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Comment on esd-2021-13

Anonymous Referee #1

Referee comment on "Natural Hazards and Extreme Events in the Baltic Sea region" by Anna Rutgersson et al., Earth Syst. Dynam. Discuss.,
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In the manuscript "Natural hazards and extreme events in the Baltic region" by Rutgersson et al., the authors attempt to classify the extreme environmental events in the Baltic region, both in the present and future climate. To do so, they describe selected extreme environmental events in detail, giving an overview of the present-day knowledge and climate projections.

There are two interconnected problems with the manuscript. The first problem is that the manuscript is not well organized; and the second problem is that the manuscript has clearly been written by many authors, most of which have chosen a different approach to the topic of their interest.

Regarding organization, I suggest dividing chapter 2 into three chapters with working titles: (1) driver of extremes; (2) present and future extreme events; (3) impact on society. In (1) the most important preconditioning (present and future day) should be described - this includes general circulation, cyclones, blocking events, sea-level rise, temperature trends, ... (2) should keep the structure of the present (2.2) but it should be re-organized starting with the longer-lasting processes and moving to the shorter-lasting one; and starting with the atmospheric processes, and moving to the ocean processes; in this sense "Extreme waves" can not come before "Sea levels" (and "sea levels" title should be changed to "Extreme sea levels");... in fact - the structure should look like what is shown in Figure 14. In (3) more impacts should be described. It is not clear why only "forest fires", "coastal flooding" and shipping and "offshore wind energy activities" are described - what about the impact to traffic in general, agriculture, recreation, tourism... Also "shipping" and "offshore wind energy activities" are different than "forest fires" and "coastal flooding" in a sense that in the former we look at the impact of natural hazards on the activity, and in the latter, we discuss the natural hazard itself. It would probably be best to move "forest fires" and "coastal flooding" in (2).

Next, all chapters in (2) must be harmonized in style, and follow the same structure (the same for all chapters in (3)). Problem with many chapters is that they just list all of the studies related to a topic, and for some topics, these studies contradict each other - leaving a reader very confused after reading a chapter. My suggestion for each chapter is to follow this structure: (1) short description of the hazard; (2) description of the main drivers; (3) present-day characteristics and trends, starting from wider area studies to a

specific country study, stating, e.g. "Most studies have shown that frequency of precipitation over the Baltic will increase (all references)... in particular, this has been confirmed for... Estimates in a number of days with heavy precipitation range from ..., and with mild precipitation... However, there are studies opposing this finding. These studies include ... showing... " (4) future changes described in a similar way. The reader should be left with a clear understanding of what is going on by the end of each chapter - i.e. a picture of what is given in Table 4 (which is a nice table) for a specific event should be created in the reader's head by the time the chapter is read. Now, some chapters feel like just reading a list of references without much connection between them.

Also, if meteotsunamis are listed in Table 4., they should be discussed as well. I suggest nice papers by Pellikka on the Baltic Sea (in particular Finnish) historic meteotsunamis.

All in all, I find the topic well analyzed and the work relevant. However, I encourage authors to make it more fluent and more harmonized.