Biogeosciences Discuss.,
doi:10.5194/bg-2017-69-AC1, 2017

Biogeosciences Discussions
Open Access
EGU

Interactive comment on "Rainfall pattern greatly affects water use by Mongolian Scots pine on a sandy soil, in a semi-arid climate" *by* Hongzhong Dang et al.

Hongzhong Dang et al.

hzdang@hotmail.com

Received and published: 19 April 2017

General comments: Identifying the water use by Mongolian Scots pine (Pinus sylvestris var. mongolica) is always the core of ecological restoration in arid and semiarid regions. In this study, the authors have analyzed the sap flux density, transpiration and its relationship with precipitation and soil moisture. The manuscript is suitable to publication in this journal; however, the author should make a minor revision mainly because of the poor organization of results and discussion part. Response: We thank referee for the helpful comments. After discussion with co-authors, we thoroughly revised the manuscript and listed in supplement. Specific comments: Title: Please give the full Latin name of Mongolian Scots pine. Response: We added the

Printer-friendly version

Discussion paper

full Latin name, that is: Mongolian Scots pine (Pinus sylvestris var. mongolica), and the title revised as “Severe drought greatly reduces sap flow of Mongolian Scots pine (Pinus sylvestris var. mongolica) and its recovery ability in a sandy and semi-arid environment”. Abstract: The abstract is too long, please shorten it and try to use more concise and simple sentences. Response: We revised in new manuscript. Line 15-25: the sentences were too long, the writing should be shorter and clearer. Response: These long sentences were rewritten in new manuscript. Line 23: how long did the daily Ts recovered completely? Response: In our revised designation of drought period (Table 2), there was no drought in 2013, so there is no recovery following heavy rainfall in 2013. Line 25: did you have any results of trees growth influenced by large intra- and inter-annual variances in rainfall? Response: We did not measure the variable about growth and we replaced it with the word “water use”. Did you analyze the rainfall intra- and inter-annual variances? Response: The intra- and inter-annual variances were analyzed in the first two paragraphs of section 3.1 Line 27: What does MP mean? Response: We replaced it with the full name, that is Mongolian Scots pine. Introduction: Line 34: I think here “However” is better than “nevertheless”. Response: We replaced the “nevertheless” with “However” in Line 30 of revised manuscript. Line 36: timings here means rainfall interval? Response: Yes, we revised it to “interval” in Line 32. Line 47-48: rewrite this sentence. Response: We rewrote it as “It is found in the Daxinganling Mountains and in Honghuaerji on the Hulun Buir sandy plains of the northeast (Zhu et al., 2008; Zheng et al., 2012)” in Line 41-43 of revised manuscript. Line 60-63:this paragraph was mainly talked about soil water availability, thus, I think those sentences were not suitable here. Response: We realized the incorrectness of those sentences, we deleted it in revised manuscript. Line 67-69: did this hypothesis reasonable? The author declared that 85% of the roots were in the shallow soil layers, but there were still 15% of the roots in the deep layers, they may absorb water from the groundwater, and in addition, what is the groundwater table in this region? Response: The MP is a shallow-rooted species with over 85 % of roots located in the upper 0.4 m of the soil profile and sharply decreased root density with depth down to 1.0 m in our

site (Su et al., 2006). So it is reasonable to hypothesize that the most water absorbed by Mongolian Scots pine is from the upper 1.0 soil layer. However, we also think that the taproot of some big trees could absorb deeper soil moisture even groundwater directly. The groundwater table in our site during the study period decreased from 5.6 m to 4.8 m, indicating a existence of deep root. We discussed it in section 4.2 in revised manuscript. Line 70-73: I think it should be removed to the method section. Response: We removed it to the section 2 Materials and methods, and describe it respectively. Line 74-76: please rewrite this sentence. Response: These sentences have rewritten in Line 62-67 of revised manuscript. 2 Materials and methods: please give a figure of your study site. Response: We added the location map of study area as Fig.1 Line 90: I suggest giving the rainfall amount (average and the year of 2013, 2014 and 2015) in Figure 1. Response: We changed the figure into anomalies of air temperature and precipitation (%) in our revised manuscript (Fig.2), the rainfall amount of historical means is provided in Line 78 and these measurements years in Line 189 of the revised manuscript. Line 101: what types of sensor? Response: The type of sensor is Granier-type thermal dissipation method (Dynamax Inc., Houston. TX. USA) with 3-cm long probe. We clarified in Line 153-154 in the revised text. 3 Results Line 199-203: the sentence was too long, I think a table here would be better. Response: The sentence was rewritten in Line 189-191 of revised manuscript. Line 244-245: remove this sentence to the method section. Response: We deleted it in revised manuscript. Line 246-249: rewrite this sentence. Response: We deleted it in revised manuscript. Line 260: how many rainfall events in the dry-wet shift in 49 days? Especially before the one of big rain event, is there any other small rainfall events? And in my opinion, I think after the rain, especially the number of rewetting days should be same if you want to compare in different years. Response: In our site, the rainfall intensity lower than 10 mm per day is unavailable for trees due to canopy interception and soil evaporation. There were some small rainfall events during this period (Fig. 4). After a heavy rain, for example, 47.6 mm per day in 2014 and 82.4 mm per day in 2015, the soil was well recharged and the relative extractable water

Printer-friendly version

Discussion paper

(REW) increased quickly. Yes, after this heavy rain, the number of rewetting days and plant recovery days could be the same between years. But the recovery ability (maximum Ts) differed due to the degree and duration of the drought. 4 Discussion Line 277-283: remove this sentence to the results section. Response: We think what contained in these sentence are indirect information that help explain the quick decline of soil moisture in sandy soil in our site. We re-organized it in section 4.1 in revised manuscript, because we want only focus on the transpiration of trees in main text and we used this only to support our discussions. Line 304-306: delete or remove to the result section. Response: We re- organized it in section 4.3 in revised manuscript. 4.5 I think this part should be removed to the result section. Response: We deleted this section in our revised manuscript.

Please also note the supplement to this comment:
http://www.biogeosciences-discuss.net/bg-2017-69/bg-2017-69-AC1-supplement.pdf

---

Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2017-69, 2017.

Printer-friendly version

Discussion paper