

Interactive comment on “Micro-topographic variation in soil respiration and its controlling factors vary with plant phenophases in a desert-shrub ecosystem” by B. Wang et al.

B. Wang et al.

tianshanzha@bjfu.edu.cn

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We thank referee and greatly appreciate the thoughtful and constructive comments and helpful suggestions. We have fully considered the referee's comments in the revision and improved the manuscript accordingly.

General comments: Wang B. and the co-authors do a good job with the high quality dataset of microtopographic variation in soil respiration in a desert-shrub ecosystem. This might be the first such study in terms of regulation of plant phenology in spatial variation in soil respiration. Accordingly, their findings are important to our understanding of biophysical control of soil respiration in the dune. Their results are robust, and

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the methods are well described. I have only a few concerns for the manuscript. Firstly, I think it would be good to include in the introduction the references of Tamai (2010), Kang et al. (2003) and Yuste et al. (2004), whose reports showed the effects of environmental factors, soil properties and plant phenological patterns on topographic variations of soil respiration in different ecosystems. Secondly, I cannot understand why the dataset for Phase I was missing in some result sections, such as Fig. 3, Fig. 4, Fig 5, Fig. 6 and Fig. 8. Some related explanations are needed. I suggest combining Fig. 5 and Fig. 6 as a clear compared list. In Table 1, the Phases need to be defined. In Fig. 3, the unit of LAI is incorrect. In Fig. 7, the legend of (a) and (b) need to be defined. References: Tamai K. 2010. Effects of environmental factors and soil properties on topographic variations of soil respiration. *Biogeosciences*, 7, 1133–1142. Kang S, Doh S, Lee D, L. Dowon, Jin VL, Kimball JS. 2003. Topographic and climatic controls on soil respiration in six temperate mixed-hardwood forest slopes, Korea. *Global Change Biology*, 9, 1427–1437. Yuste JC, Janssens IA, Carrara A, Ceulemans R. 2004. Annual Q10 of soil respiration reflects plant phenological patterns as well as temperature sensitivity. *Global Change Biology*, 10, 161–169.

Specific comments: 1. Firstly, I think it would be good to include in the introduction the references of Tamai (2010), Kang et al. (2003) and Yuste et al. (2004), whose reports showed the effects of environmental factors, soil properties and plant phenological patterns on topographic variations of soil respiration in different ecosystems. Answer: We agree. We added the three references in Page 9469, Line 7 of BGD- 12-9465-9495 (see supplement file).

2. Secondly, I cannot understand why the dataset for Phase I was missing in some result sections, such as Fig. 3, Fig. 4, Fig 5, Fig. 6 and Fig. 8. Some related explanations are needed. Answer: Our measurements in Phase I were only 9 days, we think it cannot well represent for whole Phase I, thus we did not show dataset for phase I in our analyses. We added 'Due to fewer measurements in Phase I, data analyses were mainly concentrated on Phase II and Phase III.' in Page 9472, Line 10 of BGD-

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12-9465-9495 (see supplement file).

3. I suggest combining Fig. 5 and Fig. 6 as a clear compared list. Answer: We agree. We combined Fig. 5 and Fig. 6. See below Fig. 1

4. In Table 1, the Phases need to be defined. Answer: We agree. We added the definition of Phases as 'Phase I: leaf expansion; Phase II: flowering-bearing; Phase III: coloration-defoliation' at the end of caption of Table 1. See Page 9485 of BGD-12-9465-9495 (see supplement file).

5. In Fig. 3, the unit of LAI is incorrect. Answer: We corrected it with 'm² m⁻²' in Fig.3b. See below Fig. 2

6. In Fig. 7, the legend of (a) and (b) need to be defined. Answer: We agree. We added legend (a) and (b) to caption of Fig.7. See Page 9494 of BGD-12-9465-9495 (see supplement file).

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/12/C3700/2015/bgd-12-C3700-2015-supplement.zip>

Interactive comment on Biogeosciences Discuss., 12, 9465, 2015.

