Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC2
https://doi.org/10.5194/amt-2021-401-RC2, 2022

Comment on amt-2021-401

Anonymous Referee #2

Referee comment on "Observation of bioaerosol transport using wideband integrated bioaerosol sensor and coherent Doppler lidar" by Dawei Tang et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2021-401-RC2, 2022

Paper submitted for publication in Atmospheric Measurements and Techniques: "The transport of bioaerosols observed by wideband integrated bioaerosol sensor and coherent Doppler lidar", by Tang et al.

This paper presents a study on the transport of bioaerosols, examining three case studies occurred in March 2020 at Hefei (China). The aerosols are also discriminated into fluorescent and non-fluorescent particles by using a wideband integrated bioaerosols sensor (WIBS) measurements. Also, the biological fluorescent particles are typed into several categories by applying previous methodologies. In combination with a Doppler wind lidar measurements and HYSPLIT back-trajectory modelling their transport is investigated. The relevance of this work can rely on the use of WIBS in-situ instrument in synergy with the Doppler wind lidar (remote sensing) for bioaerosol transport studies, but the novelty of this work is not clearly appreciated.

Therefore, this work could be published, but the following comments should be addressed before it is accepted for publication in AMT.

General comments:

- Regarding bioaerosols, although it is mentioned (page 3, lines 73-75), there is no discussion on the potential errors in the WIBS measurements due to the non-biological component of the registered fluorescent particles, whose concentration could be lower than that reported in the paper. Please, include such a discussion.
- About the type of the bioaerosols more predominantly found in each of the three events examined, it is necessary to provide a more complete explanation in the discussion and justification in the conclusions. Moreover, it must be included a correspondence (maybe in a Table) between each of the WIBS fluorescent particle categories (A, B, C, …, ABC),

together with their main fluorescence characteristic/parameters), and their most likely associated type of bioaerosol (fungi, bacteria, pollen, …), in addition to the corresponding, already provided, references. The reading of the paper will indeed be improved.

- Three case studies, occurring all for a short-time period (11-20 March 2020), seem to be a short sampling for the evaluation of bioaerosol transport over Hefei. Please, provide other events (in other seasons, for instance). In particular, the last dust-bioaerosol case should include an extra discussion regarding the relevance of the potential pathogenic biological targets being transported on dust intrusions, for instance, as Hefei (China) is a frequent Asian dust-influenced zone.
- Unfortunately, the WIBS instrument only register particles with sizes > 0.5 microns (> 0.8 microns as discussed in the paper). This fact should be highlighted in the paper, as WIBS measurements only can register mostly coarse bioaerosols, missing the contribution of smaller-sized bio-particles.

Other comments:

- Page 2, line 29: Not only 'fine solid particles', but also coarse solid particles. Please, remove 'fine'.
- Page 4, Section 2.1: Does the wind direction at an angle of 0º corresponds to winds from the North? Does it increase clockwise or opposite? Please, indicate it.
- Pages 4-7 (Section 2): Please, provide the distance between the diverse instrumentation used. This can give a perspective for potential discrepancies due to the different atmospheric samplings of both the in-situ and remote sensing measurements are carried out.
- Page 8, lines 200-203: Please, give the position where the measurements are performed with respect to Hefei.
- Page 8, lines 211-214: Please, justify extensively this statement.
- Page 8, lines 220-221: '… due to the difference in observation location …', please, add the distance each other.
- Page 10, lines 276-277: Any reference or explanation is needed to justify this sentence.
- Page 13 lines 363-366: A more complete justification/explanation is required for this statement.
- Page 15, line 405: Please, change 'ground-based-lidar' by 'ground-based wind lidar'.
- Page 20, Figure 1 (f): Please, use the same vertical scale for PM2.5 and PM10.
- Page 21, Figure 2 (a)-(j)-right panels: As far as possible, use the same vertical scale for Mean D and Mean AF.
- Page 23, Figure 4 (f): Please, use the same vertical scale for PM2.5 and PM10.
- Page 24, Figure 5 (a)-(j)-right panels: As far as possible, use the same vertical scale for Mean D and Mean AF.
- Page 26, Figure 7 (f): Please, use the same vertical scale for PM2.5 (x 10^{-1}) and PM10.
- Page 27, Figure 8 (a)-(j)-right panels: As far as possible, use the same vertical scale for Mean D and Mean AF.
- In Figures 3, 6 and 9, add more information (web, …) for Natural Earth, where the map data are from.