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松辽盆地营城组两类酸性火山岩地球化学特征与成因

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摘要：

松辽盆地断陷期营城组发育一套厚层火山岩,钻井岩心及薄片观察发现,火山岩以流纹岩、英安岩、流纹质凝灰岩及熔结凝灰岩等酸性火山岩为主,中基性岩相对较少。在对样品精细挑选基础上,开展了岩石主量元素、微量元素及Sr-Nd同位素测试分析。结果显示,该套酸性火山岩依据TiO_2含量可明显分为两类,其中高Ti酸性火山岩(TiO_2>0.45%),规模较小,SiO_2含量介于64.87%~68.79%之间,其主量元素、微量元素与亚碱性中基性岩呈连续变化趋势且具有相似的Sr-Nd同位素组成;低Ti酸性火山岩(TiO_2<0.4%)SiO_2含量为68.93%~76.69%,该类岩石为营城组酸性火山岩主体,与碱性基性岩呈双峰式组合,元素含量及同位素比值变化范围较大。研究表明,两类酸性火山岩的形成都与晚中生代东北地区受古太平洋板块俯冲引起的岩石圈拆沉减薄软流圈上涌有关。在板块俯冲影响下,被富集的亏损地幔源区发生部分熔融,在岩浆演化过程中经历了一定分离结晶作用形成了少量高Ti酸性火山岩岩浆。与此同时,在底侵作用下新生地壳与下地壳物质发生混合熔融,受上地壳不同程度混染后形成了大规模的低Ti酸性火山岩岩浆。

英文摘要：

The thick volcanic rocks are widely distributed in Yingcheng Formation of Songliao Basin. Core and thin section identification exhibit that volcanic rocks are mainly composed of rhyolite, dacite, rhyolitic tuff, ignimbrite and so on. Major, trace elements and isotopic geochemistry studies indicate that acid rocks are obviously classified as two types: high Ti acid volcanic rocks (HTAVR) and low Ti acid volcanic rocks (LTAVR). Many conclusions can be draw from the results of geochemical elements: (1) HTAVR have higher TiO_2 (TiO_2>0.45%) but lower SiO_2(64.87%~68.79%). LTAVR have lower TiO_2 (TiO_2<0.4%) but higher SiO_2(68.93%~76.69%). (2) Major and trace elements express continuous variation between HTAVR and sub-alkaline intermediate-basic rocks. They also have similar Sr-Nd isotopic elements. LTAVR are the main components in Yingcheng Formation with wide initial $^{87}Sr/^{86}Sr$ ratios. (3) The two types of acid rocks were probably associated with the lithospheric thinning and asthenospheric mantle upwelling by subduction of the Pacific plate beneath eastern China. However, there are many different geochemical characteristics between the two types of acid rocks because of different magmas source, geochemistry process and crustal contamination. The magmas of HTAVR were generated partial melting of the depleted mantle which has been enriched but undergoing fractional crystallization. The generation of LTAVR origined from mixed melting of juvenile crust and low crust components with contaminated by supracrust.

关键词：松辽盆地 营城组 酸性火山岩 岩石成因

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