

Hydrol. Earth Syst. Sci. Discuss., referee comment RC3
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Comment on hess-2021-430

Anonymous Referee #3

Referee comment on "Quantifying time-variant travel time distribution by multi-fidelity model in hillslope under nonstationary hydrologic conditions" by Rong Mao et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-430-RC3>, 2021

Review of Mao et al

This manuscript present work comparing travel time distribution formulations in a simple hillslope experiment. The work has some interesting aspects, comparing different approaches for simulating water residence time.

General Comments:

The manuscript is generally well written and on a topic of interest to the readership of HESS. The terminology of high-to-low fidelity is confusing or perhaps even misleading. I have some comments and suggestions below that might help clarify some aspects of the work as presented and help to better place it in context of the literature, which would help better establish the novelty of the current approach. It is also unclear the the proposed mixed approach is "better" in a computational sense, the authors jump to this conclusion seemingly without comprehensive evaluation.

Specific Comments:

1. S2.2 / lines 141-154. The approach presented has similarities and other approaches (e.g. Maxwell 2019, Maxwell 2016, Remondi 2018, Wilusz, 2020), the statements about inefficiency of the particle tracking (low-fidelity) approach are not well justified.
2. Subsurface heterogeneity can impart significant differences on macro scale behavior (e.g. Benson 2019; Danesh-Yazdi 2018, Engdahl 2014)
3. Effects beyond the hillslope are important (e.g. Kollet 2008; Maxwell 2016; Remondi 2018; Wilusz 2020) and should be discussed.
4. Some references included below that the authors may want to read / consider. This is not a comprehensive list.

References

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