

Response to the reviewer's comments to the paper by Sofiev et al, MACC regional multi-model ensemble simulations of birch pollen dispersion in Europe.

We would like to thank both reviewers for their comments and suggestions to improve the paper.

Below, we provide responses to the comments.

Reviewer 1

*R. However, there is a number of points that should be improved (see specific remarks). In addition, the use of the English language should be checked (especially the use of articles, some examples are given in the specific remarks).*

A. The paper has been proof-read and its grammar and style have been cleaned

Specific comments.

*1. Line 156: treaded => treated*

OK.

*2. Line 191: provide a reference or justification for stopping the pollen release for RH>80%.*

Done

*3. Lines 240 and 241: provide references for the diameter and for the density.*

Added

*4. Line 208: add article before "Alps" 5. Line 217: the language should be improved: : : :most samplers were located at heights from 10m to 30m on the roofs of suitable buildings.*

OK, thanks you!

*6. Line 293: what period was used to calculate the statistics?*

Whole season. Clarification added

*7. Line 305: add article: over the majority; replace "or" by "of"*

Done

*8. Line 309: How is the season start defined?*

It is introduced at the Results section: the date when 5% of the cumulative seasonal total is reached. The clarification is added.

*9. Line 334: How about uncertainties in the birch distribution?*

Well, section 4.2 considers only two "non-trivial" uncertainties, where some analysis is possible. For the sake of completeness, we now added the habitat map in the list.

*10. Table 1: Most models have just very few vertical layers. It is very hard to imagine that birch pollen transport can be modeled with just three vertical model layers (LOTOS-EUROS). Please provide justification for the use of just 3 vertical levels (e.g. in line 230).*

This is indeed an interesting issue but not the major limitation in the current case. In dispersion modelling, most of models use different (low) resolution of dispersion-model vertical but still analyse full resolution of the underlying meteorological data. It has been shown that accurate treatment of meteorological vertical allows for including the bulk of information with just 5-10 “thick” vertical layers inside the troposphere. LOTOS-EUROS has dynamically adjusting layers following the boundary layer top, which partly compensates the inaccuracy coming from consideration of just 3 layers. A short note and a reference are added, Table 1 is refined to make the distinction clear.

*11. Figure 4: Make sure “zero” appears just once in the color bar.*

This is actually a misprint: values like 0.1, 0.2 have been truncated to 0. Corrected.

*12. Figure 6: It is hard to see the difference between the two left panels and the two right panels, respectively. I recommend to use a categorical color bar (as in Figures 1-5).*

Well, the difference is hard to see because it is small, as also stated in the text. The whole idea of this figure is to show that the season timing is among the most-accurately reproduced quantities, including the south-north propagation of the season. And the maps of its start obtained from the model and from the measurements are very similar. We changed the color map and the legend to increase the contrast of the pictures but this certainly did not change their similarity. In fact, this very similarity is the reason why we introduced the difference map in figure 7 (see below).

*13. Figure 7: the upper right plot implies that the model performance at the northeastern stations is much lower than at the rest of the stations. However, I assume that this impression is just due to the large birch pollen concentrations in north-eastern Europe. Normalizing with the median of the station data could help. Again, in the lower right panel a categorical color bar should be used. It is impossible for the reader to distinguish between 0.0 and 0.2.*

Unfortunately, the absolute bias in the north is the feature of the season of 2013 and the source term, which strongly diverged. The season was anomalously low in the north (see figure 3 and related discussion), whereas the source term does not have such mechanism, which has caused the bias.

*Additionally, it is important to provide information on the significance of the correlation coefficients (p-values or 5% level). Without this information, the correlation coefficients cannot be interpreted.*

Significance values have been added as sizes of the station circles.

*It seems to me that the upper left panel is just the difference between the left panels of Figure 6. If that is the case, it can be omitted.*

This is true but, as discussed above, the maps of the figure 6 are very similar, so the zoom into the error makes sense, showing that there are still some stations where the error in the season prediction is far from perfect.

*14. Figure 8: label all y-axes and provide significance information for the correlation coefficients.*

Done

*15. Figure 10: Why do the relative frequencies in the left panel not sum up to 1? What period is the right panel based on?*

This is just a normalizing factor: the sum is 8, which is the number of ranks. Changed to 1. As all other data, 15.3-24.6 (added to the paper as stated above).