Nat. Hazards Earth Syst. Sci. Discuss., 1, C944–C945, 2013
www.nat-hazards-earth-syst-sci-discuss.net/1/C944/2013/

Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Mapping wave set-up near a complex geometric urban coastline" *by* T. Soomere et al.

Anonymous Referee #2

Received and published: 20 August 2013

The paper addresses the important problem of estimating the wave set up component of storm surges in urban environments - where one can argue that the issue matters most. The topic is relevant both for science and for urban planning, and it is definitely within the scope of NHESS. The paper does no break new ground but represents a combination of careful analysis of existing data and numerical hindcasts. The paper is written within the highest standards of scientific work, including the scientific methods used, the interpretation and the conclusions.

My only quarrel with the approach is related to the use of the WAM model for describe wave propagation up to fairly shallow water (5m). I am not sure WAM has the capability to handle finite-depth effects, certainly not nonlinear near-resonant triad interactions, which dominate wave dynamics in shallow water. It is possible that the relevant ar-

eas/cases studied here were not affected by shallow water physics (the Baltic sea is not the ocean, and 5-m depth could be deep if the waves are short enough). It is also possible that in this environment the shallow-water nonlinearities do not affect significantly the setup. However, I think a discussion about the regimes encountered in the data - maybe a simple Ursell-number analysis - would help establish a stronger foundation for the paper. Running, for example, a Boussinesq model for a couple of borderline cases would also help dispel the doubts. Because it includes most of the relevant physics, such a test would also eliminate the need of, or strengthen, the careful/lengthy discussion about breaking criteria, water levels etc.

It might also settle issues such as raised by Reviewer 1. Citing from the review: "1662 Line 1.- The assumption (1) is neither valid nor necessary. The authors should consider the significant wave height by employing a breaking index more suitable for irregular wave conditions".

"A priori" values for gamma are easy to dismiss on the ground of nmt being realistic. But this is exactly the function of parametrization constants: to be constants (i.e., not realistic). The alternative of modulating a parameterization constant does not make much sense either. The path I would suggest is to conduct a few tests comparing a state of the art (e.g., Boussinesq) model with the parameterized model, and evaluate/choose the most representative value of gamma. A Boussinesq model is accurate but slow and numerically expensive. The reason one would want to use a *validated* parametrization is because it's fast and good *enough* (as per validation).

The paper is long-winded in places (the introduction could be shortened a bit) but otherwise it is well written and is a good contribution to the journal. I recommend publication after minor revisions regarding the shallow water issue.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 1, 1651, 2013.