

***Interactive comment on* “Minimum dissipation of potential energy by groundwater outflow results in a simple linear catchment reservoir” by Axel Kleidon and Hubert H J. Savenije**

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This study clarifies a catchment’s overall behavior by deriving a characteristic time-scale for steady-state conditions. It seems to me that any catchment (i.e. also a non-linear one) in a single state (e.g. steady-state) can be characterized by a single characteristic time-scale ($\tau = S/Q$). However, a catchment can only be considered to behave as a linear reservoir when this characteristic timescale τ also applies in other states (e.g. lower or higher storage and runoff). For the presented example, showing that the derived timescale τ also applies to other conditions seems to require relaxing the steady-state assumption. However, in that case, the characteristic timescale cannot be

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derived anymore with the presented analysis. Thus, do we now have a Catch-22? Or do I misunderstand something?

(P.s. a short conversation with the second author could not clarify this issue and he encouraged me to post this query on HESSD)

Kind regards,

Wouter Berghuijs

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