

Romanian Heritage Stone with international historical significance - the ooidal limestone from Măgura Călanului pre-Roman quarry



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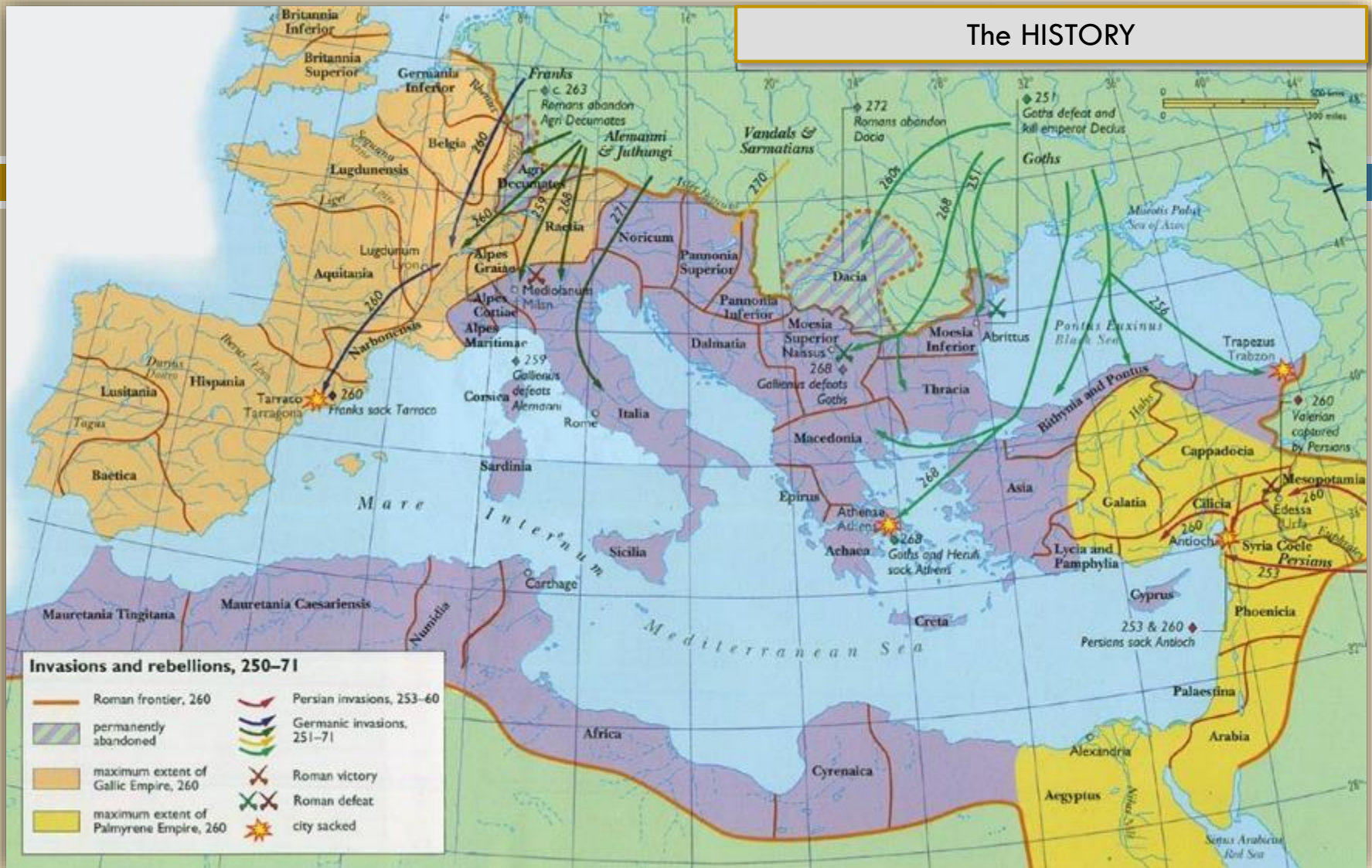
dr. Aurora Pețan

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Dacia covered a large territory in South Eastern Europe, bounded on the north by the Carpathians, on the south by the Danube, on the west by the Tisa, on the east by the Tyras or Nistru. It corresponds in the main to modern Romania and Moldova, as well as parts of Hungary, Bulgaria and Ukraine. In the first century BC, King Burebista founded a kingdom by unifying several Dacian tribes, but this kingdom soon attracted the attention of the Romans.

