Newsletter December 2023

Dear PalMod members and friends,

I hope you are all well and looking forward to taking a well-earned break after another long and exciting year.

The last Newsletter in 2023 marks a transition between PalMod Phase II and PalMod Phase III. While some work packages from Phase II are still running until mid-2024, several work packages from Phase III have already started.

Nevertheless, **M&D** from Phase II are still open as objectives to be achieved (see the usual list later). It is very likely that many of the outstanding M&D have become obsolete during the project period or that M&D have been already achieved.
Please let me know so that I can clean the list.

Moreover, please have an eye on the **final reports** that have to be submitted to the Projektträger. **And, don't forget to send me a copy**.

One last point:
PalMod started to organize a **series of talks** together with PMIP Wings. You can find the upcoming dates always on the PalMod website (www.palmod.de), and the recording of the past talks on YouTube (https://www.youtube.com/playlist?app=desktop&list=PLKU3G-23arvmLlXJRLXy-jm_7FuAPCQ8U&cbrd=1).

1. Welcome new PalMod Colleagues

- Katharina Six   (MPI)   supports WP 1.3
- Pengyang Song   (AWI)   supports WP 1.3
- Reyko Schattschneider   (GFZ)   supports WP 1.4
- Yuchen Sun   (AWI)   supports WP 3.2
- Elisa Ziegler   (Uni Tübingen) supports WP 3.3

2. SAVE THE DATE: General Assembly 2024

We will most likely will have our PalMod Phase III Kick-Off Meeting on
Tuesday, June 11th & Wednesday, June 12th 2024 in **Hamburg**.
Agenda and details will follow timely

3. PalMod DKRZ Compute Resources for 2024

Subproject	Requested CPU [n*h]	Granted CPU [n*h]	Requested /WORK [TB]	Granted /WORK [TB]
WG1, ba0989	2.076.400	974.494	1.308	1.006
WG2, bm1030	762.000	358.032	2.093	1.800
DM, bk1192	25.000	13.460	250	250
Total	**2.863.400**	**1.345.986**	**3.651**	**3.056**

Please note that the above values are still subject to change.

The high reduction in computing time is due to the high proportion of resources expired in the past year.

4. Update on Milestones and Deliverables (@04.12.2023)

It is very possible, and in the case of some severely overdue M&Ds very likely, that they turned out as not being useful. In this case, please let me know and I will remove them from the list. If you meet a M or D, please let me know (kfieg@geomar.de), so I can remove it from the list!

