

**SHRIMP U–Pb zircon geochronology of the
Huai’an Complex: constraints on late Archean to
Paleoproterozoic crustal accretion and collision of
the Trans-North China Orogen**

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The Huai’an Complex is situated in the central-north segment of the Trans-North China Orogen, which divides the North China Craton into the Eastern and Western Blocks. The complex comprises five distinct lithologic units: (1) the Huai’an TTG gneisses, (2) the Manjinggou high-pressure mafic granulite, (3) the Dongjiagou gneissic granite; (4) the Huai’an anatectic charnockite, and (5) the Dapinggou syn-collisional granite. SHRIMP U–Pb geochronology combined with U–Th and CL imaging of zircon enables for resolution of magmatic and metamorphic events that can be directed towards understanding the late Archean to Paleoproterozoic history of the Trans-North China Orogen.

CL images reveal the coexistence of magmatic and metamorphic zircons in nearly all rock types of the Huai’an Complex. SHRIMP U–Pb analyses on magmatic zircons reveal that the emplacement of the Huai’an TTG gneisses, the precursor of the Manjinggou high-pressure mafic granulite, the Dongjiagou gneissic granite, the Huai’an charnockite and the Dapinggou granite occurred at 2499±19 Ma, 1964±6 Ma, 2036±19 Ma, 1849±9.8 Ma, and 1850±17 Ma, respectively. The metamorphic zircons in these lithologies occur as either single grains or overgrowth (or recrystallization) rims surrounding and truncating oscillatory-zoned magmatic zircon cores, and are all characterized by nebulous zoning or being structureless, with high luminescence and low Th contents. The metamorphic zircons from both the Archean TTG gneisses and Paleoproterozoic granitoids and khondalitic rocks yield similar concordant ²⁰⁷Pb/²⁰⁶Pb ages around 1850 Ma, coeval with the emplacement of the Huai’an anatectic charnockite and Dapinggou syn-collisional granite.

Timing of primary zircon crystallization and regional metamorphism of the Huai’an Complex is in general agreement with recent U–Pb zircon ion probe results for the Fuping and Hengshan Complexes, ~150 km south of the Huai’an Complex. Taken together, these data suggest that the Trans-North China Orogen represents a late Archean to Paleoproterozoic magmatic arc system that has been subsequently tectonically disrupted and juxtaposed during the collision of the Eastern and Western blocks at ~1.85 Ga, resulting in the final assembly of the North China Craton

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