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Process-based estimate of global-mean sea-level changes in the Common Era

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Table S1: Details of the climate models used in this study

	Model name	Ocean Model Resolution (Lat, Lon, Lev)	Institution	Reference
1	HadCM3	144, 288, 20	University of Edinburgh, School of Geosciences, UK	Collins et al., (2001)
2	MPI-ESM-P	220, 256, 40	Max Planck Institute for Meteorology, Germany	Marsland et al., (2003)
3	GISS-E2-R	180, 288, 32	NASA/GISS (Goddard Institute for Space Studies) New York, NY	Hansen et al., (2007)
4	CCSM4	384, 320, 60	NCAR (National Centre for Atmospheric Research) Boulder, CO, USA	Gent et al., (2011)
5	BCC-CSM1	232, 360, 40	Beijing Climate Centre (BCC), China Meteorological Administration, China	Wu et al., (2014)
6	MRI-CGCM3	368, 360, 51	Meteorological Research Institute, Tsukuba, Japan	Yukimoto et al., (2012)
7	FGOALS-S2	196, 360, 30	LASG, IAP, CAS, Beijing, China	Bao et al., (2013)
8	CESM1	384, 320, 60	National Centre for Atmospheric Research (NCAR)	Otto-Bliesner et al., (2016)
9	LOVECLIM	65, 120, 20	Georges Lemaitre Centre for Earth and Climate Research, Belgium	Goosse et al., (2010)

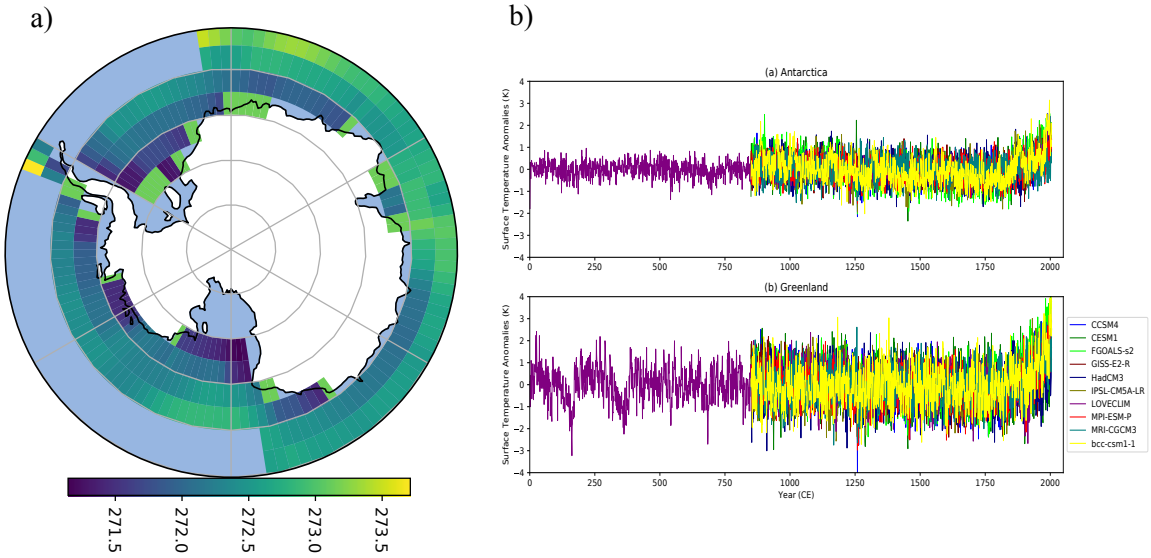

Figure S1: a) Ocean temperature off Antarctica averaged over depths 400-600 meters and for 1900-2000 CE from LOVECLIM, showing the spatial domain considered. The Oceanic forcing has been extracted over this domain for LOVECLIM (1 – 2000 CE) and all PMIP models (850-2000 CE) to force the Ice Sheet Model. b) Model surface temperature anomalies (base period 850-2000 CE for PMIP GCMs and 1 - 2000 CE for LOVECLIM) over Antarctica and Greenland, used as input to our Ice Sheet Model. The ice-core based surface temperature reconstructions used in EXP-I (see text) are shown in Fig. 2.

