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Interactive comment on “Hybrid inventory, gravimetry and altimetry (HIGA) mass balance product for Greenland and the Canadian Arctic” by W. Colgan et al.

W. Colgan et al.

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We greatly appreciate that you found two cryospheric remote sensing experts who were able to substantially contribute to our work. We have addressed all general comments raised by both reviewers, as well as all specific comments that we contest. We note that both reviewers raise concerns regarding an extension of the HIGA approach to the Canadian Arctic, primarily due to sparse airborne altimetry and in situ validation data, as well as more complex ice hypsometries than Greenland. While we respond to both reviewers that our present uncertainty assessment indeed acknowledges the asymmetrical uncertainty distribution between Canada and Greenland, we must con-

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cede that the inversion method we present is ultimately better suited for ice sheets than glacier complexes. In the event that you feel our proposed revisions will not fully address reviewer concerns regarding the Canadian Arctic, we would reluctantly omit the Canadian Arctic from our analysis and discussion. Despite acknowledged shortcomings, however, we feel the Canadian Arctic analysis we present here is a substantial improvement over that presented in the Colgan et al. (2013) companion paper, as well as complementary to assessments of Canadian Arctic ice loss made with different approaches (e.g. Gardner et al., 2011; Schrama and Wouters, 2011).

Colgan, W.; Luthcke, S.; Abdalati, W. & Citterio, M. Constraining GRACE-derived cryosphere-attributed signal to irregularly shaped ice-covered areas *The Cryosphere*, 2013, 7, 1901-1914, doi:10.5194/tc-7-1901-2013

Gardner, A.; Moholdt, G.; Wouters, B.; Wolken, G.; Burgess, D.; Sharp, M.; Cogley, J.; Braun, C. & Labine, C. Sharply increased mass loss from glaciers and ice caps in the Canadian Arctic Archipelago *Nature*, 2011, 473, doi:10.1038/nature10089

Schrama, E. & Wouters, B. Revisiting Greenland ice sheet mass loss observed by GRACE *Journal of Geophysical Research*, 2011, 116, doi:10.1029/2009JB006847

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