

Interactive comment on “The benefits of increasing resolution in global and regional climate simulations for European climate extremes” by Carley E. Iles et al.

Anonymous Referee #1

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The paper, in general, is well written and the authors attempt to solve a very critical issue regarding the added value of increasing resolution. However I do have some issues regarding the dataset used and some of the methodologies applied, hence I recommend major revision.

Here my major comments:

a) All the datasets used to compare the models' output are labelled as observations when, in reality, they are not, they are reanalyses. So I wonder why the authors chose a reanalysis when there are real observational datasets, like GPCP, CHIRP or TRMM. I do know all those datasets have some caveats, but they are derived from direct obser-

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ervations, (and most of them are of the same resolution like the one that the reanalysis used in the paper). At least for precipitation and temperature, I suggest that the authors re-do the comparisons with some of the observational datasets mentioned. For wind, I understand that there might not be another option that the one that they used.

b) I do not understand why the authors chose to use climatological means of Txx and Rx1day. Would not be more useful to have seasonal maps? Mostly for precipitation, as extremes, can occur either in summer or in winter but by very different processes. In this way, we could have seen which type of seasonal extremes are better (or worse) capture and this might also complement the results of the analogues.

c) On the same idea, why to use a 5-day average (line 568) mainly for precipitation, given the fact that by doing that you are smoothing the extreme event that normally would last one day. For temperature, it might not be a problem, considering that heat-waves per definition last several days (at least 3).

General comments:

1. Line 40, please define what do you mean by “small scale”, do you mean synoptic, mesoscale?

2. Line 60, remove “really”

3. Line 62, added to the list of reference: Risanto, C.B.; Castro, C.L.; Moker, J.M., Jr.; Arellano, A.F., Jr.; Adams, D.K.; Fierro, L.M.; Minjarez Sosa, C.M. Evaluating Forecast Skills of Moisture from Convective-Permitting WRF-ARW Model during 2017 North American Monsoon Season. *Atmosphere* 2019, 10, 694.

4. Line 66-67, I think the justification of centre this paper on Europe, has to other than “its climate is highly variable and affected by a range of both large and small scale processes which present challenges for adequate simulation”, as this is true for several regions in the planet.

5. Line 56: “. . . history and trajectory of air masses ARE important . . . (instead of “is”)

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