

## Existing and perspective arrangements to Salina Cacica in the context of tourism development in salt mines.

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**ABSTRACT:** *The capitalization of salt mines through tourism, for visits and speleotherapy is a widely spread phenomenon in Romania. The international experience in the field shows that there are many successful models in this field: a successful model for the great number of tourists who come annually but also a successful model for the very good results in the treatment of some respiratory diseases, using as therapeutic natural factor the subterranean environment of the salt mine. Romania, a country with tradition in salt exploitation, has a lot of salt mines with mining activity interrupted completely or just partially in some sectors, which can be planned for a modern, European and sustainable tourism so that they can be introduced in the tourist route. The Cacica salt mine, situated in an area of great tourist value, has a non-capitalized tourist potential and a salt subterranean environment with potential therapeutic qualities. Inside a multidisciplinary approach, the proposed planning works can turn this attraction into a complex tourist product, attractive, which will diversify the offer of the area.*

**Key-words:** tourism, salt mine, planning, therapeutic natural factor, sustainable, development

### I. Introduction.

The beneficial effect of salt on the human body was observed empirically in ancient times. The salt mine environment was recognised and used for medical purposes especially in the XXth century, based on some old notes, which included the absence of chronic bronchitis for mineworkers at the Wieliczka (Poland) salt mines or the healing of persons suffering from pulmonary diseases who hid in the Kluttert cave, located in salt, during the two world wars.

A Polish doctor, Felix Botchkovsky, was the first who thought that the air with salt particles can have a therapeutic effect. His successor, doctor M. Poljakowski, created a „Salt Spa” near Krakow, which still operates. Speleotherapy appeared in the 50's in Germany where the first medical reports mentioned efficient therapeutic results in the Klutert salt cave (North Rhine, Westphalia) and in the Wieliczka salt Mine (Poland) [1,11,12].

These scientific notes raised the interest of other states, such as Slovakia and Czech Republic [12,13, 16,17,18].

The salt mine at Wieliczka, located at 13 km from Krakow is known as the oldest salt mine in Europe, of over 700 years, classified as a UNESCO monument from 1978. It is an important example for using a salt mine in tourism and speleotherapy.

The total length of the mine galleries is 320 km, a depth of 327 m, temperature of 14°C; the visiting route is of about 3.500m and the visit lasts for about 2.5 hours. The rooms where salt was extracted and the halls are very large and decorated with salt sculptures. The mining activity is interrupted, the mine being used only for tourism since 1992. At a depth of 200 m, in the underground (gallery), people have designed an art gallery, a cathedral, a subterranean lake and a famous speleotherapy centre, visited annually by about 1.2 million persons.

In the salt mine they organise programs combining the treatment activity with the recreational one (“Health lessons in the Wieliczka salt mine”, „Enjoy health”, „With us you can breathe more easily and deeply”), underground trips, conferences, training sessions and workshops for doctors

and medical personnel interested in this field. Since 2008, tourists can sleep in the salt mine and this is seen as a great method of treatment, recovery and rest.

Another tourist and speleotherapeutic center was created in 1995 in Bochnia salt mine, one of the oldest salt mines, situated in the south part of Poland, at about 35 km from Krakow. The older areas or mine galleries which are also important from the tourist/geological point of view have been declared protected areas, but the most part of the mine has been transformed in a sanatorium. The tourist visiting route, of about 2.5 km, reaches 290 m deep. The largest mine space is the *Wązyn room*, who offers relaxing, recreational facilities and speleotherapy services. The treatment indications refer especially on respiratory diseases, but the range of treated diseases and specific procedures is wider.

