

Interactive comment on “HESS Opinions: A Planetary Boundary on Freshwater Use is Misleading” by Maik Heistermann

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I would like to thank Dr Jaramillo for pointing out the commentary article by Jaramillo and Destouni (2015).

In that commentary, Jaramillo and Destouni argued that Steffen et al. (2015) “*ignored recent scientific advances implying that the global consumptive use of freshwater may have already crossed the associated planetary boundary*”, and presented studies which suggest a consumptive water use that is substantially higher than the 2600 km³ figure published by Steffen et al. (2015). One key argument of the commentary was the finding that reservoirs can “*increase the net total actual evapotranspiration from the hydrological basins that include the reservoirs*”.

Please note that in the opinion paper, I referred, on p. 3, ll. 2-3, to Destouni et al.

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(2013) instead of Jaramillo and Destouni (2015): “*Critical commentaries, however, mostly called for a revision of the actual numbers (e.g. Molden, 2009; Destouni et al., 2013).*”

I did this because the 2013 reference forms the original and *main* (though not exclusive) basis of the 2015 commentary, and already contains the statement that “*a global indication of the regional results is a net total increase of evapotranspiration that is larger than a proposed associated planetary boundary*”. In order not to overrepresent that position of the group around Jaramillo and Destouni, I did deliberately not include the 2015 reference on top. I also put an “e.g.” before the citations on p. 3, ll. 2-3, in order to indicate that the corresponding references are not considered exhaustive.

In hindsight, however, I think it might be better to include the Jaramillo and Destouni (2015) reference into that statement in order to avoid the impression that the opinion paper misses a specific thread of the PB debate (as it occurred to Dr Jaramillo). I also admit that Jaramillo and Destouni (2015) considered further studies and findings that had not been included with Destouni et al. (2013). And finally, I appreciate very much Jaramillo and Destouni’s criticism regarding the “*message of apparent calm for freshwater*” which is being implied by Steffen et al. (2015). For those reasons, I think it is warranted to include the Jaramillo and Destouni (2015) reference in a revised version of the paper.

However, I have to emphasize that neither Destouni et al. (2013) nor Jaramillo and Destouni (2015) question the general concept of a planetary boundary on freshwater use. They only challenge the estimate of current human freshwater consumption. Accordingly, Gerten et al. (2015), in defence of Steffen et al. (2015), gratefully note “*that Jaramillo and Destouni accept the position of the freshwater planetary boundary but question our quantitative estimate of current human freshwater consumption.*”

My opinion paper fundamentally challenges the concept of a planetary freshwater PB. Therefore, I want to avoid overemphasizing the debate on quantitative estimates. In

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that regard, please also see my response to the short comment by Christof Lorenz (SC2) in this interactive discussion.

References:

Destouni, G., Jaramillo, F. and Prieto, C.: Hydroclimatic shifts driven by human water use for food and energy production, *Nat. Clim. Change*, 3, 213-217, 2013.

Gerten, D., J. Rockström, J. Heinke, W. Steffen, K. Richardson, and S. Cornell, Response to Comment on “Planetary boundaries: Guiding human development on a changing planet,” *Science*, 348(6240), 1217–1217, 2015.

Jaramillo, F., and G. Destouni, Comment on “Planetary boundaries: Guiding human development on a changing planet,” *Science*, 348(6240), 1217–1217, 2015

Molden D.: Planetary boundaries: The devil is in the detail, *Nature Reports Climate Change*, 3, 116-117, doi: 10.1038/climate.2009.97, 2009.

Steffen W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., Biggs, R., Carpenter, S. R., de Vries, W., de Wit, C. A., Folke, C., Gerten, D., Heinke, J., Mace, G. M., Persson, L. M., Ramanathan, V., Reyers B. and Sörlin, S.: Planetary boundaries: Guiding human development on a changing planet, *Science*, 347, 1259855, doi: 10.1126/science.1259855, 2015.

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