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Comment on hess-2021-479

John Ding

Community comment on "Morphological controls on surface runoff: an interpretation of steady-state energy patterns, maximum power states and dissipation regimes within a thermodynamic framework" by Samuel Schroers et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-479-CC1, 2021

The authors focus the analysis on the rising limbs of overlandflow hydrographs, e.g., Figure 10, Panels (a) and (c) for the sheet and rill flows, and the sheet flow only, respectively. These are essentially the summation or S-curve hydrographs. Not mentioned are their falling limbs after the termination of the effective rainfall, i.e. recession hydrographs.

Because of the absence of the forcing effective rainfall intensity term, P_{eff}, an additional, and simpler, analysis by the authors will likely lead to linearization of the recession hydrograph by an inverse fractional-power transformation of the discharge, $1/Q^{(1-1/c2)}$. This was derived earlier for a nonlinear storage-discharge function by this writer, e.g., Ding (1974, Eq. 4; second equation after Eq. 11).

For Manning friction law, the flow depth exponent $c_2 = 5/3$ shown in their Table 2.

References

Ding, J.Y., 1974. Variable unit hydrograph. J. Hydrol., 22: 53-69.