

Interactive comment on “Monte Carlo ice flow modeling projects a new stable configuration for Columbia Glacier, Alaska, by c. 2020” by W. Colgan et al.

Dr. Colgan

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Dear Dr. Pelto – Thank you for putting our debate over high elevation accumulation rate into perspective. When revising the manuscript I intend to increase the prescribed range from 4.5 – 6.0 mWE/a to 3.0 – 6.0 mWE/a. While this yields an uncertainty of 100 %, this seems to be representative of the level of consensus amongst the studies and arguments put forward in this TCD forum as well as in the responses to Dr. Wendell Tangborn’s Cryolist posting. I intend to submit a consolidated version of the additional Cryolist responses to this TCD forum prior to the closure date.

A revised version of Figure 4 of the manuscript is presented below. This includes both

C471

the Tangborn (1997) and O’Neel (2012) studies that were previously overlooked, as well as the expanded high elevation accumulation rate range. The Monte Carlo ensemble approach should be able to provide some constraints on the plausible range. Presumably there should be a lower limit for prescribed accumulation rate, below which the glacier receives insufficient mass to maintain the observed pre-retreat geometry. These simulations, which fail to reproduce the observed pre-retreat geometry, should be identified by the first ensemble selection filter. Thus, we will investigate the possibility of identifying a subset of un-plausibly low accumulation rates when completing our revisions.

O’Neel, S. 2012. Surface Mass Balance of the Columbia Glacier, Alaska, 1978 and 2010 Balance Years. U.S. Geological Survey Data Series 676. 8 pages.

Tangborn, W. 1997. Using low-altitude meteorological observations to calculate the mass balance of Alaska’s Columbia and relate it to calving and speed. In *Calving Glaciers: Report of a Workshop, February 28–March 2, 1997*. Edited by C. J. van der Veen. Byrd Polar Research Center Report 15.

Interactive comment on The Cryosphere Discuss., 6, 893, 2012.

C472

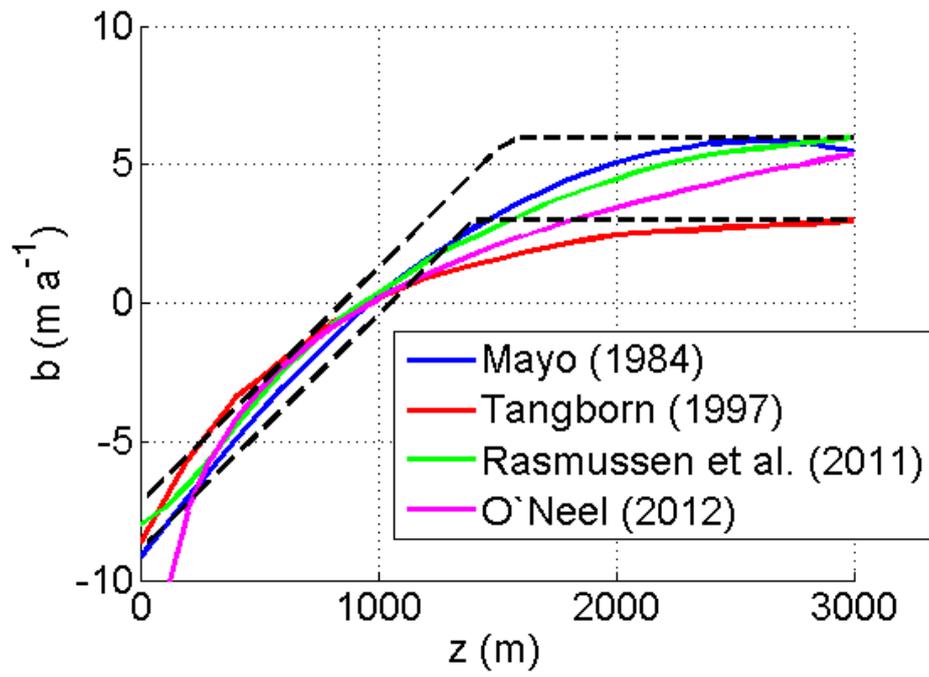


Fig. 1. Revised Figure 4: Observed relation between surface mass balance (b) and elevation (z) at Columbia Glacier (solid lines) and the parameterized range (dashed lines) used in this study.