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Hydrology and Earth System Sciences
Discussions

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 #1

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I do not see which are the scientific questions relevant for hydrology. The paper provides a numerical method that solves time-space fractional differential equations that reduce to St Venant equations if powers equal 1. The only conclusion is the solving of these latter equations, which does not seem to be an innovation. Thus, it is not clear what the present paper provides in addition to previous papers among which some are from the same authors. However, the paper is clearly built and the reader can follow easily. Figures 2 and 3 show zooms of the differences between results for various powers but the authors did not explain why these differences are important. Particularly, they did not propose a more realistic power value (instead of the classical value of 1).

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Discussion paper

The text is not always clear although the authors detail some steps of their method (but the various steps are not fully explained then one can re-build the numerical method but it is not straightforward). For instance, they seem to write that the hydraulic radius is not calculated using the ratio of the wetter area over the weeted perimeter but they do not write the equation they are proposing. There are plenty of references including a lot by the authors but often it is not clear how these references are related to the topic of the paper. So, I think too much useless references are quoted. The title quotes " application " but I did not see to which problem the described method is applied. Particularly, the " heavy tailed distribution of particle displacements " are not treated in the paper. The paper is well structured with the presentation of the equations and of the numerical method. One example is shown but it is not clear why this example was selected. Generally, language is clear but objectives are not clearly defined. Symbol of velocity "V" is not defined.

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