

# The shallow lithospheric mantle beneath the Carpathian-Pannonian region: evidence from ultramafic xenoliths

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The nature of the shallow lithospheric mantle beneath the Carpathian-Pannonian region has been investigated via the study of several suites of mantle-derived ultramafic xenoliths

which occur in the widespread Tertiary/Quaternary mafic alkaline magmatism of the region. Localities of mantle xenoliths include the Balaton Highlands, Graz Basin, Little Hungarian Plain, Nograd-Filakova and Persani Mountains, so geographical coverage is wide. Most of the xenoliths are anhydrous spinel peridotites, with harzburgites, dunites, pyroxenites and hornblendites being much less common.

The mineralogical and chemical variations of xenolith suites found in most Carpatho-Pannonian localities are very similar, reflecting the operation of similar processes in the mantle

beneath the different localities. The most important mantle processes are: (1) depletion of the mantle to varying extents by partial melting — this event is much more ancient than the subsequent events; (2) enrichment of the lithospheric mantle by the introduction of mafic melts from the deeper asthenosphere.

Most of the mantle enrichment is related to alkaline magmatism, including Late Cretaceous lamprophyric and carbonatitic magmas, and Neogene alkaline basalts/basanites. The resulting cryptic metasomatism (indicated by LREE-enrichment in the constituent clinopyroxenes) and modal metasomatism (indicated by the presence of intersti-

tial hydrous phases and formation of amphibole veins) shows isotopic and REE similarities to the host alkali basaltic magmas.

Despite close proximity to regions of subduction-related magmatism, infiltration of subduction-related fluids or melts into the lithospheric mantle of the Carpathian–Pannonian region is not easily detected in REE and most isotopic compositions. High  $^{87}\text{Sr}/^{86}\text{Sr}$  ratios and unusual enrichments in Pb isotopes in some xenoliths from the Balaton Highlands are the main indication of such subduction-related infiltration.