Subglacial Hydrology Model Intercomparison Project (SHMIP)

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This project aims at making a first step at rectifying this.

SHMIP aims

From our web-site shmip.bitbucket.io:

Subglacial Hydrology Model Inter-comparison Project SHMIP

This project aims at providing a qualitative comparison of subglacial hydrology models bv comparing results from a suite of test runs. It is designed such that any subglacial hydrology model producing effective pressure should be able to participate.



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Note: a qualitative comparison

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Test suites: two geometries



Ice sheet margin topography (square root)

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Aims Test suites

Test suites: two geometries





Ice sheet margin topography (square root)

Synthetic Bench glacier topography

Test suites: many forcings

Suite	Geometry	Temporal	Varying parameter	Remarks
Α	sqrt	steady	input volume	maybe fit to A3 and A5
В	sqrt	steady	moulin density	
С	sqrt	diurnal	diurnal amplitude of moulins	use B5 as initial condition (IC)
D	sqrt	seasonal	-4 to +4C temperature	use A1 as IC
Ε	valley	steady	geometry change	
F	valley	seasonal	-6 to +6C temperature	IC: steady state using only winter discharge

Note: "maybe fit to A3 and A5"

Participants

So far eleven people participated with simulations from twelve models.

We expect/hope for a few more submissions before wrapping up. (still several months away)

If you want to participate, there is still time. Contact us!

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0D Lumped model

One lumped element model (i.e. with no spatial dependence) participated:

dbri Douglas Brinkerhoff running *Brinkerhoff et al. (2016)*: a two element model, one water storage element, and one conduit element (R-channel + cavity combination).

(Participating models are labels with first initial and first three letters of family name of the experimenter.)

Two 1D models, i.e. simulating water flow at the bed along a flow-line, participated:

- **cdow** Christine Dow running the sheet and R-channel model of *Flowers et al. (2004)*
 - **idel** Ian Delaney running a conduit model (R-channel and one cavity combined), similar to *Kessler and Anderson (2004)*.

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- **Linked-cavity sheet** + many **R-channels** As above but adding many potential R-channels. The channel network is created as part of the solution (Hewitt 2013, Werder et al. 2013). Models: ogag, mwer, and mhof mpas

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How to best compare many of these results?

I will show effective pressure ${\cal N}$ at three different elevation bands:





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Models were tuned to A3 and A5 to have some "common ground".

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Introduction Participants & Models Results Conclusions



Suite A: steady forcings



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Suite D: seasonal forcings

At mid summer:



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Conclusions

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Thanks to all the SHMIP participants!

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