

# ***Interactive comment on “Towards a reliable assessment of climate change impact on droughts in Southern Italy: Evaluation of EURO-CORDEX historical simulations by high-quality observational datasets” by David J. Peres et al.***

## **Anonymous Referee #1**

Received and published: 23 April 2020

This paper quantifies the performances of several combinations of regional climate models (RCMs) driven by different general circulation models (GCMs) in two regions of southern Italy. The GCM-RCM combinations are part of the Coordinated Regional Climate Downscaling Experiment (CORDEX) initiative in the European domain (EURO-CORDEX). Performances are evaluated in the ability to capture the spatial variability of mean annual and seasonal precipitation (P) and temperature (T), as well as three drought metrics derived by applying the run theory.

I enjoyed reading this paper, which is well written; presents rigorous analyses; critically

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discusses the results; and has practical utility for impact studies in the study regions, since it provides a list of best GCM-RCM combinations. I recommend its publication and I only have a few minor requests and suggestions.

1) The authors should provide more details on how they applied the principal component analysis (PCA): “Was it applied on monthly or annual P?” The PCA returns spatial patterns that explain most of the P variability. How did the authors derive the subregions within these spatial patterns? This should be clarified.

2) When ranking the models based on performance in reproducing annual P, the authors find that nine models have similar error metrics. Have they tried to compute the mean rank of each model across the zones and even across the five time scales considered (annual and the four seasons)? There may be some models that are consistently in the top (lowest ranks) and these should be mentioned.

3) Line 45: Extremes occur everywhere. I suggest changing to “. . .occurrence of particularly intense extreme events, . . .”. If this is what the authors mean, a reference is also needed.

4) Line 55: CMIP5 has been already defined; just use the acronym.

5) Line 61: I suggest adding “historical” before simulations.

6) Line 326: it should be “show”.

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2020-78>, 2020.

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