

Geosci. Model Dev. Discuss., referee comment RC1
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Comment on gmd-2021-207

Anonymous Referee #1

Referee comment on "Added value of EURO-CORDEX high-resolution downscaling over the Iberian Peninsula revisited – Part 1: Precipitation" by João António Martins Careto et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2021-207-RC1>, 2021

This study presents a comprehensive assessment about the added value of precipitation dynamically downscaled regional climate model (RCM) simulations from EURO-CORDEX initiative. To quantify and spatially characterize RCMs performance compared to the corresponding lower-resolution global scale driving fields, Authors take advantage of a distribution-based metric (DAV) previously introduced and presented in Soares and Cardoso (2018). The evaluation regards all the available ERA-Interim reanalysis and global climate models (GCM) driven RCM simulations corresponding to the Hindcast (1989-2009) and Historical (1971-2005) experiments respectively. All the simulations considered refer to the Iberian Peninsula domain and an observational-based Iberian Gridded Dataset (IGD).

The present research involves a relevant research question namely if and eventually at what extent downscaled simulations can improve the large-scale forcing signal. This represents a very important point as RCMs are extensively used by a broad range of end users belonging to climate impacts and climate services communities. The main value of the study is to consider the largest dataset of RCMs available and to consider a simple and straightforward metric identifying RCMs potential added value over the entire statistical distribution.

It follows some general, minor remarks:

-Please better clarify what are the main differences in DAV configuration and application respect to the originally work authored by Soares and Cardoso 2018. Do they consist on considering a larger evaluation and historical period simulations and diving DAV according to precipitation intensity and frequency distribution?

-I think that an important point of the article is the to some extent poor RCMs performance in reproducing summer precipitation intensity and especially frequency (when the entire statistical distribution is considered). Since summer season generally presents a weaker forcing large scale signal it is relevant that the higher resolution self-generated signal (from RCMs) frequently leads to detrimental effects. I think that this aspect deserves some more discussion. It is interesting also considering that this happens mainly when RCMs are driven by ERA-Interim. Finally, this aspect can have also potential relevant propagating effect on the summer temperature representation.

It follows some line-specific, minor remarks:

Line 88. It is not clear the meaning of the "namely for temperature".

Line 147. Is the normalization performed for both intensity and frequency distributions? Please be better specify what you mean with the statement: "sum of the all bins".

Lines 172-173. Please better explain the statement: "Nevertheless, it should be noted that the Iberian overall value does not represent a mean from the spatial DAVs"

Line 181. An end-phrase dot is missing. Whereas at line 182 there is a misplaced dot.

Lines 183-186. These two statements are not clear to me.

Line 205. What do you mean with "expressive"?

Line 209. "yet the same models reveal either maximum or minimum DAVs." It is not clear, please rephrase.

Line 289. "the results do not necessarily have to agree." If we consider the same RCM driven by reanalysis.

Caption Fgiure4. Please specify the tick blues line RCMs clustering as function of the different driving GCM.