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Interactive comment on "Response of respiration and nutrient availability to drying and rewetting in soil from a semi-arid woodland depends on vegetation patch and a recent wild fire" *by* Q. Sun et al.

Anonymous Referee #1

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The manuscript deals with the changes of respiration, microbial biomass, available N and P etc. provoked by drying and rewetting processes in soil samples taken under three different vegetation patches – tree, shrubs and open area in burnt and unburnt semiarid woodland. The topic is very interesting, important regarding the consequences of climate change, and fits into the scope of the journal. It is nicely written and structured; however, I have some comments.

The main problem is the experimental design – soil sampling strategy and insufficient data set related to it. Three soil samples were taken from under the each patch at

the burnt and unburnt area, however, composite samples from three samples were prepared and thus there is no true replication for each patch. Each of these samples was divided into two parts maintained by different water content, all in four replications. I find more reasonable to have replication of patches at each plot because of the soil variability than replications of laboratory analyses. Making conclusions only on, in fact, one sample per patch and treatment is disputable. As mentioned in the Introduction, the size of rewetting flush is determined by concentration, availability and distribution of organic C, this is a known fact. Mixing of the three samples into a composite sample removes natural spatial variation existing in the soil, the subsequent subdivision into four pseudoreplicates masks true variation in soil properties.

I also do not understand statistical treatment – according to the M&M section two-way and three-way ANOVA were conducted, but the pairwise tests presented in Table 2 indicate that dfferences between all possible combinations of factors were tested by one-way ANOVA (with subsequent Tukey tests).

Minor comments:

L14/8726 – "The soil is sandy loam.." it cannot be sandy loam if there is 94% sand, 4% silt and 2% clay

L17/8726 – the date is not right "from 15th to 1 th January 2014.."

L2/8728 – "espiration"

L5/8732 – "..soils.(Hazelton.."

Table 1 – standard errors are missing

Interactive comment on Biogeosciences Discuss., 12, 8723, 2015.