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华北东南部中生代岩石圈地幔性质、组成、富集过程及其形成机理

张宏福 周新华 范蔚茗 孙敏 郭锋 英基丰 汤艳杰 张瑾 牛利锋

[1]中国科学院地质与地球物理研究所岩石圈演化国家重点实验室,北京100029 [2]香港大学地球科学系,中国香港 [3]中国科学院广州地球化学研究所,广州510640

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摘要：

本文通过对我国华北东南部中生代幔源岩浆活动的时空分布规律及其地球化学特征的系统总结来进一步厘定该地区中生代岩石圈地幔的性质和组成，并通过与华北内部如鲁中地区中生代岩石圈地幔的对比研究探讨华北东部岩石圈的时空演化规律、富集过程及其形成机理。幔源岩石的Sr—Nd—Pb同位素特征表明华北东部中生代岩石圈地幔存在明显的时空不均匀性，其中心部位如鲁中地区以弱富集地幔为主体；而东南部如鲁西南和胶东地区则为类似EM2型地幔（^87Sr／^86Sri可高达0．7114）。华北东南部中生代岩石圈地幔随时间的演化特征也很明显。这些幔源岩石的地球化学特征和玄武岩中地幔岩捕虏体（橄榄岩和辉石岩）和捕虏晶（橄榄石和辉石）的组成和结构特征皆证明华北东南部中生代岩石圈地幔曾受到过富硅熔体的强烈改造。橄榄岩-熔体的相互反应是该区岩石圈改造和组成转变的重要方式，从而造成古生代高镁橄榄岩转变为晚中生代低镁橄榄岩和辉石岩。进入岩石圈地幔的熔体具下／中地壳物质重熔的特征，从而导致该区晚中生代岩石圈地慢的快速富集。有关华北东部中生代岩石圈减薄和改造的时限、过程和机制等问题也进行较详细的讨论。

英文摘要：

This paper aims to constrain the nature and composition of the Mesozoic lithospheric mantle beneath the southeastern North China Craton on the basis of a systematic review on the temporal and spatial distribution and geochemical features of Mesozoic mantle-derived magmatism in the region,and to farther understand the temporal and spatial evolution,enrichment processes and its mechanism of the lithosphere through the comparison with the Mesozoic lithospheric mantle beneath the central,i.e.Luzhong region. Sr-Nd-Pb isotopic features of mantle-derived rocks imply that apparently temporal and spatial heterogeneity of the Mesozoic lithospheric mantle existed beneath the eastern North China Craton,the mantle under the central North China Craton,i.e the Luzhong region was dominantly slightly enriched and that under the southeastern North China Craton such as Luxi and Jiaodong region was EM2-like (~(87)Sr/~(86)Sr_i up to 0.7114).It is also apparent that the Mesozoic lithospheric mantle beneath the southeastern North China Craton evolved with time.These geochemical features of mantle-derived rocks and compositional and textural characteristics of the basalt-borne mantle xenoliths (peridotites and pyroxenites) and xenoerysts (olivine and pyroxene) demonstrate that the Mesozoic lithospherie mantle beneath the southeastern North China Craton was severely affected by the silica-rich melts.Reaction between lithospheric peridotite and infiltrated melt was considered to be an important type of lithospheric reconstruction and transformation,which led to the transformation of the Paleozoic high-Mg~# peridotite to late Mesozoic low-Mg~# peridotite and pyroxenite.Influx of melts into the lithospheric mantle, which had the geochemical characteristics of partial melting of the lower/middle crust,resulted in rapid enrichment of the late Mesozoic lithospheric mantle beneath the southeastern North China Craton.Relevant scientific issues such as the timing,processes and its mechanism of Mesozoic lithospheric thinning and reconstruction of the eastern North China Craton have also been discussed.

关键词：中生代 幔源岩石 橄榄岩-熔体反应 岩石圈地幔 华北克拉通

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