

Interactive comment on “Effect of ablation ring and soil temperature on 3-yr spring CO₂ efflux along the trans-Alaska pipeline, Alaska” by Y. Kim

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-

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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 tundra—that is, in the snow-disappeared soil—for 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/C11178/2014/bgd-11-C11178-2014-supplement.pdf>

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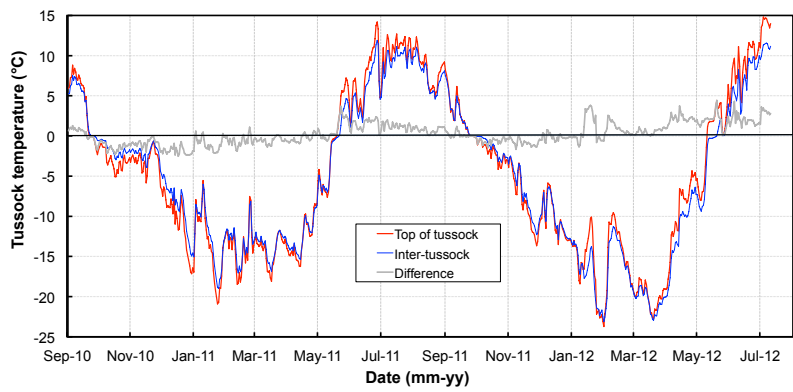


Figure 9

Fig. 1. Fig 9. Revised figure

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