Geophysical Research Abstracts
Vol. 16, EGU2014-4179, 2014
EGU General Assembly 2014

Climate at the edge of human dispersal in the European Middle Pleistocene

David Horne
Queen Mary University of London, School of Geography, London, United Kingdom (d.j.horne@qmul.ac.uk)

Pleistocene palaeoclimatic reconstructions based on fossils from sites containing archaeological evidence of human occupation can answer key questions about the climatic context of early human dispersal in Europe. Biological proxies including foraminifera, ostracods, diatoms, chironomid larvae, molluscs and pollen are widely used to estimate palaeoclimatic parameters, typically palaeotemperatures, using indicator species, Mutual Climatic Range (MCR), Modern Analogue Technique (MAT) and transfer function approaches. Any single proxy method will yield plausible results, but there is a need for multi-proxy testing; matching or overlapping results inspire confidence, whereas if independent proxies yield results that do not match or even overlap, one or more must be wrong. The Multi-Proxy Consensus (MPC) approach not only compares two or more proxy results in order to check for agreement, but also offers potential for more refined results to be obtained from the range of mutual agreement between two or more overlapping palaeotemperature ranges. Studies of MIS9 (late Middle Pleistocene) deposits in the Thames-Medway river system in SE England (some of which contain stone implements representing human occupation) have yielded palaeotemperature estimates based on ostracods, beetles, fish, herpetiles, pollen and plant macrofossils. The MPC approach demonstrates the consistency of the results and defines a more continental climate than today (mean July air temperatures similar or 1 degree warmer, mean January air temperatures at least 2 degrees colder). Two River Thames MIS11 sites (Ebbsfleet and Swanscombe) have yielded MPC results indicating summers up to 1.5 degrees warmer and winters at least 5 degrees colder than today. British early Middle Pleistocene sites record the earliest human presence in Europe North of the Alps. At Boxgrove (MIS13), well-known for its rich record of human activity (stone tools and butchered bones), combined ostracod and herpetile MCR results indicate summers within 3 degrees (above or below) of present day values, but winters at least 2 degrees colder, consistent with the mutual consensus of beetle and ostracod MCR results from another MIS13 human occupation site, Waverley Wood. Comparable MPC results have been obtained from older sites including Sugworth (MIS15?), Norton Subcourse and West Runton (both MIS17-15?); although none of these has yielded evidence of human presence they are potentially informative about the climatic context of Pakefield (MIS19 or 17), one of the earliest British sites with such evidence, where palaeoclimate reconstruction (warmer summers, winters similar to or colder than today) is based solely on the beetles. Likewise only the beetle MCR method has thus far been applied to the oldest known human occupation site in Britain, Happisburgh (MIS25 or 21), where similar summers and colder winters are again indicated; as yet no opportunity has arisen to check this result against another proxy. Human colonization of these sites by dispersal from more southerly populations had to contend with colder/longer winters, requiring greater dependence on meat for food because plant resources were only available in warmer months. Adaptive strategies likely involved using shelters and animal hides to keep warm, and eventually also fire (at least by MIS11), rather than seasonal migrations or physiological adaptations.