

Interactive comment on “Colorado air quality impacted by long range transport: A set of case studies during the 2015 Pacific Northwest fires” by Jessie M. Creamean et al.

Anonymous Referee #1

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This is a well-written and interesting paper documenting the transport of wildfire smoke from the Pacific Northwest into Colorado. The paper is organized around specific events that resulted in degraded air quality and visibility through the Front Range of Colorado. Supporting evidence was provided through a variety of measurement platforms, including remote sensing and ground based measurements, as well as meteorological data and back trajectory analyses to describe the flow patterns during the events. The authors have combined these data into an interesting story that informs as to the transport of smoke across the United States with impacts on local air quality. An important result is the transport of mineral aerosols with the smoke plume. I recommend the paper be published after addressing the comments below.

C1

Comments Line 133: “g μm^{-3} ” typo.

Line 185: The authors repeatedly refer to “hazy” conditions along the Front Range (specifically Denver) and support the degraded air quality using PM data measured by the Colorado Department of Public Health and Environment. In checking the available data it appears that extinction data are also available from transmissometer measurements at the DESC1 site. It would improve the paper to include these data so that the “hazy” can be quantified (line 185). In fact, the extinction values agree fairly closely with the TOPAZ lidar data in Figure 17 (given the wavelength differences).

Line 205: Please provide wavelength.

Line 232, Section 3.3: This section is somewhat hard to follow because the figures are broken up so it requires flipping back and forth. I suggest organizing the figures so that, for example: the first event would include figure 7a-d, 8a, 9. It would reduce the number of figures and help to focus the discussion.

Line 244,245: Do the authors mean “northwesterly” here?

Line 308: Figures 14-16 are similar enough it might be possible to just show one example.

Line 333: A quick look at the IMPROVE data at the ROMO site in Rocky Mountain National Park also showed increased soil concentrations on 8/22, further corroborating the regional impact.

Line 348: Consider replacing “small” with “low”. My first interpretation was with respect to particle size within the mode.

Line 367: While the hazy days corresponded to relatively high PM relative to non-hazy days, I am not sure this supports “large quantities”. Removing “large quantities” would make a more defensible statement.

Line 381: Was the timing of the transport ever specifically discussed or provided?

C2

Comments on Tables and Figures

Figure 4: Provide wavelength corresponding to AOD on this and subsequent figures.

Figures 7-13: See comment in text

Figure 14(a,b) and 15(a,b): Consider zooming in over North America.

Figure 18: Adding symbols would help with the error bars. As they are it is hard to tell which pair of upper and lower bars correspond to a single data point.

Figure 19: Add (a)-(e) in the caption. Consider changing “small PM2.5” and “large PM2.5” to “low” and “high”.

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-280, 2016.