

README

Dataset for “Mass loss of the Greenland ice sheet until the year 3000 under a sustained late-21st-century climate”

16 model experiments

- hist: historical simulation 1990–2015.
- ctrl_proj: constant-climate projection control experiment 2015–3001.
- exp05–10, expa01–a03, expb01–b05: future-climate experiments 2015–3001 (see Table 1 of the paper).

Zip archives

- hist.zip, ctrl_proj_long.zip, exp05_long.zip, exp06_long.zip, ..., expb05_long.zip: netCDF output files for the 16 experiments (one file for each variable).
- run_specs_headers.zip
SICOPOLIS run-specs headers for the 16 experiments.

Scalar state variables

| | |
|---------|---------------------------------------|
| lim | – Total ice mass (kg) |
| limnsw | – Mass above floatation (kg) |
| iareagr | – Grounded ice area (m ²) |

These variables are provided as yearly snapshots for the full years 2016–3001 [hist: 1991–2015]. Time variable: ‘time’.

Scalar flux variables

| | |
|---------------|---|
| dlimdt | – Total ice mass change (kg a ⁻¹) |
| tendacabf | – Total surface mass balance flux (kg a ⁻¹) |
| tendlibmassbf | – Total basal mass balance flux (kg a ⁻¹) |
| tendlicalvf | – Total calving flux (kg a ⁻¹) |

These variables are provided as yearly averages over the intervals bounded by the years 2015–3001 [hist: 1990–2015]. Time variables: ‘time’, ‘time_bnds’.

2D state variables

| | |
|-------|--------------------------|
| lithk | – Ice thickness (m) |
| orog | – Surface elevation (m) |
| base | – Ice base elevation (m) |
| topg | – Bedrock elevation (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 years 2020 (5) 2100 (25) 3000, 3001 [hist: yearly snapshots for 1991–2015]. Time variable: ‘time’.

2D flux variables

| | |
|-----------|--|
| acabf | – Surface mass balance flux ($\text{kg m}^{-2} \text{a}^{-1}$) |
| libmassbf | – Basal mass balance flux ($\text{kg m}^{-2} \text{a}^{-1}$) |
| licalvf | – Calving flux ($\text{kg m}^{-2} \text{a}^{-1}$) |
| dlithkdt | – Ice thickness imbalance (m a^{-1}) |
| hfgeoubed | – Geothermal heat flux (W m^{-2}) |

These variables are provided as averages over the intervals bounded by the years 2015 (5) 2100 (25) 3000, 3001 [hist: yearly averages bounded by 1990–2015]. Time variables: ‘time’, ‘time_bnds’.

Notes

- The variable names follow closely the ISMIP6 convention (e.g., Table A1 of <https://tinyurl.com/ismip6-wiki-gris>). However, years are used instead of seconds as the time unit ($1 \text{ a} = 31,556,926 \text{ s}$).
- For further details, see the metadata in the netCDF files (e.g., by Linux command ‘ncdump –h’ or MATLAB command ‘ncdisp’) and the paper.