Metamorphism, Anatexis, Zircon Ages and Tectonic Evolution in Gongshan Block in the Northern Indochina Continent, Southwest China

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The Gongshan Block near the Eastern Himalayan Syntaxis is a fault-bounded block in the north tip of the triangle-shaped northern Indochina continent (NIC). It is covered by late Paleozoic (Carboniferous to Permian) strata and intruded by a northsouth belt of intermediate to felsic batholiths (i.e., Gaoligongshan magmatic zone). Between the Gaoligongshan magmatic zone and the strata-covered block is a belt of high-grade metamorphic gneisses with leucosome granite veins (the so-called "Gaoligong Group"). U-Pb SHRIMP and LA-ICP-MS dating of zircons indicates that these gneisses are actually metamorphosed Paleogene sediments containing Archean to Cretaceous detrital zircons (from 2892 to 64 Ma) and have undergone medium- to high-pressure granulite-facies metamorphism at 20.4-23.8 Ma (mean at 22.5 ± 0.9 Ma). Leucosome and S-type granite of ages from 22.7 to 24.9 Ma by anatexis are ubiquitous within high-grade metamorphic rocks in the south part of the Gongshan Block. An Early Paleozoic gneissic granite and granitoid intrusions of Jurassic, Cretaceous and Oligocene-Miocene ages are also recognized in NIC blocks. These ages suggest that the NIC is distinct from the Indian continent, the Greater and Lesser Himalaya zones, and the Yangtze Craton, but resembles the Lhasa Block in terms of Paleozoic to Mesozoic magmatism and detrital zircon ages. The high-grade metamorphism in the NIC indicates a strong crustal thickening (vs. strike-slip shearing) event during much of the Oligocene (~34-22 Ma) that has brought the Paleogene sediments to depths of greater than 25 km. Continuous northward convergence/compression of the Indian Plate at the Eastern Himalayan Syntaxis may have led to the clockwise rotation, southeastward extrusion and extension of the southeastern part of the Indochina continent.