Deadlines until end of 2022

WP	WG	Due To	DAYS	Responsible	Task
WG2	WP2.2 D1	30.12.22	-339	MPI	Manuscript on feedbacks between terrestrial biosphere and climate for the deglaciation, glacial inception, and MIS3
WG2	WP2.2 D2	30.12.22	-339	PIK	Transient simulation of the last glacial cycle with CLIMBER-X driven only by orbital forcing (jointly with WP1.X).
WG3	WP3.2 D4	30.12.22	-339	AWI	Proxy-Model-comparison of global palaeotemperatures reconstructed from oxygen isotopes in lake sediment cores
WG3	WP3.2 D5	30.12.22	-339	AWI	Pollen-based biome and climate reconstruction globally available for 130 – 0 ka
WG3	WP3.2 M4	30.12.22	-339	AWI	Synthesis of terrestrial palaeoclimate reconstructions by carbonate and silica oxygen isotopes, focusing on lake sediment cores with a regional focus on the Arctic
WG3	WP3.2 M7	30.12.22	-339	AWI	Drivers of vegetation dynamics investigated
WG3	WP3.3 D6	30.12.22	-339	AWI-P	Publication describing the results for MIS3 and the full glacial cycle
WG3	WP3.3 M5	30.12.22	-339	AWI	Global synthesis and comparison of the spectrum of water isotope variability for MIS3 and full glacial cycle finished
CC	CC2 D6	31.12.22	-338	HZG	Final PalMod phase II paleo-data metadata table
CC	CC2 D7	31.12.22	-338	HZG	Documentation of ensemble model-data comparison of deglacial simulation ensemble from PalMod phase II
CC	CC2 M7	31.12.22	-338	HZG	Standardization of paleo data finished (documentation contained in DMP)
CC	CC2 M8	31.12.22	-338	HZG	Publication of quality checked paleo data and enabling of version control workflow for future updates incl. persistent identifiers
CC	CC2 D12	31.12.22	-338	UHD, Uni Bonn, HZG	Release of v1 of the toolbox and presentation of the results for all publicly released PalMod simulations on a dedicated website
CC	CC2 M11	30.10.22	-400	U Bonn	precipitation evolution in deglaciation simulation against pollen synthesis / macro fossils available
CC	CC2 M9	31.12.22	-338	HZG	Application of ensemble tools to PalMod phase II simulations and PalMod phase II marine paleo data synthesis
WG2	WP2.2 D3	30.09.22	-430	UNI HH	Manuscript about the role of shelf weathering on land-ocean biogeochemical matter fluxes
WG3	WP3.2 D6	30.09.22	-430	MUN	Global ice sheet calibration of Termination II and I
WG3	WP3.2 M10	30.09.22	-430	MUN	Global ice sheet calibration for Termination II
WG2	WP2.2 M2	30.06.22	-522	MPI	Biogeophysical and biogeochemical feedbacks between terrestrial biosphere and climate are assessed
WG3	WP3.2 M6	30.06.22	-522	AWI	Vegetation dynamics analysed including model-proxy comparison
WG3	WP3.2 M9	30.06.22	-522	MUN	Inclusion of some of the major last glacial cycle ice caps
WG3	WP3.3 D3	30.06.22	-522	Marum, AWI-B	Transient simulations including water isotopes for last glacial inception
WG2	WP2.2 M6	30.03.22	-614	UNI HH	Manuscript about the role of shelf weathering on land-ocean biogeochemical matter fluxes
WG3	WP3.2 M8	30.03.22	-614	MUN	Revised calibrated distribution of last glacial cycle ice sheet chronologies and associated 1D regional Earth models
WG3	WP3.3 M2	30.03.22	-614	Marum, AWI-B	Transient simulations of the Holocene and last glacial inception set up and ready to run
WG2	WP2.2 M5	30.12.21	-704	UNI HH	Mapping of the geochemical and lithological characteristics of the continental shelves
WG1	WP1.2 M3	30.09.22	-430	AWI, Marum, MPI	Data from first asynchronosly coupled MIS3 simulations available to the PalMod community
WG1	WP1.3 D1	31.12.22	-338	PIK	Providing early diagnostics in the ice sheet-climate system based on full glacial cycle CLIMBER-X simulations
WG2	WP2.2 M3	31.12.22	-338	PIK	Quantification of carbon cycle feedbacks operating through shelf processes during glacial inception and deglaciation with CLIMBER-X

