ANALELE ŞTIINŢIFICE ALE UNIVERSITĂŢII "AL. I. CUZA" IAŞI
Geologie. Tomul LII, 2006

THE HYDROGEOLOGICAL CHARACTERIZATION OF THE REPEDEA-PAUN PLATEAU

SEVER DRAGOMIR

From the **administrative** point of view, this plateau lies upon Paun village, which belongs to Barnova district, in the county of Iasi; from the **geographical** point of view, it lies at the crossing of 47°06′ N lat. and 27°40′ E long. coordinates.

Geomorphologically, the actual relief is a result of the summed action of internal modelling factors – geological (rocks, tectonic structure) end external factors – physical and geographical (climate components, hydrogeographic components and so on), over a period beginning with Mid-Sarmatian and coming to present time.

The Pietraria-Repedea-Paun plateau belong to the grit-lime structural units situated between the SE limit of Moldova Plain and the NE limit of the Central Moldavian Plateau, being well distinguished by its structure, with altitudes between 350-407 m.

From the **hydrographic** point of view, the walls of the plateau are crossed to N by Vamesoaia and Vladiceni rivulets, afluents of Bahlui river, to E by an afluent of Jijia river – Tamarca rivulet and to S, by the origin network of Vaslui river.

The areal belongs to a temperate-continental climate with excessive influences, due to main euro-asiatic baric centres. Those, interacting with the local conditions, lead to the following mean multiannual values of **climatic** parameters:

- mean temperature - 9,4°C;
- relative air dumpness - 75%;
- precipitations – 534 mm;
- leading direction of winds: NW and E.

Geologically, the area of Repedea – Paun plateau has been a research issue for illustrous precursors, mainly scientists of the Iasi School of Geology, among which there can be mentioned Gr. Cobalcescu, N. Macarovici, P. Jeanrenaud, R Sevastos and so on.

So, considering the section through deposits (belonging to Mid- and Superior Sarmatian) between Tomesti village and Paun hill, oriented NE-SW (***Fig. 1a and 1b***), there can be found the following succession:

○ ***Bassarabian deposits*** from the base are represented by violet clays with fine sand intermingles, with a total thickness of over 200 m, up to the altitude of 160 m, known as Cryptomactra Strata;

- between 160 – 300 m there is a layer of siltit and compact clays, with sandy intermingles which contain samples of Mactra macarovicii;
- between 300 – 320 m there are yellow micaceous sands with grit intercalations, also containing Mactra macarovicii;
- from 320 to 330 m there is a stratum of siltit clays, and then
- between 330 – 355 m there is the representative stratum of this area, known as the „Oolitic Repedea Lime", in which there is a lot of Mactra podolica;
- the succession of Bassarabian deposits ends with a sand-clay cover of approx. 30 m, with rare samples of Unio and Helix.

○ ***The Kersonian*** in the Repedea-Paun plateau is situated at over 380 m altitude, being represented by a deltaic appearance with crossed stratification, being composed of white or yellow sands, fine micaceous, with grey lime grit intercalations, with mammal debris and plant impressions.

From the **hydrogeological** point of view, we can notice that at the superior level of the Repedea-Paun plateau there is a series of detritic permeable deposits approx. 70 m thick, placed above the grit-oolitic strata, here measuring 25 m thick.

This permeable deposit complex represent an excellent meteoric water collector, which accumulate through infiltration in a subterranean aquifer with a significant potential. Due to the fact that at the inferior part of the oolitic lime there is an impermeable clay layer, at the contact with the latter the subterranean aquifer discharges in a series of $_{\text{descending}}$ springs, which run through a series of valleys with origin in the N wall of the plateau.

Certain data about the aquifer resources of Repedea-Paun area come from the 19th *century, when the existing potable water resource for the city of Iasi became insufficient. In* that time, around 1884, Grigore Cobalcescu, as a known researcher, is asked to make a report upon his studies, regarding the subterranean sources of potable water. In his study the scientist shows the complex process of water accumulation in the permeable deposits.

The city of Iasi will benefit from the use of the waters from this plateau as far as 1917, when Dimitrie Germani developed a project for the caption of 3 springs, with an effective flow of 151 m^3/day.

For the **evaluation of hydrogeological potential** of the Repedea-Paun plateau there has been used the subterranean flow modules calculating method. So, after field research, there has been settled an area of 10,2 km^2 for the hydrogeological basin.

