



## **Integrated assessment of the riverbank dynamics: A case study**

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The significant aim of the present study consists in pointing out the Motru river's critical points of river bank instability (South-West Romania) and their correlative analysis with the entire riverbed's evolution, mainly determined by flow variation (both liquid and sediment discharge) and current deposits' morphology and variability, to point precisely, and the aggradation and degradation processes of the riverbed.

The Motru river's banks are made up of cohesive rock, which infers the involvement of the material particle. Morphological river bank processes are obvious within the lower course of the Motru river, where the riverbed is characterised by a pronounced instability degree, marked by the concave and convex banks. The development of concave banks is either determined by erosion or by the effective collapsing of the banks.

The integrated assessment of the Motru river banks' dynamics (134 km) consists in elaborating a morphometrical database (the measurements were carried out with GPS Rover - GNSS Smart S 82-T) regarding the values of the two parameters considered relevant in river bank dynamics and erosive river bank processes: the scouring height and studied bank length.

The field measurements took place beginning with the spring of 2011 until the autumn of 2016 and led to the possibility of highlighting 84 locations characterised by high river bank instability. In the measured locations, the scouring height varies between the minimum of 1 m (locations of inchoative instability, upstream and downstream the confluence with the Cotoroaia tributary) and the maximum of 8 m (two cases including one in which the Motru river course turns direction by 90 degrees). In what concerns the scouring bank length, the variation interval is comprised between the maximum of 100 m and 675 m (in the sector of extended alluvial plain). In 70% of the cases, we have identified locations with values of the scouring height included in the 1-3 m class of values and the scouring bank length comprised between 100 and 250 m.

The river bank dynamics was hence correlated with the liquid and solid flow along the river, these elements being measured at three hydrometric stations (Târmigani, Broșteni and Fața Motrului) during the observation period. The general trend that emphasizes the predominance of the degradation process is explained by the reduction of the quantity of alluvia that was transported by the river and by the augmentation of the erosional power of the liquid flow.

Analysing the morphological river bank processes by taking into consideration the morphology of the banks, the typology of the riverbed and the particularities of the discharge gave us the possibility to identify the recent riparian landscape as natural habitats of unique environmental and ecological value, but highly sensitive to human impact.