

## A 30,000-year brGDGTs-based temperature record from North China Plain

MINMINSUN<sup>12\*</sup>, SHILINGYANG<sup>123</sup>

<sup>1</sup> Key Laboratory of Cenozoic Geology and Environment, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing, China

(\*correspondence:sunminmin@mail.iggcas.ac.cn)

<sup>2</sup> University of Chinese Academy of Sciences, Beijing, China

<sup>3</sup> CAS Center for Excellence in Life and Paleoenvironment, Beijing, China

The North China Plain is a very important grain production area in China. Its weather and climate is strongly influenced by the East Asian monsoon system, which has aroused widespread concern. Quantitative paleotemperature reconstruction provides insight into the mechanism of climate change and climate prediction in the East Asian monsoon domain. Here we reconstruct air temperature for the North China Plain during the last 30 ka, based on the distribution of microbial tetraether membrane lipids GDGTs in the fluvial-lacustrine sediments of Ningjinbo. Our results show that the timing of the Last Glacial Maximum and the Holocene Thermal Maximum in the North China Plain (about 21 ka and 5.8 ka, respectively) is consistent with that recorded in lake and loess deposits in northern China. The reconstructed mean annual air temperature(MAAT) during the Last Glacial Maximum is about 15.3°C, and that during the Holocene Thermal Maximum is about 18.9 °C. The climate warmed by 3.6°C from the Last Glacial Maximum to the Holocene Thermal Maximum, which is lower than the mean temperature rise over China (5.6°C)<sup>[1]</sup>and the globe (5-6°C)<sup>[2]</sup>. We suggest that the brGDGTs-based temperature during glacial periods may be more biased towards summer conditions compared to that during interglacials, due to glacial-interglacial changes in the length of brGDGTs production period, which requires further investigation.

[1] Wu (2019) Science China Earth Sciences, **62**, 1269-1278.

[2] Snyder(2016) Nature, **538**, 226–228.

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