

Supplementary information: Towards the use of dynamic growing seasons in a chemical transport model

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1. Performance of T5 method

The main article presents scatter plots (Fig. 4) for each procedure to estimate the start of the growing season, SGS. Below, Fig. S1 shows the difference (in days) between the estimated (T5) and observed SGS at each site location. These results demonstrate that the method seems to work quite well at all latitudes where sites are present. The main problems seem to occur at coastal sites, for example at all the Irish sites, and the isolated site in northern France.

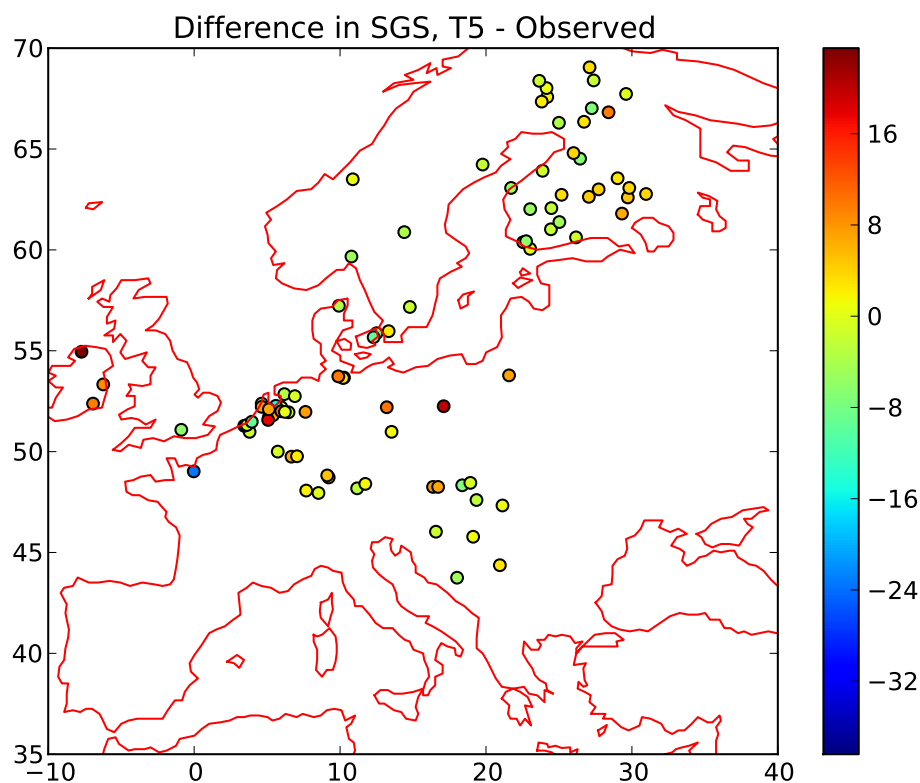


Figure S1: Difference (days) between T5-estimated SGS and observed values

2. Experiments with fixed day-requirements

In the final version of the T5 equation, a variable number of days, $D_{u,i}$, is needed with more than 5°C before SGS is attained. As seen in Fig. 2 of the main text, $D_{u,i}$ can vary between zero to almost 40 days (applicable in warmer climates).

This variable $D_{u,i}$ formulation made possible a very good fit to the observed SGS, in terms of regression statistics and index of agreement. We illustrate here the results of earlier experiments, in which different fixed values, $D_{u,\text{fix}}$, were used to define the number of days $>5^{\circ}\text{C}$. Figure S2 shows that most fixed-value formulations have great problems in reproducing the observed SGS values. The most successful version is that with a 15-day requirement, and here the results are rather good, indeed much better than the standard EMEP LAT method. However, we found that the 2-parameter T5 method provided even better results.

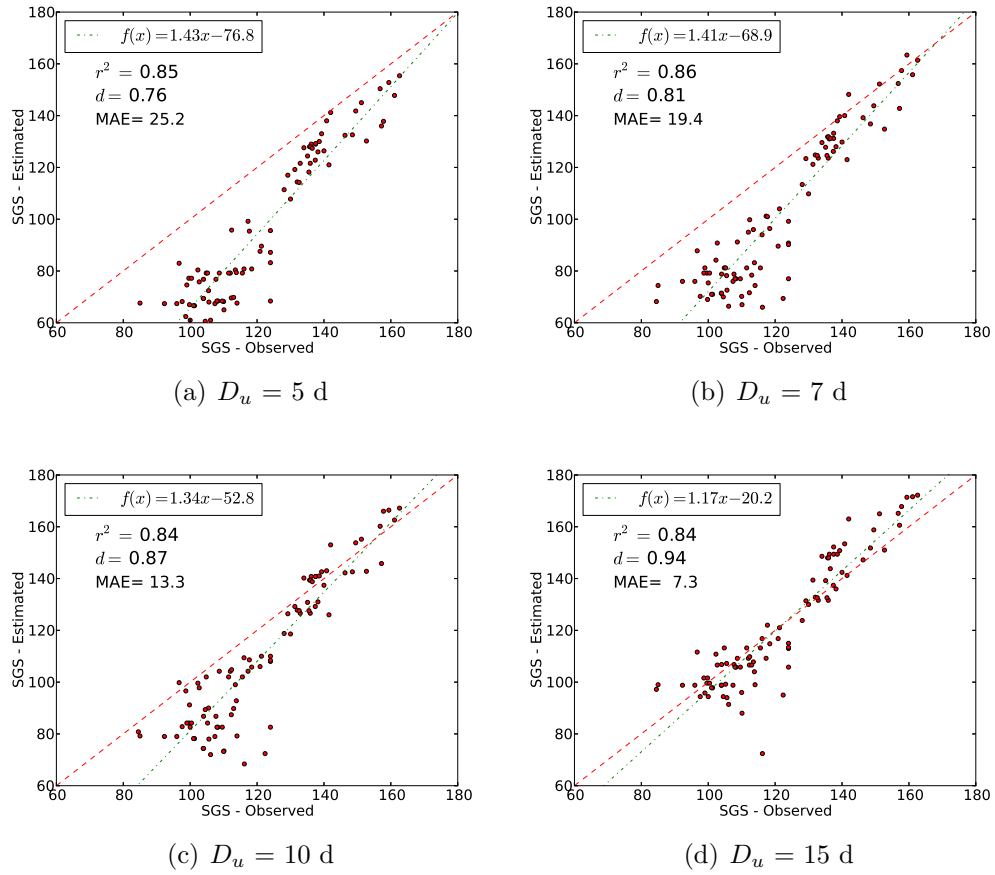


Figure S2: Evaluation of preliminary versions of the T5 equation, in which fixed $D_{u,fix}$ values of 5, 7, 10 and 15 days were tested. Notation as in main text, Fig. 4.