

The Danube Bend, Hungary - proposal for its recognition as a geoheritage

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The Danube Bend in North Hungary is a river curvature along the Danube river, cut into a rocky section that reveals Miocene volcanic successions. The deepest and narrowest part of the curvature, 5 km in diameter (called Visegrád Gorge), is one of the most picturesque landscapes in Hungary. There, the Danube, before changing its direction toward the south, forms a U-shaped valley in planform – a peculiar shape that has been an enigmatic issue in Hungarian earth sciences since the 19th century.

A number of geomorphological theories have been put forward for the origin of the valley, which is incised between remnants of ca. 16 Ma old, small-sized dacitic stratovolcanoes of the Börzsöny Mts to the north, and the ~15 Ma Keserűs Hill lava dome complex to the south, all of which emerged in a contemporaneous archipelago (existent up to Pannonian times). According to Karátson et al. (2006), the U-shaped loop is partly inherited from a late-stage horseshoe caldera morphology of Keserűs Hill volcano, open to the north. Several Ma later, the formation of the Danube Bend was initiated by river incision, removing the post-volcanic sedimentary cover in mid- or rather, late Pleistocene times. Fluvial processes and erosion in turn were triggered by mountain uplift, climate changes, and drop of remote erosion base level. The present curvature of the river was controlled by the exhumation of the horseshoe caldera as well as the surrounding resistant volcanoclastic rocks (e.g. Visegrád Castle Hill) and a hilltop lava dome (Szent Mihály Hill). Moreover, an early-stage meander of Danube may have also inherited.

The accelerated Late Quaternary erosion and intense dissection has resulted in a "re-birth" of the volcanic relief, which exhibits again steep slopes to form the spectacular gorge. At present, exposed rock formations (e.g. Vadállókővek) tower above the Danube Bend, making the area one of the most scenic landscape in East-Central Europe. Therefore, in 1997, the Danube-Ipoly National Park was established on 60,000 hectares, including the Pilis (a karst landscape made up of limestone and dolomite), as well as the Visegrád and Börzsöny Mountains. In addition to the volcanic landforms, caves, paleolithic and Bronze Age finds, and some ruins of the Roman Empire are the major features of the area. However, although the popularity (e.g. tourism, hiking) of the mountains, especially the Danube Bend, is increasing, the dissemination of relevant geological, geomorphological, botanical and historical information is still a must.

Karátson, D., Németh, K., Székely, B., Ruszkiczay-Rüdiger, Zs., Pécskay, Z. 2006: Incision of a river curvature due to exhumed Miocene volcanic landforms: Danube Bend, Hungary. *Int. J. Earth Sci.* 95 (5), 929–944

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