

# Geology and zircon U-Pb ages of the Jiamusi-Khanka and adjacent blocks in the Central Asian Orogenic Belt

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## Geological features

In the Mashan Complex in the Jiamusi-Khanka Blocks, Heilongjiang Province, northeastern China, two types of metamorphism, granulite and amphibolite facies metamorphism, have been discerned. The earlier granulite facies metamorphism ( $M_1$ ) is characterized by fluid-absent anatexis confined to the high grade Mashan Group (*s. s.*) which are dominated by residual massives or enclaves scattered in amphibolite facies gneisses or migmatitic granites. While the later amphibolite facies metamorphism ( $M_2$ ) was followed by widespread episodic magmatism. The granulites were severely retrograded during later amphibolite facies and granite activity, which substantially reset the U-Pb system of the zircons formed in earlier high-grade metamorphism and the real metamorphic age could be hardly measured. Only some magmatic zircons could retain their closed system and the formation ages be obtained [1].

## Time of the major events

The occurrence of the *c* 900 Ma granitic gneiss [2] proved the existence of the former basement and, on the other hand, constrained the metamorphism age limit ( $M_1$ , >900 Ma?) of the older granulitic enclaves. The early Paleozoic abundant granite intrusions disrupted the granulites and basement, and the granitic magmatism was probably pulsive and reached the

peak at *c* 500 Ma, which constraining the amphibolite facies metamorphism must be older than *c* 500 Ma, but younger than *c* 900 Ma ( $M_2$ , 900–500 Ma). The amphibolite facies metamorphism occurred in this period and may correspond with the possible orogeny.

## Possible mechanism

Geochemically, the early Paleozoic granitoids show dominant I- and A-type feature, and formation in post-collisional or post-orogenic, i.e., from compression to extension setting. The concomitant early Paleozoic sediments took place in passive continental margins or extensional, even rift setting, which is consistent with the occurrence of the contemporaneous volcanics and gabbros. The high grade metamorphism of the Mashan Complex is rather similar to that of the interior of the East Gondwana. The Jiamusi-Khanka blocks were of Gondwana affinity [3], but the dominant granites and tectonic activity not Pan-African orogenic feature. The Jiamusi-Khanka and other microcontinent blocks in the Central Asian Orogenic Belt (CAMB) may be derived from initial break-up in early Paleozoic along the western margin of the East Gondwana. Then the independent blocks migrated northward in the proto-Tethys or Central Asian Ocean to the present position.

## References

- [1] Wilde *et al.* (2000) *Tectonophysics* **328**, 115–130.
- [2] Yang *et al.* (2017) *Lithos* **268-271**, 16–31.
- [3] Levashova *et al.* (2011) *Precambrian Research* **185**, 37–54.