Deadline between 01/23 – 08/23

WP	WG	Due To	DAYS	Responsible	Task
CC	CC2 M12	31.08.23	-95	U Bonn	Probabilistic evaluation of temperature and precipitation trend patterns and abrupt changes in PalMod phase II deglaciation simulation ensemble against pollen synthesis from PalMod phase I
CC	CC2 D3	28.02.23	-279	DKRZ, HZG	Final release of DMP
CC	CC2 M2	28.02.23	-279	DKRZ	CMORization finished (documentation contained in DMP)
CC	CC2 M3	28.02.23	-279	DKRZ	Quality checks of model output and publication in ESGF and long-term archiving in WDCC incl. DataCite DOI assignment (documentation contained in DMP)
WG1	WP1.3 D3	30.08.23	-96	AWI, Marum, MPI	Non- Accelerated simulations of the last glacial inception with GCM-based ice sheet - solid earth - climate models
CC	CC1 D4	31.07.23	-126	MPI	Study on the outburst flood and African Humid Period lake feedback hypotheses
CC	CC1 D5	31.07.23	-126	MPI	Study on the role of land-sea carbon and nutrient transfer related to changes in sea level for CO2 variations on glacial timescales
CC	CC1 D7	31.10.23	-34	PIK	Study on simulating the last glacial cycle with PISM using the PICO "pop-up" model
CC	CC2 D9	30.04.23	-218	Uni Bonn	Plugin for Bayesian framework of spatio-temporal evaluations documented and ready for integration in toolbox
WG1	WP1.1 M2	31.03.23	-248	AWI, Marum, MPI	Analysis of control factors for the sequence of deglaciation key events
WG1	WP1.1 M3	30.06.23	-157	AWI, Marum, MPI	Benchmarked state conditions of LGM and deglacial key intervals via element cycles
WG1	WP1.2 D1	30.06.23	-157	AWI, Marum, MPI	Reports on the interplay between DO cycles and HE based on fully coupled transient simulations
WG1	WP1.3 D2	30.03.23	-249	AWI, Marum, MPI	Accelerated ice sheet - solid earth - MIS 5.2climate simulations towards
WG1	WP1.3 D4	31.08.23	-95	AWI, Marum, MPI, PIK	Model - data evaluation
WG2	WP2.3 D2	30.04.23	-218	MPI-M	Publications on methane during MIS 3 and glacial inception submitted
WG2	WP2.3 M2	30.04.23	-218	MPI-M	Transient experiment MIS3 performed, publication draft
WG1	WP1.2 M4	30.06.23	-157	AWI, Marum, MPI	Data from first synchronosly coupled simulations available to the PalMod community (prescribed CO2)
WG1	WP1.4 M6	31.10.23	-34	GEOMAR	Run FOCI with biogeochemistry component (TRACY-MOPS) and Nest 2
WG1	WP1.4 D4	31.07.23	-126	GEOMAR	Sensitivity of Southern Ocean circulation and deep convection to eddy and diffusion parameterisation yielding parameterisation suggestions for WP1.1 - 1.3
WG1	WP1.3 M4	30.10.23	-35	PIK	Analysis of climate and carbon cycle feedbacks
WG2	WP2.1 M1	30.03.23	-249	AWI	Adjust REcoM model for simulating prognostic atmospheric CO2 concentrations, including fluxes from weathering, and volcanism.
WG2	WP2.1 M2	30.03.23	-249	AWI	Include iron sources from marine shelves, rivers, hydrothermal activity and sea ice in REcoM

5. New PalMod Paper

PalMod Paper

Bagge, M., Klemann, V., Steinberger, B., Latinović, M., and Thomas, M. (2021). Glacial-isostatic adjustment models using geodynamically constrained 3D Earth structures. Geochem. Geophys. Geosys., 22, e2021GC009853. doi:10.1029/2021GC009853

Bagge, M., Klemann, V., Steinberger, B., Latinović, M., Thomas, M. (2020). 3D Earth structures for glacial-isostatic adjustment models. V. 1.0. GFZ Data Services. doi:10.5880/GFZ.1.3.2020.004

Heaton, T.J., Butzin, M.,m Bard, E., Bronk Ramsey, C., Hughen, K. A., Köhler, P., & Reimer, P. J. (2023): MARINE RADIOCARBON CALIBRATION IN POLAR REGIONS: A SIMPLE APPROXIMATE APPROACH USING MARINE20. Radiocarbon, Vol. 65, Nr 4, 2023, p 848–875. DOI:10.1017/RDC.2023.42

Fitzsimmons, K. E. and Gromov, S. S.: Northward expansion of the westerlies over glacial southeastern Australia: evidence from semi-arid lunette dunes, temperate basalt plains, and wind modelling, Frontiers in Earth Science, 10, doi: 10.3389/feart.2022.921264, 2022.

