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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Numerical modelling of tsunami wave run-up and breaking within a two-dimensional atmosphere–ocean two-layer model" *by* S. P. Kshevetskii and I. S. Vereschagina

Anonymous Referee #1

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The principal aim of this work should be the numerical modelling of a tsunami wave propagating toward a shore within a two-layer scheme. According to the title, some description of wave breaking should be addressed but, actually, no analysis is proposed about.

The description of the physical background of the phenomenon under investigation is practically absent and this (along with the bad English) makes the reading quite difficult. The governing equations [equations (1)] are introduced without any motivation/citation and, further, they are questionable. Indeed, the author repeatedly state that the fluid is incompressible but, then, use the continuity equation for a compressible fluid. The

second equation seems the vorticity equation (I was not able to derive it on my own). Then, the Authors seem to assume that the fluid is purely rotational. However, in the conclusions they state "The water flow in the ocean is close to a potential flow, and the vortex is organised at the expense of closure of flow lines through the atmosphere". But the Authors never model the potential component of the flow.

No analysis or description of the boundary conditions along the air-water interface is given in the paper. The Authors refer to a "solitary gravity wave" propagating toward the shore but this is never introduced (they state: "Some exact solution for the solitary gravity wave running to a shore is borrowed from the theory of long surface waves", page 10). There is no reference to any measurements/data-field which justify the use of the initial conditions in (2) and (3). Finally, there is no description of the numerical scheme used to solve the equations. The quality of figures is poor and cannot allow any evaluation of the goodness of the results.

Concluding, the proposed work, in its present form, does not suit the standard of a scientific publication.

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., 2, 3397, 2014.