

I would like to congratulate the authors on the improved revised manuscript. Readability has benefitted tremendously from restructuring, especially in Results and Discussions section. Well done! Conciseness also more concise now, though I see some potential to condense even more (e.g., in the very extensive study site description, or the summary (“Overall, ...”) after the summary (“In summary, ...”) in the two lower paragraphs on p. 13). I have included some additional suggestions for changes below, but would be happy to see the manuscript published after consideration of these points.

## Materials and Methods

L141/146: is the number of samples equal to the number of sampled leaves *per species*? I suggest to explain what exactly was sampled (as in L142f). For example, if  $n = 69$  is the total number of samples at the Gradient, Fig. 2c wouldn't make sense as it has more levels (81).

L176ff: the  $\Delta$  symbol is normally used for differences, not standard deviations, so I find its use here a bit confusing-.

L205: which variables were log-transformed?

L207ff: including model formulas could help with clarity.

## Results/Discussion

L225f: the statement “potentially induced by...” is repeated in the following paragraph. It seems more meaningful there, so I suggest to remove it here.

L248f: I don't think it's necessary to cite the same reference twice within this sentence and suggest to remove the first instance.

Fig. 5/6: I think the captions of the two figures are interchanged. Further, both would benefit from a more detailed description of what they are displaying in the first sentence, e.g. “foliar fluxes across treatments” (Fig. 5) vs. “between treatments” (Fig. 6).

L. 481: “The wide shrubification across the Arctic is expected to increase by as much as 52% by 2050 (Pearson et al., 2013).” This is a very vague statement. For instance, what baseline is that increase compared to? Are you referring to increases in shrub cover and/or biomass? I would advise to carefully formulate such general statements to still keep them precise (and thus impactful).

L. 483: to my understanding, Mod and Luoto (2016) neither discuss albedo nor soil surface effects of shrubification. Consider removing this reference.

## Conclusion

L528ff: I suggest to make it clear that conclusions (i) and two (ii) refer to the community level, in contrast to the initial concluding statement at species level.

L548ff: I find the last two sentences a bit confusing. After only discussing micronutrients throughout the discussion, this reference to carbon cycling distracts from the main take-home message of the paper. If you want to include this point, I suggest to move it to the previous section (Implications for vegetation shifts).

## Additional remark:

I would like to reiterate my suggestion of phrasing references to degradation stages at the Gradient site as “Minimal *thaw* area” instead of just the “Minimal area” (e.g. L519), and likewise for the other two degradation levels, to improve clarity for the readers.