

Interactive comment on “On the apparent CO₂ absorption by alkaline soils” by X. Chen and W. F. Wang

Anonymous Referee #2

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The topic is also the core of global change research. The CO₂ absorption by alkaline soils is now broadly thought as a potential way of C sequestration from atmosphere and ecosystem management. At present, soil CO₂ flux variability of alkaline soils were fewer discussed with decision-makers. However, CO₂ absorption by alkaline soils has multiple impacts on the mitigation of atmospheric CO₂ concentration increasing and protection of soil erosion in arid regions.

Authors carried out fieldwork to measure soil CO₂ flux and dew deposition, dew concentration of alkaline soils in desert. It is very important to determine the extent to which the dew deposition modulates Land–Atmosphere CO₂ exchange at highly alkaline sites, so that we can improve our understanding and implement capacity on C sequestration in Gubantonggut Desert.

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Researchers compared the changes in dew deposition in nocturnal and diurnal temperature in growing seasons in 2006 to 2008. It can be helpful to further design management strategies for highly alkaline soils in Gubantonggut Desert. Their analysis results gave us an insight for the management activities for alkaline soils in future. Moreover, the research results can help us to understand the effects of dew deposition and concentration on soil CO₂ flux in alkaline soils.

Although authors presented effective conclusion based on fieldwork, I couldn't get clear ideas how the impact of dew deposition on seasonal and intern annual soil CO₂ flux variability. Authors should clarify this kind of effects on the results' uncertainty in the Discussion sections, so they should be careful for the results and analyze existing problems.

I think that this manuscript of the quality is in a first-class international journal now.

I consider this paper needs major revision, because the current version isn't appropriate for publication.

1) Authors should present and map the location of soil plots in desert.

2) Authors should tell us the starting and ending time of sampling of soil flux and dew deposition in 2006 and 2008. When is the beginning and ending of growing season of 2006 and 2008?

3) Authors used some measurement of soil CO₂ flux to conclude that dew deposition in highly alkaline soils exerted a potential CO₂ sink and can partly explain the apparent CO₂ absorption. It is difficult to believe the conclusion based on measurement in short period, because we didn't get the annual and seasonal variation of soil CO₂ flux in alkaline soils in long term.

4) The methods are appropriate and presented in sufficient detail to allow the results to be repeated. But I really don't know the statistical description of soil CO₂ flux by their text in the Results and Discussion. authors should effectively tell us whether the data

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are adequate to support the conclusions, so that to improve the explaining of results.

5) Authors should add more explain and discussion on result's uncertainty in the paper. Are the results creditable? Can their study improve other's analysis? What are the differences between author's estimation and other's simulation?

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