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Crystal preferred orientations of upper mantle peridotite xenoliths from the Nógrád Gömör Volcanic Field (Northern Pannonian Basin)

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There are several localities in the Carpathian-Pannonian region where Plio-Pleistocene alkali basalts lavas and pyroclasts on the surface contain ultramafic xenoliths originating from the upper mantle. One of these occurrences is the Nógrád-Gömör Volcanic Field which is located in the northern part of the Pannonian Basin. Xenoliths from this area have undergone to various petrologic and geochemical studies in the past few decades, however, there is a lack of examinations focusing on crystallographic orientation. A method based on measurements with electron backscatter diffraction (EBSD) can provide insight into crystal preferred orientations of olivine and orthopyroxene - the major rock forming minerals of the mantle xenoliths.

14 lherzolites from 7 quarries of the Nógrád-Gömör Volcanic Field with previously studied petrography and mineral major element chemistry were selected to be measured with EBSD, for the purpose of determining olivine and orthopyroxene crystal preferred orientations, which are usually the result of a change in the physical conditions of the upper mantle (p, T, stress, strain, etc.). The distribution of crystallographic axes in olivines can be divided into three distinctive groups based on the alignment and directions of the a, b and c axes. These distribution groups are more or less related to the macroscopic texture and show a correlation with olivine J-indexes, which indicate the strength of the xenolith fabric. There is also a link between crystallographic orientations and calculated equilibrium temperatures. Our results show that samples from the southern part of the Nógrád-Gömör Volcanic Field (Bárna-Nagykő) display overally lower equilibration temperatures than those collected in the central part (Babi Hill and Medves Plateau). This difference in temperature, and hence in the estimated depth of origin may be responsible for the observed distribution of olivine crystal axes. Nevertheless, various crystallographic orientations suggest that there may be more deformation mechanisms that have activated on distinct levels of the mantle beneath the NGVF.