

# Review: essd-2022-263

Dear authors

This study, entitled "Historical nitrogen fertilizers use in China from 1952 to 2018", tried to develop a new detailed map of nitrogen fertilizer inputs in China. It is within the scope of the ESSD. It contains some new perspectives (crop-specific, crop rotation, etc.) and is basically worthy of publication, but it requires for some corrections before the publication. Some of the descriptions regarding the process of making the data set are unclear. Major comments are below on the points that need to be corrected.

## General comments

1. First of all, thank you very much for citing Nishina et al. (2017) (Nishina map from here). However, please note that the Nishina map is slightly misinterpreted in your comparison. As it uses LUHa (Hurtt et al., 2011) as a map of agricultural land, so it does not consider N inputs where LUHa has 0% agricultural land area. This means that there are at least some areas with zero at all in Nishina map. Therefore, Figure 6 is incorrect. In addition, Nishina map consider the double cropping region, which is based on the crop use intensity (CUI) map provided by Siebert et al. (2010), In the double cropping region, it is needed to be twice the annual input. Otherwise, the FAO input cannot be reproduced. Please refer to Figure 1 in Nishina et al. (2017), which illustrates where we treated as two-season crop areas (map for double cropping areas in Nishina map can also be shared). As for the annual nitrogen input per half-degree grid cell, if you add up the individual fertilizer input data for NH<sub>4</sub><sup>+</sup> and NO<sub>3</sub><sup>-</sup> by month, and then aggregate that data for each year. After this, the N input per unit area of cropland can be calculated by dividing by the area of farmland in LUHa. I think you can create a comparable map.

Nevertheless, this issue has nothing to do with the quality of your dataset.

2. As a matter of fact, even if you use Global maps for comparison, there are better maps available for China. One is under review, but I can refer you to two papers by Wang et al. (2020) or Tian et al (under review in ESSD). Please consider comparing with this one.
3. The method of Gap-filling is not clear. Especially when Gap-filling is applied to space, the total amount of nitrogen fertilization may be larger than the statistics used, depending on the method.
4. On a related point, each and every procedure should be formulated in mathematical formulas (even with respect to simple tabulations). Everything is described by text, making it difficult to see the validity of the method. The same applies to the description of Gap-filling. As other example, I could not see how to calculate and define uncertainty (shown in Fig 5) in the current manuscript.
5. Please add units to all drawings. Indeed, different units are mixed (e.g., "gN per unit land per year", "N fertilizers use rate per square meter of cropland ") in the text. So, it is not clear at first glance what you are referring to in the figure.

## Reference

**Wang et al (2020)** Data-driven estimates of global nitrous oxide emissions from croplands. Natl. Sci. Rev. 7 441201352

**Tian et al (under review)** A 5-arcmin resolution annual dataset from 1860 to 2019. ESSD [preprint], <https://doi.org/10.5194/essd-2022-94>