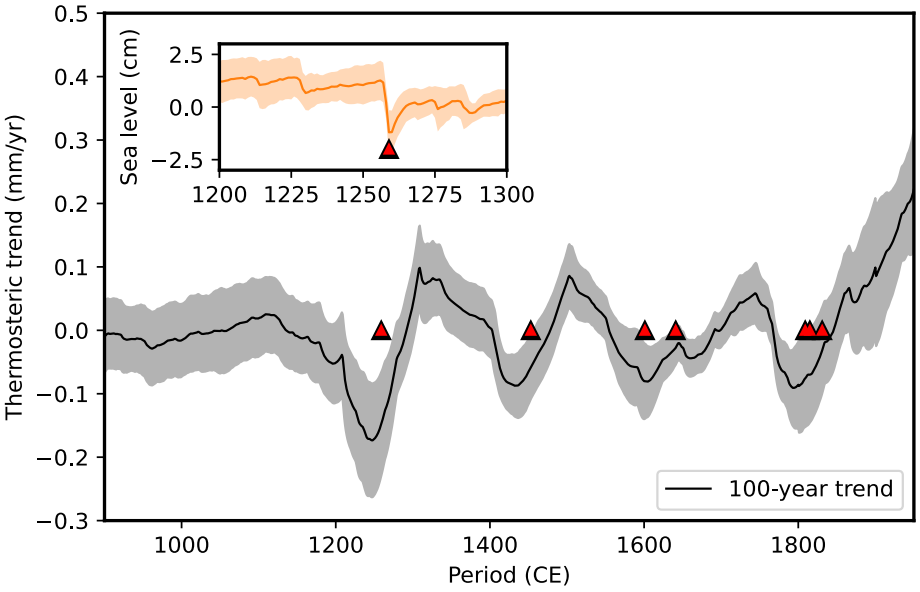

Figure S2: 100-year moving rate of thermosteric sea level from PMIP3/CMIP5 (EXP-II). The triangles represent timings of the major volcanic eruptions during the last 1000 years, as noted in Sigl et al. (2015). The shading shows 1-sigma confidence level. The inset figure is thermosteric contribution (as shown in Fig. 2a for EXP-II) but zoomed over 1200-1300 CE, showing the ~ 2 cm drop in GMTSL as a response to the 1257 eruption.

References

Bao, Q., Lin, P., Zhou, T. et al.: The Flexible Global Ocean-Atmosphere-Land system model, Spectral Version 2: FGOALS-s2, Adv. Atmos. Sci., 30, 561–576, https://doi.org/10.1007/s00376-012-2113-9 , 2013.

Collins, M., Tett, S. & Cooper, C.: The internal climate variability of HadCM3, a version of the Hadley Centre coupled model without flux adjustments, Climate Dynamics, https://doi.org/10.1007/s003820000094, 17, 61–81, 2001.

Gent, P. R., Danabasoglu, G., Donner, L. J., Holland, M. M., Hunke, E. C., Jayne, S. R., Lawrence, D. M., Neale, R. B., Rasch, P. J., Vertenstein, M., Worley, P. H., Yang, Z., & Zhang, M.: The Community Climate System Model Version 4, Journal of Climate, 24(19), 4973-4991, https://doi.org/10.1175/2011JCLI4083.1, 2011.

Goosse, H., Brovkin, V., Fichefet, T., Haarsma, R., Huybrechts, P., Jongma, J., Mouchet, A., Selten, F., Barriat, P.-Y., Campin, J.-M., Deleersnijder, E., Driesschaert, E., Goelzer, H., Janssens, I., Loutre, M.-F., Morales Maqueda, M. A., Opsteegh, T., Mathieu, P.-P., Munhoven, G., Pettersson, E. J., Renssen, H., Roche, D. M., Schaeffer, M., Tartinville, B., Timmermann, A., and Weber, S. L.: Description of the Earth system model of intermediate complexity LOVECLIM version 1.2, Geosci. Model Dev., 3, 603–633, https://doi.org/10.5194/gmd-3-603-2010, 2010.

Hansen, J., et al.: Dangerous human-made interference with climate: A GISS model study, Atmos. Chem. Phys., 7, 2287-2312, https://doi:10.5194/acp-7-2287-2007, 2007.

Marsland, S. J., Haak, H., Jungclaus, J.H., Latif, M. and Roeske, F.: The Max-Planck-Institute global ocean/sea ice model with orthogonal curvilinear coordinates, Ocean Modelling, 5, 91–127, https://doi.org/10.1016/S1463-5003(02)00015-X, 2003.

Otto-Bliesner, B.L., Brady, E.C., Fasullo, J., Jahn, A., Landrum, L., Stevenson, S., Rosenbloom, N., Mai, A., Strand, G.: Climate variability and change since 850 CE: An ensemble approach with the Community Earth System Model, Bulletin of the American Meteorological Society, 97(5), 735-754, https://doi.org/10.1175/BAMS-D-14-00233.1, 2016.

Schmidt, G. A., Jungclaus, J. H., Ammann, C. M., Bard, E., Braconnot, P., Crowley, T. J., Delaygue, G., Joos, F., Krivova, N. A., Muscheler, R., Otto-Bliesner, B. L., Pongratz, J., Shindell, D. T., Solanki, S. K., Steinhilber, F., and Vieira, L. E. A.: Climate forcing reconstructions for use in PMIP simulations of the last millennium (v1.0), Geosci. Model Dev., 4, 33–45, https://doi.org/10.5194/gmd-4-33-2011, 2011.

Sigl, M., Winstrup, M., McConnell, J. et al.: Timing and climate forcing of volcanic eruptions for the past 2,500 years, Nature, 523, 543–549, https://doi.org/10.1038/nature14565, 2015.

Wu, T., Song, L., Li, W., et al.: An overview of BCC climate system model development and application for climate change studies, J. Meteor. Res., 28(1), 034–056, https://doi.org/10.1007/s13351-014-3041-7, 2014.

Yukimoto, S., Adachi Y., Hosaka, M., Sakami, T., Yoshimura, H., Hirabara, M., Tanaka, T. Y., Shindo, E., Tsujino, H., Deushi, M., Mizuta, R., Yabu, S., Obata, A., Nakano, H., Koshiro, T., Ose, T., and Kitoh, A.: A new global climate model of the Meteorological Research Institute: MRICGCM3 - Model description and basic performance, J. Meteor. Soc. Japan, 90A, https://doi.org/10.2151/jmsj.2012-A02, 2012.