

Interactive comment on “Parameterization of bucket models for soil-vegetation-atmosphere modeling under seasonal climatic regimes” by N. Romano et al.

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We would firstly thank Ref.#1 for his appreciation of our work. With respect to the three criticisms raised by this reviewer, our comments are below.

1.1) To model rainfall variability in the growing and dormant seasons we employed a combination of two simple Poisson processes since our major objective was actually not to describe in a better way the seasonal variation of the precipitation, but rather to examine whether and to what extent different soil parameterizations of the bucket model produce discrepancies to the corresponding results of the benchmark Richards’

equation. We preferred to keep the seasonal variability of rainfall and evapotranspiration as simple as possible to highlight the effect of the different soil parameterizations, avoiding that the results could be blurred by the uncertainty of more complex models of the climatic forcing.

1.2) We definitely do not believe that the Richards equation is the truth, but both theoretical studies and experimental evidences have shown that under certain circumstances it certainly gives results close to actual situations. We discussed this point at P.5085 (L. 25 and next), but some other comments can perhaps be added in a revised version. We also agree that further investigations should be devoted to analyze experimental data, including also the climatic forcing for defining the upper boundary condition of the soil column.

1.3) As for the lack of reference to some previous works on bucket (or vertically averaged) soil moisture models, we would maintain the reference list to an acceptable number with respect to the very extensive literature on the topic (as also recognized by Ref.#1 as well). The paper by Rigby and Porporato (HESS, 2006) is certainly a work that can be cited to show to recent progress on the bucket modeling approach, the same apply for the works by Milly (1993) and Porporato et al. (2004).

Moreover, at P. 5091, L.1-2, we stated that the BM model by Guswa stems from that of Laio et al. (2001). The fact that the Laio's et al. model was derived from that of Rodriguez-Iturbe et al. (PRSA, 1999) is also known. However, one should also recognize that in the recent literature most of the people refer to the model by Laio et al. (2001) partly because Rodriguez-Iturbe is one of the authors of that paper.

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