

# **Interactive comment on “ECOCLIMAPII/Europe: a twofold database of ecosystems and surface parameters at 1km resolution based on satellite information for use in land surface, meteorological and climate models” by S. Faroux et al.**

## **Reply to Anonymous Referee #1**

### General comments

This paper consists in the overall description and basic evaluation of the new ECOCLIMAPII product for Europe at 1km resolution. The method for building the ECOCLIMAPII ecosystems map is based on a stratification in landcover types and then a partition of fractions of 4 main surface types (nature, water bodies, sea, urban areas) and, inside the nature surface type, fractions of 12 Plant Functional Types (PFTs). The paper is very well written and is easy to read. I only have some comments and suggestions that would require minor revisions. For this, I recommend this paper for publication in GMD.

**We feel very indebted to the reviewer for having a thorough reading of the manuscript and her/his encouragements in the publication of this work.**

1. I believe that since this is a discussion paper on a methodology involving different types of data and stages, more effort should be made to adequately express the data and steps involved in this process (maybe by more expressive figures, see below).

**We share the concern of the reviewer. Hence, the new figure 1 has been inserted for the sake of an improved understanding of our step-by-step methodology. The next sentence has been added at line 6 after the beginning of Chapter: “Fig. 1 gives ... terminology.”**

2. Given that the paper proposes to talk about the amelioration of a global product already existing, the authors should spend some effort significantly enhancing the discussion of the new approach used in this work, the benefits etc. The authors must also mention the reliability of the ECOCLIMAPII product, and this should be reflected in the discussions. Otherwise, the comparison made between the old and the new versions of ECOCLIMAP at the end seems delicate. . .

**Actually, many details are already provided in sections 4.1 and 4.2 about the new approach. Merely, the improvement relies on an optimization of the number of clusters while avoiding as possible some overlapping between classes, which could have been the case with ECOCLIMAP-I. This beneficial effort is well supported by both pre-existing high-quality LC products and time series of biophysical products at the enhanced resolution of 1km. The next sentence has been added at the beginning of the second section of Chapter 2: “The widespread limitations ... climate zoning.”**

**The beginning of Chapter 7 (Stéphanie, il faudra modifier cela) has also been modified in order to address this concern of the reviewer.**

3. Furthermore, the discussions should answer the questions “what are the limits of the approach? do you plan to validate on other areas? what is the repetitivity of your methodology? is it an annual global product?”...

**We retain the point of the reviewer, which is to give a larger scope and perspectives to our study. In fact, we believe that the limits of the quality of the results of classification are already discussed in Chapter 5 for the different classes along with a comparison with higher resolution products. Regarding the method itself, it has no specific limit of application as far we have some pre-existing information and well-processed time series of observations, whatever is the spatial resolution. In this regard, the European domain can be considered as a test-bed given the pre-existence tools of validation when a global extension is foreseen in the future. The text will be revised to report on these issues.**

4. On my point of view, further validation would be necessary, but that would require additional data. New initiatives based on collaborative networks are starting to emerge that indicates enormous potential for land cover validation. A first such initiative is the GeoWiki Project, where volunteers are asked to review hotspot maps of global land cover mismatch and determine, based on what they actually see in Google Earth and on their knowledge of local situations, whether the land cover maps are correct or not. Inputs are recorded in a database, along with uploaded photos, to be used in the future for the creation of a new and improved hybrid global land cover map (Fritz et al., 2009, 2011). Your work would in turn benefit from the additional validation data available there.

Fritz, S. et al., 2011. Cropland for subSaharan Africa: A synergistic approach using five land cover data sets. *Geophysical Research Letters*, 38(4):L04404.

Fritz, S., I. McCallum, C. Schill, C. Perger, R. Grillmayer, F.d.r. Achard, F. Kraxner, and

M.Obersteiner, 2009. GeoWiki.Org: The Use of Crowdsourcing to Improve Global Land Cover. *Remote Sensing*, 1(3):345354.

**We do agree that the existence of Geo-Wiki Org web portal could be mentioned. The 1st suggested reference can't be included because it connects to a domain outside the present study area. But we will introduce the 2nd one and also will add a new one. That is:**

✳ **McCallum I, Obersteiner M, Nilsson S, Shvidenko A:** A spatial comparison of four satellite derived 1 km global land cover datasets.

