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 2**

The following editorial comments have all been introduced. Thank you very much for the detailed suggestions!

*1. L60: may be better "tree" instead of "plant" 2. L69: replace "transportation" to "atmospheric transport" 3. L71: may be better to use "XX century" instead of "previous century" 4. L81: replace "Mikhail Sofiev et al" to " Sofiev et al" & replace "Yli-panula" to "Yli-Panula" 5. L95: replace "M. Sofiev et al" to "Sofiev et al" 6. L94: may be make a web-link to the model (SILAM) here or on L166; can be it also done for other 6 models used 7. L110: replace "to present the results" to "to present and evaluate the results" 8. L112-L116: may be this paragraph can be omitted 9. L124: replace "pollen transport" to "pollen atmospheric transport" 10. L126, L134, L141, L150, L154, L159, L166: it will be better if all model names will be spell-out in complete as it is done for the SILAM model in lines 94-95 11. L146: replace "An Eddy diffusion" to "An eddy diffusion" 12. L156: replace "treaded" to "treated" 13. L160: replace "semi-lagrangian" to "semi-Lagrangian" 14. L172: make similar writing for 3D & 4D-VAR for L143 15. L176: may be add in title of 3.2 word "pollen" 16. L183: replace "temperature sum" to "air temperature sum" 17. L189: may be better to use "accumulated to-date" instead of "accumulated to-day" 18. L190: replace "humidity" to "relative humidity (RH)" 19. L194: may be better to use "calm conditions" instead of "still conditions" 20. L202: replace "following members" to "following 11 members" 21. L215: "from March to September" vs. "from March till September" (e.g. location/to vs. time/till) 22. L226: is it necessary to mention "GMD MACC special issue" -> omit?; or it is enough to use the reference + add it to the section 8 "References"; + same on L123 23. L227 vs. L231: identical values for domains; write only once, just mentioning in words the same boundaries 24. L234- 235: use/write only once "m" for vertical levels (fx. : : :3000 and 5000m) 25. L239: may be better "were used" instead of "were picked" 26. L253: replace "The season was" to "The duration of the season was" 27. L261: clarify: "tens of times" vs. "ten time" vs. "ten-fold" 28. L271: may be replace "pollen index" to "SPI" (defined in L258) 29. L280: replace "four time moments" to "four episodes" 30. L287: re-write "southern blow shown" 31. L292: replace "all relying" to "all are relying" 32. L297: may be re-write in passive voice instead of "we" 33. L297- 298: replace "features of the pollen season" to "features of the 2013 birch pollen season"; and then exclude "of the 2013 birch pollen season" from title of section 5.1 (L301-302) 34. L304: re-write "Comparison of : : : Figure 7 demonstrates that" to "Analysis showed (see Figs. 6-7) that" 35. L310: replace "largely decided" to "largely influenced" 36. L311: replace "affecting or passing" to "affecting or pollen cloud/plume passing" 37. L313: may be better "large-scale" instead of "continental-scale" 38. L317: replace "over the continent" to "over the European continent" 39. L323: may be better "Central Russia" instead of "Moscow"; see L443 40. L348: replace "plumes from" to "pollen plumes from" 41. L349: replace "exacerbated by" to "influenced by" 42. L358: replace "is largely" to "was largely" 43. L370: replace "thevertical wind" to "the vertical wind" 44. L384: replace "by the long-range transport" to "by possible long-range transport" 45. L399: replace "doubts" to "concerns" 46. L403: replace "has proven beneficial" to "has proven to be beneficial" 47. L405: may be better "shortest shifts" instead of "smallest shifts" 48. L407: may be better "new area" instead of "young area" 49. L432: replace*

*"is created" to "was created" 50. L433: replace "European chemistry transport" to "European atmospheric chemistry transport" 51. L444: replace "was jeopardized" to "was influenced"*

*Extra general comments:*
*it might good to include also reference(s) to publication(s)/ guidelines for ensemble model comparison statistics (in section 4.2; L290+).*
*Clearly specify for which period (exactly: start-end of pollen season, number of days) statistical evaluation is performed/ done in this study. Clarify that/if results are statistically significant (in particular, fx: for estimated correlation coefficients). In section 3.2, although there are useful references which are listed in Sofiev et al. (2012) paper, but may be some of those can be added in this section too, where it is applicable.*
*Recheck all references to publications throughout the text comparing with section "References" as well as recheck places where links to Figures are pointed. Make an extra check for English language throughout the text.*
The references have been added into the section 4.2, where we also specified the period; p-values are added to the figures; references in the paper are maintained by the reference manger, so their consistency is automatically enforced. We also tried to improve the language.


Comments to illustrations:
*1. Table 1: as main birch pollen sources are placed within the lowest layer, include also information on how many (vertical) levels are included within the atmospheric boundary layer*
Well, this is not straightforward: boundary layer thickness varies strongly during day, so as the number of model layers within it.

*2. Fig 3: is it also possible to include a difference plot between 2010 & 2013*
Done

*3. Fig 4: may be this figure can be omitted*
This figure is introduced as a single answer to two questions: (i) whether birch pollen is transported sufficiently far to require the regional-model forecasts, (ii) how different the models can be if the source term and input meteo are identical. The corresponding discussion in the paper relies of this figure, so its removal would create problems in the text.

*4. Fig 6: may be better to use/ replot colorbars at the same scale*
The figure contains three distinctly different types of quantities: two bi-directional ones (bias and time shift) should be shown in binary colour map ("over-under" still distinguishing the absolute concentration from time), one fixed-range quantity (correlation) can also be shown as binary ("bad-good"), whereas the RMS is good with typical colour palette of "the higher the worse" type. These quantities also have strongly different physical meaning, which we reflected in choosing the different scales. Turning them all into a single palette would make them non-distinguishable for a quick look.

*5. Fig 9: may be better to use the logarithmic-scale for the left figure*
Done

*may be better to write for figures — a), b), c), d) instead of – left-top, low-right, etc.;*
Done

*enlarge individual figures (in Figs. 5,6,7) by excluding empty-white areas between;*

Done

*where it is possible (e.g. when all 4 colorbars are on same scale) keep only one legend/colorbar;*
Done

*note - all captions/ text for each figure should be self-explanatory*
The captions have been reviewed and extra information added to make them self-sustainable