

Earth Syst. Sci. Data Discuss., referee comment RC1
<https://doi.org/10.5194/essd-2021-252-RC1>, 2021
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Comment on **essd-2021-252**

Anonymous Referee #1

Referee comment on "High-resolution land-use land-cover change data for regional climate modelling applications over Europe – Part 2: Historical and future changes" by Peter Hoffmann et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-252-RC1>, 2021

The authors have implemented a massive amount of data analysis in the field of land cover/land use change. They explain that the exercise serves requirements by the regional climate modeling community for more detailed data at the geospatial level in order to improve downscaled simulations and predictions. This is of course a valuable goal. However, the authors fail in my view to characterize the quality of the data they produced for use by another community -- in terms of underlying uncertainties and limitations.

Overall, even if this was done in a companion paper, the authors should repeat or at least summarize findings on uncertainty that may be used as guide (or warning) by the modelers. Everybody wants to improve simulations, and everyone wants more detailed data of some sort--but the data provided need to come with full descriptors.

In the specific, it is well known that land cover and land use data are very uncertain, and even more so when differencing the input land data as done here. In other words, take any two established products such as MODIS and ESA CCI (as done here), and you'll see that their differences in terms of derived land cover changes are huge and hardly explainable in a consistent manner. Though explained they should be so that others can use them with a grain of salt.

At the outset and even before discussing uncertainty and limitations, the manuscript would benefit from clearly defining what is meant by land cover and land use -- key differences in the concepts etc. Then I think there should be a valiant effort to use more homogenized land use/cover categories rather than inventing yet another set of new ones (proliferation in this field is an enemy to improved understanding) as done in the manuscript. I would start by looking at the available international definitions of land use (IPCC, FAO) and use those of FAO/UN for land cover. This would have added

advantage of gaining an understanding audience, plus ensure that the climate results obtained by the modelers can be presented in understandable IPCC/FAO language. This effort is important because a good part of the "uncertainties" in the derived products actually stem from usage of different names and classifications -- and there is no need for that.

Secondly, the authors should attempt at computing uncertainty values in order to scientifically communicate their results. There is guidance in many places in the literature for this, from IPCC guidelines all the way to the remote sensing literature on this topic.

Regardless of the degree of success of the two requests above, which I recommend strongly, at a minimum the authors should clearly discuss the implications of using their data for modeling, with big warning signs to potential users of where they see the reasonable space of applications (i.e., clearly stating the boundaries outside of which "garbage in = garbage out").

I am attaching a number of more detailed comments in an annotated pdf of the submitted manuscript.

Best Regards,

Please also note the supplement to this comment:

<https://essd.copernicus.org/preprints/essd-2021-252/essd-2021-252-RC1-supplement.pdf>