Gowan, E. J., S. Hinck, L. Niu, C. Clason, and G. Lohmann, 2023: The impact of spatially varying ice sheet basal conditions on sliding at glacial time scales. J. Glaciology, 1-15, DOI:10.1017/jog.2022.125

Jiang, Z., Brierley, C. M., Bader, J., Braconnot, P., Erb, M., Hopcroft, P. O. et al. (2023). No Consistent Simulated Trends in the Atlantic Meridional Overturning Circulation for the Past 6,000 Years. *Geophysical Research Letters*, 50(10), https://doi.org/10.1029/2023gl103078

Kirsten F., Dallmeyer A., Bernbeck R., Böhmer T., Busch R., Hessari M., Pollock S., Schütt B, (2023) Were climatic forcings the main driver for mid-holocene changes in settlement dynamics on the Varamin Plain (Central Iranian Plateau)?. PLOS ONE 18(10): e0290181. https://doi.org/10.1371/journal.pone.0290181

Kleinen, T., Gromov, S., Steil, B., and Brovkin, V.: Atmospheric methane since the last glacial maximum was driven by wetland sources, Clim. Past, 19, 1081–1099, https://doi.org/10.5194/cp-19-1081-2023, 2023a.

Kleinen, T., Gromov, S., Steil, B., and Brovkin, V.: PalMod2 MPI-M MPI-ESM1-2-CR-CH4 transient-deglaciation-prescribed-glac1d-methane, WCD Climate [data set], https://doi.org/10.26050/WDCC/PMMXMCHTD, 2023b.

Prange, M., Jonkers, L., Merkel, U., Schulz, M., Bakker, P. (2023). *A multicentennial mode of North Atlantic climate variability throughout the Last Glacial Maximum.* Science Advances, Vol. 9, No.44, DOI: 10.1126/sciadv.adh1106

Prud'homme, C., Fisher, P., Jöris, O., Gromov, S., Vinnepand, M., Hatté, C., Vonhof, H., Moine, O., Vött, A., and Fitzsimmons, K.: Millennial-scale Land-surface Temperature and Soil Moisture Reconstruction Derived From Last Glacial European Loess Sequences, Nat. Commun., doi: 10.21203/rs.3.rs-1280228/v1, 2022.

Ruben, M., Hefter, J., Schubotz, F. et al. Fossil organic carbon utilization in marine Arctic fjord sediments by subsurface micro-organisms. Nat. Geosci. (2023). https://doi.org/10.1038/s41561-023-01198-z

Shi, X., Cauquoin, A., Lohmann, G., Jonkers, L., Wang, Q., Yang, H. et al. (2023). Simulated stable water isotopes during the mid-Holocene and pre-industrial periods using AWI-ESM-2.1-wiso. *Geoscientific Model Development*, *16*(17), 5153–5178. https://doi.org/10.5194/gmd-16-5153-2023

Shi, X., Werner, M., Yang, H., D'Agostino, R., Liu, J., Yang, C. et al. (2023). Unraveling the complexities of Last Glacial Maximum climate: the role of individual boundary conditions and forcings. *Climate of the Past,* https://doi.org/10.5194/cp-2023-51 (in press)

Willeit, M., Ilyina, T., Liu, B., Heinze, C., Perrette, M., Heinemann, M., Dalmonech, D., Brovkin, V., Munhoven, G., Börker, J., Hartmann, J., Romero-Mujalli, G., and Ganopolski, A.: The Earth system model CLIMBER-X v1.0 – Part 2: The global carbon cycle, Geosci. Model Dev., 16, 3501–3534, https://doi.org/10.5194/gmd-16-3501-2023, 2023*.*

PalMod in kind

Hörhold, M., Münch, T., Weißbach S., Kipfstuhl S., Freitag J., Sasgen I., **Lohmann G.,** Vinther B. and **T. Laepple,** 2023: Exceptional temperatures in central-north Greenland ice cores. Nature, 613, 503–507. doi:10.1038/s41586-022-05517-zhttps://www.nature.com/articles/s41586-022-05517-z

Krätschmer, S., A. Cauquoin, Lohmann, G., and Werner, M., 2022: A Modeling Perspective on the Lingering Glacial Sea Surface Temperature Conundrum. Geophys. Res. Letters, 49 (23), e2022GL100378. DOI:10.1029/2022GL100378

Cauquoin, A., Abe-Ouchi, A., Obase, T., Chan, W.-L., Paul, A., & Werner, M. (2023). Effects of Last Glacial Maximum (LGM) sea surface temperature and sea ice extent on the isotope–temperature slope at polar ice core sites. *Climate of the Past, 19*(6), 1275–1294. https://doi.org/10.5194/cp-19-1275-2023