First of all, the authors want to thank the referee for the work and time devoted to review the manuscript. We know that all comments will serve to improve the quality and understanding of the work and we hope we have properly answered all the suggestions.

Reviewer #2:

The paper entitled " How to mitigate flood events similar to the 1979 catastrophic floods in lower Tagus" is well written, however, the paper is required major revision as the scientific part is missing:

1. The novelty part of the MS is missing in the MS. Please mention.

Following reviewer' suggestion, and also in accordance with the comments raised by Reviewer 1, we added a new section entitled "Motivation", in which we expose not only the motivation of the study itself, but also the novelty provided. Mainly, we commented that, on the one hand, the development of the work provides new knowledge to better understand the floods in this area since there are a scarcity of studies that address the floods on lower Tagus valley from a hydrodynamic point of view. In addition, the model validation carried out also allows providing adequate tools that can serve as a basis to perform future studies in this area. On the other hand, the proposal of dam operating strategies to take advantage of existing dams to mitigate floods in lower Tagus valley, also provide new insights since there are no previous studies that analyze this issue. Additionally, the dam operating strategies proposed can serve as a basis for future studies that even improve and optimize this proposal.

"2 Motivation

The main motivations driving this study are, on the one hand, to improve the knowledge and understanding of flood development in lower Tagus valley, an area especially vulnerable to these events. In this sense, one of the main motivations for carrying out this analysis was the scarcity of studies addressing this issue, especially from a hydrodynamic point of view. For that, different freely available products were tested in order to provide the most accurate tools that can serve as a basis for future studies focused on addressing different aspects related to flooding in lower Tagus valley. On the other hand, the study also intends to provide different strategies to mitigate floods in lower Tagus valley but taking advantage of existing infrastructures, in particular, the dams. To the best of our knowledge, there are no previous studies that have developed this type of strategies for the area under scope, so the strategies presented in this work could represent an important advance in this field. This proposal will allow to provide an affordable new approach to flood mitigation compared to the implementation of additional structural measures that have to be built. For that, dam operating strategies will be proposed and tested in the most important Tagus dam. The benefits provided by the dam strategies proposed in relation to flood mitigation, will be also evaluated. This will also serve as a basis for developing future studies focused on optimizing dam strategies or even interconnecting the strategies of different dams of the Tagus basin to improve the flood mitigation."

2. The authors have mentioned the 2D hydrodynamic model (Iber+ numerical model). Is this model is open source? Please specify.

The model is freely available for download from its official website (https://iberaula.es), as we stated in the manuscript, but the code is not open source. The code in only accessible for the collaborators on its development, which are specified in the web page. This information was added in the "Code and data availability" section. In the text it was also specified that what is freely available is the executable version of the model.

3. Please mention the comparative analysis of simulated model with Iber+ numerical model to check the accuracy of model.

The comparison analysis to check the accuracy of the model was better mentioned and explained in the new version of the manuscript.

4. The statistical analysis is missing in the MS.

The performance of the model to simulate floods was evaluated through the statistical analysis provided by the Taylor Diagrams. This was better explained in the new version of the manuscript, where the Taylor method is described, and the statistical results obtained were better presented and discussed. In addition, following the reviewer's comment, a more detailed statistical analysis of the comparison between the DEMs under scope and the original elevation data, was performed (Table S2 of Supplementary Material). In particular, several statistical indicators were calculated to assess the differences between the leveling benchmark altitudes and the corresponding pixel values in each DEM. These indicators include the Mean Absolute Error (MAE), which is calculated by determining the average of the absolute differences between the DEM and the benchmarks. Additionally, the Standard Deviation (SD) was computed to measure the spread of the differences between the DEM and the benchmarks. The Root Mean Squared Error (RMSE) was also computed by taking the square root of the average of the squared differences between the DEM and the benchmarks. Moreover, the Mean Error (ME) was computed as a measure of the bias between the DEM and the benchmarks, which is determined by averaging those differences. A positive ME indicates that the DEM is overestimating the elevation, while a negative ME indicates that the DEM is underestimating the elevation. This information, which is summarized in Table S2, was added to the new version of the manuscript, which increases the robustness to the validation performed.

"In this context, and considering the wide range of available DEMs it was felt necessary to evaluate the suitability of different freely available DEMs to adequately represent floods in the lower Tagus valley. To achieve this goal, one of the most important flood events occurred in that area on February 1979, was simulated and analyzed for different DEMs in order to test which one is most appropriate for the area under scope. As was mentioned above, four DEMs were tested, namely ESRI, ASTER, SRTM and Copernicus DEM (Karlsson and Arnberg, 2011; Wang et al., 2012; Garrote, 2022).

