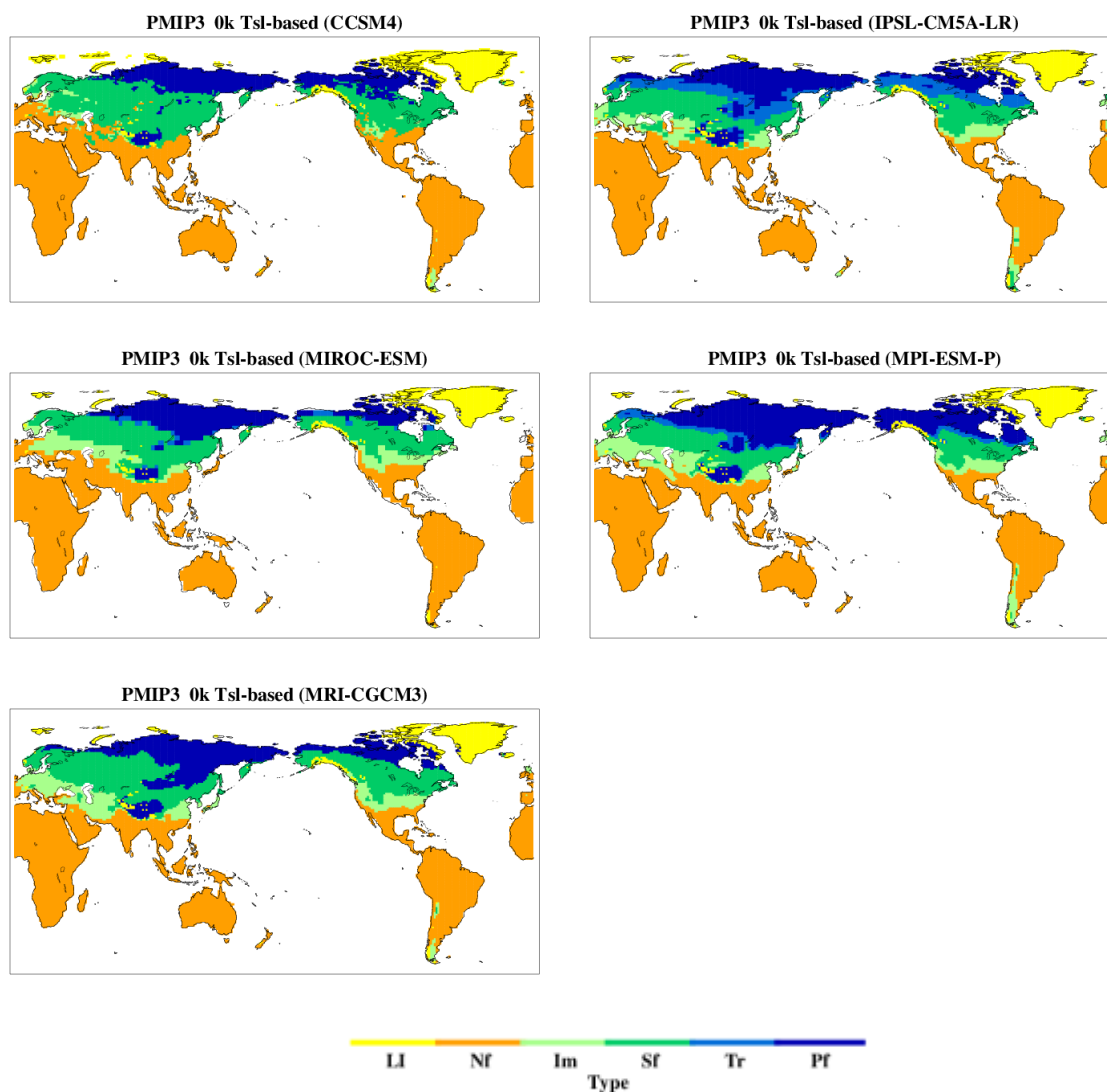


1

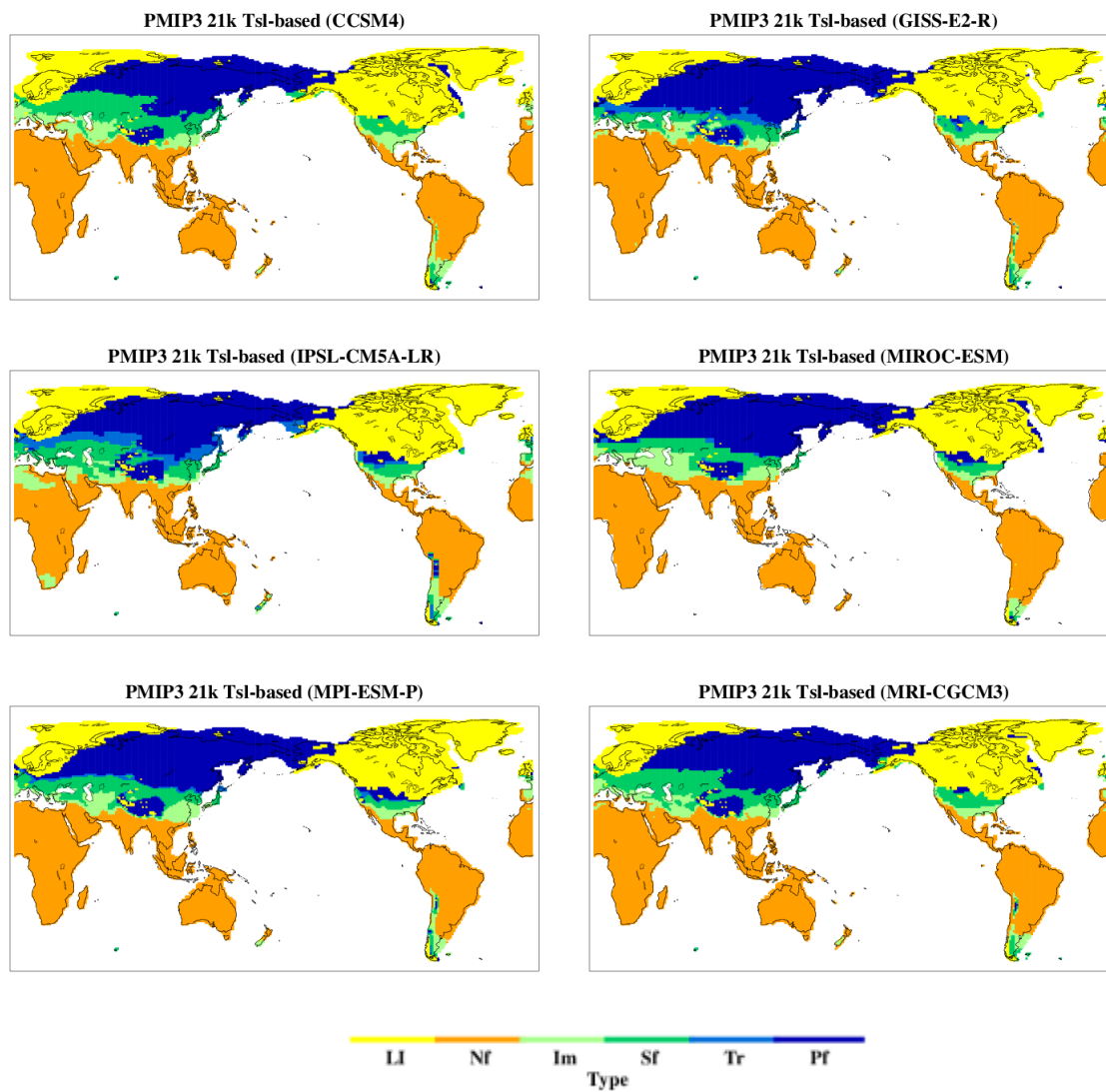


2

3 Supplementary Figure 1. Individual maps of pre-industrial frozen ground distribution
4 diagnosed from soil temperature for PMIP3 models. Model names are shown on the top of
5 each figure. Color scheme for frozen ground types is same as in Figure 2.

6

1



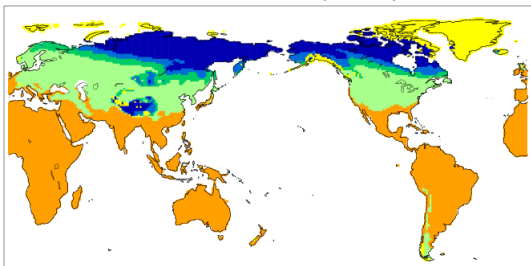
2

3 Supplementary Figure 2. Same as Supplementary Figure 1 except for LGM.

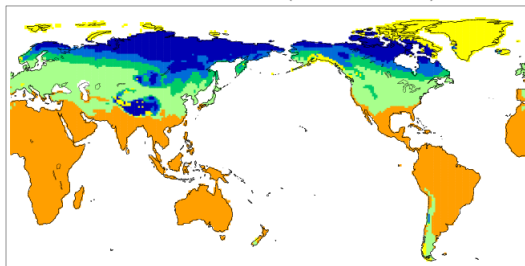
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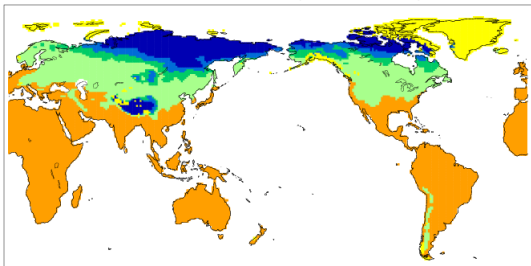
PMIP3 0k Tas-based (CCSM4)



