CERNA RIVER TERRACES BETWEEN BĂILE HERCULANE AND ORŞOVA

IULIAN SĂNDULACHE[1], FLORINA GRECU[1], CĂTĂLINA SĂNDULACHE[2], ANIŞOARA IRIMESCU[3]

Abstract

This study displays a detailed analysis of Cerna river terraces along its final 20 km (its lower reach). The main working method was the field charting during a number of campaigns.

The starting point were previous studies concerning Cerna river Valley, firstly those of Schafarzik (1891) and Popescu (1964) but also those referring to the Danube Valley (Posea and collaborators, 1963). Schafarzik found five fluviatile terraces pertaining to that sector, the same as Popescu, who, in addition wrote about the meadow step, 2-3 m high. We have identified seven steps and today the meadow is 4-7 m high against the river bed in certain sections, which makes it to be considered as the first terrace in those areas. Thus the number of levels is as high as eight in those areas. The best developed with respect to morphology but also as regards the surface are the 4-7 m and the 40-50 m steps. The 70-80 m terrace was identified only in Băile Herculane area and was named "Coronini Terrace" after the name of the respective plateau. We named the 110 m terrace "Terasa Stoghirul" after the name of the hill where it emerges, in the Cerna-Belareca confluence area. The 10-15 m terrace may be encountered only in the last 2-3 km of Cerna Valley at the outlet into the Porţile de Fier Lake. The 20-30 m terrace is also well developed, but only along the right side of the river and the 140-160 m terrace often displays erosion witnesses detached from the mountain sides. The 260-300 m terrace (the last one) is only encountered downstream Bârza (the last 8-9 km of the valley upstream the lake), clearly joining the 8th terrace of the Danube ("Ciucar" level according to Posea and collaborators, 1963). Except for the 260-300 m terrace, well rolled rocky places and gravel grounds were found on all the other steps, mainly made up of gneisses, limy breccie and limes.

Keywords: the *Cerna river, terraces, meadow, rolled rocky places, coluvio – proluvial deposits.*

1. Introduction and objectives

Known for its thermal springs ever since the Roman times, the Cerna river Valley captured the attention of scientists as early as at the end of the 17th century, in step with the development of spa tourism at Băile Herculane.

[1] University of Bucharest, Faculty of Geography, 1, Nicolae Bălcescu Blvd, Sector 1, 010074, Bucharest, Romania, <sandulachei@yahoo.com>, <florinagrecu@yahoo.com>

[2] Railway Technical College „Mihai I„,10, Butuceni Str., Sector 1, Bucharest, Romania, <catalinaraboj@yahoo.com>

[3] Administraţia Naţională de Meteorologie, 97, Şos. Bucureşti-Ploieşti, Sector 1, 013686, <anisoara.irimescu@meteoromania.ro>

The first scientific papers approached the issue of thermal waters and various geological aspects (Schafarzik, 1891, 1937, Popescu-Voiteşti, 1921 a and b, Bodiu, Ciortan, 1937, Vasilescu, Liteanu, 1973, Visarion *et al*., 1974). Later, speleological research papers are written (Avram *et al*., 1964, 1966, Dancău *et al*., 1968, Povară *et al*., 1971, Goran, 1982).

The interest in Cerna river valley research diversified, resulting in the elaboration of geographic studies (Badea *et al*., 1981), connected to the relief (Popescu, 1964, Popescu *et al*., 1967, Ielenicz, 1987) or hydrography (Sârbu, 1997, 1998, 1999, 2001, 2004).

Information about Cerna river Valley is also to be found in the general studies about the Carpathians or about the fluviatile terraces in Romania (Popescu, Ielenicz, Posea, 1973; Posea, Popescu, Ielenicz, 1974; Velcea, Valeria, Savu, A., 1982, Geografia României (Geography of Romania), vol. III, 1987; Badea *et al*., 2001, Ielenicz, Oprea, 201; Săndulache, 2014, 2015).

A more recent study was achieved by Clius (2009) through a complete analysis of the natural and anthropic environment in Cerna river valley that significantly deepens the aspects connected to their ecotourism potential. A synthesis based on numerous field researches, of the morpho-hydrological issues of the karst and of the thermo-mineral waters within Cerna river basin was published by Povară (2012).

The number of scientific papers approaching the elements of the geographic environment of Cerna river Valley (under a geomorphological, climatic, hydrologic or bio-pedo-geographic aspect) is small. Geographers have been attracted to a larger extent by the mountain massifs located in Cerna river hydrographic basin (Niculescu, 1965; Török-Oancea, 2005; Ardeleanu, 2010). This imposes an update of the studies regarding the geomorphological issues of Cerna river Valley achieved between 1964 and 1967. This approach was initiated by Săndulache (2008, 2013, 2014), being justified among others by modifications that occurred in Cerna riverbed, following the building of the "Porţile de Fier" ("Iron Gates") Hydro-power and Navigation System.

The **main objective** of this paper is to inventory, typify and chart Cerna river terraces between Băile Herculane and Orşova on the ground of researches, observations and data obtained mainly in the field, as well as through joining Cerna terraces with those of the Danube and partially with the terraces of other rivers in Banat.

Describing and locating these terraces is also attempted. The final aim of this study is to elaborate a general geomorphological map for the studied area and of special maps rendering the terraces. Such maps are useful to those who administer the relief for activities pertaining to transport, tourism, pasture, building or agriculture.

