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Geochemistry and tectonic evolution of Mesozoic-Cenozoic granites in Baoshan block, southwestern China

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Tethyan tectonic domain of western Yunnan, is composed of many blocks and their tectonic zones, as Tengchong block, Baoshan block, Simao block and Channing-Menglian structural suture zone. Influenced by Tethys orogeny, the magma activity of Baoshan block was frequent, but limited research focused on petrogenesis and tectonic setting of magmatic rocks. Samples were analyzed for major elements, trace elements and isotopic composition. Major elements were analyzed by XRF, trace elements were analyzed by ICP-MS.

The result of geochronology of granites in Baoshan block showed that there are three major phases of granite-magma intrusion activity: Jurassic granite distributed in Xiangda (K-Ar dating of biotite, 164∼169 Ma), Cretaceous granite distributed in eastern Xiangda and Pingda (U-Pb dating of oscillatory-zoned magmatic zircons, 89.6 Ma and 66.0 Ma, respectively), and Paleogene granite distributed in northern Mengdui (U-Pb dating of zircons, 56.5 Ma). Jurassic granite mineralization was not obvious, early Cretaceous granite closely associated with mineralization of lead, zinc, copper, iron; While late Cretaceous granite associated with tungsten, tin ore. Jurassic granite can be regarded as start of the activity of acid magma in large scale and related metallogenic action in Baoshan block.

Three phases granites had same features of high-K calc-alkaline and strongly peraluminous granite, which mainly belong to S-type granite. High levels of total rare earth element (REE) and a notable fractionation between light and heavy REE were observed. Tectonic setting of three phases granites were mainly dropped in post-collision region. Jurassic granite, Cretaceous granite, and Paleogene granite in study area were high Sr to low Yb type, low Sr to high Yb type, and low Sr to high Yb type, respectively, according to the Sr-Yb geochemical characteristics of the three phases granites, it may reflect the stress adjustment process of the post-collision orogenesis after closure of the Palaeo-Tethys, root delamination of the orogenic belt and erosion of mantle diapirism, the crustal thickness became thinner, pressure environment of the magma source upward to migrate.