

Response to interactive comments of Reviewer 1 (bg-2018-290)

We thank reviewer 1 for helpful comments and corrections. Our responses to specific comments (reprinted in bold) are given below.

The authors tested experimentally whether the slow degradability of boreal forest mosses is caused primarily by the chemical complexity of their tissues or the physical structure of the moss cell wall biochemical matrix inhibiting decomposition. The authors used various methods to study the decay rate of mosses, and changes in moss tissue C and N composition and physical structure during the 2.5-year laboratory incubation at two different temperatures. The results suggested 1) the moss cell wall matrix protected labile C from microbial decomposition and 2) the N and C cycles were uncoupled. I find the manuscript very interesting and topical in terms of assessing the role of boreal forest soils as sinks and sources of C. Below comments to the aspects listed by BG: 1. Does the paper address relevant scientific C1 BGD Interactive comment Printer-friendly version Discussion paper questions within the scope of BG? YES. 2. Does the paper present novel concepts, ideas, tools, or data? YES. 3. Are substantial conclusions reached? YES. 4. Are the scientific methods and assumptions valid and clearly outlined? YES. 5. Are the results sufficient to support the interpretations and conclusions? YES. 6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? YES. 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? YES. 8. Does the title clearly reflect the contents of the paper? YES. 9. Does the abstract provide a concise and complete summary? YES. 10. Is the overall presentation well structured and clear? YES. 11. Is the language fluent and precise? YES. 12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? YES. 13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? YES, see specific comments.

14. Are the number and quality of references appropriate? I CANNOT ASSES THIS BECAUSE AT LEAST 14 REFERENCES GIVEN IN THE TEXT ARE MISSING FROM THE LIST OF REFERENCES. THE REFERENCES IN TEXT AND IN THE LIST SHOULD ALSO BE CROSS-CHECKED BECAUSE THERE ARE DIFFERENCES IN THE PUBLICATION YEAR OR NAME OF THE FIRST AUTHOR IN SOME CASES.

Discrepancies between the reference list and the references cited in the text will be corrected in the revised manuscript.

15. Is the amount and quality of supplementary material appropriate? YES.

Page 3, line 13: Tell whether you only sampled green living (fresh?) parts of mosses or was the material a mixture of green and older brown parts.

The collected mosses were separated into green and brown fractions, and the green tissues were used in the incubations. This will be clarified in the revised manuscript.

Page 9, lines 33-35: Uncoupling of the N and C cycles has also been reported as a result of in situ incubations - see Manninen et al. 2016, Science of the Total Environment 571, 314-322. Add reference.

This reference will be added in the revised manuscript

Page 3, lines 18-19 and Table 1: Correct the names of the moss species, i.e. should be Rhytidiadelphus spp., Pleurozium spp. and Ptilium crista-castrensis.

Will be corrected in the revised manuscript

Page 6, line 27: I think the authors should refer to Table 2 (not Table 3).

Will be changed to Table 2 in the revised manuscript

Page 7, line 15: Replace ‘Figure 2’ with Fig. 2.

Will be corrected in the revised manuscript

Page 10, lines 25-33 (and page 11, lines 27-28): Discussion on fungi is very important, given that fungi are important decomposers in acid forest soils. If the authors have data on soil pH at the two sites, it should be added in Table 1.

The soil pH of the two sites is quite low (<4.5 in all cases) and will be added to Table 1

Table 3: Replace ‘%Carbon’ and ‘%Nitrogen’ with %C and %N, respectively. Replace ‘Nitrate’ and ‘Ammonia’ with nitrate+nitrite and ammonium. Use nitrate+nitrite also on page 7, lines 21-22.

Will be corrected in the revised manuscript

Fig. 8: Add a, b, c and d to indicate Figs. 8a-8d.

Will be corrected in the revised manuscript

Cross-check the list of references with references in the text and revise when needed.

Will be corrected in the revised manuscript