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Interactive comment on “Regional-scale simulations of fungal spore aerosols using an emission parameterization adapted to local measurements of fluorescent biological aerosol particles” by M. Hummel et al.

Anonymous Referee #1

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The manuscript by Hummel et al. describe new emission parameterization adapted to online field measurements of biological particles using fluorescence technique, compared to two literature-based emission rates. The authors show that the new model gives higher emission of fungal spores compared to the two others, and that these concentrations are significant to be considered in air quality and climate research. Below are my comments and points to be clarified by the authors before acceptance.

In general, the FBAP measurements measure all particles in the range of 2-4 μ m, how-

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ever, it the authors assume these are fungal spores. Bacterial agglomerate, as well as giant bacteria and agglomerates of free proteins and amino acids could contribute to this fraction. In this case, the simulations, referring only to fungal spores would not represent this data well. This point should be further addressed and quantified, as the introduction generalizes this issue to the entire PBAP population.

For readers not familiar with the measurement techniques, online measurements alone weaken the robustness of the study. If there are previously published works that validate this measurement with more traditional ways such as filters and genomics, please add them to show that this technique is robust and validated. If not – such validation is needed.

In general, the authors should expend the experimental section for instrumentation and validations. For instance, what is the sensitivity of the instruments? This could lead to underestimation of biological particle detection.

P. 10, line 8: this sentence is inaccurate, as not all proteins will contain fluorophore-containing amino acids.

The Authors assume that there is no contribution from dust in this size range. Could the authors supply evidence (using back trajectory analysis for example) support this assumption?

The two previously published models are based on manitol concentration, which can also indicate on other types of particles, such as vegetation in addition to fungal spores. This may lead to overestimation of bio aerosol loads. This should be mentioned and discussed as one of the factors influencing the difference between models and measurements.

The authors correct the spores suspension time in the atmosphere to be $4 \frac{3}{4}$. This significant claim needs to be validated before stated.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 9903, 2014.

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