Atmos. Chem. Phys. Discuss., 11, C8283–C8284, 2011
www.atmos-chem-phys-discuss.net/11/C8283/2011/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Receptor modeling of near-roadway aerosol mass spectrometer data in Las Vegas, Nevada, with EPA PMF" *by* S. G. Brown et al.

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Received and published: 29 August 2011

As I stated in my quick report, in my opinion the manuscript is good. The suggestions of the reviewers/editor appear to have contributed to improving it further. However, there still remains one point that I wish to raise.

The authors compare the resolved factors with known source profiles by means of correlation coefficients. The authors appear to have used the "default" centred Pearson coefficients (r^2). Paatero showed the benefits of using the uncentred ones in this very same forum (Atmospheric Chemistry and Physics Discussions, 8, S2059–S2068, 2008).

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Interactive Discussion

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I do not recommend the use of either the centred or the uncentred correlation coefficients. This is not because of the centring, but because of the scaling. Let us assume that only three species were measured. Let f = [0.5 0.2 0]' be one of the resolved factors. A known source profile might be [0.5 0.2 0.001], for example. Then both the centred rˆ2 and the uncentred one are as high as 0.999998. These results would indicate that there is excellent agreement.

Let us now imagine that the source profile is that of road dust: 50% SiO2, 20% Al2O3, 0.1% Cu, say. The tracer species is seen to be missing in the factor: the resolved factor does not represent road dust at all! In receptor modelling of air pollutants, trace species are as important as the major species. Using unscaled correlation coefficients actually ignores this fact: it is like doing unscaled PCA.

I am not saying that the manuscript has any mistaken interpretations; nor am I asking for any changes. I just wish to point out that the different scales of the species need to be considered when comparing source profiles via correlation coefficients.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 22909, 2011.