Also, considering the amount of infiltrated precipitation into the subterranean layers, the altitude of the plateau, the covering vegetation, the permeability and the inclination of the field, there has been calculated a module of the subterranean flow of 2,5 l/s · km^2. Considering the values of the surface of the hydrogeological basin and the

value of the module of the subterranean flow in the equation, it has been established a value of the whole flow of the aquifer trapped in the oolitic lime of the Repedea-Paun plateau of 26 l/s, or 518 m^3/day.

One thing to be pointed out is that besides the aquifer trapped in the oolitic lime there are situations in which the underlying clay layers is effilated, or can be cut off by the network of origins of valleys that arrouse from the plateau, and so the way of the subterranean waters goes deeper and discharges on the bed of Barnova sands, when this latter is consistently made of clays. When the sandy structure predominates, the subterranean aquifer discharges at the level of the grey-violet clay, or the Cryptomactra strata.

Considering the quality of water of the subterranean aquifer of the Repedea-Paun aquifer, in 2005 there have been made a series of analyses, with a concentration of main components and of possible salts resulting from stechiometric calculations as shown in ***Fig. 2***.

On those basis it is shown that in the hydrostructure of the Repedea-Paun plateau there is a type of water hydrogen-carbonated, calcio-magnesian (calcium and magnesium bicarbonates representing 80%, compared to the rest of the salts). Also, the biological and microbiological analyses have pointed out superior limits of water purity, thus being recommended as an excellent potable water.

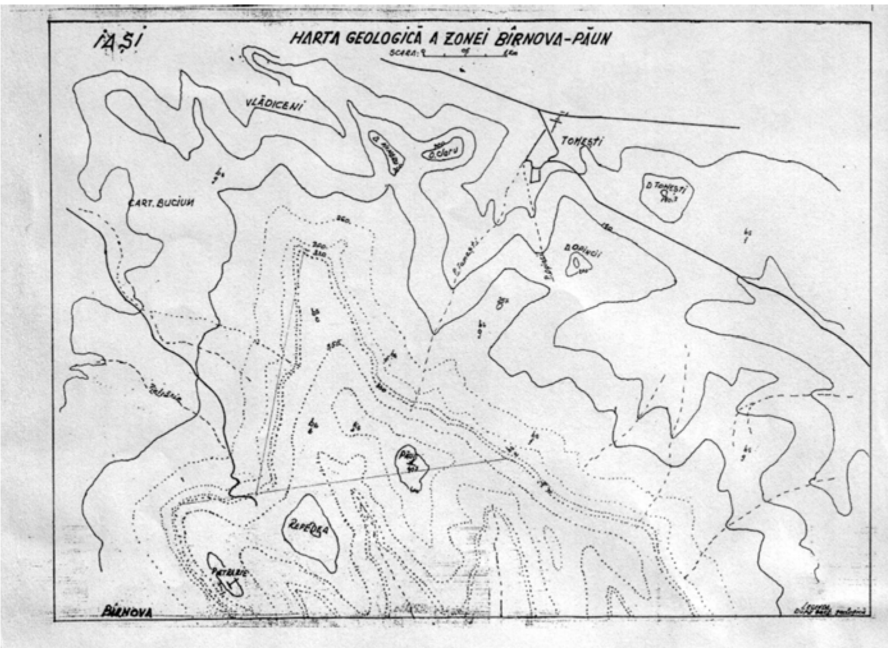
REFERENCES

CHELĂRESCU A., NICHITA O., PĂUNEL ELENA., MIHUL A. (1959) - *Posibilităţi de valorificare în construcţii ale rocilor din Masivul Repedea-Iaşi*. Bul. Inst. Politehnic „Gh. Asachi”- Iaşi V (IX), 1 – 2.

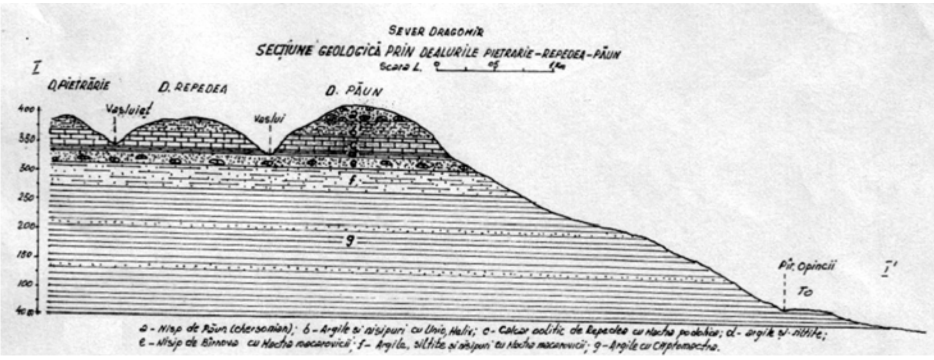
COBĂLCESCU GR. (1862) - *Calcariul de la Răpidea*. Rev. Roum. II Bucureşti.

