Natural Hazards
and Earth System
Sciences

Open Access

EGU

Discussions

Interactive comment on "Study of the threshold for the POT method based on hindcasted significant wave heights of tropical cyclone waves in the South China Sea" *by* Zhuxiao Shao et al.

Zhuxiao Shao et al.

szx0617@163.com

Replies to comments by referee #3 Thank you for your comments on our manuscript entitled "Extreme significant wave height of tropical cyclone waves in the South China Sea" (Ref: nhess-2018-349). These comments are all valuable and very helpful for improving our paper. We appreciate that we have a chance to revise the manuscript as you suggested and to resubmit our manuscript after addressing all comments point by point. We hope that the improved manuscript will meet your approval. The main corrections in the manuscript and responses to comments are shown as follows: General response: Thank you for your evaluation of our topic and research. As suggested, we

have rephrased some contents in the manuscript to show the methodological aspects more clearly and strictly. (1) Response: In this study, a 40-year hindcast of tropical cyclone waves is employed as the initial database. The wind used to drive the wave is the blended wind, which covers the entire tropical cyclone process (not only the strong intensity process). The maximal significant wave height of the tropical cyclone wave is obtained during the simulation period. Thus, the maximal significant wave height can be directly extracted as the sample. (2) Response: In this manuscript, we study the extreme significant wave height in the tropical cyclone. When the tropical cyclone track is close to the study site and the tropical cyclone intensity is strong, the wind near the study site is very strong, which primarily determines an extreme wave at the study site. Thus, the track and intensity can be used to analyse the extreme wave at the study site. Location conditions (such as bathymetry/topography, diffraction and shoaling effects) are too complex to be introduced in an extreme value analysis; however, these conditions have been reflected in the tropical cyclone wave simulation. (3) Response: As suggested, "stable threshold" was explained in the manuscript. In the sensitivity of the return significant wave height, when the return significant wave height is stable against an increasing threshold, the corresponding range of candidate thresholds is known as the stable threshold range. See the manuscript P. 4, lines 13-15: "The researchers found that the suitable threshold should be determined within the stable threshold range (i.e., a threshold range corresponding to a range of stable return significant wave heights)." (4) Response: As mentioned, the bin range plays a significant role in the sample distribution. In this study, this range is equal to the threshold interval ($\Delta u = (u_m - u_1)/N_{tot}$) defined by Liang et al. (2019). u_1 is set as the minimal sample, u_m is set as the maximal sample, and N_{tot} is set as the number of samples. On the one hand, the sample distribution can be discussed with the sensitivity of the return significant wave height. On the other hand, this definition of the bin range (i.e., the mean interval of the sample) can reflect the sample characteristics in the distribution. See the manuscript P. 8, lines 1-3: "Candidate threshold. Identify the suitable range for the equally spaced and increasing candidate thresholds, (u_1, u_m), and the threshold

interval, $\triangle u=(u_m-u_1)/N_{tot}$. u_1 is set as the minimal sample, u_m is set as the maximal sample, and N_{tot} is set as the number of samples." See the manuscript P. 15, lines 1-2: "The sample is counted from 0 m to 15 m with an interval of 0.05 m, which is the same as the threshold interval." (5) Response: As suggested, we have carefully reviewed the manuscript. To further improve the quality, proofreading and language editing have been completed by American Journal Experts.

C3