

Figure S1: Foraminiferal Mg/Ca temperature sensitivity parameter prior and posterior estimates from independent Bayesian inversion using calibration data only. Dashed red line shows posterior estimated from core-top data described in main text. Solid red line is the posterior estimate based on the down-core calibration approach of Elderfield et al. (2010), using core-top values from site 1123 and the Chat 1K core as representative of Holocene foraminiferal Mg/Ca and $\delta^{18}\text{O}$ values and site 1123 data from 25 – 15 ka to represent the LGM condition, plus an independent estimate of LGM to Holocene seawater $\delta^{18}\text{O}$ change of -1.1 ($1\sigma = 0.1$) from Adkins et al. (2002). The black line give the prior distribution applied in both analyses.

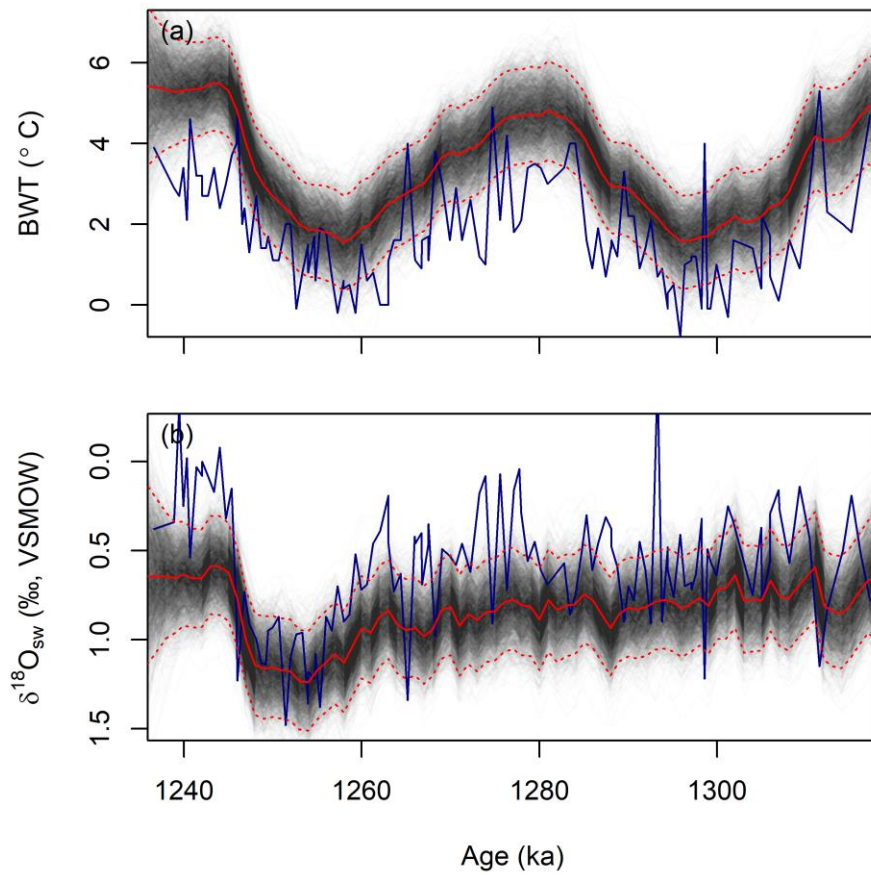


Figure S2: Paleoenvironmental reconstructions from single-site JPI of data from site U1385. (a) Bottom water temperature, and (b) seawater $\delta^{18}\text{O}$. Blue line shows the reconstruction of Birner et al. (2016) based on the Elderfield et al. (2010) down-core calibration. All other symbols as in Figure 2.

