

## ***Interactive comment on “Properties of biomass burning aerosol mixtures derived at fine temporal and spatial scales from Raman lidar measurements: Part I optical properties” by Lucja Janicka and Iwona S. Stachlewska***

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-The Paper by Janicka & Stachlewska (ACPD, 2019) shows an impressive dataset of aerosol optical properties derived for over a 100 layers within only 2 overnights. Each of those layers is selected and characterized based on unique full-set of optical properties derived from lidar data, namely  $3\beta$ ,  $2\alpha$ ,  $2\delta$ ,  $wv$  profiles, which are interpreted with help of the extensive backward trajectory simulations. This amount of lidar-derived data products, as well as much care put on the layer definitions, allowed the authors to assess the spatio-temporal extent of aerosol/mixture types. In total, 11

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different aerosol types and aerosol mixtures were identified and characterized by the mean values of optical properties. -Therefore, this study provides an excellent dataset for microphysical inversion. Why authors did not conduct any of those? As there is an indication that this is 'part one' paper, will the 'part two' paper contain extension of this study to microphysical parameter inversion? Moreover, it would be beneficial to put the results obtained on the 2 nights in the context of aerosol properties derived for multi-year analyses. Were such analyses performed? -Finally, the discussed data set comprises different mixtures of aerosols, therefore it would be beneficial to test those retrievals on automated aerosol typing algorithms, e.g. as in Nicolae et al. ACP, 2018, especially for multi-year analysis.

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