

Interactive comment on “Autofluorescence of atmospheric bioaerosols – spectral fingerprints and taxonomic trends of native pollen” by C. Pöhlker et al.

Anonymous Referee #2

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General Comments: The study is very well written and adds a great deal to the information and knowledge already available regarding the spectroscopic identification of PBAP. The study is most definitely worthy of publication in AMT once some minor revisions have been attended to and comments addressed.

Specific Comments: - I am unsure about the use of “native” in the context used here. Native implies pollen specific to a particular region however the pollen used here are observed throughout the world. I understand the authors wish to designate the pollen as chemically and physically unaltered which is an important issue. However another description maybe more appropriate.

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- p 5695 Line 6-9 Add “virus” to the list of PBAP mentioned. They are really the main PBAP types that are a few nanometers in size.

- “eg”. has been placed in front of some of the references throughout the text. ...is there a reason for these selections?

- The author makes reference to the WIBS instrument however only the parameters of the WIBS-3 are discussed and shown in the diagrams. The newer version WIBS-4 has important variations in the fluorescent wavelengths used for detection. Such differences should be referred to here.

- The author refers to the fact that some individual pollen grains showed far higher intensity compared to adjacent pollen grains. Was there any difference in the number of these high intensity pollen grains between the freshly collected and the purchased samples? Note should be made whether or not this so.

- Reference is made to water uptake in altering the pollen grain morphology due to grain swelling. Do the authors think that the moist environment used in this study could cause extraction from the pollen? Roshchina has previously shown that fluorescent components are present in water extracts. Were there differences in the cytosol contributions between the moist and dry pollen for instance?

- Reference is also made to organelle fluorescence. Did the authors observe any chloroplast organelles under the microscope? Again note should be made whether or not this is so.

- Viability and fluorescence are very interesting aspects of PBAP fluorescence studies. While it may be true that pollen fluorescence increases with loss of viability, I am not convinced the same is true for fungal spores. While Wu and Warren show that fluorescence increases with decreasing viability other work such as Kanaani et al have shown the fluorescent intensity and percentage for fungal spores decrease with age. Given that fungal spores can be considered to lose viability once released, loss of viability

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could be linked to decreases in fluorescence.

- Was there much variation in the fluorescence intensities from one run to the next for the recorded EEMs for the pollen under investigation? State.
- The authors refer to the chlorophyll peak seen in some the samples originating from chloroplasts. However chloroplast paternal inheritance is very rare (although it can occur). Indeed, in the literature, pollen are generally not considered to possess chloroplasts. Might the chlorophyll signal originate from chlorophyll in a free state or bound to the cell wall or protein?
- Could the small particles seen in Fig.6 be aeroallergen/starch particles from a ruptured pollen grain?
- The PCA analysis shows good separation between certain pollen species. Given the term “fingerprint” is used in the title how confident are the authors that, if given an unknown sample of the pollen species used here, that it could actually be identified? State level of confidence.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 5693, 2013.