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Interactive comment on "Impacts of prescribed burning on soil greenhouse gas fluxes in a suburban native forest of south-eastern Queensland, Australia" *by* Y. Zhao et al.

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Referee 2's comments 1: The study employed a before-after/control-treatment experiment design to evaluate prescribed burning effects. The authors firstly collected gas flux data before the burning (Aug. 2013) and then on two post-burning dates (Aug. 2014 vs. Nov. 2014). This dataset was compared with a one-way ANOVA to assess burning effects on CH4, CO2, and N2O exchange rates. To account for the confounding effects from the inherent temporal dynamics of those fluxes, the authors collected a second suite of dataset on four unburned replicates and conducted a second-round ANOVA. However, after carefully examining Table 1, one could draw a conclusion that

the inherent temporal dynamics of those fluxes exerted much greater influences than prescribed burning. The more accurate depiction of burning effect size and magnitude can only be derived from the second-round ANOVA. For example, although CO2 emission rate in the burning site was reduced on Aug. 2014. However, this reduction cannot be attributed to the prescribed burning because Aug. 2014 CO2 rates measured in the burned plots were not significantly different from that in the unburned plots. The authors did make such distinctions in their abstract and conclusion, but they did a poor job in the results section (especially section 3.1) I am not very concerned about the pseudo-replicate issue as long as the authors can state clearly in the manuscript that the results only reflect the effects of this particular prescribed burning. However, the presentation of their ANOVA interpretations should be carefully revised to avoid inflicting any unwanted confusions

Author's response: we appreciate that the referee kindly pointed out the problems in clearly describing the statistical analysis methods and presenting the results. About the one way ANOVA analysis, we first applied it to the gas fluxes measured before and after the burning at burned plots to test whether there were any temporal variations. Then we use one way ANOVA to compare the fluxes measured in burned and adjacent unburned plots in Aug and Nov 2014, respectively. We have rewritten this section to clarify this point as listed below:

"All statistical analyses were performed using IBM SPSS STATISTICS (version 20) software. One-way ANOVA was introduced to examine statistically significant differences between soil gas fluxes measured before and after the burning in the burned plots. This analysis was also applied to compare the fluxes between burned and unburned plots in Aug 2014 and Nov 2014, respectively."

Referee 2's comments 2: English presentation is problematic. Some paragraphs read smoothly, but a number of paragraphs are still rough. Please see below for an incomplete list of language suggestions. (Referee's list here)

Authors' response: we appreciate that the referee pointed out the problems in English presentation and gave a detailed list of examples. To improve the MS's English presentation, Prof. Zhihong Xu has gone through the MS very carefully and revised the MS substantially. Prof. Xu has been working and studying in Australia for about 30 years, and he is also an Editor-in-Chief or Editor of major international journals. Here below are the modifications to the suggestions pointed out by referee 2: P4L7: the reference reviewed some studies on global climate change and GHG emissions but there are not the authors' original research, we accept the referee's comments and deleted the reference. P4L18: we changed "altering" to "alter"; P4L18: we changed "decomposition of organic matters" to "organic matter decomposition" P4L22: we changed to use "these greenhouse gas" to avoid repetitive usage of "Soil CO2, CH4 and N2O" P4L27: we changed "wildfires of" to "wildfires in" P5L9-10: we reorganized the sentence to clarify the point –"As the altered temperature and moisture could change the amplitude of seasonal variations in CO2 emissions, reduced fine root activities after fires are more responsible for the decreased CO2" P5L24-25: we changed this sentence according to referee's comments. P10L15: we changed "significant" to "significantly"; P10L17: we changed "CH4 uptake had similar CH4 uptake rate as that before the burning" to "CH4 uptake rate became similar to that before burning."; P10L18: we changed "relative stable" to "relatively stable"; P10L19: we deleted "in uptake rate"; P13L7: we changed "moderate" to "affect"; P13L9: we changed "at insignificant level" to "at an insignificant level"; P19L14: we deleted "to manipulate the fires"; P19L22-23: we changed "it was a combination of burning introduced variation and natural . . ." to "it was largely caused by natural annual variation".

We also attached the revised copy of the MS below which listed other modifications highlighted. Please turn to the attached supplement document for details.

Please also note the supplement to this comment:
http://www.biogeosciences-discuss.net/12/C5931/2015/bgd-12-C5931-2015-supplement.pdf

Interactive comment on Biogeosciences Discuss., 12, 10679, 2015.