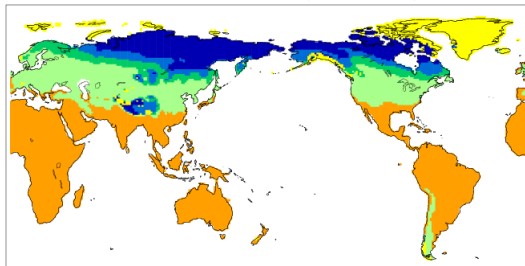
PMIP3 0k Tas-based (IPSL-CM5A-LR)



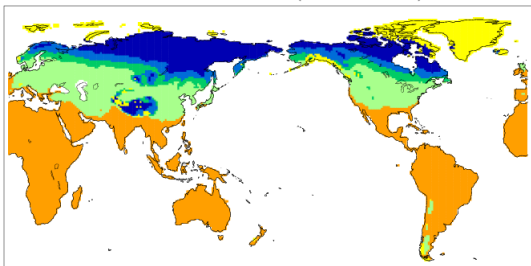
PMIP3 0k Tas-based (MIROC-ESM)



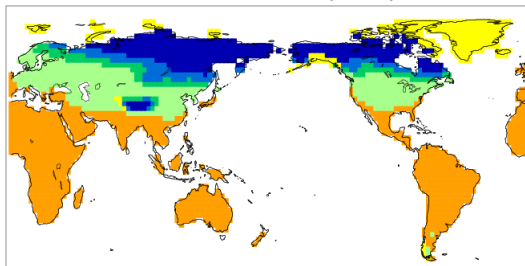
PMIP3 0k Tas-based (MPI-ESM-P)



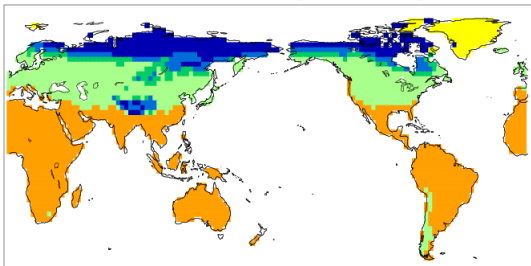
PMIP3 0k Tas-based (MRI-CGCM3)



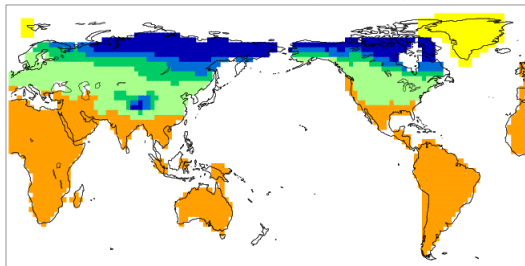
PMIP2 0k Tas-based (CCSM)



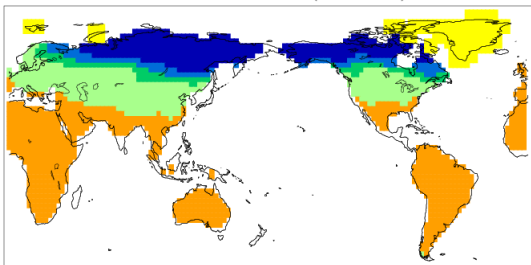
PMIP2 0k Tas-based (CNRM-CM33)



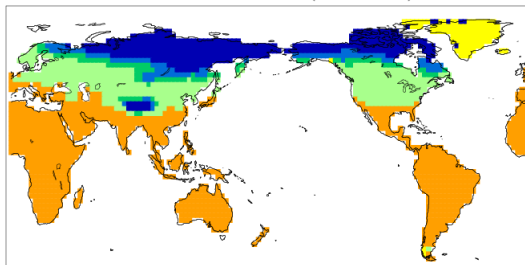
PMIP2 0k Tas-based (CSIRO1.1)

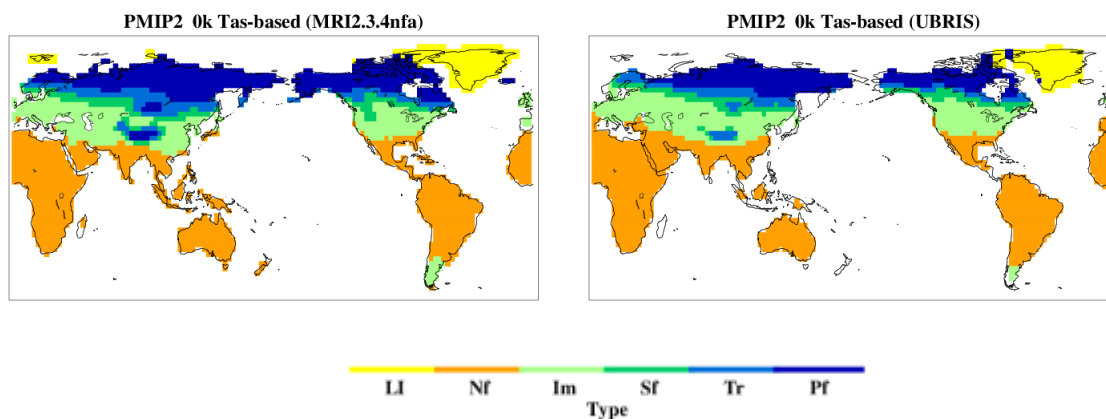


PMIP2 0k Tas-based (ECHAM5)

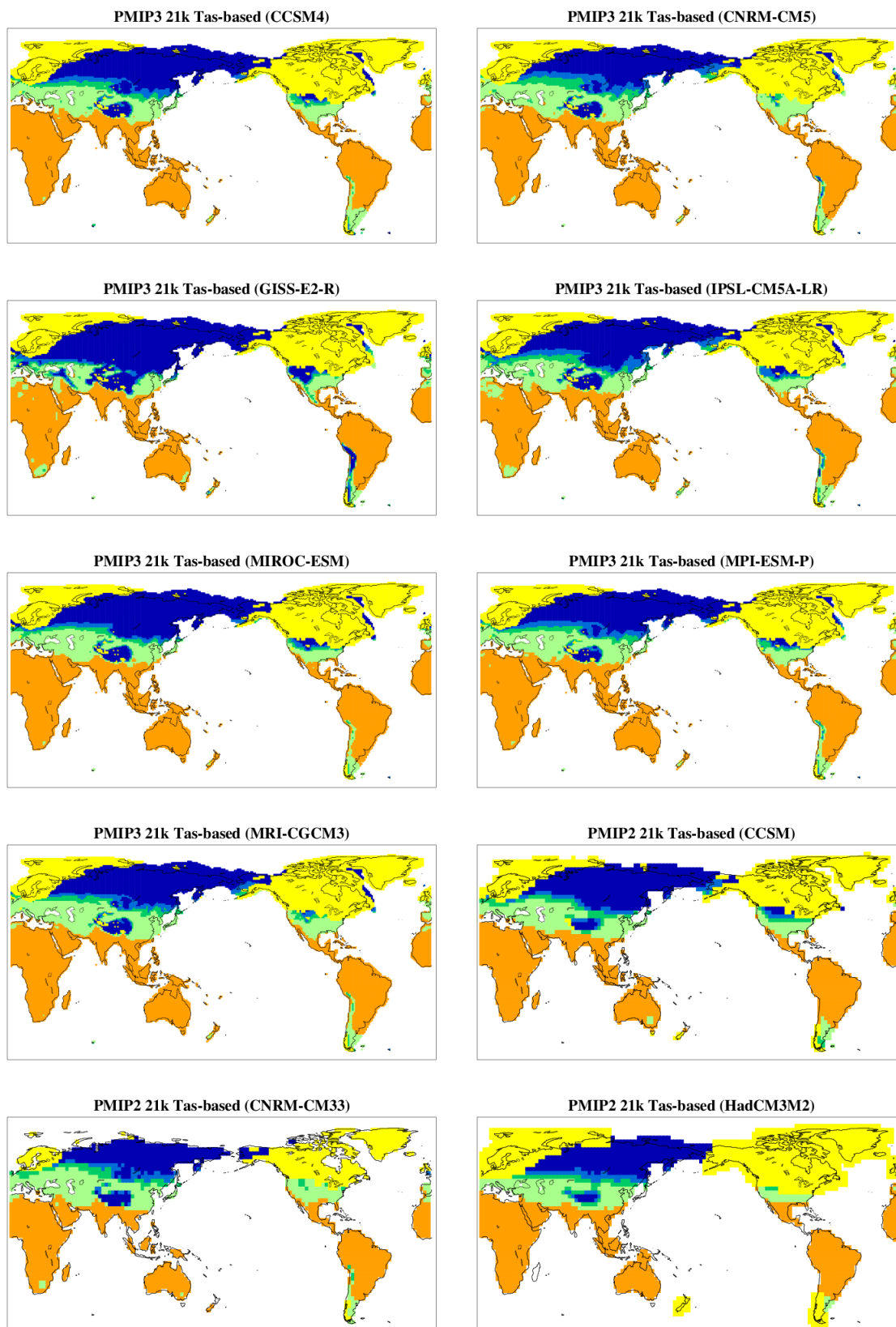


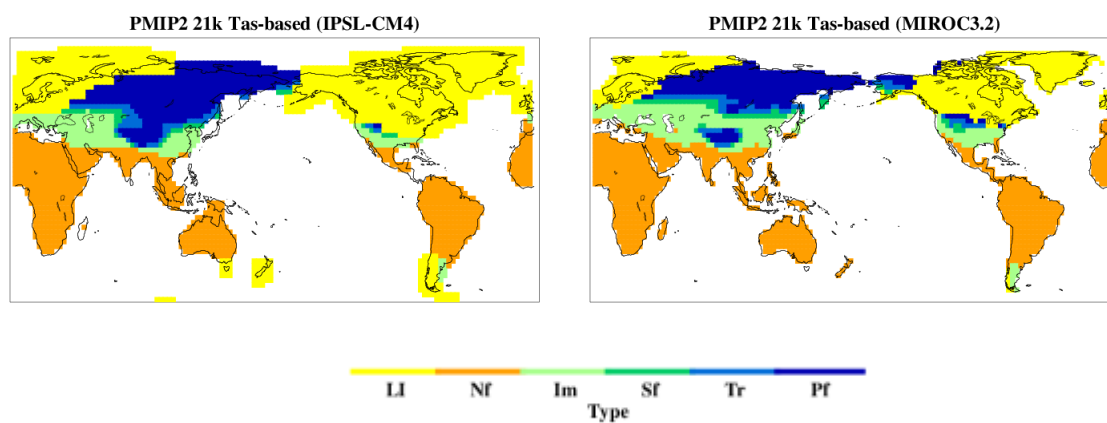
PMIP2 0k Tas-based (MIROC3.2)





Supplementary Figure 3. Individual maps of pre-industrial frozen ground distribution diagnosed from surface air temperature for PMIP3 and PMIP2 models. Model and experiment names are shown on the top of each figure. Color scheme for frozen ground types is same as in Figure 2.





