

tc-2011-110 Submitted on 23 Dec 2011. Reviewed 2012-01-30

Results of the Marine Ice Sheet Model Intercomparison Project, MISMIP

F. Pattyn, C. Schoof, L. Perichon, R.C.A. Hindmarsh, E. Bueler, B. de Fleurian, G. Durand, O. Gagliardini, R. Gladstone, D. Goldberg, G.H. Gudmundsson, V. Lee, F.M. Nick, A.J. Payne, D. Pollard, O. Rybak, F. Saito, and A. Vieli

General Comments:

I am very pleased to see this sort of paper produced and presented. Model intercomparisons are extremely valuable both for the modelling community as well as for those trying to understand what modellers are doing. These sorts of presentations go a long way in exposing the strengths and limitations of the various approaches. I appreciate that the authors point out that the approximation-free Full-Stokes solution may not be much better than many of the much more computationally efficient approximate methods because of fundamental uncertainties in the specification of material properties that produce a larger error than the approximate methods do.

The authors have provided a clear and well-defined set of extremely simple benchmarks as targets for various models with completely different physics and implementation methods. They do an admirable job of categorizing them, based on both the level of physics and the assumptions made. I would perhaps have been interested in mention of the numerical methods used, but I am sure those are spelled out in detail in the referenced papers describing each model.

The authors' conclusions appear robust and are clearly presented. I have no quibbles with this paper and would be happy to see it published as is.

Specific Comments:

1. Does the paper address relevant scientific questions within the scope of TC?
Yes
2. Does the paper present novel concepts, ideas, tools, or data?
Yes, novel results
3. Are substantial conclusions reached?

- Yes
4. Are the scientific methods and assumptions valid and clearly outlined?
YES
 5. Are the results sufficient to support the interpretations and conclusions?
Yes
 6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?
It would be difficult without access to all of the contributing modellers.
 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution?
Yes
 8. Does the title clearly reflect the contents of the paper?
Yes
 9. Does the abstract provide a concise and complete summary?
Yes
 10. Is the overall presentation well structured and clear?
Yes
 11. Is the language fluent and precise?
Yes
 12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?
Yes
 13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?
No
 14. Are the number and quality of references appropriate?
Yes
 15. Is the amount and quality of supplementary material appropriate?
I saw no supplementary material.

Technical Comments:

a minor typo: pg 289, lines 23-26:

“Implementation of grounding-line migration requires **to resolve** the transition zone at sufficient high resolution, either by using a moving-grid approach (following the grounding line directly) or by sufficient fine sub-sampling around the grounding line.”

Replace “**to resolve**” with “**resolving**”