2. Studied area

Cerna river is 79 km long, it is located in the south-west of the country (fig. 1 a) and is a direct tributary of the Danube. It springs from under Paltina peak (2149 m.a.s.l.), in Godeanu Mountains and the river mouth is situated at an altitude of 70 m.a.s.l., fluctuating depending on the levels of Cerna Gulf. In its upper and middle reach, Cerna Valley displays typically mountainous characteristics, with markedly inclined mountain sides and a narrow riverbed, which presents geologically conditioned steps. Here, the valley is centred along a tectonic corridor, having a north-east to south-west direction. In the lower section, from the confluence of the most important tributary, Belareca, (113 m.a.s.l.), close to Băile Herculane railway station, Cerna river Valley widens, displaying terraces and changes direction (north-south), down to its outlet in the Cerna Gulf of "Porţile de Fier I" Lake.

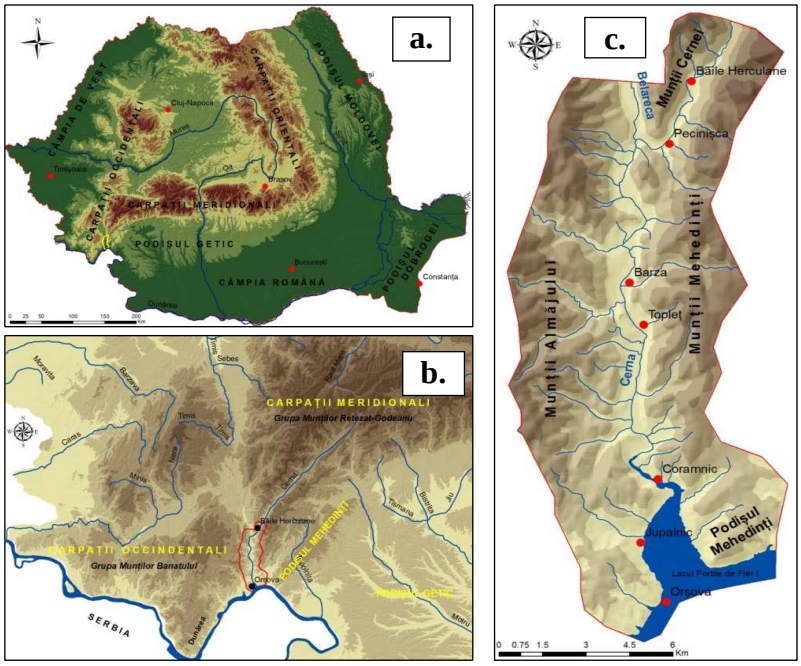

Fig. 1. Geographic location of Cerna river Valley between Băile Herculane and Orşova

In the lower sector, which is the object of this study, Cerna river Valley belongs to the Timiş – Cerna tectonic and erosion corridor that forms the boundary between the Southern Carpathians (to the east) and the Western Carpathians (Banatului Mountains) (to the west) (fig. 1b). The relief units within the lower reach of Cerna basin are Cernei Mountains (to the north-east),

Mehedinţi Mountains (to the east), Mehedinţi Plateau (to the south-east) and Almăjului Mountains (to the west) (fig. 1c). In the lower section, downstream Băile Herculane railway station, the valley presents narrowing and very small basins, petrographically conditioned, which also influences the display of terraces (see Chapter 4).

3. Methodology and data

Various materials were used to perform this study, firstly thematically varied maps at various scales, like: the 1:25 000 topographic map, thematic maps (geological, pedological and vegetation), orthoinfo-planes at the 1:5000 scale and tourist maps.

Really useful were the contour lines extracted from the Digital Elevation Model (DEM). Achieved stages meant a generally known methodology in geomorphological research: consulting scientific papers from the specialized literature, analysing thematic maps, performing numerous field campaigns which entailed charting operations in the proposed area on the 1:25000 topographic map, field observations and measurements, taking photos, and representing the charted elements in ArcMap – GIS and Corel – Draw programs. The most difficult stage was the field charting of terraces because of the physical effort required and the often unpredictable weather states.

Work was performed on 1:25000 colour topographic maps (more precisely Xerox, 1:1 copies of those), covering little by little almost the whole studied area, charting through colour conventional signs not only the terraces but also other relief shapes (the meadow, the riverbed, glacises, alluvial cones, embankments). Terraces' charting was performed on the basis of the morphogeographic and morphometric characteristics of their elements (bridge, front, edge, relative altitude), through GPS levelling; grouping and inclusion in the general, evolutionary picture of the terraces were made on the basis of joining on wider surfaces.

As regards previous studies strictly referring to Cerna river Valley, the section downstream the confluence with Belareca, they are relatively recent, although some of the first researches date from the end of the 19th century. F. Schafarzik, 1891 (cited by Povară, 2012) mentioned the presence of five terraces at relative altitudes of 15, 40, 60, 175 and 188 m respectively. Popescu (1964) stated that there are five terraces in this section, with the following relative altitudes: 2-3 m, 10-12 m, 30-40 m (climbing to 50-60 m), 60-80 m (climbing to 100 m) and 100-110 m (climbing to 150 m). In 1987, Ielenicz (cited by Povară, 2012), referred to six terraces along the river Cerna, including the 300-350 m level as the sixth terrace.

