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Spatial analysis of Budovar stream catchment (Srem Loess Plateau, Serbia) in a tectonically active region

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Budovar is the far longest stream on Srem Loess Plateau, with a length of a 52 km, and catchment area of 245 km2. Budovar stream drains a quite complex landscape in terms of generally flat loess plateau, with elevations decreasing gradually southeastward – from 213 m at slopes of Fruška Gora Mountain to 70,9 m at the confluence with Danube river.
The youngest (Pleistocene/Holocene) sedimentary formations in the catchment vary from slope loess on Fruška Gora Mtn. in upper part, through typical plateau loess in middle part, and the finest bog-sediments in tectonic depressions in lower part. These deposits lie over the bog-lake-terrestrial sediments with thickness over 100 m.
According the geodetic measurements, uplift of Fruška Gora Mtn., which has been the strongest during the Middle Pleistocene, is still present, with rates of up to 1 mm/y in contrast of general uplift of the area, subsidence is recorded in two distinct parts of the catchment.
Spatial analysis is done using a DEM, generated in ArcGIS 10.0 from the elevation points, 10 m contours and stream coverage available in 1:25.000 topographical maps. Both longitudinal and cross-section profiles of the valley reflect the influence of tectonic distortions and climatic fluctuations.
Valleys in Budovar catchment have composite character – the valleys cross-sections vary from deep incised V-shape, reversed trapezoid shape and completely flat valleys in tectonic depressions.
Moreover, there is almost no correlation between the shape of cross-sectional profiles and the direction of curvature of the main valley's long axis (left/right or straight), suggesting that the tectonic activity has the key role in shaping. The width of valleys in Budovar catchment area is in sharp contrast with present stream discharge, which suggests strong climate fluctuations since Upper Pleistocene. The longitudinal profiles also shows signs of kickpoints and some short reaches with increasing elevation in the flow direction.

Key words: active tectonics, valley shape, Srem Loess plateau, Fruška Gora Mountain