

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC3  
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## **Comment on nhess-2021-314**

Anonymous Referee #3

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Referee comment on "Characteristics of joint heavy precipitation and high sea level events on the Finnish coast in 1961-2020" by Mika Rantanen et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-314-RC3>, 2021

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General comments:

The manuscript deals with the concurrent occurrence of heavy rainfall and high water events along the Finish coast. The paper is well written, and what is presented is sound. The only thing I do not understand is, what is the point the authors want to make.

If they wanted to point out that these compound events create more severe flooding then in the case of non-compound events, well, in this case the authors failed miserably. There is no indication, and no statistics shown that can convince me that it is important to look at compound events in order to understand the severity of these events.

Actually, I am not sure why the authors have written this paper. The atmospheric circulation might be interesting, but me as an oceanographer am always looking at implications that some variables have for storm surge. I do not think that you need to analyze rain data in order to find out about flooding events.

Maybe I am missing something, maybe I was expecting too much. But as it stands now, this article is not very interesting. On these points I do reject the manuscript, but the editor might see it differently.

Specific comments:

Abstract: the authors want to correlate the rainfall and water level to compute compound flooding. Already in the abstract, they state that these events mostly are due to sea level variability (nothing surprising). I am not sure how the rainfall fits into this picture...

36-42: for this please see also Ferrarin et al, 2021 (Progress in Oceanography)

30: are you sure it is the precipitation, and not some other correlated variable like wind or atmospheric pressure that makes these events compound events?

98: how strong is this trend (numbers)?

105: please make clear if these data are observations or come from a meteorological model.

Table 1: have all points a MSL of 0?

123: I guess there is also rain data in ERA5. Did you use it and compare it to the observation data? If not, why not? If yes, how did the two data sets compare?

307-9: this is what I was fearing... that there is little correlation between rain and sea level. And for the whole article you are basically repeating it...

375-6: Well, I was eager to see the prove of this statement, but I guess the authors do not convince me

406-9: This is all hypothetical. Where can I verify this hypothesis?

431-2: It is maybe a proxy for compound flooding, but I am not sure if this is important, because you did not show the importance of compound flooding.

443-450: Well, you should have really shown that sea level is higher statistically during compound flooding then without compound flooding. I didn't see this analysis, hopefully I didn't miss it.

451-5: are these levels statistically different from non-compound events?