Interactive comment on "Impacts of future deforestation and climate change on the hydrology of the Amazon basin: a multi-model analysis with a new set of land-cover change scenarios" *by* Matthieu Guimberteau et al.

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Opinion:

This study explores how climate change and deforestation would impact the hydrology of the Amazon basin for this century, using three land surface models, three general circulation model simulations, and three (new) land cover change scenarios. The topic is quite interesting and relevant. Overall, the manuscript is well-written and well-structured. I recommend publishing this manuscript in HESS, pending some minor revisions.

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Please see the comments below:

Major Comments:

[1] Use of the new LCC scenarios is novel in your study. Therefore, it is important to provide some literature review indicating how different your results are compared to the previous studies. You discuss Siqueira Júnior et al. (2015) in Page 11 Line 32. I suggest you provide this type of examples more often so that the manuscript is well set within the context of the existing literature.

[2] Include a discussion on why you selected the three models. I have seen that you have provided details about individual models in the supplementary materials, however, a discussion is warranted on why these three particular models were selected. How are the models different from each other and why does that difference matter? Discuss why you think that multi-model approach is better than selecting the single best model (based on historical simulation performance).

[3] Are the LSMs calibrated? It is really difficult to trust a model if it is not calibrated and evaluated. As you know, model outcomes are subject to vary (often significantly) if the parameter values are changed, given that the model structure is fixed. So, model calibration/evaluation is crucial for any model simulation-based studies. Having said that, I understand that calibrating three LSMs might be difficult. However, you should at least show how consistent the model simulations are. For this study, it would be essential to compare the historical simulations of discharge and ET from all three models against the observed data. You show historical discharge in Fig. 14, however, one of the three models is missing. I suggest you expand the discussion in Section 2.1 to address the model-related issues stated above, and add a new sub-section in Section 3 (Results) to show the historical simulation performance of the three models.

Minor Comments:

[1] Page 2 Line 24: Please add citations.

[2] Page 2 Line 27: Please add citations.

[3] Page 3 Line 16: Please state what you have done more clearly. Whether you have used a 3D matrix or not is probably not that important in the introduction section. I suggest you avoid this type of technical detailing in the introduction section and focus on them more in the 'Materials and Methods' section.

[4] Page 6 Line 2: Any specific reason for selecting these two periods?

[5] Page 8 Line 18: I see a huge difference in between-LSM ET simulations. I wonder how much of this variability is attributed to improper model calibration. Any comments?

[6] Page 31 Fig 12: How is the 'range' defined here?

[7] Page 33 Fig 14: Why are there only two models?

Figure Related Comments:

[1] Fig 1a: The axis labels and ticks are not very clear.

[2] Fig 8: The plot legends are too small. Maybe use one set of legends instead of four with a larger font?

[3] Fig 13: Maybe change the color for transpiration?