Atmos. Chem. Phys. Discuss., 10, C9277–C9279, 2010
www.atmos-chem-phys-discuss.net/10/C9277/2010/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Observations of ozone production in a dissipating tropical convective cell during TC4" *by* G. A. Morris et al.

G. A. Morris et al.

gmorris@rice.edu

Received and published: 1 November 2010

Referee: "The discussion and summary section should be split into two sections: discussion (up to the last paragraph), and conclusions (final paragraph);"

Reply: We have split this section in two, as suggested by the Referee.

Referee: "...furthermore, as suggested by the other referees, it would be valuable to extend the conclusions section to indicate the authors' conclusion (and reasoning behind it) for which effect or combination of effects is most likely to make the dominant contribution.

Reply: See response to Referee #1 above.

Referee: Also, the direct production of ozone by lightning (LdO3) is a significant hypothesis, but it is only mentioned in the text and not clearly distinguished from LpcO3 in the conclusions; this definitely needs to be done.

Reply: We have clarified throughout the text that the "direct production" mechanism is related to coronal discharges, for which Minschwaner et al. (2008) used the number of lightning flashes as a proxy. We also have added a paragraph to Section 5 to address the direct production of O3 from this mechanism.

Referee: P 18954 L 22-23: "...role of lightning *and convection* in..." Section 2 would better be named "Methods" or similar – to me, "Background" implies the history and previous literature and basic theory, which are all given in the introduction.

Reply: We have changed the name of Section 2 to "Methods" as suggested by the Referee.

Referee: Table 1 is a nice overview, but would be more valuable if it were put in some kind of sensible order (at least chronological, though some sort of topical sorting would be far better). For instance, the first 5 entries include Lelieveld, Lawrence and Doherty, three closely-related studies, interspersed with studies by Price and by Zhang, which are on completely different topics.

Reply: We have reorganized this table so that entries appear in chronological order.

Referee: P 18961 L 14: "Estimated vertical velocities are derived..."; what are these values? (only the horizontal, easterly winds of 10 m/s are mentioned later)

Reply: We have modified the text to, "Estimated wind velocities are derived..." We do not use vertical velocity estimates in this paper.

Referee: P 18965 L 15: "Morris et al., 2010" – what is this paper? (It is not in the references, nor mentioned earlier, as far as I could find)

Reply: This reference has been eliminated. The intended reference is a manuscript on

the physics of the oscillation that will be submitted to the American Journal of Physics in the future.

Referee: The notation “LO3” (and “LdO3” and “LpcO3”) to denote ozone production (due to lightning) can be quite confusing, since in equation (3), “L(O3)” is used to denote photochemical ozone loss (this is very common notation and should not be changed in Eq. 3). I suspect the "LO3: stems from the commonly-used “LNOx”, but would suggest another notation here, e.g., LtO3 (LtO3d, LtO3pc), or LTO3 (LTdO3, LTpcO3), etc.

Reply: We appreciate the Referee’s comment here. Throughout the paper, we have changed lightning production of ozone to “Lt” as suggested. Although “LNOx” is commonly used for lightning NOx production, to be consistent, we have also changed this reference to “LtNOx.”

Referee: P 18973 L 8: “in *the* tropical Pacific”

Reply: Fixed it. Thanks!

Referee: P 18975 L 19: “reflective” should be “representative”

Reply: We have made the change as the Referee suggested.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 18953, 2010.