

Response to referee comments “Response of Ecosystem Respiration to Experimental Warming and Clipping in Tibetan Alpine Meadow at three Elevations” by the anonymous referee #1

Dear Referee,

We thank you for your constructive suggestions. We have tried to address your comments in the revised manuscript. Detailed responses are as follows.

Yours sincerely,

Gang Fu, Yangjian Zhang, Xianzhou Zhang, Peili Shi, Yuting Zhou, Yunlong Li, Zhenxi Shen

**Comment 1:** *What is the idea behind the clipping treatments? Is it to simulate the effect of grazing and are there ongoing/projected changes in grazing pressures in that area that motivate the clipping treatment? Or is this merely to modify above-ground biomass and study the resulting effects?*

The aim of the clipping treatments is to simulate the effect of grazing.

**Comment 2:** *What is the motivation for the elevational gradient? Do ongoing/projected temperature changes differ with elevation, e.g. more warming at higher elevations? Are changes in pressure different at these elevations? Elevation is inversely related to temperature and thus transplanting experiments are often used to simulate warming - is this a motivation for the study design? If so, the latter should be emphasised and in fact the results show that such transplantation experiments may be problematic due to confounding effects.*

Yes, the warming amplitude increases with increasing elevation on the Tibetan Plateau (Yao et al., 2000; Liu and Chen, 2000).

Yes, this is a motivation for us and we emphasised it in the introduction section of the revised manuscript. Other environmental factors (e.g. relative humidity, precipitation

and radiation) may also differ with elevation and confound warming effects (Wang et al., 2013; Egli et al., 2004). In addition, soil translocation may disturb the actual steady state of soil (Egli et al., 2004). Therefore, transplanting experiments may be problematic and an in situ warming experiment instead of transplanting experiments was performed in our study.

**Comment 3:** *Given that the discussion and conclusions sections are centered on the confounding effects of soil moisture, I think soil moisture data (by site, treatment and year) are actually underrepresented in the manuscript.*

We add one Figure as one supplement file (Fig.S1) showing the seasonal change of soil moisture.

**Comment 4:** *In the conclusions section I am missing a paragraph elaborating on the implications of the results of this study given ongoing/projected changes in climate and land use on the Tibetan plateau.*

We added the implications in the conclusions section. That is ‘This study implicated that there are not always significant positive feedbacks from the alpine meadow of Tibet to climate warming and grazing may modify the warming mode.’

**Comment 5:** *English style and grammar need to be thoroughly checked throughout the manuscript.*

We checked thoroughly the English style and grammar throughout the manuscript.

**Comment 6:** *Abstract: here I am missing the link between soil moisture, plant productivity and  $R_{eco}$ .*

We added the links between soil water content, plant productivity and  $R_{eco}$  in the abstract section. That is, ‘Aboveground biomass was positively correlated with soil water content and  $R_{eco}$ ’.

**Comment 7:** *P. 13016, l. 25: “few studies” –which ones?*

We added one references here. That is, Lin et al.: Response of ecosystem respiration to warming and grazing during the growing seasons in the alpine meadow on the Tibetan plateau, *Agr. Forest Meteorol.*, 151, 792-802, DOI: 10.1016/j.agrformet.2011.01.009, 2011.

**Comment 8:** *P. 13017, l. 3: “inconsistent” – in what sense?*

‘inconsistent’ here means experimental results varied with studies. Some studies showed that warming had no significant effects on  $R_{eco}$  (e.g. Lin et al., 2011; Xia et al., 2009), while other studies indicate that warming enhanced  $R_{eco}$  (e.g. Bai et al., 2011).

**Comment 9:** *P. 13019, l. 18-24: move to results section*

We moved the related contents into results section.

**Comment 10:** *P. 13020, l. 5-9: move to results section*

We moved the related contents into results section.

**Comment 11:** *P. 13021, l. 4: remove reference to Fig. 1 here (necessitates renumbering of figures)*

We deleted word ‘Fig.1’.

**Comment 12:** *P. 13023, l. 16-17: worth mentioning that these differences occurred after 4 years of treatment*

We deleted the related contents.

**Comment 13:** *P. 13025, l. 22-27: need to say something about direction of change here*

The negative direction showed warming-induced declines in temperature sensitivity of  $R_{eco}$ . This phenomenon was showed by many previous studies (e.g. Lin et al., 2011; Luo et al. 2001).

**Comment 14:** *P. 13026, l. 21-22: avoid repeating this major misinterpretation of  $Q_{10}$  concept!*

We deleted the related contents.

**Comment 15:** *P. 13029, l. 16-24: all figures need to be introduced first in the results section – Figs. 6 and 7 are mentioned here for the first time!*

We added one sentence in the results section showing Figs.6 and 7.

**Comment 16:** *Table 1: units of precipitation should be mm*

We changed into ‘mm’.

**Comment 17:** *All figures: the use of different letters for not significantly different results is confusing in busy figures such as Fig. 1, or just redundant where all results are not significant, such as Fig.2 – maybe the authors can find a way to avoid this.*

We deleted the insignificantly different letters in Figs.1 and 3. In addition, we removed the Fig2. in the revised manuscript according to the comments from RC C4941.