

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

**M. Zeppel (Referee)**

melanie.zeppel@mq.edu.au

Received and published: 21 September 2011

This paper describes interactions between groundwater discharge and vegetation, an important, emerging field of research. Studies on groundwater dependent ecosystems are lacking in Australia. O’Grady et al. review estimates of terrestrial groundwater discharge, using water balance studies where discharge has been identified as one component of evapotranspiration. The test of whether ecosystems which have access to ground water have higher LAI than ecosystems without groundwater is a very valuable test, demonstrating whether the presence of groundwater influences a key eco-

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

hydrological variable, LAI. This is the first test of this, to my knowledge, and hopefully this paper will inspire other publications describing plant water relations of GDEs, and comparing the hydraulic architecture of GDEs and non- GDEs. The finding that there was no significant difference between slope, while there was a significant difference in intercept for GDEs is quite interesting.

Minor comments:

- It would be useful to define what you mean by ‘convergence’ here. It is clear to me that you mean convergence as described by Meinzer (2003) however, people from different fields (evolutionary biology, ecology, ecohydrology) have different meanings for the word.
- L9 – using the Huxman paper (Huxman et al., 2004) would put this work in a global context.
- P8234 - L19 – You say here that vegetation alters soil properties. While this is true, over evolutionary periods, other factors will also alter soil properties, such as weathering.
- P8236 L 20 – do you mean potential evaporation instead of evaporation?
- P8240L 11 – I think you mean ‘particularly given the underlying. . .’
- P8240 L 13-15. The paper says ‘we expected ratios to converge along the ..’. If you labelled the energy-limit line and the water-limit line in Fig 2b this would further clarify what you mean.
- Fig. 2a. It is interesting that the relationship is so strong, with two outliers. Would you like to comment on any biological reason for what caused these two points to fall away from the others?

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



P8420 – L17 – ‘thermodynamically’ – do you mean differences in osmotic pressure due to salinity? Thermodynamically is a broader term with meaning different meanings. Do you mean differences in osmotic pressure due to saline soil? It would be simpler and more specific if you said ‘groundwater may be less available due to differences in osmotic pressure’.

P8421 – L2 – this is similar with Ellis and Hatton (2008) who also find a plateau when water becomes abundant, and when LAI reaches 4. P8242 L1 – Do you mean elevation or do you mean intercept?

Table 1 – Are latitude and longitude available for O’Grady et al, Crosbie et al, and Benyon et al?

Fig. 4a – ‘wettness’ replace with ‘wetness’. It would be useful (but not necessary) to expand the acronyms in the caption in all figures.

Huxman TE, Smith MD, Fay PA, et al. (2004) Convergence across biomes to a common rain-use efficiency. *Nature*, 429, 651-654.

---

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 8231, 2011.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper