

Interactive comment on “Free atmospheric CO₂ enrichment did not affect symbiotic N₂-fixation and soil carbon dynamics in a mixed deciduous stand in Wales” by M. R. Hoosbeek et al.

Anonymous Referee #2

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"Free atmospheric CO₂ enrichment did not affect symbiotic N₂-fixation and soil carbon dynamics in a mixed deciduous stand in Wales."

This manuscript provides data indicating a lack of elevated atmospheric CO₂ effects on N fixation (*Alnus*) and soil carbon sequestration after four years of experimental treatment. Measurements of soil C and N pools, leaf tissue concentrations, inorganic N pools, and $\delta^{13}\text{C}$ information were presented. The results indicated that the increased demand for N under the elevated CO₂ treatment was met by increased nitrogen-use efficiency as opposed to increased mining of soil N through priming or enhanced root growth or through biological N fixation via the inclusion of *Alnus* gluti-

C2350

nosa. Although the manuscript presents interesting data and important questions, it needs some more work. First of all the authors never stated how much the elevated CO₂ treatment had increased NPP. No data were presented, nor were previously published papers cited that addressed this issue. Without demonstrating enhanced NPP, the question about ecosystem response to the enhanced N demand under elevated CO₂ is moot. Second the authors specify that they used general linear models and repeated measures ANOVA to statistically test for significant treatment and species effects. However, these results were not presented in any of the four tables or three figures. At the very least, the degrees of freedom, value of test statistic, and p-value should be shown on each of the figures. Lastly, the manuscript needs a thorough editing. Also, the smearing of the potential tree species effects via wind redistribution of litter was troubling. Perhaps, one could sample the litterfall with baskets to ascertain the C and N inputs of different tree species and then determine the relative proportion of each species in the litter layer. As long as the soils were separated by size fraction, the minimum turnover rates of each size fraction based on the $\delta^{13}\text{C}$ signature of size fractions could have been reported.

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