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Comment

## ***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.***

### **Anonymous Referee #3**

Received and published: 21 August 2015

It is a very written and concise paper, addressing micro-topographic variations in soil respiration and its controlling factors. This paper uses a well-designed and collected dataset to illustrate the variations caused by the plant biomass variation across sand dune. The information will be useful to the stabilization of the sand dune in the desert region. My minor suggestion to improve this paper is to ask the authors to further exemplify the potential application of this research in practical aspects. For example, how this study can be helpful in relating to the big issue - desertification.

In term of the microsite around a sand dune, the depression area around the sand dune is completely different from the sand dune slope. For example, there is a higher water level and different pH compared with sand slope. Soil texture is completely different.

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Therefore, the natural vegetation shows great variations across sand dune, which results from multiple processes (wind blowing, seed transportation, soil water movement during a year, and soil nutrient dynamics, soil crust formation, biological processes within the soil). In particular, the soil crust in the desert could change the gas release pattern of soil. The plant coverage can also have critical feedback impacts on the crust depth and structure. Therefore, the soil respiration difference could be a combined result of multiple processes. Do you have any finding which could illustrate the relationships between the crust depth and plant coverage or partitioning the component soil respiration.

A few other suggestions are attached in the supplement file.

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/12/C4554/2015/bgd-12-C4554-2015-supplement.pdf>

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

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12, C4554–C4555, 2015

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