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Biogeosciences Discussions

Interactive comment on "Decreased carbon limitation of litter respiration in a mortality-affected piñon-juniper woodland" *by* E. Berryman et al.

Anonymous Referee #1

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General Comments

This is a review of "Decreased carbon limitation of litter respiration in a mortality-affected pinon-juniper woodland" by the authors Berryman et al. They used a combination of water and sucrose amendments to assess the degree of C limitation to soil respiration in litter and mineral soil in reference plots and experimental plots subjected to simulated tree mortality. Briefly, they found that widespread mortality may decrease labile C limitation of litter respiration in the first growing season following mortality. The authors use and innovative approach to separately analyze the effects of C and water availability on soil respiration. I thought it was interesting that there was a temporal

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component to C and water limitation in that the C response seemed to lag the water response in some cases. This supports the authors' conclusion that labile soil C may quickly be depleted following water pulses in dry ecosystems. However, I tend to think of this not as a substrate limitation, but rather a limitation in microbial access to substrate. Microbes are first limited by soil water content which controls substrate diffusion rates/distances. Once this water limitation is removed, only then will adding additional C have any effect on microbial activity. After all, if the authors had added C to soil with no water I don't think they would have seen much increase in respiration. I think that this is a subtle yet important point that the authors' may want to incorporate into their discussion.

Specific Comments

Hypothesis 2, page 14478: This seems to be a weak hypothesis to me. You identify water, substrate, and temperature as the three limitations to respiration. Doesn't it go without saying that if you remove two of those limitations (water and substrate), then respiration will be more limited by the last remaining factor (temperature)?

In the results section (page 14485, lines 1-5), I did not see how figure 1 showed how treating litter yielded a stronger immediate respiration response than treating mineral soil. A little more description of how figure 1 shows this, either in the text or the figure legend, would be useful.

In the discussion on page 14487 you talk about the possible factors that affect labile C limitations in litter in your girdled plots. It is possible that the lack of a canopy may result in increased photodecomposition of litter, which may differentially affect litter chemistry between girdled and reference plots.

Technical Corrections

Table 1: Rmax, k, and alpha are not defined in the table legend. Additionally, the mention of alpha (as a statistical parameter) in the legend is confusing as the same

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symbol is used to represent something completely different in the body of the table.

Figure 1. The fact that different symbols are used to show different chambers, but there is no figure legend is confusing. This makes this figure difficult to interpret and of limited value. Is there a way to show mean values for treatments, soil type, etc.?

Interactive comment on Biogeosciences Discuss., 9, 14475, 2012.