Interactive comment on “Rhizosphere to the atmosphere: contrasting methane pathways, fluxes and geochemical drivers across the terrestrial-aquatic wetland boundary” by Luke C. Jeffrey et al.

Anonymous Referee #2

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I apologize for the delay in getting my review in. Overall I think this study is interesting and the paper is mostly well written. It is unfortunate that it is just 2 seasonal sampling events. It is unclear if the sampling occurred over more than one day each season? Please clarify. The authors do a good job of limiting their results to what they can say with the data at hand (assuming that they sampled more than one day per season). I do think that some things need to be clarified. Below I provide comments and suggestions of issues that need to be clarified.

Lines 35 and 36- negative relationships between Fe, and SO4, and CH4? Or Fe and C1 CH4, and SO4 and CH4? The wording is unclear.

Line 46- what do you mean by early system recovery periods? Recovery from what? Was this wetland recovering from something? This was a remediated wetland?

Line 59- how are drivers and effects of seasonal weather oscillations different?

Line 62- See problems with Mitsch et al 2013 calculations from Bridgham et al 2014 and Neubauer 2014 papers. I see you cite those papers.

Line 68- “lack of spatially resolved wetland CH4 emission data”? There are many studies that have measured this. Some of which you already cited.

Line 84- Is Lal 2008 an appropriate citation for this sentence?

Line 92- how was that 1.2 Pg C estimated?

Line 112- why do you expect the fluxes going to differ across the wetland communities?

Line 162-163- Why were those fluxes reported elsewhere? Is that paper available?

Line 164- how many chambers did you have in each vegetation type? How many days did you measure fluxes? Was it only one day each season?

Lines 279-281- This sentence is more Discussion.

Line 302- Structuring the Discussion in the same order as the Results makes it easier for the reader. I suggest you Discuss your results in the same order they were presented in the Results section.

Line 326-CASS wetland restoration the same as remediation?

Lines 345 and 346- It gets hard to keep track of C1, C2, Veg A, Veg B. Could there be more straightforward ways of talking about these?

Line 352-354- This is more of a results sentence and I am not sure I understand what you are saying. Please clarify.
Line 409 and 410- this Veg A and B is getting tiring. Why not just talk about the species?
Line 433- it is hard for readers to access submitted papers. Please do not cite papers that are not already published in some form.
Line 467- Again see Bridgham et al. 2014 about the problems with Mitsch et al use of radiative forcing vs balance.
Line 452, comma between budget and however.
Figure 6- those are really low r2 values! Are these significant relationships? If they are not significant, it is better not to report the value. And r2 of 0.0005 is better to just say there was no relationship.
Figure 8- I really like this figure. Is Fe(III) in Veg C above the axis break? It is a little hard to tell.