Considerations regarding the dynamic of the present geomorphological processes developed on the sector of subsequent valley of the Prut river between Horodiștea (Romania) and Criva (Republic of Moldova)

Alin Prisăcariu
“Dimitrie Cantemir” College,
Darabani, Romania

Georgiana Văculișteanu
Department of Geography, Geography and Geology
Faculty
Alexandru Ioan Cuza University of Iași
Iași, Romania

Abstract— The terrain of the analyzed region brings to attention a series of shaping factors which have done nothing else but to “give birth” to new landforms. Under lithological aspect, the Plateau of Moldova spreads out on the territories of the three states: Romania, Republic of Moldova and Ukraine, presenting the same features which favour the evolution of the slope processes. This study has got the role of observing the differences between the two slopes of the Prut River, the right one which appears as an imposing cuesta, and the left one which overlays on a reverse of cuesta. More exactly, it will be tried the establishing of some correlations between the structural terrain with the associated processes and the petrographic one represented by the pseudo karstic terrain.

Keywords— *cuesta; reverse of cuesta; pseudo karst; structural terrain; sculptural terrain; subsequent valley*

I. INTRODUCTION

Terminologically speaking, the structural terrain from the surface of the Plain of Moldova and especially the one of the analyzed area, is basically non-existent, in fact existing one of sculptural particularity resulted through the selective erosion under the influence of the external shaping factors.

The subsequent valleys (Fig. 1) are characterized by their perpendicular layout on the direction of the layers fall, emphasizing an asymmetrical profile. The sector of subsequent valley, within the Romanian perimeter, between Oroftiana and Radauti Prut, on the Ukrainian one, between Novoselytsia (Noua Sulita) and Criva, and on the Moldavian one between Criva and Lipcani, surprises through the terrain of cuesta, very clearly bounded in the Romanian shore and by the processes of ravine and landslides which contributed mostly to the successive

modification of the border between those three states. All this geomorphological aggregate spreads out on an area of approximately 45 km.

II. THE GEOLOGY OF THE REGION

„The Prut River valley crosses the Darabany Mamalyga Rise, an uplifted area”(Andreychouk, 1988, 2007) where the gypsum substrat has thickness of 24 – 26 m. From lithological point of view, the sector overlays on a loamy-marnos complex with some grezo-sandy intercalations of quaternary age, Sarmatian and Badenian. On both sides in substrat can be found a reserve of gypsum, laid down in intercalations with the clay. This fact is shown, on the right shore, by the mining operations of this material from Ivancauti, Paltinis commune and on the left shore is more obvious through the “Emil Racovita” cave. The gypsum is of Badenian age and shows up on certain sectors under the shape of some arches. The Karst from the Prut area is younger and the groundwater circulation is influenced, the water from the fountains is not drinking. (Andreychouk, Ridush, 2009).

III. THE PRESENT GEOMORPHOLOGICAL PROCESSES

A. The areolar erosion

This is present on the vast majority of the slopes, basically being precursory to the other geomorphological processes. It is characteristic to the slopes with inclinations of 2-60°. As remainings of this process we can give example o series of small ditches, results of the drippings, or areas where can be observed large whitish surfaces, the saltings. This relatively simple process leads, by acting in time, to a silting-up of the slope, which can generate early glacises. (Băcăuanu, 1980).

B. The torrential erosion

Involves a leaking of an organized type, which shapes many trenches, ravines (Fig.2) and even streams. The last ones present a large development on the right slope, having a catchment area that can reach kilometers (1 - 10 square km) and lengths up to 7 km on certain sectors, right along Horodistea locality (Mihăilă and Prisăcariu, 2004).

have the characteristic to unfold in a prismatic shape (Băcăuanu, 1968), being, moreover, very easily erodible. These processes can be observed on a wide alignment, starting from the west of Oroftiana, very closely to the Ukrainian border, and which continues in the most of the cornices from this alignment, especially in those found along the localities Baranca, Bajura, Teioasa, Horodistea, Cuzlau and Radauti Prut. A large frequency is also shown

Fig. 1. Transversal profile in the subsequent Prut valley (between Criva and Horodiștea)

