

Interactive comment on “On the improvement of waves and storm surge hindcasts by downscaled atmospheric forcing: Application to historical storms” by Émilie Bresson et al.

Anonymous Referee #1

Received and published: 8 June 2017

Review of the Natural and Hazards Earth System Sciences - Discussions: “On the improvement of waves and storm surge hindcasts by downscaled atmospheric forcing: Application to historical storms” by Bresson et al.

The manuscript presents an interesting study on the quality of wave hindcasts and storm surges as a function of different wind forcings. Despite the usefulness of the study I have some concerns regarding the methodology, and serious concerns regarding: knowledge of basic concepts, references completeness, the way results are presented, and, most of all, the quality of the text. There is only so much one can correct, hence the authors should revise the text beyond my corrections. My advice is to move

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the manuscript to a second iteration of reviewing, pending on the (major) corrections and alerts I raise below.

P1, L1: What is FP7 IncREO? Please define all acronyms properly. P1, L7: Add “directly” after “wind”. P1, L8: What is \$D blending? P1, L11: Replace “soil” with “soils”. P1, L13: Add “storm” after “events”. P1, L17: beset? P1, L18: Intense storms have by definition high winds speeds, no? What are “high winds”? High wind speeds might be better. What are “powerful swells”? All this sentence is full of inaccuracies and lose use of non-scientific and inaccurate terms. Please revise. P2, L3: Global change of what? P2, L17: Replace “model” with “models”. P2, L18: What do you mean with “not fully resolved”? P2, L21: Sentence starting with “The technique...” is confusing. Please revise. P2, L25: Add “subsequent” before “dynamical”. Replace “fully” with “better” (are you sure that you can “fully” resolve it?). P3, L3-5: All paragraph is confusing. Revise. P3, L6: Which reanalyses? You start talking about reanalysis somehow “out of the blue”. How do you know they don’t resolve windstorms? This statement is speculative, inaccurate, and not backed up by previous studies (references). Reanalyses (against there are lots of reanalysis, s at this stage we don’t know about which one(s) you are talking about) might not resolve properly or accurately extreme wind events, but your statement is not correct. Also, the tense of the verb (here and in several other parts of the text) is not correct. Revise. [You tend to make small paragraphs, sometimes with only one sentence, which is not grammatically correct, and makes the text harder to read. Revise the all text body on this aspect.] P3, L8-10: All paragraph is confusing. Please be clearer. You don’t interpolate the reanalysis itself, but its parameters or output. P3, L13: small scales of what? What are “small scales”? [Section 2.2: The way the ECMWF ERA-40, ERA-Interim, and ERA-20C is far from correct. Revise the whole section with accurate statements and use of concepts, backed up by the proper references.] P3, L18-19: Wrong definition of reanalysis. Revise. P3, L19: Define ECMWF. What is ERA? (ERA stands for “European reanalysis”). Define acronyms properly. P4, L12-13: What do you mean with the sentence starting with “Different...”. Revise. P4, L16: add “is” before “based”. P4, L30: What is MFWAM.

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Define. (It is “MFWAM wave model”, and not “wave MFWAM model”). Is it correct to call the Meteo France version of WAM as the MFWAM model? What is the Meteo France version of WAM? At the ECMWF the use of ECWAM (the ECMWF WAM version) can be backed up by references that explain its differences to the cycle 4 WAM. Provide the same time of references to sustain the use of the MFWAM acronym and what it stands for. P5, L1-2: Why is the SWAM wave model used (and not implemented) to “investigate extreme events”? (Extreme events of what, by the way?) P5, L16: Add “the” before “Bulgarian”. P5, L18: Add references after “lakes”. P5, L23: What is BUL? P6, L6: What is NEA? P6, L25-32: The explanation provided in this paragraph falls short. Revise, having in mind clarity and completeness. P7, L1-3: Regarding the sentence stating with “Nevertheless...”: where do you see this in your findings? How can you back this statement? Stronger and deeper cyclones where? P7, L5-6: Sentence starting with “NWP...”: confusing and speculative. Revise. What is NWP? What is NWP with downscaling? Shouldn't it be something like “The downscaling of atmospheric parameters, like the wind field, using NWP models provide...”. P7, L7: From here on you start using the acronym ERA for all reanalysis. That is not correct. You should explain and mention the exact reanalysis you are using. Comparing D1 with any of the three reanalysis means self-correlation, hence that is not correct. P7, L12: Replace “are” with “can be”; replace “all the available data, such as” with “, for example,”. P7, L13: Conceptually “evaluate” and “validate” are not the same, and you use these two words for the same task, which is to evaluate the model(s) output metrics by comparison with observations. You do not validate models, hence evaluate its performance. Correct here and in the remainder of the manuscript. P7, L14: Replace “show” with “have shown”. P5, L15: Replace “hindcasts” with “the wave hindcast”. P7, L18: What is the depth of the ADCP measurements? P7, L25: “model”? Which model? You don't “evaluate models” but their output. Erase “case”. P7, L28: Add “the modelled” before “significant”. P8, L12: Replace collected with “used”; replace results” with “modelled wave heights”. P8, L16: Replace “the good”, with “a good”. P8, L23: Avoid the use of expressions like “perfectly”, since they do not fit in academic writing standards. P8,

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L32: Replace “considered” with “chosen”. P9, L4: Replace “winds” with “wind speeds”; add “during” after “as”. P9, L5: Add “the” before “December”. (I am afraid you do this mistake several times; please check the whole text.) P9, L11: add “results” after “surge”. P9, L14: They? Who ate “They”? Revise this sentence. P9, L18: reported or measured? [The whole section 4.3 is very confusing. Revise.] P10, L3: replace “features” with “speed events”. P10, L7: which reanalysis? [The conclusions section is also confusing, and way too simplistic/simplified. Revise carefully in line with the findings you convey in the manuscript.]

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2017-131>, 2017.

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