

Interactive comment on “NH₃ emissions from large point sources derived from CrIS and IASI satellite observations” by Enrico Dammers et al.

Anonymous Referee #1

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This paper is a very interesting analysis of NH₃ point source emissions world-wide derived from the observations of CrIS and IASI. The manuscript is well written but sometimes the clarity can be improved, as I will specify in the comments below.

Page 2, line 24-25: This statement is rather vague. Can the authors be more quantitative by specifying how many are "a small number of locations"?

Page 3, line 8: Why is the underestimation of modelled concentrations likely due to underestimating emissions and not due to underestimating the lifetime?

Page 5, line 6: "have a nadir diameter of 14 km at nadir". The diameter is not in nadir direction.

Page 6, line 13-14: This sentence about oversampling is not very clear. Which data

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is oversampled and how? The reference to Fioletov et al. (2011) does not mention oversampling.

Page 7, line 16-20: The regions Europe, Australia, Canada and the US are mentioned, but what has been used in other regions in the world? Please, clarify.

Page 7, line 23: "What do the authors mean with "up to several orders of uncertainty"? Please, specify the uncertainty.

Page 8, line 10: A 0.75 degree resolution is specified here as 40 km in both latitude and longitude direction. According to my calculation, 0.75 degree is about 75-80 km.

Page 8, line 14: The phrase "use 100 hPa of pressure layers at higher altitudes" is very unclear. I guess the authors mean that they use layers from the surface pressure to 100 hPa lower. Please, rephrase the sentence.

Page 9, line 14-15: If I look at equations B3 and B5, I conclude that the first part of the sentence should be "It tends to (underestimate) overestimate lifetime in...." to be in agreement with the statements in the rest of the sentence.

Page 10, line 14-15: This sentence is less ambiguous if it is written as "The fitted dataset in the longitude/latitude domain and in the downwind/crosswind domain are shown in Fig. 4(c) and (d), respectively.

Figure 3: I suggest removing all the text ("ZMU_ ...279.49") in the main title of this Figure.

Page 12, line 8: This sentence is missing a verb between "same model we" and "an uncertainty". found?

Page 13, line 2: "we first will first do free fits" => "we first will do free fits"

Page 13, line 30 and line 35: If the noise is 4 times lower why do the lower limits relate to each other with a factor 3?

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Page 13, line 35: Which lower limit belongs to which instrument?

Page 13, line 35: What is the mentioned ratio? The ratio of what?

Table 1: I suggest putting a + in front of the 6.3 (diurnal var.), just for clarity.

Page 17, line 11: What is the rationale for the choice of 0.30 as a limit value?

Page 17, section 3.2: The main result of this paper, with all the nice information, is only available in a supplementary data file. Why not showing this in a Table in this section? It is maybe not feasible to show all the locations, but at least show a table with the 20 largest emitters.

Figure 10: I think the Figure can become clearer if all the symbols have the same size. I guess the size reflects the magnitude of emissions, but the colour is already clear enough for this.

Page 23, line3: "Only for the strongest sources is it was feasible to estimates using only ..". Please, correct all the typos in this sentence.

Page 27, section 4: the conclusions are clear, but I miss the fact mentioned that all results/conclusions are made for specific conditions: summertime and high wind speed.

Page 29, line18: tau is not the decay rate but the lifetime. Lambda is the decay rate.

Figure D1. It seems that the fit in this example is clearly lower than the measured total columns. Is that understood and part of the systematic uncertainties? Here I miss some discussion of the result, since this is one of your 4 selected example cases.

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