> [EDITOR]: Dear authors,
>
> Two referees have reviewed the revised manuscript, they were satisfied with the way comments have been addressed. Only minor editing suggestions remain, I invite you to have a look at these and revise the manuscript accordingly.
>
> Additionally, please have a look at the following references, as they seem to be relevant to your work: Versini et al. 2016 (doi: 10.2166/wst.2016.310); Gires et al. 2020 (https://doi.org/10.1080/02626667.2020.1736297)
>
> The revised manuscript will be subject to editor review only.

We thank the editorial team for their support during the reviewing process. The reply to the reviewer comments can be find below. Regarding the suggestion of the editor, Gires et al. 2020 (https://doi.org/10.1080/02626667.2020.1736297) was found very relevant for the current study and therefore added to the current mansucript. Regarding Versini et al. 2016 (doi: 10.2166/wst.2016.310), it was considered by the authors slightly out of the scope of the current paper, the study looks at catchment scale implementation of green infrastructure which lead to different challenges than the modelling of green infrastructure performance at site scale (in the current manuscript), even if the two fields are closely linked. Please note that in accordance with the reviewer comments, several references have been added to strengthen the scientific basis of the study.

Please note that a typo in a formula in the appendix has been corrected, it can be found in the track change. Several other typos or reference issue have been fixed.

> [REVIEWER #2]: I was reviewer #2 of the initial submission of the manuscript. Most of my comments have been addressed and I believe that the paper can now be published after few minor changes that do not require a re-review.
> (I am using line numbers of the manuscript without track change)
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> - It should be clearly stated form the abstract that parameters are tuned according to the cascade step, meaning that the underlying idea of scale invariance associated to (multi)-fractal fields is not respected.

It has been clarified.

> [REVIEWER #2]: - If parameters change with cascade step; how can you be sure that the ones for the small scales in the future (which are unknown) will remain relevant ? This should be discussed and mentioned.

That is the main hypothesis underlying behind the use of Temperature as a predictor. Since the some precipitation pattern are correlated to some temperature range, the shift in temperature is likely to lead to a shift in parrten which suggest that temperature based MRC have higher robustness. It is also found in this paper that, in most of the location, it did not lead to a significant difference wether temperature is used or not as a preditor. This was briefly discussed L 280, and has been improved according to the reviewer comment. This was clarified in section 2.2.3 and further discussed in 3.2

> [REVIEWER #2]: - There are few typos that should be corrected as for example l.31 (therefor → therefore) or l. 117 (consists → Consist), or l. 422 Eq ?? (the equation number is missing)

This has been edited accordingly.

> [REVIEWER #2]: - l. 31-32 : it not only a question of computational power, but also of parametrization of the physical process which will still be needed since it will not be possible to go down to kolmogorov scale anyway in the near future.

That remark is very relevant and has therefore been added to the manuscript together with a reference to support that point (https://doi.org/10.1002/qj.2640).

> [REVIEWER #2]: - Introduction : some historical perspectives on MRC are missing. Reminding earlier references would be appreciated in terms of scientific context.

Thank you for that comment, those aspects has been added together with several reference (e.g. : Schertzer and Lovejoy, (1987) Gupta and Waymire (1993) Olsson (1998))

> [REVIEWER #2]: - l. 80-85 : please explain where does this specific scenario stands among the others ?

RCP8.5 was selected because it leads to a greater shift in temperature. Therefore, the effect of Temperature as a predictor would be more noticeable. The specificity of that scenario regarding climate forcing and gas-emissions has been added.

> [REVIEWER #2]: - Eq. 1 and 2 : please add the range of possible values for i and j

"j" stands for the time-scale so is between 1 and 750. The typical notation refers to the cascade level (k, see, e.g.: https://doi.org/10.5194/npg-17-697-2010) but in the case of the current model the time-scale is preferred since it is possible to downscale from hourly as well as from daily which would make the notation ambiguous.

"i" is the time-step, it is conditioned by the size of the original time-series and the time-scale "2j", if j = 1440 min and a dataset of 10000 days, then "i" is in [0, 9999]. This has been clarified.

> [REVIEWER #2]: - l. 124-125 : what is the meaning of the sentence "The generators of the MRC models were all time-scale continuous. In practice it means that there is a single set of parameter per generator and not a set per disaggregation step which ensured a parsimonious number of parameters compared to other recent works" ? Please clarify. It may be worth mentioning that other processes truly scale invariant (i.e. no tuning at each step of the distribution) rely on much less parameters as for example the Universal Multifractals (only 2 parameters). Please clarify number of parameters per cascade steps as well.

In the current approach the data analysis lead to observed statistics that depends on time-scale. The microcanonical MRC model used, similarly to Rupp et al. (2009) (doi:10.1029/2008WR007321) a direct analytical formula was found to include the time-scale dependency. This lead to the use of a single set of parameter for the entire process: the formula allow to rescale the distributions used with respect to the time-scale. This sentence has been accordingly reformulated.

The number of parameters per cascade scale is not relevant given the clarification above, but one could argue that given a time-scale, 1 parameter corresponds to the SEP generator (probability of permutation), 1 to 3 parameters for the Zero generator (probability to have a weight equal to zero) and one parameter for the non-Zero generator (sigma). for 8 level it would lead to between 24 and 40 parameters which might be seen as close to the final number of parameters in the parameter set but does not have the same regularity and is subject to more uncertainty.

> [REVIEWER #2]: - 2.2.3 : Please provide more explanations on the reasoning that lead to the choice of calibration process ?

The calibration was driven by the dataset analysis in the context of model development. A lot of data proceeding was necessary, it makes the calibration process intuitive from the data analysis perspective but also subject to significant possible improvement in case of model distribution.

> [REVIEWER #2]: - Section 3.1 and Fig. 2 : since as mentioned in answer to referees “observed” is actually “simulated with observed rainfall”, it should be clarified what you are calling model validation without actual discharge measurement if I am correct.

For the green roof testing, the discharged is observed/measured. What was mentioned in answer to referees was about the testing of the MRC models. It has been clarified in the methods.