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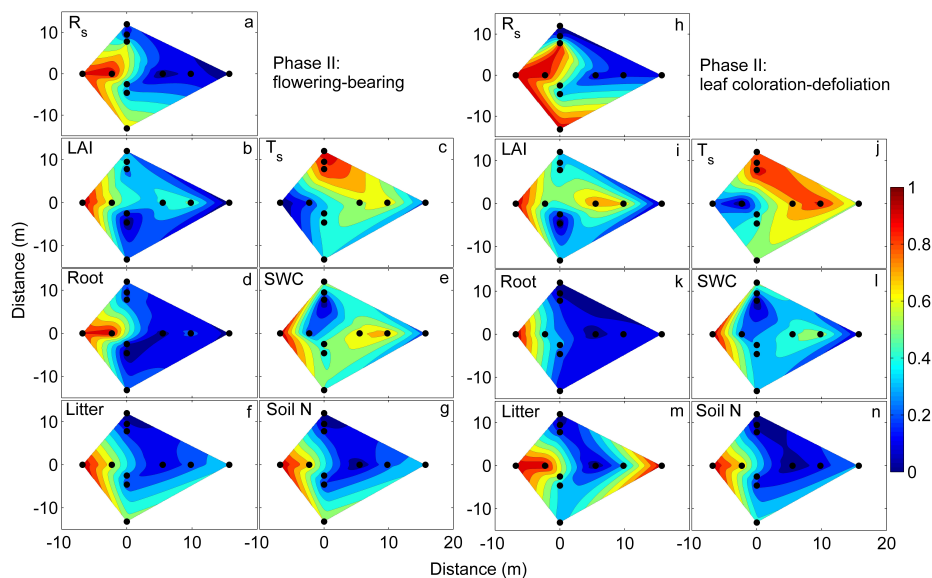


Fig. 1.

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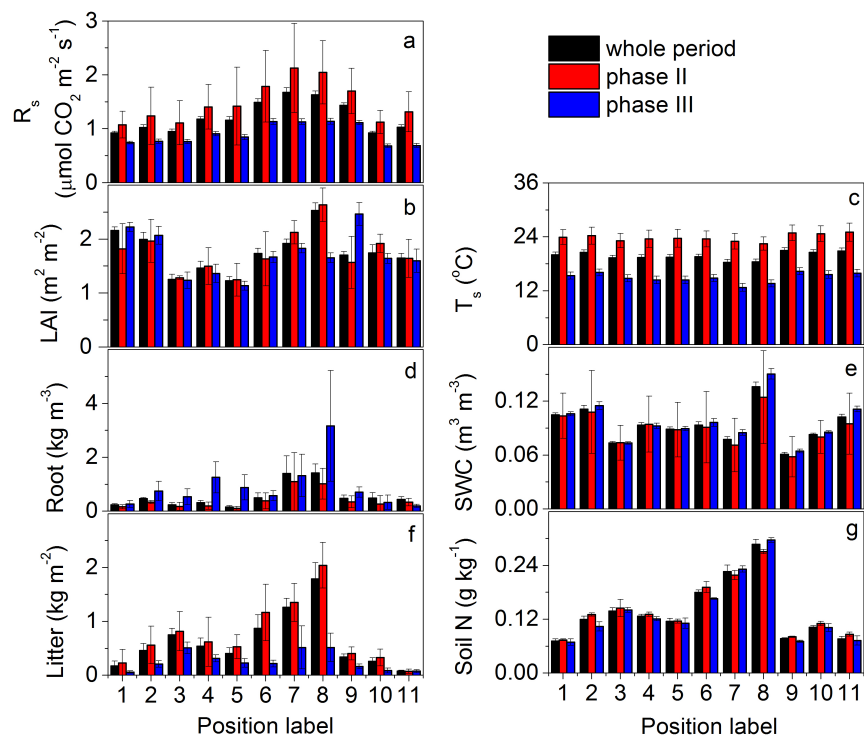


Fig. 2.