

Earth Syst. Dynam. Discuss., referee comment RC1  
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## Comment on esd-2021-8

Anonymous Referee #1

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Referee comment on "Balanced estimate and uncertainty assessment of European climate change using the large EURO-CORDEX regional climate model ensemble" by Guillaume Evin et al., Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2021-8-RC1>, 2021

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This is a comprehensive dynamical downscaling study of regional climate change in Europe. They applied a statistical approach called QUALYPSO to a very large ensemble of regional climate model simulations to partition uncertainties due to internal variability, model, scenario, etc.. But the method to partition uncertainty has limitations (Hawkins and Sutton 2009), uncertainty here only means ensemble spread and it has nothing to do with errors. No observational constraints are taken into consideration. It's unclear whether the GCMs can represent internal decadal variability and its regional climate impacts reasonably well. Although the uncertainty partitioning method has been quite popular in literature, it will be helpful to add some discussions on this method. Particularly, if the uncertainty here has nothing to do with error, how should we use the results to help provide robust estimates of future regional climate change.

In addition, the study finds relatively small contribution from internal variability, this conclusion seems to contradict with many studies that emphasize the importance to run large initial-value ensembles. It would be useful to discuss whether this is caused by the analysis method here (e.g. whether this method tends to produce narrow internal variability uncertainty).

It will also be helpful to provide more introduction and discussions of QUALYPSO so that readers can understand how this method can provide a balanced estimate without reading the reference paper and the codes.