

This has been a long drawn out exercise, but I feel the manuscript is almost ready for publication in ACP, my congratulations. I have a few statements of a general nature, and a quite possibly not exhaustive list of minor issues/corrections:

- (1) You have used units of ppbv for NH₃. I assume you know that ppbv is *not* a concentration unit (it is dimensionless). It is also not the proper SI unit (should be nmol/mole). I will not bother you with ordering to change “ppbv”, but whenever in your text you use “ppbv”, you should change the term “concentration” into “mixing ratio”, or the more correct term “mole fraction”
- (2) As for referencing other papers that (will) belong to the AOSR special issue you should use the actual full ACP reference rather than “this issue”. ACP papers are published on line when accepted, and will not be hold back to appear all at once with consecutive numbering, so the term “this issue” does not work. Furthermore, I noticed somewhere a reference to a manuscript in the ACPD phase. That is somewhat acceptable (you refer in that case not to a peer reviewed publication, although the manuscript has been accepted for review, which is something entirely different!) but here even more reference to “this issue of ACPD” is meaningless (manuscripts in ACPD will not appear in a hardcopy version, only online).
- (3) I applaud you for the consecutively line numbering of your manuscript. However, you have to realize that the line numbering used by the reviewers will always pertain to your original ACPD version of your manuscript, which will not be the same as that of either your revised version (where you show where you modified your manuscript), nor the final version. As your editor I spent a long time trying to match the line numbers of the three versions. In fact, on more than one occasion I found the line numbers you gave in your replies to the referees impossible to match. I do not have a good suggestion for this, but at least I would have appreciated if you had indicated to which version the line numbers in your replies referred (I presumed the final clean version but that did not appear to be always the case).

As for editorial comments, both referees have given you rather substantial lists of corrections, and I have several more. The sheer number of corrections indicates poor proof reading. I strongly recommend to have the final manuscript proofread once more by one of your co-authors.

Here is my list (where the line numbers refer to the clean manuscript version 4 of December 19, 2017).

L41: “causing” -> this having

L44: “and can be transported -> and **it** can be transported

L48: this is the first time for defining the term “ECCC” but you have to say so: “ECCC (Environment...)”

L68: “AOSR facilities are causing critical levels of NH₃”. I think I know what you mean but this formulation is wrong. Make it something like “...are responsible for NH₃ reaching critical levels..”

L94: it would be interesting to know how much improvement there was by using the updated version of GEM-MACH in comparison to its original version. Was there a big improvement already, and hence is use of the bidi and dire versions maybe just a slight further improvement? Some numbers would be usefujl to remove any doubts here.

L110: “physics package, this component...” -> “physics package. This component...” (too long and convoluted sentence, cut in two)

L141: reference to “this issuer” is not possible, see (2) above.

L149-156: delete (repeat)

L2015: “which are based on..” -> “:which is based on..”

L221: Since our simulation occurred..” -> “Since our simulation pertained to..”

L280: don’t you need also chemical data as input for the 12 day spin up? Need to say something about that.

L386: “but not shown in the time series” -> “but **are** not shown in the time series”

L387: “then NH3 concentrations seen in...” a little odd, because you just said in the previous line that they are not shown. Try another wording.

L398: this seems comparing apples and oranges: the bias in the new model vs ground data was comparable to the bias of the old model vs satellite data? Correct what you mean or delete this comparison.

L452: “The model also has” -> “The model output also has”

L506: why reverse in time? Make it “(12 Aug, 1 Sept, and 3 Sept, 2013)” (and change the order in the following text accordingly)

L538: “should improve”? You don’t know this, it might go the other way! Change it “might improve”

L551-569: this part is mangled up and must be reformulated.

L648: why are you so sure that the Hsu and Clair (2015) number is correct, and your number is an underestimate? This needs a justification, even if you next give arguments why your number might be low. While at this, I note you have a reference to Hsu and Clair (2015) (I645) and Hsu and Clair (2016) (I648). On scanning the list of references I see that these references appear to be to two different papers, but the titles of these references are identical. Please review and correct!

L682: delete “greatly” (subjective and not defensible)

Page 31: mixture of the last page of references with Figure 1 and Table 1

Fig 6a-d and Fig 8c-d: “Rfire” (text embedded in the figure) should be “Rfire+bidr”

Table 2: I3 of the title: “|t|” ? I presume “t”?