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Comment on nhess-2022-80

Anonymous Referee #2

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-RC2>, 2022

The study addresses the analysis of the future evolution of river floods in the city of Ourense (NW Spain), where flooding of the Miño river can cause significant damage. In particular, the historical and future precipitation data from the CORDEX project are used as input in a hydrological model (HEC-HMS) which, in turn, feeds a 2D hydraulic model (Iber+). For each model, hydrological simulations were carried out considering both historical (1990-2019) and future (2070-2099) periods.

Major comments follow.

- In the Introduction the novelty of the study with respect to the state-of-the-art knowledge must be emphasized and the main objectives of the study must be better clarified.
- Although in principle, the methodology seems appropriate, several details must be added to let the reader evaluate the correctness of the adopted approaches. In particular, the following key points should be better explained.
 - The capability of the EUROCORDEX RCMs models to represent precipitation over the area under investigation was tested by comparing RCMs precipitation data and field data by analyzing the entire distribution of precipitation data through the Perkins' test and also the extreme precipitation values through the P99 test. I assume that the Perkins' test is sensitive to the choice of the bin size and, in turn, the number of bins used to calculate the PDF. The authors should provide additional details on the test metrics and comment on this point, as well as on the advantage of this method with respect to statistical measures, such as bias, root mean square error, correlation, and trend analysis, commonly used to quantify model performance (see for instance doi.org/10.5194/nhess-20-3057-2020).
 - The transformation of precipitation into the corresponding river flow was carried out using the semi-distributed model HEC-HMS. The authors should provide additional information on the hydrological model used for rainfall-runoff transformation (including the loss method for assessing the net precipitation). Also, please explain how the historical and future flows of the river were obtained on an hourly scale,

- given that precipitation data were at the daily scale.
- Additional details on the hydraulic modeling used for flood mapping are also required.

Minor comments

A table summarizing the physical features of the catchment (mean slope, altitude, river length, time of concentration) and a land cover map must be added.

Please provide additional details on the catchment schematization within HEC-HMS (i.e., number of sub-catchments, connections among them and so on).

Please clarify the meaning of "supreme water depths".

L 70: replace "which supposes" with "encompassing".