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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Mainz Isoprene Mechanism 2 (MIM2): an isoprene oxidation mechanism for regional and global atmospheric modelling" *by* D. Taraborrelli et al.

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We thank Referee #2 for the comments on the manuscript, and for the recognition of the ability of MIM2 to emulate MCM well and to represent an improvement over the original MIM.

The referee comments that "It appears that the MCM web-site needs to be used in conjunction with this manuscript in order to figure out the details of the reaction scheme".

We disagree with this, since we have provided the full list of reactions, species names, and kinetic parameters in the Electronic Supplement. However, we agree that the MCM website could indeed be useful in conjunction with the paper, along with the additional information which the referee mentions is available in the literature in several

more detailed descriptions (Jenkin and Hayman (1995), Jenkin et al.(1997), Jenkin et al.(1998) and Saunders et al.(2003)). Since this additional information is readily available elsewhere, we do not consider it to be appropriate to generally extend the description of all of the chemical pathways in the manuscript (with a few exceptions, e.g., see below). To our knowledge, there is no isoprene mechanism that is as well documented as the MCM and in fact we encourage the use of the MCM website for mechanistic insights the reader might want. Moreover, we believe Fig.1 (diagram of the OH-pathway) is a good compromise of details and conciseness since a very detailed diagram would be hard to read. Considering that the mechanism is intended for use in 3D atmospheric models, the mechanistic description we provide is the most detailed ever done for a reduced mechanism. Finally, we want to stress that by a simple search of the Supplement with any document viewer, it is possible to see that the species HCOC5 is indeed produced by ISOPDO2 + NO2 but not directly. In fact, the reaction of OH with the resulting nitrate, ISOPDNO3, yields HCOC5. Therefore, we believe the diagram in Fig. 1 is appropriate in this context for describing the OH-pathway of MIM2.

The second comment of the referee regards the new theoretical results on OH-addition to isoprene. We are pleased to introduce a new section in which we will make use of recent experimental results on isoprene oxidation (Paulot et al.(2008)) that we consider more reliable. For a more detailed description of the new paragraph, please see the reply to Zhang's comment on this manuscript. However, we accept the Referee's request and will change the text at p. 14041 lines 19-21 from "MIM2 considers the production of three different kinds of peroxy radicals (RO2), namely LISOPACO2, ISOPBO2 and ISOPDO2." to "MIM2, as well as MCM, implicitly assumes the OH-addition to occur only at position 1 and 4 with branching ratios being 0.655 and 0.345, respectively. The O2-addition to the resulting alkyl radicals is assumed to be instanteneous. MIM2 considers the production of three different kinds of peroxy radicals (RO2), namely LISOPACO2, ISOPBO2 and ISOPDO2."

We take the chance here to let the referees know of a non-required change we will also

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include in the final version.

In the course of the discussion we became aware of a mistake in a reference. In fact, at page 14056 lines 1-3 we referred to Müller et al. (ACP, 8, 1329-1341, 2008) claiming that satellite retrievals for glyoxal started to be used for evaluation of isoprene emission models. We acknowledge it as a mistake. Müller et al. deals with HCHO retrievals instead. Therefore, we will delete the corresponding sentence in the manuscript.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 14033, 2008.