

## ***Interactive comment on “Transport and mixing patterns over Central California during the Carbonaceous Aerosol and Radiative Effects Study (CARES)” by J. D. Fast et al.***

**Anonymous Referee #1**

Received and published: 14 December 2011

This paper provides a very good model/measurement based overview of the major trace gas transport patterns over the Sacramento region during CARES. The paper is thorough and well written and is appropriate for eventual publication in ACP. I have a few comments and queries that the authors need to address, as listed below.

My first comment is for the editors of ACPD/ACP rather than the authors. As is almost always the case the production of the manuscript for review results in many figures that are far too small to be clearly seen. For example Figures 3 and 11 are virtually illegible in printed form, I have to look at the pdf on my computer and drastically increase the magnification. I make this complaint almost every time I serve as a referee for ACPD,

C13176

yet there is no improvement in the production standards.

A paper from the CALNEX period has just been published and contains some relevant information that could serve as background information for this paper, including a comparison of baseline ozone along the California coast to ozone measured across the polluted regions of California; comparison of 2010 weather to climatology; information on the limited extent of biomass burning during Calnex.

Cooper, O. R., S. J. Oltmans, B. J. Johnson, J. Brioude, W. Angevine, M. Trainer, D. D. Parrish, T. R. Ryerson, I. Pollack, P. D. Cullis, M. A. Ives, D. W. Tarasick, J. Al-Saadi, and I. Stajner (2011), Measurement of western U.S. baseline ozone from the surface to the tropopause and assessment of downwind impact regions, *J. Geophys. Res.*, 116, D00V03, doi:10.1029/2011JD016095.

Page 29959 line 1 What is the source for the information on fire locations and intensity?

Page 29960 line 19-20 This climatology says nothing about 2010. What is the source of the data for 2010 and what comparisons were made to the climatology?

Page 29963 lines 15-20 Specific humidity would be much more informative than relative humidity as it is not influenced by temperature and it gives a much better indication of air mass transitions.

Figure 16a Do the colors correspond to the emission regions in Figure 2? If so, what do the numbers mean on the color bar to the right?

Figure 16b. The units of ppb km are very unusual. Did you just sum up the ppb values at every model layer above the site? This would weight the results to mixing ratios at higher altitudes. If you are going to talk about a column value you need to report CO as a mass.

Figure 17b. Are these winds from the model or the radar?

In the minor comments below, if no explanation is given please insert the recommended

C13177

text into the appropriate place in the manuscript:

Page 29951 line 16 regional-scale

page 29951 line 20 Not sure what you mean by “periods”

Page 29951 line 27 WRF-Chem

Page 29951 line 29 that are then entrained

page 29952 lines 23-25 don't really add anything and break up the flow of the text. I suggest removing this sentence.

Page 29966 lines 26-27 Information on the measurement techniques needs to be moved to the method section.

---

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 29949, 2011.

C13178