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Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Global modelling of the total OH reactivity: investigations on the "missing" OH sink and its atmospheric implications" *by* Valerio Ferracci et al.

**Anonymous Referee #2**

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Review of "Global modelling of the total OH reactivity: investigations on the "missing" OH sink and its atmospheric implications" by Valerio Ferracci and colleagues.

This is a very interesting study that makes a significant contribution to the field. Increasingly, field experimental campaigns include OH reactivity measurements, which provide an important constraint to our understanding of VOC emissions and their atmospheric oxidation processes. Ferracci et al. introduced a hypothetical sink in their state-of-the-art global atmospheric chemistry transport model to study "missing" OH reactivity, i.e. the reactivity that could not be modelled in comparison to field data.

There is one drawback that I would like to see discussed before recommending publica-



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Discussion paper

tion. For the impacts on OH and O3 in section 4.2 it was assumed that the hypothetical emissions of molecule X, probably representing biogenic VOCs, do not recycle OH through their oxidation products (OVOCs). They are assumed to be a simple OH sink without any further chemistry, which is a rather strong simplification. There is growing evidence that biogenic VOCs are unlikely to be ultimate OH sinks and that OH recycling is ubiquitous. Although mentioned on p. 18 and 20, this aspect needs some discussion in view of the interpretation of atmospheric chemistry impacts, notably in the abstract and conclusion section.

Other than that, I recommend publication in ACP with minor revisions.

Minor comments: -Please define missing reactivity more clearly. Is it missing in the sense that accompanying VOC measurements do not account for all reactivity, or missing in the model. Please make the distinction. -p10 bottom/p.11 top: It would be helpful to compare the model calculated OH with some of the published OH measurements in the Amazon. Often, isoprene chemistry mechanisms severely underestimate OH.

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