

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
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Comment on hess-2021-453

Geoff Pegram (Referee)

Referee comment on "Stochastic daily rainfall generation on tropical islands with complex topography" by Lionel Benoit et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-453-RC2>, 2021

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Review

What a pleasure to read a hydrometeorological article bringing innovation and appropriate explanation in estimating, through resampling using valuable tools, spatially and temporarily highly variable precipitation on O’ahu, ready to be used in other counties with variable topography. I have enjoyed the journey and am pleased to have reviewed it.

There is nothing much else to add, so I am returning my marked-up copy of the document. In addition, I am repeating a few of the less trivial remarks below my signature, which is my wont.

I recommend resubmission of a revised version in due course.

Geoff Pegram

07 October 2021

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IN DETAIL

In the following panels, I will note my remarks on text and figures preceded by the line number and followed by my remarks headed by #.

71

A very useful introduction

89 storm

(seasonal cyclones)

101 Figure 1: Main features of rainfall observed over the island of O'ahu

Nice informative figure caption as are all of the others

112 Figure 2: Overview of the structure of the stochastic rainfall model

explain what you are doing more fully - also, how do you explain the *almost* perfect antithesis? What do the 'covariates' mean? What do you mean by: "will be discussed in detail later" in line 110 above? - Where? Aha - you refer to Fig. 2 (not Figure 2) in the following paragraphs -confusing

2.2.2 Meta-Gaussian representation

'Meta' can be used as an acronym for "most effective tactics available", so how you define it in this context, as it is unusual and I had to hunt for it in the web?

142 Eq. (2)

That's clever

286 Figure 3: Rain types identified for the island of O`ahu

Figure 3(a) is too crushed for a person to read the busy text in comfort. Please enlarge it and relocate 3(b) below. Your paper is short enough not to force the shrinkage.

295 ... (Fig. 3, rain types h-q)...

Types h-q are labelled above by fading green captions and r-v are fading red - why? A distraction - please change them to monochrome black

321 Figure 4: Ability of the model to simulate site-specific rain statistics on O`ahu.

I do not understand why you have a column (in (d)) of simulated values of near 125 mm/day and your simulated range is up to about 450 - same comment for the rest of the panels. (a), (b) & (c) are easy to follow ...

334 covariates properly capture rain type occurrence in a tropical marine climate

That's pretty convincing

355 Figure 5: Assessment of island-scale statistics simulation in O`ahu

Good work - the spread of mean and max daily rainfall are interesting - how do you account for the bias of the top-end in (d) with the max observed at 500mm? The text below does not comment on this.

Comment on the Supplementary material: Figure SM2.4: Assessment of island-scale statistics simulation in Tahiti.

This image is confirmation that the techniques were a success on Tahiti, transferred from your work on O'ahu. I suggest that you take a clip of the image [from (b) to (e)] to show us the value of your technique; the supplementary material is likely to be checked by few readers, so you need a teaser!

415 4.2 Concluding remarks

I think that this model will not be confined to tropical islands. I can see applications in my country, South Africa, where we have high coastal mountains in the East rising to 3000m flattening through dryer areas towards the North West. Check the figure from our work ; precip. max of 2000mm: "The gridded Mean Annual Precipitation averaged over each of the 1946 quaternary catchments in the region" in:

Pegram GGS, Scott Sinclair and András Bárdossy (2016). New methods of infilling Southern African raingauge records enhanced by Annual, Monthly and Daily Precipitation estimates tagged with uncertainty. *Water Research Commission*, WRC Report No. 2241/1/15 ISBN

455 References

Please include doi's where available

561 Scott, D. W. (2010), Scott's rule, *WIREs Computational Statistics*, 2, 497-502.

doi:10.1002/wics.103

This find required a wild goose chase through the net but, eventually for your information, I found the original:- SCOTT, DAVID W. (1979). On optimal and data-based histograms. *Biometrika*, 66(3), 605-610. doi:10.1093/biomet/66.3.605

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Please also note the supplement to this comment:

<https://hess.copernicus.org/preprints/hess-2021-453/hess-2021-453-RC2-supplement.pdf>