



## **Can the Last Glacial Maximum constrain climate sensitivity?**

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We use syntheses of proxy data for the Last Glacial Maximum both on land and ocean (MARGO Project Members, 2009; Bartlein et al., 2011; Shakun et al., 2012), combined with the ensemble of results from the second paleoclimate modelling inter-comparison project (PMIP2) to generate a spatially complete reconstruction of surface air (and sea surface) temperatures, obtaining an estimated global mean cooling of  $4.0 \pm 0.8$  °C (95% CI). We then investigate the relationship between the Last Glacial Maximum (LGM) and climate sensitivity across the PMIP2 multi-model ensemble of GCMs, and find a correlation between tropical temperature and climate sensitivity which is statistically significant and physically plausible. We use this relationship, together with the LGM temperature reconstruction, to generate estimates for the equilibrium climate sensitivity. We estimate the equilibrium climate sensitivity to be about 2.5C with a high probability of being under 4C, though these results are subject to several important caveats. We propose that the forthcoming PMIP3 ensemble of models will provide a useful validation of the correlation presented here.