

Interactive comment on “Drought impact on carbon and water cycling in a Mediterranean *Quercus suber* L. woodland during the extreme drought event in 2012” by A. Piayda et al.

Anonymous Referee #2

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Accurately modelling drought impacts on ecosystem gas exchange is a major challenge, so these data are a welcome addition. However I do have a number of comments about the analysis that I believe should be addressed before final publication.

The principal comment is that I cannot see why the data have been analysed with a single-leaf model when they are clearly whole-ecosystem data, including a vegetation canopy and soil fluxes. The leaf scale model has been fitted to canopy-top eddy covariance measures. It is not appropriate to model a system like this using a single leaf model. Some of the results may be ecosystem-level effects rather than changes in leaf-level parameters. I suggest that an ecosystem-scale model should be applied. In particular, non-canopy fluxes need to be considered, as does the role of the atmo-

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spheric boundary layer conductance.

Additional comments: Please separate out the results from the discussion. Separating them would make the results much clearer and the paper easier to read.

How many locations were used to measure soil temperature and moisture? One location only, or many?

In the leaf-level model, what is the aerodynamic conductance g_a ? Note that this conductance should be corrected by a factor of 1.37 when being applied to CO₂ rather than H₂O (eqn A12).

How is T_{leaf} calculated? T_{leaf} is mentioned on p10378 but it is not clear if this is measured or modelled, or what methods were used to estimate it.

No information is given for how well the model fitted the data, nor are there errors given for the parameter estimates. Model fit statistics and parameter errors need to be given to assess the goodness of fit. For example, parameter standard errors might show us if the differences in parameter estimates between 2011 and 2012 are actually meaningful.

The actual values for the fitted parameters are not similar to values typically obtained from fitting to leaf data, which suggests there is a problem with applying the leaf-level model. For example, Ball-Berry model slopes m are typically around 8 – 10, whereas Figure 7 shows estimates of 20 – 60, which seems unrealistic. Similarly the T_{opt} for J_{max} is generally 30 degrees or above (Kattge & Knorr 2007) so the estimated values of 20 degrees seem very low and suggest further investigation is needed.

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