Hydrol. Earth Syst. Sci. Discuss.,
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Hydrology and Earth System Sciences
Discussions

Interactive comment on "A General Analytical Model for Head Response to Oscillatory Pumping in Unconfined Aquifers: Consider the Effects of Delayed Gravity Drainage and Initial Condition" *by* Ching-Sheng Huang et al.

Anonymous Referee #3

Received and published: 16 December 2018

General comments:

Authors describe new analytical solutions to oscillatory pumping tests, applied to data collected at the Savanna River Site in South Carolina, USA, and published by Rasmussen et al. (2003). The solutions extend those published earlier by several authors, by now including delayed gravity drainage, finite radius pumping wells and initial conditions in the well bore. The solutions were well described and the writing was clear.

In general, I agree with the others reviewers that much of the in-depth derivations of the

solutions can be moved to the appendix or supplemental section so that the authors could spend more time on the geology and results of the study. As presented, only about 1.5 pages of the manuscript was devoted the testing of the solutions with real field data. Moving derivations to the appendix would also improve readability of the manuscript, which as presented is extremely dense and likely would appeal to a very few number of applied mathematicians and/or hydrologists. Simplify the presentation of the material, and more readers will take the time to read the manuscript, and cite the work.

Specific comments:

L340 – Yeh and Change (2013) not included in the references

L377 – replace 'to' with 'with'

L385 – check sentence that begins on this line; it is unclear as written and needs some clarification

L425 – replace 'researches' with 'research outcomes'

L443 – re-write portion of sentence as 'the effect of DGD on head fluctuations should be considered.'

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