1

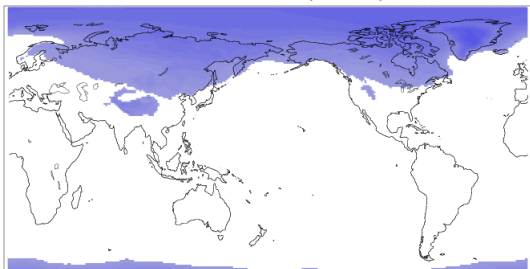
2 Supplementary Figure 4. Same as Supplementary Figure 3 except for LGM.

3

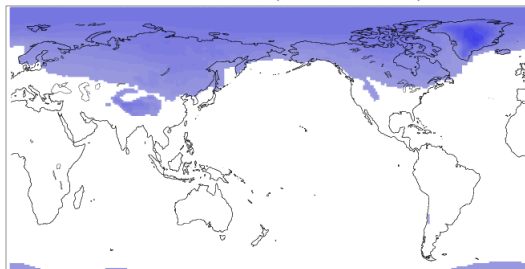
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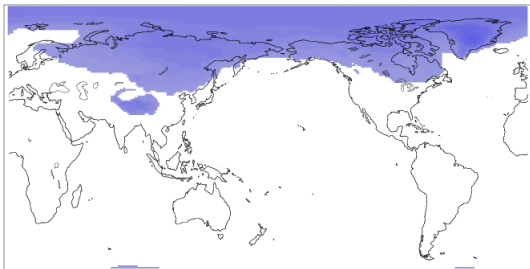
PMIP3 0k FrzIdx (CCSM4)



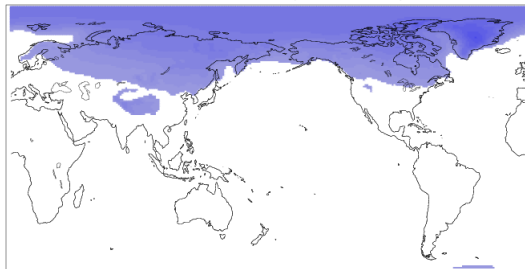
PMIP3 0k FrzIdx (IPSL-CM5A-LR)



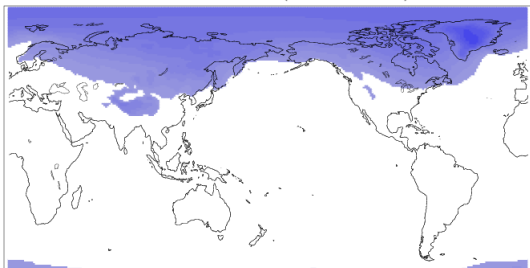
PMIP3 0k FrzIdx (MIROC-ESM)



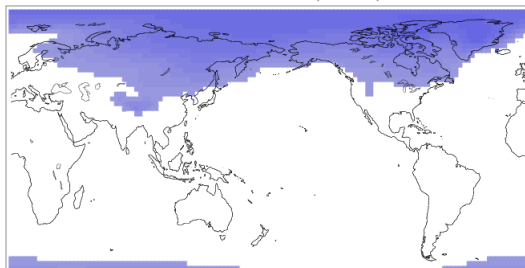
PMIP3 0k FrzIdx (MPI-ESM-P)



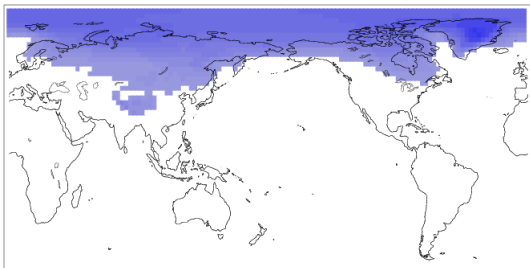
PMIP3 0k FrzIdx (MRI-CGCM3)



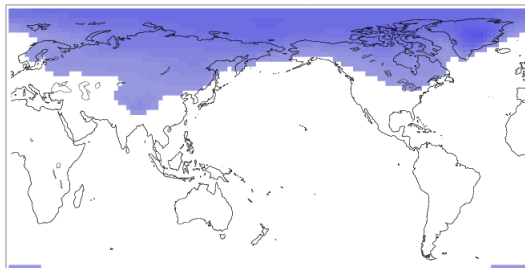
PMIP2 0k FrzIdx (CCSM)



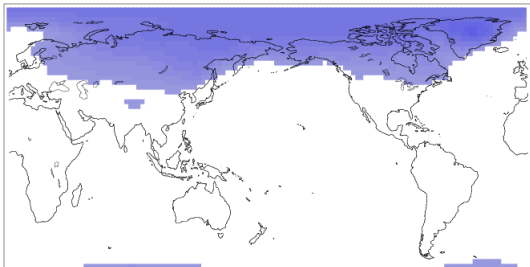
PMIP2 0k FrzIdx (CNRM-CM33)



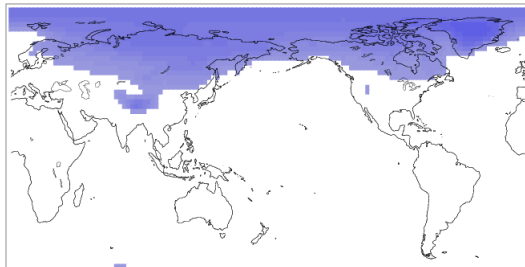
PMIP2 0k FrzIdx (CSIRO1.1)

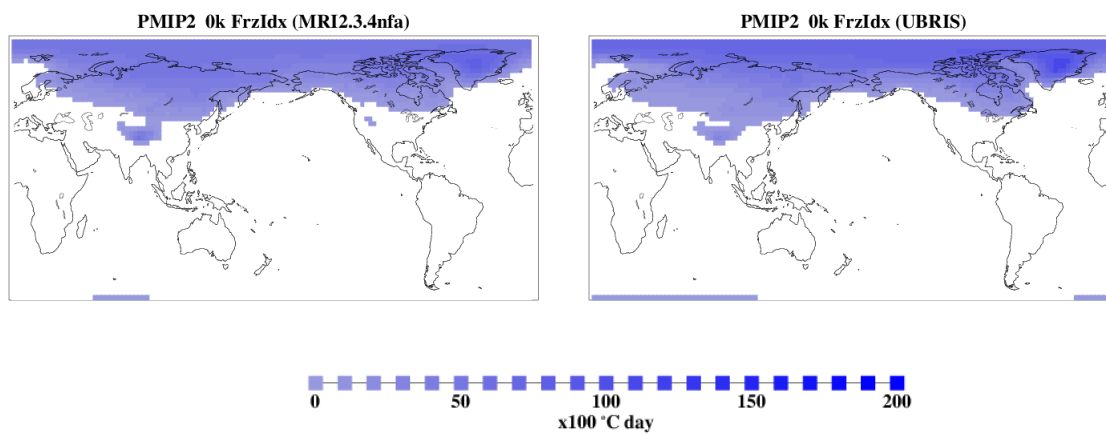


PMIP2 0k FrzIdx (ECHAM5)



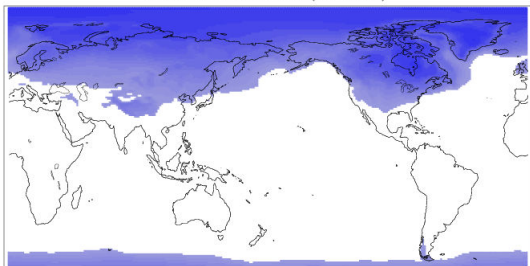
PMIP2 0k FrzIdx (MIROC3.2)



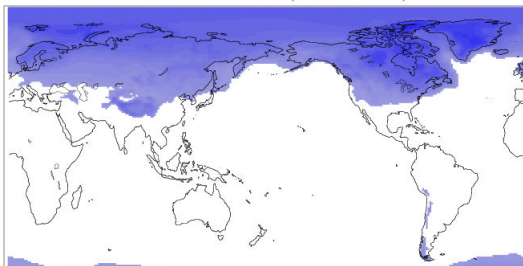


Supplementary Figure 5. Individual maps of pre-industrial freeze index for PMIP2 and PMIP3 models.