Speleotherapeutic centres have been opened where natural subterranean spaces in caves or galleries in the salt mines are used, in Austria (Altaussee, Hallstadt, Salzburg - Salzeman), Ukraine (Solotvino, in the Zakarpacie region), Romania (Praid, Slănic Prahova), Azerbaijan (Nakhichevan), Kyrgystan (Chon-ase), Russia (at Bereznikiy, in the Perm region), in Belarus (Soligorsk), at depths varying from 100-400 m [4,5,6]

## **2. The using of Romanian salt mines in tourism.**

In Romania, in the sub-Carpathian area outside the Carpathians and in the Transylvania basin, there are rich deposits of gem salt, close to the Salt formation of Neocene age. Because of the lithostatic pressure which creates plasticity, salt is formed in irregular blocks, which are fixed in the nucleus of some anticline slopes, in the so-called 'diapire de sare' (salt forms). Salt was exploited since the Romans' time and still goes on at present while the mines where salt is extracted, in solid form (blocks or in pieces) or in liquid form (concentrated 'brine') are called salt mine or pit mine [7].

The most known deposits where salt was and is still exploited are those from Ocnele Mari - Ocnița (Vâlcea county), Slănic Prahova (Prahova county), Târgu Ocna (Bacău county), Cacica (Suceava county), Ocna Dej (Cluj county), Ocna Mureș (Alba county), Praid (Harghita county) și Ocna Sibiului (Sibiu county).

Excepting the Turda salt mine (closed for exploitation since 1932 and owned by the Turda town hall), all the others are used for exploitation, being managed by SALROM – Salt national society S.A.

The exploitation in the underground by specific methods (exploitation rooms of different forms, sustaining spaces and pillars of different types) has created large spaces, impressive by their height and by the coloured strata inside the salt formation, thus becoming tourist attraction points, when the access to these spaces was easy. In order to make these places more attractive they have created different facilities and the subterranean spaces got different destinations (chapels for religious events, halls for musical concerts, spaces for public alimentation, vinothèque, halls for national and international model aircraft competitions, conference halls, sport fields, souvenir shops, etc) and they also equipped them with wood or plastic (for children or adults) furniture for rest and recreation.

Another important function of the salt mines is the treatment one, determined by the favourable conditions of the salt underground galleries, including constancy of the physical, chemical and microbiological parameters.

They are used for visiting and tourist circuit underground galleries from salt mines Cacica, Turda, Targu Ocna, Praid, Slănic Prahova, Ocnele Mari and rarer Ocna Dej.

For the evaluation of therapeutic factors and suitability for use in speleotherapeutic medical purposes, based on the National Plan for RDI projects 1 and 2 and some service contracts (Project Director - MSRII, Dr. Iuri Simionca - National Institute of Rehabilitation, Physical Medicine and Balneoclimatology), various

multidisciplinary studies were performed of underground salt mine environment, the experimental studies and on certain groups of patients (mostly with bronchial asthma but also chronic bronchitis, chronic infections and upper respiratory allergies) at which speleotherapy procedures were maintained in Salt Mine "Unirea" - Slanic Prahova (years 2005-2007) and salt mines galleries Cacica Ocna Dej and also Turda Salt Mine (2008 - 2012). Alongside of specialists from various research institutions in these projects was attended specialists from the National Institute for Research and Development in Tourism. Have been observed various curative properties of the underground salt mines "Unirea"- Slanic Prahova, Cacica, Turda and Ocna Dej that can be used for speleotherapeutic purposes, recovery or "balneoclimatic tourism" [4,5,6] Are necessary multidisciplinary environmental underground studies of Praid salt Mine, some galleries of this mine have been used for medical purposes starting with the 70s of the twentieth century, but which possess investigations old from 25 to 30 years. Also are necessary the medical-biological studies of the patients with different diseases, involved in the speleotherapeutic cure.

Likewise, similar studies require new galleries of Targu Ocna Salt Mine (the horizon IX), the modifying salt mine located for visiting.

In 2009, in Turda salt mine, the most modern salt mine project, inside the PHARE Program 2004-2006 was implemented. At the surface ecologisation works for the salt lakes were done and in the subterranean space the tourism facilities include a treatment basis, large spaces for recreation and relaxation, a hall for conferences, presentations, spaces with supplementary functions (medical point, toilets, annexes, lifts). The cold light system emphasizes the beautiful elements of the salt mine (the Salt waterfall, the stalactite forms, the unusual structure of the salt horizon, the great spaces of the exploiting rooms) and of the facilities.

