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Interactive comment on "Soil microbiological properties and enzymatic activities of long-term post-fire recovery in dry and semiarid Aleppo pine (*Pinus halepensis* M.) forest stands" *by* J. Hedo et al.

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Title: Soil microbiological properties and enzymatic activities of long-term post-fire recovery in dry and semiarid Aleppo pine (Pinus halepensis M.) forest stands. Authors: Javier Hedo de Santiago; Manuel Esteban Lucas-Borja, Dr.; Consuelo Wic-Baena; Manuela András Abellán, Dr.; Jorge De las Heras, Prof.

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Dear reviewer 2,

We would like to thank you for the revision process of our work. We have addressed all the comments made by the reviewer with the aim to improve the quality of our manuscript. The last version of the document contains the comments of both reviewers. We hope these and other modifications (see below) help to improve the quality of work.

Best regards,

Javier Hedo de Santiago

âĂČ Interactive comment on "Soil microbiological properties and enzymatic activities of long-term post-fire recovery in dry and semiarid Aleppo pine (Pinus halepensis M.) forest stands" by J. Hedo et al. Anonymous Referee #2 Received and published: 22 November 2014 The research paper entitled "Soil microbiological properties and enzymatic activities of long-term postfire recovery in dry and semiarid Aleppo pine (Pinus halepensis M.) forest stands" by J. Hedo, M. E. Lucas- Borja, C. Wic, M. Andrés Abellán, and J. de Las Heras has been revised for publication in Solid Earth. The topic of the manuscript falls within the scope of the journal. The recovery of natural forest affected by wildfires is an issue of concern mostly in sensitive areas to the impacts of climate change (e.g. increasing temperatures and frequency of drought which may enhance the risk of wildfires). The MS was written in good English and itis well structured. However, there are several queries from this referee that must be addressed prior being considered for publication in a scientific journal. (Authors) Thank you very much for all your comments and suggestions. We have addressed all of them in the new version of the manuscript and you can find a detailed response below. Major comments: There are contradictory statements in the abstract that may lead to misunderstand- ′ ing of the key message of this piece of work. It is said that "the long-term consequences and post-fire silvicultural management in the form of thinning have a significant effect on the site recovery after fire.", however, at the same time authors are ending the abstract with, to my understanding, the main outcome of their study: "We conclude that total vegetation restoration normalises microbial parameters, and that wildfire and post-fire silvicultural treatments are not significant factors of soil properties after 17 years." (Au-

thors) We erased the sentence “the long-term consequences and post-fire silvicultural management in the form of thinning have a significant effect on the site recovery after fire”. Please, rewrite the abstract trying to be coherent with your conclusions. The hypothesis must be reformulated. As it is stated now, it seems that authors were just referring to their own results after getting them. (Authors) We changed the second hypothesis by: “microbiological soil properties and enzymatic activities recovered after the wildfire and the thinning at the mid-term” My main concern in the design of the experiment is referred to stationarity of the study. Can the authors of this work justify the decision of carrying out the experiment in winter? Why did you choose this season? Logistics may be? Are there scientific reasons for this choice? (Authors) Seasonality is an important factor to keep in mind, because it affects soil properties as enzymatic activities or microbial biomass, as many studies have showed. As Ferguson et al. (2007) stated, late fall or early winter is a good time for the soil sampling. (Ferguson, R.B., G.W. Hergert, C.S. Shapiro, and C.S. Wortmann. 2007.Guidelines for Soil Sampling. NebGuide G1740. University of Nebraska–Lincoln). We sampled during the early winter season, when the variations of soil properties hit average values and also because it is the usual season used by different authors to carry out this type of research works in Mediterranean forest areas is early winter (Lucas-Borja et al., 2010, 2011 & 2012). Nevertheless, the effect of season should be further studied in the future. In fact, we are now involved in a new manuscript redaction related to seasonal effects. Some statements in the Discussion section should be extended: ′ “Furthermore, Bastida et al. (2008) indicated that seasonality affects enzymatic activities or microbial biomass, and in this work only we sampled in early winter, so it would be suitable to conduct sampling in different seasons.” Please, indicate why you choose winter. “Wic-Baena et al. (2013) have recently shown that soil enzymatic activities did not diminish 6 years after thinning.” Please, extend your discussion at this point and try to support your findings with more sources of information available in the scientific literature. (Authors) We extended our explanation about these statements. Please see discussion section. “(. . .) Our results also indicate lower C/N values at Yeste, but no significant differences among

treatments.” Could you explain why? “Lower C/N rates have been associated with higher respiration rates and microbiological properties (Schmitz et al., 1998).” Please, extend your discussion. Is there any limitation with the use of words that avoids you to do so? (Authors) We extended our explanation about these statements. Please see discussion section. The last sentence of the Conclusions section is again confusing about the main outcomes of your work: “Forest management guidelines should consider the effect of thinning treatments and forest site in order to preserve soil quality under the adaptative forest management context.” I may point out that forest site play a very important role in forest recovery after wildfire. Therefore, forest management policies should have aspect into account when designing (and budgeting) restoration plans. (Authors) We changed the last sentence in the conclusion section.

