Geosci. Model Dev. Discuss.,
https://doi.org/10.5194/gmd-2017-147-SC1, 2017

Geoscientific Model Development Discussions
Open Access
EGU

Interactive comment on "3D-Var versus Optimal Interpolation for Aerosol Assimilation: a Case Study over the Contiguous United States" *by* Youhua Tang et al.

Y. Tang

Youhua.tang@noaa.gov

Received and published: 12 July 2017

ïČŸ Thank you for your prompt comments. In this study, the observations and observation errors (constant 0.1) used in these two assimilation tools are same. However, their model errors are not the same, which is partly due to their different engineering structures. As we mentioned that GSI is 3D-var system, and its error covariance and length scales have vertical variation as shown in Figure 1. The OI assimilation is made in horizontally in 11×11 grid box (12km resolution each grid), so its horizontal length scale is approximately 11/2×12 =66km. Vertically, OI applies its adjustment ratio up to PBL top for surface PM2.5 assimilation, or whole column for AOD assimilation over

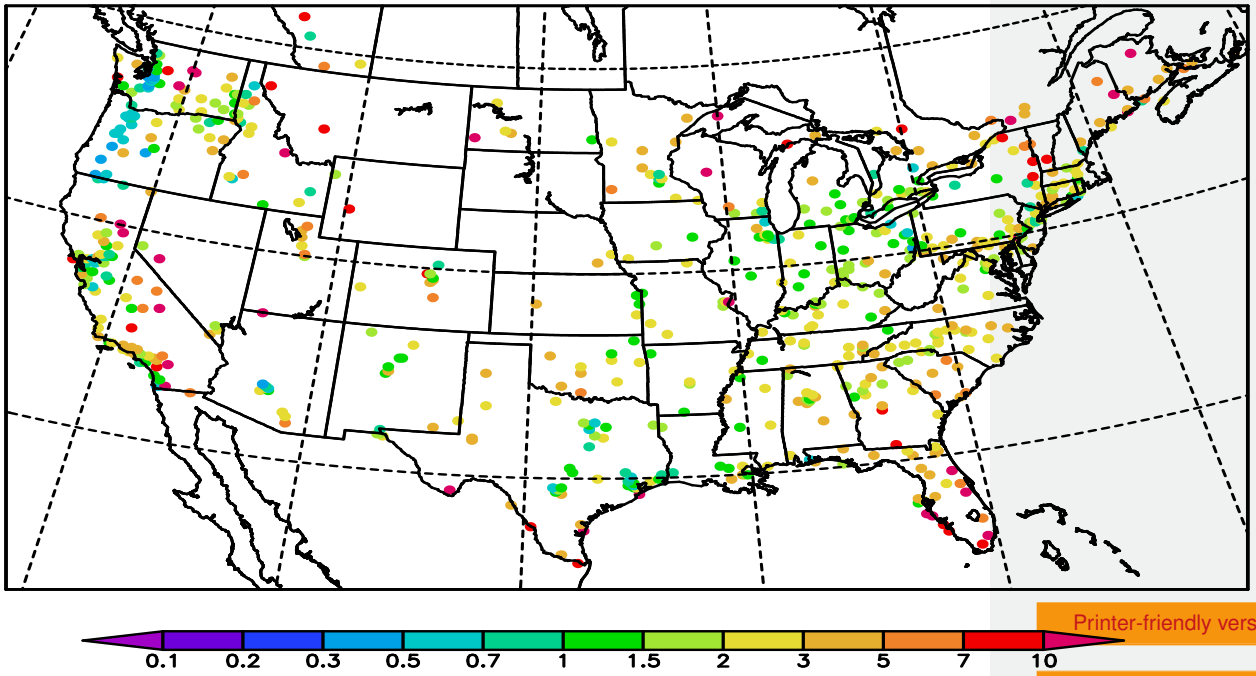
Printer-friendly version

Discussion paper

each grid location. OI's model errors for surface PM2.5 assimilation have diurnal variation and are varied from location to location based on the raw run's statistics, which is carried out in this study (Figure 2 of Tang et al., 2015). The GSI's model errors have no temporal variation or horizontal changes, but have vertical variations. Their biggest behaviors difference can be seen from the Figures 4a,b: the OI assimilation mainly affect local or nearby grids while GSI 3D-var increment expands more broadly.

Interactive comment on Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2017-147, 2017.

Model Relative Uncertainties use in OI's surface PM2.5 assimilation at 17 UTC



Printer-friendly version

Discussion paper

Figure 2 of Tang, Y., T. Chai, L. Pan, P. Lee, Daniel Tong, H. Kim, and W. Chen, Using Optimal Interpolation to Assimilate Surface Measurements and Satellite AOD for Ozone and PM2.5: A Case Study for July 2011. Journal of the Air & Waste Management Association, DOI:10.1080/10962247.2015.1062439, 2015