Nat. Hazards Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/nhess-2019-176-RC2, 2019

Natural Hazards and Earth System Sciences
Discussions

NHESSD

Interactive comment

Interactive comment on "Probabilistic characteristics of narrow-band long wave run-up onshore" *by* Sergey Gurbatov and Efim Pelinovsky

Anonymous Referee #2

Received and published: 3 July 2019

The paper presents a theoretical study of random long wave run-up over a plane beach. It starts with a general introduction of the well-known Carrier-Greenspan approach and then describes linear and nonlinear shoreline dynamics of monochromatic waves. The early sections provide reviews of previous works by the authors. The novelty of this work lies in the probabilistic analysis of shoreline displacement and velocity in the latter sections. The authors apply the geometric probability theory for shoreline dynamics to compare statistical properties of linear and nonlinear wave run-up on the shore. Although the approach has significant limitations (e.g. non-breaking and non-dispersive long waves), the paper provides a statistical view of nonlinear wave run-up which is of interest to the community. I recommend publication of the paper after following comments are addressed.

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Discussion paper

-There are typos, missing spaces between words and grammatical errors. Please edit the paper carefully.

-The equation (4.1) is a bit confusing. The RHS of the equation appears to have dimension after reading from the previous sections. Please improve the notation for readers who are not very familiar with the geometric probability theory.

-The assumption of "narrow band" is not clearly explained. In section 5, the incident wave is introduced as "a quasi-harmonic wave with a random amplitude and phase" (L328). The authors do not mention anything about wave period.

-L340-349: Is it obvious that narrow-band random waves exhibit non-breaking wave run-up if individual monochromatic waves are below the breaking criterion? This seems to require certain assumptions or some explanation at least.

-The result of broken wave runup in Section 6 may be questionable. The setting with Br=2 implies that wave breaking occurs before the incident waves arrive at the shore (The Jacobian breaks down seawards of the shoreline). This may affect the probabilistic distribution by eliminating the tail on the positive side.

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