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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.

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General comments

The authors present an analysis of the effects of drought on ecosystem and leaf function in a Mediterranean cork oak savannah. Of particular value are the multi-faceted approach, which includes data on ecosystem gas exchange, leaf physics, soil moisture, and understorey plant performance for one moist year and the following drought year. The use of photosynthesis / stomatal conductance models to analyze the changing effects of environmental conditions on leaf function over the two years provides additional insight into the complexity of underlying regulatory processes.

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Interactive Discussion
Discussion Paper

Autors' response: We are very thankful for the appreciation of our manuscript and the approach to combine leaf physiological modeling with flux observations to infer regulatory processes of the *Quercus suber* (L.) trees facing drought conditions.

Specific comments

This manuscript is of particular value for the multiple aspects of ecosystem function that are compared between the moist year and the dry year. As a result, the authors are able to place changes in leaf function into the context of changing soil moisture, providing clear evidence for the importance of deep soil water for tree function and the impact of soil moisture draw-down on understorey vegetation. The manuscript also provides some important insights into leaf function. For instance, the observation that maximum carboxylation rate decreased despite only a small change in leaf temperature between the two years helps to constrain interpretation of how photosynthesis rates were down-regulated. Also of interest is the observation that T_{opt} was actually lower in the hotter drier year, a surprising result given previous research showing that T_{opt} increases when leaves are grown at higher temperatures, indicating that water and other environmental factors must also play a role. Finally, the model-fitting process yielded insights into the complexity of regulating processes. In particular, the model was only able to correctly fit GPP_o and ET_o when both maximum carboxylation rate and the slope of the Ball-Berry function for stomatal conductance were allowed to vary, indicating that multiple physiological processes contributed to down-regulation of photosynthesis.

Overall this is an excellent manuscript and I recommend that it be accepted.

Autors' response: The authors are thankful for the positive review and the recommendation for publication.

Technical corrections

BGD

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I found two places where the author-year citation format seems to be used incorrectly:
p. 10388, line 5 : “Costa e Silva et al. (2014)” is written, where the correct format would be “(Costa e Silva et al., 2014)”
p. 10389, line 17: “de Dios Miranda et al. (2009)” is written, where the correct format would be “(de Dios Mirand et al., 2009)”

> Autors’ response: The citation format has been corrected in the revised manuscript.

Interactive comment on Biogeosciences Discuss., 11, 10365, 2014.