Human Adaptations to the Last Glacial Maximum technology and risk in China's Western Loess Plateau

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Summary

Archaeological sites dating to the Last Glacial Maximum (22-19 kBP) are rare in North China. The paucity of data from this interval has been attributed to migration or population decline in the face of devastating environmental change. Mounting evidence from the Western Loess Plateau, however, suggests that the harsh climate and depauperate landscapes of the LGM may have forced human populations to significantly modify their foraging strategies rather than vacate the region entirely.

We suggest this adaptive shift was made possible by the long evolution of a fundamentally distinct tool technology native to the Western Loess Plateau. In glacially marginal environments, declines in local foraging efficiency necessitate smaller corporate groups and highly mobile hunting patterns to keep pace with the expanding foraging patterns of increasingly migratory animals. Furthermore, the climatic variability characteristic of late glacial environments impedes development of stable networks of human interaction which limits the predictability of access to rare raw materials and prohibits maintenance of complex behavioral patterns.

A necessary feature of this hyper-mobility is an expedient tool technology that mitigates against the uncertainty of long-distance migrations in the Loess Plateau thereby reducing risks associated with dependence upon raw materials acquired through long-distance trade networks. The hypothesis presented here is informed by archaeological data suggesting that LGM hunters employed composite armatures fitted with crude microblades generated by expedient bi-polar core-reduction on low-quality but highly abundant local quartz cobbles. This technology first emerges in the marginal highlands of the Western Loess Plateau prior to the LGM, proliferates during the cold-dry glacial, complements the post-LGM development of true microlithic technology, and persists through the transition to agriculture. Though few in comparison to the preceding and succeeding intervals, the presence and character of archaeological sites in the Loess Plateau during the Last Glacial Maximum suggest in situ modifications to human foraging behavior rather than wholesale population migration or extinction.

Late Pleistocene human behavior

The initial Upper Paleolithic (UP) in northeast Asia is thought to have spread southward from Siberia through Mongolia and into north China as hunter-gatherers expanded their migratory range, perhaps in response to the hyper-variability of Dayagan Isotope Stage 3. Characterized by a large, stone blade and pre-formed core, the UP was in place at Shuidonggou by 27 kBP and persisted through 25 kBP. While the UP technology also present at Tongxiang 3, Tongxiang 8, and Guyuan 3 disappeared after about 23 kBP, human groups did not appear again in northern China until the LGM (about 20 kBP). The LGM produced highly specialized tools, which were typically used for the procurement of local raw materials. The appearance of composite tools at the LGM is closely associated with the development of composite armatures, which are characterized by expedient bi-polar reduction on low-quality quartz cobbles at Zhanglang 5, Pengyang 3, and Shiji Jingzi, all of which produce microblades and fine microlithic pieces. The appearance of composite armatures is closely associated with the development of composite tools at the LGM.

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References available upon request.

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