

Hydrol. Earth Syst. Sci. Discuss., referee comment RC3
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Reply on AC3

Keith Beven (Referee)

Referee 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-RC3>, 2021

An excellent reply (and I stress again that I do not want to discourage this research programme) but: you do have to be careful in avoiding circularity of reasoning when coefficients (like D_f or its parts) have to be back-calculated from experimental data (in the same way that it is always possible to get a value for n given observations of velocities or discharges, which is really the only reason why it is still being used as a convenience not requiring much thought). I can see that testing any hypotheses about D_f is going to be highly challenging even at small plot scales, while inferences at larger scales (including inferences about minimisation principles) are going to depend very much on assumptions about the distributed and transient nature of D_f in model simulations. So I would suggest that you proceed with caution, remembering that rejecting your favoured hypothesis is often more valuable to improving understanding.