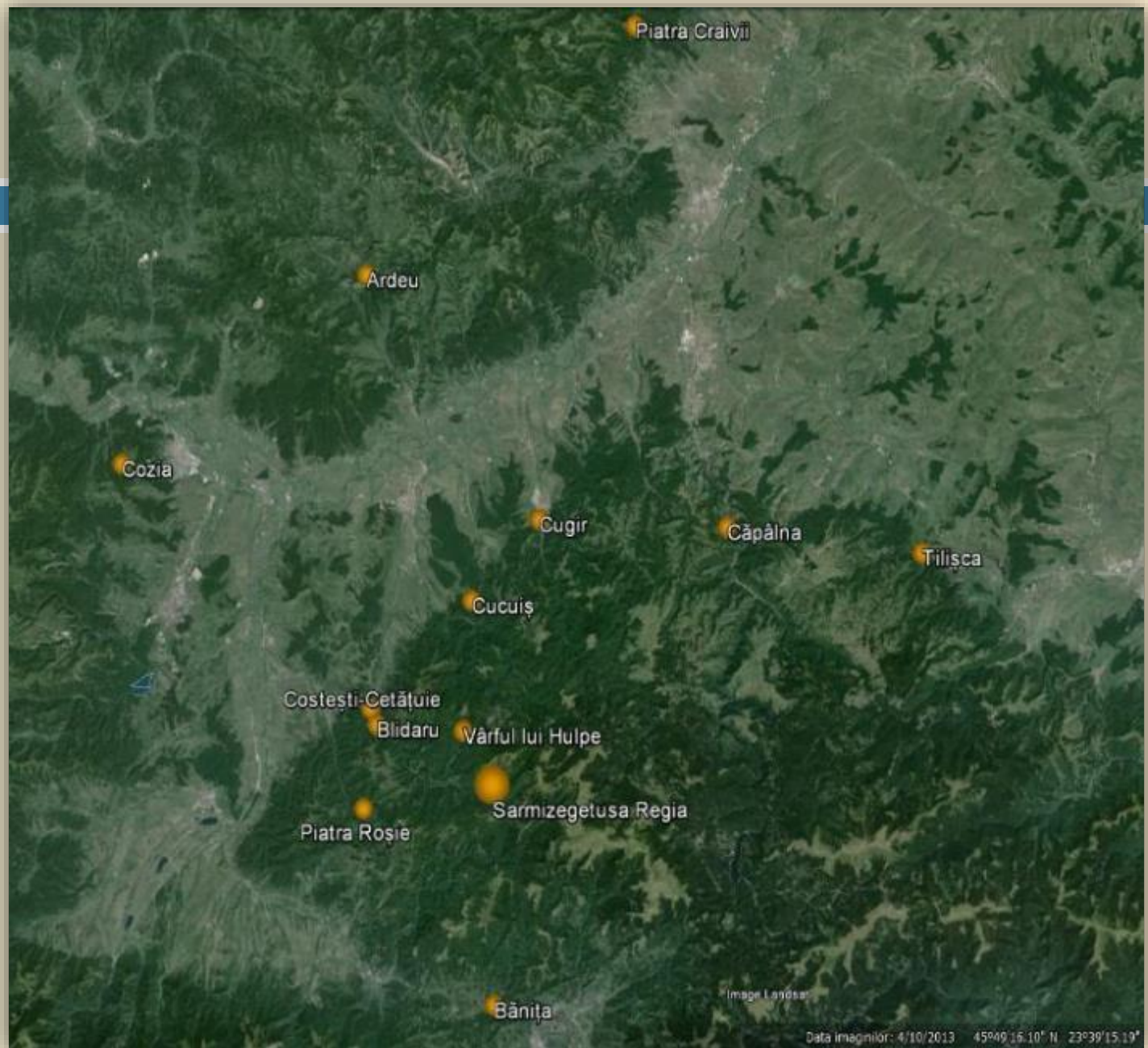
The HISTORY



After several confrontations between Dacia and Rome, Emperor Trajan conquered the kingdom during two campaigns, in 101-102 and 105-106 AD, and turned it into a Roman province. The territory remained troublesome, with constant revolt and vulnerable to attacks from the North and East. Rome finally abandoned the province under Aurelianus, in 271 AD.

