

Interactive comment on “Aerial and surface rivers: downwind impacts on water availability from land use changes in Amazonia” by Wei Weng et al.

R.S. Westerhoff (Referee)

rogier.westerhoff@deltares.nl

Received and published: 19 October 2017

This paper addresses the role of soil moisture recycling (aerial rivers) in the water balance, and how it affects downwind climates in scenarios of land-use, more specifically forest change in the Amazon. The paper reads well and touches on a topic that is not often discussed among hydrologists. The study also potentially has a large impact and therefore much relevance. I have to say that I am not an expert in soil moisture recycling and I could therefore not go into detail on the validity of all the methods used. However, I do see that the paper could use some extra description and discussion on uncertainty.

The only major comment I have is that the figures that you present incorporate some uncertainty or range, but without any explanation on how these were estimated. Also,

C1

Other uncertainties are not addressed, e.g., the assumption of constant groundwater. Some uncertainties might be higher than your actual estimates. Or not, but without proper explanation we do not know. I think the paper also deserves a discussion that deals with uncertainty.

Since my comments are relatively easy to address (in my opinion) I therefore recommend this paper to be accepted with minor revisions.

These are my comments. Please treat the comments on uncertainty as less than minor.

Page 2, line 7. Two sentences that almost say the same, try turning these into one.

Page 2, line 19-21. The sentence is unclear, especially the part "some areas' water regime". Please rephrase.

Page 2, line 26. Explain the abbreviation SDGs. Maybe a reference to some of these SDGs (e.g. water)

Page 2, line 34. The first time you use the term aerial rivers, explain what they are. That is important, since the term is in the title. You can either probably solve that quite simply by saying: " 'aerial rivers', i.e., preferential pathway of moisture flow, termed in Arraut et al. (2012) as an analogy to surface rivers."

Page 3, line 6-10. Try to avoid method description in the introduction.

Page 3. Define what the sinks and sources are in this study.

Page 5, line 22. It is e.g., not eg.

Page 6, line 13. I think you should explain the assumption of Zemp et al. (2014) in somewhat more detail, instead of the quick reference. What is balance? Are they equal? Or are their ratios equal?

Page 6, line 13. The steady groundwater storage assumption is of major importance in my opinion. This needs to be in the discussion. For example, removing trees generally

C2

elevates the water table. Although the water table is already very shallow in most of the Amazon, small differences of e.g. 5 cm might have major differences in the whole balance that you are calculating. Can you say something on the uncertainty surrounding that?

Page 8, line 6-7. a quarter of what, and extra time of what?. This sentence should be much clearer.

Page 9, I would like to see some more uncertainty discussed. E.g. the groundwater assumptions. Also, it is not entirely clear from the method how you got your result uncertainty ranges (e.g., the 10-26% to 5-12% etc).

Page 9-10: Discussion: Can the discussion mention what the relative contribution is compared to the moisture from the sea?

Page 13, line 31. It is 'bottom-up'

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2017-526>, 2017.