Integrated geological and geophysical probing of lithospheric dynamics in a young extensional basin (Carpathian-Pannonian Region)

ISTVÁN KOVÁCS[1], GYÖRGY FALUS[1], CSABA SZABÓ[2], JÁNOS KISS[1], TAMÁS FANCSIK[1], ENDRE HEGEDŰS[1], ZSANETT PINTÉR[2], NÓRA LIPTAI[2] AND LEVENTE PATKÓ[2]

[1]Geological and Geophysical Institute of Hungary, H-1143, Srefánia út 14, Budapest, Hungary

[2]Lithosphere Fluid Research Lab, Institute of Geography and Earth Sciences, Eötvös University, Budapest, Hungary, H-1117, Pázmány Péter sétány 1/c

Detailed analysis of numerous of mantle xenoliths from the Carpathian-Pannonian region revealed that the present lithosphere may be divided into two major sub-horizontal domains.

The shallower “layer” is characterized mostly by fine grained, equigranular to porphyroclastic xenoliths, generally displays an ’axial [010]’ deformation pattern. Mineral constituents show high Mg#, low H_2O content in nominally anhydrous minerals (NAMs) and depleted in basaltic major elements implying that this layer may have undergone considerable depletion.

The xenoliths from the deeper “layer” show mainly coarse grained, protogranular texture with ’A-type’ deformation pattern. Minerals usually have lower Mg# and richer in basaltic major elements. The NAMs from this “layer” show higher H_2O content than those in the shallow layer. This layering may also be seen as seismic reflections in the present lithospheric mantle 10-15 km below the MOHO, accompanied by a considerable increase in seismic velocities. Anomalous seismic anisotropy pattern showing E-W direction in contrast to the general NNW-SSE trend may be due to the fossil directions frozen in the juvenile deeper lithosphere which may be the result of an asthenospheric flow related to the Alpine collision.

Influence of long-term diagenesis on the REE content in marine reptile remains from the Middle Triassic bonebed (S Poland)

MONIKA KOWAL-LINKA[1]*, KLAUS PETER JOCHUM[2] AND DAWID SURMIK[3]

[1]A. Mickiewicz University in Poznań, Institute of Geology, Poland, (*correspondence: mokowal@amu.edu.pl)

[2]Max-Planck-Institut für Chemie, Mainz, Germany, (k.jochum@mpic.de)

[3]University of Silesia, Faculty of Earth Science, Sosnowiec, Poland (dawid@surmik.pl)

The geochemical signals recorded in fossil bones are commonly used to reconstruct conditions of sedimentary and diagenetic environments, but recent data suggest insufficient recognition of particularly the long-term impact of diagenesis on vertebrate remians. We have examined with LA-ICPMS 29 bones of marine reptiles collected from the ~247-245 Ma old (Middle Triassic) bonebed, outcropped in Żyglin (S Poland). This bonebed (a crinoidal limestone) comprises reworked vertebrate remains deposited originally in various coastal and marine settings and at different times. The two main objectives of the present study are: (1) to check whether concentrations and ratios of REE and other trace elements are useful to distinguish between relatively younger and relatively older bones in the marine bonebed, and (2) whether the early diagenetic element contents and ratios characteristic for the various depositional settings can still be deciphered.

The REE concentrations in the profiles (average ∑REE in individual profile is ~2900-3500 ppm) tend to be more or less constant. All samples are enriched in REE with regard to the PAAS. The samples/PAAS diagrams reveal “bell shaped” patterns with two peaks for Sm and Gd, a small low for Eu, and with HREE values far below the LREE values. The bones form a small cluster in the $(La/Sm)_N$ vs. $(La/Yb)_N$ diagram, although some samples are located distinctly outside the cluster margin. In the Ce/Ce* vs. Pr/Pr* diagram the bones reveal a slightly negative Ce_N anomaly or lack of it, and smoothly positive and negative La_N anomaly. Most of the samples display similar REE concentrations and distribution patterns, probably due to long-term diagenesis which obliterated the early diagenetic geochemical signals. Only several samples show different features.

M. Kowal-Linka is supported by the NCN grant 2011/01/B/ST10/04889, and Dawid Surmik by the NCN grant 2011/01/N/ST10/06989.

DOI:10.1180/minmag.2013.077.5.11