Geophysical Research Abstracts
Vol. 13, EGU2011-12824, 2011
EGU General Assembly 2011

Quaternary alterations of drainage network in the transition zone between the Alps and the Pannonian Basin

Gábor Kovács (1,2), Tamás Telbisz (1), and Balázs Székely (2)

(1) Dept. of Physical Geography, Eötvös Loránd University, Budapest, Hungary, (2) Dept. of Geophysics and Space Sciences, Eötvös Loránd University, Budapest, Hungary

The investigated study area is situated in the transition zone between the still uplifting Eastern Alps and the subsiding Little Hungarian Plain (Joó 1992), bordered by Lafnitz (Lapincs), Répce (Rabnitz) and Rába (Raab) rivers. The contrasting forcing of the regions of differential uplift created a distinctive surface morphology of typically low relief that has a characteristic drainage network pattern as well. Our study is aimed at the reconstruction of the surface evolution by separation of individual geomorphic domains delineated by their geomorphometric characteristics.

The hilly area is mostly covered by Pannonian sediments. The mesoscale geomorphological units of the study area are influenced by the uplifting metamorphic core complex of Kőszeg–Rechnitz Mountains (Tari – Horváth 1995), by the also metamorphic and relatively uplifting Vas Hill as well as by the subsiding grabens. There are two dominant flow directions alternating downstream. Valley segments are often bordered by steep scarps, which were identified by previous research as listric normal faults and grabens. Largely, the investigated area consists of tilted blocks bordered by 30-60 m high and steep, fault-related escarpments as it was demonstrated by the analysis of lignite layers, topographic sections and topographic swath analyses (Kovács et. al 2010).

Drainage network reorganizations occurred in several steps during the Pleistocene. Corresponding landforms are abrupt changes in stream direction, wind gaps, uplifted terrace levels built up of sedimentary rocks and wide alluvial valleys. Terraces are best developed along the Strem stream, which has a strikingly small drainage area at present, due to the Pinka River, which captured the upper parts of the drainage basin. The widest valley belongs to Pinka River. Drainage reorganizations are most likely due to the uplifting scarps that diverted the streams. Remainders of previous cross-valleys are wind gaps. Using these markers (wide alluvial valleys with relatively small streams, terrace levels and wind gaps) and the different height of the scarps we roughly elaborated the geomorphological development of the area, including relative age of drainage network elements, tectonic features and river captures.

Results indicate that the first recognizable dominant flow direction was N–S trending that has been interrupted in several steps by the uplifting E–W scarps. Thus the lower segments of the streams mostly developed according to the new W–E trend. Finally, N-S trending trenches and scarps captured again the drainage leading to the present state of hydrographic network.

Joó, I. (1992): Recent vertical surface movements in the Carpathian Basin. Tectonophysics 202: 129-134.

Kovács, G., Telbisz, T., Székely, B. (2010) Faulted and eroded gravel deposit in western Hungary. - Geophysical Research Abstracts Vol. 12. EGU General Assembly 2010.

Tari, G. and Horváth, F. (1995): Middle Miocene extensional collapse in the Alpine-Pannonian transitional zone, in: Horváth, F., Tari, G., and Bokor, K. (Eds.): Extensional collapse of the Alpine orogene and hydrocarbon prospects in the basement and fill of the western Pannonian Basin, AAPG Inter. Conf. and Exhib., Nice, France, Guidebook to fieldtrip No. 6, 75–105.