PMIP4-CMIP6 ice-sheet data

You will find on this page the boundary condition data that you have to use for the Last Glacial Maximum and the Last Deglaciation experiments

Please make sure to read the HOWTO section in order to use the data correctly!

Get in touch with the following people if you have questions:

Masa Kageyama	LGM
Ruza Ivanovic	Last Deglaciation
Didier Roche	LGM, Last Deglaciation
Jean-Yves Peterschmitt	Technical questions

How to use the data

- Choose the type of boundary condition you want to use. Look at the available data below, and at the ice-sheet gallery page.
    - Do not forget to document what you have chosen!
- blahblah
- After processing the boundary condition data, send a copy the BC data *as seen by your model* to Jean-Yves Peterschmitt: netCDF file and plot

Ice-sheet data

The input data for the boundary conditions is available in **netCDF files** provided by Dick Peltier and Lev Tarasov. You will find below some technical details about the data, and the related publications to cite

Data history

The data files may change a bit (rename or standardize the data, etc…) and you will find the change list below

Peltier ICE-6G-C for PMIP4

Grid

- nb_lat, nb_lon = 1080, 2160 (regular 10 minutes intervals)

- latitude_values = [-89.91667175, -89.75, -89.58334351, … 89.58333588, 89.75 , 89.91666412]
- longitude_values = [0., 0.16666667, 0.33333334, … 359.5, 359.66668701, 359.83334351]
- NO time axis (1 time step per file)

Time steps and data files

- 48 time steps in 48 files, from 0k to 26k BP : data every 500 years from 0k to 21k BP, then every 1000 years till 26k BP
- file names = `I6_C.VM5a_10min.<time_slice>.nc`
  with <time_slice> in [0, 0.5, 1, …, 20, 20.5, 21, 22, 23, 24, 25, 26]
- all the variables for the same time step are in the same file

Variables

- **Topo**: Topography (Point-value altitude), meters
  - on continents: surface altitude (including grounded ice sheet)
  - on ice-free oceans, and where there is floating ice (ice shelves): bathymetry
- **Orog**: Orography (Point-value surface altitude), meters
  - on continents: altitude (including grounded ice sheet)
  - on ice-free oceans: 0.0 (zero)
  - on ice-shelves: surface altitude
- **sftlf**: Point-value Landmask, %
  - values are `0` (not land) or `100` (land)
  - does not include floating ice
- **sftgif**: Point-value Icemask, %
  - values are `0` (not ice) or `100` (ice)
  - floating ice is included

Notes:

- Computing the `sftlf-sftgif` difference yields:
  - 100: where there is land without ice
  - -100: where there is floating ice-sheet
  - 0: elsewhere

References

Please cite **all** following papers:

- Describe the new Antarctic component of the model: Argus, D.F., Peltier, W.R., Drummond, R. and Moore, A.W. - **The Antarctica component of postglacial rebound model ICE-6G_C (VM5a) based upon GPS positioning, exposure age dating of ice thicknesses, and relative sea level histories**. Geophys. J. Int., 198, 537-563, 2014, 10.1093/gji/ggu140

- Describe the complete model: Peltier, W.R., Argus, D.F. and Drummond, R. (2015) **Space geodesy constrains ice-age terminal deglaciation: The global ICE-6G_C (VM5a) model**. J. Geophys. Res. Solid Earth, 120, 450-487, doi:10.1002/2014JB011176

Download

You will find below a table with all the available data files, and their *md5sum* checksum (if you want to check that you download was OK, you can just type `md5sum file.nc` and compare the result to what is displayed in the table).

If you want to download a file, click on the ice_sheet download link and then on the file you need

Groups running the lgm experiment have to use the `I6_C.VM5a_10min.sftlf.21_CASPIAN.nc` file, where the Caspian sea has been set to the modern Caspian sea in the land-sea mask variable

md5sum output	Data file
5ba8c0df48a12132238ffcbf675578e0	I6_C.VM5a_10min.0.nc
85ab7bf8b90ce0567ada52368c11ddd8	I6_C.VM5a_10min.0.5.nc
c35409318de8d68a8e0731915897e8cd	I6_C.VM5a_10min.1.nc
adefdf757b495b0701470ee10539ba2b	I6_C.VM5a_10min.1.5.nc
c212e04194ffa3deca47e19d206521fb	I6_C.VM5a_10min.2.nc
5d4194ae75b1d7f5427809f3bc15de0b	I6_C.VM5a_10min.2.5.nc
1e39cba575afc871f8017f04154b4dd8	I6_C.VM5a_10min.3.nc
1371cc7980cc7f58c6d095b906781dc2	I6_C.VM5a_10min.3.5.nc
cc1b10682a3aad6fece52fa64df7053b	I6_C.VM5a_10min.4.nc
10fa8a511560c8f422c5a49aee3490a4	I6_C.VM5a_10min.4.5.nc
6e2c7e647dd3870f633f5523fec451eb	I6_C.VM5a_10min.5.nc
cb0e2c9ed3d344b0e9f46b8bab2261d6	I6_C.VM5a_10min.5.5.nc
d75beb9612b3281adf48c2c1556e80ed	I6_C.VM5a_10min.6.nc
59f0986a7718bf2501a56f4d78aa82e2	I6_C.VM5a_10min.6.5.nc
6286cc8b473a8b9eb518d198313165b6	I6_C.VM5a_10min.7.nc
f322a34a64ac22dfac51f51a09de10b2	I6_C.VM5a_10min.7.5.nc
2e79dd041bd2bb6a2a4cdc60e721bfa1	I6_C.VM5a_10min.8.nc
efdc2808b7b89ca87817f5ec5da70d17	I6_C.VM5a_10min.8.5.nc
dd88ee2889bf4f63ac376ec697d9ad83	I6_C.VM5a_10min.9.nc
24743df87baf8553526fdc36575e50a1	I6_C.VM5a_10min.9.5.nc
061a5facad371878e23abf268185e35a	I6_C.VM5a_10min.10.nc
160b84499c8bf45015bdbf9dabbac153	I6_C.VM5a_10min.10.5.nc
7c01dcc26051ad7c326ac9051c4c405a	I6_C.VM5a_10min.11.nc
6d7161ac4ea2e712b6f9663e5fe21179	I6_C.VM5a_10min.11.5.nc
e742322517320d9ff61c5d9fca8e25b9	I6_C.VM5a_10min.12.nc
a7b16f877df9cdf62d4cc2088d8ab2eb	I6_C.VM5a_10min.12.5.nc
429ed0b9eaceaffda43523e011c01fae	I6_C.VM5a_10min.13.nc
e3fb84ae29042592369f260d34b85fea	I6_C.VM5a_10min.13.5.nc
832d4e842fc65dc8e07af40ba551e368	I6_C.VM5a_10min.14.nc
55ddce7c9e237e17a0fa648cd11deddc	I6_C.VM5a_10min.14.5.nc