Povară (2012) mentioned the following: the 188 m Schafarzik's terrace corresponds to Popescu's level of 300-350 m and joins the eighth terrace of the Danube ("Ciucar" level, cf. Posea *et al*., 1963); it is likely that Cerna river has at least seven terraces, the first of which being joinable to those of the Danube; the age of the 188 m terrace from the Cerna – Belareca confluence (the sixth, for authors Popescu and Ielenicz) was estimated through dating a speleotheme from a cave situated upstream Băile Herculane as being at least 350000 years (Povară).

4. Analyses and results

The relief of the studied area (Cerna river Valley between Băile Herculane and Orşova) is specific to a mountain valley created by a medium-sized river (Cerna) through deepening into generally hard rocks (various metamorphic rocks, limes, granites), an exception to this rule being to a certain extent the Orşova-Bahna sector, where rocks are crumbly (gravels and slightly consolidated sands, dating back to the Miocene Age) (fig. 2).

In that section, Cerna river valley has a north-east – to south-west disposition (between Băile Herculane and the confluence with Belareca) and from north to south (between the confluence with Belareca and Orşova), altitudes decreasing from 1198 m.a.s.l. in the north-eastern part to 70 m.a.s.l. at Orşova (in the south of the area).

In the perimeter of Băile Herculane resort slopes are 30... 40º steep and even 40... 60º on the Domogled abrupt; downstream the confluence with Belareca the valley widens notably and the dominant slopes have an inclination of less than 30º. The relief energy also is moderate to high in the area of Băile Herculane locality (400-500 m), then south of the confluence with Belareca it decreases to 200-400 m.

In this section, Cerna river Valley displays three widening areas in a longitudinal profile (Bârza, Topleţ-Bratina and Orşova), separated by the Topleţ and Bratina-Coramnic narrow passes.

Cerna mountain sides are very well forested, their secondary usage being their hay fields and pastures which give good and very good stability; since rocks are generally hard and compact, there are no landslides and torrential processes are not very evident, somewhat more dynamic being the mountain sides within Bahna-Orşova depression, where more marked torrential erosion is visible compared to the remainder of the area, on the background of a friable substratum (Miocene Age sandstone) (fig. 3).

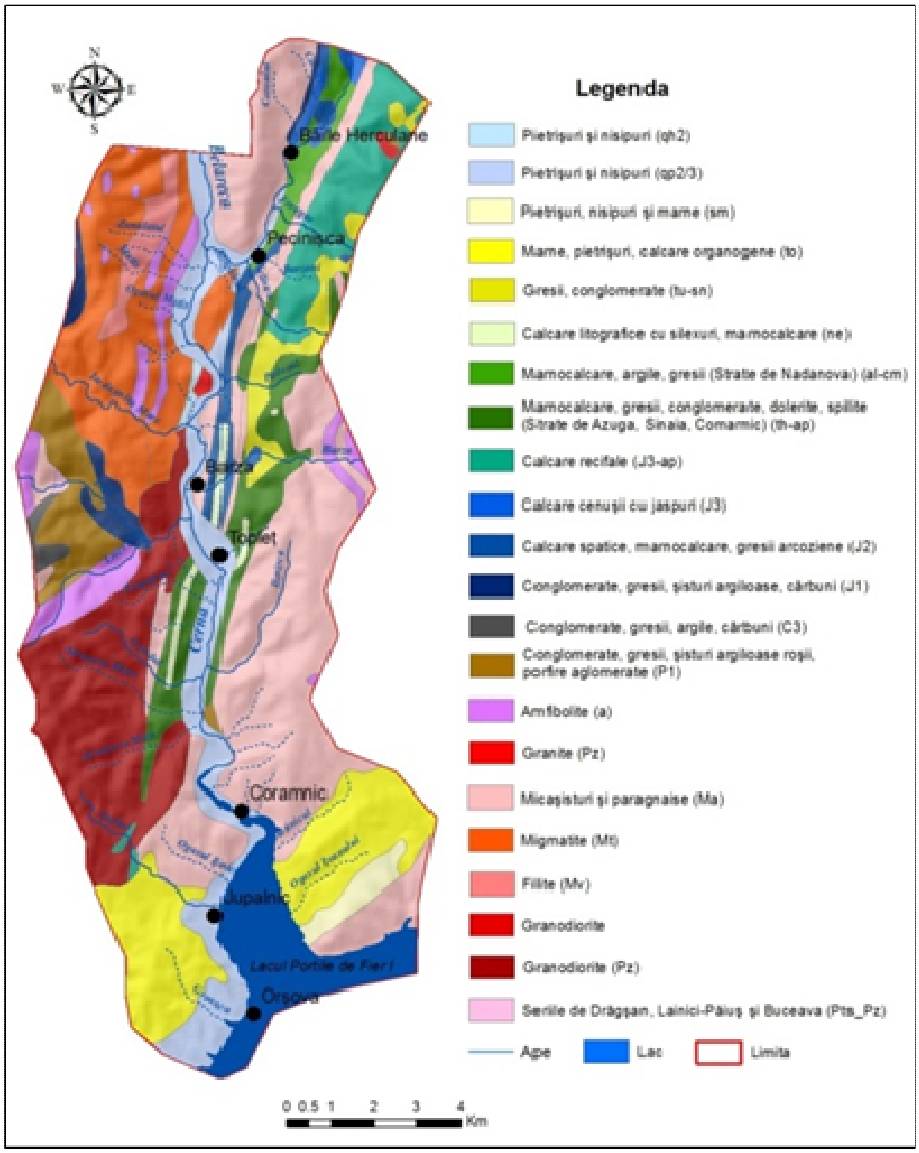

Fig 2. Geological map of Cena river Valley between Băile Herculane and Orşova
(after the 1:200 000 geological map of Romania, Romanian Inst. of Geol., 1976)

The general aspect of the relief in the studied area is that of high hills or low mountains, with altitudes gradually decreasing from 1200 m.a.s.l. in the extreme north to less than 100 m.a.s.l. at the southern border of the area. Here, the water surface of "Porţile de Fier I Lake" at its normal retention level has an absolute altitude of 70 m.a.s.l., which became in 1972 the local base level.

