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VÁRGESZTES

(Western Hungary, Vértes and Gerecse Hills, Mór wine region)

24-27th April 2013

## ABSTRACT BOOK

Editors:

LÁSZLÓ FODOR, SZILVIA KÖVÉR



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## Dynamics of the lithosphere-asthenosphere system in the Carpathian-Pannonian region following the Miocene extension

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Detailed geochemical and deformation analysis of numerous of mantle xenoliths from the Carpathian-Pannonian region revealed that the present lithosphere, which suffered significant thinning in the Miocene, may be divided into two major layers based on the equilibrium temperatures as indicators for the depth of origin. The shallower layer, from the MOHO to ~40 km depth, is characterized mostly by fine grained, equigranular to porphyroclastic xenoliths, generally displays an 'axial [010]' deformation pattern typical for transpressional deformation regime. Mineral constituents from this shallower layer show high Mg#, low H<sub>2</sub>O content in nominally anhydrous minerals () and depleted in basaltic major elements implying that this layer may have undergone considerable depletion. Trace element patterns, however, show enrichment most probably due to subsequent metasomatic enrichment episodes.

The deeper layer is below ~40 km and above the present lithosphere-asthenosphere boundary. The xenoliths show mainly coarse grained, protogranular texture with 'A-type' deformation pattern typical for asthenospheric flow. Minerals usually have lower Mg# and richer in basaltic major elements. The NAMs from this layer show higher H<sub>2</sub>O content than those in the shallow layer. Trace element patterns, on the other hand, do not refer to later refertilization episodes by showing dominantly depleted pattern.

We suggest that the deeper, more H<sub>2</sub>O rich and less-depleted layer of the present day lithosphere is a juvenile one, which may have added to the lithosphere following the Miocene extension (~10 Ma) in the thermal relaxation stage. The shallower layer, in contrast, may have undergone several episodes of depletion, deformation and refertilization prior to and during the Miocene extension.

This layering may also be seen as seismic reflectors at ~40 km depth in the present lithospheric mantle beneath the region, and, in addition, the anomalous seismic anisotropy pattern beneath the CPR may also be explained by the deeper, juvenile layer. It appears that the deeper layer does not originate from the simple updoming of the asthenosphere, but represent new asthenospheric material which was displaced and transferred into the CPR due to the collision in the Alps.