



## Comment on **essd-2021-202**

Anonymous Referee #2

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Referee comment on "Implementation of the CCDC algorithm to produce the LCMAP Collection 1.0 annual land surface change product" by George Z. Xian et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-202-RC2>, 2021

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General comments:

Xian et al. present the new Landsat-based LCMAP annual 30-meter land cover and change dataset for the conterminous United States, spanning 1985-2017 (which on the LCMAP website now seems to go through 2019). Based on the state-of-the-art Continuous Change Detection and Classification (CCDC) algorithm, the product represents a large step forward in semi-operational, large-scale monitoring of land cover and its change through time. The data are well described and easily accessible, with well-defined accuracy and uncertainties (both in the manuscript itself and in the data layers and metadata). This clearly represents an important and broadly applicable resource for a wide range of applications. I have a few minor suggestions for further clarification and on the presentation in the manuscript, but overall, this is an excellent contribution that will almost certainly become a very important dataset for both science and management.

Specific comments:

Lines 103-105: Are there specific examples that the authors could provide here?

Lines 153-155: The Introduction ends on a bit of a weak note. I'd suggest closing with a clearer statement of the objectives of the manuscript and the bigger-picture importance of the dataset, particularly following up on how the "Lessons learned" (Brown et al. 2020) informed the implementation of the LCMAP data presented here in this manuscript.

Lines 312-314 and 519-521: Why were grass and shrub included in a single grass/shrub category rather than separated into two classes? It seems like grass and shrub would likely be both ecologically and spectrally distinct, so some discussion of why that decision was made would be helpful.

Lines 472-473 and Fig. 9: Could the authors discuss or speculate about why the overall accuracy seems to decrease monotonically through time (albeit, quite a small decrease) starting around 1997? They address why the accuracy in 2017 decreases quite suddenly (limited Landsat observations at the end of the time series), but it's not apparent to me why there would be a long-term monotonic decrease prior to that rather than exhibiting more-or-less random variation from year-to-year.

Fig. 5b, 7d-f, and 8d-f: I find it very difficult to interpret these figures. The mix of gray-scale confidence shading is tough to distinguish from the different colors, and it is nearly impossible to distinguish the two shades of purple in the maps for increasing and decreasing vegetation. Those two colors are so similar to each other that it is extremely difficult to tell them apart in the maps.

Fig. 5d: I would suggest rephrasing the caption to read "...(d) total number of spectral changes detected..."

Fig. 7g-h: I would suggest making the caption more descriptive about what these represent. The number of changes through time? And are these the number of thematic changes (e.g., like Fig. 5c) or spectral changes (e.g., like Fig. 5d)?

Technical corrections:

Lines 63-64: I would suggest removing this first sentence of the Introduction. The second sentence is a much stronger opening, in my opinion.

Line 406: I don't see any dark green in Fig. 5b. (see also comment on 5b above in the specific comments)

Line 416: I would suggest adding a reference to Fig. 5d after "...in the east".

Line 430: I would suggest adding "(respectively)" after "2008 and 1995" to make it clearer that the increasing trend ended in 2008 for the grass/shrub and 1995 for the tree classes.