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## ***Interactive comment on “Thermal shock and splash effects on burned gypseous soils from the Ebro Basin” by J. León et al.***

### **Anonymous Referee #2**

Received and published: 5 December 2013

The results presented in the manuscript are confusing. Two soils are compared, one from a head slope position and the other from a foot slope position. The head slope soil, termed a Leptic Gypsisol (LP) (page 1821, Lines 7-8) is UNBURNED, whereas the foot slope soil, termed a Haplic Gypsisol (GY) (page 1821, Lines 9-10) is BURNED. The authors refer the readers to Badia et al. (2013a) for more details about the soils, but the name Leptic Gypsisol does not match the terminology in Badia et al. (2013a). Furthermore, no details are given about the BURNED Haplic Gypsisol, for example when did it burn or at what severity. Since the BURNED Haplic Gypsisol had already been subjected to an unknown duration and intensity of heat before the samples were collected, the subsequent laboratory heating would not unravel the effects of the initial heating. Also, the manuscript does not use consistent terminology for the soils throughout the manuscript. For example, Table 1 uses Leptic Gypsisol (LP) and Table 2 uses (LP)

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Haplic Leptosol.

Nonetheless, the results presented in this manuscript still represent a contribution to our knowledge of the effects of heating on gypseous soils but more details need to be provided to help distinguish the differences that are a result of topographic position compared to heating by wildfire. In my opinion, the authors need to offer more discussion of the significance of their findings. Additionally, the English needs some moderate modifications. I suggest some major reworking of the manuscript before it is published in its final form.

Here I offer extensive suggestions for improving the English and try to point out areas that would benefit from additional explanation.

Citation: Badía, D., Martí, C., Aznar, J. M., and León, J.: Influence of slope and parent rock on soil genesis and classification in semiarid mountainous environments, *Geoderma*, 193–194, 13–21, doi:10.1016/j.geoderma.2012.10.020, 2013a.

Page 1818

Line 3 Change: “Ebro Valley has extreme aridity, which determines low plant cover. . .” to “Ebro Valley has extreme aridity, which results in low plant cover. . .”

Line 5 Change: “the effects of a moderate heating, on physical...” to “the effects of moderate heating on. . .”

Line 20 I suggest changing “heating treatment or fire effect” to “fire or laboratory heating”.

Change “derived” to “determined”.

Page 1819

Line 8 Change: “to be degraded” to “to degradation”

Line 15 The verb “let” doesn’t make sense here. I would change the verb to “promote”.

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Line 16 Change: “constituents” to “constituent” since you are using the singular noun “gypsum”

Line 18 Change: “is associated to regions. . .” to “is associated with regions. . .”

Lines 19-20 It appears that you are trying to highlight the management challenges of gypseous soils but, as written, this sentence doesn’t make sense: “is necessary analysis of edaphic modifications that affect agricultural areas important of the central sector of the Ebro valley.”

Line 21 “To Neary et al. (1999)” is better expressed as “According to Neary et al. (1999)”. However, it would be even better to put the Neary et al. citation at the end of the phrase that describes the changes.

Lines 25-29 Change “In relation to reached temperatures [etc.]“ to “In terms of temperatures attained during actual fires, Perez-Cabello et al. (2012) measured maximum values between 400-800 deg [use degree symbol] C during a prescribed fire , and heat transfer values up to 110 deg [use degree symbol] during controlled plot burns in semi-arid shrubland. . .”

Page 1820

Line 2 Need to change “its” to “their” since you are talking about soils (plural).

Line 7 Need to change “erosivity” to “erodibility” since you are talking about a soil property (erodibility) not the property of the rain (erosivity).

Line 9 Change “where precipitation regime. . .” to “where the precipitation regime. . .”

Line 10 Change “short-living events. . .” to “short-duration events. . .”

Line 12 Change “after a moderate fire. . .” to “of a moderate fire. . .”

Line 19 Change “that promoted. . .” to “that have promoted. . .”

Line 25 Change “in the low slopes. . .” to “on the low elevation slopes. . .”

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Line 26 Change “until 450 mm, with maxima autumn and spring and extreme. . .” to “up to 450 mm, with maxima autumn, spring and extreme. . .”

Page 1821

Line 7 The term Leptic Gypsisol does not match the descriptions in Badia et al. (2013a).

Change “in the head of the slope. . .” to “at the head of the slope. . .”

Line 9 Change “in the foot of the slope. . .” to “at the foot of the slope. . .”

Lines 11-12 Change “The samples had a different texture: sandy loam to GY, and loamy to LP soil.” to “The samples had different textures: GY was sandy loam, and LP was loamy.”

Lines 12-14 Change “main mineralogical components, being the gypsum, dolomite, calcite, and quartz around 18-25% each component.” to “main mineralogical components; gypsum, dolomite, calcite, and quartz were around 18-25% each.”

Line 16 The number “15” should be spelled out as “Fifteen” since it is at the beginning of the sentence.

What is an “unaltered” metallic cylinder? Do you mean that you used a clean cylinder?

