

Comment on **essd-2022-245**

Anonymous Referee #2

Referee comment on "Harmonising the land-use flux estimates of global models and national inventories for 2000–2020" by Giacomo Grassi et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-245-RC2>, 2022

The paper provides an interesting advancement of the previous analysis of the same authors on the mismatch between national inventories and global models used for estimating the emissions of the land sector. The paper is well structured and accurate in the analysis and clarifies many of the possible reasons of mismatch between statistics and estimations, providing also perspectives for the reconciliation of these differences. Although the comparison is very detailed and accurate, there is no information on the different pools that are considered in the different sources considered (NGHGI, BM and DGVM) and whether this can be a source of mismatch between estimations. This should be clarified in the method section as it is a potential source of discrepancy (potentially also adding this information in Table 1).

Overall the assessment is very positive, I therefore recommend the publication with minor revisions.

Specific comments:

-Lines 94- 95 Missing quotation to the sentence "BMs estimate that land use is a net source of CO₂ globally, mainly due to deforestation, equal to around 12% of total global 95 anthropogenic CO₂ emissions."

Line 108 Suggest to add the reference to Figure 1 at the end of the para

Line 112 "The main conceptual difference is that **global models** consider those forests as managed that were subject to recent harvest and have not yet regrown to pre-harvest

stock level...." With global models are you referring to both DGVM and BM? Otherwise please specify.

Lines 322-25: The sentence is not clear, I suggest to reformulate it.

Line 374-377: This paragraph refers to an "adjustment" but I think it is more correct to refer to a "difference" or "gap" as the number represent a difference between estimations, while the adjustment is done when you want to make one of the two comparable to the other (e.g. line 378)

468 – missing space between "thatBMs"

595 – not clear why a the inclusions to natural terrestrial sink would lead to a "double-counting" perhaps to a wrong attribution of the natural fluxes to anthropogenic causes?

Table 1: add a reference to the pools included in the different sources. On Organic soils: Oscar uses the same dataset as BLUE, I guess it is not the case of H&N. I suggest to include the source of the datasets for the three BMs. In the row LULUCF net, last three cells (related to BMs): instead of repeating the same information, the information could be included once, merging the three cells (also in other cases above where the same approach is used by different models)