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Hydrology and Earth System Sciences Discussions

Interactive comment on "The olive tree: a paradigm for drought tolerance in Mediterranean climates" *by* A. Sofo et al.

Anonymous Referee #1

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General comments In this manuscript the Authors have studied some ecophysiological aspects of olive trees subjected to different irrigation regimes. The research has been carried out in a manner that was technically sound and there are elements of novelty in the results, which may be of practical interest to olive growers. However the paper is primarily descriptive and does not really address or challenge any fundamental question of how olive trees function in different soil moisture conditions. Indeed, there are no specific hypotheses posed and no new functional or structural questions addressed. In addition, the manuscript consists of two separate experiments that need to be better harmonized. The primary message appears to be that olive trees have developed a complete set of mechanisms to cope with drought stress in Mediterranean

environments, which is an expected result. Because there were no specific questions when starting these experiments, the authors struggle to provide and discuss as many details without a take home message on challenging the traditional approach to study the response of olive trees to irrigation.

Specific comments The experimental approach is relatively standard and straightforward, and falls more into the category of confirming emerging consensus rather than breaking new ground. My impression is that insights on the effect of water deficit on olive tree behavior may hardly rely on the interaction between soil moisture availability and root system structure, when plants are left growing in pots. Whole plant transpiration was not measured on trees growing in the field and any conclusion on water consumption in olive tree plantation based on pot studies may be misleading. Also recovery effects may be biased because of the limited root volume. Was the root system excavated in this experiment? Are these plants regularly pruned? This information is needed to comment on below- vs. above-ground relationships. Most of results are quite obvious for potted plants, and conclusion on field grown trees is basically a repetition of previous studies, also conducted by the same Authors. Speculating on adaptive strategies through often spurious relationships between variables collected in a highly manipulated environment (pots) may be misleading and biased. The field experiment should be integrated with the pot study, for highlighting limitations or reinforcing results. The Authors need to state what it is really new here. Another limitation of the study which needs to be considered is the use of only one cultivar. What about non-stomatal (mesophyll) limitation to photosynthesis?

Technical comments P. 2818, line 11: correct “are have”

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