

Interactive comment on “An optimality-based model of the coupled soil moisture and root dynamics” by S. J. Schymanski et al.

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Received and published: 18 March 2008

The paper entitled "*An optimality-based model of the coupled soil moisture and root dynamics*" by Schymanski et al. deals with a relevant topic for scope of the special issue "*Climate-soil and vegetation interactions in ecological-hydrological processes*" that we are promoting on HESS.

There are several elements of great interest in the results of this work nevertheless it requires **Major Revisions** according to the suggestions of the Referees. I want to remark the excellent work made by Francesco Laio and the second anonymous referee that have provided constructive reviews that will be useful to improve the final quality of the paper. I would like also to thank Praveen Kumar for his contribution to the open discussion.

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I suggest to follow point by point all the referee's comments. In particular, I would like to remark the comments made by the first referee that have raised a couple of significant points on this paper that needs to be faced. Among others, It needs to be clarified if the better results obtained by the optimal-based model are due to its increased complexity or to the use of "the optimality principle". Regarding this point, authors may consider to test the results of the model with dynamical roots where the root system evolves according to different principles of optimization (for example the maximization of water use efficiency versus the minimization of the root system maintenance costs) in order to understand which one is the driving criterion.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 51, 2008.

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