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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Reliability of lumped hydrological modeling in a semi-arid mountainous catchment facing water-use changes" *by* P. Hublart et al.

Anonymous Referee #2

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The article details the set-up and application of an agro-hydrological model in a mountainous catchment in the Andes in Chile. Specific attention is given to the simulation of the impact of snow sublimation and water use for grape growing. The model integrates hydrological, snowmelt, irrigation and phenological modules. One original aspect is the focus on parsimonious models compared to other more complex existing integrated modelling approaches. The article is well written and clearly structured. The methods are appropriate and the conclusions are sound. I found however the article is too long and the reader feels sometimes a bit lost in all the details given here, some of which are not essential. Hence the authors could try to shorten some parts or put some aspects in appendix or supplementary material. A few suggestions are made below. The article

could be considered for publication after minor revision.

1. Section 1.2, line 10 – What do you mean by amplified impacts? Larger impacts in relative terms?

2. Section 1.4 – I find it would be useful that the authors more clearly state the scientific question they wish to answer in this article. They could also better explain the complementarity/differences with their other paper recently published in HESS (2015).

3. Page 11494, line 1 – Are evaporation losses actually significant during routing in the stream channel?

4. Page 11494, line 9 – What is "we"? Water equivalent?

5. Section 3.1 – I wonder whether parts of this section could be put in an appendix. All the details given on the models do not essential to understand the rest of the paper. Though I understand the authors wish to have their model presented in details somewhere, maybe only a summary presenting the general structure of the model and the essential aspects could be left in the main text, and the more detailed description be put in an appendix or supplementary material.

6. Page 11500, Eq. 12 – Should PEGR4J be the maximum of this quantity and zero?

7. Page 11507, line 11-13 – These aspects may not be meaningful for readers not familiar with DREAM.

8. Page 11510, line 18-29 – Not sure this part is very useful.

9. Page 11511, lines 22-25 – I did not fully understand the link between the model parameters and the use of irrigation data.

10. Section 5.1 – I find this sub-section would better fit in the concluding section.

11. Page 11514, line 16 – Formulation not fully clear. May be rephrased.

12. Section 5.3.1 – I found this discussion not very convincing. It remains quite general

and discusses hypotheses that cannot be checked here. Therefore it is not conclusive. The section may be shortened or removed.

13. References – The authors could cite their recent paper published in PIAHS (http://www.proc-iahs.net/371/203/2015/piahs-371-203-2015.html) and explain the complementarity of this new paper compared to that already published paper on the same topic.

14. Table 1 – In the caption, it should be “third” and “fourth” instead of “second” and “third” respectively. The heading of the third column may be “Meaning”.

15. Table 2 – Please indicate the units of RMSE (days), NSE (-) and Bias (days).

16. Table 3 – Please indicate the units of parameters.

17. Table 4 – Indicate units of criteria.

18. Figure 2 – When printed black and white, the green and blue boxes appear the same. Maybe find another way to differentiate more clearly the hydrological and irrigation modules on the figure.

19. Figures 6 and 12 – Maybe use more different line types (e.g. dashed line) so that the graphs can be more easily understood when printed black and white.

20. Figure 11 – Top right graph: I did not understand what is meant by “water level variations (%)”.

21. Figure 12 – In the blue series, there are some suspect data, typically a sudden drop in the year 1988 or almost constant values over 1998-2000. How can this be interpreted?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 11485, 2015.