

Interactive comment on “Revisiting land cover observations to address the needs of the climate modelling community” by S. Bontemps et al.

Anonymous Referee #2

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This paper uses surveys of climate modeling groups who utilize satellite derived land cover data products to assess what the specific needs of this particular user community are, as well as what shortcomings exist with presently available data products with respect to these specific needs. Based on these surveys, an attempt is made to make recommendations for future improvements. While the basic premise of this paper is highly relevant, and I would ultimately like to see it published, in its present form, the paper has serious shortcomings as outlined below and major revisions will be required before publication.

General comments:

In my opinion, the paper does not quite live up to its objective to identify needs of the climate modelling community in terms of land cover data products. A lot of the

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approaches discussed do not seem to target the modelling community in particular, but rather apply to a broader quest for improved land cover products. The list of findings on pages 7719-7720 is too extensive. Some of the findings are not necessarily specific to the climate modelling community, but apply to land cover products, or even satellite data products in general (some of them are rather obvious). This list of findings is presented, but the paper does not go on to address most of them. It would be more useful, and better for the flow of the paper, to zero in on a handful of the most relevant findings and discuss how the shortcomings of current land cover products that were identified can be overcome. Finally, the paper was written by non-native speakers of English, and a lot seems to be lost in translation. Several of my comments below are related to confusion over the language used. While I sympathize with the authors, I believe it is essential to facilitate the readers' understanding of the material by cleaning up the English in the paper. In particular, there are many instances where simpler language could be used to make things easier to understand.

Specific comments:

p.7715 (18-21) Are only single sensor data sets available? How is area weighted accuracy defined?

p.7717 (5-7) A statement like this needs to be elaborated further or backed up with citations.

p.7718 (5-6) & Fig.1: How was this data collected? Were users given these options and required to choose one, or several? More info in the figure caption would be helpful.

p.7718 (11-17) Too many acronyms and not enough information. What is the implementation plan mentioned here, why is it important, etc.?

p.7719 (15-16) This point is too vague. What is considered "stable land cover data"? It seems to me that land cover, such as many other climate variables is per definition dynamic, to a different degree on different time scales (annual cycle, longer term trends

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due to climate change, etc.). Should the stable land cover data be thought of as a climatology over some period of time? This needs to be defined.

p.7720 (6-9) I guess that broad spatial levels here refers to coarse spatial resolution? Rewrite the second sentence: However, there is a need for finer resolution, in particular with regard to future projections and regional modelling.

p.7721 (8-15) This section is a bit confusing. Is what the authors mean here that the lack of accurate land cover limits the user community in the use of other land surface variables? If so this needs to be clarified.

p.7721 (21-23) The authors should elaborate on the diversity of opinion they refer to by adding some references. Not all land surfaces are in use, so it seems obvious to me that there is a clear distinction between land cover and land use. (cut out the “the”s in this sentence. Use land cover and land use, rather than the land cover and the land use)

p.7722 (18) - p.7723 (9) Here the authors talk about vector and raster representations of land cover data. I am not sure how relevant this discussion is to the objective of this paper to identify and address needs of the climate modelling community, given that climate models utilize gridded data. The hybrid land cover representation model the authors propose thus does not seem to be the best suited for modelling purposes. It is also unclear what the authors mean by “continuous field”. How does it relate to vector/raster representation of data?

p.7723 (18-20) Variations in land cover products over time that are artifacts of changes in classification rather than representations of actual land cover change are significant issues, and deserve more emphasis in the paper.

p.7723 (23-24) The way Fig.3 is cited in the text suggests that it explains the GlobCover classification chain. However, it does not. The figure could potentially be skipped, since it does not add any information to the paper. Instead, the authors should consider

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adding a sentence or two on the GlobCover classification processes.

p.7724 (4-21) The authors' argument that changes in land cover classification over the 11 years they have analyzed are more likely related to measurement uncertainty than actual land cover change needs to be expanded upon. For example, they say that Fig. 5 shows that classification instabilities occur in areas known to be heterogenous or having contrasting seasonal cycles. A brief explanation and maybe an example or two would be beneficial here. In general, more information should be given on how the authors can distinguish between actual land cover change and an artifact of the methodology. They briefly mention time scales of change, but more detail here would be helpful.

p.7724 (28) - p.7725 (4) Why not? Add a brief explanation.

p.7725 (14-27) It is not mentioned how the approach described here would benefit the climate modelling community in particular. What are the types of land cover data most models utilize now, and how would models need to adapt to implement this building blocks approach? I would be particularly skeptical about the object-based orientation of the proposed datasets with regard to their utility for models.

p.7726 (10-16) The authors should be more specific about why the detection of change is so complicated. An additional sentence on the processing methods referenced would also be useful.

Technical comments:

p.7715 (24-28) This sentence is confusing. It mixes two ideas that should be presented separately: one talking about long time series and the other about the need for interaction between users and producers of land cover data. I don't understand what the "associated dynamics" refer to.

p.7720 (13-14) It is unclear to me what this means.

p.7721 (6-7) "key and fundamental dataset": There is no need to use both adjectives

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as they basically mean the same thing. This is an example of the overly complicated language the authors use, that could be easily simplified. See also p.7722(16) “strictly and precisely”.

p.7722 (17) “crisp univariate distinction” - I am not sure what this means.

p.7724 (2) Fig.4 needs a legend. It is unclear what is shown here.

p.7727 (14) Change “Conclusion and perspective” to “Conclusions”. A perspective is not given here.

p.7727 (22-25) This is confusing, it is unclear to me what the authors are trying to say.

p.7728 (4-7) This last sentence is unnecessary.

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