PROCESSES AND FORMS IN THE ARGEŞEL RIVERBED

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Abstract. We may notice that from the source to the confluence with the Râul Târgului, riverbed processes are different. If in the higher section the erosion and transport predominates, in the sub-Carpathian three processes: erosion, transport and accumulation processes succeed as dominant, and in the low piedmont, the accumulation process is winninig in the other two processes’ detimental. These forms are also varied: islands of various sizes, gravels (especially in the lower setion), meanders. The anthropic intervention has changed significantly the appearance of the Argeşel basin in some regions by embankment, straightening the river’s course or removal the ballast from the riverbed.

Keywords: *mountain sector, sub-Carpathian piedmont, reindeer, islets, the meandering coefficient*

Geographic position

Argeşel River Basin is part of the rivers in southern Romania. He is the main affluent of the Targusorului River on your left, the river network that belongs to the river basin (Fig. 1). Throughout its course the Argesel river passes through several landscape units, including: Mountains Iezer-Papusa (the south-east), Muscelele Argesului and Getic Plateau (the limit between the hills of Arges and Piedmont Cândeşti)

From the mathematical point of view, the Argeşel hydrographic basin is on 32 'north latitude, i.e. between 45°29'30 "north latitude, respectively Grădişteanul peak in 2148 m. and 44° 57'15" north of the southwest basin corresponds to the area below the altitude, and that the confluence between Targului River and Argeşel. Longitudinally, the Argeşel basin is between the meridian 24 º 56 'east longitude and 25 º 10'30 "east longitude, so only a longitude of 14'30", which indicates a more elongated shape on the north-south.

From the spring situated below the summit of Mount Grădişteanul, at an altitude of 2148 m to the mouth in the Targului River, Argeşelului basin can be shared by units crossed, processes and forms encountered along, by three separate courses.

Methods

For a more precise analysis of the area in terms of changes in the riverbed, a map of the minor bed forms on a scale of 1: 25,000 has been drawn. Thiswas based on a topographic map with a scale of 1: 25 000 (1983) and completed in 2006 by ortho-photo views. To these two materials were added the field mappings and the field pictures done in 2008-2010. The latter revealed a significant change of the riverbed Argeşel suffered, largely because of changes in human intervention.

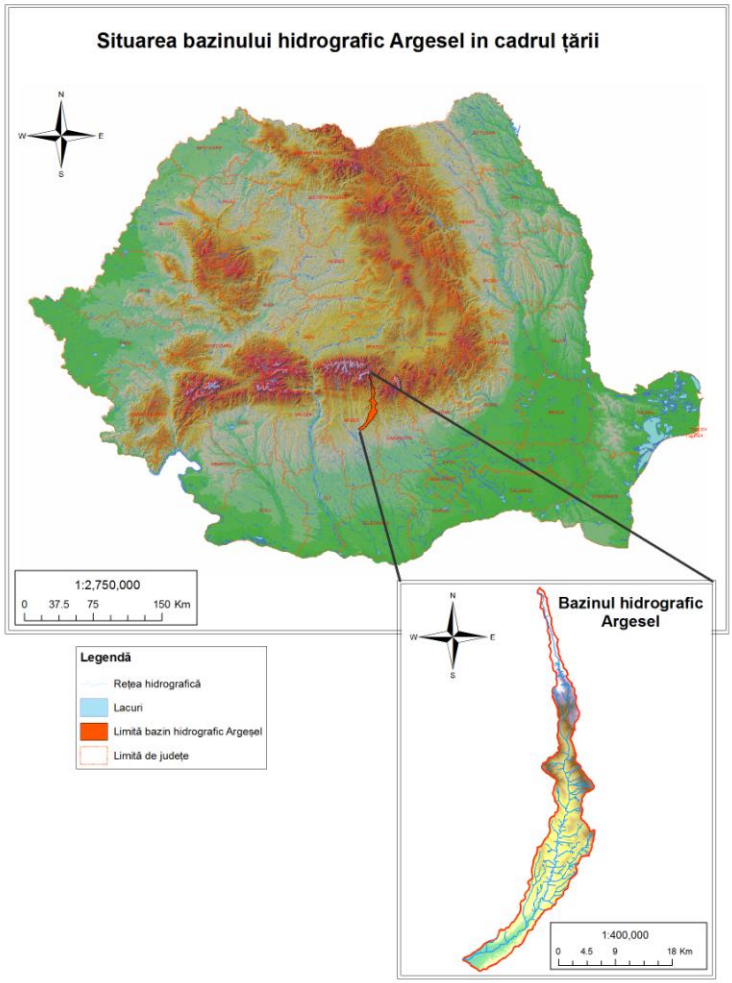

Figure 1 The position of Argeşel hydrographic basin in Romania

The upper flow

From the spring and up to an altitude of approximately 900 m, i.e. the contact between the mountains and the sub-Carpathians, the minor riverbed of Argeşel has some characteristics: Upper course of the river Argeşel has a length of about 24 km (24,675 m) from spring until Namaesti out of town. Here it enters a sector of the Câmpulung Carpathian basin, an offshore sector, with a low slope, which led to an apparent widening of the river Argeşel.

Sinuosity coefficient for this sector is 1.15, indicating a weak meandering riverbed.

By geo-referencing with 1:25 000 scale map made in 1983 and 2006 ortho-photo view, it has been observed that the upper bed has not suffered major lateral movements during the last 23 years.

