



EGUsphere, referee comment RC1
<https://doi.org/10.5194/egusphere-2022-1037-RC1>, 2022
© Author(s) 2022. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on egusphere-2022-1037

Anonymous Referee #1

Referee comment on "How well does a convection-permitting regional climate model represent the reverse orographic effect of extreme hourly precipitation?" by Eleonora Dallan et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-1037-RC1>, 2022

The authors offer a well-presented manuscript examining the ability of a convection-permitting (CP) model (ERA-Interim-driven COSMO-crCLM) to represent the reverse orographic effect at the northeastern Italian Alps area. The manuscript is well-written, and concise, with a good flow and sufficient discussion. The contribution of the manuscript is significant since it gives answers to an issue which may arise for many researchers dealing with CP models.

Every query or suggestion I had during the first part of the manuscript was explained or applied in the next sections, therefore I only have a few minor suggestions, mainly grammatical-syntax comments and typos.

Some minor/discussion comments:

It would be helpful to see a short literature review on existing CPM permitting models (probably in the Introduction), and comments on their performance. This would help you justify better the selection of the ERA-Interim-driven COSMO-crCLM.

Lines 17-19: "We introduce the use of a non-asymptotic statistical approach (Simplified Metastatistical Extreme Value, SMEV) for the analysis of extremes from short time slices such as the ones of CPM simulations" The word "introduce" is a bit misleading, since SMEV has already been introduced; maybe rephrase it to "We propose" or something like this?

Lines 55-57: "Over the Alps, but also elsewhere, CPMs tend to generate more precipitation at higher elevations than in reality, thus reducing the bias with respect to observations compared to RCMs (Lind et al. 2016, Reder et al. 2020)." This sentence is confusing to me, it sounds like CPMs overestimate precipitation at higher elevations than in reality, but at the same time, they reduce the bias compared to RCMs. Could you rewrite this?

Lines 143-144: "We considered only rain gauges with at least 9 valid years during the period 2000-2009," Could you explain here why you chose this period?

Lines 153-154: "More details on the used physical parameterisations can be found in Leutwyler et al. (2016)." Give two-three sentences on the basics of the process.

Some suggested syntax changes:

Line 25: "SMEV's capability"

Line 26: "promises further applications"

Line 45: "In CMPs,"

Lines 51-53: "In areas with a complex terrain, the possibility of explicitly resolving convection along with a more detailed representation of orography and surface properties are crucial elements for correctly capturing the initiation and development of convection"

Line 269: Do you mean "A spatial pattern" instead of "organization"?

Lines 361-363: I think a verb like "show" is missing from that sentence: "The consistency of the return level estimates obtained from the full record and from the 10 yr record, and the small increase in the associated uncertainty show that, once its assumptions are verified, SMEV is a reliable statistical method for the analysis of extreme precipitation from short time slices."

Line 415: "n" in italics

Line 480: "100 yr, and parameters of..."

Figure comments:

Figure 2, Figure 4 and rest of the figures showing linear regression: do you want to also show the coefficient of determination R^2 ?

Figure 4: "(SC_CPM), and all CPM"

Figure 4: "the linear regressions lines shown as a solid line, are expressed as.."

Figure 4: Could you change color for the observations, it is the same as CPM

Figure 4: You do not focus on the orographic effect for daily but still can show the slope for the 24-hour case

Figure 7: remove ",," from: "grid, CPM"

Figure 7: "are significant" instead of "result significant;"