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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Decreases in elemental carbon and fine particle mass in the United States" *by* D. M. Murphy et al.

Anonymous Referee #2

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The submitted paper does a nice job of reviewing the recent history of elemental carbon and fine particle mass as measured at primarily remote sites across the contiguous United States. The fundamental findings of reduced aerosol burden across the country indicate that air pollution control efforts in the United States are having large scale effects.

The strategies employed in conducting the analysis are all well-chosen - controlling for the effects of station histories, reporting the trends by season, using multiple model formulations, and comparing the decline qualitatively to emission reductions in the U.S. all lend credence to the result.

Use of the IMPROVE data set for this study significantly reduced the problems of evolving measurement network configurations and changes in local environments at monitoring sites that would confound such an analysis based on urban monitoring data. Using IMPROVE data allowed examination of records from a consistent station list and nearly constant measurement methods.

Although an extensive analysis of U.S. regulations and/or progress toward attainment of statutory air quality goals is beyond the scope of the present study, it would improve the paper to expand slightly on the discussion of emission reductions and air quality benefits to allow the reader to qualitatively compare the reported improvements to the air quality history in urban areas of the country. A short discussion of USEPA Trends Reports such as the one linked here http://www.epa.gov/airtrends/2006/aq_summary_2005.html which includes air quality data for essentially the same time period, and a brief look at USEPA emission trends, would be a nice complement to the inferential discussion of reduced emissions in section 5.2.

For clarity, the discussion of the northern California sites needs a little more context as well. A reader unfamiliar with the peculiar meteorology of coastal northern California might struggle to comprehend how EC and BC trends for California sources, as noted in the urbanized San Francisco Bay area, could be replicated at a remote coastal site like Trinidad Head, or at Point Reyes National Seashore, where one might suppose trends would be suppressed by the intense and persistent sea breeze, and that "background" pollutant loading at these sites might respond more to Asian emissions or coastal shipping than to urban emission reduction programs. This section need not be much more than a paragraph or two, explaining that these sites are exposed to local vehicles and occasional land-breezes can bring coastal-zone emissions to these headlands, while transport from far upwind to these sea level sites is suppressed by the strong, shallow marine inversion.

Finally, I would like to thank the authors for presenting this report. Although it involves

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neither exciting technical breakthroughs nor novelty of results, it performs a valuable and needed service by providing perspective on the general progress of U.S. efforts to control air pollution, and relating that progress to how it should be incorporated into the global framework of climate study and the formulation of relevant and up-to-date policy responses.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 2057, 2011.