Atmospheric
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Discussions

Interactive comment on "**Impact of interannual variations in aerosol particle sources on orographic precipitation over California's Central Sierra Nevada**" *by* **J. M. Creamean et al.**

Anonymous Referee #4

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This paper describes the results of some nice work conducted over three years (Feb/March 2009, Jan/Feb/March 10, and Jan/Feb/March 2011) in CA to investigate the association of aerosols with precip. Forty two samples were collected at a single sampling site in CA, and a ATOFMS was used to characterize constituents in the precip samples. The authors found that dust and biological residues were dominant when precip was in the ice phase, and local biomass burning and shallow clouds produced less precip (in general). This work is important for development of regional climate models for precipitation processes in California (and elsewhere in the world) and should be published. Portions of this dataset have been published already (particularly from

the 09 and 11 collection years), but it is the opinion of this reviewer that the synthesis of the three years (which includes some new association/correlation analyses) adds some integrated value. The authors should however, be cautious of data duplication in figures across already published manuscripts.

Suggested points to be addressed in the revision: Table 1. It would be nice to know how many major precip events (above a certain threshold precip rate) were captured in each sample. In other words, for each sample ID, how many unique/discrete precip events were sampled? Were most of these more than one discrete event? For example, Figure 3 S7 and S10 appear to capture major discrete events, whereas S8 appears to capture a cumulative sample of multiple major events. Any trends that could be attributed to discrete events alone?

Figure 1 could be removed. Providing GPS coordinates is sufficient for readers these days; a quick cut and paste into GoogleEarth and you are good to go. Picts of the trailers are great for .ppt presentations, but aren't needed here.

The results often contain discussion points that would be more appropriate for the discussion section (e.g., p 10, L 24-27, p11, L4-13, etc.)

How do you define a 'shallow' cloud? e.g., 3.2.2

P16, Line 12. Limited? How so? What future measurements should be taken?

P16, L16. How do you define 'local'?

What role might precip scavenging (e.g., collection of material by rainfall during descent to your collection beakers) play in the composition of the constituents in your samples? Perhaps this could be addressed in the discussion?

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 931, 2015.