Minor comments: Abstract: I am not sure if “normalises” is a good term to be used here. (Authors) I think that is a good term, because the meaning of “normalize” is “resume a normal state”. “(. . .) wildfire and post-fire silvicultural treatments are not significant factors of soil properties after 17 years”. Substitute “of” by “affecting”. (Authors) It has been changed. Introduction: ′ I do not understand the term “exposed” within this context. (Authors) It has been changed by “. . .and runoff and surface erosion rates can greatly increase”. Please, add a sentence about the importance of your work in the context of climate change and the vulnerability of natural forests against wildfires in sensitive (to the con sequences of Climate Change) Mediterranean areas. (Authors) We added the sentence: Moreover, global change is affecting fire regime, increasing fire frequency and area burned, its destructiveness to Mediterranean ecosystems (Pausas 2004). “thinning in young”, Is there a “more scientific” term to refer to this practice. (Authors) “Thinning” means selective removal of trees, primarily undertaken to improve the growth rate or health of the remaining trees. When is “thinning in young”, in a post-fire context, the selective removal of trees is carried out when the trees are still young. “physical–chemical”. Use “Physicochemical” and be uniform within your MS. Please, add a more recent reference to “Nannipieri et al., 1990”. You said that “Some long-term studies appreciated that soil organic matter and

microbial communities can recover to the pre-fire levels (Guénon et al., 2013)." Please, rephrase this statement indicating the differences with your study and their singularities. Otherwise, it seems that the work was already done. (Authors) We homogenized the term "physicochemical" in the manuscript. We added another reference (Bastida et al. 2008). We specify that Guénon et al. (2013) worked with different species. Please see Introduction section. "It is noteworthy 5 that we define recovery as a scenario which returns to the same soil functioning activity levels between the burnt or thinned and mature plots." I see this sentence more as "Materials and Methods information". (Authors) We moved this sentence to Material and Methods, in Experimental design. Section 2.3. Add a reference to "organic matter (OM) was inferred by multiplying the TOC content by 1.728." (Authors) The reference have been added. Was a weather station placed in the experimental sites during the campaign? (Authors) No, there was a official weather station closet o the study areas. Section 3.1. ′ In "Soil texture (Table 1) and electrical conductivity (Table 2) were also similar for both study sites and for the different treatments." Delete "also" to give coherence to the entire paragraph. (Authors) It has been deleted. "In relation to the experimental treatments, enzymatic activities presented similar values in the "BT", "MAT" and "BNOT" plots (Fig. 1)." I guess this was already mentioned at the beginning of the sub-section. (Authors) It has been deleted the second sentence. Section 3.3. Delete "and also among the microbiological variables," (Authors) It has been deleted. Discussion "Gutknecht et al. (2010) recently showed" Delete "recently". "(. . .) soil moisture and temperature showed no significant differences in the "BT", "MAT" and "BNOT" plots," Change "in" by "between". (Authors) We erased "recently". We wrote "between" instead "in". Please, look for a different term to avoid "a large part" or rephrase the sentence. (Authors) We finally wrote "may largely explain". There two times in the discussion in which you refer to "15 years". This is confusing since you mentioned a period of 17 years before. Please, clarify this point. (Authors) We apologize about this mistake. The correct period is 17 years. "This long-term study demonstrated that soil parameters might recover to the pre-fire levels 15 years after the fire event and thinning operations." Please, add "at least" before "15

years" and change "15" by "17". (Authors) We changed 15 by 17; and we added "at least" into the sentence. Based on the stated above, I conclude that a major revision is needed prior considering the paper to be published in Solid Earth. Yours sincerely

Please also note the supplement to this comment:
http://www.solid-earth-discuss.net/6/C1358/2014/sed-6-C1358-2014-supplement.pdf

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Interactive comment on Solid Earth Discuss., 6, 3025, 2014.