

Atmos. Chem. Phys. Discuss., referee comment RC2 https://doi.org/10.5194/acp-2021-538-RC2, 2021 © Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.

## Comment on acp-2021-538

Anonymous Referee #1

Referee comment on "Evaluation of interactive and prescribed agricultural ammonia emissions for simulating atmospheric composition in CAM-chem" by Julius Vira et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-538-RC2, 2021

The manuscript presents an evaluation of the agriculture  $NH_3$  emissions process model (FANv2) embedded within the land model CLM, and coupled to the atmospheric chemical transport model CAM-chem. The evaluation focuses mainly on atmospheric species (atmospheric  $NH_3$  and  $NH^{+4}$ , and wet  $NH^{+4}$ ), and uses a massive compilation of in-situ observations from regional networks, literature and satellite data from IASI. The manuscript also evaluates the use of alternative global emission inventories (HTAP, CEDS, EDGAR).

Modelling interactive agriculture  $NH_3$  emissions (both from synthetic fertilizer and manure) is of a great interest to the earth system modelling community as these agriculture emissions are very sensitive to climate. I really enjoyed reviewing the manuscript. It is well written, organized and the figures and tables are clear. The paper presents results that are of interest to the ACP readers and is adequate for publication, with a few minor changes:

- Page 10 Line 2. Referring to Figures S9-12 here is a bit confusing as these belong to section 3.1 below. I recomend referring those figures within section 3.1.
- Page 18. Figure 10. Monthly precipitation from observations is compared to FAN or HTAP?
- Page 20 Line 14. FigS4 should be FigS17?
- Page 25 Line 1 "to to"
- Page 24 Line 3 "the the"