The official data from National Salt Company SALROM A.S. shows, for most salt mines in Romania, a constant increase of the number of visitors (table nr. 1), which shows a greater interest for these tourist attractions and we think that implementing some investment projects creating tourist facilities is necessary [10].

Table 1

### Number of persons (visits + treatment) registered in Romania salt mines

Nr. crt.	Salt mines	Period							
		2005	2006	2007	2008	2009	2010	2011	2012
1	<i>Ocna Dej</i>	2380	2160	1095	1280	54537	-	-	-
2	<i>Cacica</i>	9500	20000	50000	65000	46410	45620	63300	73042
3	<i>Trotuș (Tg. Ocna)</i>	32375	55440	75468	108066	130000	132000	128000	118000
4	<i>Praid</i>	270464	331131	399068	430143	484000	392000	416000	376000
5	<i>Slănic Prahova</i>	92409	100869	150250	164252	146000	162000	179000	182000
6	<i>Salina Ocnele Mari</i> (opened 06.09.2009 )	-	-	-	-	21000	143000	178000	194000
	<b>TOTAL / YEAR</b>	<b>450181</b>	<b>565797</b>	<b>743374</b>	<b>832205</b>	<b>881947</b>	<b>874620</b>	<b>964300</b>	<b>943042</b>

Source: Branches of SALROM

## CACICA SALT MINE – NECESSITY AND OPPORTUNITY FOR TOURIST PLANNING.

### *Location, accessibility*

Cacica large village is situated in the Suceava county, included in a great tourist value area, known at national and international level as Bucovina.

The access to Cacica can be made like this:

➤ by route, on DN 2E, ramified at Păltinoasa from European E58 road, which connects two border points (RO/UA – Halmeu – Dej – Vatra Dornei – Gura Humorului/Păltinoasa – Suceava – Botoșani – Iași – Sculeni, border point RO/MO); the distance from the European road till Cacica is 49 km (on E 58, DN 2E);

➤ by rail, using the Cacica railway station, from the 513 / Suceava - Soloneț - Cacica - Păltinoasa secondary line, a ramification of the București - Bacău – Suceava major line;

➤ the closest airport is in Salcea town (61km), situate dat 12 km E from Suceava, which can be reached by DN 2E, E 58

### *The description of the tourist attraction*

The salt mine represents a tourist objective which is visited since the XIX century, on a short route, kept till nowadays.

From the building with the extraction well, where the small museum lies, visitors can get down the spiral form, wooden stairs, dating from the XIX century (lying around the main access well) and then walk through galleries dug in salt, having a rectangular shape and not sustained, with a width of minimum 1m. The air temperature in the salt mine is constant, of about 10<sup>0</sup>C.

The tourists are accompanied by a guide, working in the salt mine, and the visiting route is marked with signs and dry, with short sectors where infiltrated and production process water is drained on main sewers. At 25m depth, the first chapel of this type in Romania was built, dating from 1871, with the altar, pulpit, vestry and the St Varvara icon, dug manually.

At 35 m depth, on the horizon 1, one can see the wood timberings, well conserved in the salt mine and still functioning. Then the tourist route gets down to the artificial lake, a brine basin (10x6 m), with balustrades and flood-lights and the ,dancing hall', named ,Ing. Agripa Popescu hall' (the first director of "State Monopolies") with 24x12x12 m dimensions and two salt-dug balconies at its ends. At this level (37m depth) events, shows are organised. In 2008, the tourist route was extended with a sport field and connecting galleries.

### *Tourist value of the area*

The Cacica large village belongs to one of the most well-known tourist areas in Romania , known as Bucovina or North Moldavia. Besides the natural attractions of the relief forms, among which Obcina Mare can be admired, the area boasts many cultural-historical monuments. The famous monasteries in north of Moldova, of which 7 belong to the UNESCO patrimony, attract annually many tourists, a lot of them coming from abroad. The ethno-cultural value – traditions, folklore, traditional costumes, crafts – complete the unique potential of the area. The Roman-Catholic church in Cacica, built in the last century, by the Polish community was declared *Basilica Minor* during Pope John Paul II's visit and is considered unique in SE Europe and perfect for pilgrimage. Designing this salt mine in line with European tourism demands would offer the possibility to include it in tourist circuits [1,14].

