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Discussions

Interactive comment on "The Budyko framework beyond stationarity" *by* P. Greve et al.

Anonymous Referee #3

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Main Remarks

This paper deals with the Fu water-balance formula. Basically, the work reported here aims at introducing in the formula a second parameter which accounts for catchment storage capacity. The authors do so by going back to the initial differential equations and reintegrate them by using a new boundary condition.

I was very interested by this work, and I honestly believe that there is a lot of potential. The reason why I am quite negative about it, is that I think that there is a fundamental confusion (in the way it is presented to the reader, and also in the solution proposed). Here is what I consider to be the major flaw: the Fu water balance equation is not a dynamic equation, and its partial derivatives do not refer to time. This equation explicitly deals with long-term fluxes. The very use of the word "stationarity" shows that the authors have made a confusion.

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I also have doubts about a few choices made by the authors (such as Pmin in Eq. 11, what if Pmin is equal to zero?).

Last, I believe that section 5 lacks enough information to explain how parameters k and y0 have been calibrated. I initially thought that the authors had used catchment (measured) data, I then understood that they have used simulations given by another model. There, I have a second major problem: what do you prove here by calibrating a model with another model? Isn't it quite a circular approach?

Minor Remarks

. P6599-L11: I understand what you mean by "Budyko curve" but I think that this concept is not properly defined.

. P6800-L25 : your historical introduction is wrong. Please read Schreiber's paper, it has nothing to do with the 'Budyko' framework, Schreiber does not introduce the aridity index, he does not even use the notion of potential evaporation.

. P6801-L20: again "the original Budyko curve" requires some explanation.

. I do not understand equation A4

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 6799, 2015.