Biogeosciences Discussions

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Reply on RC1

Vincent Niderkorn et al.

Author comment on "Effects of elevated CO_2 and extreme climatic events on forage quality and in vitro rumen fermentation in permanent grassland" by Vincent Niderkorn et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2020-464-AC1, 2021

The manuscript is well written and the results are interesting and important for further grassland studies with reference to climate impact research. As the authors mention in the manuscript, to obtain reliable evidence of climate change effects on forage quality, it is important to consider all relevant site conditions and climate effects.

We thank the referee for his/her work, helping us to improve our manuscript.

However this manuscript still raises some questions, especially in the methods section:

Line 160-167: I wonder how it was determined which was the most appropriate mixed model. Was the model always used as a full-factorial model with all interactions or was the model reduced for non-significant interactions? Were the models evaluated for their goodness of fit, e.g. based on the Akaike information criterion? And which covariance type was used (e.g. first-order autoregressive process)? I think the model application should be described in more detail.

We thank the reviewer for having noted this omission. All main factors and interactions were included in the model which was not reduced for non-significant interactions. For each variable analysed, data were subjected to three covariance structures: compound symmetry, autoregressive order 1, and unstructured covariance. The covariance that resulted in the smallest Akaike's Information Criterion was used.

Some minor things:

Line 78: what kind of extensively management, e.g. how many cuttings, fertilization regime?

The field site is a long-term fertile grassland (clover rich) managed by a combination of grazing (3-5 grazing periods) and cutting (1 cut year). One organic fertilisation occurred at the end of the winter period.

Line 80-81: it may be of interest to know what the dominant plant species in the botanical composition are.

At the onset of the experiment, five species contributed to 70% of species composition, *Trifolium repens*, *Lolium perenne*, *Holcus lanatus*, *Agrostis tenuis*, *Alopecurus pratensis*.

Line 286: I would not start the sentence with an abbreviation.

This has been changed.