The HISTORY

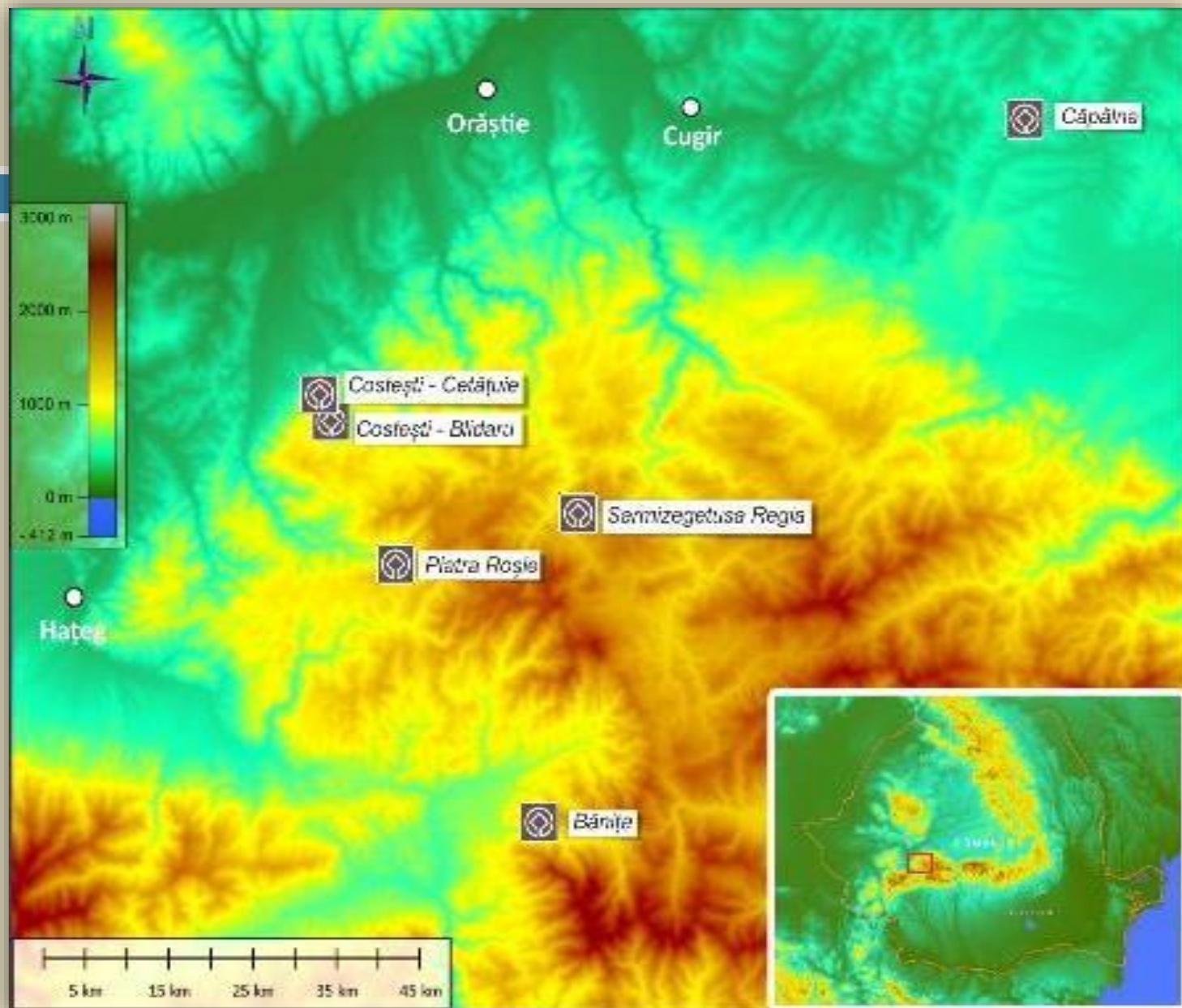
The monumental structures of Sarmizegetusa Regia, the capital of the Dacian Kingdom, and the ensemble of fortresses and fortifications around them, erected by the Dacians during the 1st century BC and destroyed by the Romans at the beginning of the 2nd century AD are situated in a mountainous area, over 1000 m.