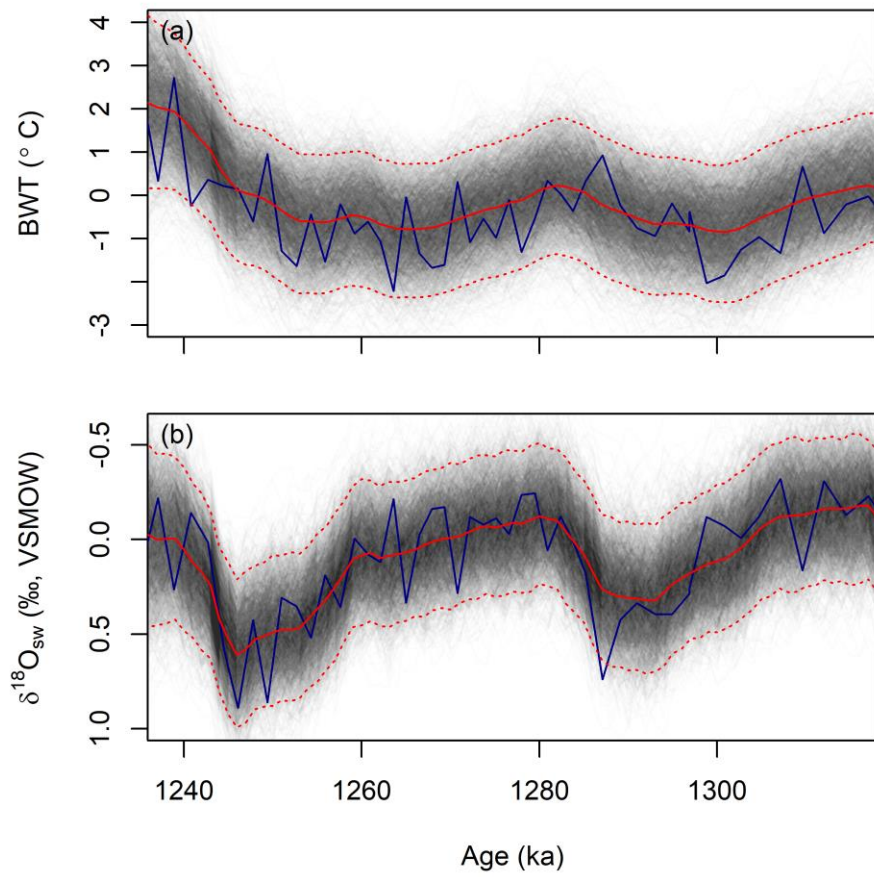


Figure S3: Paleoenvironmental reconstructions from single-site JPI of data from site 1123. (a) Bottom water temperature, and (b) seawater $\delta^{18}\text{O}$. Blue line shows the reconstruction of Elderfield et al. (2012) based on the Elderfield et al. (2010) down-core calibration. All other symbols as in Figure 2.

References

- Adkins, J. F., McIntyre, K., and Schrag, D. P.: The salinity, temperature, and $\delta^{18}\text{O}$ of the glacial deep ocean, *Science*, 298, 1769-1773, 2002.
- Birner, B., Hodell, D. A., Tzedakis, P. C., and Skinner, L. C.: Similar millennial climate variability on the Iberian margin during two early Pleistocene glacials and MIS 3, *Paleoceanography*, 31, 203-217, 2016.
- Elderfield, H., Greaves, M., Barker, S., Hall, I. R., Tripathi, A., Ferretti, P., Crowhurst, S., Booth, L., and Daunt, C.: A record of bottom water temperature and seawater $\delta^{18}\text{O}$ for the Southern Ocean over the past 440kyr based on Mg/Ca of benthic foraminiferal *Uvigerina* spp, *Quaternary Science Reviews*, 29, 160-169, <https://doi.org/10.1016/j.quascirev.2009.07.013>, 2010.
- Elderfield, H., Ferretti, P., Greaves, M., Crowhurst, S., McCave, I. N., Hodell, D., and Piotrowski, A. M.: Evolution of Ocean Temperature and Ice Volume Through the Mid-Pleistocene Climate Transition, *Science*, 337, 704, 2012.