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华北地块东部晚中生代至新生代岩石圈不均一减薄与改造模式

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摘要：

本文综合运用不同时代幔源包体平衡温压对比、玄武岩地球化学性质对岩石圈厚度的反演以及不同时代岩石圈地幔地球化学性质的对比的方法，把华北地块东部岩石圈的减薄时间限定在晚中生代至新生代之间。减薄的机制可能是华北东部地区晚白垩世以来大陆岩石圈的拉张作用。由于机械性拉薄和热、机械和化学侵蚀作用，岩石圈厚度最终减薄到70km以下。但古老的岩石圈地幔并没有完全因减薄而消失，残留部分受到了来自软流圈物质的强烈改造，使其Sr、Nd同位素组成类似于软流圈，但Os同位素没有受到明显的改变。改造后的岩石圈地幔成为华北地块东部新生代岩石圈地幔的主体。在时空上，岩石圈的减薄具有不均一的性质。

关键词：华北地块 晚中生代 新生代 不均一 减薄 改造模式 岩石圈地幔 地球化学性质 岩石圈厚度 大陆岩石圈 同位素组成 平衡温压 幔源包体 综合运用 拉张作用 晚白垩世 东部地区 侵蚀作用 软流圈 玄武岩 机械性 反演

Model of the Lithospheric Non-uniform Thinning and Alteration from Late Mesozoic to Cenozoic in the North China Block

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Abstract:

This paper integrates three methods to constraint a time span from Late Mesozoic to Cenozoic when the lithospheric thinning took place in the eastern North China Block. These methods include comparison of equilibrium P-T conditions of mantle-derived xenoliths with different ages, reflection of the lithospheric thickness by the geochemical characteristics of basalt and comparison of the geochemical characteristics of lithospheric mantle with different ages. The mechanism of thinning may be the spread process of continental lithosphere after Late Mesozoic in this region. The lithospheric thickness was ultimately thinned to less than 70 km by mechanical spread as well as thermal-mechanical and chemical erosion. However, the old lithospheric mantle did not whole disappear after thinning. The rudimental part of it was intensively altered by the materials derived from the asthenosphere, making its Sr-Nd isotopic composition similar to the asthenosphere, while its Os isotopic composition was not evidently influenced. This altered lithospheric mantle constituted the main body of Cenozoic lithospheric mantle in the eastern North China Block. The lithospheric thinning presented non-uniform characteristics in space and time.

Keywords: lithosphere thinning isotope the North China Block

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