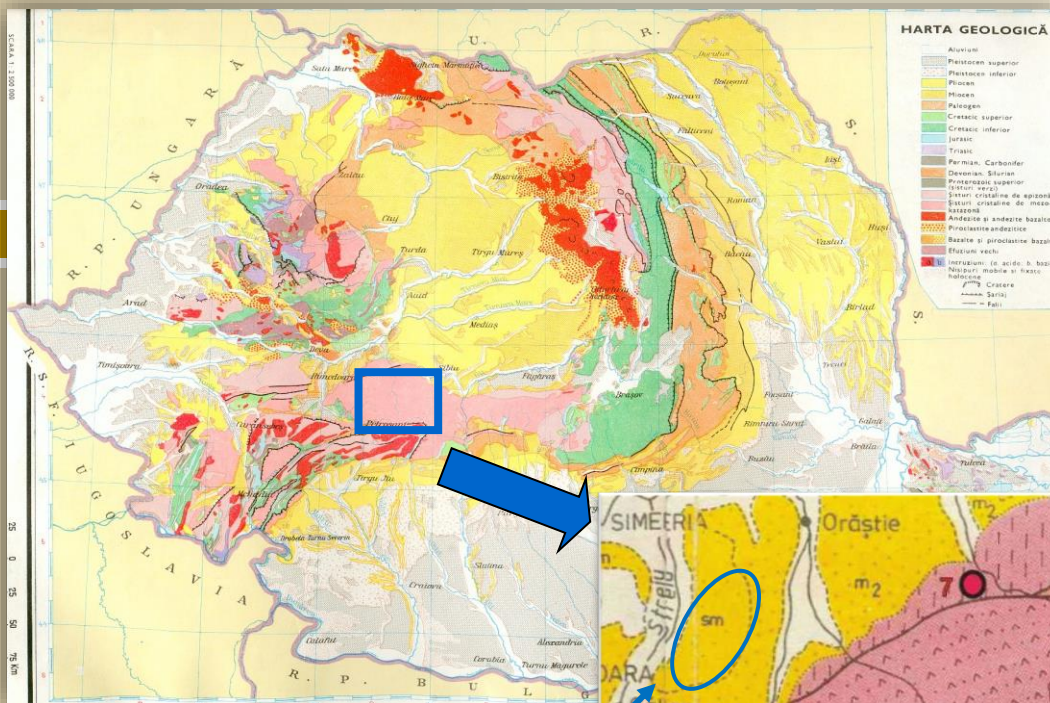


The HISTORY

The Dacian fortresses of the Orăştie Mountains form a group of hillforts, defensive works and settlements located in South-West Transylvania.

Six of them has been inscribed on the World Heritage List since 1999.

