# Deformation and tectonic evolution of the upper mantle in the northern Pannonian Basin

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The Carpathian-Pannonian region is a young back-arc basin with a complex Neogene tectonic evolution, mainly characterised by extension and asthenosphere uplift during the Miocene associated with subduction and slab rollback in the Eastern Carpathians. Post-extensional alkali basalts have sampled the upper mantle at five occurrences. One of these is the Nógrád-Gömör Volcanic Field (NGVF), located in the northernmost part of the Pannonian Basin.

In order to gain information about the deformation state and processes of the upper mantle, crystal preferred orientation analyses were carried out on a representative set of 50 xenoliths. All three most abundant olivine CPO types are present among the xenoliths, although orthorhombic and [010]-fiber are dominant over [100]-fiber pattern. Based on fabric strength and equilibrium temperatures, two major groups can be distinguished. Coarse grained and part of the porhyroclastic textured xenoliths exhibit higher equilibrium temperatures and J-indices, along with a greater amount of intragranular deformation, whereas the rest of the porphyroclastic and equigranular xenoliths (i.e., where olivine shows equilibrium texture) have lower J-indices and temperatures, and occasionally show annealing-related grain growth. The first group represents the result of deformation induced partial dynamic recrystallisation, whereas the second group was affected by post-kinematic annealing, possibly linked to the extension and asthenosphere uplift. The differences in equilibrium temperatures are considered to be resulting from different depths of origin.

Seismic anisotropy calculations reveal a maximum of 5% S-wave anisotropy under the NGVF in a direction which falls in the plane of foliation but is perpendicular to the lineation. Recent geophysical data showed NW-SE directions for the fast polarized S-wave in the vicinity of the NGVF. Calculations for the thickness of the anisotropic layer reveal a significant contribution from the sublithospheric mantle.