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Interactive comment on "Effect of ablation ring and soil temperature on 3-yr spring CO_2 efflux along the trans-Alaska pipeline, Alaska" *by* Y. Kim

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Response to Referee #1's comments

Effect of ablation ring and soil temperature on 3-yr spring CO2 efflux along the trans-Alaska pipeline, Alaska

Y. Kim

Thank you for your invaluable comments on my manuscript.

First, the reason I have observed soil CO2 efflux surrounding tree trunks in the spring season has been to better understand the effects of the ablation ring and subsequently-increased soil temperature in the snow-disappeared soils of coniferous forest and tus-

sock tundra. The ablation ring was found in nearly all white and black spruce forests and across tussock tundra in the spring. I have many photos of this available upon request.

Considering the effect of this ablation ring and the subsequent increase in soil temperature, I measured efflux in the surrounding trunks of coniferous forest trees and tussock tundraâĂŤthat is, in the snow-disappeared soilâĂŤfor better understanding of the efflux between exposed and snow-covered soils. In particular, efflux measurement was also investigated for the difference in four-directional CO2 emission from the white spruce stem. Further, despite the narrower range for soil temperature, soil CO2 efflux increased greatly, with Q10 value highest, as I described in the manuscript.

For winter and spring, I also focus on the effect of snow depth and snow crust influencing soil CO2 efflux, across boreal forest and tundra sites.

For these reasons, I focused on the effects of the ablation ring and subsequent soil temperature during this investigation of winter and spring CO2 efflux along the unpaved 660-km haul road (total running distance: ca. 3800 km/year). Although the manual chamber system places some constraints on the temporal variability of soil CO2 efflux at some points, I have observed efflux-measurements at the same points for each site during winter and spring, 2010-2012.

I attached the detailed response to referee #1's comments, as Supplement file.

Please also note the supplement to this comment:
http://www.biogeosciences-discuss.net/11/C1178/2014/bgd-11-C1178-2014-supplement.pdf

Interactive comment on Biogeosciences Discuss., 11, 3615, 2014.

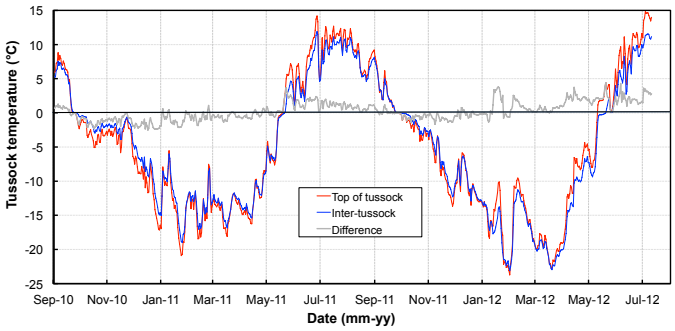

Figure 9

Fig. 1. Fig 9. Revised figure