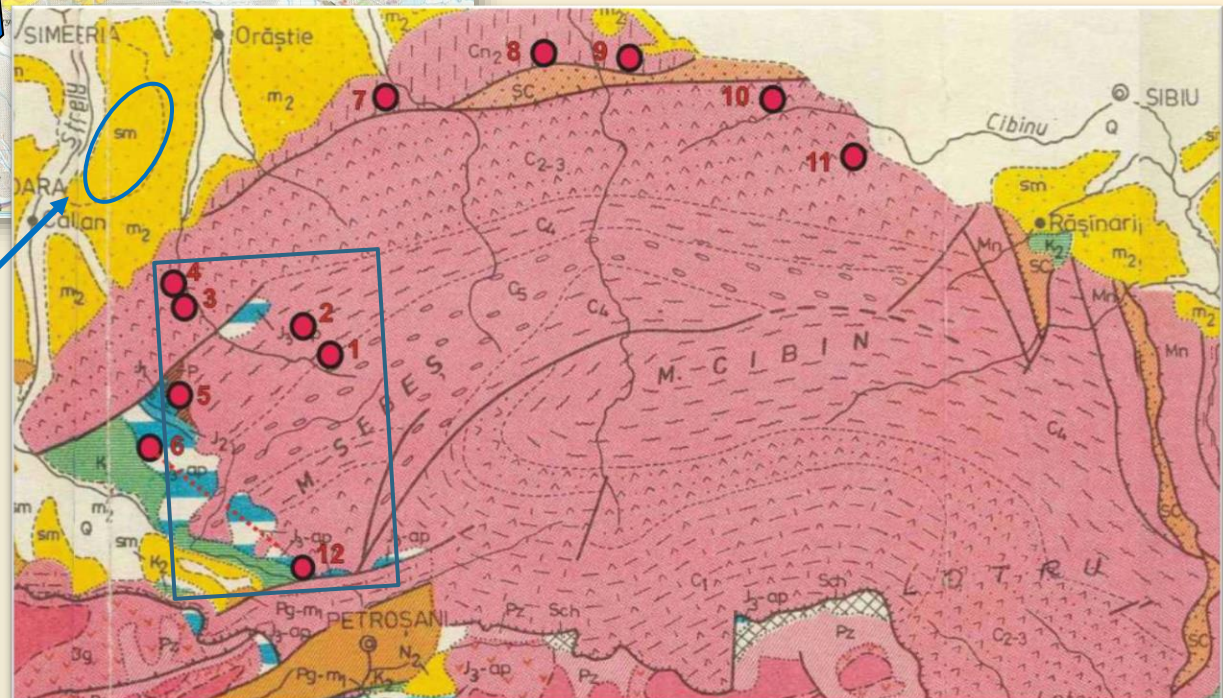




The fortifications from the Sarmizegetusa Regia capital and the fortresses around it are situated in a mountainous area, overlapping a schistous or a hard limestony geological substratum.

Măgura Călanului

- the most important source-area for the Dacian fortresses from Orăștie - Șureanu Mountains



1 - Sarmizegetusa Regia
2 - Fetele Albe
3 - Blidaru
4 - Costesti

5 - Pietă Rosie
6 - Ciclovina (peștera)
7 - Cugir
8 - Capalna

9 - Calnic
10 - Tilisca
11 - Sibiel
12 - Banita

--- - presupuse cai de comunicare subterana

Sarmizegetusa Regia – the capital of Dacian Kingdom



All of fortresses are located on hard mountain tops and their extensive and well-preserved remains stand in spectacular natural surroundings.

Sarmizegetusa Regia – the capital of Dacian Kingdom





Along the following centuries, the fortresses and the settlements were covered by thick forests and the access to them grew more and more difficult. At the same time, their isolation up in the mountains, in the middle of century-old forests, made for their preservation over the centuries.

The recent HISTORY



The ruins of these fortresses came to the attention of the authorities only at the beginning of the 19th century, after the local villagers discovered a series of gold treasures in the area of the royal fortress.

Măgura Călanului



At present, it is admitted that all these fortresses were built with limestone that originates from Măgura Călanului quarry. However, while the above mentioned fortresses has been inscribed on the World Heritage List 20 years ago, the Sarmatian limestone from Măgura Călanului quarry, although having a real heritage significance, *has never been systematically studied, nor the geosite protected or valued.*

