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Biogeosciences Discussions



# *Interactive comment on* "Response of temperate grasslands at different altitudes to simulated summer drought differed but scaled with annual precipitation" *by* A. K. Gilgen and N. Buchmann

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MS bg-2009-89 has received fairly critical reviews by two reviewers, in fact reviewer #2 detected serious flaws in the experimental design which led him/her to suggest to reject the paper, while reviewer #1 suggest major revisions. I largely agree with the two reviewers in that there may be serious problems in the experimental design (more details given below) and also that the results section needs considerable streamlining in order to better convey the main results. Should the authors decide to submit a revised version of their manuscripts they will need to make a strong case in order to defeat the concerns raised regarding the experimental design. This does not mean that



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their findings cannot be accepted because they do not match the existing literature, but extraordinary findings need extraordinary evidence and thus the paper really has to be convicing in this regard. Clearly the authors will not want to publish something which later turns out to result from an experimental artefact. In case the authors submit a revised version the manuscript should be line-numbered and accompanied by a letter containing a point-by-point reply to the reviewers and my comments.

General comments: The reversed response to the drought treatment is really disturbing and I was wondering whether the authors see a possibility to rule out the experimental artefacts suspected by reviewer #2. Maybe the authors can check soil moisture at greater depths and across the shelters in order to get a better idea. Alternatively I was thinking of transplating soil monoliths from Fruebuehl to the laboratory and to subject these to a drying cycle in order to confirm the "beneficial" effect of drought. In retrospective a pre-treatment year would have been really good in order to rule out differences between the treatments not related to the treatment. I was also wondering about the effect of excluding fertilisation during the study period. In particular at Chamau a lot of nutrients are exported during the six cuts and according to my experience not replenishing these may quickly affect productivity. In particular since excluding precip also excludes part of the nutrient inputs via wet deposition. So there is also a difference in atmospheric nitrogen input associated with the experimental design (in addition to changes in nitrogen fixation resulting from shifts in the legume fraction). Finally, I would like to see the questions posed in the intro being more clearly addressed in the discussion.

Detailled comments: p. 5220, l. 9-20: I am not sure that LAI is worth a question of its own at it is related to above-ground phytomass unless large changes in the bulk SLA occur p. 5222, l. 17: here and on many other occasions in the MS you are referring to productivity but actually you are reporting and discussing biomass not changes of biomass over time; when you then sum all the harvested material of each year this is rather the total harvest than productivity in an ecological sense (where you would



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have to quantify litter fall, herbivory losses and so forth); another definition issue is biomass, which to the best of my knowledge is living plant matter; attached dead plant matter thus usually is referred to as necromass and the sum of (living) biomass and necromass gives phytomass p. 5225, l. 1: Statiscal analysis p. 5226, l. 4: what about temperatur maxima and minima ? p. 5231, l. 17-26: these are original data and should be presented in the results section p. 5232, l. 20: the statement regarding fertilisation seems to contradict the methods section, where you state that no fertilisation occurred Table 3: units are missing

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Interactive comment on Biogeosciences Discuss., 6, 5217, 2009.