A Big Earth Data Platform for Three Poles

**Geochemical provenancing and direct dating of the Harbin archaic human cranium**

1、Description

As one of the most complete archaic human fossils, the Harbin cranium provides critical evidence for studying the diversification of the Homo genus and the origin of Homo sapiens. However, the unsystematic recovery of this cranium and a long and confused history since the discovery impede its accurate dating. Here, we carried out a series of geochemical analyses, including non-destructive X-ray fluorescence (XRF), rare earth elements (REE), and the Sr isotopes, to test the reported provenance of the Harbin cranium and get better stratigraphic constraints. The results show that the Harbin cranium has very similar XRF element distribution patterns, REE concentration patterns, and Sr isotopic compositions to those of the Middle Pleistocene-Holocene mammalian and human fossils recently recovered from the Harbin area. The sediments adhered in the nasal cavity of the Harbin cranium have a 87Sr/86Sr ratio of 0.711898, falling in the variation range measured in a core drilled near the Dongjiang Bridge, where the cranium was discovered during its reconstruction. The regional stratigraphic correlations indicate that the Harbin cranium was probably from the upper part of the Upper Huangshan Formation of the Harbin area, which has an optically stimulated luminescence dating constraint between 138 and 309 ka.
U-series disequilibrium dating (n = 10) directly on the cranium suggests that the cranium is older than 146 ka. The multiple lines of evidence from our experiments consistently support the theory that the Harbin cranium is from the late Middle Pleistocene of the Harbin area. Our study also shows that geochemical approaches can provide reliable evidence for locating and dating unsystematically recovered human fossils, and potentially can be applied to other human fossils without clear provenance and stratigraphy records.

2、Keywords

Theme：Others
Discipline：Others,Palaeoenvironment
Places：Haerbin
Time：Middle Pleistocene

3、Data details

1.Scale：None

2.Projection：

3.Filesize：100.0MB

4.Data format：None

4、Space scope

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| west：80.0 | - | east：140.0 |
| - | south：20.0 | - |

5、Time frame:2020-10-31 16:00:00+00:00--2021-12-29 16:00:00+00:00

6、Reference method

References to data:

NI Xijun . Geochemical provenancing and direct dating of the Harbin archaic human cranium. A Big Earth Data Platform for Three Poles, doi:10.1016/j.xinn.2021.1001312021

References to articles:

7、Supporting project information

Second Tibetan Plateau Scientific Expedition Program

8、Data resource provider

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