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## ***Interactive comment on “Characterization of forest fire smoke event near Washington, DC in Summer 2013 with multi-wavelength lidar” by I. Veselovskii et al.***

### **Anonymous Referee #1**

Received and published: 18 November 2014

Title: Characterization of forest fire smoke event near Washington, D.C. in Summer 2013 with multi-wavelength lidar Paper No.: acp-2014-738

General Comments: The paper reports optical and microphysical parameters of the smoke plume mainly observed by NASA/GSFC multi-wavelength Mie-Raman lidar. This paper analyzes lidar ratios and Angstrom exponent at different wavelengths and shows that those parameters are in agreement with findings of previous research for smoke particles. The important scientific findings of this paper is that the backscatter Angstrom exponents for the two wavelength pairs considered contain additional information about the height variation of aerosol size and refractive index. Also, such

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information can be used for preliminary analysis of lidar observations. The information provided is useful to the ACP readers and can be published. However, there are some minor corrections that need to be accounted for the publication in Atmospheric Chemistry and Physics. A detailed review follows:

Comments 1. (26866,7-9) Mixing with local aerosols during for transportation is explained as the reason for LR532 exceeds LR355 in 3000-3750 m layer at 23:20-01:20 UTC period. But, we cannot find that how the smoke is mixed with local aerosols. More explanation is needed.

2. (26867,8-9) How the contribution of smoke layer to the total AOD was calculated? The wavelength of AERONET and lidar data is different.

3. (26874, 24) This is same question with 1. How the smoke plume was significantly diluted by local aerosols during the transport? When we consider the pathway of air mass in the backtrajectories, that cannot be the reason.

4. (26859, 13) butis →but is

Figure 7. The data for 3:20-5:20 is missing in the figure.

Figure 8. Please use the same legend at (a) and (b). Figure 9. The data for 3:20-5:20 is missing in the figure.

Figure 13. The data for 3:20-5:20 is missing in the figure.

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 26857, 2014.

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