

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

Anonymous Referee #2

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This manuscript claims to give a new, “more physical” derivation of the MCY model of the Budyko equation describing long-term catchment evapotranspiration. The authors attempt to make an analogy between water flow from one catchment to another via transport in the atmosphere, followed by precipitation in the receiving catchment, and Ohm’s law as applied to two resistors arranged in series in an electrical circuit. No justification based on catchment hydrology is given for this analogy or for the three assumptions and two corollaries that it is purportedly derived from. The authors’ resulting “Ohm’s law expression” (Equation 18) is then converted into the MCY model by making another assumption, that the functional form of each term is a power-law in the independent variable. The manuscript also contains many erroneous statements (for example, that homogeneity is the basis for Equation 19). Experts on modeling the

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Budyko equation will find nothing “new” or “more physical” in this manuscript.

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