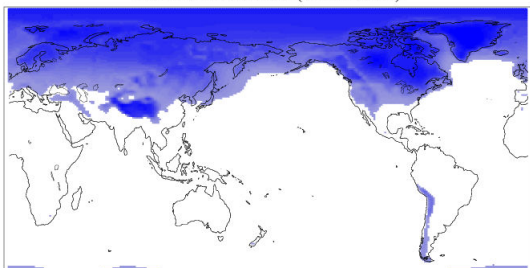
PMIP3 21k FrzIdx (CCSM4)



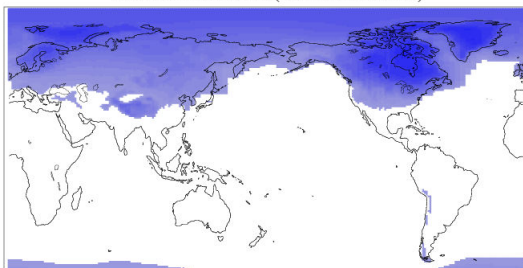
PMIP3 21k FrzIdx (CNRM-CM5)



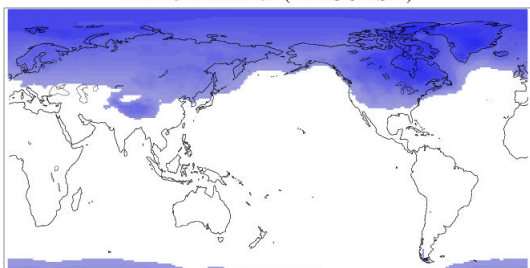
PMIP3 21k FrzIdx (GISS-E2-R)



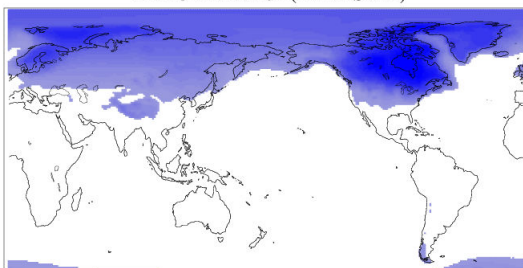
PMIP3 21k FrzIdx (IPSL-CM5A-LR)



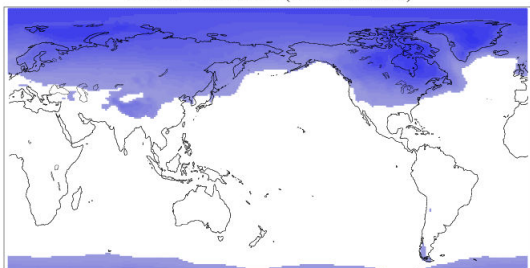
PMIP3 21k FrzIdx (MIROC-ESM)



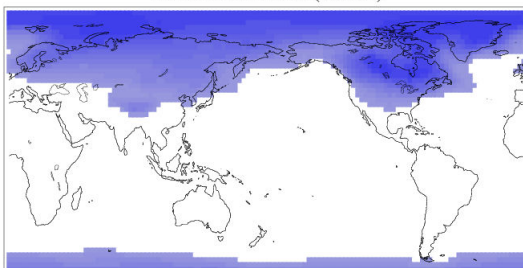
PMIP3 21k FrzIdx (MPI-ESM-P)



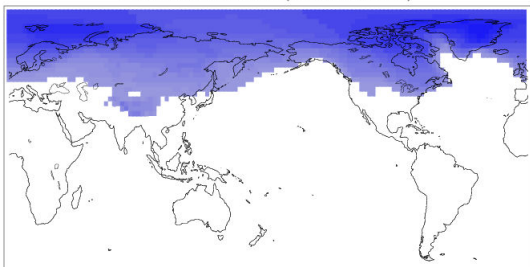
PMIP3 21k FrzIdx (MRI-CGCM3)



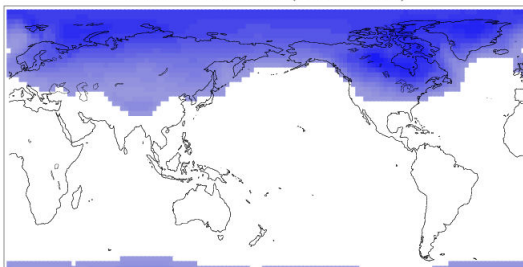
PMIP2 21k FrzIdx (CCSM)

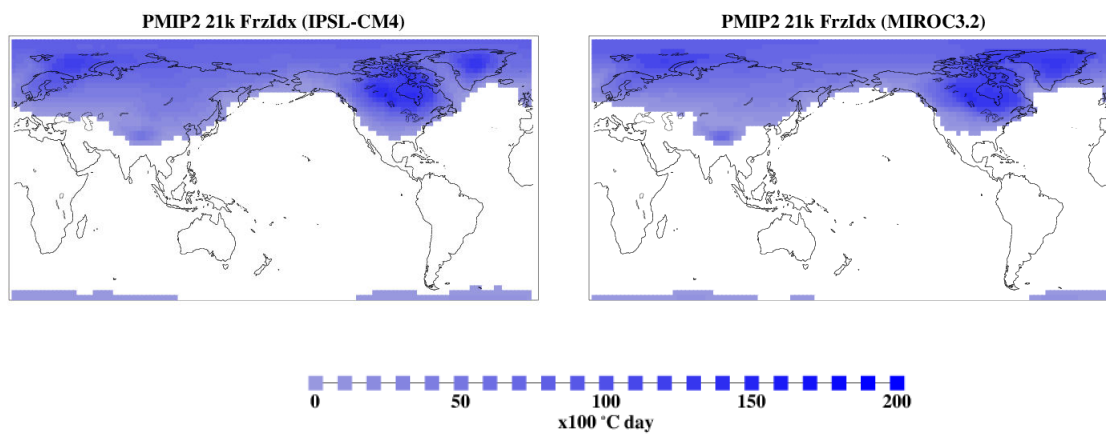


PMIP2 21k FrzIdx (CNRM-CM33)



PMIP2 21k FrzIdx (HadCM3M2)





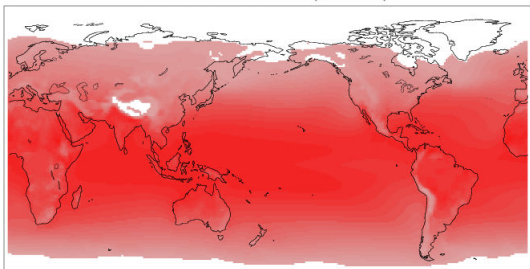
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2 Supplementary Figure 6. Same as Supplementary Figure 5 except for LGM.

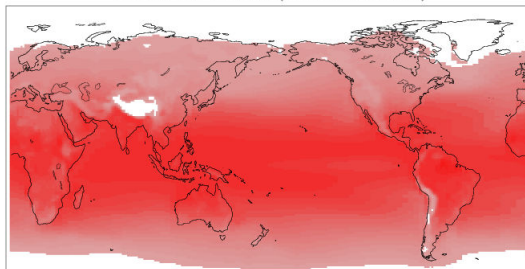
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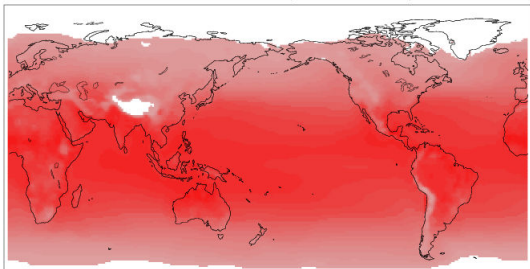
PMIP3 0k ThwIdx (CCSM4)



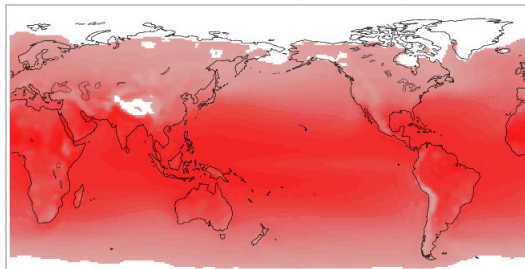
PMIP3 0k ThwIdx (IPSL-CM5A-LR)



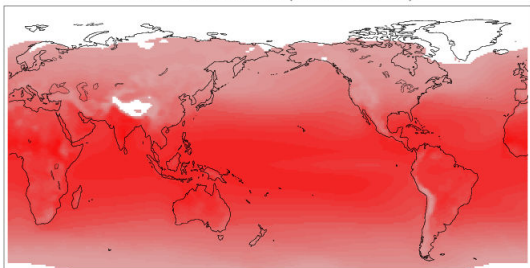
PMIP3 0k ThwIdx (MIROC-ESM)



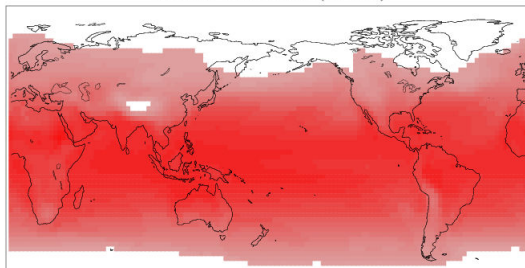
PMIP3 0k ThwIdx (MPI-ESM-P)



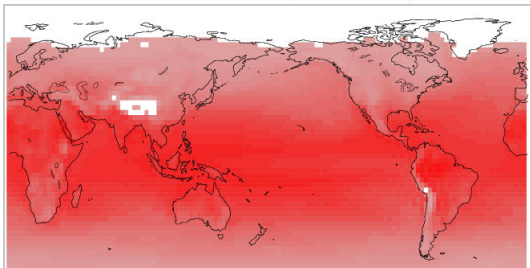
PMIP3 0k ThwIdx (MRI-CGCM3)



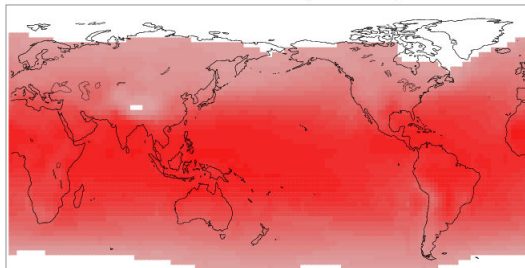
PMIP2 0k ThwIdx (CCSM)



