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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Understanding atmospheric peroxyformic acid chemistry: observation, modeling and implication" *by* H. Liang et al.

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Thanks for your constructive and thoughtful comments. We have revised our manuscript, according to your comments. Below is our response, as shown in answer (A), to your comments.

The manuscript cites Yang et al (2006) as indicating that "the radical product from the HC(O)+O_2 reaction could have a stable HC(O)OO structure." This point is not in question, as HC(O)OO has been detected at 25 Kelvin (J. Phys. Chem. A 2004, 108, 4228–4231). The question is whether HC(O)OO is sufficiently long lived (lifetime of at

least 10 seconds) to react with HOO under the conditions of the observations. The results of Yang et al (2006) and those of Martinez-Avilla et al (2003: Chemical Physics Letters, vol. 370, pp. 313–318) suggest that HC(O)OO need only overcome a barrier of about 21 kcal/mole to thermally dissociate to HOO+CO. This might be consistent with a thermal lifetime of 10 seconds but does not offer strong support for that possibility.

A: Yes, you are right. Whether HC(O)OO is sufficiently long lived to react with HO_2 does determine the possibility of PFA formation. Unfortunately, there has been no direct report of the lifetime of HC(O)OO in the literature. We have added your statements into the discussion of our manuscript.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 2055, 2015.