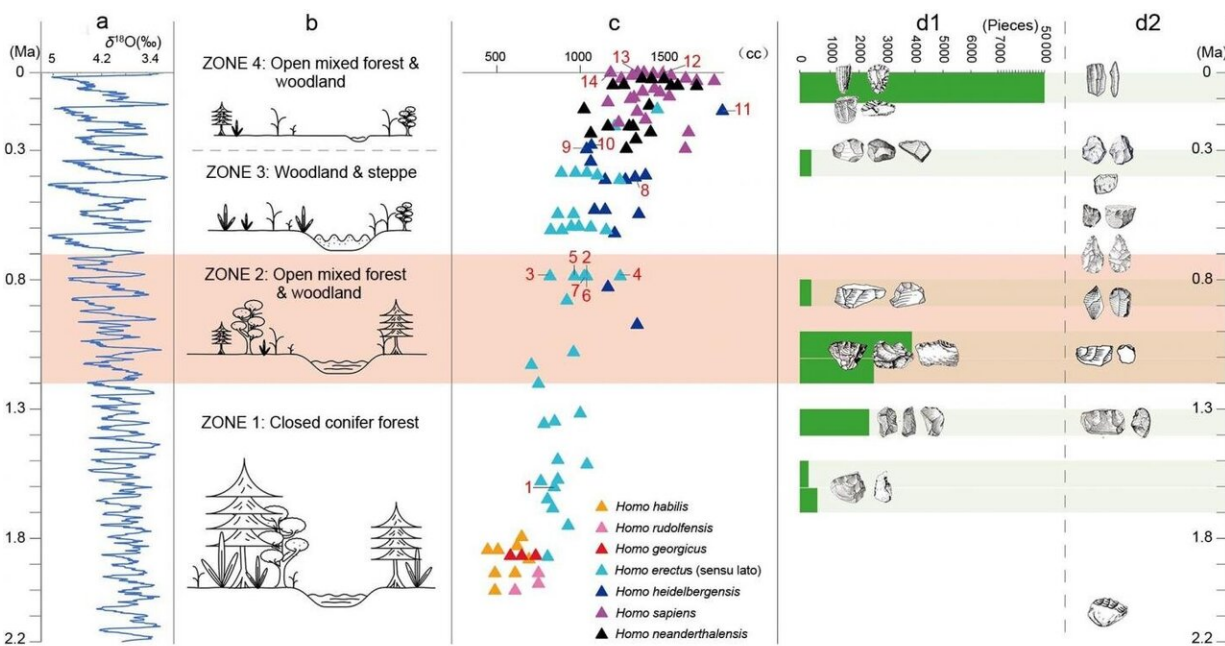


# Early humans in China innovated technology to adapt to climate change one million years ago

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Ecological, biological and stone tool information from 2.2 million years ago to the present (the light red horizontal bar shows increased climate variability) (a) Global climate change. (b) Vegetation history of the North China Plain based on pollen analysis. (c) Hominin brain size estimates for Africa and Eurasia. (d1) Stone tool changes through time in the Nihewan Basin, China, showing the frequency of artefacts across different time periods (dark green bars). (d2) Key stone tool changes across China. Credit: Science China Press

To assess the degree to which early stone tool using hominins modified their tool manufacturing behaviours in Eastern Asia, Shixia Yang and colleagues examined three well-known archaeological sites from the Nihewan Basin in North China. Stone tool comparisons between the archaeological sites of Xiaochangliang, Cenjiawan and Donggutuo indicate that technological skills increased at ca. 1.1-1.0 million years ago. The stone tools at Cenjiawan and Donggutuo show increasing levels of control in manufacturing procedures and some degree of planning in the tool-making process to produce the desired end-products.

The technological innovations at ca. 1.1-1.0 million years ago in the Nihewan Basin correspond with a major climate transition which occurred between 1.2 million years ago to 700,000 years ago (called the Mid-Pleistocene Climate Transition). A series of global and regional palaeoclimatic and palaeoenvironmental changes occurred during this period, such as increases in aridity and monsoonal intensity and decreases in sea surface temperatures in the North Atlantic.

At 1.1 million years ago the early human inhabitants of the Nihewan Basin lived under a changeable and unstable environment, experiencing strengthened aridification. As climatic variability produced ecological changes, including landscape alterations and mammalian extinctions, novel technological innovations likely provided benefits to early hominin populations in the Nihewan Basin. The unstable environmental conditions at the onset of this period provide a good example of the adaptive versatility of hominins in China, contrasting with the notion of long-lasting conservative behaviours described by other archaeologists. Yet, the increasingly harsh and oscillating climatic conditions of this period likely undermined sustained population in North China, illustrating that technological and cultural solutions did not always overcome environmental challenges.

**More information:** Shi-Xia Yang et al, Technological innovations at

the onset of the Mid-Pleistocene Climate Transition in high-latitude East Asia, *National Science Review* (2020). [DOI: 10.1093/nsr/nwaa053](https://doi.org/10.1093/nsr/nwaa053)

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