### *The tourist value of Cacica salt mine*

Although it does not have extraordinary facilities or impressive subterranean halls, Cacica salt mine is special by its old character, simplicity and large spaces which can be prepared for visits. The main elements of the salt mine with special value are:

- St Varvara chapel, at 29 m depth, built in the first salt exploitation room and dedicated in 1904; annually on 4<sup>th</sup> December priests have a divine service for St Varvara,

the protector of miners, where many visitors gather;

- the salted lake, at 42 m depth, an artificial 10x6m lake, where salt crystals lay down on its board; people can cross the lake by boat – Carol I crossed the lake with it in 1902;

- “Grota Piticilor” cave

- the “Dancing hall”, at 44 m depth, cut manually, with 6x12x24 dimensions;

- the huge salt crystals, a very rare mineralogical element, lighted up adequately

- an echo room, where echo comes back eight times, which could become an

important attraction if it is designed for tourists

### **The current manner to capitalize the Salt mine Cacica.**

The Cacica salt mine is visited especially for tourist purposes, being included in the north Moldavia monastery route, the national DN2E road connecting this great village to the tourist attractions of Bucovina.

The data from SALROM – Cacica show that the number of visitors is increasing, which can be seen in the following table.[10].

*Table 2*

**Number of visitors registered at Cacica salt mine, during 2005 - 2009**

<b>Year</b>	<b>TOTAL Visitors</b>	<b>Annual increase or decrease percent (%)</b>
<b>2005</b>	<b>9500</b>	-
<b>2006</b>	<b>20000</b>	<b>+210,53</b>
<b>2007</b>	<b>50000</b>	<b>+250,90</b>
<b>2008</b>	<b>65000</b>	<b>+130,00</b>
<b>2009</b>	<b>46410</b>	<b>-71,40</b>
<b>2010</b>	<b>45620</b>	<b>-98,30</b>
<b>2011</b>	<b>63300</b>	<b>+138,75</b>
<b>2012</b>	<b>73042</b>	<b>+115,39</b>

*Source: SALROM - Branch Salt Mine Cacica*

There is no information about the origin country of the foreign visitors. The increasing tourist demand can be explained by the investments made by SALROM - - Branch Salt Mine Cacica for tourist recreation (designing inside the salt mine a large salt water pool, modernizing its beach, installing booths and other useful facilities for the pool), improving the tourist offer of this main village. Many visitors come to the salt mine for hoping to improve their health by using the subterranean salt environment [14,15].

During of the year 2012 City Hall of Cacica has conducted a feasibility study for the salt mine landscaping, comprising a parking deck with 180 seats (cars) (area 6264.00 sqm) and a visitor center, building ground floor and bathroom (167.18 sqm built area). The investment was approved on Technical and Economic Commission of the Ministry of Tourism (now the National Tourism Authority) and will be financed from the governmental funds [1,8].



In Cacica large village there are only 88 places in tourist accommodation units which are classified (29.12.2013)<sup>2</sup>. Using the data from Cacica mayor's office, there are non-classified tourist boarding houses.

Still, on the area around the Cacica main village, there are about 1400 bed places in classified tourism units, at 2-4 stars, which satisfy the tourists demands concerning tourism comfort and accommodation.

### ***Deficiencies related to designing the salt mine and the visiting facilities.***

#### *For the subterranean facilities:*

- visitors enter by a wooden stairs, from 1803, with an accentuated inclination – most tourists get down it with difficulty, it needs a re-design;
- the access is the same for the personnel who exploits and keeps it in working order;
- the interior spaces are not enough designed and diversified for rest and recreation;
- although an additional space has been opened, which includes other subterranean valuable enclosures, these are not adequately designed: there are no lights, the access way are simple exploitation galleries, there are no visitation facilities;
- the persistence, in the subterranean galleries of an unpleasant smell of hydrocarbon and of cheese casks which were stored here before 1990

