

## ***Interactive comment on “Non-stationary Extreme Value Analysis: a simplified approach for Earth science applications” by Lorenzo Mentaschi et al.***

**Lorenzo Mentaschi et al.**

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First of all we would like to thank the editor for his interest in our work, and reviewer 2 for his time spent reading carefully the paper, and for the comments and the suggestions to improve the quality of the work. Follows a item-by-item reply to the reviewer comments.

reviewer: The uncertainty in extreme value analysis can be very large even without nonstationarity. Besides using EA as a benchmark, it would be better if the uncertainties (bias or standard errors) of the estimator (for either the distribution parameters or return levels) are also compared among three approaches.

author: Thank you for the suggestion. The mean confidence intervals for the return levels estimated by TS, SS and EA have been added in tables 3 and 4, and have been commented in paragraphs 4.1 and 4.2.

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reviewer: 1. Page 5 line 1. Add "as" in the middle of the sentence. "It can be shown that the time-dependent GEV parameters given by Eq.(7) are the same" as "that would be obtained from. . ."

author: Amended as requested

reviewer: 2. Page 6 line 1. The notation  $x$  in  $\mu_x$  should be a subscript.

author: Corrected

reviewer: 3. Page 5 line 3. "it is maximum also" → it is also the maximum

author: Amended as requested

reviewer: 4. Page 9 footnote line 1. Suspected grammar error in the first half sentence.

author: The sentence was reformulated hoping to make it clearer: We can evaluate the error on the average of the observations by propagating the intrinsic error of each observation, which is given by the standard deviation of  $s$ , to expression ...

reviewer: 5. Page 12 line 3-4 citation format. "implemented by (Alfieri et al., 2015) and (Vousdoukas et al., 2016)" → implemented by Alfieri et al. (2015) and Vousdoukas et al. (2016)

author: Amended as requested

reviewer: 6. Page 14 line 11-12. "The estimated seasonal GEV and GPD are significantly lower than. . ." Does the "estimated GEV/GPD" refer to estimated pdf or estimated return of levels? The text is not clear enough.

author: In the specific we refer to the pdf. Clarified as requested

reviewer: 7. Page 19 conclusion. The generality of TS method has been described in the first paragraph in session 5 (page 17). It seems redundant.

author: The reviewer is right that this concept is repeated. However we prefer to stress it once again in the conclusions, as we regard this as a major aspect of the TS ap-

proach.

reviewer: 8. Figure 1. Resolution is not high enough (based on the size of 100% in PDF file).

author: Figure 1 has been replaced and the resolution increased.

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