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Geoscientific Model Development Discussions

Interactive comment on "Global Evaluation of Gross Primary Productivity in the JULES Land Surface Model" *by* Darren Slevin et al.

Anonymous Referee #1

Received and published: 24 October 2016

Title: Global Evaluation of Gross Primary Productivity in the JULES Land Surface Model

The authors confirmed the performance of JULES version 3.4.1 in this study. The main analyses are 1) evaluating an effect of different biome type on GPP, 2) comparing GPP among 0.5, 1 and 2-degree grid resolution, 3) examining GPP using three kinds of climate dataset. By using satellite observations, the model estimates were assessed. Unfortunately, I feel like it is a summary of technical reports. Much improvement can still be made to make it clearer and more concise.

General comments; I can't understand the novelty of this manuscript. I agree that the novelty is the performance confirmation of JULES. Please rethink why the authors would like to show others the original results via this manuscript. And, for all things,

if the content is related to just JULES unique performance confirmation, it might not directly help the reader's scientific knowledge. At such times the authors need to improve the explanation by changing the standpoint. Please rewrite the manuscript to serve to help the readers in getting maximum benefit from what the authors revealed.

Please organize all the information of the model introduction. The authors wrote them in 1. Introduction section and 2.1 Model description. Naturally the 2.1 section should be included contents directly related to this study's discussion, and omit the explanation that had little to do with this study. For example, the authors wrote the interminable explanation for the GPP calculation method, but the reader can understand several author statements in discussion section without such knowledge; there is no explanation about spatial resolution as model structure. . .etc.

Please more explain why the authors used different climate dataset. What of the JULES GPP estimate do the authors reveal? Why did you examine just sensitivity to each dataset? (why didn't you choose the sensitivity to each meteorological parameter?) Please add the comparison among three climate datasets into results. I can't understand the impact of climate dataset on GPP (e.g., fig. 2, 3. . .), because I don't know the difference of the climate dataset specific feature related to this study. Moreover, please add the explanation of the relationship between JULES and the meteorological parameters in 2.1 Model description section. It means, the reader would like to know the model structural interpretation in discussing what types of calculation approach to choose.

The authors should organize first and second paragraph of "1. Introduction". The authors should integrate the two paragraphs into one. P1 L19-20: delete the sentence (Changes in atmospheric CO2. . .). P2 L2 and L4: "location of" -> reservoir in? P2 L3: "Changes in the land surface" is not clear. P2 L7: "models and observations (Friedlingstein" -> the existing studies (e.g., Friedlingstein. . .

The explanation relevant to data used is strange format (P5 L10-P7 L21). For example,

why is parameter's unit necessary here? most explanation of "P6 L28-P7 L9" is for the Zhao's work, not this study. After downloading the data, what did the author do as the data pre-processing? The explanation directly related to this study (P7L13-21) should be written at the start of the paragraph. . .etc.

P10 L19-21: The statement does not match with fig. 3. It is significant mistake.

P15L13-14: "In general, CARDAMOM was better at simulating GPP than JULES." Please present factual evidence if the statement is correct. The dataset is created with ground observations, and the empirical method is used to expand it from point to spatial data; CARDAMOM may include some significant error.

Fig. 7: As everybody knows, accuracy of the satellite observations is essentially not good at low latitude because of bad observed condition by cloud cover. The authors should represent the difference of GPP in not only low latitude but also other region. Since the evaluation data is global scale, you can do the comparison at global scale. If you keep the way to compare your results with others at just low latitude, please explain the reason.

Abstract; L6: delete "it was found that" L8: delete "fluxes" L9: delete "It was found that L9: between -> among L9-11: this sentence is not clear. L12: what is the meaning of "no impact"? Please add the quantitative interpretation.

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