



Comment on **essd-2022-94**

Feng Zhou (Referee)

Referee comment on "History of anthropogenic Nitrogen inputs (HaNi) to the terrestrial biosphere: A 5-arcmin resolution annual dataset from 1860 to 2019" by Hanqin Tian et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-94-RC1>, 2022

This study is a very impressive work that comprehensively reconstructs the History of anthropogenic N inputs to the terrestrial biosphere, especially with consistent temporal coverage, spatial resolution, and spatial allocation. This work is beneficial for a comprehensive assessment of the coupled human-earth system and addresses a variety of social welfare issues, including climate-biosphere feedback, air pollution, water quality, and biodiversity. Although uncertainties and limitations occur in this global N input dataset, I think this work has taken a big step forward anyway. This paper is reasonably well written. I fully support the submission of this paper with minor revisions. The detailed comments are as follows:

- Line 200, the subtitle is not quite correct, since in this part you also describe the method for N fertilizer use in the pasture.
- Line 210-241 Does the method of spatializing manure application in pasture differ from that in Xu et al. (2019)? Can you explain where the improvements are made? I must be understanding something wrong, otherwise, I can't figure out why the ratios of the two methods are exactly opposite. What's the definition of $N_{app_c,y}$, and how to get the value of $N_{app_c,y}$. In addition, the $GN_{prod_c,y}$ you get should be adjusted and compared with the national-level application amounts from the FAOSTAT database.
- Line 224, the reference of Dong et al., 2006 can not be found in the reference list. Please check throughout the manuscript.
- Line 247-248. The method you used for spatializing manure deposition in pasture and rangeland is similar to the method for manure deposition to pasture in Xu et al., not the manure application method.
- Line 255-256, what's the full name of SSP585 and TRENDY. A full name is required on the first occurrence. Please check throughout the manuscript.
- Line 280-282, when manure N and atmospheric N deposition accounted for 37% and 24% of N inputs refer to which year? The sentence is not very clear and easy to cause ambiguity. Please rephrase it.
- You might cite and compare with the recent work of Wang et al. (published in National Science Review, 7: 441-452, 2020), which developed crop-specific N fertilizer inputs

applied to cropland from 1961-2014.