

Interactive comment on “Net ecosystem production in a Little Ice Age moraine: the role of plant functional traits” by E. Varolo et al.

Anonymous Referee #2

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Varolo et al. tell an intriguing story of vascular plant life under harsh environmental conditions in a glacier forefield. The narrative is clear and the research objectives well justified by the bibliography. In the introduction, the authors lay out clearly the specific questions they address in their study and in the conclusion provide a clear account of the main findings. Special care, however, should be taken in the transitions between sentences and paragraphs where the fluidity of the text is often interrupted by rapidly switching arguments. Overall, despite the complex experimental design and the subject-specific terminology, the authors manage to convey a convincing story.

One aspect of the study that could be elaborated further is the comparison of carbon accumulation into the ecosystem by the contrasting vegetation types. The authors give only a brief tentative explanation as to why they find similar soil carbon stocks and

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isotopic signatures despite the clear differences in the magnitude and isotopic composition of photosynthates assimilation. The proposed mechanism of lateral transport (i.e. herbivory) resulting in equal carbon stocks despite the higher productivity of *Festuca* is sound. Nevertheless the strikingly similar isotopic signature of the soil organic matter under the two contrasting species could only imply that ^{13}C enriched *Sempervivum* litter does not get incorporated into the soil (a process which should even further enrich the SOM due to fractionation) and ends up being respired upon senescence. It was Körner in his Alpine plant life book stating that cushion and rosette growth forms run their private nutrient cycling by creating favourable microclimatic conditions for microbial turnover of organic matter. If this argument holds, perhaps the observed high Reco fluxes and low assimilation rates in *Sempervivum* could be attributed to an excessively high heterotrophic respiration, rather than an inefficient photosynthesis. I believe that the authors should at least reflect on such a scenario and perhaps propose tentative ways to test it employing isotopic CO_2 analyses and microbiological assays.

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