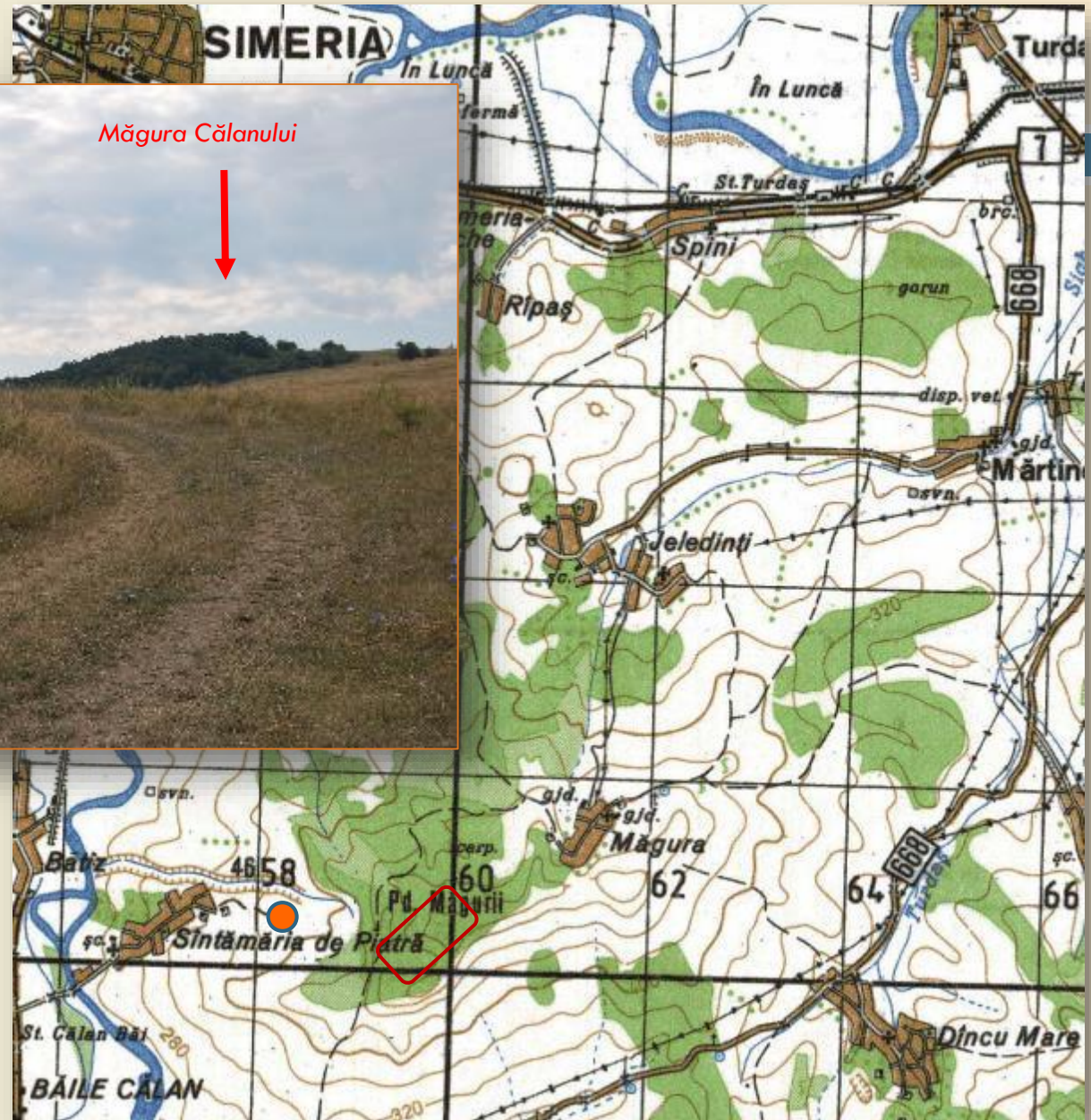
Măgura Călanului area and the paths to the old quarry



