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Geochemistry and Implication of Paleogene Intrusions from the Kemailuo of Shangri-La Region, Eastern Tibetan Plateau

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The Shangri-La region is located at the intersection of the Songpan-Ganzi Fold Belt, Sanjiang tectono-magmatic-metallogenic Belt and the Yangtze Block, which have experienced oceanic crust subduction-mountain building of Indosinian, arc-continental collision of Yanshanian and intercontinental strike-slip of Himalayan from 235Ma (Yang et al., 2002). The Paleogene intrusions from Kemailuo region located at the western Yangtze Block, the west neighboring the Yidun Arc and north neighboring the Ganze-Litang Suture Belt. The intrusions are composed mainly of monzodioritic porphyry, monzonite porphyry, quartz monzonite porphyry and diorite, which emplaced in the limestone of Beiya Group. The phenocrysts are mainly plagioclase, potash feldspar, and quartz with minor hornblede, pyroxene and secondary biotite.

Major elemental data from the intrusions shows the rocks have intermediate compositions with SiO_2 content ranging from 56.07 to 64.51 wt.%. The MgO content varies from 1.79 to 5.24 wt.% and Al_2O_3 varies from13.67 to 15.94 wt.%, with high Mg numbers(0.52~0.67) ,high Na_2O(4.38~5.08 wt.%) and variable K_2O(2.59~4.10 wt.%). All the rocks shows that enrichment of light rare earth elements(LREE) and high field strength elements (HFEE) (e.g. Nb, Ta, Th, U, Zr)with depletion of heavy rare earth elements (HREE) and large-ion lithophile elements(LILE) (e.g. Rb, Ba, K)relatively in the chondrite-normalized REE and spider diagrams respectively. The geochemical features suggest that the Kemailuo intrusions unrelated with the arc magmas. The intrusions have low Y（$15.99\sim25.03\times10^{-6}$） and Yb（$1.33\sim1.85\times10^{-6}$） contents with high Sr（$1074\sim1751\times10^{-6}$）and $(La/Yb)_N$(87.17~ 125.28) ratios, resembling adakitics. It is also display high Ni ($13.8\sim48.3\times10^{-6}$) and Cr ($34.2\sim127.3\times10^{-6}$) contents. In the Rb-(Y+Nd) diagram (Figure 1a), the entire sample located at the WPG feild. All of the fuatures suggest the source of the magmas may be related to the the mantle material and partial melting of the low continental crust. The clearly plot along the fractional crystallization in the Cr-SiO_2 diagram (Figure 1b) indicates that the fractional crystallization may dominant the magmas process in the formation of the intrusions.

The "Sanjiang" Fold Belt is considered an accommodation zone that relieves the deformation of the India-Asia continental collision. The Shangri-La regions have experienced a strong intracontinental deformation and the formation of the large-scale strike-slip faults since the collision of the Indian and Eurasian plates at 65Ma (Xue et al., 2010). With the continuation of the collision, the Shangri-La region have also experienced the late-collisional transformation and postcollisional extension between 41~26Ma and 25Ma~ respectively (Ding et al., 2003). The pre-research suggested that the oblique collision and opposite subduction of the Indian and Eurasian plates plate lead to the mantle asthenosphere upwelling and underlying the bottom of crust along the fracture zone, and occurred miscible metasomatism to form the crust-mantle transition layer(Hou et al., 2003). The Kemailuo intrusions formed between the late-collisional transformation and postcollisional extension of the Shangri-La region, and the tectonic setting was in the transition stage of compressive to tensile causes the crustal pressure decreases. With the mantle asthenosphere upwelling of the "Sanjiang" region and the crustal pressure decreases, lead to the partial melting of the low continental crust and accompanied by contamination the mantle material.

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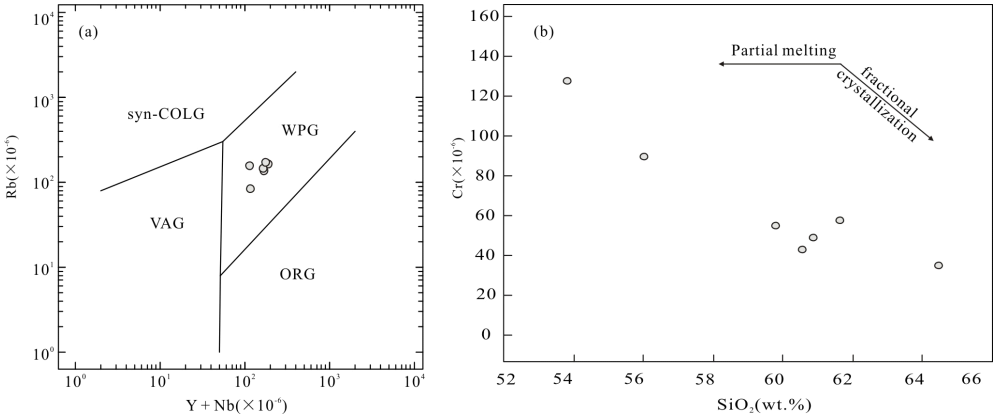

Fig. 1 Diagram of Rb vs. Y+Nd (after Pearce et al., 1984) (a) and Cr vs. SiO_2 (b)

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Key words: partial melting, adakitic, geochemical, Shangri-La

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