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Comment on acp-2022-162

Anonymous Referee #1

Referee comment on "Estimation of surface ammonia concentrations and emissions in China from the polar-orbiting Infrared Atmospheric Sounding Interferometer and the FY-4A Geostationary Interferometric Infrared Sounder" by Pu Liu et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2022-162-RC2, 2022

In this manuscript, the authors report on a study aimed at analyzing the changes of hourly NH_3 concentrations and estimating surface NH_3 concentrations and NH_3 emissions in China with top-down method. The manuscript fits into the scope of ACP and the results presented are very interesting to their readers. Overall the paper is clearly structured and generally well written. I have the following comments of the paper that should be addressed.

General comments:

- Although the sources of uncertainty in the experiments covered are described in the limitations and outlook section, a quantitative analysis is lacking and should be added. How did you solve the problem of missing GIIRS data in the Yangtze River Basin mentioned in the constraints ?
- I am confused about the treatment of the feedback ratio of surface NH_3 concentrations and emissions mentioned in the methodology. Is it the calculation done on an annual scale or on a monthly scale? Is it a variable value over time or a constant value? The feedback ratio should also be included as an element in the uncertainty and limitation analysis.

Minor comments:

line 247: check and modify the content in the Figure 5

line 292: The data of Figure. 8 doesn’t match the data described in the article

line 13: replace "China has largest NH_3 emissions in the world…" by "China has the largest NH_3 emissions globally…"

line 89: replace "method by using" with "method using"

line 103: Correct "are" to be " is"

line 115: replace "at high frequency" with "at high frequencies"

line 121: change "The average value of HRI is 0 with the standard deviation as 1" to be "The average value of HRI is 0 with a standard deviation of 1"

line 124: replace "from November in 2019 to October in 2020" to be "from November 2019 to October 2020"

line 139: change "product of" to be "product of the"

line 168: Correct "which is" with "which are"

line 208: replace "while for other time…." with "while NH_3 concentration … at other times"

line 208: replace "changes of" to be "changes in"

line 214: replace "which may be also related with" by "which may also be related to"

line 215: replace "except" by "except for" and replace "have" by "has"

line 216: Correct "patterns" by "patterns are"

line 253: delete "during 2010-2015"

line 267: replace "have" by "had"

line 276: replace "change of" to be "change in"

line 305: Correct "are" to be "is"

line 315: change "estimated" to be "estimate"

line 318: change "in" to be "from"

line 320: change "low" to be "the low"

line 325: change "occurred" to be "occur"