

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.

Anonymous Referee #1

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In response to the reply to comment 1: Changing the nomenclature from "site" to "plot" does not change the low replication number or the pseudo-replication issue. All statistics are based on only 4 chamber locations this is simply to lower a number to make any of the conclusions proposed by the authors. As outlined in our initial comments to capture the spatial variation in soil greenhouse gas (GHG) fluxes at one plot at least 5 chambers would be necessary. The authors try to describe a whole forest system with 4 chambers.

The response given by the authors also highlights that this is a completely non-replicated experiment there is now 1 site with 4 plots and 1 chamber per plot. If we ignore the chamber replication and spatial variation issue for a moment this type of
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experimental design might work in a treatment vs. control type of experiment. However, in the case of the experiment outlined in the manuscript control plots were not measured or established before the burning event. Another point that the authors have not clarified is if they measured GHG before and after the burning event at the exact same location what appears unlikely since chambers were probably removed before the burning event. Again, since no consideration has been given to generate plot means of multiple chambers per plot for the measured GHG fluxes the differences between measurements taken before and after the burn might largely be confounded by spatial variability.

In response to the reply to comment 2: The response given by the authors highlights that an inappropriate statistical test was used to analyse the data. This dataset is not suitable to be analysed with a one way ANOVA since the measurements according to the authors were repeated measurements of the same subject over time. Potentially a linear mixed model might be appropriate to analyse these type of data, however; this might not be possible given the low replication number and the limited number of measurement events. The experimental design is simply not strong enough for any of these analysis and as highlighted in the first response all that was archived is to determine that soil GHG fluxes are different at different times of the year. Furthermore the correlation analysis (no information what test was used) are based on only 3 time-data points. In addition as outlined in our first set of comments some very unusual type of measurements have been correlated with the GHG fluxes in question especially gravimetric moisture content has very little use in this type of analysis Therefore it is in our eyes not possible to talk about "recovery" in the way the authors do. It is also unclear in the result section when the authors compare the before and after burn measurements and when they compare the after burn burned vs. after burn unburnt measurements.

In response to the reply to comment 3: Please outline the reasons why you would not have had access to the plots in the first 2-3 month after the burn. The investigated forest

is opposite the University campus and prescribed burn areas are generally accessible to the public in within 48 hours after a burn or even directly after a burn if research permits are requested. Furthermore, assuming that soil GHG fluxes are the same in the same month of each year is quite incorrect since their seasonal and inter-annual dynamic depends on the weather (especially soil temperature and moisture), which may differ quite largely between years.

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

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