Due to the hydrotechnical fit-up of Cerna river, especially through the construction of the two dams (Valea lui Ivan and Herculane), but also through the discharge of a share of the liquid flow towards Motru river basin, the dynamics of the river's bed has modified in the latest decades. Thus, as an effect of the liquid flow decrease, the ableness of the river as regards its capacity to transport coarse fractions has also decreased and the energy of the river is consumed especially through deepening (Rădoane *et al*., 1991). Thus, Cerna River has deepened by 3-4 m in the last 40-50 years, a phenomenon that has been noticed and inferred from testimonies made by the locals and through comparing today's altitude of the meadow with that from 40-50 years ago. This situation is partly valid for the sector in the proximity of "Porţile de Fier I" Lake.

In this sector, Cerna river has forged six terraces, staged at the following altitudes: 10-15 m, 20-30 m, 40-50 m, 110-120 m, 140-160 m and 260-300 m, to which the meadow level adds, situated 3-7 m higher than the riverbed (Săndulache, 2014) (figs. 4 a and b).

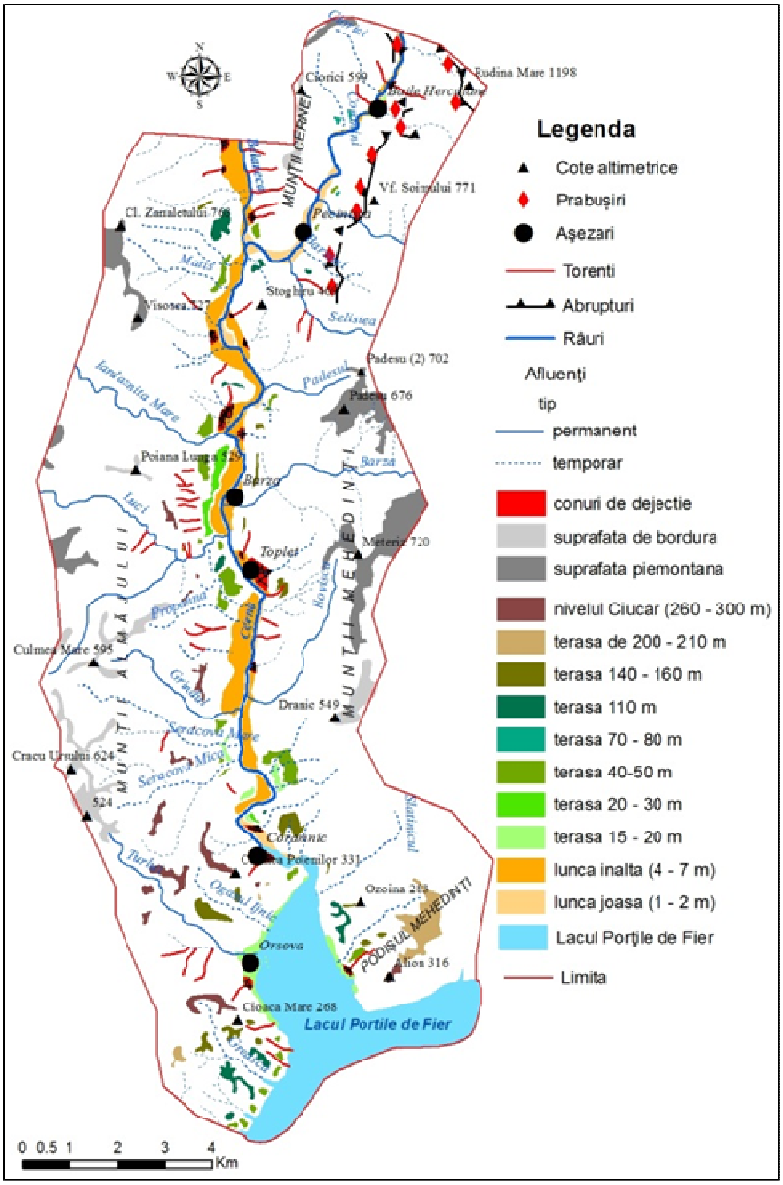

Fig. 3. Cerna river Valley between Băile Herculane and Orşova, general geomorphological map

In all the terrace levels except the 260-300 m one, alluvia were found made up of well rolled elements, especially gneiss and limy breccias. Also, the opinion of geographers having studied this region is that the 260-300 m level represents the first thalweg bearing the nowadays sense of Cerna river flow (table 1).

