

## **Notes for Guidance** (*distillation of information from PlioMIP Google Group*)

### **General:**

Two boundary condition data packages are available - *preferred* and *alternate*. The preferred data package requires the ability to change the models land/sea mask to a Pliocene configuration. The alternate data package, with a modern land/sea configuration, is supplied for those models that cannot change the land/sea mask. A modern land/sea mask (*land\_fraction\_v1.3*) is provided in the alternate package. Groups that cannot change their land/sea mask will use their own modern land/sea mask. The inclusion of *land\_fraction\_v1.3* is simply to help guide the implementation of Pliocene topography and vegetation etc. onto your own modern land/sea mask.

*Groups should have consistent land/sea masking, as well as consistent implementation of other boundary conditions, between Experiments 1 and 2.*

Data packages make use of fractional land grids. SST files assume a maximum ocean footprint; land variable files assume a maximum land footprint. Therefore, coastal grid cells that contain both land and ocean also contain both SSTs and all land variables.

The protocols for Experiment 1 and 2 pre-industrial control simulations match the PMIP3 protocols for groups that are only running PMIP3-style experiments. For groups running CMIP5 experiments, the Experiment 1 and 2 pre-industrial control runs should be the same as the one used for CMIP5 experiments. It is thus the same reference as the one for 20th century simulations and future climate projections (see *taylor\_cmip5\_dec31.pdf* on the PMIP3 wiki: <https://pmip3.lsce.ipsl.fr/wiki/doku.php/pmip3:design:pi:index>). Specification of trace gasses (with the exception of CO<sub>2</sub> which is set at the Pliocene value of 405ppm), along with aerosols, the solar constant and orbital configuration for Pliocene Experiments 1 and 2 should be consistent with the chosen values used for the pre-industrial control simulations (i.e. either CMIP5-type or PMIP3-type).

### **Applying Pliocene SST and Topography:**

To create the Pliocene SST/topography please add the difference between PRISM Pliocene topography/SST and PRISM modern topography/SST to your own local control modern topography and SST data sets. For example:

$$\text{Topo\_Plio} = (\text{Topo\_Plio\_PRISM} - \text{Topo\_Mod\_PRISM}) + \text{Topo\_Mod\_Local}$$

$$\text{SST\_Plio} = (\text{SST\_Plio\_PRISM} - \text{SST\_Mod\_PRISM}) + \text{SST\_Mod\_Local}$$

To create the modern topography/SSTs use your local topography/SST data sets for modern.

A potential mismatch between Pliocene and modern topography land-sea masks exists, but this can be overcome by using absolute Pliocene topography in regions where no

modern data is given. Modern SST is projected on the same Pliocene grids (preferred and alternate) to make anomalies easier to generate.

In using this method, lakes should disappear. In the absence of data on Pliocene lake distribution, this is an appropriate solution.

### **Ocean Mode:**

For Experiment 2, the Pliocene global deep ocean temperature dataset (Global\_dot\_v2.0) is recommended for use as the initial state for ocean temperature. The deep ocean temperature data set should be applied using the anomaly method in the same way as Pliocene SST in Experiment 1 and Pliocene topography in Experiments 1 and 2 (see previous note).

There may be mismatches (for example in the West Antarctic region) between the Pliocene deep ocean temperature data, and where it is provided, and the Pliocene land/sea mask. Where this is the case, Global\_dot\_v2.0 deep ocean temperatures should be extrapolated horizontally into regions with no data coverage, therefore maintaining the Global\_dot\_v2.0 vertical temperature profile.

Groups unable to alter initial ocean temperature state should begin the simulation with a modern control state and document the spin-up of the simulation.

Salinity should be derived from Levitus or an existing modern (control) simulation.

The starting atmospheric conditions for Experiment 2 should be derived from the end of Experiment 1 if possible.

Please document what you do for the spin-up of the simulation.

### **River Routing:**

Standard solution is to alter the river routes to follow Pliocene topography. Minimum solution is to follow modern river routes except where inappropriate due to changes in the Pliocene land/sea mask where rivers should be routed to the nearest ocean grid box.

### **Ocean Gateways:**

The configuration of ocean gateways is the same in the Pliocene as it is in your control (PI) experiments. Please ensure that the Pliocene ocean gateways are as consistent as possible with the ocean gateways in your control (PI) experiment.

The Central American Seaway (Panama Gateway) is closed.  
The Bering Strait, Madagascar Strait, Drake Passage, Tasman Gateway, Gibraltar Strait and Indonesian Gateway are open.

