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Human Existence Potential in Europe during the Last Glacial Maximum

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The Human Existence Potential (HEP) in Europe duringe the Last Glacial Maximum (LGM) is determined based on the locations of archaeological sites dated back to the LGM, and a reconstruction of the LGM-climate by the Weather Research and Forecasting Model. With that, the the suitability to inhabit a region by hunter- gatherers with regard to the environmental conditions can be indicated. Therefore, the precipitation and the temperature are converted into 19 bioclimatic variables (e.g. Annual Mean Temperature, Annual Precipitation) and applied in a logistic regression with second degree polynomials. As some resources are not or only hardly accessible, the resulting score is lowered in those regions, that are determined by topography, water bodies, glaciers and vegetation. We separate the European hunter-gatherers into a Western and an Eastern population group along the 10°E longitude. Furthermore, we compare the HEP derived from sites that are determined of having been permanently settled over the whole time period of the LGM by the Optimal Isoline (OI), with the HEP derived from all sites of the archaeological set. Two methods are applied on the potential surface, the Best Potential Path (BPP), which is calculated by inverting the HEP into a cost matrix and applying the method of Kondo et al. (2018), and the Environmental Human Catchment (EHC), which are areas of attraction, determined by the maxima of the potential. We examine a hypothetical BPP from the North of France to the most southern point of Iberia, and the EHCs of the Eastern population. The HEP-patterns of hunter and gatherer determined by sites inside of the OI differ significantly from those determined by all sites, especially at the Northern fringes. Moreover, our results show that there was no overlap of potential refugia for the Western and Eastern population which is in contrast to the findings from former studies.