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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Coastal flooding: impact of waves on storm surge during extremes. A case study for the German Bight" *by* Joanna Staneva et al.

Anonymous Referee #3

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The manuscript presents a case study analysis of coastal inundation during an extreme extratropical storm event (Xaver) that made its land fall in northwest Europe December 2013), with a considerable impact in the North Sea. The central focus (and goal) of the paper is to show the goodness of having a wave model coupled to a surge model (or a regional ocean model).

I consider this study useful and interesting, nevertheless I have some comments regarding the way the study and the results are presented. I make some suggestions regarding language, but the authors should read and correct the whole text, since the use of the English language is sometimes far from appropriate. If the authors choose to comply with my comments I would still like to read the manuscript before the final

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Discussion paper

acceptance.

Abstract The abstract has several flaws that I suggest the authors should address. Please have in mind that the abstract should “survive” (or stand) by itself. Hence it should have concise but complete information so that an educated reader knows (or understands) what to expect in the text body. Please provide information about the models you are using in the abstract.

P1-L13 (same in L21 and L23): Extremes? What extremes? Extreme storm event? Extreme sea level rise? P1-L21: replace “enhances significantly” with “is significantly enhanced”. P1-L23: replace “area” with “areas”. P2-L7: erase ”the” before “ocean”. P2-L7: Regarding sentence starting with “The wind-induced...” why is this here? It seams disconnected from the rest of the text (although, of course, being a valuable statement). P2-L8: sea surface or ocean surface (mixed) layer? I tend to look at the sea (ocean) surface as a skin layer. Please be clearer. P2-L13: add “a” before “circulation”. P2-L15: replace “waves-current” with “wave-currents” (here and in other parts of the text). P2-L16: I am afraid wave models are not earth system components. Regarding “. . . and further integrating of biogeochemical or morphologic parts” I don′t get what you mean; could you please re-phrase it? P2-L20: instead of “wind boundary layer” (which doesn′t exist or it is not a valuable geophysical statement” please use “lower marine atmospheric boundary layer”. All references here are from high wind speed regimes, when the highest (deeper) impact actually occurs during light winds and swell regimes. Consider adding some references regarding light winds regime. P2-L22 (and in several other parts of the text): add curly brackets on the years in the references. P2-L26: what do you mean with “radiation stress approach”? P2-L27: what is a “practical analysis”. I am afraid this might not be a very scientific statement. P2-L28: what is “circulation for the ocean state”? P2-L30: the sentence starting with “The role of. . .” is lost here. No relation with before of after text. P3-L1: add “a” before “Lagrangian”. “Drift” what drift? Stokes? Wave induced? P3-L3: replace semicolon with full stop and start new sentence afterwards. No need for this here (here and in other parts of

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the text). P3-L7: it is a fact that storm surges are meteorologically driven, not a “well accepted” situation. It would be the same as saying that “it is well accepted that ocean surface gravity waves are wind driven”, or that “the thermohaline circulation is driven by water density differences”. P3-L11: correct tense of sentence starting with “IPCC. . .”. P3-15: please provide some more explanation on how waves and tides are amplified by the rise of sea level. P3-L16: “could” or “can”? P3-L17: add “and” after “seawalls”; add “ocean” before “circulation”. P3-L18: add a comma after “Bight”; replace “greatest” with “great”. P3-L19: how can the forecast reduce the damage? P3-L20: add “farms” after “energy”; replace “navigation” with “routing”. P3-L23: sentence starting with “Further. . .” is confusing; please re-write. P3-28: what are external waves? P3-L30: replace “substantial” with “a considerable”; replace “for” with “in”. P4-L1: erase “cause”. P4-L8: erase “as well as satellite data”; add “and remote sensing” after “in-situ”. P4-L22: “outer model” or “outer domain”? P4-L28: add “further details.” after “2016)”. P5-L15: “action density” or “wave energy density”? P5-L21: there is no “S” in the rhs of equation (2). P6-L9: “wave motion” is too broad; please provide additional explanation. P6-L27: add “wave model” after “by”; the WAM model doesn′t “give” data!; all this sentence is inaccurate from a wave model standpoint. P7-L2: add “of” before “GOTM”. P7-L10: replace “causing” with “that caused”. P7-L19: replace “has” with “had”. P8-L19: erase double punctuation. P9-L5: replace “As an example we present” with “As can be seen in”. P9-L12: sentence starting with “The standard. . .” is confusing; please consider re-writing. P9-L15: “low”?, how much?; replace “analysis on” with “the analysis of”. P9-L28: you have defined Hs before, hence erase “significant wave height”. P10-L12: replace “is” with “are”. P10-L28: replace “demonstrate” with “show”; maybe this reduction should be quantifies here. P11-L14: reached or reaching? P11-L30: replace “their” with “its”. P12-L3: erase “with”. P12-L17: add “to be” before “important”. P12-L30: correct the tense of the verb. P13-L4: “North-Frisian Wadden Sea” is this correct? P13-L5: “is due. . .” how do you know? P13-L6: replace “of the” with “to the”. P13-L29: models only could be inappropriate. . .” wrong tense; please re-write. P14-L2: replace “is” with “are”. P14-L3: add “the” before Nederland”.

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P14-L6: sentence starting with “Recently. . .” is confusing; consider re-writing. P14-L22: replace “with” with “to”. P14-L30: replace “the coastal area” with “coastal areas”. P14-L30: replace “know” with “understand”. P14-L31: “risks and losses”? What do you mean?; replace “increases” with “has increased”. P15-L1: sentence starting with “Although. . .” is confusing; consider re-writing. P15-L4: what “leads”? P15-L6: replace “has” with “have”. P15-L7: replace “cause” with “causes”. P15-L9: erase “the”. P15-L18: sentence starting with “Nowadays. . .” is confusing; consider re-writing. P15-L24: replace “satellite” with “remote sensing”; which products?, please be more specific. P15-L27: add “have after “We”; add “the” after “that”.

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