The Cryosphere Discuss., 4, C593–C594, 2010
www.the-cryosphere-discuss.net/4/C593/2010/

The Cryosphere Discussions

Interactive comment on "A numerical study of glacier advance over deforming till" *by* G. J.-M. C. Leysinger Vieli and G. H. Gudmundsson

I. M. Howat (Editor)

ihowat@gmail.com

Received and published: 3 August 2010

I can only echo the praise from reviewers Sharp and Benn for this ground-breaking work. I look forward to accepting this paper for TC once the discussion period ends and the authors supply a revised ms with a rebuttal to the comments of Sharp and my own comments (mostly copy editing) below.

- 825, 23: does "area" mean location on the glacier here for field of study? what exactly are the assumptions that are invalid and how do we know they are invalid?

-826, 7: "the assumption" and, again, need some more detail about which assumptions and how they are violated.

- 826, 14: "formulated in" doesn't seem appropriate here ... "approximated by"?

- 827,27: "Unstructured gridding .... "

- 830, 25: "distribution"

- 831, 19: "non-dimensionalisation", do you mean "normalisation"?

- 837, 26: But elsewhere you state that it's ratio of till and ice hardness, not the till hardness alone, that is most important.

- Discussion/conclusions was a bit of a let-down. There are lots of important implications for this work that should be touted. For instance:

- Can the model results guide future field data collection, specifically till properties and bed feature shape, that would help constrain till rheologies?

- Most of what we know about till deformation is gathered either from the terminus (e.g. Boulton and Hindmarsh, 1987) or from the Antarctic Ice Streams. How exactly would this bias our understanding (you start to address this but don't really follow through with a conclusion).

- What are the next-steps for development of the model and future experiments? As D. Benn mentioned, there's so much that could be done to extend this.

Interactive comment on The Cryosphere Discuss., 4, 823, 2010.