

REVIEW of « The ability of a stochastic regional weather generator to reproduce heavy precipitation events across scales », by X Guan et al.

This paper presents the application of two statistical methods to evaluate how a recently updated « non stationary Regional Weather Generator » (nsRWG) produces heavy rain events over Germany.

The manuscript well explains the main features of the nsRWG and describes exhaustively the statistical methods used for the evaluation. I recommend publication in NHESS once the minor comments below have been solved.

GENERAL COMMENT

It would be highly beneficial for non expert readers to give more references useful for the physical interpretation of values of WEI and xWEI, i.e., examples of how the values of WEI and xWEI link to extreme event extension and duration. This can be added/extended in the Methods and Results and Discussion Section (although in section 4.2 an example is already mentioned).

TECHNICAL COMMENTS

Lines 53-55 : Merge or connect sentences – it is not evident that they are discussing the same issue.

Lines 119-120 : Specify that « SANDRA » is used to classify / cluster the circulation patterns.

Lines 129-130 : Specify that WEI is computed for each HPE !

Lines 133-134 : Clarify that E_{tA} is computed once for every value of A. Moreover, the dependency of A on n should be expressed in Equation 1.

Lines 165-170 : In my opinion this paragraph, explaining why sub-daily precipitation is not considered, can be easily compressed as a note of a couple of lines, since it is a limitation, and not relevant for the discussion of your results.

Lines 185-187 : The last two sentences are not coherent with each other. Please adjust.

Lines 197-198 : observed WEI is underestimated also for duration > 4 days and return periods between 10 and 20 years.

Line 200 : Is it worth mentioning here that the return period increases with duration, when considering fixed WEI values?

Lines 219-222 : How are the synthetic events in the comparison selected? Is there a way of selecting these based on the highest similarity in the WEI surface profile (i.e., sampling similar events in terms of extent and duration) ?

Line 248 : Doesn't it underestimate the frequency, since the return periods for the same WEI value are higher in the synthetic data?

Line 257 : Explain briefly what spatial counterfactuals are.