Ocean Science
Discussions

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Interactive comment on "Evaluation of Peaks-Over-Threshold Method" *by* Soheil Saeed Far and Ahmad Khairi Abd. Wahab

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Senior Scientist Andreas Sterl Topic Editor, Email: andreas.sterl@knmi.nl

Dear Dr. Sterl, I am pleased to inform you that we provided our point-by-point responses to the comments raised by the reviewer #1 dated August 2, 2016 for the following manuscript:

Journal: OS Title: Evaluation of Peaks-Over-Threshold Method Author(s): S. Saeed Far and A. K. Abd. Wahab MS No.: os-2016-47 MS Type: Research article

C: Comment & R: Response

1). C: The common nomenclature in extreme value theory is that there are two approaches: block maxima, or peak over thresholds. The block maxima are fitted to the

GEV (Generalized EXtreme value) model, the peak over threshold values are fitted to the GPD (Generalized Pareto Distribution) model. It seems that this manuscript mixes up these words, and describes two models as POT and GPD, which - in my opinion - belong to each other: In the POT approach, the GPD is fitted.

R: This manuscript is a part of an academic research, which mainly aims to improve the Peaks-Over-Threshold (POT) model, introduced by Goda (1988). The POT model is completely different with the GEV or GPD models described by Coles (2001). Despite of some accusations have been seen about the POT model, however, it has commonly been used since the last two decades. In addition, the results of the POT model have shown its credibility compared with the modern models such as the GPD model. The start point of this research turns back to 2012, it happened after publishing a paper by Li et al. (2012). Li and his co-authors compared three extreme wave models (GEV, POT and GPD) and concluded that POT and GPD provide credible results. However, the authors, despite of their results, left many other questions behind without providing suitable answers. This manuscript is an effort to answer some of the important questions concerning to the POT and GPD models, and introducing two proposed methods to improve the POT model.

2). C: The choice for one of those two models is completely based on a single dataset. The option that another dataset could possibly result in another conclusion, is not discussed.

R: Despite of obtaining several results, this manuscript described a comparison between POT and GPD. The aim of comparing the two models was to evaluate the models in order to highlight their merits and limitations. Therefore, we needed to employ same data in developing the two models. This provides a suitable platform to make a comparative study like the published research by Li at el. (2012).

3). C: The Gumbel (FT-1) model is applied to peak-over-threshold values, which is wrong. The same holds for the FT-2 and Weibull models, which should be applied to

block maxima.

R: Please see Goda (1988); Goda (2000) and Goda (2010). This is not the GEV model.

4). C: the manuscript lacks a good description of the wave data. There seem to be too many observations around 2.25m, 3.25 and 4.25 meter (see e.g. Figure 8). Especially the many observations around 4.25 m are suspect: one wouldn't expect so many values just below the maximum value. And if it were true, this points to a (physical) upper limit of the maxima.

R: This comment is not completely clear. The majority of the observed data are in the range of 2 to 3.5 m. However, around 4.25 m less data were recorded. In the manuscript, we did not use the method of Block Maxima, and the GEV model has not been employed or noted.

5). C: the choice of the Weibull shape parameter to be either 0.75, 1, 1.4 or 2 is rather arbitrary. The same holds for the FT-II distribution (fixed to 2.5, 3.33,5 or 10). The fixation of this shape parameter strongly influence the goodness-of-fit, and it also reduces the uncertainty range considerably. It would have been much more logical that the GEV (or GPD) distribution would have been fitted, in which also the shape parameters is estimated from the dataset, and its uncertainty influences the confidence bands. This is correctly done in section 3.1, but I don't understand what section 3.2 (the so-called POT method) adds to section 3.1.

R: I think, this comment has been based on the assumption of using the GEV model. The use of fixed shape parameters has never been the manuscript's idea. It is a routine procedure of developing the POT model. We know that all of these statistical models come with uncertainties, and sometimes the criticisms are reasonable, however, a perfect model with no uncertainty has not been introduced, yet.

We appreciate your time taken to review the responses.

Yours Sincerely, Soheil Saeed Far

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References:

1. Goda, Y. (2010). Random seas and design of maritime structures. World scientific.
2. Goda, Y. (2000). Random seas and design of maritime structures. World scientific.
3. Goda, Y. (1988). On the methodology of selecting design wave height. Coastal Engineering Proceedings, 1(21). 4. Coles S. (2001). An introduction to statistical modeling of extreme values. London: Springer Series in Statistics. 5. Li, F., Bicknell, C., Lowry, R., & Li, Y. (2012). A comparison of extreme wave analysis methods with 1994-2010 offshore Perth dataset. Coastal Engineering, 69, 1-11.

Please also note the supplement to this comment:
http://www.ocean-sci-discuss.net/os-2016-47/os-2016-47-AC1-supplement.pdf