

Interactive comment on “Water-use dynamics of an alien invaded riparian forest within the mediteranean climate zone of the Western Cape, South Africa” by Bruce C. Scott-Shaw et al.

Bruce C. Scott-Shaw et al.

brucecharlesss@gmail.com

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RC2: 'Water-use Dynamics of an Alien Invaded Riparian Forest within the Mediteranean Climate Zone of the Western Cape, South Africa', Anonymous Referee #2, 16 Mar 2017

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Anonymous referee #2 (AR2) is thanked for their thorough review. The thorough comments and suggestions provided were appreciated by the authors.

AR2 stated that the paper is missing some relevant literature citations. “The paper by Cullis, Gorgens and Marais (2005) is relevant to this paper, as it estimates just how

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seriously invasive trees in riparian zones can reduce streamflows on a national scale. The papers by Scott et al (1994) and Scott and Lesch (1996) on the influence of trees in riparian zones within experimental catchments should also be referred to.” This comment was well received. All of the recommended papers were reviewed and references made in the paper. A more recent paper by Scott (1999) was used. Reference was made to the contrast of water use between riparian and upslope invaded areas. Some results were included on the reduction in streamflow yield if a riparian area were to be left uncleared.

2. AR2 stated that there were regular spelling errors throughout the paper. The authors apologize for these errors. These have since been corrected.

3. There was no reference to intermittent adjustments of probe depths to account for radial stem growth. Trees tend to grow past the probes, gradually positioning the TCs deeper in the sapwood, or even into the heartwood. I would expect that a species. The authors agreed with this comment. More detail was provided in the methods stating that regular checks were done to adjust probes for tree growth.

4. As is usual with sap flow studies, available equipment constrains the number of sample trees. Perhaps the authors would like to suggest how sampling intensity can be improved in future studies? If some of the trees were monitored for three years, maybe one could reduce this to one year, and then sample additional trees for each succeeding year? This is a valid point. However, during the study the authors decided to focus on long term monitoring of the same trees that were all providing good clear data. This was also beneficial for investigations into the change of wounding over a longer period. For the indigenous stands, it was difficult to find representative trees within close proximity to one another for wiring to a central logger box. Had the equipment been moved, the authors would not have been able to measure a range of sizes elsewhere. In the introduced stand, there were few clusters of indigenous species limiting the possibility of moving the equipment. For consistency, the *A. mearnsii* equipment was not moved.

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5. I suggest that under "The study area", the mapped vegetation types be given, and a reference to Mucina and Rutherford added. Much more floristic and environmental information is then available to the reader. This information was included and reference was made to Mucina and Rutherford.

6. The list of references needs some careful checking to ensure consistent formatting. This has since been checked and corrected. Specific Comments

1. P1, L26: Suggest using sap flow rather than water-use. Could be helpful since many readers will not know what the heat ratio method measures. Water-use was changed to sap flow except where up-scaled results were discussed.

2. P1, L41: A hydrological gain could describe an increase in ET. The term is too general, better to say a gain in streamflow? Changed to streamflow.

3. P2, L9: Hybrid genotypes are most common in Eucalyptus plantations, but they are mostly not invasive. The word hybrid was removed.

4. P2, L20. This sentence is far too long and clumsy. This sentence was re-worded and split into two sentences.

5. P2, 42: Surely temporal flow patterns as well? Temporal was included.

6. P2, L46: Buffeljags River and river seen in the text. Be consistent. Corrected throughout.

7. P3, L11: ...which is characterized by Corrected.

8. P3, L19: spelling. Occurs Corrected.

9. P3, L22: Podocarpus changed to Afrocarpus? Corrected: Afrocarpus (Podocarpus falcatus).

10. P3, L34. Strictly speaking, Plant area index, since light interception is also by twigs, branches, stems. Agreed but left unchanged to avoid confusion.

