

Interactive comment on “Use of various remote sensing land cover products for PFT mapping over Siberia” by C. Ottlé et al.

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We would like to thank Reviewer 1 for his/her relevant comments and suggestions to improve our paper, and for his/her corrections. We agree with all comments and addressed all of them as advised. All the changes were included in revision mode in the revised file and our answers to the specific comments and questions are presented below.

Specific reply to Anonymous Referee #1

General comments: The paper presents a methodology to compare global LC maps over Siberia with the further aim of PFT mapping. To my knowledge, this question is very rare while being critical. Indeed, it is not so common to pay so much attention to

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the input data (knowing their strengths and weaknesses, understanding their thematic content, etc.) even if the impact of the input data on the whole experiments is obvious. I would therefore recommend publishing this paper. Nevertheless, I would also encourage the authors to address with more emphasis the issue of uncertainty/validation and to widen a little bit the discussion (see specific comments). Specific comments - page 260, line 24: the authors indicate that the results explicitly address the uncertainties. I don't have the feeling that this uncertainty analysis is so much visible throughout the manuscript.

We agree that the uncertainty issue is not much visible in the paper and in fact, could not be addressed properly because of the lack of ground truth data. Our objectives are more focused on the assessment of dissimilarities between global products and the resulting potential impacts on climate modeling which will be the subject of future studies. We have modified this sentence in the revised version to avoid confusion. The final sentence is: “Our results are presented in terms of product comparison and final PFT mapping, with discrepancies explicitly addressed”.

- page 262 (lines 12-13): the authors mention that the GlobCover map used GLC2000 for training pixels. This is correct that GLC2000 is the main auxiliary dataset for the classification of the Siberian region, but not as training pixel. Indeed, the classification algorithm is unsupervised and thus does not rely on any training dataset. This is a key difference in terms of methodology with regard to all other products.

The sentence was corrected according to your comment and changed in: “GlobCover uses a fully automated unsupervised classification approach using GLC 2000 as main auxiliary dataset for the class interpretation.”

-section 2.3: could the authors explain how they interpreted the mixed classes of the different products?

The mixed classes of the different products were interpreted according to higher resolution products and images as it is now better explained: “The merging rules and the

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allocation of the ambiguous classes have been driven by the comparison of the spatial distribution of the land cover classes and the help of the auxiliary products, especially the high resolution maps (CAVM and the various Landsat images acquired on different sub-regions of Eurasia). ”

- when comparing the products, did the authors account for their accuracy? Indeed, there are published validation figures which have been obtained using independent reference data at least for GLC2000 and GlobCover. These figures exist for the whole product (overall accuracy) but also on a per-class basis.

The different global products have been indeed validated in various publications, but as noted in the introduction section, the respective accuracies much vary spatially even at regional scale, depending on the training datasets available within the respective developing team. Therefore an overall accuracy is not really reliable and cannot be used to rank the products. Since we don't have access to ground truth data on the studied region, we preferred in this work not to account for these overall statistical indexes.

- page 268, lines23-24: I would also say that the difficulty to identify croplands comes from the fact that the seasonality is not taken into account in the current classification methodology. This is a different topic that the use of only 1 year of data.

In fact, it was also what we meant. We have modified the sentence to be clearer, in: “The classification discrepancies between crops and sparse vegetation highlight the difficulties in separating such ecosystems if several dates per year are not used to assess the intra-seasonal variability, and if a pixel based classification technique is used.”

- section 3.5: the authors mention that some ecosystem properties can be / are derived from LAI. Were the different global products compared to the LAI products?

No, this has not been done because we focused this study on PFT mapping.

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Would it be more important to select the "best product" or the product which is the "most consistent" with the LAI data?

In our case, the ORCHIDEE model is not forced with LAI products, since LAI is calculated by the model. We use LAI products for validating this output variable. For a model which uses both land cover and LAI products as input, the consistency of the two products is certainly important and the relative impacts of the errors probably much vary with the land cover type and regionally. The larger the seasonal variability, the greater the impacts of inconsistency errors (probably but this should be checked carefully).

