



EGUsphere, referee comment RC1  
<https://doi.org/10.5194/egusphere-2022-1196-RC1>, 2023  
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## **Comment on egusphere-2022-1196**

Anonymous Referee #1

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Referee comment on "Description and evaluation of the JULES-ES set-up for ISIMIP2b" by Camilla Mathison et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-1196-RC1>, 2023

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The authors provide a description of the JULES-ES model used as part of the ISIMIP project. The paper is overall well-written and easy to follow, with a fairly detailed description of key model processes and the model set-up. The authors also present an evaluation of present-day model performance to indicate its skill in simulating key ecosystem and water cycle processes. It was particularly great to see the authors using the ILAMB evaluation tool for this purpose as it forms a useful basis for benchmarking any future JULES developments against JULES-ES in a transparent way. Overall, I do not have any major concerns about the manuscript and recommend it for publication subject to some minor revisions.

Specific comments:

L12: Best to spell out what ISIMIP2b stands for (a few other abbreviations in the abstract -GCMs and GPP- are not used and thus not needed)

L30: what do you mean by "representing impacts"?

L39: Intrigued to know why JULES-ES is more efficient than the UKESM version? What are the main differences?

L40: I think you mean uncertainty in climate forcing and its impact on land? Otherwise I don't quite follow the "land surface forcing" terminology as you only use one LSM

L61: should this say "lower" carbon assimilation rates?

L65: C4 grasses twice

L82: would be good to briefly discuss how realistic it is to assume identical physiology?

L109: Do you mean the TRIFFID time stepping?

L133: Suggest rewording "they are consistent" because it implies that the different ISIMIP2b scenarios are consistent with a >2deg world but this is not true for RCP6.0. I

thus found the sentence a little confusing

L136: historical ends in 2005?

L142: should be post-2005?

L141-2: this reads like only the period 1979-2013 was bias-corrected?

L143: Reference should be in brackets

L145: Need to mention all variables that are bias-corrected, this suggests only humidity etc. were

L148-9: Again this reads like only the reference period was corrected, is this correct? Also a bit confused by each GCM having a "different variability and climate" outside of reference period, would this not also be true during the reference period? Perhaps consider rewording some of this section as I find it challenging to follow

L163: check grammar

L164: historic -> historical

L170: could you very briefly explain what a suite is for those not familiar with JULES

L179: Please explain what TRIP is

Figure 1: suggest reverting colours, red normally implies too little water

L193: Also other southeast Asian catchments?

L193: I don't quite follow how water extractions "disproportionally affecting groundwater depletion" leads to high runoff biases? Also what about other model processes that might be missing, such as river channel evaporation and transmission losses?

Figure S2: needs units

Figure S3: monthly precipitation? And are the units mm/month?

Figure S4: the panels and legend are far too small to read, and the righthand panels are cut off.

L205: is the ET bias shown anywhere? If so, refer to a figure

L216: off -> of

L230: typo

L230-232: Any thoughts on what might be causing these albedo biases?

L238-9: check sentence and reword

L240: global bias in shrub?

L247: Perhaps worth mentioning here again that fire was only turned on in a subset of simulations, and not in the official ISIMIP submissions?

L255: any idea why you see these biases?

L263: spatial distribution of what?

L267: GPPs -> GPP's

L268: would be useful to know compared to what observed value?

L270: models' -> model's

L274: Can you briefly state what these well-documented biases are?

L284: do you mean the seasonal cycle?

L298: results -> this results

L300: none -> non

L305: a bit of a confusing statement (number of trees may lead to higher or lower albedo)

L313: fix brackets

L317: which areas and impacts where?

L332: even for hydrological applications with Q simulations degraded?

L560 and L565: I think you provided a different reference elsewhere in the text?

L561: why weren't longer observations used where available given the GCMs have their own IAV, making a longer evaluation period preferable?

Figure3: this would be easier to read if the "observed" legends were directly below those panels. Also check albedo unit ("unknown"). Also best to avoid red-green colour schemes

L574: datasets -> datasets

Figure 5: No need to repeat legend 5 times? Also would be helpful if the model maps were shown as biases from obs as in previous figures.

L588: Do these show the ensemble mean?