Please find the Authors responses to the subjects raised by Reviewer #1 and supported by the Handling Editor below. For ease of reading we omitted the points were the Reviewer indicated that an agreement was found and present only comments and responses were an issue had remained.

Reviewer #1

- Issues with inference: I am glad to read that the management history of the different sites does not differ. It is also better that the title and framing of the study, based on changes suggested by the other reviewer, now reflect that this is an altitudinal transplant, with all that entails, and not necessarily a warming treatment. However I strongly object to the statement: "We regard this element of heterogeneity as an advantage, as it is a factor that supports the general applicability of our results." It is at best neutral and at worst a diluting influence on the applicability of the results because it introduces unwanted confounding variation. However I think this statement was only made in the response to the reviewers and not the main text. If such a statement is in the main text I would suggest removing it.

Authors: We comply without problems. No such statement is in the text.

Reviewer #1

- Discussion of factorial experiments: This is improved but I do not quite follow the logic in lines 127-130: (These findings suggest that the outcome of a global change productivity-experiment depends to some degree on the chosen treatment levels and their interaction with the ambient climate during the experiment. Combining multiple treatments with many levels might thus improve interpretation of experimental outcomes and related climate change predictions.) Please clarify.

Authors: The quoted sentence (l. 77-80) stands in the context of the preceding arguments (in brackets). We clarified as follows (l. 77-80):

(Not only can a low number of treatment factors, but also a low number of treatment levels invite overly simplistic interpretation of experimental results, if only a short or linear segment out of a larger range of biologically possible responses is represented in the data. For example, a hump-shaped response curve (2-dimensional) under atmospheric N-deposition best described the properties of a soil C-sink in subalpine grassland (Volk et al., 2016). Similarly, a ridge-shaped response surface (3-dimensional), driven by temperature and precipitation during 17 experimental years, was needed to explain NPP data (Zhu et al., 2016).)

These findings demonstrate how, depending on the chosen treatment levels and their interaction with the ambient climate, the vegetation in a global change productivity-experiment may respond with increasing, as well as decreasing growth. Combining multiple treatments with many levels might thus improve interpretation of experimental outcomes and related climate change predictions.

Reviewer #1

- Details of GAM fitting: Thanks for this clarification. I would suggest including this additional detail in the appropriate place in the methods section, or alternatively include your verbal clarification that you gave in the response document in the appendix (in addition to the code). It cannot hurt to be explicit.

Authors: We added this information to the appendix (l. 682 ff):

#Generalized additive models to test for the effects of thermal energy (DD0Ctot) and percent days with less soil moisture (PercDryDays) on aboveground biomass yield.

Please note that we used the defaults from the mgcv package, which one exception. The 'gamma' statement of the gam() function has been increased slightly to increase the degree of smoothing (to result in a smoother fitted line). This, however, did not (or only marginally) influence the inference and conclusions drawn from the model, i.e. *P* values for smooth terms reported in the main text and Tables A4 and A5 were highly significant in either case.

Reviewer #1

- Justification of statement that subalpine grassland productivity will increase with warming: I think the final statement of the concluding paragraph is still not fully supported by the data. I think the other reviewer made a similar point. Please reword this to be more suitable to the results you found.

Authors: We reworded the Conclusions paragraph (l. 444-446). Preceding arguments are in brackets, followed by the final statement mentioned by reviewer #1:

(Despite dwindling soil water content, the subalpine grassland growth increased to up to +1.8 °C warming during the growing period (corresponding to +1.3 °C annual mean), compared to present temperatures. Even at the maximum warming (corresponding to +2.4 °C annual mean) the yield was larger than at the reference site. At the same time -1.4 °C cooling during the growing period (corresponding to -1.7 °C annual mean) did not reduce plant growth.) These results suggest that the productivity of the subalpine grasslands in our study has likely not yet increased during the past century warming. But the positive response to warming treatments suggests, that despite growing soil moisture deficits, productivity will increase with continued warming in the near future.