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Hydrology and Earth System Sciences Discussions

Interactive comment on "Connected flow paths as first order control on critical zone water flows: coincidence or self-organized optimality?" *by* E. Zehe et al.

Anonymous Referee #2

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This paper deals with a very interesting topic and could be a great contribution to HESS. At the same time, the concept covered in this paper is not that easy to digest for people who are not familiar with this area. Hence while I read this paper, I hoped if there is further clarity in writing. What I mean by is not the language issue-The usage of English in the manuscript is great. Rather, there are rooms of improvements in details of writing and organization.

For example, introduction of this paper is lengthy. While I can understand the need of lengthy introduction, but it would be much easier for readers if authors provide what this

paper is about briefly before the paper jumps to section 1.1. Numerical experiments are also difficult to follow. For example, there are 3 cases in Experiment 1, and with the given text it is difficult to imagine what the differences are among these cases. It would be easier if authors provide figures of topography of these cases. I think this paper delivers valuable results which are worthy of publication but after clarification of writing. Detailed comments follow.

P10596, Ln 20: remove 'been'

P10596, Ln 23: define 'intermediate systems' more clearly. (i.e., they are intermediate between what?)

P10599, Ln 12: move (MEP) to Ln10, next to Maximum Entropy Production

P10599, Ln 20: MED – Write its full name. It cannot be initials of reduction of free energy.

P10600, Ln 10: define 'critical zone'

P10604, Ln 15: What is dU in Eq (1)?

P10622, Ln 11: Does 'uniform slope' mean 'linear profile'? Including this, the explanation of case 2 is confusing. Do authors mean (1) the same network as Fig4a with linear profile shown as a straight line in Fig4b, or (2) homogeneous slope with no tree network configuration in Fig4c? I suggest showing figures for the three cases.

P10626, Ln 22: 'not produce a base flow component' – Why? Did authors define something about subsurface flow condition, infiltration, groundwater, etc. between the three cases? Needs clear explanation of the three cases.

Fig 5: In figure a, I can't see 'case 2 in solid black'. In figure d, why runoff volume is not conserved among cases?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 10595, 2012.