

Weather Clim. Dynam. Discuss., referee comment RC2
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Comment on wcd-2022-11

Anonymous Referee #2

Referee comment on "Convection-parameterized and convection-permitting modelling of heavy precipitation in decadal simulations of the greater Alpine region with COSMO-CLM" by Alberto Caldas-Alvarez et al., Weather Clim. Dynam. Discuss., <https://doi.org/10.5194/wcd-2022-11-RC2>, 2022

The main aim of this work is the evaluation of COSMO-CLM simulations at different resolutions, to assess the scale-dependency of thermodynamical processes influencing extreme precipitation. This topic is very interesting, since the assessment of very high-resolution climate simulation is a challenging area in the climate community. However, before I can recommend publication, there are some issues that must be addressed, mainly related to formal aspects and not to the scientific content, which is relevant.

As a general comment, in some points the English style is poor and must be improved, especially from Section 4 onward. I suggest a general review by a qualified in English support officer.

From the title, the reader would expect that general conclusions about regional modelling have been drawn but then, moving throughout the text, he realizes that only one regional model has been considered. As the authors properly say (line 525), the present conclusions cannot be generalized to other regional models. So, I suggest to add "COSMO-CLM" in the title. Moreover, the RCM used (i.e. COSMO) is neither specified in the introduction. Please add a few descriptive lines about this model in the Introduction.

The captions of many figures are too long and descriptive. I suggest to shorten them and to explain in the caption only what is really shown in the figures, moving the other considerations to the text. For example, in the caption of Figure 10, the sentence "The precipitation days are selected as those over one standard deviation of the Principal Components for EOF-1 shown in Fig. 9" can be removed and included in the main text.

Regarding the conclusions, I think that bullets a, b and c are not so relevant and can be merged into a single bullet.

I would remove Table 1 and 2, since all the information contained are already provided in the text.

Specific comments

Line 57: Probably "of" is missing between "development" and "Convection"

Lines 90-93: I would avoid using direct questions in an Introduction.

Line 94: I suggest to add: "This paper is organized as follows:", before of "In Sect. 2".

Line 115: I do not understand the need of comparing HYRAS with ERA5 here, since ERA5 is mentioned here for the first time. If you want to keep this sentence, please add more details about ERA5 and a proper reference.

Line 120: Probably "was" is missing between "MSWEP" and "obtained".

Line 125: change "high" with "higher"

Line 128: "distance of 250 km". Distance from what?

Line 135 and 283: "recent". Since the period starts in 1961, it is not so recent. Please use another adjective.

Line 154: I do not think that you can talk of "small inconsistencies" between the simulations, as the domains are different, the forcing are different, and the resolutions are different.

Line 282-283: It is useless to write the whole name of the model again here. Use only COSMO-CLM.

Line 293-295: "This not imply...compared to RCM". This sentence is not clear, probably some commas are missing. If I well understand, you claim that CPM performs better than RCM according with literature study. Anyway, your conclusions must be based on the present results and not on literature ones.

Line 305-306: "The improvement...in a climatology". There is something wrong in the English.

Line 307: change "show" with "shows".

Line 309: "shows"... "showing"... Avoid using the verb "show" too many times.

Line 316: "al" ?

Line 334-335: what do you mean "for its part" ?

Line 339: remove comma after 2007.

Line 341: change "larg" with "large"

Line 363: Avoid using the word "bias" twice

Line 363: The bias is 0.5° also below 925 hPa. Please rephrase.

Line 364: "close to 2° ". The bias is larger than 2° below 700 hPa.

Lines 367-371: This paragraph (and Figure 8) is quite confusing and must be rephrased. It is not clear if you are talking of spatially averaged or temporal averaged bias. Moreover, in the caption of Figure 8, explain better what is shown.

Line 398-399: probably the verb "explaining" is not correct. Moreover, there is a closed bracket after CPM that was never open.

Figure 9. The caption is not clear. Explain clearly what is shown in each panel (a, b... etc).

Lines 403-406. It is not clear why red color is referred to CPM and blue to RCM. Probably these maps show the difference between CPM and RCM, but please explain better what is shown and what are you describing.

Line 411-412: "low terrain"? do you mean "low heights"?

Line 418: "to be the main precursors of the differences". This sentence is stand-alone and I do not understand what you mean.

Line 423: The concept of "preconditioning" is used in numerical analysis. I understand what you mean in this context, but I recommend to use an alternative term here (e.g. pre-existing).

Line 428: "in compared"? Probably "in" must be removed.

Line 431: Explain also here what "theta" represents.

Lines 459-460: "The analysis... processes". The English style is poor.

Line 467-468: Again, I believe that "preconditioned" is not the appropriate verb.

Line 471: change "differences" with "different".

Line 471: "RCM evaporates more moisture"? RCM is a numerical model and does not evaporate anything□□□

Line 511: In a similar manner, RCM does not emit sensible heat flux.