# Ragweed: diffusional spread and pollen load

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Invasive alien species cause a major threat to our ecosystems and health [1]. We simulate the spread of *Ambrosia artemisiifolia* L. (common ragweed) under current climate as well as with climate change assuming 1.5°C temperature increase from the year 1990 until 2050 (Fig. 1). *Ambrosia artemisiifolia* L. spreading rapidly in Europe [2-5] is an annual weed that causes pollen allergies [6]. Therefore, it is necessary to implement pollen load into the spread model to be able to determine the pollen pressure in the study area Austria and Bavaria. Recently, this was done for whole Europe on a coarse scale of 50 x 50 km with two different models [7]. We, in contrast, used a finer scale of about 6 x 6 km and considered in addition a higher number of pollen traps in relation to the size of the study area. For calculating pollen dispersal, we assumed that the drifting time for each pollen grain (i.e. the time it stays in the air) follows an exponential distribution with parameter τ and the empirical distribution of wind directions and velocities is constant for each individual trajectory. To achieve an estimate of the spatial pollen distribution, we compared the annual pollen totals recorded at eight Austrian pollen traps with the results of our simulations (Fig. 2) and thereby determined τ to be 1.72 h [8].

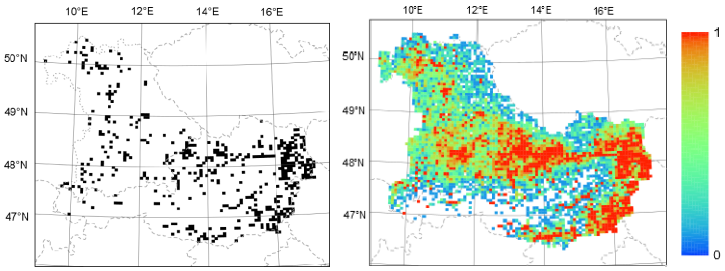


Figure 1: Distribution of grid cells infested by *Ambrosia artemisiifolia* L. in 2005 (black squares, left) and in 2050 (right, with climate change, different colours indicate the probability of infestation).

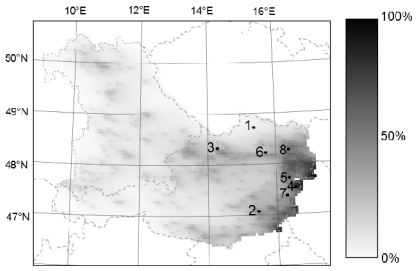


Figure 2: Simulated pollen dispersion (darkest shade indicates maximum) and location of eight Austrian pollen traps (blacksquares with numbers).

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