

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC1
<https://doi.org/10.5194/nhess-2022-80-RC1>, 2022
© Author(s) 2022. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on nhess-2022-80

Anonymous Referee #1

Referee comment on "Multiscale flood risk assessment under climate change: the case of the Miño River in the city of Ourense, Spain" by Diego Fernández-Nóvoa et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2022-80-RC1>, 2022

The presented topic is quite interesting not only for local populations and policy-makers but also for the international research community. The authors presented a methodology that uses results from the CORDEX database to force a hydrological model that will feed a 2D hydraulic model. The methodology seems to be coherent and appropriated for the obtained results. The authors were careful in choosing the forcing conditions from the CORDEX project, comparing the historical results with observed precipitation data in the region. The numerical models selected are adequate, being well known tools fully developed and validated for different regions. The manuscript is well written, easy to follow and to understand, with up to date references. The authors seem to have previously experience with the topic, the region selected and the presented numerical models, which were previously configured in already published manuscripts.

However, there are some comments/issues that should be clarified.

The authors state in the introduction that "This provokes that the hydrological cycle regimes are mainly conditioned by the timing and position of winter storms, which in turn, are dependent on the NAO phase". However, is worthy to notice that there are previous studies demonstrating that the precipitation regimes in the Iberian Peninsula are not only dependent of a single atmospheric variability mode.

The authors need to clarify the methodology section. Initially, the reader understands that the hydrological model will be forced which each one of the models that provide a good characterization of the precipitation for the study area, and the authors present Figure 3 and Table 2 with the individual results for each selected model. Then, the reader realized that an ensemble was constructed with the best CORDEX models and this ensemble will force the hydrological model. It is important to use an ensemble because, since the hydrological model will be forced with results for another numerical model, the ensemble will avoid numerical inconsistencies and reduce the inaccuracies in the hydrological and

hydraulic models. The early in the calculation that the errors are minimized, the smaller inaccuracies obtained. However, it will be necessary to include how the ensemble was constructed. It is a simple average or the authors considered a weighted mean? The weighted mean could provide more accurate results by considering the previous performance of the CORDEX numerical models in the weight.

The authors should better describe the procedures to construct the forcing with the CORDEX data. In the methodology it was not specify the version of the CORDEX project data. It is CMIP5 or CMIP6? Having a full range of numerical predictions, why the authors only selected the RCP8.5? If possible, it will be interesting to compare with a not so extreme scenario (RCP 4.5, for example).

It is not also clear the forecasting period. The authors referred that they used historical (1990-2019) and future (2070-2099) periods, and that the data has an hourly scale. However, it is not clear if the historical simulations and the future projections were done for an specific year or if the authors calculate an average for the full period. For historical conditions, using an average period to compare with the observed data is acceptable. However, a difference of 30 years in the projections could produce significant differences in the results.

Why the figure 5 presents the results for the whole year? The authors explained in the methodology that the period that they use to validate the precipitation data was for the wet season (November-March).

The authors mentioned that "The developed procedure takes between 2-3 weeks to execute each model". Please, include the characteristics of the computer used to run those models.

I recommend to the authors to include the limitations of the study. Is worthy to notice that there are several factors that could conditioning the future river flow that will reach a specific region, and not only the precipitation. The authors are representing the natural flow, but not changes in the man-made interactions with this flow. Changes in the aquifer capacity, in the river margins, in the soil characteristics, in the water use or in the hydroelectric production, among others, are non-easy predictable factors and will not be reproduced by the numerical models. However, they can have strong impacts in the floods.

Figure 1c should include the latitude and longitude

Figure 2: Future evolution of river flow risk instead of "risk river flow" and at Ourense city instead of in Ourense city