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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.

Georg Frenck et al.

erich.tasser@eurac.edu

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We thank the reviewer for the comments and we address the various concerns below. Reviewer comments are highlighted (R), with our response below (A) in each case.

R: [Authors find that pasture community coming from a wet site (rainfall ca.1100 mm) exhibits a water-spending strategy while the pasture community coming from a mesic site (rainfall ca. 525 mm) exhibit a water-saving strategy, what is non-surprising.]

A: Our manuscript seeks to reveal how these two different strategies are realized in the same environment and along the gradients of combined variation of soil water pro-

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vision and atmospheric demand. To our knowledge, no comparable dataset was published which contrasts the water spending potential of two vegetation types in this way. Showing that for a given combination of SWC and ET0 values, two vegetation types reveal differences in their eco-hydrological behaviour, which is not primarily product of differences in growth and standing biomass, leads to questions about the underlying mechanisms.

R: [However, some possible artefacts and/or strangle results (the surprisingly low biomass production in wet community respect to the mesic community; the 16-fold difference among wet and mesic communities for g DW produced by Kg of water), and some interpretations that are questionable (mesic community use better soil moisture at low range of SWC), besides of many other small details (see annotated pdf) need a revision.]

A: Potential artefacts of the experimental setting on the productivity of our experimental populations will be discussed in a revised version of the manuscript. However, in some cases explanations of our results can only be guessed without any data foundation. The reviewer is arguing that potential artefacts might be the cause for particular results. Artefacts within the experimental proceedings, however, would not have affected particular vegetation x treatment combinations exclusively like reviewer2 argues, but all experimental entities evenly, since they were all treated the same way.

R: [English languages is also sometimes awkward.]

A: We will improve language and clarity according to the specific suggestions the reviewers made.

R: [Specific comments & Technical corrections in the provided supplement]

A: Reviewer2 invites the improvement of clarity at several points throughout manuscript and asks for further reaching explanations. We are thankful for the specific points made by reviewer 2. A revised version of the manuscript will clearly benefit from implement-

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ing these suggestions at all points where this is possible. However, at some points their arguments are presented as personal beliefs and assumptions, which are often challenging to discuss with respect to actual data gathered in the field when a references to the particular body of research underlying these beliefs is missing.

Here, we would like to address the major concerns: R: [I miss a heading for this section]

A: We apologize for missing section headings. As you correctly address later in your specific comments we have lost due to technical problems the main headings (Introduction, Material & Methods, Results, Discussion) which will definitely be part of a revised version.

R: [I assume you checked common atmospheric parameters inside the sheltered areas]

A: Yes. We explain the experimental design in section 2.2. and present statistics on atmospheric parameters in lines 234-240 at the very beginning of the Results section.

R: [A brief description of the soil description, with common soil depth and rooting profile would help. And and brief expalnation why you select 30 cm depth.]

A: We will thoroughly revise section 2.2. and add the requested information on lysimeter excavation and soil profiles. Former studies showed main rooting depths of 0.15-0.2 m for the investigated grasslands.

R: [In my opinion, this set up could bias the results in favor of the vegetation type that has not been out-transplanted.]

A: We planned and performed the experiment in order to minimize disturbance of the vegetation in the lysimeters, carefully excavating the mesocosms including the soil compartment. Therefore, in situ soil based determinants of plant performance were kept constant to a degree this was manageable. We let the mesocosms also acclimate for several months to the conditions of the study site and allowed them to grow completely undisturbed until the first harvest. In an addition, species in the transplanted vegetation are not uncommon in the region they were transplanted to, arguing that

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environmental properties of the study site were not exceeding the species natural ecological range for the transplanted mesocosms. Beyond that, we argue that our results do actually imply that the transplanted vegetation did not suffer systematically from the transfer to the wetter region.

R: [Why not use Generalized cross validation and allow the model to chose the optimal number of knots given the data?]

A: Biomass was estimated at 18 time points evenly distributed during the course of the experiment. Five knots for the GAMM were chosen in order to prevent short-term fluctuations of the biomass prediction (for example caused by rainy weather) by allowing a knot after approximately every third measurement point on average. With this constrain the generated pattern did not reveal any implausible short-term decreases of biomass before increasing again, which would not be expected from developing vegetation. On the other hand, it allowed the general pattern to suggest a potential decrease of biomass over longer period as it might be caused by increased rated of respiration in drought stressed vegetation.

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