Insight into the evolution of lithosphere beneath Pannonian Basin through studying H_2O content in NAMs from Füzes-tó upper mantle xenoliths (Hungary)

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The youngest xenolith-bearing alkali basaltic outcrop (Füzes-tó) in Bakony-Balaton Highland Volcanic Field (BBHVF) in the central Carpathian-Pannonian region (CPR) includes peridotite xenoliths with the highest diverse textures from the BBHVF.

Based on prior studies [1], a two-layered continental lithospheric mantle is present beneath the region: 1) shallow lithospheric mantle portion with fine-grained texture from the MOHO to 40 km depth, and 2) deeper, coarse-grained layer between 40 km depth and the present LAB boundary. The deeper layer could represent a juvenile lithosphere which was transformed form asthenosphere following the Miocene extension event. It was also proposed that tabular equigranular textures xenoliths may form a thin horizon which may separate these two layers [2].

Six representative and well characterized spinel peridotite xenoliths were selected for detailed FTIR study, covering the two mantle domains and, in addition, three tabular equigranular textured xenoliths from Füzes-tó are also inlcuded. H_2O content of the nominally anhydrous minerals (NAMs) were calculated from avaraged unpolarized FTIR spectra of each NAM [3]. Xenoliths from shallow layer show generally low bulk H_2O content (6-13 ppm), wheares the xenoliths from juvenile deep mantle have higher bulk H_2O contents (~20 ppm). The tabular equigranular textured xenoliths from the horizon that separate the two main domains show the most elevated H_2O concentrations in bulk NAM (~25 ppm). The higher water content of the deeper layer may be explained by its asthenospheric origin due to higher water activity presumably induced by the instability of pargasitic amphibole.

[1] Kovács et al. (2012), *Tectonophysics* **514-517**, 168-179. [2] Hidas et al. (2007), *Journal of Geodynamics* **43**, 484-503. [3] Kovács et al. (2008), *American Mineralogist* **5-6**, 765-778.