Table 1

Number and relative altitude of Cerna Valley terraces between Băile Herculane and Orşova

Terrace	Posea, Grigore, Popescu, 1963, *Valea Dunării*	Schafarzik, 1891, *Valea Cernei aval de confluenţa cu Belareca*	Popescu, 1964, *Valea Cernei aval de confluenţa cu Belareca*	Săndulache, 2014, *Valea Cernei între Băile Herculane şi Orşova*
1	5-8		2-3	Meadow or T_1(4-7 m)
2	10-20	15	10-12	10-15
3	30-50	40	30-40 (climbing to 50-60 m)	20-30
4	50-80	60		40-50
5	90-115	–	60-80 (climbing to 100 m)	70-80
6	150-160	–	–	110
7	190-210	175	100-110 (climbing to 150 m)	140-160
8	260-300	188	Level of 300-350 m	260-300

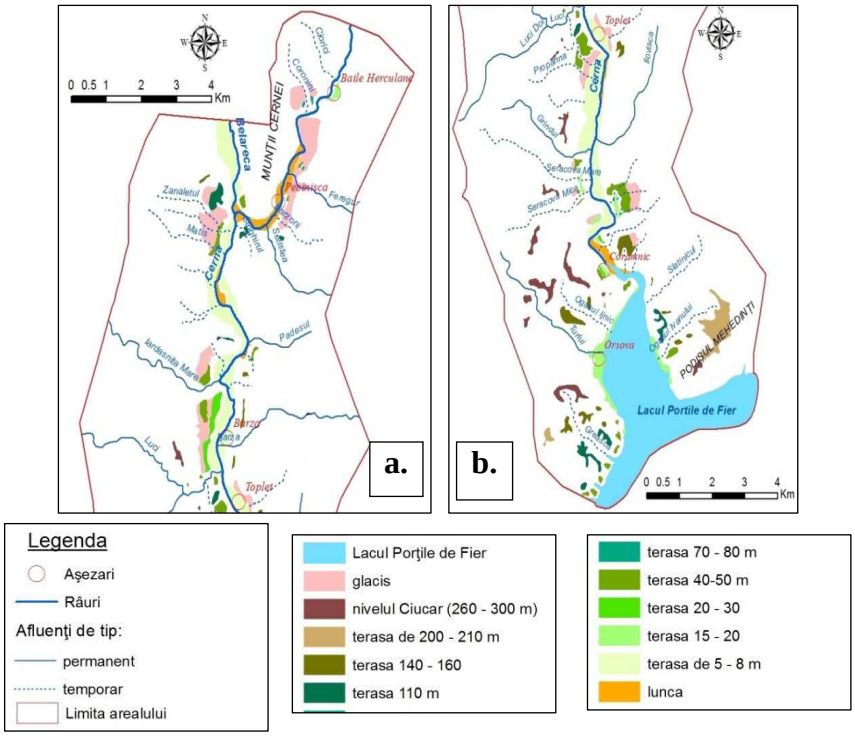

Fig. 4. Cerna river Valley between Băile Herculane and Orşova – map of terraces; a – Băile Herculane – Topleţ sector and b – Topleţ – Orşova sector

The meadow

In Orşova – Herculane sector, Cerna river meadow has altitudes of 3-7 m against the level of the minor riverbed and hosts the localities Bârza and Topleţ, Pecinişca and Bratina quarters, the small railway station Valea Cernei, the Bucharest – Timişoara railway and E 70 European main road (both on embankments), as well as crops (fig. 5a). This is a step safe from flooding, which we may well consider the first terrace of Cerna river (fig. 5 b).The speed the river deepens seems to be significant, since in the last 40-50 years Cerna has deepened by 2-3 m (information supplied by locals; in 1964, Popescu attributed this step a relative altitude of 2-3 m). Cerna river meadow joins the first terrace of the Danube (5-8 m) (Posea *et al*., 1963).

Fig. 5a. Cerna river meadow (3-7 m terrace) in Bratina area (upstream view)

Fig. 5 b. Important development of Cerna river meadow (first terrace) downstream Topleţ

First terrace

The 10-15 m terrace is only encountered downstream the confluence with Seracova Mare. At Bratina (the area of the confluences with Seracova Mare and Seracova Mică), there is a gravel grinding and sorting station on this terrace. Also, on the right side of the valley, inside the meander lock downstream Bratina there are four households and agricultural plots, the terrace being overbuilt by lateral cumulative glacises with a relative altitude of up to 25 m. The terrace can also be encountered on the left side of the valley, in the same Bratina-Coramnic perimeter, in the form of two fragments, the one downstream being located inside the lock of the last meander of Cerna river Valley, before the outlet into "Porţile de Fier" Lake (fig. 6) A part of Orşova city (the area of Cerna hotel) is situated on the 10-15 m terrace that joins the 10-20 m second terrace of the Danube, now flooded by "Porţile de Fier" Lake.

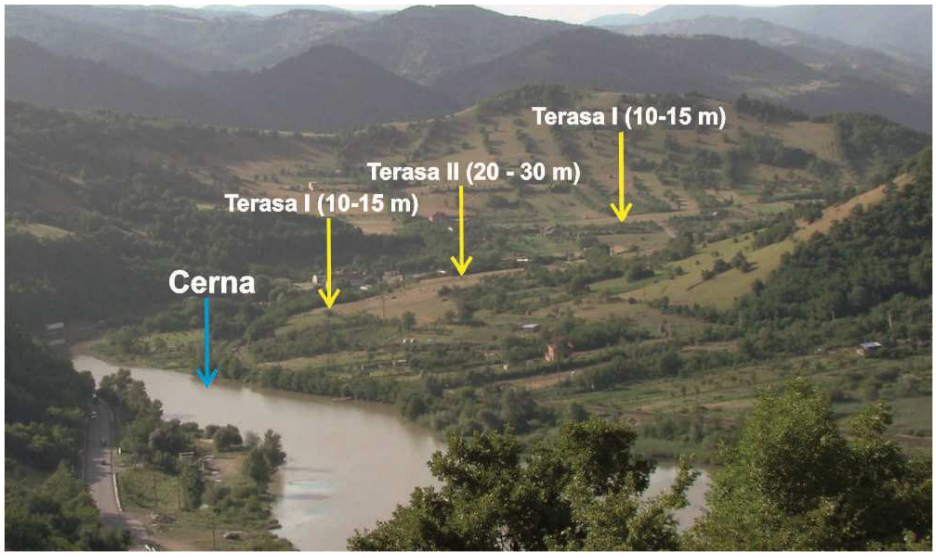

Fig. 6. Cerna river Valley at Coramnic (upstream view)

