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Determination of the Lithosphere-Asthenosphere Boundary (LAB) beneath the Nógrád-Gömör Volcanic Field by combined geophysical (magnetotellurics) and geochemical methods

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Understanding the fundamental role of LAB is substantial for the investigation of the geodynamic evolution of the Earth. The LAB depths can be estimated by different geophysical methods (seismology, magnetotellurics), however these depths are controversial. It has been emphasized in the literature that combined geophysical and geochemical approach may lead to better understanding of these depths.
The magnetotellurics (MT) is very powerful method because it indicates the sudden increase in conductivity at the LAB. The mantle xenoliths (small fragments of the lithospheric mantle) provide the information to reconstruct their P-T paths.
In the Carpathian-Pannon region (CPR) five, well-studied occurrences of mantle xenoliths-bearing Plio-Pleistocene alkali basalts are known, which makes the CPR a very promising area for investigating the inconsistency in the LAB estimates. As a test area Nógrád-Gömör Volcanic Field (NGVF) has been chosen.
The host basalt erupted at the NGVF collected mantle xenoliths from a small volume of the upper mantle in a depth of about 40-50 km. The major element geochemistry of the studied xenoliths indicates that most of them represent common lherzolitic mantle, whereas others show strong wehrlitisation process. This metasomatism is supposed to be caused by a migrating mafic melt agent, resulting in the transformation of a large portion of lherzolite to wehrlite beneath the NGVF, possibly just below the crust mantle boundary.
In aim to detect the LAB at the research area and find the correlation with petrologic and geochemical results we carried out MT deep soundings. The campaign contained 12 long period MT stations with 3-5 km average spacing along 60 km long profile SSE to NNW direction. This presentation summarizes the preliminary results of the combined geophysical and geochemical approaches to determine the LAB depths.