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Discussions

Interactive comment on "Automatic pollen recognition with the Rapid-E particle counter: the first-level procedure, experience and next steps" *by* Ingrida Šaulienė et al.

Anonymous Referee #3

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The study outlines the development of three artificial neural networks (ANN) at three different sites around Europe for use with a novel real-time fluorescence spectrometer instrument Rapid E from Plair. The need for such work is timely with allergy associated with pollen noted throughout the world and traditional methods sorely lack the time resolution to truly help those effected. The study does generate discussion on what the data analysis procedures should be for such instrumentation however it struggles to gel the three separate testing campaigns together well. Little in the way of true comparison is made. I believe the paper is useful, however the authors should be address the comments below

General comments (1) adding a column indicating the percentage of pollen that were deemed above the fluorescence threshold would be of help in table 1. Was this consistent from sample to sample? Ie Was approximately the same fraction of each pollen type deem fluorescent in each calibration test? (2) how reflective of pollen in the atmosphere would the test pollen be? The collection method used in payerne seems to significantly different than that seen in the other sites. (3) Was the compressed air, zero grade air from a cylinder or from a compressor for the Siauliai tests? (4) the instrument was run in pollen mode between 5-100 micron. Can this be changed? The majority of pollen is far larger than 5 micron. What is the expected lifetime of the instrument? Increasing the lower size threshold would likely extend it. Were the authors interested in fractionated pollen also? (5) L189: Do the authors have any idea how many pollen particles are not classified due to partly or fully missed the particle if the deep-UV laser fired at a wrong moment of time?

(6) L196: Is saturation of the fluorescence spectra still a possibility? Were some pollen more likely to cause this than others? (7) why was fluorescence lifetime not used in the Siauliai data analysis (8) how was the threshold of the particle fluorescence intensity level (> 1500 units) determined? This would be interesting for the reader and is generally discussed for other instruments? What was undertaken at the other sites? (9) for the Swiss data analysis, why was the optical size corresponding to 10 micrometers estimated? Was it simply due to the practicality of not having 10 micron PSLs? (10) The beginning of the results section has both general and site specific research questions (Lithuania). This seems out of place (consider moving to intro). (11) Consider cutting section 3.2.1. Recognition using scattering images only to a sentence and removing table 2 or moving it to a supplemental section. It does not add to the results and is far and away the weakest procedure. (12) Should there be results sections for the other two sites as well? Or is the results section an amalgam of the other sites also. Currently it reads like the results originate only from Siauliai (13) A very interesting observation that Festuca pollen was seen with the signal amplitude growing during the first 500 ns (Figure 8) do the author have any suggestion as to why

this is so? (14) A line on chemical interactions and degradation should be added L 405

(15) A brief mention of the work undertaken by the WIBS instrument should be discussed in 4.3. Comparison with other studies on pollen recognition (16) authors have suggested lifetime could be utilized to discriminate between pollen I feel this should be discussed, for example "O'Connor et al Using spectral analysis and fluorescence lifetimes to discriminate between grass and tree pollen for aerobiological applications Anal. Methods, 2014,6, 1633-1639" (17) What are the R2 values between the Rapid E and the Hirst? Is the Hirst a true reflection of what is in the atmosphere? (18) Could large fungal spores or clumps of fungal spores act as an interferant in the Rapid E for its current task? (19) Did only the Swiss site compare the Rapid E to a Hirst type trap? If yes why? If not, why are the results talked not about? This would be a good way to evaluate the ANN at each sampling site.

(20) Does the Rapid E come with any classifier? Or is it incumbent on the purchaser to develop their own? If the creator has an algorithm 5-10% better than seen here why is this not part of the commercial instrument?

Specific comments L19 specialized rather specialization L65 "it has become a necessity to develop new methods enabling the information on airborne pollen to become available in real-time" L66 were related L87 experiments L128 fitted rather than fit L136 a new bottle L137 "previously sampled" rather than "blown" L142 clarify for the reader what you mean by busy slides L212 which aimed L312 a challenging task

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