

Biogeosciences Discuss., referee comment RC3
<https://doi.org/10.5194/bg-2021-99-RC3>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on bg-2021-99

Anonymous Referee #2

Referee comment on "The application of dendrometers to alpine dwarf shrubs – a case study to investigate stem growth responses to environmental conditions" by Svenja Dobbert et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2021-99-RC3>, 2021

Dear authors, dear Editors,

it was a pleasure reading the manuscript "A new mechanistic understanding of ecophysiological patterns in a widespread alpine dwarf shrub – Refining climate-growth relationships", which presents a pioneering work at the emerging interface of dendroecology and wood anatomy (of which more could be added to the paper) that appears particularly timely in the context of understanding the causes and consequences of "Arctic greening" (as we still don't understand the abiotic and biotic drivers of shrub growth at hourly rather than integrated ring width resolution). Furthermore, I was delighted to follow the interactive online discussion, during which challenging scientific questions were raised and – most importantly – answered.

The data used and methods applied (i.e. a network of hourly-resolved dendrometer and in-situ meteorological/environmental measurements from several *Empetrum nigrum* sites along elevational gradients in central Norway) provide detailed insights into the growth-climate response of an important alpine and Arctic shrub species. The two thorough replies to the critiques of R1 not only confirm the robustness of the study, but also contribute to an improvement of the quality of the manuscript, which clearly goes beyond previously published dendrochronological evidence of shrub growth.

Once all comments and suggestions of R1 are either considered or counterargued, my recommendation to the authors is to further improve the writing style of their paper (maybe even inviting further authors?), which is still rather vague and imprecise at several occasions. This being said, I have no doubt that a revised version of this manuscript will make a strong contribution to the wider community of global change ecology/biology and biogeography, and stimulate discussion within and between dendroecology and wood anatomy (where high-resolution dendrometer evidence from shrubs is still lacking).

The main reasons for publishing this study are at least two "firsts": 1) hourly-resolved shrub growth dendrometer in tandem with in-situ climate and environmental measurements, and 2) winter climate affects stem growth of one of the focal species of recent Arctic and alpine greening.

I am looking forward to read a fully revised article and, again, congratulate the authors to their achievements in what I consider a ground-breaking study that has the potential to stimulate further research.