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PRESENT-DAY GEOMORPHOLOGICAL PROCESSES IN THE VEDIŢA CATCHMENT

PROCESE GEOMORFOLOGICE ACTUALE ÎN BAZINUL HIDROGRAFIC VEDIŢA

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Abstract: The river Vediţa is situated in the middle section of the Cotmeana Piemont. It is delimitated Westwards by the hydrographical basin of the Vedea river and Eastwards by the hydrographical basin of the Cotmeana river. From a geological point of view, it is located in the Getic Ground, which was a sedimentation area. This area is made up of Cândesti Stata which are made of sand in alternation with gravel with lens of clay. This geological structure is the main factor for the present dynamics of the relief. In the hydrographical basin of the Vediţa river, the main processes regarding the relief dynamics are: torrents, scrunb in area, landslips and landslides. There are some elements which influence this processes, such as: the relief characteristics, the human land use and the climate parameters.

Key-words: *Cândeşti strata, recent geomorphological processes, gush formation, clough formation, gutters, landslides, landslips*
Cuvinte-cheie: *Strate de Cândeşti, procese geomorfologice actuale, torenţialitate, ravenare, rigole, alunecări de teren, prăbuşiri de mal (surpări)*

I. INTRODUCTION

The Vediţa river basin is entirely located in the Getic Piedmont, one of the most interesting relief units in Romania. The latter lies Southwards from the Southern Carpathians and the Romanian Plain. Within the Getic Piedmont, the analysed area is represented by one of the Eastern components (the Cotmeana Piedmont), occupying the central-Eastern part of the unit and having a general North-South orientation, between the settlements Morăreşti (in the North) and Vităneşti (in the South).

From North to South, the Vediţa river basin is confined in its Western part by Obejdeanului Hill (510 m), Ciorachii Hill (484 m), then Ursului Hill (371 m) Southwards, Scorustea Hill (360 m), Mereni Hill (331 m), Vlaici Hill (266 m), Coloneştilor Hill (256 m), Sucet Hill (252 m), Râsului Hill (237 m) and Somandocului Hill (214 m).

Eastwards, the border is made up of Piscul Nutei (520 m), the topographical point North Miercani (491 m), Pădurenii de Vale Hill (347 m), Govaneşti Hill (290 m), Branarului Hill (272 m), Badei Hill (255 m), Berendei Hill (253 m).

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II. RESULTS AND DISCUSSIONS

2.1. The factors influencing the dynamics of recent geomorphological processes

The Cotmeana Piedmont geology, in general and the Vediţa basin, in particular, is closely connected with the Getic Depression, as a whole, which formed through Carpathian and Balkan bedding immersion, at the beginning of the Sennonian. During this period, there was a continuous marine flooding and immersion of the analysed area, resulting a rudaceous facies. During the Eocene progressive transgression, an argillaceous facies is deposited, while during the Tortonian, the marine waters progressively draw off Eastwards. There is another marine cycle durin the Sarmatian, this period's deposits being sincline, anticline, but also horizontal ones. The Pontiand deposits fully develop within the analysed area, three different levels being specialised, according to the share and amount of the constituent elements: clay, sands or gravel. At the beginning of the Cuaternary, the continuously regressing levantine lake is clogged with raw materials transported by the torrential streams from the Southern Carpathians, affected by the elevation dynamics of the Valahian phase. The inferior Pleistocene is made up of two horizons which together form the Cândeşti strata (sands in alternance with gravel and clay), while medial Pleistocene is represented by loess deposits. This geological structure increased torrential constitution, collapsing along riverbanks, but also small-sized landslides.

The relief influences the terrain dynamics through for of its characteristics: density of relief fragmentation, fragmentation depth, geodeclivity and hypsometry (Fig. 1, 2).

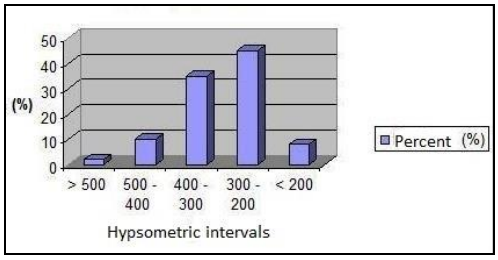

Fig. 1. Hipsometry

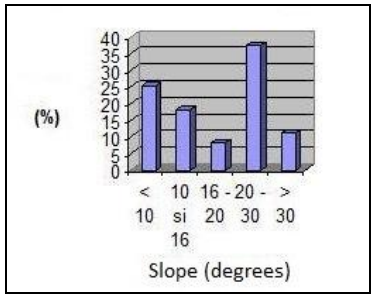

Fig. 2. Geodeclivity

We should also take into consideration the fact that the Vediţa river basin is an assymetrical one, having steep flanks on the right side and lineal on the left side, which impose certain ranges of geomorphological process development.

The climatic factor also influences the actual modelling through two parameters: temperature and rainfall. These parameters register maximum values in June, July, August, with direct implications in activating and developing torrential streams, but also a higher stress exerted by the river flow on the banks, increasing the risk of collapse (Fig. 3, 4).

