Extremely low structural hydroxyl contents in upper mantle xenoliths from the Nógrád-Gömör Volcanic Field (northern Pannonian Basin)

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We carried out detailed Fourier-transform infrared (FTIR) analyses on 63 well-characterized upper mantle xenoliths from the Nógrád-Gömör Volcanic Field (NGVF) [1].

The xenoliths show extremely low average structural hydroxyl contents (~0, 31 and 185 ppm for olivine, orthopyroxene and clinopyroxene, respectively) compared to values reported worldwide. The xenoliths have anomalous FTIR spectra and high structural hydroxyl ratios between clinopyroxenes and orthopyroxenes (an average of ~8). There is little correlation between the structural hydroxyl content and other physical or chemical properties of the xenoliths. These FTIR characteristics suggest that the NGVF upper mantle xenoliths were exposed to significant modification of their structural hydroxyl contents, which may be linked to pre- and post-eruptive processes.

Pre-eruptive decompression during extension leads to lower water activity, which is likely to have played a key role. However, post-eruptive cooling can be significant as well, as suggested by the higher structural hydroxyl content in xenoliths hosted in more rapidly cooled pyroclastics.

Our study reveals how FTIR characteristics may evolve in continental rift settings in young extensional basins.

[1] Patkó *et al.* (2019) *Chemical Geology* **507**, 23-41.