

Interactive comment on “Exploring the severe winter haze in Beijing” by G. J. Zheng et al.

Anonymous Referee #2

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The paper by Zheng et al. focuses the haze episodes occurred during the winter of 2012–2013. The author utilized hourly chemical composition data of PM_{2.5}, model simulations, and meteorological data to characterize the processes involved in the development of these events. Their manuscript contained the following major points: 1. They determined on the basis of modeling that the severe winter haze was shown to result from stable synoptic meteorological conditions over a large part of northeastern China and not from a change in emissions. 2. The build-up of secondary species was the major driving force behind these polluted periods. 3. The contribution of organic matter decreased with increasing pollution level while sulfate and nitrate contributions increased. 4. There is a weakening of the photochemical activity due to the dimming effect of high loading of aerosol particles. 5. Regional transport of pollutants played an important role during these severe pollution events. The paper was generally well written, and I recommend that this paper can be considered for publication after the

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following issues are adequately addressed. General comments: My main concern with this paper is that it would benefit if the paper can be more quantitative as a whole. There are many places when they author stated a conclusion, but did not back it up sufficiently with a number. For example in the model discussion, the paper stated that the change of emissions added “+ 10 ug m⁻³” (Ln 9). It would be helpful if the readers were presented with the initial average PM concentrations and the differing resultant concentrations. Another example in section 6.1, the only direct value presented was 2.77 MJm⁻², and there were no other values to allow the reader to understand how low this value is compared to the rest of the observational period.

How well did the model reproduce the observations? It would be nice if one could see a figure displaying the accuracy of the plot for a reader to have confidence in the conclusion.

The use of quotation marks was awkwardly used throughout the paper. I think the paper would read better if they were removed.

Pg 17919 In 1-10: I did not follow the thought process in which the authors used the OC/EC ratio to determine the SOA production or how it connected with the boundary layer. The rational and assumption need to be better explained.

Specific comments: Pg 17917 In 4: The use of “embrace” in this way personifies the weather system, which is not typically used in scientific writing.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 17907, 2014.