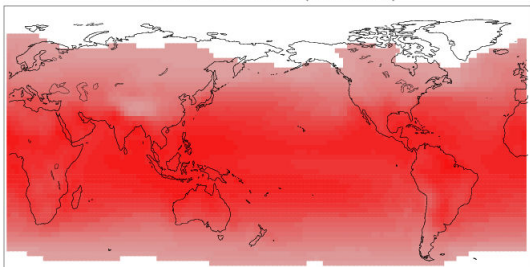
PMIP2 0k ThwIdx (CNRM-CM33)



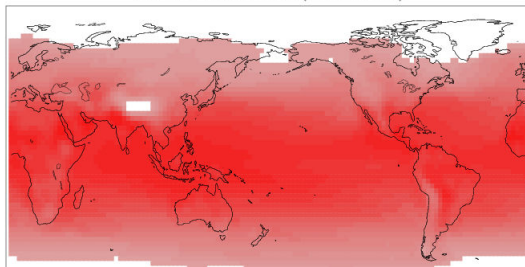
PMIP2 0k ThwIdx (CSIRO1.1)

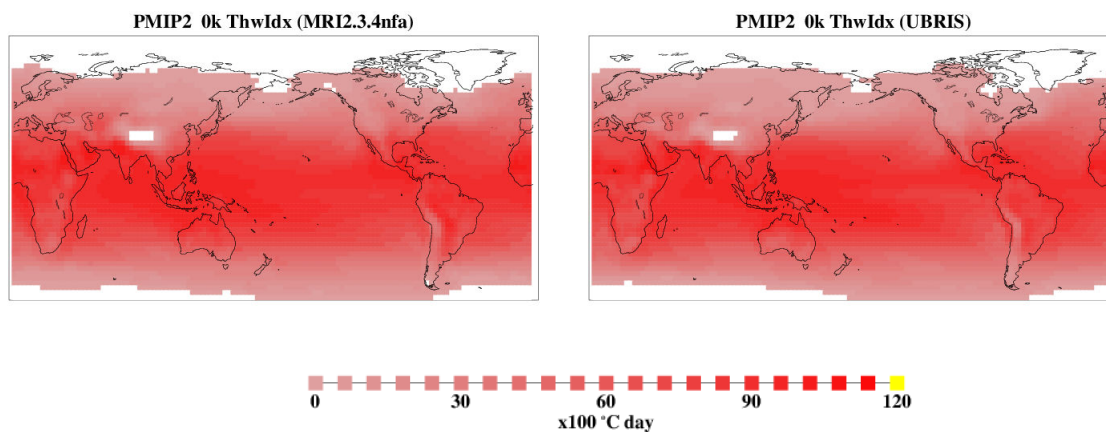


PMIP2 0k ThwIdx (ECHAM5)



PMIP2 0k ThwIdx (MIROC3.2)





1

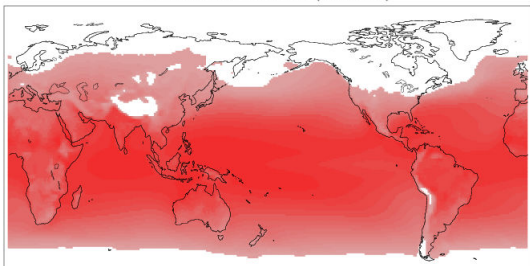
2 Supplementary Figure 7. Same as Supplementary Figure 5 except for thaw index.

3

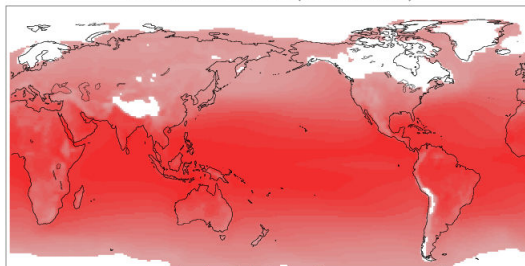
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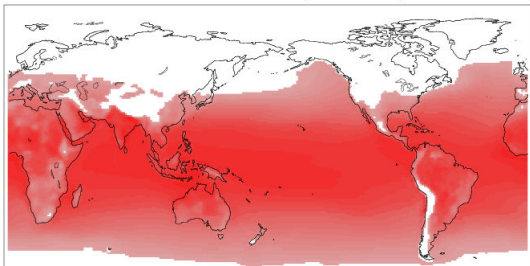
PMIP3 21k ThwIdx (CCSM4)



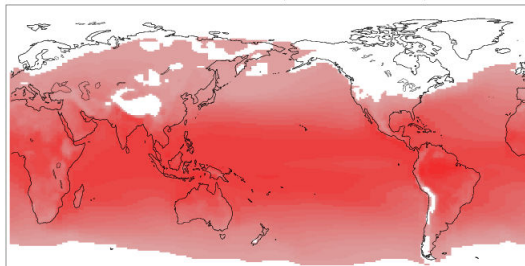
PMIP3 21k ThwIdx (CNRM-CM5)



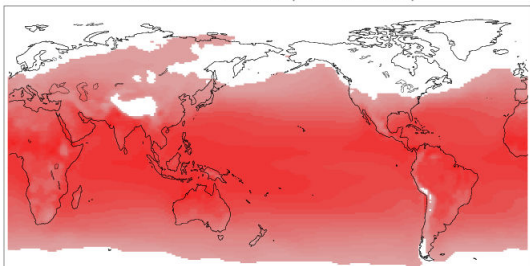
PMIP3 21k ThwIdx (GISS-E2-R)



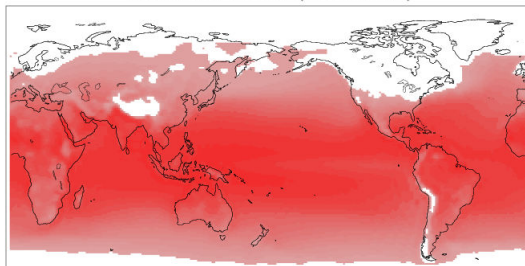
PMIP3 21k ThwIdx (IPSL-CM5A-LR)



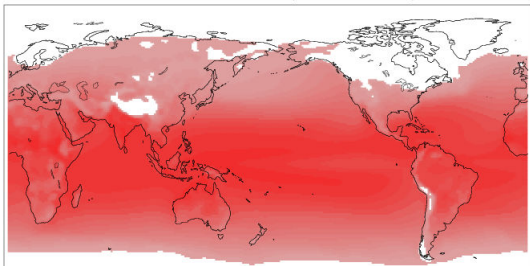
PMIP3 21k ThwIdx (MIROC-ESM)



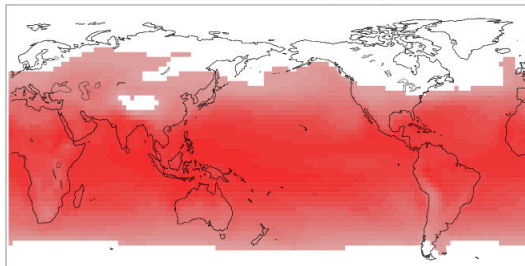
PMIP3 21k ThwIdx (MPI-ESM-P)



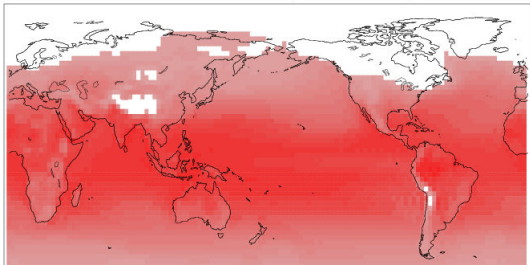
PMIP3 21k ThwIdx (MRI-CGCM3)



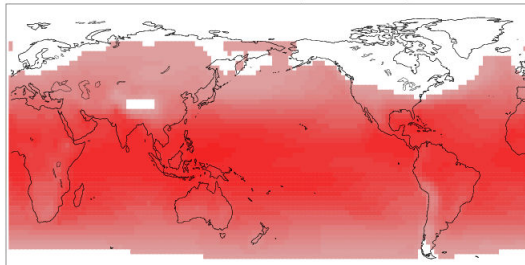
PMIP2 21k ThwIdx (CCSM)

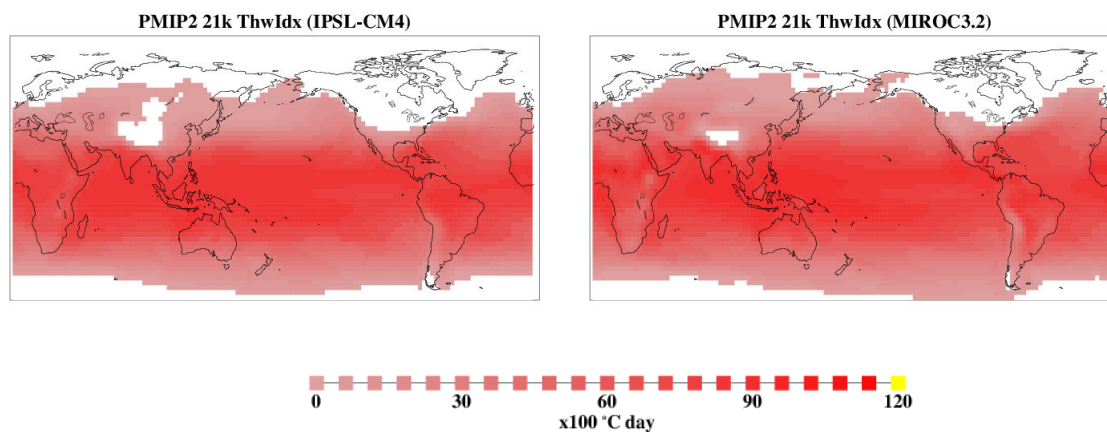


PMIP2 21k ThwIdx (CNRM-CM33)



PMIP2 21k ThwIdx (HadCM3M2)





1

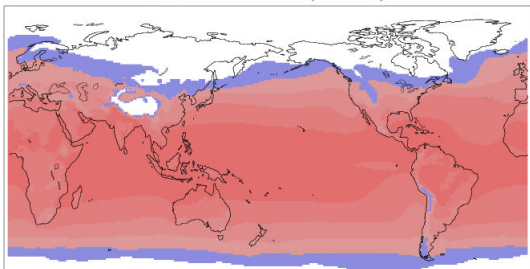
2 Supplementary Figure 8. Same as Supplementary Figure 7 except for LGM.

