

Interactive comment on “Effect of plateau pikas disturbance and patchiness on ecosystem carbon emission of alpine meadow on the northeastern part of Qinghai-Tibetan Plateau” by Yu Qin et al.

Anonymous Referee #1

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General comments: The plateau pika (*Ochotona curzoniae*) is one of the main native soil faunas on the Qinghai-Tibet Plateau and plays a key role in the terrestrial ecosystem there. Previous studies have mainly focused on its active habits and the influence of population density on soil properties, plant communities, and so on. On contrast, the present study aims to study the effect of plateau pika disturbance and patchiness on ecosystem carbon emission at the plot scale (i.e. large bald patch, medium bald patch, small bald patch, intact grassland, above pika tunnel and pika pile). The results are critical for ecological restoration and environmental change on the Qinghai-Tibetan Plateau.

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Specific comments: (1) Introduction: This section has not clarified clearly why we should study the effect of plateau pika disturbance and patchiness on ecosystem carbon emission at the plot scale, but not at other scales? What are the exact differences between this study and so many previous studies? (2) Materials and methods: Line 114-118: Is there any standard to distinguish the six representative underlying surfaces? Especially how to determine the threshold area for the division of large, medium and small bald patches (i.e. 9 m² and 1 m²)? Line 124-136: Were the soil temperature and moisture measured at all three 100 m × 100 m plots or only one 100 m × 100 m plots? Were the soil saturated hydraulic conductivity, soil hardness and ecosystem respiration rates measured for only one time or many times during the study periods? These key questions should be clarified. Line 138-141: How depth was the pika tunnel? Did this depth limit the collection of soil core to 40 cm? (3) Results: Line 180-182: The soil saturated hydraulic conductivity for all six surfaces types was very low. Please check the calculation process or data units. Line 203-204: Temperature is a mainly controlling factor of ecosystem respiration (line 50-51); however, regression analysis of this study showed that ecosystem respiration had no significant correlation with soil temperature. What is the reason for this unexpected result? (4) Discussion: Line 216-217: “Nevertheless, the increased water infiltration was unable to increase soil moisture under pika pile.” Why? The potential reasons should be discussed. Line 227-229: The explanation for the low soil moisture under bald patches was not convincing, because the vegetation transpiration at intact grassland may be higher than the corresponding soil evaporation under bald patches at the same periods. Line 230-233: More details about the reason for the different soil temperature patterns should be added. Line 234-235: What is the reason for the description of “high soil temperature under bald patch was a disadvantage for the recovery of vegetation”?

Technical corrections: Line 33: Delete “under”. Line 88-90: This sentence is not exact, because lots of previous researches have studied the heterogeneous underground vegetation and belowground soil properties. Line 188-189: This sentence has the same mean with the sentence in line 185-186. Line 197-198: According to the descrip-

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tion in line 172, the growing season in the study is from May to September. Please add the data about ecosystem respiration in May and September. Line 214: Change “Figure 3” to “Figure 4”. Line 311: Some references cited in the text were not listed in the “Reference” section. Line 518-520: Six small photos below the aerial photo are not clear. Moreover, add “MP” after “2”. Line 539: The regression analysis was used to analyze the relationships of ecosystem respiration with biotic and abiotic factors (line 168-169). However, the result in figure 9 was only the correlation coefficient between them.

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