

Interactive comment on “Forecast error covariance structure in coupled atmosphere–chemistry data assimilation” by S. K. Park et al.

Anonymous Referee #1

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The authors examined the structure of an ensemble-based coupled atmosphere–chemistry forecast error covariance using WRF model coupled with Chemistry (WRF-Chem), a coupled atmosphere–chemistry model, was used to create an ensemble error covariance. The control variable vector includes both the dynamical and chemistry model variables. A synthetic single observation experiment was designed in order to evaluate the cross-variable components of a coupled error covariance.

It appears to this reviewer that a very short Appendix describing WRF_Chem latest version might contribute to the paper being self contained

Otherwise the results are impressive and indicate that the coupled error covariance

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has important cross-variable components allowing a physically meaningful adjustment of all control variables. An additional benefit of the coupled error covariance is that a cross-component impact is allowed, e.g., atmospheric observations can exert impact on chemistry analysis, and vice-versa.

It remains to see if the results carry to realistic cases.

I recommend publication with very minor revision.

Interactive comment on Geosci. Model Dev. Discuss., 7, 8757, 2014.

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