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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Rapid formation of isoprene photo-oxidation products observed in Amazonia" *by* T. Karl et al.

T. Karl et al.

tomkarl@ucar.edu

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Proposed changes:

We thank both reviewers for their constructive comments. We have incorporated the following changes in a revised manuscript:

(1) The biosphere-atmosphere exchange section will be extended and will include a discussion on the effect of vertical mixing and deposition on VOC correlations and the evolution of OVOCs.

(2) A new figure (4) along with an extensive discussion about observed and modeled OVOC ratios will be added. This section will now also include very recent literature (Paulot et al., 2009, and Peeters et al., 2009)

(3) As suggested the new isoprene - HOx recycling mechanism proposed by Peeters et al. (2009) will be evaluated using OVOC observations. As pointed out in our response to reviewer 2, the mechanism would produce unrealistic OVOC ratios. We will add another new figure (5) which will address this specific mechanism in detail and discuss potential changes that could bring the Peeters et al. mechanism in line with OVOC observations. The expected impact on the HOx recycling efficiency will also be discussed.

(4) The section on OH reactivity will be significantly expanded and a revised figure (now figure 6) will be added comparing the OVOC evolution of four different chemical schemes.

Figure captions:

Figure 4: Observed (left panels) and modelled (right panels) OVOC/isoprene ratios using four different models (Peeters et al., 2009, Paulot et al., 2009 a and b, SRM, a sequential reaction model according to Table 2), and the Mozart model (Emmons et al., 2009). Top panels: MVK+MAC/isoprene ratios. Middle panels: MVK/MAC ratios. Lower panels: Hydroxyacetone/(MVK+MAC) ratios. Dashed black vertical and horizontal lines depict conditions during AMAZE for a (MVK+MAC)/isoprene ratio of 0.44, which are connected to predictions from three models. Solid red lines are extended to the photochemical age where the Peeters et al. (2009) mechanism would predict a ratio of 0.44.

Figure 5 OVOC sensitivity analysis as a function of photochemical age for the Peeters et al., (2009) mechanism. Top panel: MVK. Middle panel: MAC. Lower panel: Hydroxyacetone. The sensitivity (dln(u)/dln(p)) of each OVOC is shown with respect to three specific reaction rates in the mechanism (see table 3).

Figure 6 Evolution of the OH reactivity of OVOC oxidation products relative to isoprene as a function of photochemical age calculated for four photochemical oxidation schemes. Panel a: Paulot et al., 2009 a and b. Panel b: sequential reaction model

(SRM) including the fast production of OVOCs according to Table 2 (Appendix). The black dashed line shows the total reactivity without fast production of OVOCs. Panel c: same for Mozart mechanism. Panel d: RACM mechanism.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 13629, 2009.

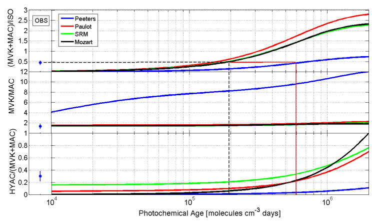

Fig. 1. Figure4

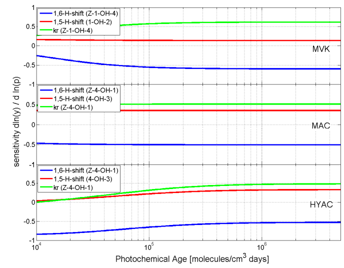

Fig. 2. Figure5

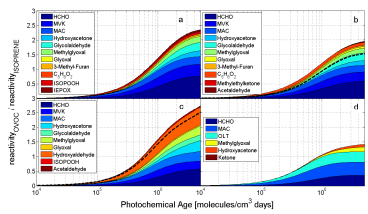

Fig. 3. Figure6