Supplementary material

The following programs are provided to document the different steps which have been followed to create the LGM boundary conditions for the atmosphere and the ocean for the IPSL model.

5 These programs along with the data needed to run them can be downloaded from: https://pmip4.lsce.ipsl.fr/doku.php/exp_design:lgm

Prepare_LGM_BC_files.py (in *python*, using the UV-CDAT python distribution): preparation of the variables required to modify the model's boundary conditions, from the GLAC-1D and ICE_6G-C data sets.

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Interpol.bash (in *bash*, using the *nco* and *cdo* packages) and **bathy_lgm.py** (in *python*, using the UV-CDAT python distribution): Computation of the NEMO 1° ocean coastlines and bathymetry. **bathy_lgm.py** calls **nemo.py**.

Figure S1 describes how these programs have been used, along with the required data and the output produced by the

15 programs, for the IPSL model case.

Figure S1: Programs (in bold, framed with a thick black line) provided in this supplementary material. The input, available on the PMIP4 web site, or specific to the IPSL model, is indicated in slanted thin black line boxes. The produced output for the atmospheric model is framed in light blue and for the ocean in dark blue. The programs corresponding to the steps indicated with

20 **dashed arrows are not described here.**

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verif_all.jnl (in *ferret*): for checking coastlines and bathymetry. The program calls **regions.jnl** (in which the user can define the regions for which the maps are made) and **verif_bathy_mask.jnl** (which makes one page of maps

25 for each region). The l.h.s column shows, from top to bottom: the modern bathymetry, the LGM bathymetry and the LGM – modern bathymetry anomaly, with colour scales in m; the r.h.s column shows, from top to bottom: the modern ocean mask (in red) and land mask (in white), the LGM ocean and land masks (same colour code) and the difference between the masks (white: land for both Modern and LGM, yellow: ocean for Modern, land for LGM, red: ocean for both Modern and LGM, green: ocean for LGM and land for Modern – there should be no such point). The corresponding figures for the IPSL

30 model are available in the 'Figures' directory provided with the supplementary material.