

Interactive comment on “Nonlinear controls on evapotranspiration in Arctic coastal wetlands” by A. K. Liljedahl et al.

Anonymous Referee #2

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1 Summary

This manuscript uses field observations from Arctic coastal wetlands to analyze the controls on evapotranspiration. They find that evapotranspiration (ET) is suppressed in both wet and dry conditions due to different mechanisms. By identifying mechanisms in addition to looking at total magnitudes of water flux they are able to make statements regarding the viability of Arctic coastal wetlands in the future under a warmer climate.

The main conclusions of this manuscript find that measured ET rates are less than 75% of potential ET rates. This suppression comes about during wet atmospheric conditions (low VPD) through small evaporative demand, and during dry atmospheric conditions (high VPD) due to the limited rate of water transfer through mosses increasing the

surface resistance.

I think that the abstract, introduction, discussion and conclusion are well organized around the central statements. However, I lost the tread of this story somewhat in sections 3-5.

The main points that I take away from the ms are the identification of a pair of mechanisms controlling Arctic ET rates and the link of these mechanisms to long-term Arctic observations. Overall, I think that the scientific points of this paper are well supported but find that it could use some editing to streamline the text and improve clarity.

2 Comments

2.1 General Comments

1. Many compound sentences could be broken into two to increase readability.
2. I would like the authors to restate the mechanisms limiting ET in the conclusions and not just allude to them.

2.2 Specific Comments

3. 6308.11: “Dry soils increased. . .” Increased compared to what?
4. 6311.4: “Transpiration is closely related to Leaf Area Index (LAI) as stomatal closure is rare at wet coastal Arctic sites”. I suggest changing this to “total transpiration” for clarification.
5. 6311.22-26 This sentence contrasts two sites but I can’t tell which ones. I suggest splitting into two sentences and clarifying.

BGD

8, C2667–C2669, 2011

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6. 6311.23: “a larger portion”, change to “a larger portion of energy”
7. 6313.17: Instead of LAI, why not just use the unit? “Standing dead leaf biomass in the Barrow area reaches 1.23 (m^2m^{-2}).
8. 6315.23-26: Split into two sentences
9. 6317.14: Remove the extra “if”
10. 6318.8: Reference for 1.26?
11. 6318.11: Should be “suppresses”
12. 6319.3: “The maritime air mass” sentence is awkward. I suggest “The maritime nature of both sites leads to low variability in VPD and air temperatures.”
13. 6319.8: I suggest “defined as winds originating from between . . .”
14. 6324.3: remove the first “through”
15. 6325.3-4: Sentence beginning from “Also. . .” does not make sense with the parentheticals as they are.
16. Table 1: Caption should read “including” rather than “such as”.

Interactive comment on Biogeosciences Discuss., 8, 6307, 2011.

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