

Mesozoic and Cenozoic exhumation history and magmatic-hydrothermal events of the eastern Central Asian orogenic belt: Evidence from $^{40}\text{Ar}/^{39}\text{Ar}$ and (U–Th)/He dating

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The study of the uplift and exhumation of geological bodies can invert the nature, scale and process of regional tectonic evolution from qualitative to quantitative. In this paper, the Mesozoic and Cenozoic thermal history and exhumation process of the eastern Central Asian orogenic belt have been analyzed by means of isotope thermochronology, taking the intrusive rocks in Linxi area as research objects.

Linxi area is located in the eastern Central Asian orogenic belt, south of the Daxing 'an Mountains' main vein (figure 1). During the early Permian (280.5 ± 2.0) Ma, Middle Triassic (241.9 ± 2.0) Ma, Late Jurassic ($143.8 \sim 162.4$) Ma and Early Cretaceous (134.0 ± 2.9) Ma, magma emplacement occurred in the Linxi area. Intrusive rocks such as diorite and granite currently cover 60 percent of the research region's surface area. For the samples gathered from the research area, $^{40}\text{Ar}/^{39}\text{Ar}$ and (U–Th)/He dating were performed, and low-T software (version 5.0) was used to invert the time-temperature history (figure 2). Extensive extensional tectonics formed in eastern Eurasia from the Baikal area to the South China plate throughout the Late Jurassic to early Cretaceous 160–97 Ma, according to the study. The southern of the Daxing 'an Mountains experienced significant rapid uplift as a result of the tectonic activity, and the intrusive rocks in the Linxi area were excavated to the surface on a huge scale. The maximum uplift of intrusive rocks exceeds 4 km, with a geothermal gradient of $35^\circ\text{C}/\text{km}$. The tectonic activity of the eastern Central Asian orogenic region declined dramatically after the Late Cretaceous (from 97 Ma to the present), and the uplifting and exhumation process was gradual.

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