

Dataset for

“On non-dimensional forms of basal sliding laws and flow laws for ice-sheet and glacier modelling”

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— README —

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Three model experiments (for details see the paper, Sect. 4)

Similar to experiment H of the EISMINT Phase 2 Simplified Geometry Experiments (Payne and others, 2000, *J. Glaciol.* 46, 227-238, doi: 10.3189/172756500781832891).

- Exp. H1: Weertman sliding with $(p,q) = (1,0)$, Nye–Glen flow law with $n = 3$.
- Exp. H2: Weertman–Budd sliding with $(p,q) = (3,2)$, Nye–Glen flow law with $n = 3$.
- Exp. H3: Weertman sliding with $(p,q) = (1,0)$, Nye–Glen flow law with $n = 4$.

Run with SICOPOLIS v25 (revision 2488194da of 2025-06-30), compiler gfortran 13.3.1.

The SICOPOLIS run-specs header files are contained in the archive ‘run_specs_headers.zip’.

Variables

The variable names follow closely the ISMIP6/7 convention (e.g., <https://thegithub.org/groups/ismip6/wiki/ISMIP6-Projections-Greenland>). However, years are used instead of seconds as the time unit ($1 \text{ a} = 31,556,925.445 \text{ s}$).

2D state variables (in archives ‘expH1.zip’, ‘expH2.zip’, ‘expH3.zip’)

lithk	– Ice thickness (m)
xvelsurf	– Surface velocity in x (m a^{-1})
yvelsurf	– Surface velocity in y (m a^{-1})
zvelsurf	– Surface velocity in z (m a^{-1})
horvelsurf	– Horizontal surface velocity (m a^{-1})

xvelbase	– Basal velocity in x (m a^{-1})
yvelbase	– Basal velocity in y (m a^{-1})
zvelbase	– Basal velocity in z (m a^{-1})
horvelbase	– Horizontal basal velocity (m a^{-1})
xvelmean	– Mean velocity in x (m a^{-1})
yvelmean	– Mean velocity in y (m a^{-1})
horvelmean	– Horizontal mean velocity (m a^{-1})
litemptop	– Surface temperature (K)
litempbot	– Basal temperature (K)
strbasemag	– Basal drag (Pa)
sftgif	– Land ice area fraction (–)

These variables are provided as snapshots for the times $t = 5 \text{ ka}$, 25 ka , 100 ka (final time).
Time variable: 'time'.

Scalar state variables (in archives 'expH1.zip', 'expH2.zip', 'expH3.zip')

lim	– Total ice mass (kg)
iareagr	– Grounded ice area (m^2)

These variables are provided as snapshots every 10 years: $t = 0.01 \text{ ka}$, 0.02 ka , ..., 100 ka .
Time variable: 'time'.

Note

For further details on the variables, see the metadata in the netCDF files (e.g., by Linux command 'ncdump -h' or MATLAB command 'ncdisp').