

Atmos. Meas. Tech. Discuss., referee comment RC1
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Comment on amt-2021-272

Anonymous Referee #1

Referee comment on "Laboratory evaluation of the scattering matrix of ragweed, ash, birch and pine pollen towards pollen classification" by Danaël Cholleton et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-272-RC1>, 2021

The authors studied here a pollen classification method so as to be able to automate the identification process in the future. The topic is novel and important, as the pollen recognition and counting comprises an arduous task and also does not allow for (near-)real-time pollen information.

The methods seem sound, the concept novel, the results robust enough. However, i wish to suggest some corrections and additions based on several concerns i have that, if addressed, would further improve the paper:

Pollens: correct throught the manuscript into pollen.

line 8: not only nowadays; please rephrase.

lines 10-11: how (and where) are these the most common? You need to further justify here and in the Methods.

line 24: this is a dramatic generalisation: the referred paper actually cites a projection for Ambrosia pollen, which, being an invader, could be expected. Plesse be more neutral here.

line 26: citation?

line 27: change to allergic reactions.

line 30: change to 'consisting of sampling the...'

Lines 35-36: it is not as recent. Check also Sauliene et al. 2021, and Schaefer et al 2021, and references therein, in both (<https://doi.org/10.1016/j.scitotenv.2021.148932>).

line 56: please provide, here and in Methods, a full justification. for instance, pine pollen is not considered as allergenic because of its size. And based on their geographical distribution, there are other pollen types that are definitely more allergenic and abundant. You need to explicitly justify the selection criteria, at least for the locality, if not in an international context, as it might be considered otherwise a convenience sample.

lines 66-71: unless the journal formatting and writing style requires it, it is not necessary to state here the structure of the paper. As currently is, it rather resembles a thesis. Please rephrase/omit.

lines 82-83: Thibaudon et al. studied the pollen distribution; there are other studies and reviews that provide such information. Please change.

line 92: Why *Fraxinus americana*, since you refer to France as the study area? Why not *Fraxinus excelsior* or similar?

line 94: please be more specific, which ones?

line 96: 3-4 colpi

line 99: in central and north Europe.

line 106: Again, why *Pinus strobus*? Please justify the selection of species.

line 106: in the aim and abstract, it was pointed out that the taxa presented here were selected based on being highly allergenic. Be consistent please.

line 121: why were commercial pollen grains were used? Was it considered that there might a difference compared to the real-life, fresher pollen? It is known from other laboratory experiments that pollen may deteriorate and lose physical and chemical (and optical?) properties when not fresh and manipulated from commercial samples. Please justify and discuss fully.

Fig. 2 and relevant text: while i am in agreement with the method used before and here, i wonder whether specifically the pine pollen would exhibit a different behaviour that might have affected the scattering results too. Despite irregularities and peculiarities of all pollen grains per species, they all have in common that they are rather ovoid. Exception is the pine pollen, which is not symmetrical (only along it axis), it is much heavier and with distinct texture and shape between the main body and the sacci. Please discuss more in depth on this and provide further justification and comparisons.

Figure 6 and relevant text: while the results are robust and the method successful for the selected species, my main concern is whether this or a similar technique would be actually operational in a real-life study design, with more species, fresh pollen, and if then there would be indeed a possibility to identify among a larger range of pollen species. Please discuss and set as a study limitation.