

Tectonic affinity of the Jiaobei block constrained by its basement rocks and overlying strata

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The Jiaobei block is located in the boundary between the North China Craton (NCC) and the Yangtze Craton (YC), which is generally considered to be the SE part of NCC. Since 1960s, the Jiaobei block, the third largest gold producing area in the world, has been a hotspot of geological study for its gigantic scale of gold mineralization. However, its tectonic affinity has been controversial.

Jiaodong Group and Fenzishan Group are the Archean and Paleo-Proterozoic crystallized basement of the Jiaobei block, and Penglai Group is the only overlying stratigraphical unit on the basement. Detailed dating and element-isotope geochemical studies have been applied to determine their forming ages and material sources, thereafter to discuss tectonic affinity of the Jiaobei block.

Jiaodong Group was originated from the magmatic event around 2819Ma and was recognized as TTG. Fenzishan Group was formed around 2710Ma, and is a remelting product of the lower crust of 2.8Ga. Thus 2.7-2.9 Ga should be an important era of continental crust growth in the Jiaobei block, though the major magmatic event occurred in 2.5Ga in the broad mid-west NCC.

Age spectrum of the detrital zircons of Penglai Group show five peaks at ~2.5Ga, 1.8-2.0Ga, ~1.6Ga, ~1.2Ga and ~470Ma. The first four age populations are identical with relevant literatures. However, the age of ~470Ma is identified for the first time in Penglai Group. The existence of this age population suggests that Penglai Group was precipitated later than Ordovician. No correlated strata in the same era are documented in NCC. Material sources of the Penglai Group could be traced to both NCC and YC, as well as other source.

The basement rocks and overlying strata of the Jiaobei block clearly show affinities and varieties to both NCC and YC. Therefore, the Jiaobei block could be a micro-continent located between NCC and YC. The gigantic gold mineralization in the Jiaobei block might have been brewed with this unique material base and tectonic regime.

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