In general terms, the results obtained with Copernicus, SRTM and ASTER DEMs clearly indicate better performance for simulating floods in lower Tagus valley with respect to ESRI DEM, which provides worse results in all the statistics analyzed (Figure 4). Especially highlight the results obtained with Copernicus DEM, which are clearly the closest to the reference data, indicating that Copernicus DEM presents the best accuracy, i.e. the best capability to address floods in the area under scope. In particular, it presents a high correlation with the measured data, above 0.99, with a normalized standard deviation close to 1 and the lowest RMSD (< 0.1). The SRTM DEM also presents a correlation above 0.99, although the normalized standard deviation (1.11) and the RMSD (0.17) are worse than those obtained with Copernicus DEM. ASTER DEM presents statistics slightly worse than SRTM DEM. In addition, the original elevation data from these DEMs were also compared with the official altimetric values by calculating several statistical indicators to evaluate the associated error and deviation (see Table S2 in the Supplementary Material). Copernicus DEM is also corroborated as the most accurate, presenting the lowest values in all the analyzed statistics, followed again by the SRTM DEM (see the detailed analysis provided in the Supplementary Material). Recent studies comparing the accuracy of different DEMs along the European continent (Guth and Geoffroy, 2021) and in other parts of the world (Garrote, 2022), also confirm the higher precision of Copernicus DEM in comparison with other global products.

This confirms that Copernicus DEM, coupled with the Iber+ model, are capable of the adequate reproduction, at large-scale, of the flood events in the lower Tagus. In fact, the statistical parameters analyzed by means of the Taylor diagrams corroborate not only the better performance compared to the other DEMs analyzed, but also the accurate representation of the reference flood data. Therefore, Copernicus DEM was selected for the remaining of the analysis."

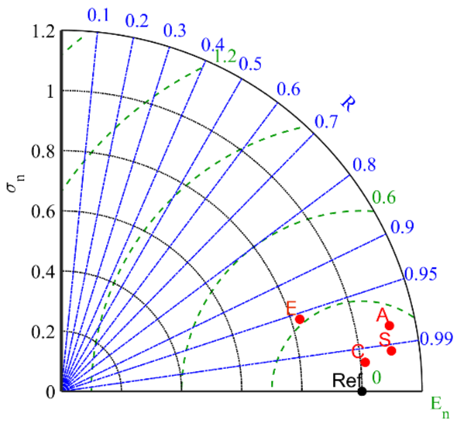

Figure 4. Taylor diagram of the water elevation obtained with Iber+ using the field data as reference. E, A, S and C indicate the Iber+ data obtained using the ESRI, ASTER, SRTM and Copernicus Digital Elevation Models, respectively.

DEM / STATISTICAL INDICATOR	ESRI	ASTER	SRTM	Copernicus
MAE (m)	*3.56*	*4.74*	*3.10*	*2.12*
SD (m)	*4.71*	*4.90*	*3.94*	*3.81*
RMSE (m)	*4.81*	*5.91*	*4.42*	*3.81*
ME (m)	*-1.00*	*3.30*	*2.01*	*0.17*

Table S2. Statistical analysis of the altitude difference between leveling benchmarks and analyzed DEMs.

5. Please do the sensitivity analysis of the model.

Following a similar suggestion provided by both reviewers, a sensitive analysis was performed to analyze the effectiveness of the proposed strategies to mitigate floods in lower Tagus valley under different river flow scenarios, taking into account that these strategies suppose the main tool developed to address flood mitigation. For that, the original series of river flow was randomly perturbed allowing a deviation of ± 25 %, that is, each real daily value of river flow has been allowed a random variation of ± 25 %. In this sense, as many perturbed series as the original number of data were generated (> 17000) to add more robustness to the evaluation. The average number of floods generated by the river flow of the perturbed series as well as the associated standard deviation were presented in a new table. The respective average number of floods resulting from applying the dam operating strategies proposed to the perturbed series, as well as the associated standard deviation, were also evaluated. The efficiency of both proposed strategies was clearly maintained in terms of reducing the total number of floods. In addition, the effectiveness of OS2 to mitigate the most extreme floods was also confirmed. The results obtained corroborate the robustness of dam operating strategies proposed under different scenarios of river flow. This information was added in the new version of the manuscript.

Parameter	Natural Regime	Operation Strategy OS1	Operation Strategy OS2
Days > 1000 m^3s^{-1}	453.97 ± 87.63	77.64 ± 3.34	89.05 ± 3.57
Days > 3000 m^3s^{-1}	37.98 ± 3.16	16.13 ± 2.05	14.42 ± 2.28
Days > 5000 m^3s^{-1}	6.98 ± 1.61	3. 65 ± 0.88	1.66 ± 0.98

Table. The original series of real inflow at Alcántara location was perturbed by applying a random deviation of ± 25% to the daily river flow values. Thus, several random perturbed series equal to the total number of days from the original series (> 17000 days) were created. Then, the mean number of days (and the corresponding standard deviation) exceeding different critical outflows at Alcántara location, were calculated for the perturbed river flow series, considering a natural regime and also, applying the operation strategies OS1 and OS2.

6. Kindly, separate the discussion section and mention the limitation and recommendation of the study.

Following similar suggestions by both reviewers, we have restructured the manuscript to a certain extent. In this sense, and following also the comments of reviewer 1, some parts of the "Results and Discussion" section, more related to conduct experiments or simulations, as well as some statements or information that are not specifically a result, have now been placed in previous sections ("Introduction" and "Data, Models and Methods" sections).

The limitations and recommendations of the study were also clarified in the revised version of the manuscript. The limitations and caveats are now exposed in the corresponding sections, while the recommendations were placed both in the "Motivation" section and also in the "Summary and Conclusions" section.

We consider that the new version of the manuscript now presents a clearer structure. However, if the reviewer considers that more changes are needed, we will make the proposed additional changes.