

# ***Interactive comment on “Harmonization of Global Land-Use Change and Management for the Period 850–2100 (LUH2) for CMIP6” by George C. Hurtt et al.***

## **Anonymous Referee #2**

Received and published: 6 June 2020

Review for gmd-2019-360:

In their manuscript “Harmonization of Global Land-Use Change and Management for the Period 850-2100 (LUH2) for CMIP6”, Hurtt et al. present the methods used to create the LUH2 dataset – the detailed land cover maps used by the CMIP6 land surface models. The paper is well written and thorough, though it reads like a technical description (which is actually appropriate given the detailed methods required to understand the construction of the LUH2 dataset). I have only minor comments on the manuscript, and believe it is appropriate for publication in GMD.

Comments:

C1

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Line 50 – since the CMIP6 runs have already mostly happened, mentioning that here, and that this is a description/analysis of the land use patterns used by those simulations, would be appropriate (the authors mention it in the discussion).

Line 64 – typo: provided -> provide

Line 100 – I was confused about what GLM2 was, and what role it plays in LUH2. A bit of elaboration here on that would be helpful.

Line 115/116 – drop “i.e.”

Line 120 – (equation 3) Please elaborate more on what equation 3 means.  $m = f$ , but the following sentence (lines 121-122) don’t sound like  $m=f$ ...

Line 155 - At this point, the reviewer wonder's "How are changes in ice and water fraction accounted for?" Are no gridcells that are 100% ice projected to be less than that in the future? Or do those gridcells get to be "bare ground" under the ice, and models with dynamic ice sheet models can convert to the regular land model as appropriate, but just use gravel/bare ground as the ground cover? Or is there a chance for grass to grow on melted glacial sites in 100-300 years? Maybe this dataset assumes land ice is fixed temporally – if so, please state. If not please elaborate on how it is handled.

Line 203 - Is this because rice is the only C3 crop that is flooded? Is all rice in this dataset represented as flooded?

Line 370 – Section 2.8 provided a very clear and useful walk-through of the land use in each SSP – I thank the authors for laying this out so clearly.

Line 695 - "these 12 states" -> which 12 states? Maybe say "the 12 potential states of vegetation cover used in this dataset..." (remind/help the reader)

Line 728-730 - Elaborate on these three historical scenarios? (It feels a bit like they just showed up - if they were already introduced above it got lost in the details, and reminding the reader of what they are here would be helpful...)

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Line 740 – “Badge plots”: This is a minor comment, feel free to ignore it. I’ve never heard the term “badge plot” - I knew what it was when I looked at it, but have always heard of and referred to these plots as “circle network graphs” or “circle network diagrams”. Putting “badge plot” into google didn’t pop up any figures like this.

Line 760-763 – This is quite interesting! At this point, I wanted to hear more about it. The authors actually discuss it more later.

Line 785 – Typo: “above- ground” -> “above-ground” (remove space after dash)

Line 788-789 – as mentioned above, it wasn’t entirely clear what the lower, baseline, and upper historical scenarios were.

Line 814 – Is this the same metric as used on Line 760? (If so, consider moving the two discussions to the same place - when I hit line 760 I wanted to know more about what it used to look like.)

Line 824 - tied to the above comment - secondary forest age is going up by quite a bit in RCP 8.5?

Line 936 - This is the list of datasets for Ma et al 2019 - maybe it is the same list, in which case no modification is necessary. If there is a separate list for this manuscript, then this link needs to be updated.

Figure 4 – Why the discrete drop in pasture-land after 2000? Cropland has a smoother transition from historical to projected land area.

Figure 5 – text is extremely small in subplot legends. Had to blow it up on the computer, and wouldn’t be able to read it in print.

Figure 8 – as in Figure 5, text is too small to read

Figure 9-14 – are these images blurry?

Figure 15 – legend text too tiny to read

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