

## ***Interactive comment on “Rainfall intermittency and vegetation feedbacks in drylands” by M. Baudena and A. Provenzale***

**Anonymous Referee #1**

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This is an interesting model study of dryland soil and vegetation that distinguishes between different soil layers and different feedbacks between vegetation and soil water dynamics. Also, the effects of rainfall intermittence could be studied as well as different plant dispersal strategies. The model is original and well described, and the results consistently presented and discussed.

I have some major and minor points that I would like to bring forward.

Major

The authors start by introducing the lack of understanding the interplay between climate and biosphere, however, they do not address this issue. They address the in-

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terplay between vegetation and soil moisture given certain climatic conditions. So, the authors first argue that it is essential to take the interplay between climate and biosphere into account and then they seek to ignore it by considering climate as a given condition that does not depend on the vegetation and soil water dynamics that they model. I think that is not good enough and could be better justified. I do not disagree with their approach, but I would like to see an argument in the introduction that they ignore something that they first acknowledge to be so important, and I would appreciate at least a comment on that in the discussion.

Then, the authors mention things like “correct description”, “accurate climate modelling” and “relevant parameters and processes” and then they come up with a mechanistic, minimalistic modelling approach. I am in favour of such approach for the reason that the authors give. Now, interestingly, they come up with the main conclusion that it turns out that whenever one of the components rainfall intermittency or vegetation feedbacks are present in the model, the addition of the other component does not really matter. I like this result because it suggests that one of these components can be safely ignored without having too much of an effect. Now, coming back to “correct description”, “accurate climate modelling”, and “relevant parameters and processes” statements, I would like to see a reflection on this in the discussion. In particular I am wondering if there may be an elegant explanation for this.

The same basically counts for incorporating the colonization rate being dependent on soil moisture in bare soil. One would expect a significant effect at least in case bare soils have lower infiltration rates and higher evaporation rates, but apparently adding this effect does not matter.

Minor

I would like to see the motivation why soil moisture in deep layers below bare soil is not explicitly modelled earlier in the text. I agree with it, but the point needs to be made earlier so that the reader is not kept wondering about this when the model is

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introduced.

Several times in the manuscript the authors mention colonization rate being dependent on soil moisture in the root layer. I would like to see a clear and consistent separation of two processes: colonization rate being dependent on bare soil moisture and seed production rate being dependent on soil moisture in the root layer of vegetated soil. Otherwise it does not make any sense.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 4241, 2007.

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