

## ***Interactive comment on “Mass balance, runoff and surges of the Bering Glacier, Alaska” by W. Tangborn***

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Tangborn (2012) presents a study detailing the results of the PTAA model reconstruction of the mass balance of Bering Glacier, AK. The modeled mass balance compares favorably to a result from a geodetic method, and its potential for real-time mass balance results is both promising and exciting. The record of modeled mass balance and runoff for Bering Glacier provide the potential to further investigate the relationship between mass balance, runoff, and surges. Before this paper can be a valuable contribution, the following issues should be addressed:

1. The paper should be reorganized, with sections ordered in order to better explain/expand the relevant background and results. Results should not be intro-

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duced before the method has been explained.

2. Several statements should be supported with either citations or further explanation, not simply presented as fact; these are noted under specific comments.
3. The section on surges should be expanded, especially the discussion of the evidence for the relationship between runoff and surge timing. The fact that the accumulation balance record and runoff record are similar is shown, but further development of this fact, as well as some discussion of the apparent time lag between the two graphs, would strengthen the analysis.

Specific comments:

5096-7: choose  $m$  w.e. or  $m_w$ , not both.

5096-22-23: This statement should be supported with a citation, or further explanation.

5096-26: Introduce the acronym PTAA here. If there are citations for the PTAA model, they should be included here.

5097-19-22: I don't think this explanation is necessary here.

5097-23-26: This explanation is unnecessarily confusing. Please keep to the glossary terms throughout the manuscript.

5098-7-12: More explanation of the variables used in the model would be useful here.

5099-14: Forest "fires", not "files". In addition, it is not clear to me how the PTAA model accounts for the increased albedo of the glacier surface.

5101-1-12: This section should be expanded. The prospect of real-time mass balances is an intriguing one, and further discussion of both the potential uses and drawbacks would be desirable.

5101-14-19: More citations are needed in this section.

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5101-22-24: The purpose of this comparison is not clear to me.

5102-1: Ice front? Surface? What is being displaced here?

5102-5: Your citation for the 2008-2011 surge should be updated with a reference from after 2011.

5103-1-9: Your conclusions are good, but should be expanded on.

5106: Fig. 1: The figure caption should not be a repeat of the text on page 5096. A map showing the location of Bering Glacier within Alaska would be useful.

5116: Fig. 9a: Where does the 1966-1967 surge fit into this figure, as well as the explanation of increased runoff?

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Interactive comment on The Cryosphere Discuss., 6, 5095, 2012.