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Simulating climate effects on archaic human habitats and species successions

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It has previously been suggested that climate shifts during the last 2 million years played an important role in the evolution of our genus *Homo*. However, quantifying this linkage has remained challenging. Here we use an unprecedented transient Pleistocene Coupled General Circulation model simulation in combination with an extensive compilation of fossil and archaeological records, to study the spatio-temporal habitat suitability of five hominin species over the past 2 million years. We show that astronomically-forced changes in temperature, rainfall and terrestrial net primary production had a major impact on their observed distributions. During the early Pleistocene hominins primarily settled in environments with weak orbital-scale climate variability. This behaviour changed drastically after the mid-Pleistocene-transition when archaic humans became global wanderers who adapted to a wide range of spatial climatic gradients, which increased the likelihood for habitat overlap and cladogenic transitions. Our robust numerical simulations of climate-induced habitat changes provide a novel framework to test hypotheses on our human origin.