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comment

Interactive comment on "Effectiveness of emission control to reduce PM$_{2.5}$ pollution of Central China during winter haze episodes under various potential synoptic controls" *by* Yingying Yan et al.

Anonymous Referee #2

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This article analyses the potential synoptic controls over central China during winter haze pollution episodes by using Lamb-Jenkension method and the NCEP/NCAR FNL operational global analysis data, and further evaluates the effectiveness of emission control to reduce PM2.5 under main synoptic conditions by GEOS-Chem model simulations. They found a substantial contribution of transportation in two synoptic patterns (SW-type and NW-type) and a dominated contribution of local emission sources in other two synoptic conditions (A-type and C-type). These results provide an opportunity to effectively mitigate haze pollution by local emission control actions in co-

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Discussion paper

ordination with regional collaborative actions according to different synoptic patterns. The topic is of practical significance and the results are reliable. I would suggest for publication after addressing my comments below.

1. The present comparison and verification of control simulation results in GEOS-Chem is not enough. It can be further verified by using PM2.5 observation data in a larger region of China or component observations of PM2.5 at some specific sites.âĂÍ

2. The novelty of this study need to be further clarified. New understanding or improvement of conclusion and application or in methods should be provided to reflect the general interests of the work rather than the local interests.

3. Lines 105-109: several studies have investigated the potential effective emission reduction on ammonia, which should be reviewed here properly.

4. In Section 3.2, the mechanisms of heavy particle pollution caused by these four potential synoptic controls should be briefly discussed when describe characteristics of each synoptic pattern.

5. Lines 294-296: Why the four pollution episodes are selected?

6. Lines 304-308: The model control simulation is compared to PM2.5 observations at just one site (Jingzhou). Current comparison is insufficient to demonstrate the modeling performance.

7. Line 308-311: Model biases are generally attributed to resolution, emission errors, meteorology and chemical mechanism without statistical results of further sensitivity simulations. Be careful to discuss the model deviation.

8. Line 337: PSC -> PSCs

9. Line 359: The transportation of air pollutants from the south makes the proportion of the threeâĂÍinorganic salts (45.7%) in Jingzhou area the smallest. Consider revising it like: The transport of air pollutants from the south leads to the smallest proportion of

the three inorganic salts (45.7%) in Jingzhou.

10. Line 482: remove potential synoptic controls or (PSC)

11. Line 494: contribute 82%/85% of PM2.5. Consider revising it like: dominate the contribution (82%/85%) to PM2.5.

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2020-920, 2020.