

## ***Interactive comment on “Comment on “Soil CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O fluxes from an afforested lowland raised peatbog in Scotland: implications for drainage and restoration” by Yamulki et al. (2013)” by R. R. E. Artz et al.***

**Anonymous Referee #2**

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Comment on “Comment on “Soil CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O fluxes from an afforested lowland raised peatbog in Scotland: implications for drainage and restoration” by Yamulki et al. (2013)” by R. R. E. Artz et al.

Overall comments Artz et al provide a very useful comment on the study of Yamulki et al which will contribute to the interpretation of this and other studies. In general I agree with the comments of the authors. There are some points that may require clarification and these are addressed below. I also agree with the comment of Reviewer # 1 regarding the inclusion of a figure to illustrate the component GHG fluxes.

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### Specific comments

Artz et al suggest that the measure respiratory fluxes on the unplanted sites represent net ecosystem respiration (L9). However, Yamulki et al used opaque chambers and I suggest that these measurements represent net ecosystem dark respiration. Light respiration can be measured indirectly using transparent chamber and this method has been used in undrained peatlands (e.g. Laine et al., 2007). This technique allows the net ecosystem GHG balance to be measured.

L16 While the measurements in the planted plots will include heterotrophic and autotrophic respiration the insertion of the collars into the soil (albeit only 3 cm) may have severed some roots. This would reduce the autotrophic component and lead to an underestimation of the total soil CO<sub>2</sub> efflux. It is surprising that Yamulki et al did not attempt to partition the soil CO<sub>2</sub> efflux into autotrophic and heterotrophic components. This would assist in the interpretation of the study, provide further insight into the soil GHG balance and assist in the development of emission factors for these soils. This has been done by Makiranta et al (Mäkirananta et al., 2008; Makiranta et al., 2009; Makiranta et al., 2010; Makiranta et al., 2012) and the estimates of the contribution of R<sub>h</sub> and R<sub>a</sub> to R<sub>soil</sub> reported therein could be applied to the soil respiration data of Yamulki et al to estimate R<sub>h</sub> in that study.

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in a drained peatland forest. *Agricultural and Forest Meteorology*, 150, 1585-1596.

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