README

Dataset for "Reduced ice loss from Greenland under stratospheric aerosol injection"

14 model experiments

- HIST_MIROC5-RCP85: Historical simulation 1990–2015.

- CTRL_PROJ: Unforced projection control experiment 2015–2090.

- <GCM>-<Scenario>: Future climate experiments 2015–2090,
    where <GCM> = {BNU-ESM, HadGEM2-ES, MIROC-ESM, MIROC-ESM-CHEM}
    and <Scenario> = {RCP85, RCP45, G4}

Zip archives

- SICOPOLIS_Scalar.zip:
  14 netCDF output files for scalar variables as functions of time produced by SICOPOLIS.

- SICOPOLIS_2D.zip:
  14 netCDF output files for snapshots of 2D variables produced by SICOPOLIS.

- ElmerIce_Scalar.zip:
  14 netCDF output files for scalar variables as functions of time produced by Elmer/Ice.

- ElmerIce_2D.zip:
  14 netCDF output files for snapshots of 2D variables produced by Elmer/Ice.

Scalar variables

t	–	Time
delta_ts	–	Surface temperature anomaly (average over ice sheet)
SMB	–	Total surface mass balance
calv	–	Total calving rate
V_tot	–	Ice volume
V_af	–	Ice volume above flotation
V_sle	–	Ice volume above flotation in sea-level equivalent (SLE)
A_grounded	–	Area covered by grounded ice
A_floating	–	Area covered by floating ice

These variables are provided for every full year. We distinguish between state variables (all except for SMB, calv) and flux variables (SMB, calv). State variables are given as snapshots (e.g., 2020 → 2020-01-01 00:00), while flux variables are averaged over one year (e.g., 2020 → average between 2019-01-01 00:00 and 2020-01-01 00:00).

2D variables

mapping	–	Dummy variable (scalar) that contains the parameters of the polar stereographic projection as attributes
time	–	Time (scalar)
x	–	Projection x coordinate (1D)
y	–	Projection y coordinate (1D)
mask	–	Ice–land–sea mask
H	–	Ice thickness
vm	–	Vertical mean of horizontal velocity
Q	–	Horizontal volume flux (vertical integral of horizontal velocity, = H × vm)

These variables are provided as snapshots for the final time of the respective experiment (2015 for the historical simulation, 2090 for all other cases). For SICOPOLIS, the grid is the native, regular grid with 5 km resolution. For Elmer/Ice, the data were interpolated from the unstructured finite-element mesh to a regular grid with 1 km resolution.

Further details

Please see the metadata in the netCDF files (e.g., by Linux command 'ncdump –h' or MATLAB command 'ncdisp') and the manuscript.