An operational phenological model for numerical pollen prediction

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The general prevalence of seasonal allergic rhinitis is estimated to be about 15% in Europe, and still increasing. Pre-emptive measures require both the reliable assessment of production and release of various pollen species and the forecasting of their atmospheric dispersion. For this purpose numerical pollen prediction schemes are being developed by a number of European weather services in order to supplement and improve the qualitative pollen prediction systems by state of the art instruments.

Pollen emission is spatially and temporally highly variable throughout the vegetation period and not directly observed, which precludes a straightforward application of dispersion models to simulate pollen transport. Even the beginning and end of flowering, which indicates the time period of potential pollen emission, is not (yet) available in real time. One way to create a proxy for the beginning, the course and the end of the pollen emission is its simulation as function of real time temperature observations. In this work the European phenological data set of the COST725 initiative forms the basis of modelling the beginning of flowering of 15 species, some of which emit allergic pollen.

In order to keep the problem as simple as possible for the sake of spatial interpolation, a 3 parameter temperature sum model was implemented in a real time operational procedure, which calculates the spatial distribution of the entry dates for the current day and 24, 48 and 72 hours in advance. As stand alone phenological model and combined with back trajectories it is thought to support the qualitative pollen prediction scheme at the Austrian national weather service. Apart from that it is planned to incorporate it in a numerical pollen dispersion model. More details, open questions and first results of the operation phenological model will be discussed and presented.