3

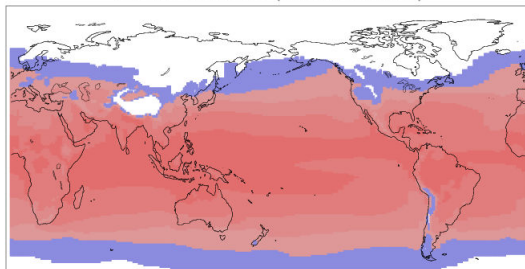
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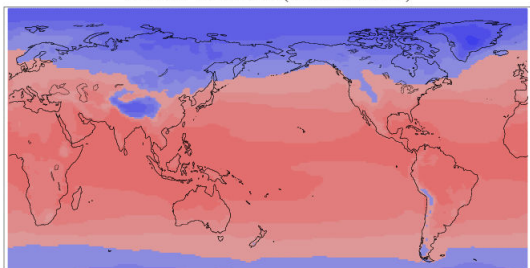
PMIP3 0k MAAT (CCSM4)



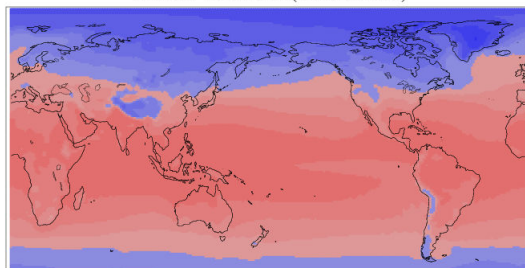
PMIP3 0k MAAT (IPSL-CM5A-LR)



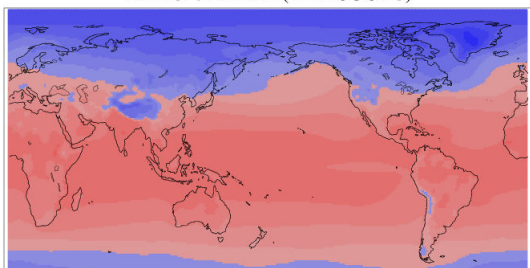
PMIP3 0k MAAT (MIROC-ESM)



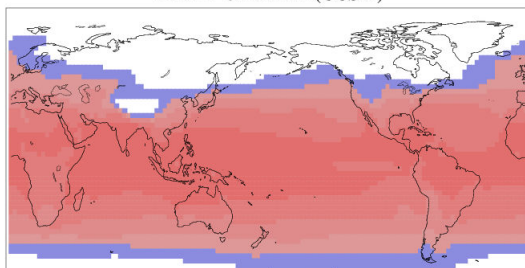
PMIP3 0k MAAT (MPI-ESM-P)



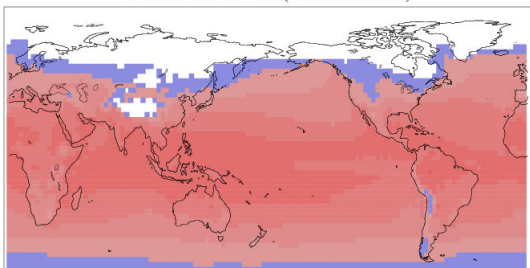
PMIP3 0k MAAT (MRI-CGCM3)



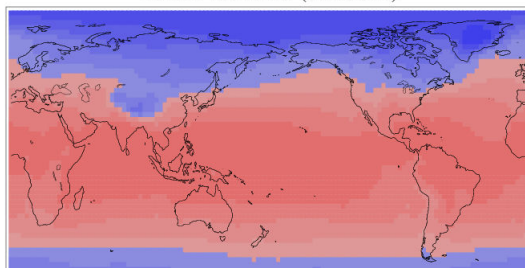
PMIP2 0k MAAT (CCSM)



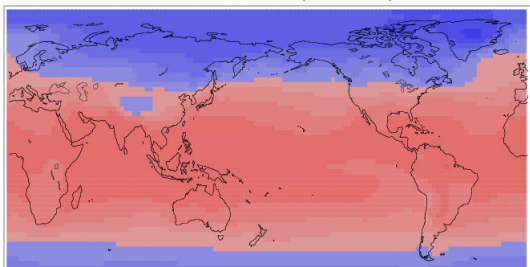
PMIP2 0k MAAT (CNRM-CM33)



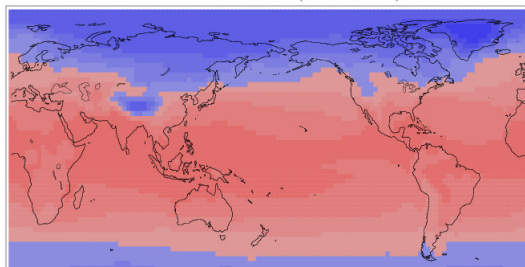
PMIP2 0k MAAT (CSIRO1.1)

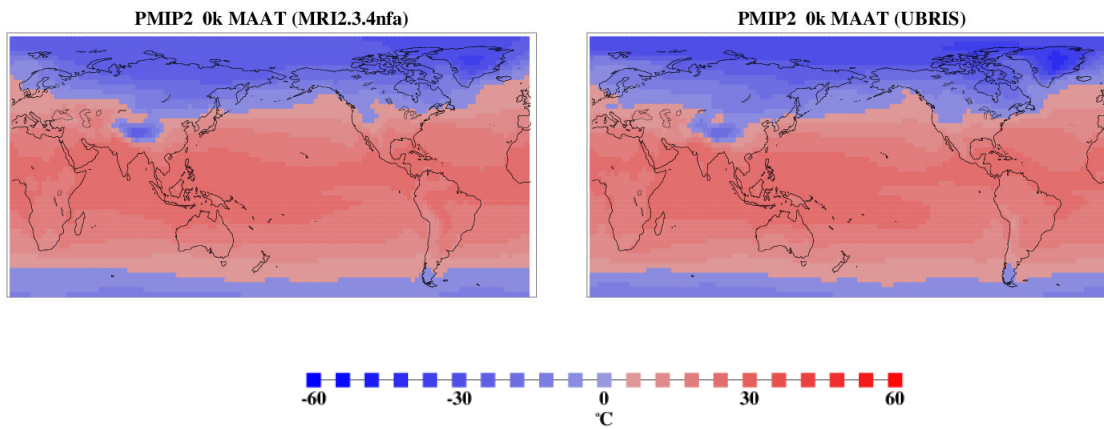


PMIP2 0k MAAT (ECHAM5)



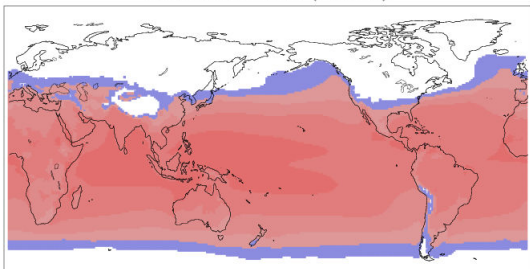
PMIP2 0k MAAT (MIROC3.2)



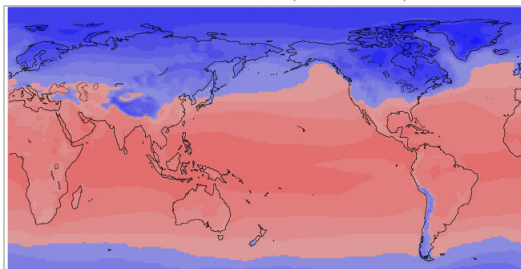


Supplementary Figure 9. Same as Supplementary Figure 5 except for mean annual air temperature (MAAT).

