**Atmospheric
Chemistry
and Physics
Discussions**

Interactive comment on "A three-dimensional variational data assimilation system for multiple aerosol species with WRF/Chem and an application to $\mathbf{PM}_{2.5} prediction" by Z. Li et al.$

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let u be a certain aerosol species, x - sum of aerosol species (say PM2.5)

B_xx - background error covariance matrix for x
B_ux - correlation matrix between u and x

Then increment of species u is given by

delta_u=B_ux * (B_xx)^(-1) * delta_x (1)

(Menard, 2003)

(http://www.ecmwf.int/newsevents/meetings/workshops/2003/modelling_stratosphere/menard.pdf)

To arrive from formula (1) to formula (10) in the manuscript not only assumption that species u is uncorrelated with any other aerosol species within x is needed but also assumption that all correlation scales for u and x or equivalently u and other aerosol species are the same.

The manuscript claims that these scales differ between aerosol species. Can authors elaborate on that?

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 13515, 2012.