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Hydrology and Earth System Sciences Discussions

Interactive comment on "Water-use dynamics of a peat swamp forest and a dune forest in Maputaland, South Africa" *by* A. D. Clulow et al.

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General Comments:

Clulow et al. present detailed and long–term sap flow (transpiration), weather and soil water data for 5 individual tree species commonly occurring in Peat Swamp Forest and Dune Forest ecosystems in South Africa. The novelty of this study lies in the collection of a unique primary data set for two scarce vegetation types in South Africa. The results add to the slow but steady increase in knowledge around the water-use of indigenous tree species in South Africa. The authors mention that the results will provide useful baseline information for further measurement and modelling studies.

The paper would benefit from an indication by the authors of practical ways of us-

ing, or scaling up, the measurements described here for the purposes of water balance calculations, or water resource assessments in this important conservation area. The challenge of scaling up the measurements is mentioned in the conclusions, but this statement requires some elaboration in terms of what specific measurements and modelling would be required to improve understanding of the general hydrology of the area.

Specific Comments / Suggested Corrections

Page 1727, line 8: Use “introduced” as opposed to “alien”. Page 1727, line 23: Suggest replacing “blamed” with “associated with”. Page 1727, lines 22-25: I suggest clarifying this point by mentioning that “the cause of the water balance change was largely attributed to the fact that deep-rooted, evergreen, high leaf area, aerodynamically rough forest plantations replaced shallow rooted, seasonally dormant, grasslands.” Page 1728, line 5: References required e.g. “.....cost associated with forestry (DWAF, 2004), and strict environmental legislation associated with riparian zones have been implemented (FIEC, 2005)”. Suggested references are: DWAF. 2004. Stream Flow Reduction Allocations: History. Department of Water Affairs and Forestry, Pretoria, South Africa. Available from: < http://www.dwaf.gov.za/sfra/sfra_lic_history.asp > [Last Update Used: 18 March 2004]. FIEC 1995. Guidelines for environmental conservation management in commercial forests in South Africa. Forestry Industry Environmental Committee, Forest Owners Association, Johannesburg. Page 1731, line 26: It is possible to include a Table or figure of LAI fluctuations for the two sites? Page 1732, line 7: Remove “monitored” from the sentence. Page 1733, line 13: Add:.....to distinguish between sapwood and heartwood replacing “blamed” with “associated with”. Page 1733, line 24: Add “TC” between the words “four” and “pairs”. Page 1734, line 15: Add:.....”below any branches.” Page 1735, line 5: Remove the “,” at the end of the sentence. Page 1736, line 18: Is this the best way to represent the proportions of roots at different depths and between different sites? By using a % dried root mass per dried soil mass, you are not accounting for differences in soil

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density between the two sites. This makes it difficult to assess how root densities varied between sites, unless the soils had very similar densities. Would it not be more appropriate to state what the dried root mass was relative to the soil volume sampled? Page 1736, line 21: Change to: “2009/2010 hydrological year” between the words “four” and “pairs”. Page 1740, line 14: Could the decreasing water use of the Syzigium during the 2010/2011 season (relative to the 2009/2010 season) possibly be attributed to progressive increases in the wound widths associated with the sap flow and heater probes, and the resultant reduction in heat dissipation / detection by the TCs? Were any periodic observations on wound widths made, or just an assessment at the end of the study? Page 1744, line 21: The reference (Bulcock and Jewitt, 2012) does not appear in the reference list. Check that all references cited in the text appear in the reference list. Page 1746, line 25: Change “daily” to “day”. Page 1746, line 28: Change “resulting” to “resulted”. Page 1751, lines 25 and page 1731, line 1: A more appropriate citation for Geldenhuys (2010) would be: von Maltitz et al., (2003) and Mucina and Rutherford (2006): Reference is: von Maltitz, G., Mucina, L., Geldenhuys, C.J., Lawes, M.J., Eeley, H., Aidie, H., Vink, D., Fleming, G. & Bailey, C. 2003. Classification system for South African Indigenous Forests. An objective classification for the Department of Water Affairs and Forestry Unpublished report, No. ENV-P-C-2003-017, Environmentek, CSIR, Pretoria. 275 pp. Page 1752, lines 12-20: More appropriate citations for these references would be the following: Gush, M.B. and Dye, P.J., 2006. Water use measurements of selected woodland tree species within the Kruger National Park. In: Proceedings of the 4th Natural Forests and Savanna Woodlands Symposium, Port Elizabeth, 15 – 18 May. pp 387. Gush, M.B. and Dye, P.J. 2009. Water-use efficiency within a selection of indigenous and exotic tree species in South Africa as determined using sap flow and biomass measurements. Acta Hort. (ISHS), 846: 323-330. Gush, M.B., Scott, D.F., Jewitt, G.P.W., Schulze, R.E., Lumsden, T.G., Hallowes, L.A. and Görgens, A.H.M., 2002. Estimation of streamflow reductions resulting from commercial afforestation in South Africa. Water Research Commission Report No. TT173/02. South African Weather Services: Temperature

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and precipitation data, Pretoria, South Africa, 2004. (website??)

Please also note the supplement to this comment:
http://www.hydrol-earth-syst-sci-discuss.net/10/C125/2013/hessd-10-C125-2013-supplement.pdf

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 1725, 2013.