● *Point of view*



Măgura Călanului area and the paths to the old quarry



● Point of view

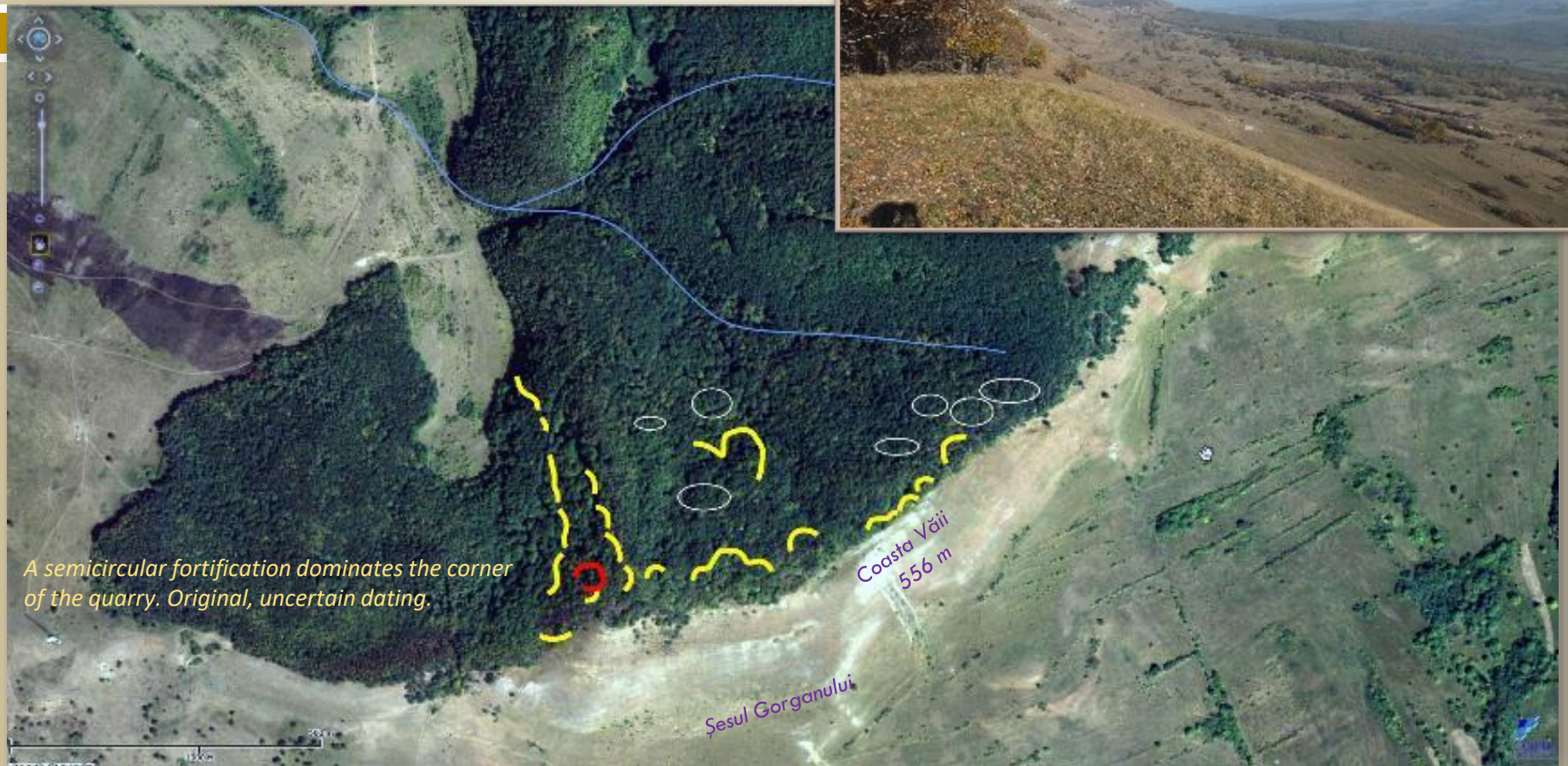
Often modern roads overlap
the ancient ones

Măgura Călanului Hill - the Pre-roman quarry of limestone



The quarry lies on an area of at least 30 hectares and today is covered by forest. Fortunately, it was only exploited during the building of the Dacian fortresses and it is well preserved, being probably one of the most spectacular ancient monuments of its kind outside the Greek-Roman world.

The quarrying area and the counted operating fronts



Located at 30-50 km away from the fortresses and at about 500 m altitude, Măgura Călanului limestone quarry is the most important preserved ancient quarry on the Romanian territory.

The quarry is L-shaped in the mirror, with the sides of 600 x 400 m. The long side is on the hill ridge and E-W. A few dozen of operating fronts are aligned on these sides or in the internal area. Are also large anthropic terraces close to the water source.