These organisms of erosion fall perpendicularly on the subsequent valley, generating the obsequent valleys of the region. They are young forms, found in full evolution and amaze through a huge alluvial cone which can spread up on tens of meters. The most relevant bodies of erosion can be found along the localities Bajura and Baranca, in the Hills Cetatuia Rotunda, Movila Bortoasa, Movila Iezunie, Dealul Mare and Dealul Holmului. The same situation is found in the North - the West of the locality Paltiniș, in Dl. Paltinisului, Dl. Ivancauti, Dl. Cuzlau and Dl. Sloboziei. All these enroll to the cuestaslope from the right side of the River Prut.

Fig. 2. Ravine, NV of Horodiștea

C. The crumblings

They show a relative frequency, being found mostly in the slopes of the main erosion bodies. The amplitude of this process is due mainly to the factors related to the lithological structure, such as the one of the clays which

in the shores of the slopes of the valleys of obsequent kind.

Fig. 3. Landslide NV of Paltiniș

D. The landslides

Affect strongly the landscape, also causing the decrease of the agricultural potential of the region had into view.

Those are mainly of mixt type (Fig.3 and 4), presenting a mixture of mounds, waves and steps, or even nests (Bojoi, 2000). Often, between the landslides waves the water stays, generating ponds which will favour the process afterwards. The cornices have heights and lengths that reach even hundreds of meters on certain alignments. The sliding bed has got here and there thicknesses of 10 - 20m. Another relevant factor is the sliding velocity, which presents a kind of variability depending on declivity and also on the moistening degree. On certain slope sectors there is implemented a stabilization by planting some curtains of trees, but, even though, over 75% from them have got an active status.

The distribution of landslides in Moldavian Plateau is a direct consequence of the normaly contributin of natural

factors. These are spread along the cuesta fronts. (Mărgărint and Niculiță, 2017)

Fig. 4. Landslide NE of Horodiștea

E. The suffosion

Is the process which can be considered as precursory to the formation of the subsequent pseudo karstic terrain (Bleahu, 1974). Funnels of suffosion can be found in the north of Ivancauti and continue on certain alignments up to Radauti Prut or spread out to the north to the region analyzed in this study, correspondent to the Republic of Moldova. The pseudosuffusional processes are obvious at the upper part of the slopes, at the contact with the interfluvies. These processes develop themselves mainly on loessial deposits.

Fig. 5. Criva landscape (Google Earth).

F. The pseudo karst

“Emil Racovita” cave from Criva, county Briceni, Republic of Moldova, enrolls itself amongst the most important from Europe, being the third longest. From geomorphological point of view, there can be mentioned certain processes of surface reunified by the ones that have

a subaerial evolution. The precipitation, dissolution, alteration or even the dripping being the main processes generating new forms of terrain. (Eslava et al., 2000) This cave is made up from gypsum and becomes amazing through its dimension.

It has got over 20 lakes inside, with variable dimensions. An aspect of similar importance is represented by the clay deposited on the internal walls, transported and deposited by the water course which had various fluctuations, this obviously determining different thicknesses, and especially a distinguished colouring. Its genesis is due to the erosion exercised by water, on certain sectors taking place crumbling that can block the galleries. A special feature is the sedimentation of some sectors and namely, the speleal sedimentation.

Fig. 6. Exploitation of gips resources - Criva

IV. CONCLUSIONS

This study has got as its purpose the analysing in parallel of the two slopes of the Prut River, with the desire of underlining both the differences and the similarities. The right slope becomes original through the amplitude of the geomorphological processes, while the left one amazes through the development of a karstic terrain on gypsum. It is also impressive the difference of morphometric type between those two, apart from that morphogenetic. Thus, the structural terrain represented through the wide cuestas from the northern frame of Ibanesti Ridge, more exactly the cuestaslope found along the locality analyzed, namely Horodistea (the northernmost point of Romania - 48°14'41"N) enrolls itself in the terrain through continuous shaping and subsequent generation of new and ample organisms of erosion and processes of slope. The Criva region, although poor in processes of slope, has got a real geomorphological “laboratory” (Figs 4 and 5) in the underground.

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