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青藏高原东北缘柳坪新生代苦橄玄武岩地球化学及其大陆动力学意义

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摘要:

柳坪苦橄玄武岩出露在青藏高原东北缘特殊的构造部位, 位于青藏、华北和扬子三大构造域的交接转换区域。岩石形成年龄在23~7.1 Ma之间, 属于新近纪火山岩。岩石SiO₂介于41.72%~42.82%之间, Na₂O>K₂O, K₂O/Na₂O平均0.51, 为一套典型的幔源钠质碱性玄武岩类。岩石微量及稀土元素具板内火山岩特征, Th、Rb等元素呈较明显的富集状态, 而岩石显著的低K₂O特征(0.48%~0.90%)明显不同于青藏高原北缘新生代钾质-超钾质火山岩系列。岩石⁸⁷Sr/⁸⁶Sr(0.704158~0.704668)、¹⁴³Nd/¹⁴⁴Nd(0.512831~0.513352)、²⁰⁶Pb/²⁰⁴Pb(18.729871~18.779184)、²⁰⁷Pb/²⁰⁴Pb(15.591395~15.602454)和²⁰⁸Pb/²⁰⁴Pb(39.097372~39.181458)等同位素变化特征具有显著的混源属性, 投影点位于EMI、EM II、BSE及PREMA等典型地幔储库的过渡部位, 并可能存在EM地幔源的部分参与, 明显不同于单一地幔源局部熔融形成的玄武岩的同位素组成特征。表明新生代期间青藏东缘西秦岭-松潘地区受青藏、扬子及华北三大构造体系域的控制, 西秦岭-松潘构造结处于从下部地幔到上部陆壳物质的总体汇聚拼贴阶段, 地幔具有显著的混合特征。柳坪苦橄玄武岩正是在这种特定的构造背景下, 由于新生代青藏高原软流圈地幔物质向东的流动, 诱发西秦岭-松潘构造结多源混合的地幔橄榄岩局部熔融而形成。

英文摘要:

The Cenozoic picritic basalt from the Liuping area, northeastern margin of the Tibetan Plateau located at the convergent region between Tibetan Plateau, North China and South China plates. It erupted during the Miocene Period with ages in the range 23~7.1 Ma. The rock exhibits SiO₂ between 41.72% to 42.82%, Na₂O>K₂O, K₂O/Na₂O being 0.51 (mean value), belonging to an association of the typical mantle generation sodic-alkaline basalt. The trace and rare earth elements show geochemical characteristics of the within plate volcanism. The Th and Rb are enrichment and the K₂O is obviously depletion (0.48%~0.90%), indicating that this volcanic rock association is different from the potassic-ultra potassic-shoshonitic Cenozoic volcanic rocks widely distributed in the north margin of the Tibet Plateau. Isotopic compositions of this group rock have radiogenic Sr, Nd and Pb (⁸⁷Sr/⁸⁶Sr=0.704158~0.704668, ¹⁴³Nd/¹⁴⁴Nd=0.512831~0.513352, ²⁰⁶Pb/²⁰⁴Pb=18.729871~18.779184, ²⁰⁷Pb/²⁰⁴Pb=15.591395~15.602454, ²⁰⁸Pb/²⁰⁴Pb=39.097372~39.181458, ε_{Nd}=4.0~14.2). The Sr-Nd-Pb isotopic compositions located between EMI, EM II, BSE, PREMA and HIUM, suggest that the basalt should be derived from a mixed mantle reservoir. The western Qinling-Songpan tectonic region was controlled by Tibet, North China and Yangtze blocks since Cenozoic, therefore, the region was in the stage of tectonic substance converge from the lower mantle to upper crust, producing a mixed mantle reservoir in the studied area. The Miocene picritic basalt from the Liuping area occurred in the specific tectonic background can be interpreted to reflect lateral asthenospheric mantle eastward flow of the Tibet Plateau and partial melting of a mixed-asthenospheric mantle reservoir in the western Qinling-Songpan tectonic node.

关键词: [苦橄玄武岩](#) [源区性质](#) [深部动力学](#) [新生代](#) [青藏东缘](#)

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