



Investigation of fluvial landforms in the north-eastern Pannonian Basin, using cartographic materials from the XIX-XXI Centuries

Delia Robu, Bogdan Niga, and Ioana Perşoiu

Ştefan cel Mare University of Suceava, Suceava, Romania (deliarobu@yahoo.com)

The study area is located in the north-eastern Pannonian Basin, and covers approximately 3700 km².

Using cartographic materials for the last 155 years, we analyzed and defined river network and relict fluvial morphologies created by the rivers Tur, Someş, Homorod and Crasna. Database extraction from each set of historical maps was performed by field verification and validation, associated to GIS techniques.

Relict fluvial morphologies on the Someş alluvial cone comprise a wide variety of channel typologies and sizes, drainage directions and their consequent typology, which indicates a complex fluvial evolution.

The dominant category of relict fluvial morphology is represented by the meander loop. Following the quantitative analysis on the successive sets of maps we identified and delimited meander loops and meandering paths formed prior to the reference year 1860.

Generally, the post-1860 relict fluvial morphologies are secondary morphologies, as the keynote is given by those formed previous to the reference moment 1860.

An analysis of the share of the relict fluvial morphologies on the three sets of reference cartographic materials (the second Austro-Hungarian topographic survey, Google Earth and orthophotoplans) highlights that most relict fluvial morphologies were identified on the second Austro-Hungarian topographic survey, followed by those identified in Google Earth and orthophotoplans.

The map of fluvial morphologies constructed in this study enables a discussion on drainage directions, based on the observation that a series of abandoned meander loops and segments follow clear directions.

We applied several quantitative indices in assessing the relict fluvial morphology (radius of curvature, paleochannel width). Consequently, we identified underfit stream sectors with meander loops larger than the modern ones Someş meanders (on the Racta River), uncharacteristic features such as braided riverbed reaches, a high frequency of meander scrolls present on the right bank of Crasna at its entrance in the plain, or the occurrence of wetlands in an area affected by subsidence (the Ecedeea Plain).

Despite the ample human intervention in our study area through sewers, dams, meander cuts, the river network evolution trend remained the same between 1860 and 2005, with evolution and formation of meanders, although the change rate has diminished.

“ACKNOWLEDGMENT

This paper has been financially supported within the project entitled „SOCERT. Knowledge society, dynamism through research”, contract number POSDRU/159/1.5/S/132406. This project is co-financed by European Social Fund through Sectoral Operational Programme for Human Resources Development 2007-2013. Investing in people!”