

Earth Surf. Dynam. Discuss., referee comment RC1  
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## **Comment on esurf-2021-63**

Anonymous Referee #1

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Referee comment on "Climate changes and the formation of fluvial terraces in central Amazonia inferred from landscape evolution modeling" by Ariel Henrique do Prado et al., Earth Surf. Dynam. Discuss., <https://doi.org/10.5194/esurf-2021-63-RC1>, 2021

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### General comments

This is an interesting and well written paper addressing the conditions under which river terraces are formed – both a 'classic' problem as well as one with specific relevance to the Amazon basin.

At the outset I should say that I am not a modeller and not really qualified to comment on the model. Like me, others may appreciate a change to the title that clearly indicates that this is a modelling paper, not a paper with new field evidence.

### Specific comments

The authors model three scenarios and how they may impact terrace formation (aggradation and degradation of the channel and floodplain). Two of those scenarios explore changing climate conditions: one where conditions become wetter and one where conditions become drier. The third scenario explores base level change. The results are interesting and provide some food for thought, particularly in how these results may (or may not) be applicable to other lowland river systems.

I wonder if the authors considered exploring a broader range of conditions (in effect, a sensitivity analysis)? For example they use modern Amazonian precipitation as an initial condition and vary it by +/-30%. What are the model results if 2000 +/- 30%, 1000 +/- 30% etc are used?

Second, sediment discharge is dependent on water discharge using a regression based on modern observational data (line 265) but I am left wondering how valid this is under past climate regimes, especially where sediment delivery to rivers may be significantly different to today (line 480-490)?

Finally, with regard to the larger, higher terraces compared with the smaller, lower terraces: I wonder if different mechanisms are required or if this is just a product of their differential preservation as a function of their age? If you like, an example of the Sadler effect where there is more preserved accumulation (and small scale detail) in recent sediments where older sediments have been 'edited' to leave only the broader/larger signals. Just an idea.

Technical corrections

See PDF

Please also note the supplement to this comment:

<https://esurf.copernicus.org/preprints/esurf-2021-63/esurf-2021-63-RC1-supplement.pdf>