

## ***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***

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Citation from the report: " the approach chosen by the authors seems to be an "overkill" for the prob- lem in hand. The use of a two-fluid approach has to be properly justified. " namely the novel and promising approach of generalized solution of the problem is interesting. Why it 'overkills?.

citation from the report:

"Moreover, the wave breaking process in numerical simulations was not highlighted at all"

C1708

I think namely the generalized solution is convenient for a breaking description. It could help to avoid non-uniqueness of two-layer model.

Citation from the article:

"The authors consider that the given experience of modelling of propagation and breaking of a tsunami wave within the limits of a two-dimensional united water–air model is successful as a whole."

The pictures evidently support the statement.

citation from the report:

" Clearly, this manuscript is not a mathematical work. It is not numerical either. Is it physical? Perhaps no"

The paper contains concise statement of problem: Equations (of well-known physical origin) and boundary-initial conditions (also conventional) guarantee the uniqueness of solution. Its existence follows from convergence and stability of the numerical scheme.

All it means that the paper is physically and mathematically consistent. The numerical part could be exhibited more clear, but perhaps in a speatial separate publication.

citation from the report:

"On Figures 2 & 3 one can see that a numerical tsunami wave during the propagation creates a huge disturbance in the air (up to 1km in the height). This prediction does not seem to correspond to the reality,"

opposite, I am sure the effect is expectable (I would stress again that the equations have clear physical origin). The perturbation in the air looks as a internal gravity wave because the stratification in z is taken into account. It is also of significant interest in connection of tropospheric perturbations origin.

From the report:

C1709

"Finally, the use of a solitary wave paradigm for tsunami waves seems to be outdated. See, for example, the recent publications of H. Segur with his co-authors"

Maybe the paradigm is not so good for the tsunami wave, but at some stage of shallow water phenomenon its contribution is not excluded.

Summarizing, I strongly recommend the paper for publication (after small corrections).

Sergey Leble

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