PMIP4-CMIP6 ice-sheet data

<note important> You will find on this page the boundary condition data that you have to use for the **LGM** 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

</note>

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

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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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