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Interactive comment on "High methane emissions dominate annual greenhouse gas balances 30 years after bog rewetting" *by* M. Vanselow-Algan et al.

Anonymous Referee #3

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General Comments

This paper makes an important contribution to our understanding of GHG fluxes following rewetting – an area where there is a paucity of information. It challenges the view that methane emissions revert to more natural levels with time. However, it may be regarded an example of the extreme end of what may occur and to this end acts as a caution to the management of rewetting where tighter controls on the water table are paramount. The English is a little strange in places; some, but not all, are listed below.

Specific Comments

P2810 L26 I do not have access to the Koster reference but I would challenge this state-

ment. Perhaps true if you are only including N. Germany, Denmark and the Benelux countries but it cannot be so if you include Sweden, Norway, Iceland, the UK and Ireland (as would normally be included in "north-western Europe"). It will be low (5% if you exclude Iceland, Norway and Sweden) but not as low as 1%. Check the figures in Joosten and Clarke (2002).

P2814 L15 These are very deep frames

P2821 LL3/4 "N2O fluxes were significantly different. . ." – slightly misleading statement; in reality all the vegetated sites were the same and only the industrial site was different.

P2823 L16ff The methane emissions are remarkably high: they are twice those seen in the hot spots of Cooper et al. and more than three times maximum values seen in other studies in natural systems (see Couwenberg et al.). The fact that the site is inundated for almost half the year must pay a major role (it would be useful to know the mean annual water level and also to know if this was typical of previous years or a more recent atypical phenomenon). The site would almost seem to be too wet for Molinia which prefers more sloping terrain where there is run-off.

P2824 LL20-28 If this "filling up" was 30 years ago, it would seem unlikely to contribute much to current methane emissions as this material would already be quite decomposed. In contrast, the heather bales in Cooper et al. had only been recently incorporated. Fresh labile material will surely be the dominant source.

P2825 L5 It is almost passed over that even the Sphagnum (with Eriophorum) and Heath stands were still giving very large methane emissions and even if Molinia is excluded they would still be a problem for climate protection.

Technical Corrections

P2815 L12 Replace "camber" by "chamber".

P2816 L2 Replace "closing" by "closure".

P2816 L9 Replace “triply” by “in triplicate” (also L14). Why “three” plots and not four?

P2817 L4 Replace “dillution” by “dilution”.

P2818 L11 Replace “appropriate” by “appropriately”.

P2818 L13 Replace “none” by “neither”.

P2818 L24 Replace “well as” by “was done for”.

P2819 L5 This sentence is not quite clear – reword.

P2821 L1 Not necessary to repeat numbers already in Table 3.

P2824 L27 Replace “fulfilled” by “blocked”.

Table 2 Replace “mooses” by “mosses”.

Figure 2 It is not really necessary to denote the individual plots. A single mean fitted line for each vegetation type would be sufficient.

Figure 5 I’m not sure why this should follow an exponential fit. In theory, it should be linear or even indicating some saturation when the belowground methane becomes exhausted.

Figure 6 – not usual to duplicate data in both table and figure.

Interactive comment on Biogeosciences Discuss., 12, 2809, 2015.