Biogeosciences Discuss.,
doi:10.5194/bg-2016-191-RC2, 2016

Biogeosciences Discussions

Interactive comment on "Quantifying the relative importance of greenhouse gas emissions from current and future savanna land use change across northern Australia" *by* M. Bristow et al.

B. Amiro (Referee)

Brian.Amiro@umanitoba.ca

Received and published: 27 June 2016

Review of Bristow et al. Biogeosciences OzFlux 191

General Comments:

This paper describes flux tower measurements of carbon dioxide for a paired treatment where one site was disturbed while another was used as a control. The paper provides new data on comparative net ecosystem exchange. It further estimates GHG emissions from a burning activity during land clearing, and provides a perspective on broader implications over a large area of northern Australia.

The science is basically sound and the experiment is a worthwhile contribution. The

manuscript needs to be carefully edited before acceptance. Some specific comments are given below, many of which are editorial. However, there are several sections that require additional technical input.

Specific Comments:

1. Page 2, line 10. No need for the "EC" abbreviation in the abstract. 2. Page 3. Line 9. Remove "northern" since it is not needed and misleading for a global audience. 3. Page 4, lines 3 and 5. The references for IPCC and Tubiello are not in the reference list. 4. Page 4, lines 22-25. These lines are repeated. 5. Page 5, Line 8. "Leakage" is not clear; suggest to avoid the term. 6. Page 6, lines 3-4. "Significant" used twice. Also put "in" preceding "northern". 7. Page 6, line 8. Extra bracket in reference. 8. Page 8, line 15 and elsewhere. "SD"instead of "sd". 9. Page 8, lines 20 and 23. The heights and towers are not clear. Perhaps say height-adjusted because only the instrument height is important, not the tower height. 10. Page 9, line 5. Remove "one in" to make the return time correct. 11. Page 9, line 13. Why say GHG when this part is all about carbon? 12. Page 9, line 22. Give address for first mention of a company. 13. Page 10, line 1 and elsewhere. The Ozflux convention uses subscripts for the energy balance components. Also Rn is used for net radiation here but then Fn is used on page 11, line 4. 14. Page 10, lines 4 to 16. The method for flux calculation is not clear. The Isaac paper says that the high-frequency data are recorded and then processed. But this section says that only the 30-min covariances were recorded, so some of the procedures, such as spike removal, could not be applied. Please rewrite this section so that the audience can follow the method. 15. Page 11, line 8. This is repeated in Lines 17-20 on Page 10. 16. Page 11, lines 14-16. The gap-filling method is not clear. In the Results, the different phases are described. Because the fluxes can be very different among phases, it would seem that the gap-filling neural network should only be trained for each phase. It is not clear that this was done. Further, the amount of gaps are not presented, and the use of different ANN for each phase needs to be evaluated to identify any artefacts caused by the gap filling. 17. Page 13, line 1. It would appear

that emission factors for burning were developed for wildland fires, and not for piled, cured fuels. Please give us an idea of the possible error in the emission factors. I realize that you have suggested that the 10% residual following burning is similar, but this would only tell us about carbon, not about the non-CO2 emissions. 18. Page 14, lines 3-6. These two sentences seem to say the same thing. 19. Page 14, lines 3-6, and Table 3 (fire emissions late dry). It appears that the flux tower data were not used while the area was burnt to exclude combustion emissions in the NEE measurement. Please confirm. If so, where did the value (0.90) for the CS tower come from? Was it the NEE measurement without a smoke plume? 20. Page 15, lines 3 and 10: check grammar. 21. Page 16, line 12. Figure 2 does not add much to the paper because there really is no energy balance component to the study, just GHG. So remove Figure 2, and just describe the general nature of energy balance closure in the text. 22. Page 17, line 10. I think you mean Fig 4 here, not 3, for this period. 23. Page 18, line 6. “Mg” 24. Page 18, line 16. Figure 5 shows an amount less than 2.75; where did this come from? 25. Page 19, lines 17-18. Awkward sentence. 26. Page 20, lines 6 and 8. The values given in the text are not the same as those in Table 4. 27. Page 20, line 23. Other GHG gases were not measured; omit the part in brackets. 28. Page 21, line 3. Spelling. 29. Page 22, line 15 and elsewhere in manuscript. Proof-read carefully everywhere. For example insert “be” ahead of “a weak”. 30. Page 23, line 6. Any evidence for this statement? In temperate systems, cropping systems are usually a carbon loss once harvest is included. 31. Page 24, line 15. “24,769” is not in Table 4. 32. Page 24, line 9. The greatest error is often in gap-filling, and you did not assess this part in the study. We need further information to assess this. 33. Page 25, lines 16-19. Very awkward. 34. Page 26, line 5. “ranging”. 35. References: check very carefully. For example: Page 29, line 32. Should be Paw U, K.T. 36. Table 3. NEE is given in Mg per month, but the totals are total Mg. Perhaps insert a new row of units for the two “total rows” so that the reader can see the unit change. Also, it would have been good to have done a statistical comparison between CS and UC for each phase and show here if different (days would be replicates). You did this only for the intact

period. This would make the paper more experimental to test a hypothesis. 37. Figure 3 caption for d). Say this is daily average NEE. 38. Figure 1. Latitude and longitude lines would help the audience. 39. Figure 3 axis for VPD should be kPa instead of KPa.

Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2016-191, 2016.