

Interactive comment on “Aerosol decadal trends – Part 1: In-situ optical measurements at GAW and IMPROVE stations” by M. Collaud Coen et al.

Anonymous Referee #2

Received and published: 31 October 2012

This is a well written and timely study of trends in optical properties of atmospheric aerosols. It uses a wealth of data recorded at a large number of globally distributed stations. The results are interesting and might serve as a very useful basis for future studies of e.g. the link between climate change and aerosol optical properties. The scientific approach and the methods are valid and clearly described. The description of the statistical tools is necessary and appropriate as these kinds of analyses are rather specialized. The link between trends in scattering coefficients and PM concentrations is clearly supported by data obtained in PM monitoring networks and emission inventories. Trends in size distribution are indicated by backscatter ratios and Angstrom exponents, which provides valuable additional information on the changing aerosol situation. Of course longer and more numerous time series would have been preferable, but the authors make excellent use of what is available at this time.

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There are just a few minor points that should be considered and a few editorial issues (given in the order of occurrence in the text)

The abstract could do with less general information in favour of more quantitative information on the trends and their differences in Europe and the US.

In some instances, the different statistical methods yield contradictory results on trends obtained from identical data sets. The discussion on the reasons for the discrepancies should be expanded and at least some indication which of the results are the more robust ones should be given.

p. 20792: Check spelling of Leibensperger et al. in the text

p. 20795, last line: is there a reason to suspect "trends in RH"?

p. 20796: give indication why inlet changes do not affect the aerosol properties

p. 20796, last two sentences: discuss truncation errors in the statement that the measured scattering will be lower than the true scattering when large particles are present

Figure 2 contains too much information - maybe part of it could be moved to an additional figure. The blue lines are difficult to attribute to data points in some instances.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 20785, 2012.