

***Interactive comment on “Can we predict groundwater discharge from terrestrial ecosystems using eco-hydrological principals?” by A. P. O’Grady et al.***

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General: The manuscript assesses the relationships between LAI, climate and water balance of vegetation associated with (using) groundwater and determines whether existing ecohydrological principles can predict groundwater discharge, i.e. groundwater use by vegetation. In particular, LAI is related to groundwater discharge to identify whether a functional ‘benefit’ is afforded to vegetation and indirectly (although not assessed in this study) to ecosystem processes.

I found the MS to be very interesting and original. Of particular note was the demonstra-

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tion of LAI increases with groundwater discharge across a range of terrestrial habitats.

The emphasis of the MS is discharge of groundwater by terrestrial vegetation, however, the more general term ‘groundwater discharge’ is often used. I suggest the authors clarify the assumptions made when referring to groundwater discharge by terrestrial ecosystems and the alternative pathways of discharge that are not being addressed.

Title: Replace ‘principals’ with the noun ‘principles’. Also correct throughout the MS.

8232 Ln 7 focusing

Ln 11-14 Suggest a brief explanation of the Budyko framework (and referenced if abstract format allows) to hence the completeness of the abstract.

8233 Ln 5-10 Although I am just as guilty, I suggest replacing ‘groundwater dependence’ with ‘groundwater use’. This removes the expectation that the ecosystem would not exist or be significantly altered without the presence and access to groundwater. Furthermore, demonstrating dependency would require a specific experimental design e.g. a times series of ecosystem measurement under declining access to GW. The references listed (with the exception of Groom 2000; more recently Sommer and Froend 2011) have not demonstrated GW dependency but have documented the magnitude and variability in groundwater use by vegetation at a point in time.

The topic of the MS, the Australian studies analysed and the references cited are all specific to vegetation and not ecosystems. I suggest replacing ecosystem with vegetation where appropriate.

8235 Ln 6-7 Provision of ‘additional’ water by groundwater. Agree with the point made but the authors may wish to also consider the ecological benefit of increased consistency in water source that an aquifer provides.

8235 Ln 9 Perhaps the question of whether ecohydrological principles can be used is better phrased as ‘can existing ecohydrological principles be used...’ as per Ln 16.

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8240 In 18 ‘...thermodynamically less available’ is not an explicit statement of what (I believe) the authors are implying, i.e. saline groundwater is less available to the vegetation due to differences in osmotic potentials.

8240 In24-26 Surely soil water as well as groundwater loss via ET is not unique to arid and semi-arid systems, or have I misunderstood what was implied? Can the authors address this as a phenomenon across all sites, and comment on the relative contribution of GW to total discharge via ET?

Figure 2b, no comment on the 2 outliers ?

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