#### *For the exterior facilities:*

- there are no adequately designed parkings near the access in the salt mine
- the capacity of the existing parking, in front of the salt mine access wing, is insufficient
- there is no visiting and information centre
- there are no toilets near the parking and inside the salt mine, this being a real problem

### ***The speleotherapeutic value of the Cacica salt mine microclimate.***

The preliminary study about the salt subterranean environment in Cacica salt mine (Suceava county) drawn up in 1999. On this occasion, they noticed that the subterranean environment in Cacica salt mine contains salt aerosols, is natural and aseptic, less polluted and not allergic, the total number of germs being 110-1426/m<sup>3</sup> air. The microclimate studies have shown the following parameters: air temperature – 10.2 - 10.4<sup>0</sup>C, relative humidity – 76%, wind speed < 0.1 m/s, air pressure of +5 mmHg (in comparison with the surface one), thermal comfort of 9.5 TEE<sup>0</sup>. Due to the results of this study, we have thought that the subterranean spaces in Cacica salt mine - galleries situated at horizon 1 of salt exploitation (the gallery near the 'brine' lake - the dancing hall and sport hall) could be used in speleotherapy purposes after carrying out some technical works. Several studies, including medical ones, which evaluate the curative properties of the salt mine have been proposed to this purpose [2,3, 15].

In order to solve some important aspects of the speleotherapy field, a complex and multidisciplinary research-development-innovation project with the title "Medical-biological complex study in view of an innovative use of the environment potential therapeutic factors in salt mines and caves for health and balneo-climateric tourism; solutions to improve these" - has been launched in 2008 within the National plan of Research-Development-Innovation 2, Program-Partnerships, Prior program - Health (Project and Financing contract 42120/2008, Project Director - MSRII, Dr. Simionca Iuri - National Institute of Recovery, Physical Medicine and Balneoclimatology, period 01.10.2008-01.10.2011). The project, with original scientific character, with a large number of applicative aspects and important economic and social impact presented a national and international novelty [5,6].

Among the salt mines was evaluated in the project included Cacica salt Mine with underground salt environmental studies, the experimental biomedical ones regarding the underground environmental salt mine effect on laboratory animals with induced pathology (experimental asthma) and those of patients with bronchial asthma, chronic obstructive bronchitis and other diseases to which has been applied speleotherapy experimental cure in respective salt mine.

The scientific, methodological and technical complexity of the project (complex cellular and molecular medical-biological-immunological studies, microbiological and biochemical studies, cellular biology and cytological studies, studies of some physical-pathological processes and clinical-functional investigations for laboratory animals with experimentally induced pathologies and also for people suffering from bronchial asthma/chronic bronchitis, cutaneous inflammatory process which are supplemented by field studies including mine safety ones, salt mine subterranean environment studies – microclimate, radiation, chemical-ecological and microbiological studies) is the majeure and involved classical, modern and competitive equipments and methodologies provided by the consortium partners (National Institute of Recovery, Physical Medicine and Balneoclimatology; Victor Babes” National Institute of Research Development in Pathology and Biomedical Sciences; National Salt Company SALROM SA; National Institute of Research and Development in Tourism; Bucharest University; Horia Hulubei National Institute of Research and Development in Nuclear Physics and Engineering), results having the aim to relaunch the use and the efficiency of speleotherapy for medical and balneoclimatic tourism purposes [6]

### ***The opportunity of the investment for the salt mine planning.***

The National Development Plan 2007-2013 (NDP 2007-2013) includes in the national development priorities tourism, too as a manner to “*raise the economic competitiveness*” “on medium term, in an equilibrated context (Priority no. 1), which also contributes to the improvement of Romania’s image in the world. *Developing rural economy and increasing productivity in the agriculture field (Priority no. 5)* and the increase of life standards in the rural areas by diverse rural activities promote the concept of sustainable and balanced development in rural areas, in view of an economic and social cohesion. The diversifying of rural activities towards non-agriculture activities also includes the stimulation of tourist activities which capitalize the local tourist resources but also absorb a part of the labour force surplus. This priority is also connected with the EU policies concerning. “*The European strategy for agriculture and rural development. Diminishing the development differences between the country regions (Priority 6)*” and is based on the low capitalization of the local and regional tourist potential. The general strategy of this priority is based on national and sectorial interventions with regional and sub-regional specific to support and generate economic increase, implemented by a combination of public investments in local infrastructure with active policies which stimulate business activities and support the capitalization of local resources, such as the development of regional and local tourism.

