

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!



- 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](https://doi.org/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](https://doi.org/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
6c1fe398efeed143c47d150f0dfeba4	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)
 - $HDCB \leq 0$: $ls_mask = 0$ (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](https://doi.org/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](https://doi.org/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](https://doi.org/10.1016/j.quascirev.2014.09.003)
- 4th paper to be added here (Eurasian component)

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Groups running the lgm experiment have to use the GLAC-1D.sftlf.21_DIRTY-CASPIAN.nc land-sea mask file, where the Caspian sea has been set to the modern Caspian sea in the land-sea mask variable

md5sum output	Data file
3796bd615de2811f593483d648b94562	GLAC-1D.sftlf.21_DIRTY-CASPIAN.nc
e8be8847a4dabd0a446682d51f6d77c3	TOPicemsk.GLACD26kN9894GE90227A6005GGrBgic.nc

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