

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC2
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Comment on nhess-2021-94

Anonymous Referee #2

Referee comment on "Statistical estimation of spatial wave extremes for tropical cyclones from small data samples: validation of the STM-E approach using long-term synthetic cyclone data for the Caribbean Sea" by Ryota Wada et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-94-RC2>, 2021

Overall review

The paper presents a novel approach to predicting extreme wave conditions, the methodology appears to be rigorous and the study of high quality. The subject will be of interest to readers and is recommended for publication following consideration of the comments below.

General comments:

The main test is to compare 500 year return values predicted from 200 years of data. Was there a particular reason why the 200 years of data was selected? I would have thought that a smaller length of data, say 50 years typically the length of record available for cyclone, would provide a sterner test and may reveal larger differences between STM-E and single location analysis. That said, the paper is valid and worthwhile as it stands.

Specific comments:

- P2 line 32 'Return level'. Most of the paper uses the term 'Return value' and, for clarity I think it would be better to be consistent throughout
- P6 Figure 3 From the size of SWH it would appear that the SWAN model is using Wu (1982) wind drag formula which is linear with wind speed. Later versions of SWAN use Zijlema et al (2012) where the wind drag coefficient rises to a maximum and falls at high wind speeds. It would be worth specifying the version of SWAN used.
- P7 line 142 I don't understand 'longitude-latitude transects with arbitrary orientation'.

Please clarify.

- P9 lines 202-203 Please consider rephrasing this sentence to avoid a double negative. It is a bit confusing.
- P11 line 229-231 If I understand correctly, you have modelled 1971 cyclones so would it not be better to count back rather than randomly sample? It would be a more robust way of estimating the 500 year return value.
- P14-15 Figures 6 to 9 There is a lot of information included in the graphs and they are hard to interpret. It is difficult to compare black with blue and red. They need to be bigger which may require splitting into smaller subsets.
- P14 line 271 Should this say decreasing rather than increasing? Either way perhaps this sentence needs some clarification
- P15 figure 11 Red and blue show a consistent difference in shape for all sample sizes. Is this important and is it common to other locations?
- P18 line 313 Is this the case for both MLE and PWM? It doesn't look that way.

Typos:

- P6 line 116 remove 'on'
- P7 line 145 Insert 'be' between 'should' and 'sufficiently'
- P9 line 199 An extra 'no' has been included. Please use the most appropriate of 'no obvious' or 'obviously no'
- P18 line 331 'that' should be 'than'