The Cacica large village belongs to the Region 1 north-east, whose strategy identifies 3 major purposes which include The development of enterprises and business, the capitalization of tourism potential of the region by productive investments in tourism and the stimulation of the services sector in tourism and rural area.

## DESIGN PROPOSALS FOR INCREASING THE TOURIST ATTRACTIVENESS OF CACICA SALT MINE

### *1. Works proposed at the surface.*

The exterior design works at the Cacica salt mine (part of which were included in the feasibility study prepared by INCDT Bucharest for Cacica City Hall) will be realised on the field owned by the Cacica mayor's office, located close to the salt mine, between the pool and the air well, in order to facilitate the tourists' access in the subterranean area.

The planning proposals include:

- a visiting centre
- two parking platforms
- a ticket office
- the wing which will shelter the lift for the access in the subterranean area

The visiting centre will include an exposition space with information tourist point and a stall with promotion materials, souvenirs, maps and tourist guides, an administrative office and toilets for tourists.

The parking platforms will be built on the same spaces where cars are parked now, but in disorder and will totalise 180 places.

The ticket office will be located near the lift wing, towards the forest and close to the parking. The wing which will be built above the air well will include a waiting room with wind-fang for tourists, the lift case, a maintenance workshop and a wardrobe room for personnel with toilets and shower.

Information boards with the area tourist map, data about the salt mine and main tourist attraction in the area will be installed in the main crossroads (DN 17/E 58 with DN 2E), at the resort entrance and also at the salt mine entrances.

In the forest area near the salt mine, the mayor's office is developing a project to design a walking alley and to turn the space into a recreational forest-park.

*Other design works which have been proposed for the Cacica salt mine:*

- to rebuild the tourist welcome point inside
- to modernise the access building in the subterranean tourist location
- the re-segmentation of the sitting space in the salt mine
- improving the lights system

### *2. The proposed works for the subterranean area*

Designing the tourist location in the Cacica salt mine, Suceava county, in view of developing the tourism activity, implies the following works:

- a. redesigning the access way in the subterranean area – repairing the wooden stairs and the circulation ways*
- b. replacing the electric light system, by supplementing the number of light sets, to offer a better visibility for tourists*
- c. replacing the entrance/exit doors and the air circulation system in the subterranean area at the recreational place - maintaining a fresh air in the tourist location will be ensured by a functional ventilation system*
- d. designing the existing spaces – placing equipments and furniture for creating playing spaces for children, sport fields, meeting and conference rooms*
- e. designing the toilet area in the subterranean area*
- f. creating commercial spaces in the subterranean area; the products which are sold can be objects specific to the salt extraction activity, food products, local craft objects*
- g. designing, equipping the sport field*
- h. designing the 'brine' pool + fountain*
- i. planning a salt therapy area*
- j. repairing the water and sewerage system in the subterranean area*
- k. modernizing the tourist transport system by introducing a person lift of medium capacity which should connect the surface with Horizon I and II of the tourist location [1].*