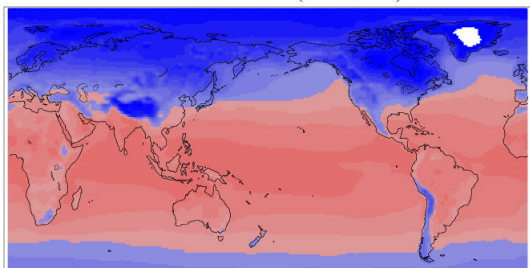
PMIP3 21k MAAT (CCSM4)



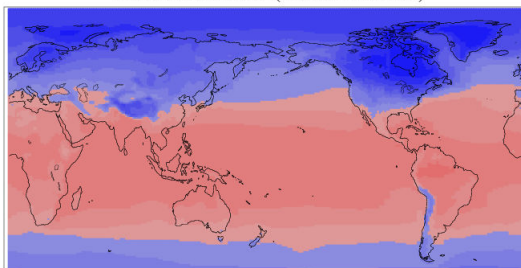
PMIP3 21k MAAT (CNRM-CM5)



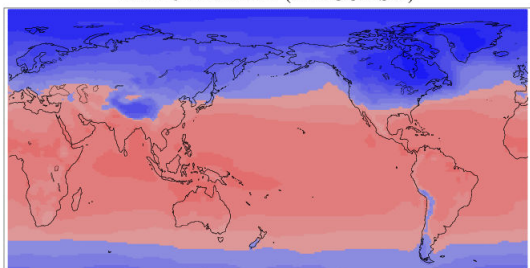
PMIP3 21k MAAT (GISS-E2-R)



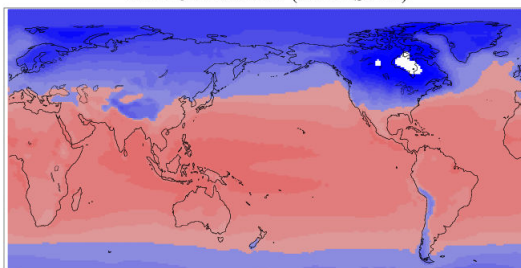
PMIP3 21k MAAT (IPSL-CM5A-LR)



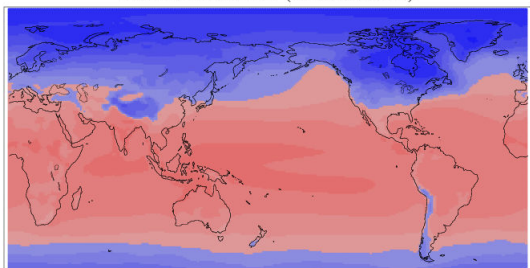
PMIP3 21k MAAT (MIROC-ESM)



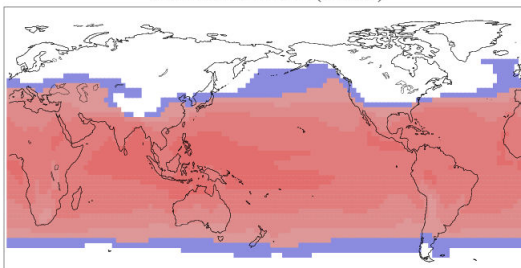
PMIP3 21k MAAT (MPI-ESM-P)



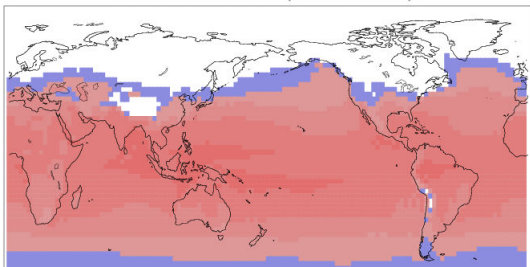
PMIP3 21k MAAT (MRI-CGCM3)



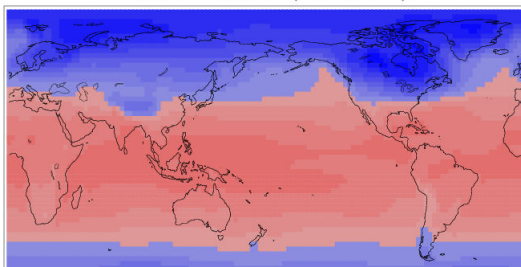
PMIP2 21k MAAT (CCSM)

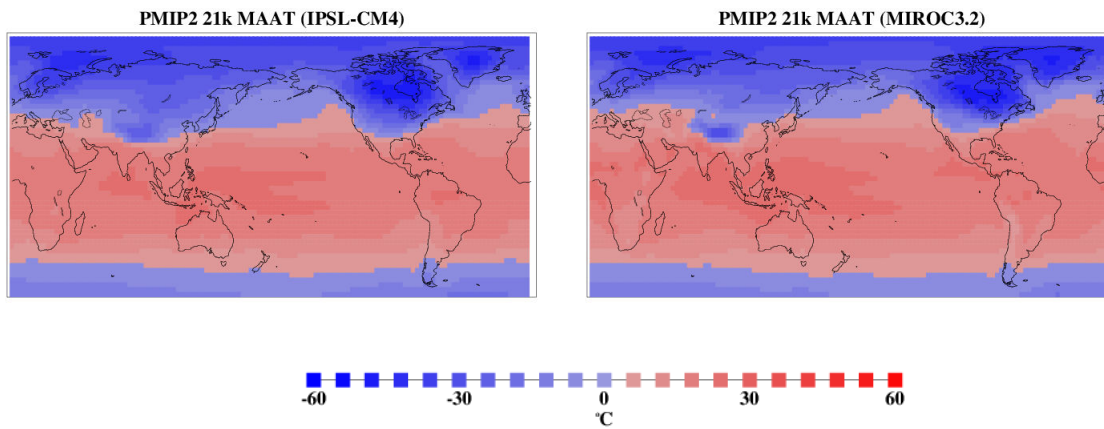


PMIP2 21k MAAT (CNRM-CM33)



PMIP2 21k MAAT (HadCM3M2)





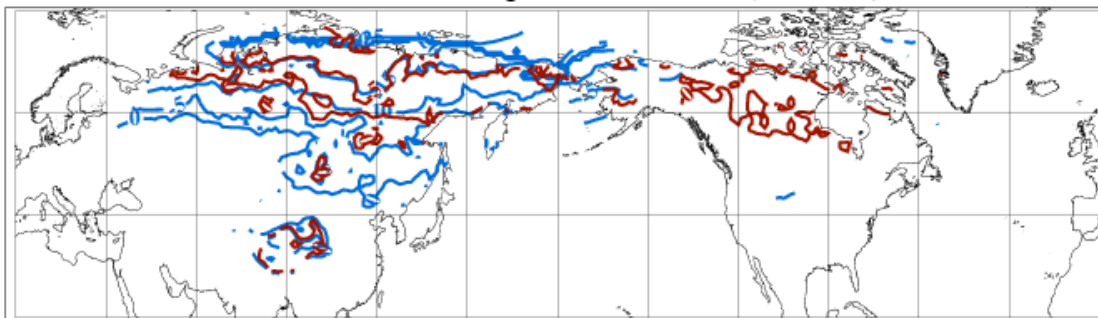
1

2 Supplementary Figure 10. Same as Supplementary Figure 9 except for LGM.

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4

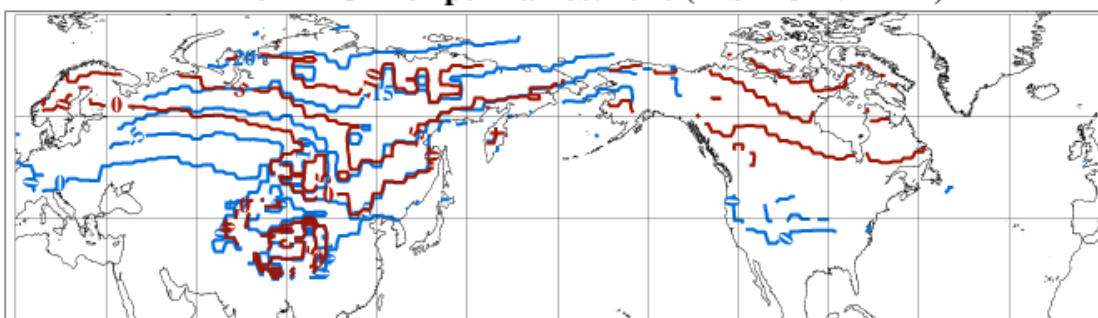
PMIP3 MAGT for permafrost zone (CCSM4)



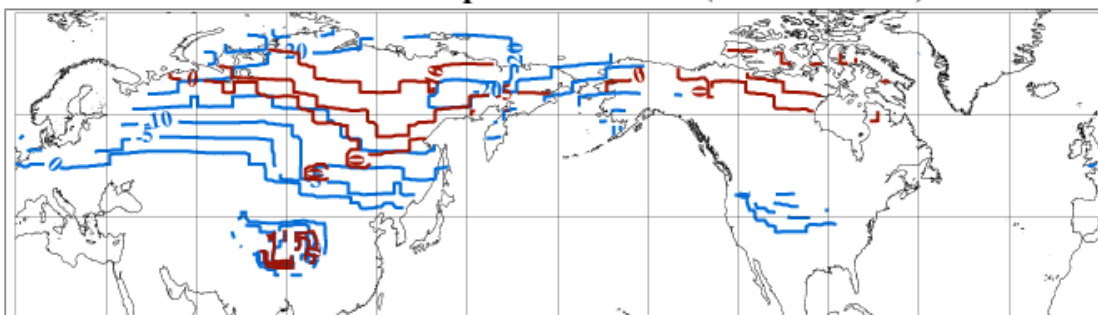
PMIP3 MAGT for permafrost zone (GISS-E2-R)



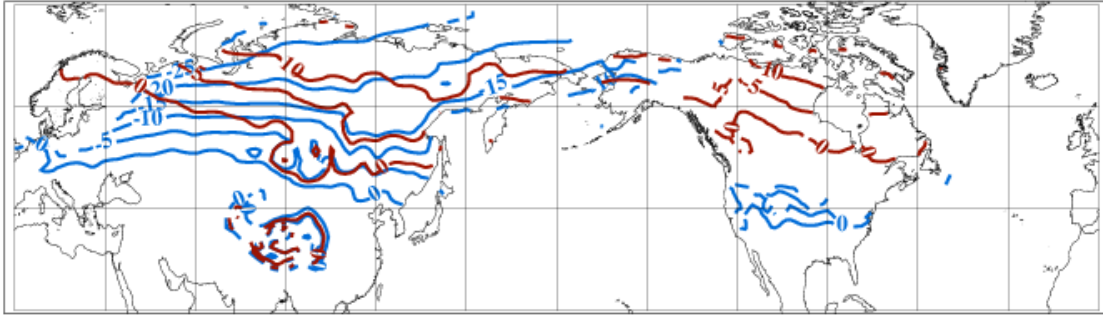
PMIP3 MAGT for permafrost zone (IPSL-CM5A-LR)



