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Biogeosciences Discussions

Interactive comment on "Consistent EO Land Surface Products including Uncertainty Estimates" *by* Thomas Kaminski et al.

Anonymous Referee #2

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General Comments:

The paper presents a sound application of the previously developed Joint Research Center Two-stream Inversion Package (JRC-TIP) to retrieve radiatively consistent land surface products, specifically all radiant fluxes (absorbed, transmitted and reflected) and LAI and FAPAR state variables, that are compliant with climate and numerical prediction models. Full and robust uncertainty estimates are also provided both for the state variables and the fluxes. The authors show that global-scale processing is also achived in an extremely efficient, robust and agile computational way. The JRC-TIP retrieval system also provides aggregated coarser grid products that are better compliant with continental to global-scale terrestrial models. They also describe various approaches to validation of the JRC-TIP products, including the comparison with in-situ observations from dedicated instruments/sites.

Specific comments following the requested aspects:

1. Does the paper address relevant scientific questions within the scope of BG? Yes, the paper shows the suitability of the previously developed JRC-TIP retrieval system to provide land surface parameters, including their respective full and rigorous uncertainty information, ready for assimilation into climate and numerical weather prediction models. The paper demonstrates this for LAI and FAPAR, also providing their lower resolution coarser aggregated products and validation performance, even with in situ dedicated instruments.

2. Does the paper present novel concepts, ideas, tools, or data? Yes, the paper shows the robustness and efficiency of the JRC-TIP package which could also be applied to new Copernicus products.

3. Are substantial conclusions reached? Yes, definitely: âĂć Flexibility of JRC-TIP to deliver radiatively consistent land surface products including their fluxes (absorbed, transmitted and reflected) suitable for assimilation into terrestrial models âĂć Rigurous estimation and fully traceability of the uncertainty both for the state variables and for the simulated fluxes âĂć Computationally efficient, robust and agile global-scale processing âĂć Provision of aggregated coarser grids products better compliant with climate models âĂć Possibility of various approaches to validation, including in-situ observations from dedicated instruments/sites

4. Are the scientific methods and assumptions valid and clearly outlined? Yes. It should be mentioned that the detailed scientific explanation of the inverse modelling approach requires high knowledgable proficiency on the matter. The excellent scientific basis of the senior co-authors guarantees this. They are absolute reference in the field.

5. Are the results sufficient to support the interpretations and conclusions? Yes. The work is presented for LAI and FAPAR. However, the title is ampler mentioning "Land Surface Products" in general. A minor suggestion is to better specify the title. The work has not been tested for many other different land surface products (soil moisture,

evapotranspiration, etc).

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Yes, but it is required that fellow scientists trying to reproduce the work should be proficient in the matter, as indicated in #4. Besides, the authors make the C and Fortran versions of the code available upon request.

7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Yes. This is recognised in the generous and appropriate reference list, as well as in the Acknowledgment section.

8. Does the title clearly reflect the contents of the paper? The title is more general that the applications actually shown in the paper. As indicated in #5, the title mentions "Land Surface Products" in general. However, the application is only for LAI and FAPAR. It is suggested to be more specific in the title.

9. Does the abstract provide a concise and complete summary? Yes, the abstract is very well and clearly written.

10. Is the overall presentation well structured and clear? Yes.

11. Is the language fluent and precise? Yes, as far as this referee may judge.

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Yes.

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? A minor suggestion is to unify the format and style of the figures, namely Figure 3, Figures 4 and 5, Figure 6, and Figures 8 and 9. They are all graphs but seem having been processed with different tools. They should be homogeneised. Besides this, Figures 6 and Figure 8 and 9 should be moved forward, closer to their respective texts, because now they are behind the References section. Figures 8 and 9 are very small, as compared to the previous ones, and difficult to be read.

14. Are the number and quality of references appropriate? Yes, the list is quite generous and appropriate; references are cited timely in their correct place.

15. Is the amount and quality of supplementary material appropriate? Yes, as mentioned earlier, the authors make the C and Fortran versions of the code available upon request.

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