Second terrace

The 20-30 m terrace is mostly encountered on the right side of Cerna river in just two sectors – at Bârza and at Coramnic. At Bârza, on the right side of the valley this terrace forms a well shaped and developed bridge, hosting a variety of crops (fig. 7).

Fig. 7 – Second terrace (20-30 m) at Bârza, on the right side of the valley

On the front side, alluvia were found with well rounded elements, mainly made up of crystalline. In the sector of Coramnic quarter, the 20 – 30 m terrace is encountered on both banks of Cerna river, however as narrow areas. We may consider that a Coramnic quarter, situated in the right side of Cerna river, is placed on three terrace levels: 10 – 15 m, 20 – 30 m and 40 – 50 m. On the left side of the valley, this terrace emerges in the lock of the last meander of Cerna river, before the outlet in "Porţile de Fier" Lake, as a small fragment covered with hay fields.

Fig. 8 – Third terrace (40-50 m), at the Cerna-Belareca confluence.
The bridge of the terrace displays a mild glacis slope, as well as alluvia

Third terrace

The 40-50 m terrace is the most frequent occurrence along Cerna river valley in this sector, except for the 4-7 m step, being encountered on both banks but mostly on the right side of the valley.

At Pecinişca it emerges as two flat pieces of ground used as hay fields. At the confluence with Belareca, the 40-50 m terrace is well developed on both banks, with bridges inclining in a mild slope (5-10º) to the axis of the valley (representing a glacis "cut-off" as a terrace by rivers Cerna and Belareca) and is used as a hay field (fig. 8).

At the confluence with Iardaşniţa Mare, the 40-50 m terrace is developed on one side and the other of this right side tributary of Cerna river, as two bridges inclining in a 5-10º slope both towards Cerna river and towards the tributary, those bridges being used as arable land. At Topleţ it forms a well shaped bridge on the right side of the valley, facing the centre of the above mentioned commune, the terrace being used as village common (pasture). Well rounded alluvia were found on its front, mainly made up of crystalline. Not far northwards (in the same Topleţ-Bârza area), three fragments of this terrace were identified, the best developed of which shelters a football field. In Bratina quarter area this terrace is on the same right side, however less developed than at Topleţ; there are three narrow fragments still displaying the shape of suspended bridges, used as pasture. On the left of the valley, immediately downstream Bratina, the 40-50 m terrace forms a well developed bridge overbuilt towards the mountain side by 20-25 m by an accumulating glacis. At Coramnic, the upper part of the quarters belongs to this terrace. Also, a part of the North quarter in Orşova is placed on that terrace. Towards the Danube, this structure passes into the fourth terrace of the Danube (50-80 m), where Orşova Station belonging to the Faculty of Geography from Bucharest is also placed.

Fourth terrace

The 70-80 m terrace was to be found only in Băile Herculane area. The Coronini Plateau is a well developed bridge of the 70-80 m terrace, on the right side of Cerna river, located in the central perimeter of Băile Herculane resort (fig. 9).

In the area of Pecinişca quarter belonging to the town Băile Herculane, on the left side of the valley there is a narrow fragment of the 70-80 m terrace, placed in an upper position compared to an also narrow fragment of the 40-50 m terrace.

Fig. 9. Fourth terrace (70-80 m) at Băile Herculane

Fifth terrace

The 110 m terrace was identified in the following areas: on the left side of Cerna river, at Pecinişca, a narrow flat piece of ground inclined towards the axis of the valley, at the Cerna-Belareca confluence, both on the right of the valley (upstream Băile Herculane railway station) (fig. 10) and on the left, in Stoghirul Hill

Fig. 10. Terraces in Cerna – Belareca confluence area (right mountain side)

(in both locations, the terrace bridges are relatively well developed, though slightly undulated, looking like hills when seen from the base), on the right of the valley, in the area of the narrow pass upstream Bârza, at Topleţ, (on the

right of the valley, in the area of the centre), at Bratina (on the left, in the meander lock before the outlet of Cerna river into the lake), on Ozoina Hill (on the left of the valley, in the area of Orşova railway station), where it displays a well developed bridge used as pasture, and alluvia were found on the front, characteristic to Cerna river terraces (prevalence of gneiss, and the well rounded pebbles 7-20 cm in diameter) (fig. 11), as a terrace of the Danube in Graţca sector (relative altitude of 100-200 m).

