

Interactive comment on “A note on the water budget of temperate glaciers” by J. Oerlemans

Anonymous Referee #1

Received and published: 27 July 2013

I read with interest , ‘A note on the water budget of temperate glaciers’. It is a new twist on an old topic, which was a relatively popular subject in the literature of the 1970s. Unfortunately, that work was not cited in this short note. The paper is very clear in its presentation and significant outcomes, a characteristic of H. Oerleman’s work. I found only one small error, I think, on page 2685, just after line 15 where $b_{\text{sub}L}$ is defined. That constant is not used in the paper and I believe it is replaced with $h_{\text{sub}L}$, which is undefined. Perhaps $b_{\text{sub}L}$ was a typographical error.

I find it intriguing that the dissipative melt may contribute to a glacier’s surge behavior and the author’s thought that such melt water may accumulate in basal regions isolated from surface input is a suggestion worth considering. In a surging glacier, close to instability, perhaps the water generated internally may be sufficient to increase the that instability significantly.

C1211

One overall thought prompted by this paper is the implications for the microphysics of the glacier. What is the specific source of the water and what does its routing imply? Is the source dissipative melt localized along the boundaries rather than from the entire mass of crystal? If the grain boundaries indeed enlarge throughout the englacial region does that increase the porosity and hydraulic conductivity of the ice? Even if the water is not drained to the bed does the enlarged water-filled crystal boundaries reduce the yield stress of the ice allowing the surge to propagate faster or perhaps deform easier?

In conclusion, I appreciate the author providing this thought-provoking paper to the glaciological community.

Interactive comment on The Cryosphere Discuss., 7, 2679, 2013.