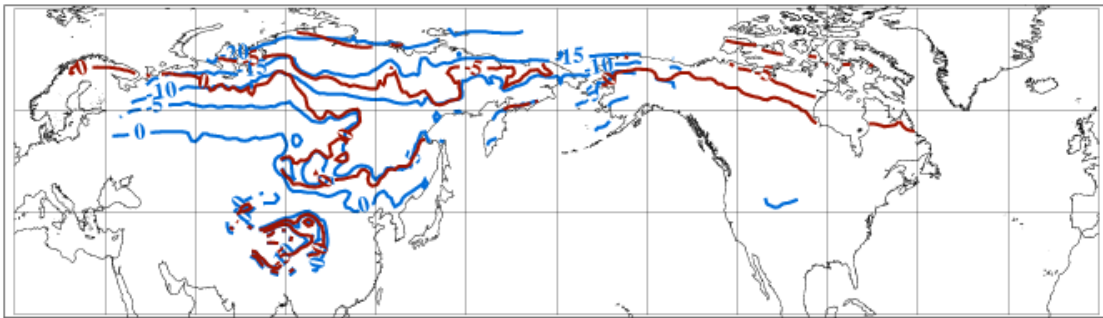
PMIP3 MAGT for permafrost zone (MIROC-ESM)



PMIP3 MAGT for permafrost zone (MPI-ESM-P)

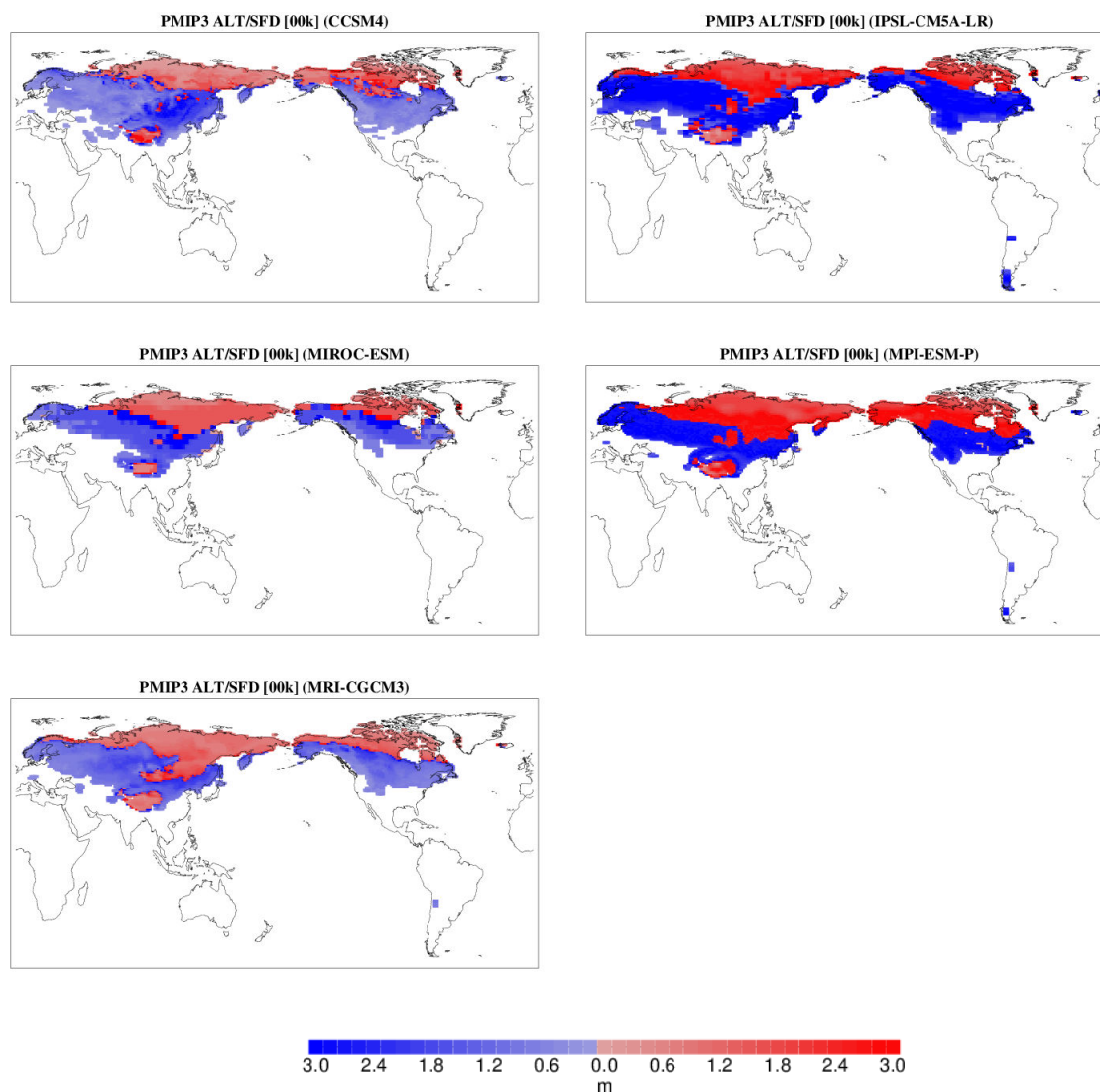


PMIP3 MAGT for permafrost zone (MRI-CGCM3)



Supplementary Figure 11. Individual maps of mean annual ground temperature (MAGT) for the pre-industrial (red) and LGM (blue) period for the PMIP3 models. Model names are shown on the top of each figure. Contour interval is 5 °C. Only temperatures below 0 °C on the exposed land areas are shown.

1



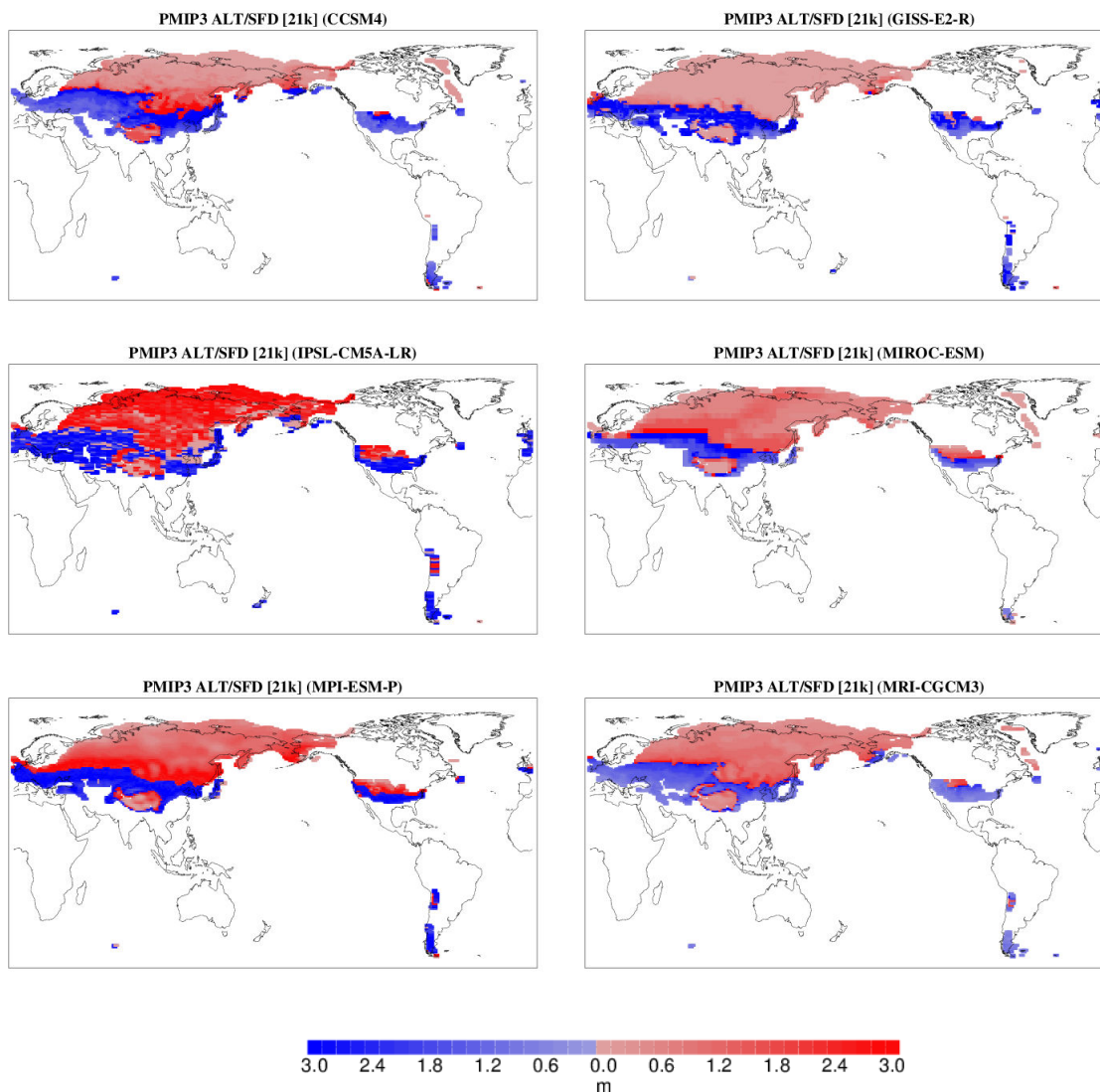
2

3 Supplementary Figure 12. Individual maps of pre-industrial maximum active layer depth (in
 4 red; for permafrost zones) and seasonal freezing depth (in blue; for seasonally frozen ground
 5 zones) for the PMIP3 models.

6

7

1



2

3 Supplementary Figure 13. Same as Supplementary Figure 12 except for LGM.