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**GMDD** 7, C3162–C3163, 2015

> Interactive Comment

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

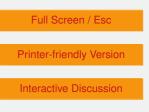
## Anonymous Referee #1

Received and published: 29 January 2015

The authors examined the structure of an ensemble-based coupled atmospherechemistry 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



**Discussion Paper** 



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.

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Interactive Comment

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Interactive Discussion

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