

Interactive comment on “Global Carbon Budget 2017” by Corinne Le Quéré et al.

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This is an excellent paper that deserved to be published. I have a few general remarks and the some minor suggestions.

There is no doubt that this is an important publication that is used by both policy makers and scientists. As such proper referencing and transparency of method is crucial. The authors do a great job in this. The authors appear to have trimmed the actual text a bit to last year that makes the paper overall now more readable. The authors now use two bookkeeping methods, which diverge. This is a useful step. The authors have taken the brave and courageous step to base the land sink and land use emissions on models, resulting in a closed budget with the residual reflecting (0.6 Gtonyr⁻¹) the errors in all terms. Previous budgets put the residual in the land sink. This is in my view a much needed step, as it identifies issues in the land surface models and the overall

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budget. That being said, I would appreciate if there is a little more discussion about the error attribution to both the land sink and LUCCF emissions. We know the models may provide the right answers for the wrong reasons as they were invariably tuned and in the paper further constrained by observations of the historical period. 5. The change in cumulative emission due to these changes is substantial (20 Gton excluding the). I would suggest that the authors make a little more of this the final discussion and conclusion. In particular the latter reads like a rather lacklustre introduction in a Research proposal. The change and uncertainty in the land have important implications for policy- how much is still left to reach the 1.5 target and has implications for a monitoring effort of reductions in general. The latter is now discussed in a separate paper (Peters et al., 2017), but I feel that it is appropriate to mention and discuss it here, as this is the ultimate source on which it is based.

Minor comments

P 4, l 14. It suggest here that the budget is only referring to the atmosphere. Suggestion to change wording to include land and ocean and emissions. P 4, l 28. I would use the word bulk emissions to emphasise what it is you determine. There may still be hidden other sources or sinks that we do not take into account, other than the ones you mentions here. P 1, l 3 change comparing to normalising P 17, l 15. What is meant by the difference in approach and processes. Is approach not obsolete in this sense? P 29 l 1-3. The suggestion here is that only the known factors explain the variability in the residual. I would like to leave open the possibility that there an unknown factor. The for example is a bit weak in this context. P 32 l 9-16. Given the wide uncertainty ranges, the use of wording such as “very close to” is a bit presumptuous. Better also use terms like within the uncertainty. P 37 and Table 10. I like Table 10, as it is almost a roadmap for further research. However, it would help the reader if there is some indication of the sign of the components possible flux. If all would work (I know they duo not. . .) in the same direction they could make a difference of almost 4 Gtonyr-1. That surely is not the case, so an additional column indicating the possible sign if known would help.

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