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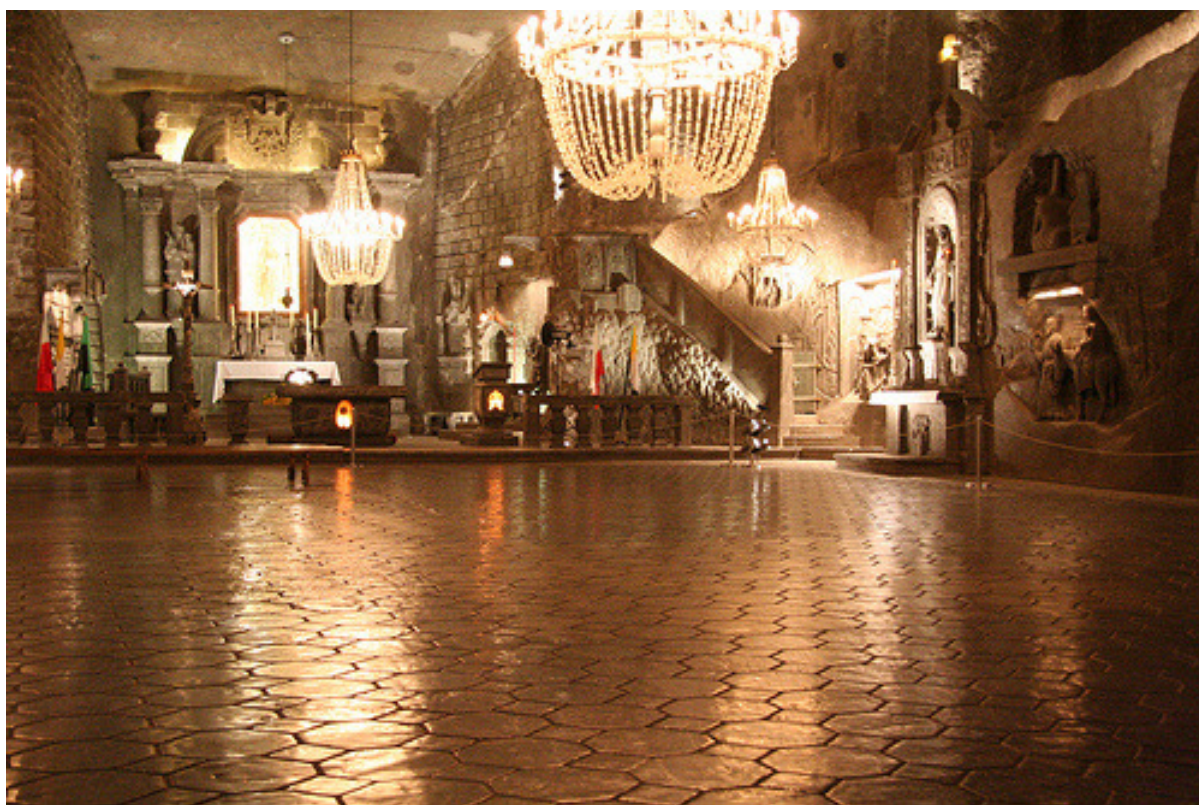


Foto nr. 1. Wieliczka Salt Mine (source: <http://thepolskiblog.co.uk/2009/04/travel-tip-wieliczka>)

