

琼中古-中元古代变基性火山岩地球化学特征及其地质意义

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中文摘要:琼中古-中元古代抱板岩群斜长角闪(片麻)岩为高钾变基性-中基性火山岩。化学成分上具有富钾(K_2O/Na_2O 值大于0.6)、高铝(Al_2O_3 含量高于15%)和低钛(TiO_2 含量低于1.3%)等特点。岩石的K、Rb、Ba、Th等大离子亲石元素和轻稀土元素明显富集,LREE/HREE值较高,并具有显著的Ta、Nb、Ti负异常。微量元素和Sm、Nd同位素特征表明,琼中变基性火山岩岩浆源区偏离原始地幔,并且未受成熟地壳物质的明显污染,它们是俯冲消减带上部陆弧区地幔楔受俯冲洋壳析出的流体和硅酸盐融体交代作用后部分熔融的产物。古-中元古代时期,海南地块可能经历了由拉张到挤压的地球动力学转变,早期拉张阶段形成琼西洋脊型和过渡型拉斑玄武岩,中晚期则形成与洋壳俯冲作用相关的琼中岛弧型高钾钙碱性玄武岩,这一过程可能与华南大陆的裂解及随后洋壳向华夏古陆的深俯冲作用有关。

中文关键词:古-中元古代 高钾变基性火山岩 地球化学 地幔交代作用 琼中

Geochemical Characteristics of the Paleo-Mesoproterozoic Meta-Basic Volcanics in Qiongzong, Hainan Island, and Their Geological Implications

Abstract:The protoliths of the plagio-amphibolites and plagio-amphibolic gneisses in Baoban Group from Qiongzong, Hainan island, are K-rich metamorphic basic and medium-basic volcanics. Chemically, they are characterized by the enrichment of potassium (K_2O/Na_2O values higher than 0.6) and aluminum (Al_2O_3 contents higher than 15%), and depletion of titanium (TiO_2 contents lower than 1.3%). They have high LILE (such as K, Rb, Ba, Th, etc.) and LREE concentrations and relatively high LRREE/HREE values, and display clear negative Ta, Nb and Ti anomalies. Geochemical characteristics of trace elements and Sm-Nd isotopes indicate that the magma source areas were somewhat away from the primary mantle, and did not suffered from significant contamination by the evolving continental materials. They were formed by partial melting of the mantle wedge above the subduction zone in the continental arc area that had been subjected to the metasomatism of the fluids and silicic melts released by the subduction oceanic shell. The Hainan block might have suffered a geodynamic shifting from "extension" to "squeezing" in the Paleo-Mesoproterozoic period, leading to the formation of the oceanic_ridge type and oceanic_arc transitional type tholeiites in western Hainan at the early extension stage and the K_high calc_alkaline basalts in the Qiongzong area at the middle_late subduction stage. This shifting process was probably related to the splitting of the South China continent and the subsequent subduction of the oceanic shell to Cathaysia.


keywords:[Paleo-Mesoproterozoic](#) [K-rich meta-basic volcanics](#) [geochemistry](#) [mantle metasomatism](#) [Qiongzong](#)

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