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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Chemical climatology of the southeastern United States, 1999–2013" *by* G. M. Hidy et al.

Anonymous Referee #3

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This paper provides undated analyses on a rather extensive air quality monitoring network operated predominating under the Southeastern Aerosol Research and Characterization (SEARCH) study. The data set has been well documented and analyzed in previous publications (e.g. Blanchard et al., 2013a, 2013b, 2013c) so it not unreasonable to ask the authors to provided an indication of what the valued added elements are in the current work relative to previous analyses in these cited works. It seems, although not explicitly stated, that the current analyses utilize a data set extended to 2013 (i.e. 1999-2013), while previous work considered data through 1999-2010. If so, this should be stated and the authors should highlight changes and similarities observed in the updated analyses compared to previous studies cited above. The analyses of these long-term observations provide the foundation for establishing the

meteorological and chemical representativeness of the Southern Oxidant and Aerosol study (SOAS) field intensive period (June-July, 2013). Overall this is a good paper that warrants publication.

Abstract and Introduction The abstract and introduction should address the comment above regarding the valued added elements (analysis results) in the current work relative to previous analyses in previous publications in Blanchard et al., 2013a, 2013b, and 2013c. The CTR site description needs more detail, e.g., local site conditions, proximity to major sources and urban centers, seasonal prevailing wind patterns, and overall regional representativeness. The abstract states that, "The long-term measurements show that the SOAS experiments took place during the second wettest and coolest year in the 2000-2013, with lower than average soar radiation, while the summary section states, "... summer 2013 data at CTR were biased towards a range of conditions that were marginally wetter and cooler, ...", Marginally wetter and cooler seems inconsistent in describing the second wettest and coolest year.

2.2 Ambient concentration trends The trend analyses presented for SO2, NOy, NMOC..... , extend analyses performed in Blanchard et al., 2013b from 1999-2010, through 2012. – But Table 1 indicates the period analyzed is 1999-2011. Is this a typo? Also why weren't data extended to 2013? There seems to be precedent for using data through 2013 in other figures. What are the statistical criteria for the computation of a valid annual average? e.g. % of valid hours, or ....?

2.3.2 Nitrogen oxides, NMOC and ozone The distinction between CO "background" versus the lack there of for SO2 and NOy is due to their significantly shorter lifetimes relative to CO.

3.2 Meteorological conditions Figure 12 does not present Box plots. (It looks like the authors meant to use Figures 13S here).

3.3 Chemical characterization It would seem that the pollution-wind direction roses for the 1 June – 15 July 2013 (Fig 13) need comparable analyses of prior years to

establish the meteorological representativeness of the special study period and year to year variation.

4. Summary Provide a summary of changes in analyzed trends associated with extending times series data set from 1999-2010 to 1999-2013 and any improvements observed in statistics.

Some typos

P17103, l23 ARA – spell out first time

P17108, l7 – SOC – spell out first time (remove from l13-14)

P17111, l15 light winds and transport distances (<200km) are correlated (cannot be treated as independent variables.

P17123, l16 . . ., with rise at ∼6:00. - Needs revision.

P17147 figure caption . . .while SO4 shows a (not “are”) sharper . . .

P17156 figure 12 – referred to in the text as a “box plot” see figure S13

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 17101, 2014.