

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

**Anonymous Referee #2**

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This article introduces a transformed-stationary (TS) method for extreme value analysis in earth science. Authors did a good job illustrating the specific procedures of the TS approach. Tables and figures speak for themselves with titles and labels. The results comparison among three methods – TS approach, established approach (EA), and stationary on slice (SS) approach – demonstrated that TS method is sufficient for the estimates of distribution parameters and return levels when adopting EA as the benchmark.

The uncertainty in extreme value analysis can be very large even without non-stationarity. 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.

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The use of English language is not perfect. Some sentences are too long and hard to understand. The use of prepositions in some phrases/sentences are awkward.

Specific comments in the text:

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..."
2. Page 6 line 1. The notation  $x$  in  $\mu_x$  should be a subscript.
3. Page 5 line 3. "it is maximum also" → it is also the maximum
4. Page 9 footnote line 1. Suspected grammar error in the first half sentence.
5. Page 12 line 3-4 citation format. "implemented by (Alfieri et al., 2015) and (Voudoukas et al., 2016)" → implemented by Alfieri et al. (2015) and Voudoukas et al. (2016)
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.
7. Page 19 conclusion. The generality of TS method has been described in the first paragraph in session 5 (page 17). It seems redundant.
8. Figure 1. Resolution is not high enough (based on the size of 100% in PDF file).

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