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Atmospheric Measurement Techniques Discussions

Interactive comment on "Evaluation of hierarchical agglomerative cluster analysis methods for discrimination of primary biological aerosol" *by* I. Crawford et al.

Anonymous Referee #2

Received and published: 13 August 2015

Overview: In general the manuscript is well written and I believe of great relevance to the bioaerosol scientific community. The use of more complex analysis techniques to glean addition information from online, single particle biological sensors is an important advance. Thus I believe the paper should be published upon the correction of some minor technical/specific issues discussed below.

Specific/technical comments:

P7308 L22: The D50 for the WIBS-4 references Gabey et al 2011. Wasn't a WIBS-3 used in that work? Are the WIBS-4 and 3 comparable in this respect?

P7308: Standardized particles for the calibration of the AF values are talked about. What Standardized particles were used for rod-like particles? or irregular shaped particles?

Does size have any effect on AF values?

Where would an irregular-shaped particle be placed between 1-100? Between 10-20?

P7309 L4: Is the excitation used in the FL3 350 or 370nm?

P7312: How many of the particles saturated the PMT. What percentage of the fluorescent particle count did they make up?

If a particle was fluorescent in all channels but only saturating in one was it removed?

Would it be better to keep saturation particles but give them their own Cluster? A saturation cluster? Do you believe these particles are non-biological interferences particles? And are thus more willing to remove them?

P7315: The author talk of the WIBS instrument automatically entering forced trigger. Does the pump stop during this process? How low is the chance of coincidentally striking a real particle in this mode? Was there any evidence to suggest this may have happened? If so how was this data dealt with? Was this automatic forced trigger ever compared to the previous method of manually placing the WIBS instrument into the forced trigger mode while the pump was off?

How much of the fluorescence data was clustered? Was all the data placed into a cluster or was some of it left unclassified?

In previous work, the wasp clustering centers and standard deviations about the centers were reported. Could this be done for the clusters here? If so I believe it would be useful.

P7316 L19: The text mentions 5 clusters in each of methods used however in figure 5 the Z-Scores normalization only has 4?

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P7316 L22: R1,R3 and R5 are similar to R2? Should it read “R1,R3 and R5 are similar to Z2”

P7317 L3 “which was determined to be be representative” "be" is repeated.

The author suggests that a cluster representative either fungal or bacterial. The author in particular suggests that bacteria have a strong positive response to rainfall. However several fungal spore species are known to be positively correlated with rainfall and have sizes and morphological feature similar to those suggested by the data here. This should be discussed as a possibility by the authors. I believe the authors should possibly row back on saying the clusters are representative of bacteria or fungal spores this may be true however without supporting measurements this should described in this way. It feels too strong as other particle types may be contributing. Other WIBS related work has co-located impactors to assess the contribution of fungal for example. With those types of added measurement the current terminology used would be possible.

Also was there any possibility the non-biological particles could have been clustered into the solutions shown here. If so this should be discussed. Of course this is another reason for not suggesting clusters are representative of a single class of particle.

Figure 8: was there much difference in diurnal trend for days with and without rainfall for bacterial clusters? Were increased concentrations at 18:00 hours due to rainfall events?

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 7303, 2015.