

Interactive comment on “Observation and modeling of the evolution of Texas power plant plumes” by W. Zhou et al.

W. Zhou et al.

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We would like to thank Anonymous Referee #2 for the thoughtful comments. The following are our responses:

I found the manuscript to be a bit too long and rambling in many places to arrive at the main points of the study. The use of English is also a bit poor. I strongly suggest tightening up the manuscript and proofreading it thoroughly. Specific comments are annotated in the attached manuscript, and I recommend publication after they are addressed.

Reply: The manuscript has been thoroughly proofread and made more concise where possible.

C12609

1. Is this for cloudy day only or also for cloud-free days? Please revise the sentence to make it clear. (Line 3-4 of page 2)

Reply: this is for the cloudy day only. The manuscript has been revised accordingly: “Model-based estimates of ozone production efficiency (OPE) in PPPs are 20–50% lower than observation-based estimates for the cloudy day.”

2. Is it correct to say that the model “under-predicted” OPE when in fact the observation-based estimates are biased high because of rapid removal of NO_y from the plume? (Line 6 of page 2).

Reply: the discrepancy between the modeled and observed OPE was mostly due to the rapid removal of NO_y in PPPs which was not captured in the model. The last sentence of the abstract has been deleted in the revised manuscript.

3. I am not sure I follow what this sentence is trying to say. What are intensive clouds? Is the word “interactive” used correctly here? (Line 12-14 of page 3).

Reply: Statement removed.

4. This reference seems to be missing in the reference list. (Line 18 of page 3).

Reply: Statement removed.

5. Ambiguous sentence. Can the authors clarify how much detail are they referring to in this statement? (Line 19-20 of page 3).

Reply: The sentence has been deleted.

6. HNO₃ is part of NO_y. Was the rapid loss of NO_y entirely due to HNO₃ in these studies? (Line 21 of page 3).

Reply: The studies have primarily attributed the NO_y loss to HNO₃.

7. As it reads, this statement inadvertently implies that ozone is emitted. Delete primary and change it to “NO_x and SO₂ emissions” (Line 1 of page 4).

C12610

Reply: the suggestion is accepted. Changed "primary" to "NO_x and SO₂".

8. trace gases? (Line 9 of page 4).

Reply: changed "Chemical" to "trace gases"

9. Aerosols cannot be "absorbed" into cloud water like gases are absorbed in cloud water. Do you mean the accumulation-mode aerosols are assumed to be completely activated to form cloud droplets? (Line 20-21 of page 8).

Reply: Yes, the accumulation-mode aerosols are assumed to be completely activated to form cloud droplets. The manuscript has been revised accordingly.

10. Above mean sea-level or above ground level? (Line 13 of page 9)

Reply: above ground level.

11. What is the value of the dry deposition velocity for HNO₃ in CMAQ? (Line 15 of page 20).

Reply: in northeastern Texas on September 16 2006, the dry deposition velocity for HNO₃ in CMAQ was around 2–5 cm/s.

12. This section heading should be changed to Summary and Conclusions. (Line 14 of page 23).

Reply: the suggestion is accepted. Changed "Discussion and Conclusions" to "Summary and Conclusions".

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 19953, 2011.