The Hurbanovo–Diösjenő Fault: boundary between the Central Western Carpathians and Northern Pannonian Domain

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The boundary between the Central Western Carpathians and the Northern Pannonian Domain – two crustal fragments with a different geodynamic provenance is represented by the Hurbanovo–Diösjenő Fault. The fault itself is located in the northern edge of the Transdanubian Unit and is covered by the relatively thick Neogene to Quaternary fill of the Danube Basin. The nature of this tectonic boundary is explained very contradictory because it is known only from several boreholes drilled in the 1950–70s. Moreover, interpretation of the seismic profiles is missing. The description of aforementioned boreholes often displays an old-fashioned biostratigraphy and outdated tectonic explanation of the Hurbanovo–Diösjenő Fault activity. Re-evaluation of the deep borehole cores penetrating the fill of several different Neogene and Palaeogene basins located above or near the Hurbanovo–Diösjenő Fault supported by structural analysis allowed a new interpretation of the Cenozoic activity along this fault zone: (1) during the Oligocene collision of the Eastern Alpine–Western Carpathian orogenic system with the European Platform, latter replaced by the Early Miocene formation of the ALCAPA microplate and its successive tectonic escape eastward required a dextral strike-slip movement along the fault; (2) a sinistral strike-slip movement along the fault is documented during the Middle Miocene evolution of the Danube and the Novohrad–Nógrad basins; and (3) a tectonic extinction of this crustal weakness zone was confirmed for the Late Miocene, when the Lake Pannon was formed. The renewed activity of this tectonic boundary as a normal fault is expected as a result of the Central Western Carpathian tectonic inversion phase in the Early Pliocene.

Acknowledgement: This work was supported by the Slovak Research and Development Agency under the contracts APVV-0099-11, APVV- 0625-11, APVV-0315-12, APVV-14-0118, Comenius University grant UK/325/2014, UK/389/2016; European Social Fund grant ESF-EC-0006-07, ESFEC-0009-07 and by grant VEGA 2/0042/12, 1/0193/13. Our special thanks goes to the company Nafta a.s. management and to Dr. Ľubomír Sliva for allowing access to the borehole core repositories.