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Impacts of Heinrich events upon Human existence potential in Europe

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Heinrich events are recognized as the dominant periods of extreme cold terrestrial climate conditions during the last glacial period. The role of climate forcing alone upon Human Existence Potential (HEP) during extreme events, e.g. Heinrich and Dansgaard-Oeschger events, is not yet sufficiently resolved. By reproducing climate variables during the two extreme cold and warm cycles by means of an Earth System Model, employing an improved HEP model, and utilizing archaeological excavation sites, we report the spatial distribution of HEP over Europe during both cold stadials and warm interstadials corresponding to the two Upper Palaeolithic technocomplexes: Late Gravettian and Aurignacian. By introducing some other diagnostics like Environmental Human Catchment, which is defined as an area delimited by low HEP, cooling-aridity index, and Least Cost Path among colonized people, we shed light into population dynamics in this epoch. Consecutive extreme cold and warm cycles, corresponding to contraction-expansion of HEP, supports the hypothesis of repetitive depopulation–repopulation cycles of habitats. Regarding the controversial issue of late survival location of Neanderthals, we illustrate that western coastlines had such a suitable and stable HEP scores for all human taxa including Neanderthals to survive during Heinrich events.