Lakes, reservoirs and ponds, vol. 3(2): 120-127, 2009

BAIA VERDE - SLANIC PRAHOVA SALTED LAKES COMPLEX

Monica SAVA
Grup Şcolar Industrial „1 Mai" – Ploieşti, România
monimo_s@yahoo.com

Abstract

Baia Verde – Slanic Prahova Lakes Complex have been formed by water accumulation resulted out of infiltrated salted water from bell shaped surface salt mines dated XVII century (1685). Such lakes, as per their method of formation, can be also found in other places from the SubCarpathians area (Telega – Prahova, Ocnele Mari – Valcea), Transilvanian Depression (Ocna Sibiului, Turda, Sovata, Ocna Dejului, etc.). Water contact with diapires, in the places where have always existed such mining explorations and exploitation, has determined the formation of salted lakes having balneary and therapeutically qualities and sometimes the development of a heliothermic / mezothermic bed. At Slanic – Prahova besides the three lakes known as Baia Verde 1, 2 and 3, there is also the lake Baia Baciului situated at the border of "Salt Mountain" which represented the first objective for capitalization of the balnear and therapeutically potential of the area.
Keywords: abandoned salt mines, salt lake, balneary locations, turism

1. Introduction

Baia Verde Lakes Complex is formed out of three lakes (Baia Verde 1, 2 and 3), formed after 1850 by collapsing of the old bell shaped salt exploitation facilities/mines. The lake from Slanic river bed vicinity has been evacuated and covered due to the assumption that could affect through infiltration the Cantacuzino salt mine following that in 1998 has been refitted for balneary and tourism purposes.

The salt lakes from Slanic – Prahova can all be all found on the location of the old abandoned salt mines. From historical documents results that salt exploitation in the area has begun in 1685.

Figure.1 Left bank of Baia Verde 1 lake

Figure 2. East bank of Baia Verde 2 lake

On the left side of the Slanic creek can be found the three mine lakes known as Baia Verde 1, 2 and 3 starting from upstream to downstream. Internal collapsing processes of the salt breccia layer have greatly contributed in shaping the lakes form.

The three salted water lakes are affected by logging / colmation process due to gravity instability resulted out of humectation effect of the yellow clay that forms creek walls. Same contributions have also the salt spring which feeds the creek and their surface subject to vaporization.

Baia Verde Complex has a high salinity, over 200g/l, resulted of its salt banks. Salt concentration at the surface is lower during the spring and after rich rains (80-120g/l) and is increasing in the rainless periods of time as a result of vaporization effect. At deep depths the salinity – salt concentration remains constant.

Slanic Prahova area presents at a first sight the aspect of a petrographical monotony. The geological formations of the region's substratum are complex, the most often found being the salt formations. Slanic salt is particularized by its many nucleuses and variable thickness lens present in an area of 1.6 km^2.

From the geological point of view, Slanic Prahova belongs to Tarcau Unit and it was formed during neogen and pliocen geographical period of time as tortonien deposits within quaternary river bed silt.

2. Relief characteristics

The topographical relief is represented by high hills situated in the north - western part of the area, made out of compact sandstone/slate and micro conglomerates. Geomorphically considered, Slanic Prahova is situated between the river beds of Prahova and Teleajen, in the vicinity of Teleajen Mountains – from which the nearest is Grohotis Mountain.

Figure 3. Baia Verde 3 lake

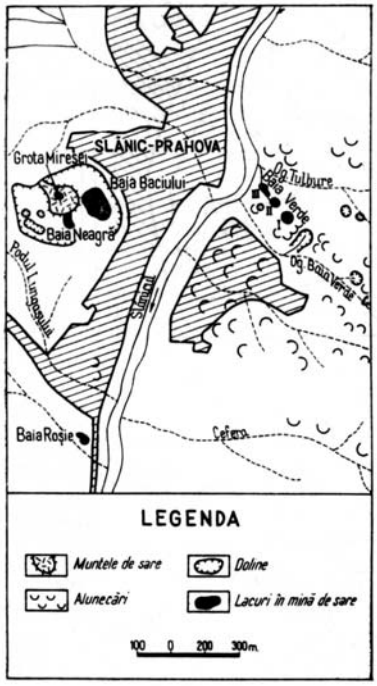

Figure 4. Lakes of Slanic Prahova (morphological sketch, acc. V.Sencu, 1958)

A distinct note in the topographical relief is given by the landslides seen as 2-3 m height sudden soil differences. Landslides and surface soil carried by water results in monoclay layer removal making place of salt deposits. Due to water action is developed a micro topographical relief with special shapes that lasts for several years such as avena type pits and mini caves.

Figure 5. Baia Verde 2 lake

Most of the lake made depressions is made out of loosed – cemented alternant clays and sandstone/silts. Topographical shapes that can normally be found are pits, wholes and rectilinear lapiezes. Gypsum can be very often found and provides a specific topographical shape such as rounded peaks that dominates the few meter river plateaus.

