

Investigating the relationship between Ambrosia pollen concentration and meteorological variables in a European domain based on CORDEX and CMIP5 simulations

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As part of the European project, ATOPICA (atopic diseases in changing climate, land use & air quality) evaluation and scenario simulations were accomplished on 50-km grid spacing over a European domain which was defined in the framework of the international initiative called COordinated Regional Downscaling Experiment (CORDEX). Based on observational data collected from European pollen data bases, the pollen peak season of *Ambrosia artemisiifolia* L. (short or common ragweed) was found between the period: August-September (AS). One sub-region was selected (the most contaminated one: southern part of the Carpathian Basin) for further studies. Based on the ERA-Interim driven simulation of a regional climate model (RegCM) developed at the Abdus Salam International Centre of Theoretical Physics: temperature and precipitation indices are introduced related to the total common ragweed pollen concentration amounts over the target region for the period 1984-2008. In each case (temperature, precipitation) the index was based on the August-September (AS, peak-season) and June-July (JJ, pre-season) means by subtracting the latter from the previous one. The results manifested in a relatively clear signal between total pollen amounts and the indices. The temperature index is negatively, while the precipitation index is positively correlated with the total pollen amounts. This means cooler and wetter pre-seasonal and relatively drier and warmer peak-season weather conditions are favorable for the common ragweed outburst with high pollen concentrations. In total twenty global climate models (GCMs) from the Coupled Model Intercomparison Project Phase 5 (CMIP5) and five regional climate models from the CORDEX initiative were involved in the analyses in order to assess the link between the indices and the seasonal total pollen amounts. The temperature and precipitation indices presented in this study can be a useful tool for seasonal pollen forecasting in future studies.