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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The influence of natural and anthropogenic secondary sources on the glyoxal global distribution" *by* S. Myriokefalitakis et al.

Anonymous Referee #2

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This is an interesting follow up of the GRL paper by Wittrock et al., putting together the current knowledge on glyoxal formation and removal and comparing it to a limited amount of surface and satellite observations. To my knowledge there are no other publications that have done such

work, so it could provided the 'benchmark' for further studies. The paper is relatively straightforward, focusing on budget issues (anthropogenic versus natural). The comparison of model with measurements is far from perfect, to me it is not very clear what agreement should be expected based on uncertainties

in model assumptions and measurements. It is this aspect that to my opinion could im-

prove the paper. All in all I like the paper- and recommend publication after addressing the minor revisions proposed below.

Detailed comments: p. 1674 l. 20; numbers add up to 104 %; doesn't seem to be a rounding problem.

p. 1676 l.7 ecosystems

p. 1676 l. 19 why not include this as a biomass burning source ; instead of neglecting it? What could be source strength?

p. 1677 l. 13 VOC oxidation processes

p. 1677 l. 25 As far as I understood you just compare to satellite observations, and do not constrain?

p. 1678 l. 7 low resolution: later it appears that you also use the 3x2 resolution. Confusing.

p. 1678 l. 18 issued=>derived

p. 1680 l. 24 removed via wet and dry deposition

p. 1681 l. 1 How sensitive is the choice of H? Why use Kroll et al. (measured?). I found a reference to Betteron et al; stating that H>=3e5.

p. 1681 l. 10 To me it would make more sense to have the 'best' high resolution simulation named S1; and the lower resolution simulations S2 and S3.

p. 1683 l. 5 like with all Sciamachy products choosing a normalization of 0.5x1e13 over the Pacific might be tricky. Where can we find were this value is coming from, is it constant with latitude. In general can we get an estimate of retrieval errors (and how it reduces when averaging). Is the error constant?

p. 1683 section 3.2 Here should be described how you compare model results with satellite measurements. Are measurements aggregated to 2-3 bins? Or is model

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interpolated to the location of satellite overpass (at 10:30 LT).

p. 1684 l. 6 I think the comparison with measurements shows an order of magnitude agreement; probably this is to be expected but not everybody would call this reasonable. What is the accuracy of the surface measurements? Mostly determined by representativity errors?

p. 1685 Figure 1 is quite honest; but shows that there is a real issue with the measurements. If the measurements indeed have a large random uncertainty; it would make sense to group them to reduce the error. But why did you decide to put measurements in 'bins' together, as far as I understand they could come from very different locations, which might not be correlated. I would advocate to perform a spatial aggregation to reduce the measurement error (after making plausible that we are talking about random errors). Why don't you put error bars on the 'squares?

p. 1685 Regarding the large disagreement over the tropical oceans (upwelling areas). Can you give a statement of how certain you are about whether this is not a measurement artifact? Are there supporting surface measurements (maybe of other biologically derived gases in that area?)

p. 1686 Why not perform an extra sensitivity using biomass burning emissions (how about biofuels, could they be important?).

p. 1690 l. 21 I don't understand the reasoning behind '5 Tg could be available for aerosol formation. This is the amount removed by wet deposition, but remember that most clouds do not rain-out. So I think it could be more, depending of course if the high H=3e7 is valid. What is known about in-cloud formation of aerosol from glyoxal? Perhaps P. Warneck has done work on this.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 1673, 2008.

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