Hydrol. Earth Syst. Sci. Discuss., 6, C1999–C2002, 2009
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Hydrology and Earth System Sciences Discussions

Interactive comment on "Water availability, water demand, and reliability of in situ water harvesting in smallholder rain-fed agriculture in the Thukela River Basin, South Africa" *by* J. C. M. Andersson et al.

Anonymous Referee #2

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Re: Hydrol. Earth Syst. Sci. Discuss., 6, 4919–4959, 2009

Water availability, water demand, and reliability of in situ water harvesting in smallholder rain-fed agriculture in the Thukela River Basin, South Africa by J. C. M. Andersson, A. J. B. Zehnder, G. P. W. Jewitt, and H. Yang

General observations:

The manuscript tries to make an interesting bridge between the quality of hydrological

simulation (i.e. calculating discharges) and crop simulation (i.e. estimating yields). Also the in situ water harvesting is of interest to an international audience.

One problem with this manuscript is that the double objective of contributing to a better insight in water harvesting and the objective of the combined simulation (crop yield and river discharges) leads to often to a lack of focus in different sections of the manuscript. Restructuring of the text is needed, so that paragraphs and sections focus more clearly towards one objective at a time within the same paragraph(s).

Also the authors have reflect on what is appropriate in the introduction, materials and methods, results and discussion with conclusions. Now a lot of sections are mixed in nature. The discussion is relatively short partly because of the presence of too much discussion in the results section.

Because of both shortcomings I advised major revisions; but I am optimistic that the authors can restructure their manuscript.

Specific remarks:

page 4920 line 10 SUFI-2 algorithm; please do not use too many abbreviations in an abstract. So write SUFI-2 in full as Sequential Uncertainty Fitting algorithm, so that the abstract can be read without reading the article. Sequential Uncertainty Fitting algorithm (SUFI-2) is explained in section 2.3.

page 4921 line 10: "aerial" expansion. In the air ? Probably not; funny typo in a text which reads well.

PPU not clearly defined; neither in the abstract nor on page 4928 line 7.

Page 4928 line 10: copy/paste: "A dual-objective calibration against ten nested discharge stations on daily temporalresolution, as well as against annual basin-wide maize yield in the smallholder and the commercial production systems was carried out for 1 January 2002 to 31 December2006". This section should be restructured in a more systematic way. One could firstly elaborate the two objectives separately and

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explain then more explicitly. After the separate definitions the combined objective function can be introduced. After this the calibration strategy and sensitivity analysis can be given. The current section 2.3. requires puzzling bits and pieces together in order to understand the section. Good understanding of this section is also quite critical for the entire manuscript.

Page 4929 page 20: "However, the crop parameter calibration was carried out conjunctively with the hydrological calibration on a qualitative basis in order to capture inter-linkages affectingall output variables." Not clear what exactly is meant here.

Page 4929 line 3 "R2 is the coefficient of determination" As there is some confusion in hydrology about the definition due to DR Legates & GJ McCabe, 1999, in their Water Resources Research-article, it is necessary to define R2 either as correlation coefficient or as real coefficient of determination (or also called Nash-Sutcliffe efficiency).

Pag 4930 line 13-15: "For completion, the commercial systems were incorporated in the simulation and calibration process. However, all further analysis centred on the smallholder system in accordance with the objectives." Not clear what is meant here.

Pag 4932 line 7. Figure 2 is not clear. A continuous line is used while the year results are better represented in a discontinuous way. The box-and-whisker plots on the figure are very small and virtuallly invisible.

Page 4932 line 14: Figure 3 is too small and very unclear. Fewer but larger graphs would be better; e.g. one for a good and one for a poor simulation.

Section 3 (pag 4931-4936) should be confined to results and contains a lot of comparison to literature and discussion. In contrast section 4 (pag 4936-4939) contains too little discussion and too little comparison to other research. An example of Rain Water Harvesing in East Africa is the work by dr Nuhu Hatibu.

Pag 4969 Table 1 tries to put too much and too small text in the table and contains a rather limited amount of examples.

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Page 4949: most figures are too small.

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