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Supplement of

Comparison of four calving laws to model Greenland outlet glaciers

Youngmin Choi et al.

Correspondence to: Youngmin Choi (youngmc3@uci.edu)

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Figure S1: (a) The observed ice front positions between 2007-2017 and (b),(c) modeled ice front positions obtained with crevasse depth calving laws assuming no water in crevasses ($d_w = 0$). The background is the bed topography of Upernavik Isstrøm.

Figure S2: Same as Fig.S1 but for Hayes Glaciers.

Figure S3: Same as Fig.S1 but for Sverdrup glacier.

Figure S4: Same as Fig.S1 but for Kjer glacier.

Figure S5: Time series of modeled retreat distance (with respect to the calving front initial position in 2007) compared to observed retreat distance for Upernavik Istrøm. Solid lines indicate the observations and dotted lines represent modeled retreat distance.

Figure S6: Same as Fig.S5 but for Hayes Glaciers.

Figure S7: Same as Fig.S5 but for Helheim, Sverdrup and Kjer glaciers.

Figure S8: (a) The modeled ice front positions with von Mises tensile stress calving law used in the main text and (b) with the von Mises tensile stress criterion without the velocity component.

Figure S9: The modeled ice front positions for Kjer glacier based on the finer mesh resolution than the one in the main text. The mesh here has a resolution of 50 m near the ice front. The results are in qualitative agreement with the ones in the main text.