

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1  
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## Comment on hess-2022-200

Michael Ryan (Referee)

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Referee comment on "Is the reputation of *Eucalyptus* plantations for using more water than *Pinus* plantations justified?" by Don A. White et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-200-RC1>, 2022

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The study did a meta-analysis of *Eucalyptus* versus *Pinus* water annual Evapotranspiration (ET) for 57 closed-canopy plantations and used the relationship between Vegetation Evaporation Efficiency (VEE, ET/Potential ET (PET)) versus Climate Wetness Index (CWI, Precipitation (P)/PET) to assess differences between the genera using an Analysis of Covariance. The range of ET, P, PET and CWI was similar for the two genera. The analysis concluded that both genera had an identical relationship of Vegetation Evaporation Efficiency with Climate Wetness Index, contrary to current expectations. The study clearly shows that differences in genera planted are unimportant in determining ET compared to the differences between plantation forests and the prior land use (pasture or native forest).

This is an important, very sound study and very clearly presented in a thorough, well-written manuscript. In addition to the comparison of ET by the genera, the Discussion also argues that the timing of measurements during the growth of plantations and the length of the rotation are important considerations for assessing differences in ET among genera.

### Comments:

- A regression of Vegetation Evaporation Efficiency with Climate Wetness Index has ET/PET as the dependent variable and P/PET as the independent variable, with PET as the denominator of both variables. Such normalizing may influence the goodness of fit and perhaps the shape of the fitted function. I recommend redoing the analysis with just ET versus P as a cleaner test of the differences between genera.
- While differences in wood production between genera are briefly mentioned, some more discussion on this topic would be useful. If wood production per unit ET differed

between genera, that would be an important consideration for forest management. My expectation is that Eucalyptus would have a greater wood production per unit ET than Pinus.

- It would also be useful to test if there are any differences between the different methods for estimating ET in the relationship between Vegetation Evaporation Efficiency with Climate Wetness Index or ET versus P.
- The data spreadsheet included as Supplemental Material is useful but should have the column names defined and the data used in the paper identified specifically.

Minor edits:

L91: 'have found that not observed' should be 'have not observed'.

L144: Should 'Energy Limit' be included in the definitions?

L178: What is reference evaporation?

L341 and elsewhere: limit numbers to three significant digits.

L411: 'similar (Beynon and Doody, 2015), Figure 3)' should be 'similar (Benyon and Doody, 2015, Figure 3).