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Interactive comment on "Soil biochemical properties after six years in amended brown and gray mine soils in West Virginia" *by* C. Thomas et al.

Anonymous Referee #2

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This paper contains important details dealing with the near term reforestation practices effects of hydroseeding (herbaceous seed mix and fertilizer) on soil biochemical properties (carbon and microbial biomass-C, pH, EC) using different top soil substitutes (brown and grey sandstone) in land previously mined for coal. The authors did a good job of introducing the issues relating to re-establishing forest in different types of mines soils, and clearly stated the objectives of the study on how hydroseeding could not only aid in soil stabilization and chemical properties, but also improve on reforestation. Overall, the interpretations of the data and findings concluded from the study were concise and well structured, though findings reported were similar to those already re-

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ported in the literature. Discussion on MBC and SOC ratios was of particular interest, and adds to the scientific literature.

The paper could be greatly improved if the following technical issues were addressed.

Title: Since hydroseeding along with top soil substitute were co-treatments, makes sense to include in title instead of using general term “amended”.

Introduction: pg 676, Line 9. Would be helpful to briefly include advantages and disadvantages of using brown and gray sandstone. Like citing literature that shows grasses typically don’t grow well in acid soils (brown stone), although very coarse soil material could be a people in drought years, since water storage is low.

Materials and methods: pg. 677, Line 12. Soil series is listed, but would be helpful if sand, silt, clay % is listed of the fine fraction and % of coarse material is also listed.

Pg 677, Line 20. Because this study did not randomized its treatments plots, but instead sampled from sub-plots. Attention must be given that pseudo replication was conducted to determine differences in treatment mean analysis and explanation or simple statement of spatial variability across sub-plots (i.e. slope %, top soil depth, clay % etc. . .) was taken into account.

Pg. 679, Sampling of analysis: Line 19. Lack of baseline data or even a reference point is a huge drawback in this study. Pg. 679,

Pg. 679, Line 25. A huge issue that must be addressed, is that coal that has been weathered and considered lower ranked (or less resistance) can be thermally oxidized along with soil organic matter underestimating Coal-C and overestimating soil organic-C. This is of huge concern, since brown mine soil is more weathered and the gray stone in this study.

Pg. 680, Line 3-28. If followed procedure closely, no need to give detailed steps if cited procedure. Just when modifications to procedure were done.

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Pg. 680, 29. What type of mean separation test was run? Since pseudo replication was done, breaking major Anova assumptions, considering doing non-parametric mean separation such as Kruskal–Wallis test might be appropriate. Results and discussion. Pg. 683, line 6. What about coal N? Coal-C was discussed, but not Coal-N?

Pg. 683, line 10. Brown mine soil was significantly lower when compared to gray and brown mine soil with hydro seeding. Pooling of results is not appropriate here. Perhaps, the brown mine soil with no hydroseeding resulted in the lowest MBC because of having lower pH and rhizosphere exudates.

Other general comments.

More discussion on how hydroseeding (specifically, species populations) affects C and N cycling is needed, since they are coupled cycles.

Table 2. Actual plant species populations in 2012 are needed.

Table 5. Define “fines”, assuming its less than 2 mm sieved soil.

Interactive comment on SOIL Discuss., 2, 675, 2015.