

Interactive comment on “Trivariate copula to design coastal structures” by Olivier Orcel et al.

Olivier Orcel et al.

philippe.sergent@cerema.fr

Received and published: 16 June 2020

According to the comments of the referee, we have modified the paper as follows.

The Defra method is now presented as a current practice. The section 3.2 explains in which context the Defra method is a current practice. We have recalled that $FD=25$ is a weak dependence and the $FD=20$ is lower than the value that is recommended by Kergadallan. In section 2.1, we acknowledge that the choice of the values at high tide is not the only choice. We had omitted to mention that we used the same data as Kergadallan and his own method as we selected the maximum H_s value within a time window centred on the time of high water. That is now mentioned in the paper. We nevertheless consider that a threshold on H_s is inappropriate in regards of the distribution function (this threshold is applied for copula but not for the distribution function). Since we have two wave populations, we have indeed used a threshold and excluded

C1

wave height values less than one meter (see figure 2). We acknowledge that the independence assumption is not completely valid when two tuples per day are selected but this is a common assumption. Full compliance with independence would lead to ignore some relevant pairs of wave height and surge values. We focus on the lower tail dependence of the survival copula. That is now better explained in section 3.3. We choose the survival copula instead of the standard copula because it simplifies the equations (22), (26), (30), (34). We acknowledge that we do not address the return period of wave overtopping and of armour damage. We also recall that the definition of the return period is not unique. The mixture model is similar to Chakak and Koehler (1995) method that is explained line 50. Its compatibility problem is explained line 51. The title of section 3.1 is changed. The caption of figure 7 is completed in order to improve the understanding of the figure. Five proposed references are added to the text.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2020-80>, 2020.

C2