## **Vegetation:**

Care should be taken to make sure that the procedure used to create a Pliocene vegetation map for your model is self-consistent with your model's modern vegetation map (i.e. when using the BAS BIOME4 modern vegetation, be sure the procedure can adequately reproduce the modern vegetation map for your model). Land use - Land use should be included in pre-industrial (Control) vegetation maps. Ideally this will be representative of the 20th century. Please follow CMIP5 recommendations (see [http://cmip-pcmdi.llnl.gov/cmip5/forcing.html?submenuheader=2#land-use\\_data/landuse](http://cmip-pcmdi.llnl.gov/cmip5/forcing.html?submenuheader=2#land-use_data/landuse) data) and see the PMIP3 homepage for more information (<http://pmip3.lsce.ipsl.fr/> > PMIP3-CMIP5 Design > 0Ka Preindustrial experiment).

## **Soils:**

Option 1 (recommended). Specify as Modern. In areas where land has been created in the Pliocene reconstruction (compared to the Modern land/sea mask) extrapolate soils from the nearest modern grid box.

Option 2. Specify soils types that are consistent with Pliocene vegetation distribution.

## **West Antarctic Bathymetry:**

In Pliocene Experiment 2, specify the bathymetry of the deglaciated West Antarctic region to an average depth of 500 meters, flat, and grade this bathymetry into your modern bathymetry. For those models which are very sensitive to bathymetric alteration, do what is necessary to enable a simulation to be successfully completed.

## **PlioMIP Variables, Output Format & Data Storage:**

Model data will be stored within the PMIP2 database.

It is necessary that each participating group carefully follows PMIP2 guidelines for variables and output format. Please go to the PMIP2 web site: <http://pmip2.lsce.ipsl.fr/>

Information on the PMIP2 database and its use can be found at:  
<http://pmip2.lsce.ipsl.fr/> >> Database

Information on PMIP2 variables can be found at:  
<http://pmip2.lsce.ipsl.fr/> >> Experimental Design >> Variables

Information on PMIP2 output format can be found at:  
<http://pmip2.lsce.ipsl.fr/> >> Experimental Design >> Output format

A summary of the data flow is provided at:  
<http://pmip2.lsce.ipsl.fr/> >> Experimental Design >> Data flow

Which covers:

- Participating groups initial action (data preparation and submission)
- The subsequent role of LSCE (basic quality control (\*\*NOTE: *it is the responsibility of each participating group to carry out all necessary quality control checks prior to data submission*\*\*)) plus data ingestion and data logging)
- Data access and data use.

PlioMIP data submitted to the PMIP2 database will be secure. Only PlioMIP participants will have access to the data for the first 6 months following submission of Experiments 1 and 2.

To accommodate PlioMIP data, a few changes have been made to the PMIP2 database, as well as to the PMIP2 instructions for submitting data.

PlioMIP participants must make their data available on their ftp server or send it to the CEA ftp server. Each group will then be individually sent the exact location for the database once the first files are successfully inserted in the PlioMIP database.

The changes and any new requirements are documented below.

\* Original: PMIP2 standard experiment names:

<http://pmip2.lsce.ipsl.fr/design/experiments/standard.shtml>

\*\*New: PlioMIP standard experiment names\*\*

<i>Short name:</i>	<i>Long experiment name:</i>
PLIOMIP_EXP1_PI	Pre-industrial atmosphere-only PlioMIP experiment
PLIOMIP_EXP2_PI	Pre-industrial atmosphere-ocean PlioMIP experiment
PLIOMIP_EXP1	Pliocene atmosphere-only PlioMIP experiment
PLIOMIP_EXP2	Pliocene atmosphere-ocean PlioMIP experiment

\* Original: IPCC output requirements adaptation to PMIP2:  
[http://pmip2.lsce.ipsl.fr/design/output\\_format/ipccadapt.shtml](http://pmip2.lsce.ipsl.fr/design/output_format/ipccadapt.shtml)

\*\*New: adaptation for PlioMIP:

<experiment> part of the file names should be a lowercase version of the 'Short names' above.

The value of project\_id must be PlioMIP (instead of 'PMIP 2')

The lines 'expt\_id\_ok' lines in the PMIP2 CMOR tables should be adapted to match the PlioMIP names.

\* Choosing one's model identifier: please choose an appropriate <modelorlab> identifier,

as specified in:

<http://pmip2.lsce.ipsl.fr/database/datasub.shtml#datafname> and submit it to the PlioMIP Advisory Panel for approval.

\* The data files will be accessible on the LSCE DODS/OPeNDAP server:  
[http://pmip2.lsce.ipsl.fr/database/access/openssl.shtml](http://pmip2.lsce.ipsl.fr/database/access/.opendap.shtml)

For a Demo look in the PMIP1 DB server:  
[http://www-lscedods.cea.fr/cgi-bin/nph-dods/pmip1\\_db/](http://www-lscedods.cea.fr/cgi-bin/nph-dods/pmip1_db/)

If you have not yet registered on the pmip-announce mailing list please send an email to Jean-Yves Peterschmitt to register ==> [pmip2@lsce.ipsl.fr](mailto:pmip2@lsce.ipsl.fr)