

Interactive comment on “Microphysical characterization of long-range transported biomass burning particles from North America at three EARLINET stations” by Pablo Ortiz-Amezcuca et al.

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The authors thank the reviewers for the efforts, time and the thorough review of our manuscript. Please, find below a detailed response to the reviewer's comments.

Comment: This paper presents a comprehensive analysis of optical characteristics of transported aged forest fire smoke using multi-wavelength Raman lidars and AERONET sun photometers. The paper is very well written. The manuscript may be accepted in the present form. It would be better, however, to add some discussion on hygroscopic growth. Relationship between effective radius and relative humidity would

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be interesting. It would be also very interesting if vertical profile of effective radius in Warsaw was presented.

Response: We agree that a discussion on hygroscopic growth would be interesting, but we think that an analysis of those properties would deserve a more complete separated work if one wants to properly assess the enhancement factor and other related properties, which we consider that might be out of the scope of our paper. As suggested, we performed the calculation of the microphysical properties for several altitudes inside the detected smoke layer at Warsaw (namely 1.7 ± 0.2 km, 1.9 ± 0.2 km, and 2.1 ± 0.2 km) in order to retrieve vertical profiles of those properties. However, we found the same values (within uncertainties) as the ones retrieved for 2.28 ± 0.2 km, i.e., around $0.2\ \mu\text{m}$ for effective radii, around 1.47 for RRI and around 0.001 for IRI. For this reason, we decided to include in the manuscript only the retrieval corresponding to the highest values of particle backscatter and extinction coefficients, where the calculation appears more stable.

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