

Comment on **essd-2021-86**

Anonymous Referee #2

Referee comment on "GCI30: a global dataset of 30m cropping intensity using multisource remote sensing imagery" by Miao Zhang et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-86-RC2>, 2021

This study combined Landsat, Sentinel-2, and MODIS images to generate a global cropping intensity map at a spatial resolution of 30 meters between 2016 and 2018. This study also validated the cropping intensity map using thousands of pixels from time series satellite images and currently available PhenoCam data. Then this study compared the resultant cropping intensity map with other cropping intensity datasets. This is nice work. The writing and the logic of this manuscript are good. However, I have some comments which may help the authors improve this study.

Page 1 Line 34-35: This study did not do the relevant analysis to support this conclusion.

Page 2 Line 14: Here is the definition of cropping intensity. What is the continuous cropping type you mentioned in the manuscript?

Page 3 Line 6: You may need to highlight why you combined Landsat, Sentinel-2 and MODIS data somewhere in the Introduction section.

Page 3 Line 15-25: According to your Google Earth Engine code, this study included forest, water, and urban mask to help integrate the cropland layer. But I did not find any description in this section.

Page 4 Line 4-5: Why not using surface reflectance data?

Page 4 Line 16-17: Landsat and Sentinel-2 are TOA data, and MODIS data are surface reflectance (SR) data if my understanding is right. The reflectance values from TOA data and SR data should be very different, especially when including the blue band to calculate EVI. Which version of MODIS data are used?

Page 5 Line 1-2: More details are needed for the data gap filling and smoothing. The integrated data is 30 meters, but what is the temporal resolution?

Page 5 Line 14: what is the size for these samples?

Page 5: Line 25: How did you separate flooded and non-flooded croplands?

Page 6 Line 1: Why did you choose the 50% of the NDVI amplitude?

Page 7 Figure 2: This figure is not clear to me. Could you please the ticks for the x-axis?

Page 8 Line 9-25: A brief introduction of these products is needed. Or you can move Table 2 here and add the two phenology datasets in the table.

Page 9 Line 14-25: Could you explain why the underestimation and overestimation happened based on those samples (RDSat)?

Page 10 Figure 4: I could not see the cropping cycles dots.

Page 11 Figure 5: The colors for different cropping intensity types are too close. Please

modify the colors.

Page 14 Line 2: Why excluding the continuous cropping pixels?

Page 14 Line 19-20: Why "Wu et al(2018) might overestimate the annual harvest area and ..."?

Page 14 Table 2: Please cite the relevant references. FAO data in 2010 is used for comparison, and the FAO data in 2016-2018 should be better for comparison.

Page 15 Line 7: MDC12Q2 should be MCD12Q2.

Page 16 Line 4: This study "provides insight only into the current actual cropping intensity (Page 17 Line 18)" instead of "agricultural land use management".

Page 16 Line 7: I agree that the GCI30 generated by this study reduces uncertainties caused by the mixed pixel effect. However, suppose you would like to say you generated a more accurate global CI estimation. In that case, you need to do accuracy assessment for each cropping intensity product based on their specific definition and the same set of ground reference samples.

Table S1: You may add the spatial resolution for each product.

This manuscript is too long and could be shortened.