

Interactive comment on “Multiphase MCM/CAPRAM modeling of formation and processing of secondary aerosol constituents observed at the Mt. Tai summer campaign 2014” by Yanhong Zhu et al.

Anonymous Referee #1

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Review of Zhu et al. “Multiphase MCM/CAPRAM modeling of formation and processing of secondary aerosol constituents observed at the Mt. Tai summer campaign 2014”

The authors report a detailed multiphase chemical modeling study of the formation and processing of secondary aerosol compositions during transport to the Mt. Tai in summer 2014. The model performance of MCM/CAPRAM was evaluated against the field observations, and the day vs. night and with cloud vs. non-cloud processes were examined. The major formation pathways and key precursors of sulfate, nitrate, ammonium, and DCRCs were identified with the model. The impacts of emissions and

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glyoxal partitioning constants on the modeling results were also estimated by sensitivity studies. Despite an increasing number of field observational studies of secondary aerosols in recent years in China, such kind of detailed multiphase modeling study is still lacking. This study is helpful for better understanding the regional formation and processing of secondary inorganic and organic aerosols in the North China Plain. Therefore I would recommend that this manuscript can be considered for publication at ACP after the following specific comments being addressed.

Specific Comments:

P2 L58 “However, formation pathways based on measured data. . .”: rephrase this sentence.

P3 L67-68: this sentence is not clear. Do the Yangtze River Delta and Bohai Rim have a total of 410 million populations? Additionally, the commonly used three largest economic zones in China don’t include the Bohai Rim.

P3 L83-84: provide the standard deviations for the average temperature and RH values.

P4 L98: predicted and observed concentrations. . .

P4 Section 2.2: I suggest the authors to provide the air mass cluster figures in the SI so that the readers can easily access the plot.

P4 L111-112: was only an important source. . .

P5 L150-156: this paragraph is a little bit redundant with the last paragraph of the Introduction (P3 L73-79). I suggest the authors may remove this paragraph.

P6 L158: replace “oxidations” by “oxidant”

P6 L 168: non-radical oxidant concentrations. . .

P6 L 175: I would suggest the authors to delete the citation here as it is only modeling

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results from this study.

Section 3.2: I suggest to provide the sub-titles for “Sulfate” (e.g., 3.2.1), “Nitrate” and “Ammonium”.

P9 L253: replace “dominated” by “dominant”

P10, L286-287 “Potential reasons are discussed below”: it is not clear where the potential reasons are discussed. Please clarify.

P11 L 321: replace “shows” by “show”

P11 L348-349: I suggest to move this sentence to the beginning of this section, i.e., L319.

P12 L363: under-estimation

P12 L365-366: I presume the emission data were obtained from the emission inventory, rather than model calculations.

P13 L401 “reported in in above references”: delete one “in”.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2019-982>, 2019.