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Interactive comment on "Impact of crop field burning and mountains on heavy haze in the North China Plain: A case study" *by* X. Long et al.

Anonymous Referee #1

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The paper by Long X. et al. assesses the impact of crop field burning (CFB) and topography on air quality in North China Plain. The contribution of crop field burning is quantified. This analysis would have a substantial impact on policy. However, I think the impact of CFB and mountainous topography are two distinct impact sources. Please justify the reason to address these two distinct impacts in this single study.

Introduction. Page 3 Line 17, "…it is lack of study for the quantitative effect…" I do not think it is appropriate to claim this without justification. A number of source apportionment studies have quantilfied the contribution of biomass burning in Beijing with modeling approach1, 2,3. A more comprehensive review of previous studies should be summarized in this part. It should be also noted in the manuscript on what the novelty of this study is. Also, Summary of references on biomass burning emissions and the influence of mountains in NCP on air pollution is needed in introduction part as well.

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Further work on modeling evaluation and validation of model are needed. Page 5 Line 20 states that the aerosol module from CMAQv4.6, released in 2006 is used in this study. Could the authors explain why to choose version 4.6 instead the latest version of CMAQ? It has been accounted by Baek, et al. 4 that the simulated OM tends to be underestimated due to the uncertainty in secondary organic aerosols mechanism. However, Figure 4 shows that simulated and observed PM2.5 mass concentration matches well. So is it possible to evaluate the model with PM2.5 species mass concentration and their precursor mass concentrations?

Page 9 Line 10 states that “strong southerly wind, with mean wind speed of 2.5 (2.7) m s-1 in NNCP and 3.0 (3.6) m s-1 in SNCP” to illustrate that “The pollution is continuously transported from SNCP to NNCP”. It’s not strong enough to get such conclusion. Trajectory analysis and wind speed profile analysis should be included.

In Section 4.5, it is written “The differences between the simulations with or without mountains showed the net effect of the topography on PM2.5 concentration”. I wonder if it is appropriate to make this assumption for several reasons. First, the impact of topography is complicated. I am not sure if it is good to represent it just as “reduced to the averaged altitude”. Second, the NCEP FNL Operational Global Analysis data is employed as the initial meteorological condition. It means the initial condition is “real” (with moutains) in all scenarios. The spin-up time is only 12 hours. I think the spin-up time is not long enough to get balanced. Also I wonder if any nudging method is used in this study (it should be explained in method part). If so, the contribution might be changed due to the nudging. Third, the domain is not large enough to ignore the impacts of “real” bounadary condition. The mountainous topography may change the large-scale circulation.

1. Yao, L.; Yang, L. X.; Yuan, Q.; Yan, C.; Dong, C.; Meng, C. P.; Sui, X.; Yang, F.; Lu, Y. L.; Wang, W. X., Sources apportionment of PM2.5 in a background site in the North China Plain. Science of the Total Environment 2016, 541, 590-598. 2. Mukai, S.; Yasumoto, M.; Nakata, M., Estimation of Biomass Burning Influence on

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Air Pollution around Beijing from an Aerosol Retrieval Model. Scientific World Journal 2014. 3. Cheng, Z.; Wang, S.; Fu, X.; Watson, J. G.; Jiang, J.; Fu, Q.; Chen, C.; Xu, B.; Yu, J.; Chow, J. C.; Hao, J., Impact of biomass burning on haze pollution in the Yangtze River delta, China: a case study in summer 2011. Atmospheric Chemistry and Physics 2014, 14, (9), 4573-4585. 4. Baek, J.; Hu, Y.; Odman, M. T.; Russell, A. G., Modeling secondary organic aerosol in CMAQ using multigenerational oxidation of semi-volatile organic compounds. Journal of Geophysical Research: Atmospheres 2011, 116, (D22), D22204 (12 pp.)-D22204 (12 pp.).

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