Earth System
Dynamics
Discussions

Interactive comment on "Fractional Governing Equations of Transient Groundwater Flow in Confined Aquifers with Multi-Fractional Dimensions in Fractional Time" *by* M. Levent Kavvas et al.

Anonymous Referee #1

This study developed a governing equation of transient groundwater flow in a multi-fractional, multi-dimensional confined aquifer in fractional time. This study has sufficient novelty, and the developed governing equations would be important for groundwater modeling. Furthermore, this paper is documented well. However, the application and discussion parts of this paper are short. If the authors can provide more detailed information on the application, and more discussions on the results, it would be helpful for readers to understand importance of this study.

Specific comments: 1. Mathematical symbols such as time "t" and function "f" should

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be written in italic even in sentences. 2. It would be helpful to readers if the authors provide more explanation why nonlocal governing equations can account for the influence of the initial and boundary conditions on the flow process more efficiently than the corresponding local-scale equations, in P.9 L.4-6. 3. I highly recommend the authors to provide more detailed information of the setting of the numerical application in Section 6. It is possible to understand the numerical application setting if one reads Wang and Anderson (1995). However, it is currently difficult to know it from the description of this paper. 4. In P.10 L.8-10, "the recession rate of the nondimensional hydraulic heads from the initial condition also gets slower with respect to the case of the conventional governing equation with integer derivative powers." Please explain why this result is important on groundwater modeling. 5. I recommend the authors to add a description about the importance of the result of the numerical application at the end of Conclusion.

Interactive comment on Earth Syst. Dynam. Discuss., https://doi.org/10.5194/esd-2017-47, 2017.