

We thank again the reviewer for the thorough review of our paper that improves a lot the quality of the document.

All the remarks have been taken into account. Is is marked in blue in the manuscript.

Remarks of the reviewer:

Are the sea level time series detrended to ensure the independent and identically distributed (i.i.d.) assumption is met?

More explanation of the complete Defra method would be desirable on line 302 since it is referred to later on in the text i.e. is the Gauss copula used to estimate the dependence between wave height and storm surge?

The explanation on lines 321-325 is not at all clear. I would also be tempted to restate "In the following section, we use survival copula C and survival function \bar{u} . Upper tail dependence and lower tail dependence will be inverted." (lines 260-261) here too, to remind the reader that since survival probabilities are being assessed lower tail dependence corresponds to high wave heights and water levels.

Be careful to differentiate between the class of tail dependence and the 'actual' tail dependence. For instance, the Gumbel survival copula has the same class of tail dependence as the Clayton copula (i.e. only lower tail dependence) but the tail dependence is not necessarily the same since it depends on the value of the copula parameters.

The survival Gumbel copula is also referred to as the Gumbel survival copula. Be consistent!

Equations need to be form part of a sentence. Often this correction can be achieved by moving the full stops to after the equation.

Specific comments

Line 12: Grammar. Perhaps change to "joint distribution functions to their".

Line 32: I think they are "reliable return period estimates" rather than "reliable return periods".

Line 34: Grammar. Add "the" before "simplified".

Lines 46-57: The text on all these lines can form a single paragraph.

Line 50: "Copulas generally aggregate only two random variables." I suggest stating more explicitly that this is only the case because most of the studies carried out 'to date' have considered two variables.

Line 51: Grammar. Remove "a" before "specific".

Line 57: As stated by the other reviewer the "conditional mixture" model needs additional explanation.

Line 61: "The pair copula construction (PCC)" change to "PCC" as the acronym has already been defined.

Lines 58-70: The text on all these lines can form a single paragraph.

Line 71: Grammar. Change "to a" to "for a". Also, a bad result is still a result; consider rephrasing the next part of the sentence too.

Line 73: "best results" as compared to which other approaches/models?

Line 74-82: The text on all these lines can form a single paragraph. Also, add an opening sentence summarizing the paragraph e.g. "The paper is divided into three parts.".

Line 81: Consider changing "our practical applications of coastal engineering" to "our coastal engineering based applications" or similar.

Line 86: Replace "he" with "is denoted by" or similar.

Line 163 &166: Consider changing "two-to-two" to "pairwise".

Line 245: Replace "it" with "tail dependence". The next sentence does not make sense; consider removing.

Lines 256 & 260: Replace "it" with "the copuIa".

Table 1 and Table A1: Typo. Change "Franck" to "Frank".

Line 265: "Gauss" is also an abbreviation requiring a definition.

Line 266: "deal with" is too colloquial.

Line 306: Add "dependence factor " before "FD". As stated by the other reviewer what do the values of 25 and 20 correspond to e.g. Weak dependence? Which corresponds to stronger dependence? Why does Kergadallan (2013) recommend a minimum value of 25?

Line 268-280: The text on all these lines can form a single paragraph.

Line 334: Clarification required here. "as the Gumbel copula has an upper tail dependence, the use of its survival copula is recommended" By recommended do you mean recommended over the Clayton copula? Or recommended as another copula which maybe appropriate given the observed tail dependence?

Line 319: "Since the sample has a tail dependence, it should be known whether it has a lower tail dependence or an upper tail dependence." Not clear!

Line 341: Clarification required here. "We will select the survival copula with the largest likelihood among those which possess the same class of tail dependence as the sample." Is this more accurate?

Line 344: Consider ending the sentence after Student and discussing the lower tail dependence of the AMH in the next sentence. The text currently implies that all of the listed copulas only have lower tail dependence when their parameter(s) are close to 1.

Line 346: Remove "correct" before "tail".

Line 361: "Gumbel survival copula is as large as the log-likelihood of the Clayton copula." Not true, it is smaller! Consider adding "approximately" or similar before large.

Line 364: "is therefore as suitable as the Clayton copula." Again, not sure this is accurate as in the next section it is shown that the Clayton is the most suitable. Perhaps say "potentially as suitable".

Line 386-399: Condense the text on these lines currently there is too much repetition of the line "The points obtained by the XX copula come close to the bisector."

Line 399: Grammar. "We therefore reestablish a right tail dependence which gives correct results." Rephrase and as stated in the general comments it is the appropriate class of tail dependence.

Figure 8: Shorten caption e.g. Joint exceedance probability obtained with a) Clayton copula (0.38) for Saint Malo b) with Clayton copula (0.74) for Le Havre with tide for return periods of 10, 100 and 1000 years.

Line 438: Remove "a" before "lower".

Line 438: Reorder. "We can therefore conclude that the Clayton copula is the most appropriate copula for our application. For this purpose, the Table 4 gives the parameters of the different sites." Move these two sentences to the end of the paragraph.

Line 446: Grammar. "There are areas" not clear.

Line 453: The use of the term "parameters" is a little confusing as parameter refers to the parameter of the copula elsewhere in the manuscript. Could it be "bivariate copula with a single"? A bivariate copula by definition models the dependence between two variables.

Line 454: "Unlike Corbella (2013) we introduce two parameters". More explanation required.

Line 462: "For all three combinations, the Clayton copula still has the largest maximum likelihood value. In addition, we find that for the combination (H, T) the log-likelihood is significantly higher. The parameters (H, T) are therefore the most correlated parameters." The survival Gumbel copula has a highest maximum likelihood for the (H,T) case. Also, the loglikelihood does not most correlated parameters.

Line 488-500: Shorten and arrange into a single paragraph.

Line 505: "generally good". Too vague. Do you mean the best of the four fitted trivariate copulas?

Line 508: Rephrase e.g. "As expected, the fit of the single parameter Archimedean copula is ...".

Table 8: Define "KHI-2" and "KS".

Line 525: "In present practice, ". Please make it clear that joint probabilities are not calculated like this in all cases.

Line 659: "site specific". Given the next sentence it seems they are more "region specific"?

Line 482: "There exist four families". There are more than four families of copulas. Perhaps "Four of commonly applied copulas families are the ..." Also, the "Archimedean, Elliptics" do not need to be plural.

Table A1: Remove an erroneous bracket in the first column of the Joe copula row. Also, please double check the formulae in the Frank copula row.