

## ***Interactive comment on “Derivation of the mean annual water-energy balance equation based on an Ohms-type approach” by X. Shan et al.***

**Yang**

yanghanbo@tsinghua.edu.cn

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We really appreciate the review and comments from the reviewer.

Regarding the “more physical” derivation, I think that the derivation for Equation (18) has more physical meaning, proposing a catchment network using Lagrangian particle tracking method, establishing the equations based on the Ohm-type law, and giving the boundary conditions of catchment hydrology. According to the Ohm-type law, we assumed water vapor being forced by some potential difference, similar to the movement of soil moisture.

Regarding “new” understanding, one is that the previous derivations for the MCY equation had an underlying assumption, i.e. the homogeneous assumption, the generalized

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flux having the same form for both water vapor transportation and phase transformation. It indicates that the assumption needs further test or another form is more suitable for the real catchment.

As the review pointed out, Equation (19) and the text aren't rigorous. Instead, the homogeneity assumption is included in Equation (18). We will revise the manuscript.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2018-598>, 2018.

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