

Interactive comment on “Global sensitivity analysis, probabilistic calibration, and predictive assessment for the Data Assimilation Linked Ecosystem Carbon model” by C. Safta et al.

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Dear Editor:

We herewith submit our revised manuscript, “Global Sensitivity Analysis, Probabilistic Calibration, and Predictive Assessment for the Data Assimilation Linked Ecosystem Carbon Model”, by Safta, Ricciuto, Sargsyan, Debusschere, Najm, Williams, and Thornton for publication in the Geoscientific Model Development. The original manuscript had been returned to us after a round of reviews, with requests for major modifications. The reviewers had also posed some questions to us.

We have gone over the reviewer comments in detail. We have benefited much from
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many of the reviewer comments, shown in cursive font in this letter, and have incorporated them in the revised text. Our detailed responses are shown in normal font immediately following each question.

We feel that we have addressed all comments, and have done the major revisions to the paper consistent with the Editor’s and reviewers’ requests. Some of the major changes are briefly described on the next page.

We respectfully ask the Editor to reconsider the revised paper.

Sincerely,

Cosmin Safta

A brief outline of major changes in the current manuscript compared to the previous version is provided below.

- We reduced the size of the Introduction. We refocused the paper to emphasize the comparison between the steady and transient model setups. This comparison is now the focus of all Sections in the revised manuscript.
- In the GSA section we replaced the discussion of first-order Sobol indices, S_i with total effect indices, S_i^T . We believe that total effect indices, which include the first order effects and the joint and higher order interaction effects, provide a better picture on which parameters matter for specific quantities of interest.
- In the current version of the manuscript we employ informative priors for all model parameters. These priors are described in Section 4.3. In addition to the model calibration study, these priors were also used in Section 3 for Global Sensitivity Analysis.
- The model error is no longer ignored in the current version of the manuscript. We discuss the modeling associated with the statistical model error term in Section 4.2. In Section 4.4.1 we present a convergence study for the parameters controlling the model error.
- Given the new emphasis on steady state/transient model setups, we removed the section Fisher Information matrix (FIM) and subsequent discussion and results based on FIM. Overall the length of the paper, not including figures and tables, increased by one page due to the substantial increase in the discussion in other parts of the paper.

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- All figures and most of the associated text, except perhaps the sketches, were updated in the revised manuscripts to account for the changes in priors and model error term. We reduced the number of figures by two, from 19 to 17.

Please also note the supplement to this comment:

<http://www.geosci-model-dev-discuss.net/7/C3673/2015/gmdd-7-C3673-2015-supplement.pdf>

Interactive comment on Geosci. Model Dev. Discuss., 7, 6893, 2014.

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