

## ***Interactive comment on “Temperature effects on heavy rainfall modify catchment hydro-morphological response” by Nadav Peleg et al.***

### **Anonymous Referee #1**

Received and published: 8 October 2019

As far as I am aware this is the first manuscript examining the effects of changes to spatial rainfall patterns under climate change. I believe this is a very important contribution because, as interesting rainfall changes are, it is the on-ground impacts that are really of key importance. Some small comments below (suggestions are at the authors discretion).

Minor comments:

Section 4.2: I got a bit confused here because I thought case 3 could be either where mean rainfall increases by 3% or 7%. I only realized what case 4 was in Section 5.2. Can “case 4” be added to Figure1 and the cases (1-4) be labelled in Table 1?

C1

I don't entirely agree with there just being two options for spatial rainfall downscaling (i.e. CPM or rain-temperature sensitivities). Some authors use stochastic methods (Bordoy and Burlando, 2014) others use RCMs directly with varying convective parametrizations which will affect the results (Li et al., 2018).

Bordoy, R., Burlando, P., 2014. Stochastic downscaling of climate model precipitation outputs in orographically complex regions: 2. Downscaling methodology. *Water Resour. Res.* 50, 562–579. <https://doi.org/10.1002/wrcr.20443>

Li, J., Wasko, C., Johnson, F., Evans, J.P., Sharma, A., 2018. Can Regional Climate Modeling Capture the Observed Changes in Spatial Organization of Extreme Storms at Higher Temperatures? *Geophys. Res. Lett.* 45, 4475–4484. <https://doi.org/10.1029/2018GL077716>

Line by line:

# Title: add “spatial structure” somewhere?

# Page 1, Line 11: “small-scale resolution . . .”

# Page 3, Line 16: “The second option” -> “An alternative”

# Page 4, Line 6: “on the hydro. . .”

# Page 9, Line 13: “is simulated” -> “can be simulated” (because later you choose one method)

# Figure 5 caption: “km” -> “m”

# Page 12, Line 15: Could you add the domain to Figure 5?

# Page 13, Line 5: “corresponds” -> “corresponding”

# Page 15, Line14-18: Could this be moved up to follow the first sentence in this section? Just fits better with the point made in the first sentence.

# Figure 8 caption: “black” -> “grey”?

C2

# Page 16., Line 18: 10% of what?

# Figure 9: could add zero, zero guide lines

# Page 18, Line 17: “considerably increased”. Feels like this result is interesting and could easily be included in Table 4?

# Page 19, Line 9: “demonstrate” -> “demonstrated”

# Page 19, Line 19: Section “4.4”

# Page 21, Line 4: “by small-scale changes in the rainfall spatial structure. . .”

# Page 21, Line 33: “A viable alternative presented here is . . .”

# Page 22, Line 7: You use 10 stochastic replicates – could mention this here.

# Page 23, Line 10: Add the words “under climate change” before “as was done here”?

# Figure S3: can you add to the legend if this is an example of a stratiform or convective storm?

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Interactive comment on Earth Surf. Dynam. Discuss., <https://doi.org/10.5194/esurf-2019-44>, 2019.