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Geochemical characteristics and geological significance of the major granitic bodies in early Yanshanian, Southeastern Hunan

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Southeast Hunan is an important part of Nanling polymetallic belt, and its granites have closely genetic relationship with a series of mineralization. Based on the petrology and geochemical characteristics, the early Yanshanian granites in the southeastern Hunan can be roughly divided into two types. The first type includes Qitianling, Furong, Chuankou, Baofeng mountain, Yaoxianling, and Dadong mountain granites, of which the lithology is dominated by biotite monzogranite. The geochemisty of these rock bodies is characterized by high silicon and potassium content, as well as enrichment of alkali, lower rate of A/KNC and higher rate of KN/A. All of these granites are metaluminous to weakly peraluminous and belong to the high-K calc-alkaline series. In addition, these granites are enriched in Th, U, high field strength elements (HFSE) and volatile elements F, Be, Li, Rb, with the higher content of ΣREE and the higher ratio of (LREE/HREE). Chondrite-normalizes REE diagram show a W-type pattern with significantly enrichment in LREE and evident negative Eu anomalies,which suggest the high degree differentiation of primitive magma,with features of crust origin or mixed features of mantle-crust interaction origin of the magma, which lead to the formation of W, Sn and other polymetallic mineralization. The other type mainly includes Tongshanling and Baoshan granites, these rock bodies are dominated by biotite monzogranite Granodiorite. Geochemically, the granitoids have low content in silicon and high content in potassium, moreover these rocks have the characteristics of enrichment in alkali, higher rate of A/KNC and lower rate of KN/A, which generally belong to peraluminous and high-k calc alkaline series. These granodiorite are depleted in Ba, Sr, Ti, Nb, Ta, with the lower content of ΣREE and higher ratio of (LREE/HREE). The chondrite-normalized REE patterns are right deviation type, showing typically enrichment in LREE, without obviously negative Eu anomalies . The low degree of magmatic differentiation shows that the crust-mantle magma is mixed and leads to the polymetallic mineralization such as Cu, Pb and Zn.