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Hydrology and Earth System Sciences Discussions

Interactive comment on "Climate-vegetation-soil interactions and long-term hydrologic partitioning: signatures of catchment co-evolution" *by* P. A. Troch et al.

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Subject: Aquifer time scale

The review by Savenije, in his larger/major comment 1 (one), helps spotlight on the most significant role played by the so-called "perched aquifer advective time scale [day]" in the Discussion Paper (see Figure 6 and, later on, Figure 9). This being the case, the subject of baseflow recession from groundwater storage release may bear or merit another brief mention by this writer.

A grand synthesis of an ecosystem at a catchment scale is a laudable aim, and I applaud the authors for their ambitious, intellectual pursuit. For a synthesis to be suc-

cessful, it must be rooted in the first principles of whichever fields or disciplines involved, such as and including hydrology, but having only a few parameters to capture the essence of the system (e.g., Dooge, 2005), one being their aquifer advective time scale τ.

As defined by their Equation (4), obviously this is linearly related to the length of the hillslope in m (metre), implying that the larger the size of an aquifer, the longer its time scale. But the authors need to provide or clarify the context: what does a τ of, say, 10 days mean, in terms of the moisture storage available for plant growth and survival, etc. ?

I suggest the authors cast this, if they haven't done so elsewhere, in the context of a lumped storage system. What is frequently and prominently reported in current literature is the famous Brutsaert-Nieber (BN) recession plot (e.g., Stoelzle et al., 2013). The BN equation, $-dq/dt = aq^b$, is, in my view, based on the law of momentum conservation or balancing.

As part of a discussion of Stoelzle et al. paper, the writer (Ding, 2012a) establishes the equivalence of the BN model and, again in my view, an energy-balancing, nonlinear storage-discharge model, $q = c^N s^N$, and further more that $b = 2 - 1/N$ and $a = Nc$.

Their scale parameter τ is expected to relate to other one, a or c, maybe in as simple as those between the BN model and that of mine.

$Correction\ to$ "Addendum: ROSR transform" (Ding, 2012b): In the third and last paragraph, "Earlier discoverers ..... is now known" to read "Earlier discoverers ..... are now known".

References

Ding, J.: Interactive comment on "Are streamflow recession characteristics really characteristic?" by M. Stoelzle et al., Hydrol. Earth Syst. Sci. Discuss., 9, C4378-C4381, 2012. www.hydrol-earth-syst-sci-discuss.net/9/C4378/2012/

Ding, J.: Interactive comment on "Are streamflow recession characteristics really characteristic?" by M. Stoelzle et al., Hydrol. Earth Syst. Sci. Discuss., 9, C5107-C5108, 2012. www.hydrol-earth-syst-sci-discuss.net/9/C5107/2012/

Dooge, J. C. I.: Bringing it all together, Hydrol. Earth Syst. Sci., 9, 3-14, doi:10.5194/hess-9-3-2005, 2005.

Stoelzle, M., Stahl, K., and Weiler, M.: Are streamflow recession characteristics really characteristic?, Hydrol. Earth Syst. Sci., 17, 817-828, doi:10.5194/hess-17-817-2013, 2013.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 2927, 2013.