-page 270, lines 17-19: please note that the GlobCover regional legend is not spatially consistent. This level of detail was reached where auxiliary data were available but it is not ensured at the global/regional scale. Even in the regional products, the "global classes" coexist with the regional ones.

Thanks for this precision, which we added in the manuscript in Section 3.5: “In addition, GlobCover 2005 provides a more precise legend (compared to GlobCover 2009, even if this level of detail is not ensured globally) and an increased spatial resolution (compared to GLC 2000). “

- section 4.2, page 272: the MODIS VCF are not validated products. Can they serve as a basis to adjust vegetation percentages?

The MODIS VCF product has been evaluated in different parts of the globe and recently over Siberia by Montesano et al., 2009. They showed that the VCF product can be much valuable to assess the spatial variability, especially in transition zones. This reference is now discussed and added in the paper (see section 4.2).

- the authors mention in the introduction that there were already several studies about global products comparison. The authors mention that these comparisons were not carried out with a PFT mapping objective and can thus not be useful. I agree that they cannot directly help in identifying the correct LC map and LC class interpretation. Yet,

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it would be interesting to know if the approach followed by the authors results in the same kind of outcomes.

Yes, the PFT maps result in the same level of uncertainty. This issue is fully discussed in Poulter et al. (2011) which we referenced.

Could the author discuss their approach in terms of generalization? I find their approach highly valuable to ensure a correct utilisation of global LC maps and thus improve the ecosystems modelling. What would be their recommendations to do the same job in other regions of the globe?

PFT maps are needed globally, and the work needs to be generalized to the rest of the world. Ancillary products and especially high resolution products are needed to interpret classification legends regionally. Our recommendations would be to extend the methodology globally before the availability of new validated products. This work could be better done by the land cover producers themselves because they are better able to interpret regionally the classification legends, provided they could work together with ecosystem modelers, to better understand their needs given the regional dominant characteristics of the ecosystems needed for modeling and the climate model parameters sensitivities.

Technical corrections: -page 261: the paper mentions that Table 1 includes the classification legend while this information seems to be presented in Table 2. And there is no reference to Table 2 in the text. Should be clarified - Table 1 contains both "global LC products" and "auxiliary datasets" (according to the structure of the paper). It should help the readers to find a way to separate these 2 kinds of products in the table. - page 263: Table 1 includes the CAVM and the MODIS VCF, but neither the Fedorov's LC map nor the Simard's forest canopy height. Is there a reason? Logically, all products should be listed in the Table.

YES, sorry for this omission. Table 1 has been updated in the revised version and it lists now both the global and the auxiliary products. Table 2 is now properly referenced.

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- typo error in Table 1: for the GlobCover maps, the "WGS84" is in the wrong column

This typo error was corrected and was introduced when converting our tables in pdf format.

-Could the Table 1 include the validation figures of the different maps?

If the reviewer meant the global accuracy of the various products, as discussed before, we think that these indices are not reliable for our regional work. Then, we prefer as discussed in the introduction, not to give them.

- figure 4: using the same extent for the studies global LC maps and the LIDAR product would help the comparison.

Figure 4 was corrected to show the same area in all the subplots.

Same comment could be done for Fig. 2 but to a lesser extent.

Figure 2 has also been corrected and the analysis has also been modified in order to better guide the readers in the comparison.

– specific attention could be paid to acronyms (1 definition before using it and using all the time the same acronym)

We have tried to define all the acronyms before using them and hope that we did not forget any. The revised texte and figures are given in the attached files.

Please also note the supplement to this comment:

<http://www.earth-syst-sci-data-discuss.net/6/C145/2013/essdd-6-C145-2013-supplement.zip>

Interactive comment on Earth Syst. Sci. Data Discuss., 6, 255, 2013.

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