

## ***Interactive comment on “Soil carbon release responses to long-term versus short-term climatic warming in an arid ecosystem” by Hongying Yu et al.***

### **Anonymous Referee #2**

Received and published: 1 October 2019

Author(s): Yu et al.

Title: Soil carbon release responses to long-term versus short-term climatic warming in an arid ecosystem

General Comments:

This paper specifically addresses our lack of knowledge on climate change within desert grassland ecosystems. While there have been many studies within boreal and temperate ecosystems, warming experiments focused on soil microbial community function and C stock assessments in arid systems are rare. Therefore, this study fills an important gap.

C1

The sampling design appears robust and is accompanied with a clear presentation of data. The methods for analyses are valid and informative enough for readers that might not be familiar with these techniques to understand, or where to read more, if desired. The authors further supported their hypotheses succinctly that warming reduced microbial respiration while wetting events enhanced respiration. However, my one concern is that 0.5 – 1.0 degree (Line 244) warming is not enough of a difference to define two treatments of warming (long-term, moderate and short-term, acute). Although, when moisture became limiting in August, there was a greater separation of the warming treatments which does highlight seemingly subtle differences. Perhaps a more direct addressing of the miniscule differences in the warming treatments until SWC becomes the greatest inhibitor to respiratory rates.

Overall, I find this study well conducted and clearly presented. I would recommend for publication.

Specific Comments:

Line 12: Can examples of severe impacts be included here?

Lines 16-17: Since many readers do not get past an abstract, it would be useful to list treatment pressures in parantheses following long-term (ex.), short-term, etc.

Line 19: Give the percentage of substantial water input treatment?

Line 55: Use a more updated IPCC statistics (this one is 2014)

Comment: Warming treatment pressures were only applied during the growing season (June-Aug) of each year. In many temperate ecosystems, there has been evidence of seasonal extensions. Has there been any evidence that the growing season is becoming extended (earlier springs, later falls) at this site? If so, should this warrant extending warming treatments beyond June – August?

Line 774: If outlier point does not change equations, why not remove it completely?

C2

Technical Comments:

Figure 2 line 769: Linear line is blue and not black as stated

Line 773: Typo? What does “soil animal” refer to?

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