DRAGOMIR S. (1993), *Zonarea hidrogeologică şi hidrochimică a surselor acvifere subterane din judeţul Iaşi*, An. Şt. Univ. „Al. I. Cuza” Iaşi t. XXXIX s II Iaşi.

GRASU C., BRÂNZILĂ M., MICLĂUŞ CORINA, BOBOŞ I. (2002) - *Sarmaţianul din sistemul bazinelor de foreland ale Carpaţilor Orientali*. Ed. Tehnică Bucureşti.

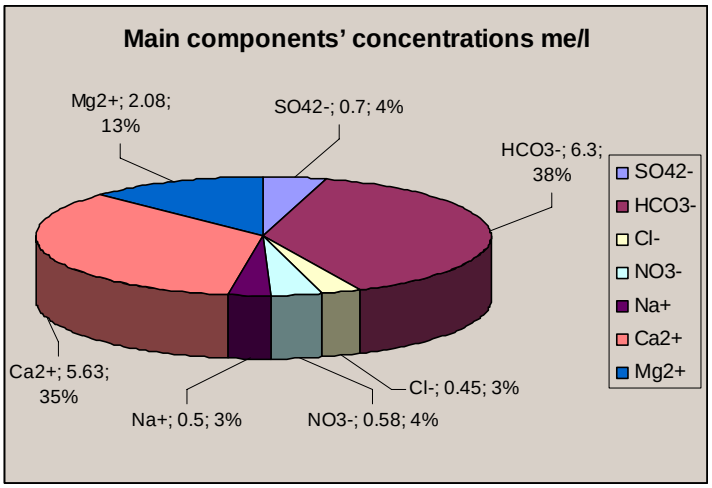

IAȘI
HARTA GEOLOGICĂ A ZONEI BÎRNOVA-PĂUN
VLĂDICENI
TOMEȘTI
CART. BUCIUN
REPEDEA
BÎRNOVA

(a)

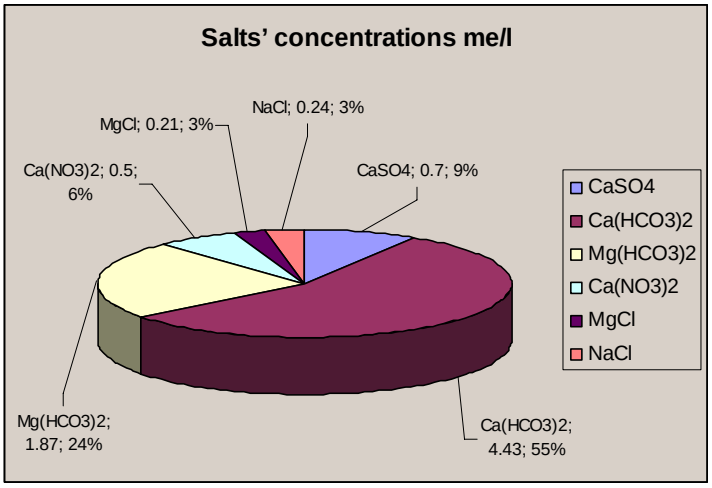

SEVER DRAGOMIR
SECȚIUNE GEOLOGICĂ PRIN DEALURILE PIETRARIE-REPEDEA-PĂUN
D. PIETRĂRIE
D. REPEDEA
D. PĂUN
Vasluieț
Vaslui
Pîr. Opincii
To
a - Nisip de Păun (chersonian); b - Argile și nisipuri cu Unio, Helix; c - Calcar oolitic de Repedea cu Mactra podolica; d - argile și siltite;
e - Nisip de Bîrnova cu Mactra macarovicii; f - Argila, siltite și nisipuri cu Mactra macarovicii; g - Argile cu Criptomactra.

(b)

Fig. 1



Main components' concentrations		
Component	**me/l**	**%(me/l)**
SO_4^{2-}	0.70	4.00
HCO_3^-	6.30	39.00
Cl^-	0.45	3.00
NO_3^-	0.58	4.00
Na^+	0.50	3.00
Ca^{2+}	5.63	35.00
Mg^{2+}	2.08	13.00



Salts' concentrations		
Salt	**me/l**	**% (me/l)**
$CaSO_4$	0.70	9.00
$Ca(HCO_3)_2$	4.43	56.00
$Mg(HCO_3)_2$	1.87	24.00
$Ca(NO_3)_2$	0.50	6.00
MgCl	0.21	3.00
NaCl	0.24	3.00

Fig. 2