

THE AREA DISTRIBUTION OF BOULDERS IN THE GRAVELS OF THE EASTERN GETIC PIEDMONT

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Abstract. The Getic Piedmont east of the Olt River includes two units, the Căndești Piedmont and the Cotmeana Piedmont. The source area of the gravels in the Căndești Piedmont is Carpathian, while the source area of the gravels in the Cotmeana Piedmont is much wider, Carpathian and Intracarpathian. In the Căndești Piedmont, large pebbles (boulders) appear only in the north of the piedmont, close to the source area. In the Cotmeana Piedmont, the boulders appear in the north-east of the piedmont but also on its western margin, on the left bank of the Olt River, a river with high transport power that carries detrital material from both the Carpathian and Intracarpathian areas.

Keywords: Căndești Piedmont, Cotmeana Piedmont, gravels, boulders.

Rezumat. Repartiția areală a bolovanilor în pietrișurile din estul Piemontului Getic. Piemontul Getic de la est de Olt include două unități, Piemontul Căndești și Piemontul Cotmeana. Aria sursă a pietrișurilor din Piemontul Căndești este carpatică, în timp ce aria sursă a pietrișurilor din Piemontul Cotmeana este mult mai largă, carpatică și intracarpatică. În Piemontul Căndești, galeți de dimensiuni mari (bolovani) apar doar în nordul piemontului, aproape de aria sursă. În Piemontul Cotmeana, bolovanii apar în nord-estul piemontului dar și pe marginea sa vestică, pe malul stâng al Oltului, râu cu putere mare de transport care aduce material detritic atât din aria carpatică, cât și din aria intracarpatică.

Cuvinte cheie: Piemontul Căndești, Piemontul Cotmeana, pietrișuri, bolovani.

INTRODUCTION

The Getic Piedmont to the east of the Olt River has two divisions: the Căndești Piedmont and the Cotmeana Piedmont. The Căndești Piedmont is bounded by the Dâmbovița River, to the east, by the Argeșel and Doamna rivers, to the west, and by the Argeș meadow, to the south. Gravel deposits have a maximum thickness in the northern area of the piedmont, close to the source area, where it can reach 180 m, while it does not exceed 35 m in the southern area; on the north-south direction, thick deposits occupy the middle area of the piedmont (PARASCHIV, 1965). The source area of the gravels is Carpathian, most of the pebbles coming from the geological formations that outcrop in the Iezer Mountains. The most important geological formations supplying clastic material are the quartzo-feldspathic gneisses of the Cumpăna Series, the gneisses with albite porphyroblasts of the Leaota Series, the amphibolitic rocks intercalated in the two formations and the Albești granites (GHENCIU & STELEA, 2016).

The Cotmeana Piedmont is bounded by the Olt and Topolog rivers, to the west, and the Argeș River, to the east. The thickness of the gravel deposits varies from 140-150 m on the northern margin of the piedmont, to 50-70 m on the eastern margin and to 30-100 m on the western margin, close to the Olt River (CULESCU, 2022). The source area of the gravels is Carpathian, drained by the rivers Olt (middle course), Argeș and Topolog and Intracarpathian (northeast of the Făgăraș Mountains, southeast of the Transylvanian Basin and Perșani Mountains, drained by the Olt River upper course). Thanks to the vast source area, the Cotmeana Piedmont gravels present a much greater petrographic variety. In addition to the metamorphic rocks from the proximal Carpathian area, pebbles of rocks from the distal Carpathian and Intracarpathian areas appear here: volcanic rocks, plutonic rocks, red sandstones with jasper lithoclasts, siliceous rocks, dacitic tuffs, gneisses with arfvedsonite, rocks with glaucophane, pegmatites with spessartine (CULESCU, 2022).

In addition to ordinary gravel (with 3-10 cm pebbles), coarse (10-20 cm pebbles), small (1-3 cm pebbles) and fine (smaller than 1 cm pebbles), in the gravel deposits of the two piedmonts boulders (20-50 cm pebbles) also appear.

THE AREA DISTRIBUTION OF THE BOULDERS

Boulders in the Căndești Piedmont. Boulders were identified in the gravels of the Căndești Piedmont in 11 observation points from a total of 30 observation points (GHENCIU & STELEA, 2016). All the points with boulders are located on the northeastern margin of the piedmont, in the vicinity of the Carpathian source area (Iezer Mountains, Fig. 1). By order of frequency, the petrographic types of boulders are: quartzites (7 points, Fig. 1), quartz (7 points), quartzo-feldspathic gneisses (4 points) amphibolites (2 points), amphibolitic gneisses (1 point), augen gneisses (1 point), gneiss with albite porphyroblasts (1 point), Albești granites (1 point). In the central-eastern area of the piedmont, PARASCHIV (1965) described a horizon of boulders with stratigraphic landmark value, but subsequent research (GHENCIU & STELEA, 2016) did not confirm its existence; it is possible that in fifty years it has been eroded.