3. Limnogegraphical characteristics

The depth of the three lakes variates in time as can be seen in the below table:

Lake depth / Year	1968	1981	1991	2008
Lake 1	40.0 m	37.0 m	32.0 m	40.0 m
Lake 2	17.5 m	17.0 m	13.0 m	15.0 m
Lake 3	32.0 m	33.0 m	4.5 m	4.5 m

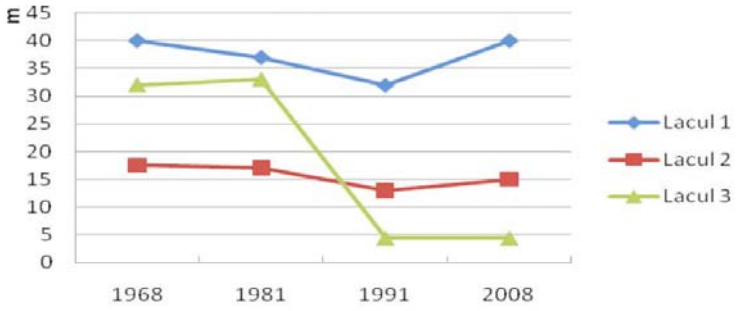

Figure 6. Depth variation of Baia Verde lakes

As it can be seen, Lake 1 and 2 has an almost constant depth during the studied period of time.

In October 1989, a large quantity of water of Lake 2 has been transferred / drained to Lake 3 in almost 5 hours and from here (Lake 3) to Slanic Creek.

The level of Lake 2 has been lowered with app. 2.5 m and by visible small landfalls and by soil compaction, the micro system has been separated.

The sudden depth decrease of Baia Verde 3 lake from 33m to 4.5 m over 10 years is the result of the mid lake funnel clogging which had in 1981 a diameter of 6 m.

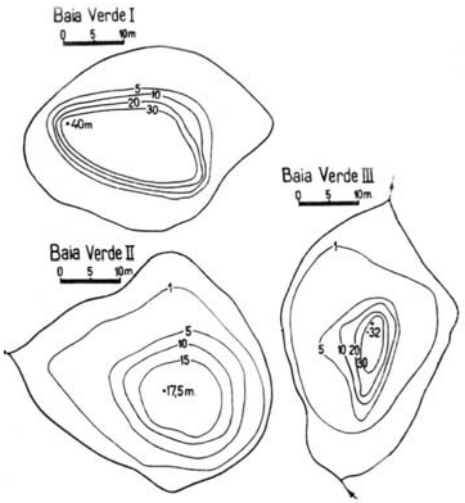

Figure 7. Baia Verde Complex (batimetric sketches, acc. I.Pisota, 1969)

The volume of water present over time variations as can be seeing in Table 2:

Table 2

Lake water volume / Year	1968	1991	2008
Lake 1	13650 m^3	10089 m^3	9855 m^3
Lake 2	6616 m^3	5200 m^3	5740 m^3
Lake 3	4750 m^3	705 m^3	698 m^3

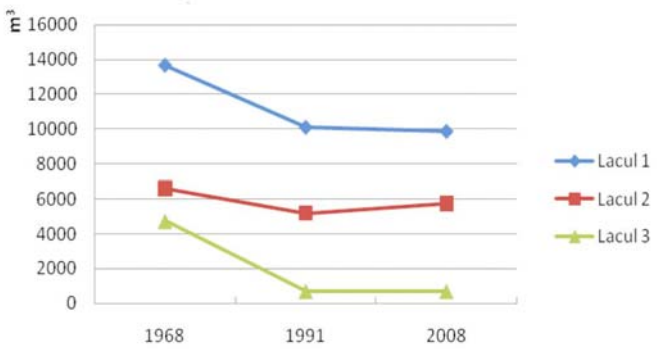

Figure 8. Baia Verde water level variation over time.

Lakes salinity varies over time in close relation with rocks components where the lakes have been formed. This can be seen is the following Table 3:

Table 3

Lake salinity/Year	1968	1991
Lake 1	240 g/l	230 g/l
Lake 2	210 g/l	220 g/l
Lake 3	203 g/l	200 g/l

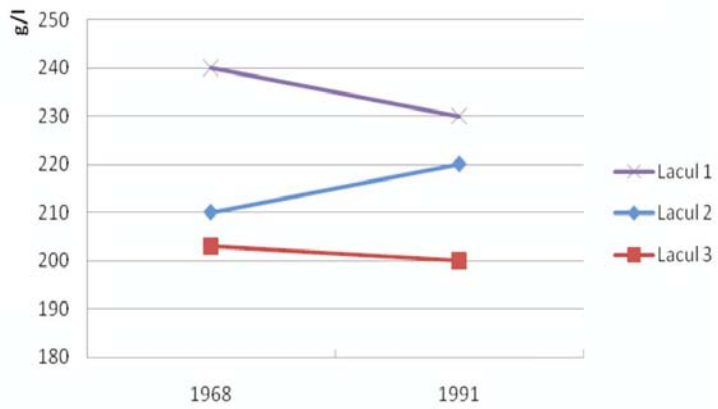

Figure 9. Baia Verde lakes – salinity variation over time

Lakes salinity varies in depth determining the existence of several layer of water with different salt concentration, the maximum salt concentration being in the inferior lower layer – over 250 g/l.

