

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-

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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., Stoezle 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 Stoezle 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

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