advection situations (25%). In years with the highest frequency of days over 10 Pollen/m³, the prevailing directions of the pollen influx into Poland were from the South (2004-2006, 2008, 2011) but in one year (2014) from the East. Trajectories for the studied period show that air masses come most frequently from Slovakia and the Czech Republic. Sometimes, the Ambrosia pollen transport happens from Ukraine.

Keywords: Air masses directions; Backward trajectory analyses; HYSPLIT model; Ragweed pollen transport.

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Declaration of competing interest The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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