

Interactive comment on “Community specific hydraulic conductance potential of soil water decomposed for two Alpine grasslands by small-scale lysimetry” by Georg Frenck et al.

Anonymous Referee #1

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General comments:

This study explores the responses of two different vegetation types to climatic changes in terms of evapotranspiration and biomass productivity. It is an interesting, experimentally well done study, and will be useful to consider for of future community specific studies and to improve predictions of how grassland ecosystems may respond to alterations in precipitation.

Overall, the study provides a valuable data set, with a broad set of measurements at high temporal resolution and the use of small-scale lysimetry. The main conclusion is that low stature vegetation communities with different water-use strategies react

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differently to drought with concurrent changes in soil water contents and co-varying evaporative demand. The experiment was conducted in the Alps where exceptionally fast climatic changes have been reported during the last decades. This is mentioned several times as a motivation to the study (e.g. in Lines 60-63), but the discussion does not really touch on this context again. It would be definitely worth to explain more clearly what the results really mean for Alpine grassland ecosystems.

The manuscript is mostly well-written, however, at the moment there are no distinct sections (introduction, material and methods, results, discussion and conclusion). It might be a matter of taste, but some of the sentences are very long (e.g. lines 44-47, lines 170-173, lines 352-354) and sometimes the authors use long chains of words which could be simplified for a better readability (e.g. drought-adapted vegetation could be written as vegetation adapted to drought).

My main criticism is about the relationship presented in Figure 5. I think this apparently strong correlation is mainly related to the fact the two variables are not completely independent from each other (ET and ET/DW). Please check this paper by Kenney (1982). Figure 5 and its explanation should probably be removed from the manuscript. Moreover, the methodology provided by Renton and Poorter (2011), for the log-log-scaling method, appears to be different than that presented by the authors in lines 222-225.

Specific comments:

Line 43: which structural changes at the soil-plant-atmosphere interface?

Line 89: The hypothesis is well formulated, but the two types of vegetation should be addressed earlier in the paragraph. For example mention - also already in the abstract - that you studied two different Alpine grassland communities with contrasting strategies of water use and adaptation to drought.

While reading the manuscript I had trouble in understanding when the extended periods

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of drought were manipulated during the experiment. This is important to state in the text and to show in figures 2, 3, and 4. In the same figures I also suggest to use two different colours for the shaded areas. At the moment it is difficult to see which shaded area belongs to each treatment.

Technical corrections:

There are several typos and technical flaws throughout the text. Here are some of them together with some suggestions:

Please define every acronym the first time it is mentioned. For example in line 16, evapotranspiration (ET).

Line 23: the vegetation's reaction to two

Line 34: add space after transpiration

Line 42: change focused to main

Line 45: change composition to abundance

Line 51: can only be predicted inaccurately

Line 79: climate change

Line 119: transplanted from a meadow in Matsch/Mazia

Table 1: Please check that the soil classification is correct.

In Line 171: add a comma before the word addressing and remove the "and"

Line 174: in the current experiment

Line 219: add space before bracket

Line 220: please cite the nlme package

Line 227: ET0 should be written as ET0

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Figure 5: The x-axis of the log(DW) is missing.... In any case, see my comments above about this figure.

Line 316: change EVT to ET?

Kenney BC. 1982. Beware of spurious self correlations! *Water Resources Research* 18(4): 1041-1048.

Renton M, Poorter H. 2011. Using log–log scaling slope analysis for determining the contributions to variability in biological variables such as leaf mass per area: why it works, when it works and how it can be extended. *New Phytologist* 190(1): 5-8.

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