

Interactive comment on “Regional frequency analysis of extreme storm surges using the extremogram approach” by Marc Andreevsky et al.

Anonymous Referee #1

Received and published: 3 December 2019

===== General Comments: =====

The present work uses the Empirical Spatial Extremogram (ESE) approach to conduct a Regional Frequency Analysis (RFA) of extreme skew storm surges (SSSs). This is a contribution to our knowledge in flooding hazard in coastal areas.

The authors provide a comprehensive description of the ESE based approach to form a physically homogenous region centred on a target site, avoiding the problem of the “border effect”. Once the physically homogeneous regions are formed, the statistical homogeneity is checked and the regional frequency estimation is estimated.

The approach is applied to three target sites (Calais, Brest and La Rochelle) and the results are compared to those obtained in previous work (Weiss, 2014c). The compar-

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ison shows progresses concerning on how the statistically homogenous regions are built. The authors should note that the so mentioned work of Weiss (2014c) is missing on the references.

The research falls in the scope of NHES and the writing is generally good. This article should be interesting to the readership of the journal. This reviewer recommends the article to be published with consideration given to the general and specific comments listed below.

===== Specific Comments: =====

Line 39: The definition of SSSs is lacking in the introduction.

Line 39: ‘Bernardara et al, 2001’ not ‘Bernardara, Andreevsky and Benoit, 2011’. Note that this also appears in other places in the paper. Please, correct it because when more than two authors are referred in the text the Latin expression ‘et al.’ needs to be used.

Line 77: ‘in section 5.’ Not ‘in section 5’.

Line 98: the sentence appears with different text size.

Line 147: the definition of lambda, λ , is lacking.

Line 155: the work of Weiss (2014c) is mentioned several times in the paper but it is missing in the references.

Line 166: The observation period ranges between 1846 and 2011. Why recent years are not considered? What about climate changes in the past? What would happen with projected Sea Level Rise? Is the estimated return period affected? Should this affect the results and its confidence? This should be introduced and discussed in the text.

Line 191: Many times the word neighbours or related words (e.g., neighbouring, neighbourhood) are mentioned in the text. Sometimes, it is written ‘neighbours’ and, other

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times, 'neighbors'. Please, make the writing uniform in the paper.

Line 215: Figure 3 is mentioned in the paper. The quality of figure 3 must be improved because the name of the sites are difficult to read. The figure caption should contemplate the meaning of the brackets next to the name of each site.

Line 216: The authors mention Figure 6 instead of Figure 4. Please correct it because this mistake appears several times in the text.

Line 220 and others: 'Dunkirk' or "Dunkerque", "Saint-Malo" or "St-Malo", "Saint-Servan" or "Servan", "Saint Helier" or "Jersey". Note that the sites defined in figures 1 and 3 appear different in the text. Please, avoid it, because this might confuse the readers.

Line 261: the heterogeneity measure H (equal to 0.53) was already ok. Probably the authors want to provide the new value of D_c because that was the discordant parameter. Please, verify it.

Line 280: 'The distribution parameters' not 'The distributions parameters'

Line 289: The paragraph should be rewritten. The definition of RLs is lacking. What are the results in brackets in Table 2? The results and the link to Table 2 values should be better explained because it is confusing.

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