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11. P3, L40: Vepris. After first mention, abbreviate to *V. lanceolata*. âĀĀ Corrected.
12. P3, L42. Spelling. Diameter âĀĀ Corrected.
13. P4, L8: insert comma âĀĀ Corrected.
14. P4, L32. Check format of units throughout MS. Inconsistent. âĀĀ Corrected.
15. P4, L40: ...dendrometer, and canopy height... âĀĀ Corrected.
16. P4, L41: I think it would be clearer to refer to aerodynamic fetch rather than reach? âĀĀ Corrected.
17. P4, L44: Spelling. Indigenous âĀĀ Corrected.
18. P4, L46: Is this stem density sph or the wood density of stems? âĀĀ Clarified, stem density.
19. P4, L47: Not sure if it is worth introducing the term medoid to the readers! âĀĀ Discussed but left unchanged as it is statistically the correct term rather than saying representative, which could be subjective if not statistical.
20. P5, L6: Spelling again. Indigenous âĀĀ Corrected.
21. P5, L19: Were observation borehole measurements occasional or continuous. âĀĀ Due to no solinist level loggers being available for this project, only occasional borehole measurements (with a dip meter) were possible.
22. P5, L29. Spelling. significantly. âĀĀ Corrected.
23. P5, L40: ...occasional maximum temperatures exceeded 40°C ? âĀĀ Corrected. The word 'occasional' was used to describe days when the temperature exceeded this value. This was to avoid the sentence suggesting the everyday exceeded this temperature.
24. P6, L33: After first mention, abbreviate to *C. africana* âĀĀ Corrected.

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25. P7, L3: ...very low, dropping ... âĀĀ Corrected.
26. P7, L7: ..and a porosity of 0.42... âĀĀ Corrected.
27. P7, L9: 22 hours to get to FC or wilting point? Seems very fast, even for a sand. âĀĀ Sentence re-worded. "The drying curve, after an isolated event, took on average 22 hours from saturation to the expected field capacity"
28. P7, L10: Spelling. Greater âĀĀ Corrected.
29. P7, L18: Throughfall and stem flow are surely not interception storage? âĀĀ Corrected
30. P7, L20: ...indigenous site took much longer ... No comma âĀĀ Corrected.
31. P7, L38: ...water use... Be consistent about using a hyphen. âĀĀ Corrected.
32. P8, L4: C. africana âĀĀ Corrected.
33. P8, L28: aerodynamic fetch rather than reach? âĀĀ Corrected as before.
34. P8, L34: ..a stand of introduced A. mearnsii... Sounds better than an introduced stand? âĀĀ Corrected.
35. P8, L34: ..can annually use up to six âĀĀ Corrected but said: 'can use up to six times more water annually...'
36. P8, L37: But see Cullin Gorgens and Marais paper which offers some quantified estimates. âĀĀ Updated comparisons
37. P10, L1 onwards: Found 16 formatting errors! Please check carefully. âĀĀ Corrected.
38. Table 1. Suggest be consistent in arranging trees from small to large. The first two groups of sample trees have a different sorting order. Moisture fraction is very variable in group 2 (A. mearnsii). Do you know why? âĀĀ Tree sizes re-ordered. The variation in moisture content was possibly due to the different ages and sizes of the

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trees measured (variations in sap wood depth and active xylem concentration), which may explain these differences. This was included on page 4, line 20.

39. Figure 2. Numbers within bars along the X axis are partly obscured. âĀĀ Corrected.

40. Figure 3. Caption says solar radiant density. Y2 axis label says solar radiation. Be consistent. Format of units again variable. The point separating each unit is sometimes in a lower or middle position. Check throughout the manuscript. âĀĀ Corrected.

41. Figure 4: ...lower reach alien stand... Consider referring consistently to *A. mearnsii* rather than alien stands. âĀĀ Corrected.

42. Figure 7. Pity no water table trends shown! âĀĀ Due to little change in the infrequent measurements, these were not included as they did not provide further insight.

43. Table 2. Thousands separated by blank spaces here, but not consistently through the paper. Check throughout. âĀĀ Corrected.

44. Figure 8. I think Et in the legend should be Et0 ? Again, introduced stand might be better described as *A. mearnsii*? âĀĀ Corrected.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/hess-2016-650/hess-2016-650-AC1-supplement.pdf>

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., doi:10.5194/hess-2016-650, 2017.

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