

***Interactive comment on “Technical Note: Differences in the diurnal pattern of soil respiration under adjacent *Miscanthus x giganteus* and barley crops reveal potential flaws in accepted sampling strategies” by J. Ben Keane and Phil Ineson***

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Review of Technical Note: Differences in the diurnal pattern of soil respiration under adjacent *Miscanthus x giganteus* and barley crops reveal potential flaws in accepted sampling strategies. *Biogeosciences Discuss.*, doi:10.5194/bg-2016-397, 2016

from Jeff Atkins (jeffatkins@virginia.edu)

I think this is an excellent contribution to an important experimental design and sam-

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pling issue that has been a concern in some circles of the carbon cycling community for a while. Showing differences in diurnality between these two vegetation types is an important consideration and that the diurnality changes seasonally as well! This work will be of interest to the Biogeosciences community. I think this work, though it is a short technical note, could be improved further.

In the abstract, there is discussion of correlations with solar radiation and later in the paper discussion of soil moisture effects, though these are not quantitatively included later or specifically addressed. Nor are site effects such as soil carbon, soil nitrogen, etc. While a full description of the site is referenced, a brief inclusion of a sentence here to help understand site differences or homogeneity would be beneficial given the implications for carbon cycling. There is also a body of work on soil carbon flux hysteresis that is not included or referenced. I have made some notes of that later in this review. I offer this as it would add to this work, provides sound theoretical background, and will also help better frame how this work can aid researchers in the future. I have noted some considerations for the figures as well.

Pg 1, line 26 need an “of” between “amounts” and “carbon”

Pg 2, line 4 – this sentence is worded awkwardly and could be focused more. Monitoring would imply fixed-chambers, but many studies employ portable chambers some of which require in-situ collars and some that don't.

Pg 2, line 13 – “these studies have focussed on a single vegetation type or land use thus do not resolve . . .” Focused has an “s” too many and you need a conjunction between “use” and “thus.”

Pg 2, lines 10-20 – There is some work from Diego Riveros-Iregui that would be a valuable contribution here about diurnal hysteresis if not in this section to set the scene, perhaps later:

Riveros-Iregui, D. A., Emanuel, R. E., Muth, D. J., McGlynn, B. L., Epstein, H. E.,

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Welsch, D. L., ... & Wraith, J. M. (2007). Diurnal hysteresis between soil CO<sub>2</sub> and soil temperature is controlled by soil water content. *Geophysical Research Letters*, 34(17).

And this paper may also be useful:

Ruehr, N. K., Knohl, A., & Buchmann, N. (2010). Environmental variables controlling soil respiration on diurnal, seasonal and annual time-scales in a mixed mountain forest in Switzerland. *Biogeochemistry*, 98(1-3), 153-170.

Pg. 3, line 30 – just a note on units grams per hour or micromoles per second are typically more common in the literature.

Pg. 4, lines 1-3 – I don't completely understand what you are saying with this phrase, “. . . and daily means at 09.00 and ca. 20.00 for all three months in barley” could you clarify that? Are you saying that is when fluxes approximate daily means?

And a really, really minor point, but I think “greater” works better to describe fluxes than “higher” because you are talking about a magnitude, an accumulating sum of sorts.

Pg. 3, lines 16-20 – Love it. That is a great point and I am enthused to see this work on experimental design and sampling! That is a good highlight to show that difference and make that point about missing differences between the systems.

Pg. 4. – It would be helpful if you showed your soil moisture data or described it in some way and provide analysis of how that is working with temperature or in isolation to control fluxes. That interaction can be important. There are various ways to look at the interaction of temperature and moisture such as an ANCOVA or even looking at some log regression detrending. Inclusion of an ANCOVA would likely address this and be of minimal additional work.

Fig. 1 – there is a bit of an over-plotting issue with the data that could be addressed by perhaps widening the plot or decreasing the marker size.

Fig. 2 – Great plot in general, but I think that changing the scale on the y-axes, though

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I understand visually why it was done, is not a good practice. Normalizing those axes would also better show monthly differences as you can see in the soil temp. plots at the bottom.

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