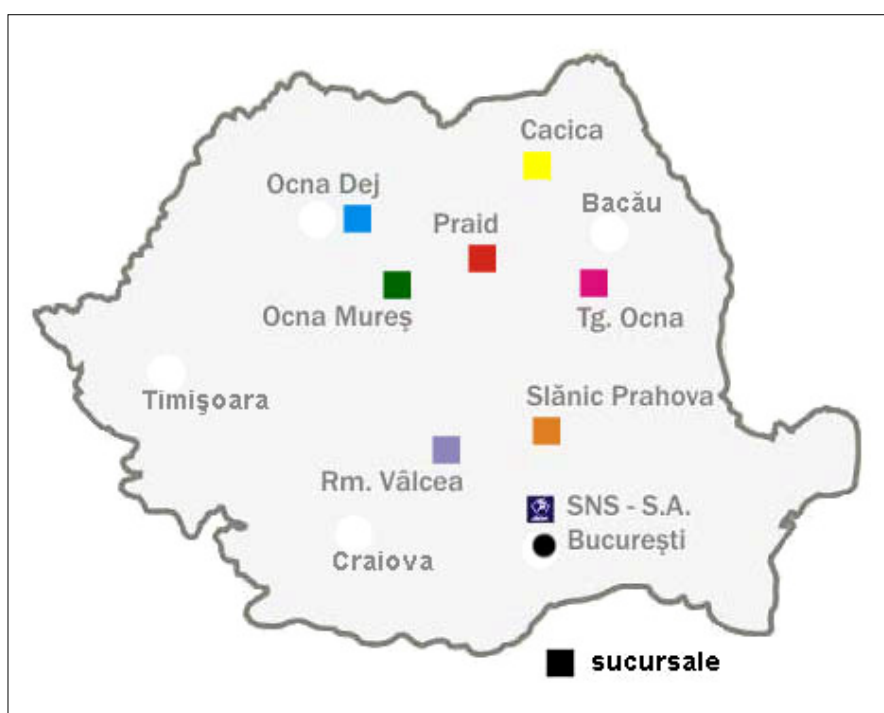


Fig. no. 2. Romania's salt mines (source: [www.Salrom.ro](http://www.Salrom.ro))



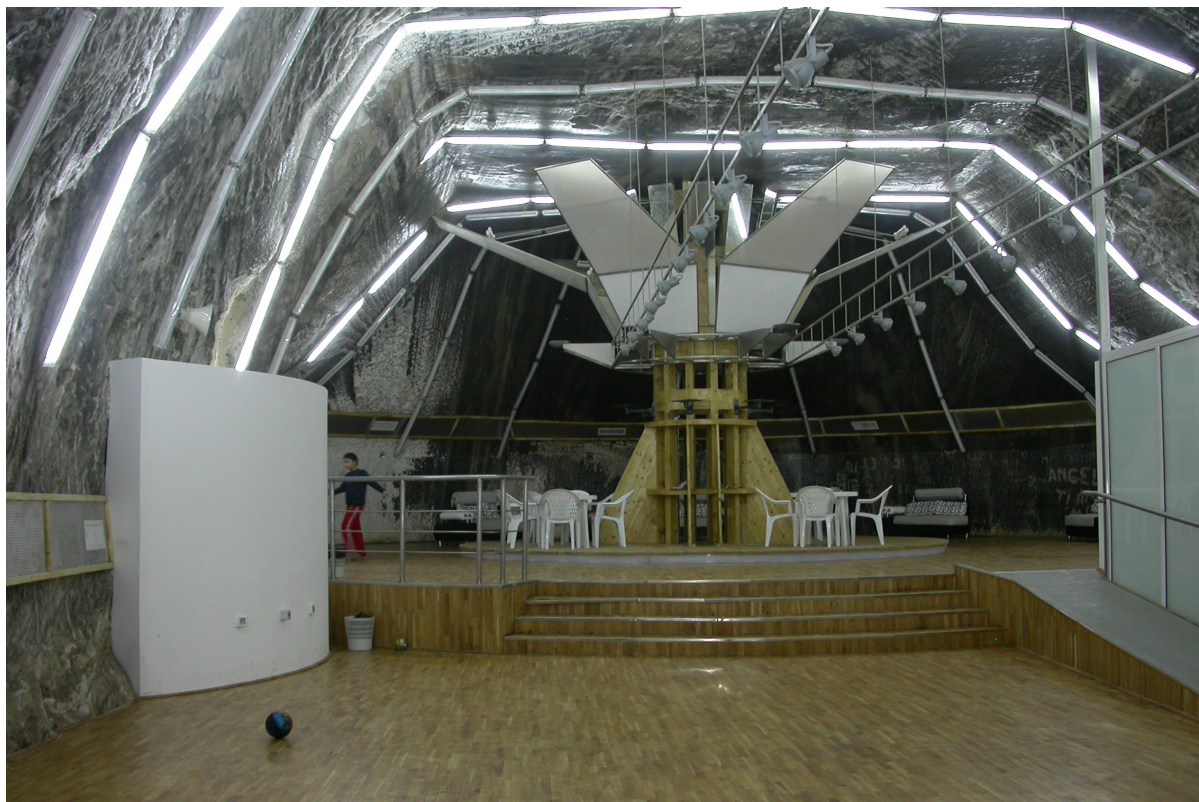


Foto no. 3. Turda salt mine (foto: G. Maioreescu)



Foto. No. 4. Cacica salt Mine – „Dance Hall” (foto: G. Maioreescu)





Foto no. 5. Cacica salt mine – „*St. Varvara Chapel* ” (foto: G. Maiorescu)