

Interactive comment on “Modeling study of the 2010 regional haze event in the North China Plain” by M. Gao et al.

Anonymous Referee #2

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General comments: This manuscript, using the online coupled Weather Research and Forecasting-Chemistry (WRF-Chem) model, to investigate a haze event in NCP, the contributions of Secondary inorganic aerosols and transportation, particle composition, aerosols' feedback on the local meteorology and PM_{2.5} itself, and feedbacks associated to Black Carbon. The aim the study is meaningful. The model simulations are in certain agreement with observations. Each point of the paper discussed (cause of haze event, composition, transport, radiative feedback) is important and worth doing. Unfortunately the paper involves too many aspects, but could not concentrate on the one or two targets to study and discuss them in detail. I recommend its resubmission basically in a revision in accordance with the following comments:

Major comments: 1. Table S1-1 and Figure S2-10 are all supplement files. The authors
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spend too much space to discuss them in the manuscript which could not be seen by readers in fact and this may lead to misunderstanding. I suggest if they are necessary, please put them into the formal figures and tables in the paper, otherwise reject them and the use texts in the manuscript. 2. Though there is a high correlation between CO and PM_{2.5} concentrations, it is groundless to use the CO transportation contribution as that of PM_{2.5} directly. It is not difficult to calculate the transportation amount outside Beijing by model output parameters directly. 3. AOD is a basic parameter to calculate aerosols direct radiative feedback. The AOD difference between model results and observation (CALIPSO) is obvious (Figure 3) and the model AOD is not good enough to support the aerosols radiative feedback calculation. Further AOD evaluations are needed (MODIS, etc.) for modeling the aerosols radiative feedback reasonably.

Minor comments 1. Please examine the quota format in the manuscript carefully (different quota format appears in the paper). 2. Figure 1, 3, 4, 11, 12 are not clear and need to be redrawn. 3. Figure 4 and its related content (page 22791), wind vectors in the figure needs legend explanation. Pressure system is explained on line 1-10, but it is not drawn in the figure. Please examine the similar questions in other figures (Figure 4, 5, 7, etc.) 4. Please examine the figure captions under the figure and the explanation in the manuscript. They are not same for some figure.

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