

## ***Interactive comment on “Numerical Solution and Application of Time-Space Fractional Governing Equations of One-Dimensional Unsteady Open Channel Flow Process” by Ali Ercan and M. Levent Kavvas***

### **Anonymous Referee #2**

Received and published: 28 September 2016

I think that the authors do not have improved the critical points highlighted in my previous comments.

I repeat that this work is not suited to the present Journal, because, the authors simply present some numerical procedure for a methodology already introduced in a previous work. In the reply to point 1, the authors assert "... Authors (Kavvas and Ercan,2016) presented a detailed derivation of the complete continuity and momentum equations of unsteady open channel flow in fractional time-space, for the first time in hydrology and hydraulics, from the basic mass conservation law and the Newton's second law of

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motion, and this manuscript provides an approach on the numerical solution of these new equations and insights for the capabilities of these new governing equations by the help of a new numerical solution algorithm and its numerical application ...".

I repeat that the proposed numerical technique is obsolete, comparing to the tremendous number of the new introduced ones, during the last 3 decades.

The handling of the boundary condition remains unclear and the authors do not explain how they deal with these conditions according to the local (at boundaries) Froude number.

Generally, when one introduces a "new" numerical technique, he has to prove what he asserts, i.e., on the base of comparisons with other numerical procedure, in terms of computational costs, efficiency, and so on. One should provide an analytical study performing numerical tests, on the base of reference solutions (analytical and/or experimental data). In literature there are millions of examples of such comparison. There is no a perfect numerical method, suitable for all situations. Generally, there are situations in which the own method is better than others, other situations in which it is worst (in terms of accuracy of the solution, computational cost, treatment of the input data, ...). The readers need to know when/where one can use the proposed new algorithm and in which cases the new methodology performs better than others. Without any comparison with other references solutions (either from works/numerical methods proposed by other researchers, either analytical solutions or experimental data), it is easy to acclaim own work.

The authors minimize the lack of such comparisons and assert, in the reply to point 4 "... The numerical algorithm provided here is the only available algorithm to solve the governing equations of unsteady open channel flow in fractional time-space, which was derived by Kavvas and Ercan (2016). Therefore, such a comparison with other solvers is impossible ....". Then, compare the proposed technique with other numerical methods applied for the Saint Venant equations, for the case of exponent 1 and, if

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you do not want to provide any comparison with analytical solution, consider that there are studies in the literature giving with experimental measurements, also very detailed. Test the model and provide the analysis of the results, required in this and the previous revision.

The authors do not provide any element which allows the reader to evaluate the presented work. The general impression is that the authors propose a self-referenced work, and despite my previous comments, they still do not want to compare their proposed methodology with other solutions.

I think that the paper is not acceptable in the present form

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., doi:10.5194/hess-2016-364, 2016.