

## ***Interactive comment on “From runoff to rainfall: inverse rainfall–runoff modelling in a high temporal resolution” by M. Herrnegger et al.***

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### **General Comments**

I couldn't resist to post a comment to this interesting study by Herrnegger et al. investigating an alternative and quite new approach for estimating rainfall from runoff observations.

Overall, I found the paper well written, well structured and clear. The content of the paper is surely of interest for the readers of HESS. For instance, the recent paper by Adamovic et al. (2014), who tested the Kirchner's approach (Kirchner, 2009) for inverting the hydrological cycle in a Mediterranean catchment, has received several

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comments (also highly detailed) in the Interactive Discussion. Personally, I am very interested to this kind of approaches and I posted this comment as I would like to have some clarifications (some others were already posted in the previous discussion).

1) In the paper it reads that “virtual experiments” were carried out to test the robustness and reliability of the proposed approach. However, no result is shown in the paper and only a reference to the PhD thesis (in German) of the first author is given. I believe that these results should be shown in the current study to demonstrate the feasibility of the approach.

2) As mentioned by the authors, Kirchner (2009) already proposed a simple method for estimating rainfall from runoff data. As the catchment under investigation should be quite wet, I believe that the Kirchner's approach should work well and, hence, I suggest performing a comparison between the two methods. In the paper it reads “The parsimonious approach of Kirchner (2009) is however limited to catchments, in which discharge is determined by the volume of water in storage.” and “A more elegant method to calculate rainfall from runoff by analytically inverting the model equations is principally possible, but has some disadvantages (Herrnegger, 2013).”. These statements should be justified by proof given in the paper (otherwise removed).

3) Technically, the paper contains too many figures and many of them should be removed by reporting the results in a summary table. Specifically, I am referring to Figures 12, 13, 14, 17, 18, and 19.

Finally, I suggest the authors some recent studies (Crow et al., 2009; Pellarin et al., 2013; Brocca et al., 2013, 2014) that used soil moisture data for inferring or correcting rainfall that could be of interest for future investigations (sorry for self-citing to my studies). Indeed, I believe that the integration of runoff and soil moisture data should be highly beneficial for obtaining more accurate rainfall estimates. Soil moisture data works well in dry-medium conditions (not at saturation) while runoff data for conditions from medium to wet.

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## References

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