In the lakes that present a draining, such as Baia Verde 3, the lower salinity layer of water is evacuated so that the remaining richer salt water layers, right at the surface, will prevent the formation of ice.

According to a research carried out in February 1969, it was discovered that while Baia Verde 1 and 2 were covered with an ice bridge of around 15-20 cm thickness, Baia Verde 3 was defrosted due to a very high salinity (242g/l).

The heliothermal phenomenon often appears in the Baia Verde Complex because they have high depths, small surfaces, a more diluted water film and salinity stratification. The number of bays being more reduced here contributes to the maintenance of the heliothermal state.

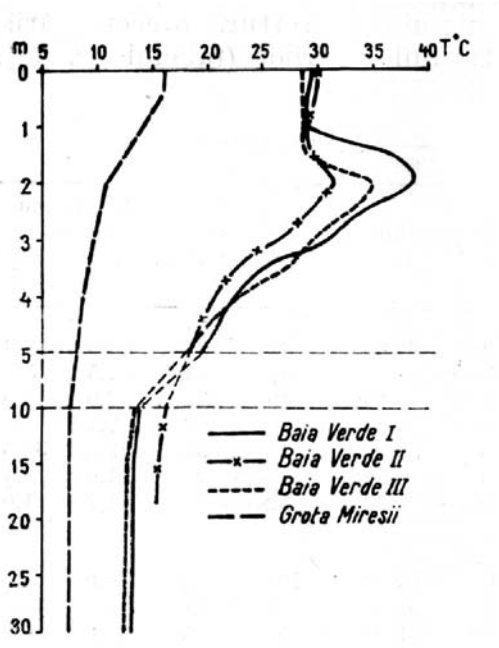

Figure 10. Baia Verde lakes/ Slanic-Prahova temperature distribution over depth dated July 3rd, 1970

As a result of thermal sounding of the three lakes – Baia Verde 1, 2, 3 realized by P. Gastescu and B. Driga on July 3, 1970 – it was acknowledged that in the Baia Verde lake, the upstream one, where the number of bays is very small, the heliothermy is better emphasized (29 C on the surface, 38,8 C at 2meters and 22,6 C at 4 meters) whereas in Baia Verde 2 it is almost inexistent. (fig. 10).

The water transparency of the lakes is influenced by the quantity of clay particles obtained from banks streaming and the existence of a rich organic mass. One can sequence the lakes according to their antitone order: Lake 1, Lake 2 and Lake 3.

The water color is provided by water salinity and the quantity of materials which come from mountainside and banks streaming. Lake 1 is green (due to strong mineralization), Lake 2 is yellowish - green and Lake 3 is greenish - yellow.

The lakes have sapropelic mud containing different mineral substances such as chloride, bromine, nitrate, sulfur, carbonate, bicarbonate, calcium, magnesium, iron and other organic substances.

Figure 11. Baia Verde 2 lake – 1911

Figure 12. Baia Verde 2 lake – 1932

Figure 13. Baia Verde 2 lake – 2000

Figure 14. Baia Verde 3 lake – 2001

4. Conclusions

The waters of Baia Verde Lake Complex are used in curing/amelioration of degenerative rheumatic diseases, diatritic diseases (cervical spondilosis–dorsal and lumbar arthrosis, poliathrosis, tendenites, etc), posttraumatic effects (cricks, sprains, fractures after arthrosis), peripheral nervous system diseases (poliomyelitis sequels, light paresis), gynecological diseases (ovarian insufficiency, chronic cervicites, etc.), dermatological diseases (psoriasis, keratonic dermatitis) and vascular diseases (varicosity, etc.).

Rehabilitation is mandatory for the banks, same as for side versants and boundaries situated over the salt deposit exploited in the previous timeframes. The current geomorphological situation allows surface infiltrations as well as deep infiltrations to which are added also surface salt domes fissures or the fissures from the inners side on the caverns situated in the boundaries/versants.

Currently rehabilitation activities are undergoing targeting touristic improvements for the three salted lakes as well as for the surrounding areas (development of touristic facilities, access roads and promoting activities).

Bibliography

Drăgănescu L. (2002), *Istoricul exploatărilor de sare de la Slănic Prahova*, SWEMP 2002*,* Cagliari, Italia.

Gâştescu, P. (1971), *Lacurile de România. Limnologie regională,* Editura Academiei Bucureşti.

Petrescu, V. (2003), *Slănic Prahova la 470 de ani de atestare documentară*, Editura Premier.

Pişota, I.,Trufaş, V., Ciumpileac,Gh. (1969), *Lacurile de la Slănic-Prahova şi Telega, Hidrobiologia,* t.10

Sencu, V. (1968), Muntele de sare de la Slănic-Prahova, *Ocrotirea naturii* nr.2,t.12.