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Spatiotemporal relationships between human population and climate during the last glacial period in China

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Climate variations during the last glacial period had major impacts on plant and animal populations including humans. Yet, relationships between human population levels and climate through time and across space remain elusive. Here, we used the archaeological radiocarbon dates spanning 50 to 10 ka BP in China to indicate fluctuations in human population sizes, and investigated their correlations with climate variables from paleoclimate proxies and climate model outputs using a Bayesian radiocarbon-dated event count (REC) statistical model. We find that temperature has a significant positive effect on population in China during 50 – 10 ka, while the sensitivity of population size to temperature exhibits a declining trend over time, suggesting a potential gradual adaptation to cold climates. We further used a global ecosystem model that explicitly simulates human population dynamics, the ORCHIDEE-FOEGE model, to reconstruct human densities during the LGM, and investigated the roles of climate and atmospheric CO₂ levels in shaping the distribution of human populations in China.