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Hydrology and Earth System Sciences
Discussions
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Interactive comment on "Water-use dynamics of an alien invaded riparian forest within the summer rainfall zone of South Africa" *by* Bruce C. Scott-Shaw and Colin S. Everson

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RC4: 'Water-Use Dynamics of an Alien Invaded Riparian Forest Within the Summer Rainfall Zone of South Africa', Anonymous Referee #3, 17 October 2018

HESS-2018-227

Anonymous referee #3 (AR3) is thanked for their thorough review. The thorough comments and suggestions provided were appreciated by the authors.

1. AR3 stated that the authors report that the hydrological campaign was conducted in conjunction with an ecological study (page 2, lines 6-7). However, the present study

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does not report on the ecological implications of the study. Are the ecological results to be reported in a separate study? Or is this the paper by Everson et al. (2016) that the authors refer to at a later stage in the manuscript? âĂć Although this study was undertaken in conjunction with an ecological study. Direct discussions with this component have been removed. Rather this paper is compared to a companion paper (hess-2016-650) that measured the water-use in a winter rainfall zone. The ecological findings are not reported on in this paper. However, more detail has been provided on the sampling strategy, density measurement and water-use up-scaling. The reference to Everson et al. (2016) has been updated in the reference list.

2. Despite the potential relevance of the species-speciïňĄc water use measurements, the real added value of these data lies in their potential to indicate ecosystem beneïňĄts gained from removing or promoting the establishment of speciïňĄc tree species relative to others. However, the current hydrological data set does not provide sufïňĄcient information to support such decisions. I therefore advise the authors to include data from their ecological study in the present hydrological study to interpret the hydrological differences between pristine and (heavily) invaded sites in terms of ecosystem functioning. âĂć This comment, much like comment 1, requests more emphasis on the ecological component. The authors feel that providing detail on the ecological study would make paper too broad and require the inclusion of extensive literature, methods and results. This would detract from the quantitative findings provided in this study. As such, the authors have included only the necessary ecological methods and findings required to select the monitoring site, species and assist in up-scaling. The findings show a hydrological gain and not the changes in ecosystem functioning and other services.

Specific Comments

1. Reference list appears incomplete. âĂć Checked and updated.

2. Reported wood density in table 1 is in tonne mËĘ-3, not kg mËĘ-3 âĂć The values

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were corrected to g.cm-3 which is consistent with documented studies within South Africa and abroad.

3. Please report standard deviations alongside the averages in tables 1 and 2 to provide some information on the variability of the data underlying the average. âĂć The standard deviations have been added to table 2 for each tree (calculated for the extent of the measurement period).

4. Please provide some more information on how the water use at the tree level was upscaled to the forest level. This is not described in the methods section at al. âĂć A new Chapter (2.6) has been included detailing the up-scaling process. This Chapter also links to relevant Chapters on sampling design and species selection.

5. Please analyze and discuss in more detail which plant functional traits determine the difference in water use between native and indigenous species. âĂć Although the functional traits that determine variations in water-use was not the focus of the study, it is an important component to discuss in this study. For example, “The greater sapwood area in introduced species, as well as their fast establishment, tree density and rapid growth, results in a greater transpiration rate than indigenous species per unit area.” was included as a finding in this study.

6. Please indicate in ïňĄgure 1 where exactly the site is located, perhaps by adding a dot in the lower right panel. âĂć The location of the site relevant to the catchment and its elevation has been provided (yellow marker).

The study quantiïňĄes the potential hydrological beneïňĄt of the conversion of invaded stands to more pristine stands for forest management practices, in South Africa. The idea is scientiïňĄcally novel and addresses key hydrological questions and the ïňĄndings are likely to inform policy and decision making in the water sector. The paper needs great improvement before it can be published in HESS. Comments. Title- The title requires rephrasing I failed to understand why the authors emphasize on the “SUMMER RAINFALL ZONE OF SOUTH AFRICA”. Does this have anything to do with the

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spread of invasive or water use by these plants?

Abstract-generalwellwrittenbutIwouldrecommendthatauthorsincludetheobjective of the study. As it is one has to speculate the direction of the study. Introduction- This section is very weak and to general besides reading like a technical report. I would recommend that authors strengthen the motivation and support their argument with relevant literature. Authors should intensively interrogate literature and highlight scientiïňĄc research strides that have been made as well as the gaps in knowledge that still need to be addressed. So far, this is totally missing. It is therefore very difïňĄcult for one to understand whether this is a technical report or a scientiïňĄc study. Methods – are poorly packaged and this makes it difïňĄcult for one to follow. I would, therefore, recommend that authors improve on this. The study area may is poorly drawn beside been illegible. A great improvement is required. Results and discussion - although these sections read well they are very shallow and lack objectivity. The discussion is weak like the introduction; there is a lack of rigorous engagement of literature. Surprisingly there are too many references in the bibliography but the manuscript content does not demonstrate a thorough interrogation of literature. Please also note the supplement to this comment: https://www.hydrol-earth-syst-sci-discuss.net/hess-2018-227/hess-2018-227-RC2supplement.pdf

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