

Interactive comment on “On the importance of including vegetation dynamics in Budyko’s hydrological model” by R. J. Donohue et al.

Anonymous Referee #4

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The paper “On the importance of including vegetation dynamics in Budyko’s hydrological model’ by Donohue et al. is a welcome analysis on a fundamental aspect of eco-hydrology. The paper is well written and the analysis is thoroughly carried out and explained. The paper should be published after minor revisions.

However, one point that deserves more attention is the definition of steady state. In particular, when one considers equation (1), dS_w/dt is always varying (at different time scales), because of the (random) fluctuations of evapo-transpiration and precipitation. Thus, to neglect dS_w/dt , what really one does is to assume stationary conditions and integrate over a temporal scale that is larger than the integral time scale of the fluctuations of S_w (e.g., the integral of the absolute value of the autocorrelation function of S_w). this should be clarified. When this is not possible, then ΔS_w needs to be take in to

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account along with the typical time of integration (τ), and thus the interesting analysis of the paper. The paper would benefit from a more precise discussion of these issues.

Other minor points: line 25 of page 1518: 'one of the central challenges of ecohydrology' Rodriguez-Iturbe and Porporato is 2004 and not 2005.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 3, 1517, 2006.

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