The characteristics of trace elements in Emeishan basalt and its contribution to mineralzation

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Emeishan basalt (EB) related mantle plume, Permian basic volcanic rocks belonging to the continent flood basalt, widely occurs in southwestern China, and has been extensively studied [1, 2, 3]. EB consists of four lithologic sections from bottom to up: the first consists of volcanic breccia; the second consists of porphyritic basalt, the third consists of amygdaloidal basalt and compact massive basalt; and the last consists of compact massive basalt and amygdaloidal basalt. The trace elements from 102 EB samples in the southern part of the eastern Yunnan province, China, were obtained. The results show that (1) Pt, Pd, Au and Cu are 10.2ng/g, 9.7ng/g, 5.2ng/g, and 314.3ug/g, respectively, which are higher than that of in the original upper mantle; (2) compared with the northern of the study area, Pt and Pd have enrichment trends, and (3) compared with the abundance of continental crust, the enrichment sequence is Pt-Pd-Cu-V-Ag-Au-Zn-Co-F. Cu mineralization associated with zeolitization, actinolite-tremolitization, silicatization, bituminization mainly occur in the last lithologic section with Pt-10.1ng/g, Pd-11.3ng/g, Au-5.3ng/g, Cu-444.2ug/g, which is like as the Keweenaw copper deposit, and Au mineralization mainly occurs in the tuff. The results also demonstrate that mantle plume control the spatial distribution of EB, which offers the ore-forming materials for related Cu, Au mineralization.

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Geochronology and geochemistry of Trassic Sanyanlong granitic complex in Eatern Tibetan Plateau: Origin and implications for tectonic evolution

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Zircon U-Pb dating by LA-ICP-MS and geochemical study have been conducted on the Late Triassic Sanyanlong granitic complex, eastern Tibetan Plateau. This granitic complex is the biggest intrusion in the Songpan-Garzê Fold Belt (SGFB), formed at 210 Ma, 10-15Myr younger than those exposed to the east [1-2] and north [3]. This complex composed of two major rock types: one is high-K calc-alkaline rocks with adakitic affinities (K-adakites), with Sr > 550 ppm, Y < 12 ppm, strongly fractionated rare earth element (REE) patterns ($(La/Yb)_N$ = 53-86) and high K_2O/Na_2O (≈ 1); another is ordinary high-K calcalkaline I-types with lower Sr (< 400 ppm), higher Y (> 20 ppm) and weakly fractionated REE patterns ($(La/Yb)_N$ < 20). The K-adakites have weaker negative Eu anomalies (Eu/Eu* = 0.62 to 0.81) than ordinary rocks (Eu/Eu* = 0.48 to 0.78). These geochemical features are generally consistent with those older eastern granitoids [1-3]. The K-adakites are interpreted as magmas were derived through partial melting of thickened and then delaminated TTG-type, eclogitic lower crust, with some contribution from juvenile enriched mantle melts. Ordinary high-K calcalkaline magmas were generated by partial melting of shallower lower crustal rocks. These new data argue that magmatism in the SGFB last over 20 Myr (230-210Ma) and further imply that the passive margin crust of the Songpan Ocean was greatly thickened and then delaminated, all within a time interval of ~ 30 Myr. Such post-collisional crustal thickening could be the tectonic setting for the generation of many adakitic magmas.

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