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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 #2

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In the presented manuscript, the authors further investigate the data and results of their previously published paper "Coupling of wave and circulation models in coastal–ocean predicting systems: a case study for the German Bight, Ocean Sci., 12, 797-806, doi:10.5194/os-12-797-2016, 2016 by Staneva et al.

In the new manuscript, more emphasis is given on the storm surge predictions from coupled -and uncoupled models, while the general experiment setup and case study are the same as in the previous paper. The advantage of having a coupled model system is discussed; the authors show that the coupling of their ocean circulation model with a wave prediction model improves the predictions of extreme storm surges to a large degree.

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Discussion paper

While little new data or knowledge is presented compared the the previous paper, I would still consider this new paper as worthy for publication because their model data shows remarkable agreement with observations, particularly when using a coupled model system. The relevance of wave-current interactions for storm surges still lacks sufficient documentation that is backed up with observational data, and this new paper presents strong arguments for using coupled models for the forecasting of dangerous storm surges. The data is presented clearly and informative in the figures, but the text needs some revision with regard to clarity and English grammar, therefore I would recommend the paper for acceptance with minor revisions.

Points to be corrected:

- Some references that are used in the text are missing in the the reference list.

- page 2, line 8: wind-induced surface stress does generally play an important role, not only in shallow areas.

- page 2, line 11: The reference to Qiao et al (2004) is not an original reference to this problems, there are many earlier studies that treat wave-induced mixing in both experiments and models. It would be good to also cite some of the earlier works here.

- page 6, line 12: If <u> is the sum of Eulerian current and the Stokes drift, equation (3) will solve for the Lagrangian current following water masses. This is somehow different to the way GETM solves for fixed grid points. If solving for <u> that includes Stokes drift, the radiation stress is not the only wave information that is used in eq. (3). Note that traditional formulations of radiation stress use a Eulerian framework. I think that that <u>, as it is used here, should only include the Eulerian current. If not, further revision of the coupling method will be necessary.

- The coupling from GETM to to WAM should also be described along with section 2.3.

- Some text passages, particularly section 6 are somehow hard to read and should be revised for clarity and grammar.

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