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Magma Mixing and Mingling for Xiangjiananshan Granitic batholith at eastern area of the East Kunlun Orogenic Belt

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The East Kunlun Orogenic Belt (EKOB) in northeast margin of the Qinghai-Tibetan Plateau is an important part of the Central Orogenic System (COS). During the long-time geological evolution, complicated tectono-magma events occurred in the EKOB and produced large-scale granitic intrusions with different ages and origins, in which the plutons crystallized in the period from late Late Paleozoic to early Mesozoic developed predominantly in the area. Xiangjiananshan granitic batholith is the main constituent part of the EKOB and contains numerous mafic microgranular enclaves (MMEs), on which studies the issues of Triassic crust-mantle magma mixing and mingling and its geodynamics background in the EKOB would be solved reasonably.

LA-MC-ICP-MS zircon U-Pb dating suggests that the granodiorite, MMEs in Qianwadaqiao area and gabbro in Jialuhe area crystallized 251.0 ± 1.9 , 252.8 ± 3.0 and 221.4 ± 3.3 Ma ago, respectively. Granodiorite in Qianwadaqiao - Jialuhe area is geochemically featured by LILE enrichment and HFSE depletion, low Mg# value and Nb/Ta ratio. The calc alkaline series granodiorite evolved gradually from metaluminous middle-K to quasi aluminous middle- to high-K in geochemistry in the place from Qianwadaqiao area to Jialuhe area. The MMEs and the Jialuhe gabbro have unobvious differentiation between HREE and LREE,

and high Mg# value and Nb/Ta ratio. Inferred by the geochronological and geochemical data, it is believed that the granodiorites in Qianwadaqiao area and Jialuhe were the products of partial melting, triggered by underplating from mafic magma into crust in the EKOB, occurred in subduction and post-collision period of paleo-Tethyan respectively. And the MMEs are results of magma mixing and mingling between mafic and felsic magma. During the magma mixing and mingling, if the magma is mixing, the mixture should be material diffusion between mafic and felsic magma as a result of element difference as well as the residual felsic magma and xenocrysts; if the magma is mingling, the mingling magma would be composed of mafic and felsic magma in a certain volume proportion.

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