

## 1) INTRODUCTION

[R]eviewer : I think Figure 1 is regrouping the necessary information but it could be better reorganized with a bigger text size in the figures to be able to read the necessary information and the caption should explain each maps/figure that could be listed (a) / (b) /...

[A]uthor : Figure 1 is remade with bigger text size and labels. Caption is changed to list the images correctly.

## 2) DATA

R : 2.1 : how far from the dyke do you calculate the “mean slope of the beach in front of the dyke”, please be precise.

A : Edited part 2.1 takes into account the maximum distance from the dyke covered by the bathymetry. More details are provided about the whole data set.

R : 2.2 : References to the corresponding data (GLOSS for example) should be added. In addition, a reference to highlight the feasibility to use data from a station kilometres away from the study site for such purpose should, I think be added or more motivated.

A : URLs pointing the corresponding data are added as footnotes. We added a paragraph in Part 2.2 to motivate the feasibility of our choice of data.

R : 2.3 : References to the model used and the type of data (forecast, reanalysis, hindcast, ...) could be added as well as to motivate that data used can be “considered offshore”.

A : We added a reference to the model used in ANEMOC-2 as well as the type of generated data. We also added a reference to bathymetry data to justify that we reach the continental shelf of this region of the Mediterranean sea.

R : 2.4 : For me, the text explaining the process is clear enough so as figure 2 can be deleted. Instead of using V & W to explain the method, directly use the variables you are studying could clarify the text even more and help the reader, in my opinion. Pearson’s coefficient between sea level and significant wave height has been calculated which is nice to see but the statistical significance (p-value for example) is not mentioned. The Kendall, Spearman and rank correlation coefficients should be studied (Tootoonchi et al., 2021: <https://doi.org/10.1002/wat2.1579>).

A : We replaced V and W by the variables that we are currently using as suggested. We really enjoyed reading the provided article and agree that only calculating Pearson's coefficient is indeed a mistake and thus added the Spearman's and Kendall's rank coefficient to support our case.

### 3) METHODS

R : Table 1 and Table 2 could, I think, be regrouped for better clarity as it gives information on characteristics from same variables. I think, the units could be added.

A : Tables 1 and 2 merged and units have been added to the table.

R : Maybe a small paragraph resuming the full method based on figure 3 can be useful to help the reader.

A : Agreed, it has been added at the end of section 3.

### 4) RESULTS

R : 4.1 : The use of the GEV fit (Coles, 2001) is still unclear to me. A GEV fit is commonly used on block maxima such as yearly maxima but it is really unclear how you applied the GEV here (on which datasets: the 30 years of hourly data on each independent variable?). For me, more clarification is necessary here. Maybe, this should even be introduced in the method section. Linked to this, I think figures 4 and 5 can be updated. I would still think that figure 5 can be omitted as it is clear in the text you are using a commonly used approach which is the maximum-likelihood one and could be added in the appendices.

A : We have added elements supporting our case for the use of the GEV fit by running a KS-test on different distributions and choosing the best fit which was still the GEV or the Gumbel distributions. We decided to keep the most general law as the Gumbel law is encapsulated by the GEV. The fit is done on each independent dataset indeed and we clarified this in the text. Figure 5 has been deleted. Figure 4 is updated to show the different tested distributions.

R : Line 326: you mention a "significant correlation", do you mean that it is statistically significant (p-value check)? Please, be precise. I am a bit surprised about figure 6 and wonder if you could double-check that the curves we see are really corresponding to the hypothesis of independence. Also, I wonder if showing the 1000 years (and even the 100 years Return Period curves) is here relevant as the short length of data available would suggest a really high uncertainty at those levels...

A : Changed "significant" to "moderate" The 100 year contour line is to be kept as the dyke owner projects to exploit the site for more than 70 years so keeping this line makes sense for the scope of the whole project. The 1000 years contour line has been removed. We double-checked the results, comparing the obtained copula with the theoretical independence copula ( $u*v$ ) and it matched.

R : 4.2 : Figure 7: I wonder how relevant it is to have the y-axis ranging from 0 to 20m and if having it from 0 to 10m would not be enough for example. A color bar should be added in my opinion. Text size on the curve is hard to read.

A : Agreed, the range of the y-axis is now limited to 10m. Text size on the labels is increased.

R : 4.3 : According to figure 8, it is hard to see that  $d$  and  $b_0$  parameters are “significant”, the same remark for the overtopping process parameters. Also, the term “ $gf$ ” in figure 8 relates to which variable?

A : The term “ $gf$ ” has been replaced by the  $\gamma_f$  symbol that is actually used in the article. Also, due to some minor changes in the code, the results of the sensitivity analysis have changed so we decided to rewrite the results subsection relating to this figure as well as a part of the conclusion to be in better accordance with the new results.

R : 4.4 : A reference proving the right use of GEV here can strengthen it.

A : Added 2 references supporting the use of the GEV distribution.

## **5) DISCUSSION**

R : In my opinion, figures 12 and 13 could be unified and added as appendices to make the paper clearer. Uncertainties linked to the methods used should be discussed.

A : Both figures are now unified. We still believe that it is an interesting result as it provides an idea of the size of the sample one should expect to generate in order to bring stable results so it should be kept in the main text.

## **6) TECHNICAL CORRECTIONS**

R : Figures: text font size is often too small and difficult to read.

A : Figures fontsize increased.

R : Multiple typos pointed by the reviewer

A : All corrected.