*International Journal of Applied Earth Observation and Geoinformation* 2006, 8:246-255.

✳ **Fritz S, McCallum I, Schill C, Perger C, Grillmayer R, Achard Fdr, Kraxner F, Obersteiner M:** Geo-Wiki.Org: The Use of Crowdsourcing to Improve Global Land Cover.

*Remote Sensing* 2009, 1:345-354.

**This is clear that differences amongst land cover datasets will have an impact on climate simulations, which is the targeted objective of the study. For the time being, we believe that the accuracy assessment of our land cover product is already a significant step forward. To be outlined that in page 3576, it is enumerated the 4 existing land cover products at 1 km (IGBP, UMD, GLC2000, and MODIS) that are compared in the paper by McCallum et al., IJAEOG,**

2006. In fact, UMD and MODIS suffer from a lack of serious validation over Europe. On the other hand, IGBP is now obsolete. This is why only GLC2000 has been considered here. In this sense, it is believed that owing to a refinement of the moderate classification over Europe, strengthened by the comparison with HR FORMOSAT products, then ECOCLIMAP-II could be of added value for Geo-Wiki Org. The perspectives stressed in the last section have been reviewed accordingly.

Specific and technical comments :

p 3576 line 20 : ECOCLIMAP or ECOCLIMAPI ? To be clarified in the all paper.

**We use 'ECOCLIMAP' when we refer to the whole initiative, independently of the version number. We modified the text as follows in the Introduction in order to remove any confusion: "In addition to land cover classifications, the rationale of the ECOCLIMAP programme as a whole is to provide sets of surface parameters that are primarily useful in meteorology: ..."**

P 3583 line 16 : any reference ?

**Unfortunately, there is not reference available from peer-review journal.**

P3587 Line 18 : what is the meaning of "using the several classes. . . surface types"? Could you reformulate?

**The crossing information between our classification and other land cover maps was found to be of great benefit to convert the covers into functional types. The wording has been considerably reviewed here.**

Line 23 : what is the 3.2.1 section ?

**The text into brackets has be removed.**

Line 25 : homogenize the vocabulary => line 23 "covers" = line 25 "classes" ? Could you explain once in the paper (or with a scheme) the imbrication between covers => surfaces types / functional types => FTC => parameters ? You may simplify with a tree like this:

**This is a good suggestion. We could also add synonymous on the scheme:**

**covers = land covers = ecosystems = classes**

**surface types = tiles**

**plant functional types = vegetation types**

The new Figure 1 integrates this.

P3598 5.3.1 grid point = pixel of 1km ?

**This is correct. The text has been changed as suggested. Thanks for posting this comment.**

Fig3.  $RC < 1.5$  must be an example. Do not put any threshold if it varies from one cluster to another.

**We modified accordingly the figure 3 (now Figure 4) to let the threshold be more neutral.**

Figure 4. Could you add a loop notion? From  $i=1$  to  $n$ , Step 1 : P2 calculation Step 2 : P3 calculation Step  $i \dots$

**Thanks for the suggestion. The new Figure 5 integrates this.**

Fig8. Could you represent the region you talk about in the text? It could be more readable with another representation, i.e. the difference between ECOCLIMAPII C4 fraction and ISLSCP C4 fraction.

**We believe Figure 8 offered already a good vision where the major discrepancies occur, also their magnitude since the same colour scale is presented. However, the new Figure 9 (ex Figure 8) was improved for the ease of better understanding.**

Fig9. The grey background does not help to clarify your point ! Homogenize the number of curves on your graphs. About the 1 to 12 classes, where is the legend?

**This new figure 10 integrates these changes. The classes numbered 1 to 12 are in fact the 12 main classes that are present on the FORMOSAT image.**

Tab2. How did you deal with the different spatial resolutions? It should be mentioned in the text.

**All products were generated at the same spatial resolution and re-projected on the same grid. The text has been improved when introducing Table 2. Thanks for the comment.**

**Fig. 1.** How to better explain the imbrication between covers => surfaces types / functional types => FTC => parameter ?

**Figure 1 has been improved to comply with the comments of the referee.**