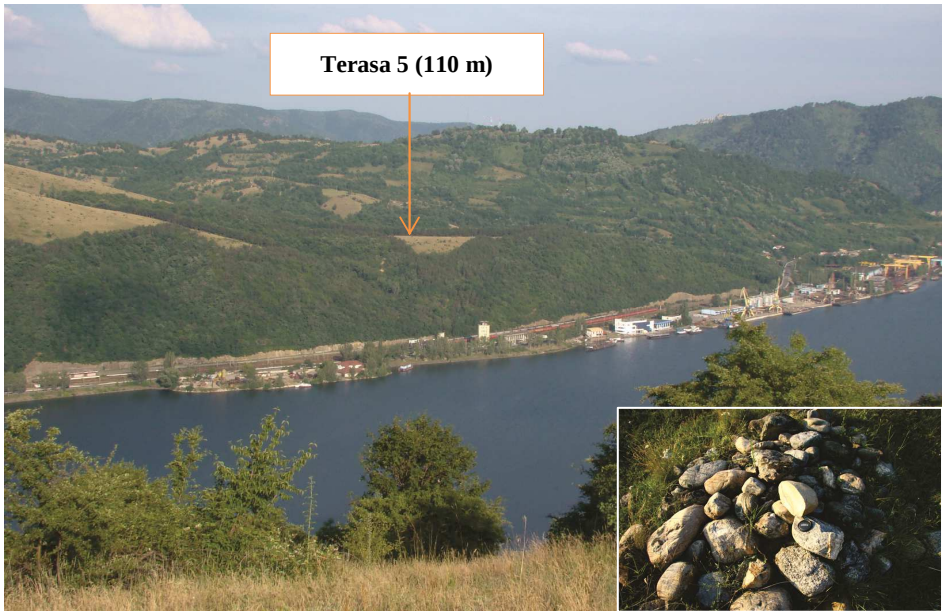

Fig. 11. Fifth terrace (110 m) in Ozoina Hill (railway station and Orşova port areas)

Sixth terrace

The 140-160 m terrace in encountered in the following places: at Belareca-Cerna confluence, on the right of Belareca valley (in the area of Băile Herculane railway station) under the form of an oblong flat mountainous area descending towards the north-east, from 180 to 150 m, dominating by 40-50 m the 110 m terrace (this fragment is probably the one given by Schafarzik as the 188 m terrace); at Bârza-Topleţ, on the left side of the valley (fig. 12), as hillocks detached from the mountain side; also on the left, in the area of the centre of Topleţ commune, as a relatively narrow flat piece of ground used as hay field; at Coramnic, on the same left side of the valley, having the aspect of a promontory connected to Drănic mountain side through a saddle (there, within

the saddle area, alluvia were found made up of crystalline elements with the prevalence of well rounded gneisses with diameters mainly between 7 and 20 cm – fig. 13), which proves that this saddle is a rest of the ancient valley bottom of Cerna river from the level of the sixth terrace; at the confluence with Slătinic (in the area of the viaduct over Cerna Gulf), also on the left of Cerna river (fig. 14), under the form of a step within the steep interfluve between Slătinic and Cerna (completely forested); in Ozoina Hill, with a flat mountain area not very well developed that dominates by 30 m the 110 m terrace; in the basins of Ijnic and Ivanului track grooves, as connectable shoulders higher by 90-100 m than their thalwegs; in Moşului Hill, as a terrace of the Danube (sixth terrace, 150-160 m high, according to Posea *et al*., 1963).

Fig. 12. 140-160 m terrace at Bârza, on the left of the valley. View from the 20-30 m terrace

Fig. 13. Alluvia on the sixth terrace, at the altitude of 140 m, in Drănic Hill

Fig. 14. 140-160 m terrace in the area of the viaduct over Cerna Gulf

Seventh terrace

The 260-300 m terrace represents the "Ciucar" level, *i.e.* the eighth terrace of the Danube, which is encountered along the whole of the large river's narrow path (Posea *et al*., 1963). As a terrace of the Danube, it is noticeable in Moşului (286 m.a.s.l.) and Alion (316 m.a.s.l.) hill respectively, but it is also present upstream, on Cerna river Valley, especially on the mountain side on the right: at Bârza (fig. 15) at Topleţ, in the sector of Valea Cernei railway station, at Coramnic (fig. 16), in Rudina, Bratina and Poienilor hills (northern sector of Orşova small basin) (fig. 17). The absolute altitude of this level increases from the Danube upstream, on Cerna river Valley, from 290-310 m.a.s.l. in Moşului and Alion hills to 330 m.a.s.l. in Rudina Hill, reaching 380-430 m.a.s.l. in Bârza section, which proves that Cerna river was flowing its present-day course between Bârza and the Danube since the period bridge T_8 of the Danube formed.

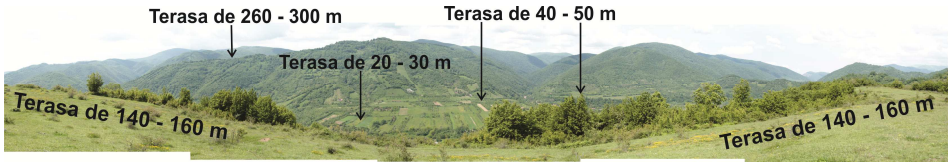

Fig. 15. Cerna river Valley at Bârza – view towards the mountain side on the right

Fig. 16. Cerna river Valley at Coramnic-Bratina (view facing upstream)

Fig. 17. Cerna river Valley at Coramnic-Orşova (view from the 140-160 m terrace in Drănic Hill

Terraces' junction

When attempting to track junction of Cerna river terraces with those of the Danube, we may consider that:

- the 4-7 m stage joins the first 5-8 m terrace of the Danube (Posea *et al.*, 1963);
- the first (10-15 m) terrace of Cerna river joins the second (20-30 m) terrace of the Danube;
- the second (20-30 m) terrace of Cerna river joins the third (30-50 m) terrace of the Danube;
- the third (40-50 m) terrace of Cerna river joins the fourth (50-80 m) terrace of the Danube;
- the fourth (70-80 m) terrace of Cerna river joins the fifth (90-115 m) terrace of the Danube;
- the fifth (110 m) terrace of Cerna river joins the fifth (90-115 m) terrace of the Danube;
- the sixth (140-160 m) terrace of Cerna river joins the sixth (150-160 m) terrace of the Danube;
- the seventh (260-300 m) terrace of Cerna river joins the eighth (260-300 m – "Ciucar" level) of the Danube.

