Biogeosciences Open Access
Discussions

Interactive comment on "Biophysical controls on net ecosystem CO_2 exchange over a semiarid shrubland in northwest China" by X. Jia et al.

Anonymous Referee #2

Received and published: 7 May 2014

This paper describes a research of CO2 exchange over a semiarid area in northwest China. As emphasized by the authors, this region is unique because of climate conditions. The less vegetation in this region may be attributed to low precipitation and dry condition. However, the recent attention to the ecological restoration in China may mean the great change of ecosystem in this region, an increasing of vegetation coverage. Therefore if the region associated with the study will be a sink of source of carbon will be critical to not only the local climate change but also the global climate condition. Therefore, the study will be providing great insight in this aspect. The MS is well written with a clear description of research method and applied statistical approach. The results and discussion are presented to a sufficient detail. To my understanding, it is worthy of publication in this journal.

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However, I have some questions about this MS as following: (1) An arbitrary approach is used to separate the environmental factor into different levels, for example, soil water content >0.1 or <0.1 m3 m-3, is there any valid bases to justify this? Similarly, for vapor pressure, and so on. (2)In data processing, 29% of the data has been determined as bad data and excluded and gap-filled. Although you have used approaches to linearly gapfill the small gaps with but NEE-PAR relation for a large gaps (e.g., gaps lasting for a few days), a gapfilling with consideration of solar radiation may be too coarse as described in Xing et al (Ecological modelling,2007, 2008). In addition, you have also found "At the half-hourly scale, water stress exerted a major control over daytime NEE, and interacted with heat stress and photoinhibition in constraining C fixation by the vegetation". How can you justify your approach to fill gaps. (3)In your examination of rainfall pulse, you illustrated a period of 61 mm rainfall event (Day 178-184). Although there is no clue how long the event lasted but I am pretty sure that the figure 9 is providing other information as well. If you look at the panel a in the figure, there are other small rainfall events as well but their NEE do not show a significant responses to the rainfall events as the largest rainfall event, in particular the event around Day 210. Therefore, a further explanation may be useful. By the way, I would suggest to add rainfall data to panel b so that reader can clearly see the delay of 1-2 day described in your paper. In addition, the figure can be enlarged at the x direction to see a clear trend. (4)The abbreviation PPT during growing season is not accurate. I would use term rainfall instead.

Some specific comments: Line 17 on page 5092, Mu Us desert, not clear to me. Line 26 on page 5094, PPT should be rainfall. Figure 2, the June and July pattern are similar. There is a third order polynomial patter, any explanation to this. Figure 3, the marker size in the top panels is too big. Figure 5 is in poor quality. The letter font in the figure is not proportion to the figure size. Figure 9, reduce the marker size on the top two panels.