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Interactive comment on "Potential of global land water recycling to mitigate local temperature extremes" *by* Mathias Hauser et al.

Anonymous Referee #2

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Review of Hauser et al. esd-2018-48

I am recommending that this paper be accepted, subject to a few corrections and clarifications.

Overall I found the manuscript to be fairly straightforward. The authors analyzed their simulations very carefully and got a conclusion that, while having never really been demonstrated before, is perhaps unsurprising. I will say that it's difficult for me to get excited about this present paper.

What really interested me is lines 25-26 on page 2, as well as lines 27-29 on page 9. There is a fascinating paper to be written on how irrigation has suppressed climate change, and because groundwater is being depleted, accompanied by increasing de-

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Discussion paper

mand due to population growth, climate change is posed to accelerate in the near future. I realize that's a very different paper than what the authors wrote, and there isn't really too much wrong with the present paper, so I'm not going to suggest that they rewrite their entire paper to cater to my preference.

General comments:

I think some additional attention needs to be paid to caveats. The LWR scheme uses local water sources, but many of those water sources are already spoken for, generating competition among resources. This has important implications for agriculture, energy use, and transport. The authors are not well set up to address these implications (that's what integrated assessment models are for), but they can certainly discuss the importance of representing all of these processes and how they might affect the conclusions of the study.

Relatedly, the authors should discuss the feedbacks that their new scheme will have on the climate system. As an example, reducing runoff will reduce river flow, which will increase salinity in river deltas and reduce sediment transport. There are many other processes that I suspect are not included in this study. This needs to be mentioned.

Specific comments:

Page 1, line 21: "SM is prescribed to pre-defined values" such as? Page 2, line 4: What does "it" refer to? Page 2, line 10: Change "is" to "are" Page 2, line 16: "asymmetric" is misspelled Figure 1: I'm having trouble understanding panel a. The caption needs to be improved so I can better understand what is going on. Page 7, line 1: No strong remote effects. There are probably weak effects. Table 1: Experiment name is misspelled Page 9, line 6: "there are some regions" Page 9, line 23: I don't really understand this sentence. What realistic irrigation experiments? I thought your simulations were more realistic. Are you referring to anything in particular? In which case you need a citation.

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