

We appreciate the comments made by Aldis Butlers for our manuscript.

Dr. Butler commented on the model evaluation. In our paper we evaluated CoupModel with three years of eddy covariance fluxes and supported environmental data for a restored peatland. We acknowledge that other chamber measurements exist elsewhere, and these might be useful for further model evaluation in the future. Note detailed model evaluation results were presented in Fig. 1 and 2. Model sensitivity analysis were made with regards to the thickness of the newly grown acrotelm (Fig.3) and climate (Fig. 6,7 and 8). The parameter sensitivities of CoupModel for pristine bog, and bog undergoing extraction were addressed in earlier studies (supplement section F of He et al. 2023, Hydrology and Earth System Sciences and e.g. Table 3 of He et al. 2023, Ecosystems). The simulated NEE is compared with measured NEE (Fig. 1i, 2), also see Line 252-260.

The study site is oligotrophic, raised bog typical of continental North America. The restoration approach used for the study site is well documented (e.g. Quinty and Rochefort, 2003; Gonzalez and Rochefort, 2014) and several earlier studies investigated the sites nutrient status (e.g. Andersen et al. 2010). The Canadian practices require the extracting companies to leave a residual peat layer to facilitate restoration using the moss-layer-transfer-technique (MLTT). In BDB, two meters with 80 cm *Sphagnum* peat on top was left over in 1999 before the restoration. Hence, there is no groundwater altering nutrient conditions in our study site. We will add more site description to make this clearer in our revision.

## References

González, E. and L. Rochefort (2014). "Drivers of success in 53 cutover bogs restored by a moss layer transfer technique." *Ecological Engineering* 68: 279-290.

He, H., Moore, T., Humphreys, E. R., Lafleur, P. M., and Roulet, N. T.: Water level variation at a beaver pond significantly impacts net CO<sub>2</sub> uptake of a continental bog, *Hydrol. Earth Syst. Sci.*, 27, 213–227, <https://doi.org/10.5194/hess-27-213-2023>, 2023.

He, H., Clark, L., Lai, O.Y. *et al.* Simulating Soil Atmosphere Exchanges and CO<sub>2</sub> Fluxes for an Ongoing Peat Extraction Site. *Ecosystems* **26**, 1335–1348 (2023). <https://doi.org/10.1007/s10021-023-00836-2>

Andersen, R., Rochefort, L. & Poulin, M. Peat, Water and Plant Tissue Chemistry Monitoring: A Seven-Year Case-Study in a Restored Peatland. *Wetlands* **30**, 159–170 (2010). <https://doi.org/10.1007/s13157-009-0015-0>

Quinty, F. and Rochefort, L.: Peatland Restoration Guide: Second Edition, Canadian Sphagnum Peat Moss Association and New Brunswick Department of Natural Resources and Energy, 2003.