

## ***Interactive comment on “Decadal variation of CO<sub>2</sub> flux and its budget in a wheat and maize rotation cropland over the North China Plain” by Quan Zhang et al.***

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This paper presents an assessment of the 10 yr carbon budget of wheat/corn crop rotation along with a much more detailed component assessment over the course of one year in China. The authors use both long-term eddy covariance observations along with respiration measurements and a comprehensive array of biophysical ones for their analysis. The main result is a comprehensive carbon budget for this cropping system as well as some estimates of the controlling drivers and a comparison with previously published agroecosystem C budgets.

The paper is well written. The results are clearly presented and the discussion is well

C1

framed. There is a great need for these kinds of studies so that the large uncertainty in carbon budgets of agroecosystems can be reduced.

I have no major objections to this paper being published. The weakest part of the paper is its consideration of uncertainty. Ideally, it would be great to see confidence intervals given on the detailed crop budgets, but this is difficult to address and not easy to improve. I have just a few stylistic suggestions to improve the paper's presentation.

1. Throughout the paper, "groundwater table" is used to indicate "depth to groundwater" or "water table depth" or even "groundwater depth". One of these latter terms should be used. (e.g., L. 27). Likewise, "cultural" is used to indicate "agricultural". This should be changed to "crop" or "agricultural" cycle.

2. All throughout the paper, C balance figures are reported down to the 1/10th's of a g C. I'd suggest rounding these off to the nearest whole number which would make it easier to read as well as not convey such high level of confidence in their accuracy (maybe even consider rounding the nearest 10's).

Figure 1. There are two dots on the map to indicate location of one flux site. Also, would be nice to have a smaller inset map that shows a more zoomed out region to indicate where in China we're zoomed into.

L151. "gaps less than 2 h" L274. "as previously mentioned" L283. "were" to "are". also see L288 and elsewhere.

L323-332. Here and elsewhere, correlation is being used to indicate causation. The text should be changed to correct this.

L338-339. Wondering if this cold season uptake might be caused by IRGA self-heating as shown previously by Burba et al. Did you consider this?

L413. "a short period of" L421 considered L422 "are required" L423 "is much closer to the surface because..."

C2

L454-464. Rather than reporting all these values in the text again, I'd suggest just referring to the values in the table.

L522. Rather than just reiterating these numerical results I'd suggest trying to write what some of the broader implications of your work are.

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