The comparison between ERA5 and WRF data used to determine the start of birch pollen season in Poland.

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Distribution of pollen can change quickly in the air. Chemical transport models (CTMs) can be used to model transport and concentrations of pollen. CTMs require emissions information, includding the start of the pollen season, its duration and end. One of the vital input to the emission model are meteorological data. In our work we have checked how different meteorological data, with different spatial resolution influence on the results of a birch pollen emission model. We have focused on birch pollen because it is one of the most common cause of pollen allergy in Poland. The parametrisation of emission used in this work is based on Heating Degree Days (HDD) according to Sofiev et al. 2013. To determine the start of the pollen season we have used data from reanalysis (ERA5), with 30 km x 30 km spatial and 1 hour temporal resolution and data from the Weather Research and Forecasting Model (WRF) with 12 km x 12 km spatial and 1 hour temporal resolution. To verify of the results data from 11 pollen stations located in different parts of Poland were used. All calculations were carried out with the use of RStudio. The results have shown, that emission model based on ERA5 can quite accurate predict the start of the pollen season. For 7 cities, the model indicated the start of the season consistent with observational result. The biggest difference was 2 days for Białystok. In case of WRF model, there was visible overestimation of temperature, which influenced on the start date. For only 2 cities the model accurate predicted the start of the seasons. The biggest differences between the model and observations reached 6 days.