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Indosinian movement in South China

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Many Triassic granitic complexes occur in South China block between the Song Ma and the Qinling—Dabie indosinian suture zones, among which the Ziyunshan granitic complex in Hunan Province and the Shibanwan granitic complex in Guangxi Province have been selected in this study. After systematic studies in petrography, geochemistry and zirconology, it was determined that: (1) I-type granites, as main intrusive phase of the granitic complexes, are weakly-differentiated granites of crustal origin with zircon U–Pb ages of about 239 Ma; (2) Alkali-feldspar granites, as subsequent intrusive phase of the granitic complexes, are highly-differentiated granites homologous to the I-type granites with zircon U–Pb ages of about 217 Ma. Combing the structural geology and the granitic magmatism in South China block, this study proposes that the collision between Indosinian block and South China block in the early Triassic caused compressive tectonic environment in South China block. Then, magma chamber developed in the middle crust and I-type granites intruded in the upper crust at ~239 Ma. After compressional zenith, an ultra-long period of fractional crystallization of huge amount of granitic magma in the chamber took place, and resulted in generation of high-Si, -Al, and -alkalis, and incompatible trace elements- and volatiles-enriched residual magma at the top of the magma chamber. At the late Triassic, the extensional tectonic environment occurred in South China block, and a very small volume of highly-differentiated residual magma ascended rapidly from the magma chamber, and formed the alkali-feldspar granites at ~217 Ma. Both constitute a large of Triassic granitic complexes in South China block.

In conclusion, the Indosinian movement in South China block can be defined by two landmark events: syn-orogenic granites (i.e., I-type granites) with their emplacement ages of ~239 Ma (representing the peak compression of this movement), and post-orogenic granites (i.e., alkali-feldspar granites) with their emplacement ages of ~217 Ma (representing the peak extension of this movement). Accompanied by the intrusion of the latter, extensive mineralization of rare metals (W, Sn, U) occurred at ~217 Ma in South China block.