

## ***Interactive comment on “Freshwater flux to Sermilik Fjord, SE Greenland” by S. H. Mernild et al.***

### **Anonymous Referee #1**

Received and published: 15 September 2010

#### General

This comes across as a comprehensive and authoritative analysis of the freshwater flux to Sermilik Fjord based on a combination of observations, satellite remote sensing and modeling. I will represent a solid contribution to “The Cryosphere”. One thing I would like to see in the Summary and Conclusion section, which I think would strengthen the paper, is some further effort to place this work in the larger context of changes in the freshwater flux from Greenland. For example, while 85% of the flux to Sermilik Fjord came from ice discharge, is this representative, in terms of dominant process, to what is happening elsewhere in Greenland?

#### Specific

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1) Page 1196, line25: The strongest increases in temperature for the past decade have been over the Arctic Ocean in autumn and winter in response to loss of the insulating Arctic sea ice cover. See for example:

Screen, J.A. and Simmonds, I. 2010. The central role of diminishing sea ice in recent Arctic temperature amplification. *Nature*, 464: 1334-1337.

2) Page 1197, para 1. It would help the reader if Figure 1 was call here instead of later.

3) Page 1200, line 6: It is not entirely clear to me how you computed the temperature lapse rates. More explanation is needed.

4) Page 1204, line 20: Please clarify. Are you arguing that the absence of a significant change in runoff is due to balancing changes in precipitation and air temperature?

5) Page 1204, line 23: Reword. The way this is phrased, one might be led to believe that the ACIA noted an average precipitation increase of 1% per decade in Sermilik Fjord, when they are talking about the Arctic as a whole.

6) Page 1205, second to last paragraph. See the paper by M. Tsukernik et al. (2007) which provides an assessment of cyclone activity in the Northern North Atlantic, with particular reference to processes around Greenland.

Tsukernik, M., Kindig, D.N. and Serreze, M.C. 2007. Characteristics of winter cyclone activity in the northern North Atlantic: Insights from observations and regional climate modeling. *Journal of Geophysical Research*, 112: D03101, doi:10.1029/2006JD007184.

7) Abstract: The dominance of glacier discharge to the total freshwater flux needs to be mentioned here.

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Interactive comment on The Cryosphere Discuss., 4, 1195, 2010.

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