

## ***Interactive comment on “Can a coupled meteorology-chemistry model reproduce the historical trend in aerosol direct radiative effects over the Northern Hemisphere?” by J. Xing et al.***

**Anonymous Referee #2**

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The paper presents results from 21 year simulations of the coupled meteorology-chemistry model WRF-CMAQ over the Northern Hemisphere. Trends in aerosol optical depth and short-wave radiation from the model are compared with numerous satellite datasets and surface measurements. Model estimates of the aerosol direct radiative effect are also presented.

### **General Comments**

This work is a solid contribution to the area of coupled meteorology-chemistry models and provides results that, although not perfect, are good quality and reasonably repre-

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sent the current state-of-the-science. Being an air quality modeler myself, I understand how difficult a task the authors have taken on and given the well-known uncertainties in emissions (windblown dust, biomass burning, etc.) and model parameterizations (secondary organic aerosol formation), the work is a strong step forward. Results are presented in a thorough manner and the authors are honest and forthcoming in their analysis of model shortcomings. Figures and Tables are clear and informative and the writing is easy to follow. I can find little to criticize in this work but suggest the authors include a short discussion on steps they are taking to address identified shortcomings in emissions and model parameterizations to improve future similar model investigations. I thus recommend that the manuscript be accepted with only minor revisions.

### **Specific Comments**

- p. 14032, line 26: I believe it should be "retrievals" instead of "retrieves".
- p. 14033, line 23: Should be "... the satellite datasets are interpolated ...".

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Interactive comment on Atmos. Chem. Phys. Discuss., 15, 14027, 2015.