Taking into account the dating by Povară (2012) of Schafarzik's 188 m terrace from the Cerna-Belareca confluence, we can assert that Cerna' s sixth terrace is at least 350000 years old.

5. Conclusions

In Băile Herculane – Orşova sector steps of morphological levels/ terraces are encountered, of which five/six terraces of Cerna river are well marked within the relief, the seventh terrace has the features of a valley level, proving the river's formation at that level and the eighth terrace is the Danube's.

The relative altitudes are: 4-7 m (the meadow terrace), 10-15 m, 20-30 m, 40-50 m, 70-80 m, 110 m, 140-160 m and 260-300 m; except for the 260-300 m terrace, all the others display alluvia; these rolled materials resemble much with each-other on all the terraces where they are encountered; well rounded pebbles prevail, 7-20 cm in diameter, made up of crystalline elements, mostly gneisses.

If we consider the 4-8 m step to be Cerna river meadow, the following seven terraces remain to be considered: the first terrace (10-15 m), the second terrace (20-30 m), the third terrace (40-50 m), the fourth terrace (70-80 m), the fifth terrace (110 m), the sixth terrace (140-160 m) and the seventh terrace (260-300 m). In Orşova area, the 200-210 m terrace also emerges, but this one exclusively belongs to the Danube (seventh terrace, according to Posea *et al*., 1963).

In Băile Herculane – Belareca section there can be clearly identified five terraces: 5-8 m (passing to the meadow at Pecinişca), 20-30 m, 40-50 m, 70-80 m (that we may call "Coronini Terrace") and 110 m ("Stoghirul Terrace") Pecinişca quarter is located on the 2-3 m step (Cerna river meadow). "Coronini Plateau" is a well developed bridge from the 70-80 m terrace, on the right side of Cerna river. In the perimeter of Pecinişca quarter, on the left side of the valley, narrow fragments are encountered from the 40-50 m and the 70-80 m terrace respectively. At Cerna – Belareca confluence, the obvious formations are: the 20-30 m terrace on the right side of Cerna river, displaying alluvia; the 40-50 m terrace developed within the confluence angle and displaying alluvia; the 110 m terrace, both of the left side of Cerna river and on the right side of Belareca river; on the front of the 110 m terrace in Stoghirul Hill a small number of pebbles were found, at diameters of 30-40 cm made up of breccie.

Five terraces are also clear in Belareca-Topleţ sector: 5-8 m, 20-30 m, 40-50 m, 110 m and 140-160 m.

In Bârza-Topleţ sector, Cerna river meadow becomes the first terrace, 5-8 m high (with respect to the level of the low meadow step), hosting Bârza and Topleţ localities, Bucharest – Timişoara railway and European road, as well as crops.

The 20-30 m terrace is also very well developed, especially on the right side of the valley; somewhat above a 40-50 m step can also be identified, on the same right side of the valley. As erosion witnesses (hills or hill summits), on the same right side of the valley, the 110 m terrace is also noticeable. On the left of the valley there are fragments from the 140-160 m terrace under the form of peaks detached from the mountain side. Well rolled alluvia were found on the

fronts of the 20-30 m and 40-50 m terraces, as well as on the 110 m terrace, in the perimeter of Topleț commune centre.

In Topleț-Orșova sector six terraces are encountered: 5-8 m, 15-20 m, 20-30 m, 40-50 m, 110 m and 140-160 m; in that sector an additional terrace emerges at a relative altitude of 15-20 m, on both banks but especially on the right side one, however displaying poor development. Downstream, the first terrace (5-8 m) passes again to the meadow, on the background of recent accumulations caused by the setting up and fitting of "Porțile de Fier I" storage lake.

Coramnic quarter has an amphitheatre aspect, being located on the 15-20, 20-30 and 40-50 m terraces. On the left of the valley, in Drănic Hill area, the 140-160 m terrace unfolds slightly detached from the frame of the mountain side. In Orșova small basin all the Danube's terraces may be retrieved, from the fourth to the eighth, the first three of them and the meadow being flooded by the lake. In Orșova area there emerge the seventh (200-210 m) and eighth (260-300 m) terraces of the Danube, that are also traceable upstream, on Cerna river Valley (the 200-210 m terrace is noticeable on the left of the valley or of Cerna Gulf, in Ozoina Hill and the 260-300 m terrace may be identified upstream, as far as Topleț, on the right of the valley).

The formation and evolution of the hydrographic network on wider areas from Banatului Mountains should be additional arguments as regards the junction of terraces and implicitly to settling their number. Starting with the third terrace, it seems that terraces have undergone a duplication process, either like the one noticed at Nera, in Bozovici Depression, by Posea and Gârbacea or owed to modifications in the climate-influenced energetic/hydrologic regime, in the sense of those explained by Toshihito Sugai, 1993 (cited by Grecu 2017).

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