

Interactive comment on “Experimental drought induces short-term changes in soil functionality and microbial community structure after fire in a Mediterranean shrubland” by M. B. Hinojosa et al.

Anonymous Referee #2

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The paper’s overall objective is to investigate how drought affects post-fire responses in soil. The application of treatments, responses measured, field and lab approaches are sound. However, in my view, the experimental design is not being used appropriately to address the question. A factorial design to explore main and interactive effects of fire and drought would be ideal to investigate the question (this would imply a much much larger experiment, particularly if levels of drought are to be explored). However, the design actually used by the authors could work as an alternative approach and valuable insights could be derived. As currently presented, the authors show results and discussion as if two different and separate questions are asked, and their interplay comes almost anecdotally: 1. what’s the effect of fire? (using not droughted with and

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without fire plots) 2. what's the effect of drought? (using burned plots under different types of water manipulations) Because of this structure, the hypotheses, results and discussion are messy and don't actually meet the goal of answering the original question. However, the current design allows for a more explicit comparison of the effect of fire on not droughted plots vs the effect of fire on droughted plots. This would allow to make hypotheses and conclusions in terms of (a) whether drought reinforces or counteracts or doesn't affect the impact of fire and (b) whether this is time dependent. To do this, I'd suggest, to instead examine responses to fire, as differences or ratios. That is, $ec+/ec-$, $hc+/ec-$, $md+/ec-$, $sd+/ec-$. Because all plots are randomized and are all in one same area this should be legitimate. In this way, while the raw observations can be presented in tables, the ratios (or differences) will just be one set. In this way, the introduction could be re-written and better focused to frame more specific hypotheses about how drought modifies the response to fire, i.e. does it counteract or exacerbate the response. I see that at the end of the discussion some of the conclusions point in this direction, but as I tried to convey before it is messy in its current state. Once more specific hypotheses are put forward, regarding selected variables of interest, some exploration of particular mechanisms could be explored using relationships among response variables, that is going a little beyond just listing the responses of every single variable measured.

Specific comments: I consider important to state the dates of sampling in and the dates of watering. Also, the x-axis representing time should be a continuous variable. The results need to be considerably synthesized, focused and shortened. The discussion would need to be re-structured in full. There are too many tables and figures. The results of the statistics presented in tables could be integrated into the figures. Table 2: are these fractions?

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