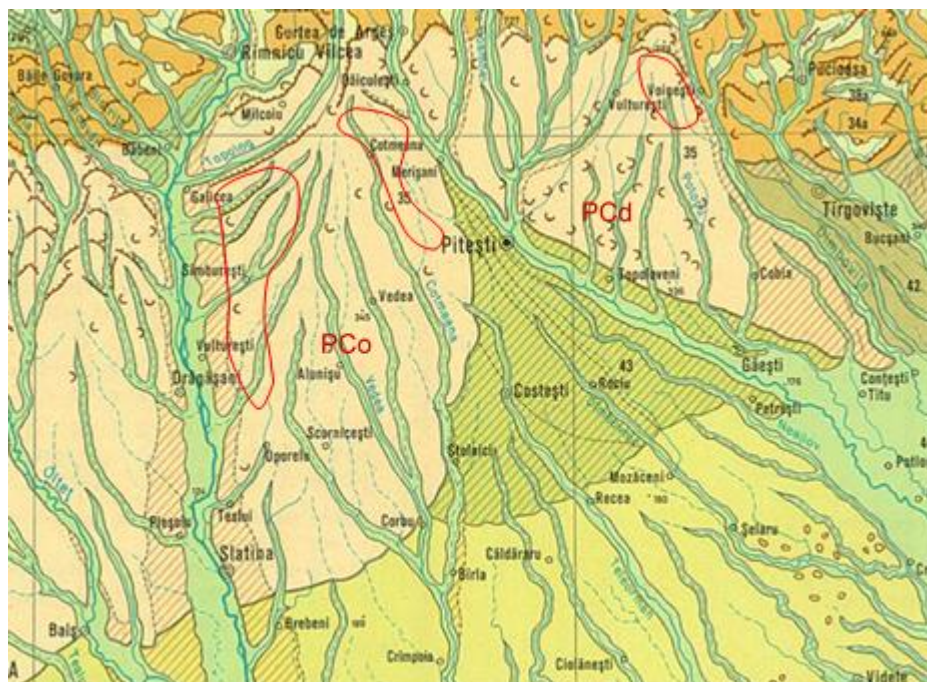


Figure 1. The areas with boulders (red outline) in the Cârdești (PCd) and Cotmeana (PCo) piedmonts (orig.).

Boulders in the Cotmeana Piedmont. In the gravel deposits of the Cotmeana Piedmont, the boulders were identified in 21 observation points from a total of 123 observation points (CULESCU & GHENCIU, 2021; CULESCU, 2022). Their area distribution within the piedmont is as follows: 8 points on the northeastern margin, in the vicinity of the Carpathian source area (Făgăraș Mountains), 1 point in the central-southern area and 12 points on the western edge, close to the Olt Valley (Fig. 1). By order of frequency, the petrographic types of boulders on the northeastern edge of the piedmont are: quartzites (7 points), augen gneisses (6 points), quartzo-feldspathic gneisses (5 points), yellow-brown silicolites (5 points), pegmatites (3 points), quartz (2 points), rhyolites (2 points), granodiorites (1 point) and eclogites (1 point). In the same order, the petrographic types of boulders in the western Piedmont are: quartzo-feldspathic gneisses (11 points) quartzites (9 points, Fig. 2), yellow-brown silicolites (7 points), amphibolites (3 points), pegmatites (3 points), amphibolitic gneisses (2 points), eclogites (2 points), red sandstones with jasper lithoclasts (2 points) and granodiorites (1 point). In the only point in the central-southern area of the piedmont we found boulders of red jaspers. Some boulders are shown in Figure 2.



Figure 2. a) Quartz boulder in the north-east of Cârdești Piedmont (Boulders Hill);
 b) Outcrop with boulders of quartz-feldspathic gneisses and quartzites in the western Cotmeana Piedmont (Mare Valley) (orig.).

The petrographic types of boulders specific to the Cârdești Piedmont, in the sense that they appear only here, are: Albești granites (1 point), gneisses with albite porphyroblasts (1 point), hematite-bearing quartz (1 point) and black quartzites (3 points). The boulders specific to the Cotmeana Piedmont are: yellow-brown silicolite (12 points), eclogites (3 points), red sandstones (2 points), rhyolites (2 points), granodiorites (2 points) and red jaspers (1 point).

The boulders of the Cotmeana Piedmont are grouped in two distinct areas, northeast and west. The specific petrographic types of boulders for the northeastern area of the piedmont are augen gneisses and rhyolites, rocks with

Carpathian source area. Red sandstone boulders, rocks of intracarpethian source area, are specific for the western margin of the piedmont. Based on the criterion of the Intracarpethian source area, the point with red jasper boulders in the central-southern area of the piedmont can also be related to the western margin.

DISCUSSIONS AND CONCLUSIONS

The source area of the boulders in the Căndești Piedmont can only be the source area of the gravel deposits in this piedmont, which is Subcarpathian and Carpathian (GHENCIU & STELEA, 2016). Obviously, most boulders are made of rocks and minerals with high hardness, quartzites and silica, although these petrographic types do not form large geological bodies but only intercalations in geological formations with large area development. However, we must mention that black quartzites and hematite-bearing quartz small bodies or intercalations are not shown on the 1:50,000 scale geological maps of the source area, nor have we identified them during field observations in the source area.

Similarly, the boulders source area of the Cotmeana Piedmont is identical to the source area of the gravel deposits, in this case Subcarpathian, Carpathian (proximal and distal) and Intracarpethian (CULESCU, 2022). Boulders of augen gneisses and rhyolites, petrographic types specific to the northeastern area of the piedmont, definitely come from the Carpathian source area from the north of the piedmont. Red sandstone boulders with jasper lithoclasts occur only on the western edge of the piedmont. Pebbles of red sandstone, like those of jaspers, do not appear in the Căndești Piedmont, with an exclusively Carpathian source area. Therefore, the sandstone boulders with jasper lithoclasts have an Intracarpethian source area, i.e. the Perșani Mountains and/or the southeastern Transylvanian Basin (CULESCU, 2022). These boulders represent the input of coarse detrital material of the Olt River, deposited exclusively in the Cotmeana Piedmont, very probably along the route of an old course initially diverted to the east (CULESCU & GHENCIU, 2021). This paleocourse of the Olt would also explain the presence of jasper boulders (with Intracarpethian source area) in the central-southern area of the piedmont.

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