Obvious lateral bed movements are located at the confluence of the mountain streams and Pravăț Clabucetul (altitude of 910m, near the trout facility belonging to the village Pravăț Valley and 880 meters, near Valley Pravăț), where buildings in the commune led to an increase in this process (locals intervened by maintenance to prevent flooding even at average flows). Also here (out of town Pravăț Valley), due to the massive deforestation in the basin, the volume of materials hauled in by the floods formed cones, deposited in the bed river,.which led to a new flow course of Argesel towards the opposite bank. Here there has been achieved a strong erosion and the undermining of the base of the slope. (Fig.2).

There are situations in which transportation level through the channel is high, the flow increased and therefore the materials of dejection cones are taken from the main course, which does not lead to exchange rate movements. Following the torrents dejection cones are cut away (e.g. at an altitude of 1130m, on the right bank of the river at the north exit of the village Valley Pravat) (Fig. 3).

Thiscone of dejection in 2010,following a flood in August, was split in two by ator rential organism (depth 0.5 m).

Figure 2 Materials on the mountain side carried in the river bed

Figure 3 Dejection cone in the riverbed

The main course of the minor bed river, within the whole mountain area, is narrow and only at high flow rates exceeding 4m and 5m widths. In these situations, where a pronounced decrease takes place, an acute process of unplait occurs. (Figure No.4)

In the bed river there are several breaks of slope, which are located mostly in the nature of the litho-structural contacts. (example: the right confluence with the river Valea lui Tap)

In some cases the slope of the riverbed breaks are arranged anthropogenically, to mitigate the effects of linear erosion.

In narrow areas, where the slopes go straight in bed, the meadow is missing and the materials they come directly from the river bed where accumulation results.

In areas where the basins are depressions, the banks are less steep and covered with byhydrophilic vegetation.

Figure 4 Mountainous-despletire sector and reinforced banks in the Argeselului bed

Due to the deforestation slopes, the amount of materials brought by pluviodenudare is abundant.

In the riverbed of the river are islands that have elongated shapes and sizes of 1 m and 2m wide and 10m, 15m length. Most are made up of gravel and sand with low vegetation. Between them the river side arms dishevelled in 3-4 secondary branches.

Often in some secondary course there are sectors which have focused on the forest road. (i.e. At the left next to the confluence with the brook Clabucetul, approx. 900 m and up near the altitude of 1900 m).

The meanders in the upper reaches have major, dynamically influenced by the intake of materials brought from the slopes (especially during periods of high rainfall)

At low flows the river bed being reduced to a narrow, often with a layout of a deep ditch in silt.

The middle flow

It runs between the localitie Valea Mare Pravat and Hârtieşti, and has other features including: bed widens, there are gravels, islands are much larger, both in length and in width, and the meanders are wider.

Comparing the performance of field mapping, as the results of the analysis of the ortho-photo maps have revealed, that many of the forms of accumulation (reindeers, islets) were the same in the last four years, and have slightly changed their layout and surface. (Figure no. 5).

Most meanders are present in the south sector of the city Boten here dentifi as man deserted bed river (especiall the left side o the curren riverbed) North of town Hârtieşti there are areas where the river bed has recorded important dishevelled.

Figure 5 The correlation between the mappings made with the ortho-photo plans and the field situation

The calculation of the sinuosity coefficient for this sector has obtained the value of 1.31, therefiore higher values than the higher (mountainous) sector.

Over the bed there are numerous human works, designe to strengthen the banks, and the strengthening of the bridges' feet (Fig. 6).

Figure 6 Works to strengthen the banks in the middle sector

The inferior course

It starts at the Hârtieşti city entrance until the confluence with the Targului River (the city of Mioveni).

Over this last area, generally the enbankments have gentle low slops, covered by a lush vegetation compared to other sectors.

In the Contesti locality there can be seen meanders, then unplaits of the river, with numerous reservoirs in the riverbed. (Fig. 7)

Figure 7 Processes and forms in the Argesel River Bed in front of Conţeşti locality

Here there are the most numerous development projects along the minor bed (strenghtening of banks, either by using concrete slabs, i.e. the confluence of the Mâzgana River, affluent on the left side of Argeşel).

They have been started in the summer of 2010 and will be continued in 2011.

Since the entry into Davideşti village in the north and by its exit in the south (5km), the Argeşel riverbed forms 13 meanders of different sizes.

Following the calculation of the sinuosity the determined value is of 1.87, (a highly meandering channel compared with the previous statements).

The Argeşel riverbed is large near its confluence with the Targului River, reaching values that exceedi 10m in height; there are also much more common processes of accumulation, but many unplaits, which surround big islets, as well as very large gravels (Mioveni) some may even reach 95m long and 60m wide.

Also in this area, near Mioveni there are islets with heights exceeding 5m, which are not flooded even at high flow rates (see Fig. 8).

Figure 8 Islet in front of Mioveni city

Conclusions

The minor Argeşel riverbed, because of a differentiated occurrence of their fluvial processes, has a different layout, divided into three sectors.

The mountainous sector presents a narrow channel with steep banks, few forms of accumulation and a higher transport capacity and erosion.

The sub-Carpathian sector (middle) is an enlargement of the bed, have meanders, gravels and large grassed islands.

The last section of the river (the lower), piedmont plateau is the most complex and active due to human activities (banks and building works rectification of course). It is characterized by a large valley, wind and vegetation with a rich wool. Here there are the largest forms of accumulation throughout the larger watershed.

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******* Orofotoplanuri realizate în anul 2006

******* Hărţile topografice cu scara 1:25 000