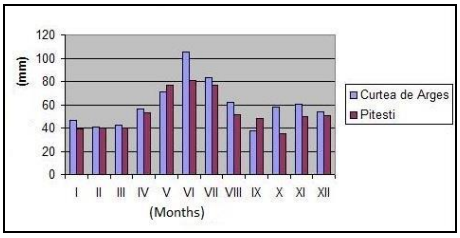

Fig. 3. Monthly rainfall

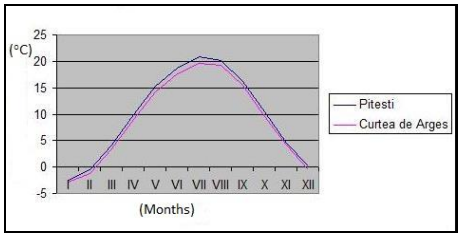

Fig. 4. Air temperature

The man-made activities are represented in the area by cereal and fruit tree cultures, which actually induce a high level of human intervention. In the Vediţa catchment, deforestation was meant to capitalize wood and extend crop fields. This mainly resulted in the degradation of vegetal associations and denudation exposure. Chain processes developed, which also modified the soils. The main human-induced activities that arficialized the land were: agricultural activities intensification, communication arteries development etc.

2.2. Present-day geomorphological processes in the Vediţa Catchment

The present-day relief modelling processes that take place in the Vediţa Catchment can be divided into two main categories: slope processes and channel processes.

Among the slope processes, there are to be noted the rainwash and the sheet erosion; gully erosion and torrentiality; as erosion processes induced by the water flow concentration on slopes and in the riverbed, the gully erosion and the torrentiality characterize the entire Vediţa Catchment, but especially the right slope. The torrential flash floods are extremely strong because of the large development of the drainage basins on the quasi-structural surface that forms the left slope of the Vediţa. The erosion is characteristic to the lower half of the flow channels, where it becomes manifest both through their deepening, as well as through the lateral degradation of the banks and of the slope base. The lateral erosion of the torrents maintains the entire slope in a permanent state of imbalance (Photo no. 1, 2).

Photo no. 1. The drainage basin of the Ciocăneşti torrent (2005)

Photo no. 2. The drainage basin of the Ciocăneşti torrent (2008)

The year 2005 was characterised by high precipitation quantities, this aspect leading to the intensification of torrential erosion at the level of the River Catchment. The torrents began to enlarge their surface especially through regressive erosion in the drainage basins (Photo no. 3, 4).

Photo no. 3. Ciocăneşti torrent (2005)

Photo no. 4. Ciocăneşti torrent (2008)

After this period of erosional activation within the drainage basins and the flow channels, the region under study was characterised by an interval with low precipitation quantities, which led to the decrease of erosional intensity and to the tendency towards a balance profile; during this interval, the gravitational processes were predominant, which led to the decrease of the slopes along the torrential organisms.

The gully erosion, the elementary form of concentrated flow, appears either as component of the river catchments, as it is to be noticed in the torrential sources located on the left side of the Vediţa - although these landforms can also be seen on the right side of the river - or as individual element on the slopes, situation that is especially characteristic to the slopes of the Vediţa, downstream of the Vedea, within the middle sector of the catchment. Its linear development is favoured, on the one hand, by the extension of the structural surfaces, given their general consequent character and, on the other hand, by the loess-like clayey deposits that cover these slopes.

The extended surfaces that undergone deforestation in the Vediţa catchment-especially those located on the slopes of its tributaries, the Ulmul Mare and the Boul (Photo no. 5), as well as in the lower sector of the Vediţa - favoured the development of small-scale landslides (their development is not ample because the slope and the lithological conditions do not favour such an extension). Important rill and gully erosion processes accompanied the landslides, especially within the sectors where torrential erosion could install.

Photo no. 5. Landslide on the Vediţa-the Boul interfluve

The Vediţa riverbanks are affected by lateral erosion, which leads, in the first stage, to the under-caving of the rock packages and the appearance of erosion marmites; subsequently, the rock packages located above would collapse under the action of gravitational force. This type of riverbank regression can be pointed out by comparatively analyzing the 2005 and the 2008 situations (Photo no. 6, 7). The geological constitution of the region, with the predominance of the Cândeşti Strata, favours the rapid regression of the slopes.

Photo no. 6. Left slope of the Vediţa, between Gueşti and Vităneşti settlements, 2005

Photo no. 7. Left slope of the Vediţa between Gueşti and Vităneşti settlements, 2008

The riverbed processes characteristic to Vedița catchment area are intermittent, led by strong floods of the river. The fluvial modelling is done both by transport and accumulation processes in the riverbed, maintaining a high mobility thereof (banks, braided channels) and by side erosion processes which affect especially the Vedița meander banks and slopes in the meander bends, affecting also some tributaries such as the Ceptura river (tributary on the right side).

The shore side erosion in these places is a permanent cause in triggering the shore collapses. Such situations occur on the left slope downstream of Gueşti (Photo no. 8) or on the left slope near Coloneşti locality.

Photo no. 8. Slope collapse (subsidence) - Gueşti

III. CONCLUSIONS

The current geomorphological processes in the Vedița catchment area are caused by: geological substrate in which prevail the Cândești Layers, relief, anthropogenic factor that favours or accelerate their development.

The forms created by the current modelling processes are found throughout the studied area, and depending on the predominant factor in their formation, a regionalization can be obtained as follows: the northern half - the predominant processes are torrents and ravines; the southern half - where the slope collapses prevail.

In conclusion, there are accelerating periods of the current geomorphological processes (periods of rainfall) in the studied region and periods with reduced intensity (during periods of low rainfall).

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