md5sum output	Data file
b6b0a51ff9cfc3f30532e6c0e49592bf	I6_C.VM5a_10min.15.nc
a47a49626b6778fa387ccc78831a0025	I6_C.VM5a_10min.15.5.nc
257b8cd456c7936d2daf4383e92690fe	I6_C.VM5a_10min.16.nc
6c1fe398efeeed143c47d150f0dfeba4	I6_C.VM5a_10min.16.5.nc
90981cc37069758307d8cdeca9f6b1de	I6_C.VM5a_10min.17.nc
f22013d948a4fdd85d8f476574ddab51	I6_C.VM5a_10min.17.5.nc
f4dbbd2742d920e5c0bd324f190885d1	I6_C.VM5a_10min.18.nc
7a95dc97c4818db719bc1e0008889883	I6_C.VM5a_10min.18.5.nc
2a6064e417d0b2242956be4ffc4d75f6	I6_C.VM5a_10min.19.nc
0337c11ea0c15a565d942eec83dce645	I6_C.VM5a_10min.19.5.nc
516a3530681ba4a7963a5c31a857274f	I6_C.VM5a_10min.20.nc
28bfdccdb9da24aafa5a999ff11e0ee5	I6_C.VM5a_10min.20.5.nc
9443668583800099ce9e865be90e4ad6	I6_C.VM5a_10min.21.nc
c8a69bd5b3c1d5aa55b361e9b7dea99e	I6_C.VM5a_10min.sftlf.21_CASPIAN.nc
dabcbabf06211ccf6bdcdf306a85d3cc	I6_C.VM5a_10min.22.nc
da0268feca9fa4d2f2c479e38a72b197	I6_C.VM5a_10min.23.nc
78b35dd7d1c2d7b39c8eb37feef8ca9b	I6_C.VM5a_10min.24.nc
f51db17bc0f90392464df9a0fb83bf59	I6_C.VM5a_10min.25.nc
489570ddeadd55b3887b43d89f1abfad	I6_C.VM5a_10min.26.nc

Tarasov GLAC-1D for PMIP4

Grid

- nb_lat, nb_lon = 360, 360
- latitude_values = [-89.75, -89.25, -88.75, … 88.75, 89.25, 89.75]
- longitude_values = [0.5, 1.5, 2.5, … 357.5, 358.5, 359.5]
- time axis: see the *Time steps* section below

Time steps and data files

- 261 time steps in one file, from 0k to 26k : data every 100 years, from 0k to 26k BP
- time_values = [-26. , -25.9, -25.8, … -0.2, -0.1, 0.]
- all the variables and all the time steps are in the same file: `TOPicemsk.GLACD26kN9894GE90227A6005GGrBgic.nc`

Variables

- **HDC**: GLAC contemp. elevation(masl), meters
  - on continents (including ice sheets) and ice shelves: surface altitude (including ice sheets/shelves)
  - on ice-free ocean: bathymetry
- **HDCB**: GLAC contemp. elevation(masl), bathymetry for floating ice, meters
  - on continents (including ice sheets) and ice shelves: surface altitude (including ice sheets)
  - on ice-shelves: altitude of the bottom of the floating ice

    - on ice-free ocean: bathymetry
- **ICEM**: GLAC ice mask, fraction
    - ice fraction values between 0.0 (no ice) and 1.0 (100% ice)

Notes:

- The land-sea mask can be computed with:
    - HDCB > 0 : ls_mask = 1 (land)
    - HDCB ⇐ 0 : ls_mask = 0 (no land)
- Computing the `HDC-HDCB` difference yields:
    - ice-shelves thickness where there are ice shelves
    - 0.0 everywhere else

References

Please cite **all** the following papers:

- L. Tarasov and W. Richard Peltier **Greenland glacial history and local geodynamic consequences**, Geophysical Journal International, 150, 198-229, doi:10.1046/j.1365-246X.2002.01702.x
- Lev Tarasov, Arthur S. Dyke, Radford M. Neal and W.R. Peltier, **A data-calibrated distribution of deglacial chronologies for the North American ice complex from glaciological modeling**, Earth and Planetary Science Letters, Volumes 315–316, 15 January 2012, Pages 30–40, doi:10.1016/j.epsl.2011.09.010
- Robert D. Briggs , David Pollard , Lev Tarasov, **A data-constrained large ensemble analysis of Antarctic evolution since the Eemian**, Quaternary Science Reviews, Volume 103, 1 November 2014, Pages 91–115, doi:10.1016/j.quascirev.2014.09.003
- 4th paper to be added here (Eurasian component)

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