Line 18 Replace “controlled” with “under controlled conditions. . .”

Replace “heated at” with “heated to”

Lines 22-24 Change “To assess changes on splash erosion the rainfall simulator is especially useful, in semiarid areas, where precipitation regime is irregular, having intense and short-living events...” to “To assess changes in splash erosion the rainfall simulator is especially useful in semiarid areas, where the precipitation regime is irregular, having intense and short-duration events...”

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Lines 5-6 Change “Simulation plot. . .” to “The simulation plot. . .”

Also, you need some clarification and additional information here. The sub-plots themselves were not calibrated; rather, the rainfall hitting the subplots was calibrated using the disdrometer. And by “calibrated”, I am assuming you mean that you adjusted the rainfall simulator to get the desired rainfall drop size and intensity. It would be useful to give the reader more detail or cite a previously published work that describes the method in greater detail than is provided here.

Line 11 Change “of fine fraction.” to “of the fine fraction (<2 mm).” Is this what you mean?

Line 12 You need a little more detail in this sentence. I suggest that you change “The pH was measured in a 1 : 5 dilution with distilled water with a pH-meter. . .” to “The pH of the <2 mm fraction was measured in a 1 : 5 (soil : distilled H<sub>2</sub>O) with a pH meter. . .”

Line 13 I suggest that you change “1 : 10 dilution” to 1 :10 (soil : distilled H<sub>2</sub>O) dilution”

Line 14 It would be helpful to the reader if you state the pore size of the filter you used during the filtration step.

Line 15 Change “it was taken about 30 g of material. . .” to “about 30 g of material was crushed. . .”

Lines 16-18 You use the word “calculated” for all of the soil parameters. I think it is more accurate to say that you “measured” SOM, gypsum content, and SAS.

Lines 18-19 Change “we used Sand-Box method..” to “we used the Sand-Box method. . .”

Line 20 Delete “was used”.

Line 21 Change “was used for measured. . .” to “was used to measure. . .”

Line 23 Change “according to Taubner et al. (2009) equation. . .” to “according to the

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Taubner et al. (2009) equation. . .”

Page 1823

Lines 5-6 I prefer commas instead of dashes to set off explanatory information. So I suggest you change “soil type and temperature – independent variable -,” to soil type and temperatures, the independent variables,” and change “. . . gypsum content - dependent variable -,” to “. . .gypsum content, the dependent variables,”

Line 19 Add ‘for both soil types after ( $p < 0.05$ ).

Change “being GY more susceptible. . .” to “with GY being more susceptible. . .”

Lines 23-24 It is not clear what you mean by “SOM quality” here and how that property affects the response to heating.

Page 1824

Line 3 Change “it suffers only a considerable decrease” to “gypsum content undergoes a considerable decrease. . .”

Lines 6-12 This description of the statistical significance of the results is confusing. Consider re-writing this paragraph.

Line 13 Change “In this study there was observed on a little, but significant decrease in soils pH” to “In this study a small, but significant decrease was observed in pH...”

Line 14 “Oxidation” of what?

Lines 21-22 The phrase “on the time of resilience of the temperature peaks” doesn’t make sense. Do you mean the duration of the heat pulse? Need to clarify.

Line 29 Do you mean to say “depth under thick shrubs” instead of “depth on shrub” since you use the term “on [under is better here too] a less dense shrub” on Line 1 of page 1825?

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Line 23 Instead of using the phrase “issued by different authors”, I suggest you use “provided by different authors”.

Line 28 Change “water retention values descend both surface and in depth” to “water retention values decrease both at the surface and at depth”

Page 1826

Line 7 Change “FitzPatrick” to Fitzpatrick”

Line 15 Change “Contrasting” to “In contrast”

Line 26 Change “for diffusing the water through the crystal” to “ for the water to diffuse through the crystal”

Line 27 Change “reaching” to “temperatures reached”

Page 1827

Line 3 Change “The first one suffered a significant soil loss after heating” to “The first soil experienced a significant soil loss during the rainfall simulation experiment after heating”

Line 19 Change “by soil type” to “correlated with soil type”

Line 22 Do you mean to say “salt solution” or “salt dissolution”?

Line 24 Change “ maybe it is explained because the SAS” by “a possible explanation is that the SAS. . .”

Page 1828

Lines 10-11 The phrase “because there is water retention with a major energy by increase the microporosity (lost [should be loss] of macroporosity)” doesn’t make sense. What is your meaning here?

Line 15 Add the word “correlated” after “positively”

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Page 1836

Table 1. Since the superscripts “a” and “b” are the same letters as the letters showing significant difference (not superscripted) I suggest that you bold the letters that show the significant differences. You will need to describe this in the Table caption.

Page 1837

Table 2 uses (LP) Haplic Leptosol instead of Leptic Gypsisol.

Page 1838

Fig. 1 Change “Samples preparation” to “Sample preparation” and (C) to “sub-sample preparation”

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Interactive comment on Solid Earth Discuss., 5, 1817, 2013.

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