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HESSD

4, S1962–S1964, 2008

Interactive
Comment

Interactive comment on “Modelling groundwater-dependent vegetation patterns using ensemble learning” by J. Peters et al.

J. Peters et al.

Received and published: 22 January 2008

Interactive comment on [“Modelling groundwater-dependent vegetation patterns using ensemble learning”](#); by J. Peters et al.

S. Manfreda (Editor) manfreda@unibas.it Received and published: 9 January 2008

The paper entitled "Modelling groundwater-dependent vegetation patterns using ensemble learning" by Peters et al. deals with a topic of great interest that deserve to be part of this special issue on [“Climate-soil and vegetation interactions in ecological-hydrological processes”](#).

The first referee provided an enthusiastic review of the paper raising only minor points that in my opinion can be easily addressed by the authors. Nevertheless, I agree with

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the referee regarding the limited consideration given to the hydro-ecological interactions in the model construction.

Q: The analysis show clearly that the most important variable for the prediction of vegetation composition is the ground water depth (Fig. 8). In this regard, the authors did not use all the available information like the series of ground water depths (at the piezometers). What is the effect of ground water depth fluctuation in time? This would be very interesting to study using for instance not only the mean depth, but also the variance. REPLY: This is a very valuable suggestion. We did realize that valuable information was lost by only using the mean groundwater depth, and no variable expressing groundwater fluctuations (e.g. amplitude, variance, mean seasonal depths). However, the unavailability of groundwater depth time series data for the test site Snoekengracht forced us not to include such a variable, because including it would not allow for model testing on a spatially independent data set, which was considered to be important in this study.

Q: The fact that the model can not be easily generalize is an expected result. In fact, the model is strongly dependent on the specific ecosystem analyzed and the selected independent variables. Here, the challenge would be the selection of a set of independent variables (vector x) able to produce an appropriate prediction in different sites. REPLY: Correct. A preliminary step in that direction is given in section 5: Reduction of model complexity, where the important variables are identified, and model performances are briefly analyzed using reduced environmental information. Reduction of the number of variables reduces the degrees of freedom of the model, making it more robust for applications elsewhere. However, as stated by the editor, the real challenge would be to identify a reduced number of environmental variables which have causal effects on the vegetation distribution. Leaving the empirical nature for a more mechanistic approach can be presumed to add to the generalization ability. Within the scope of this article, the 'expected' result is considered to add value to the study, especially when linked with the niche concept.

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