Special signs / glyphs





Extraction and dimensioning of stone



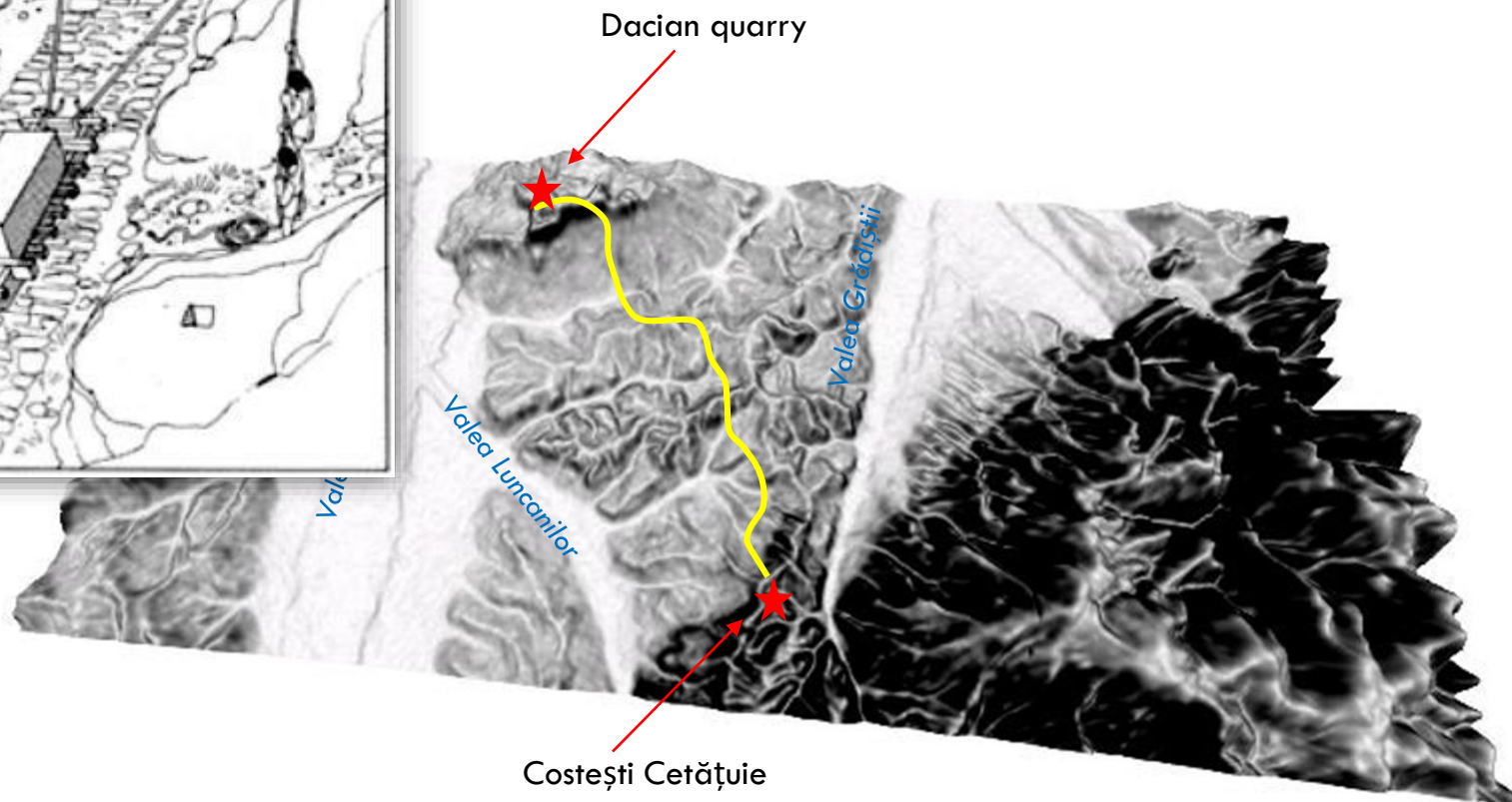
Moigrad processing plant
Dimensioning for kerbs

Măgura Călanului



The Gorgan Plain, located at the base of the southern slope of the hill, is still covered with blocks from the old quarry. Most probably, this area was used for primary processing and preparation for the transport.

Paths and the ancient transport equipments



The stones were either rolled from the quarry on the slope, or were brought to this place on two of the main quarry paths.

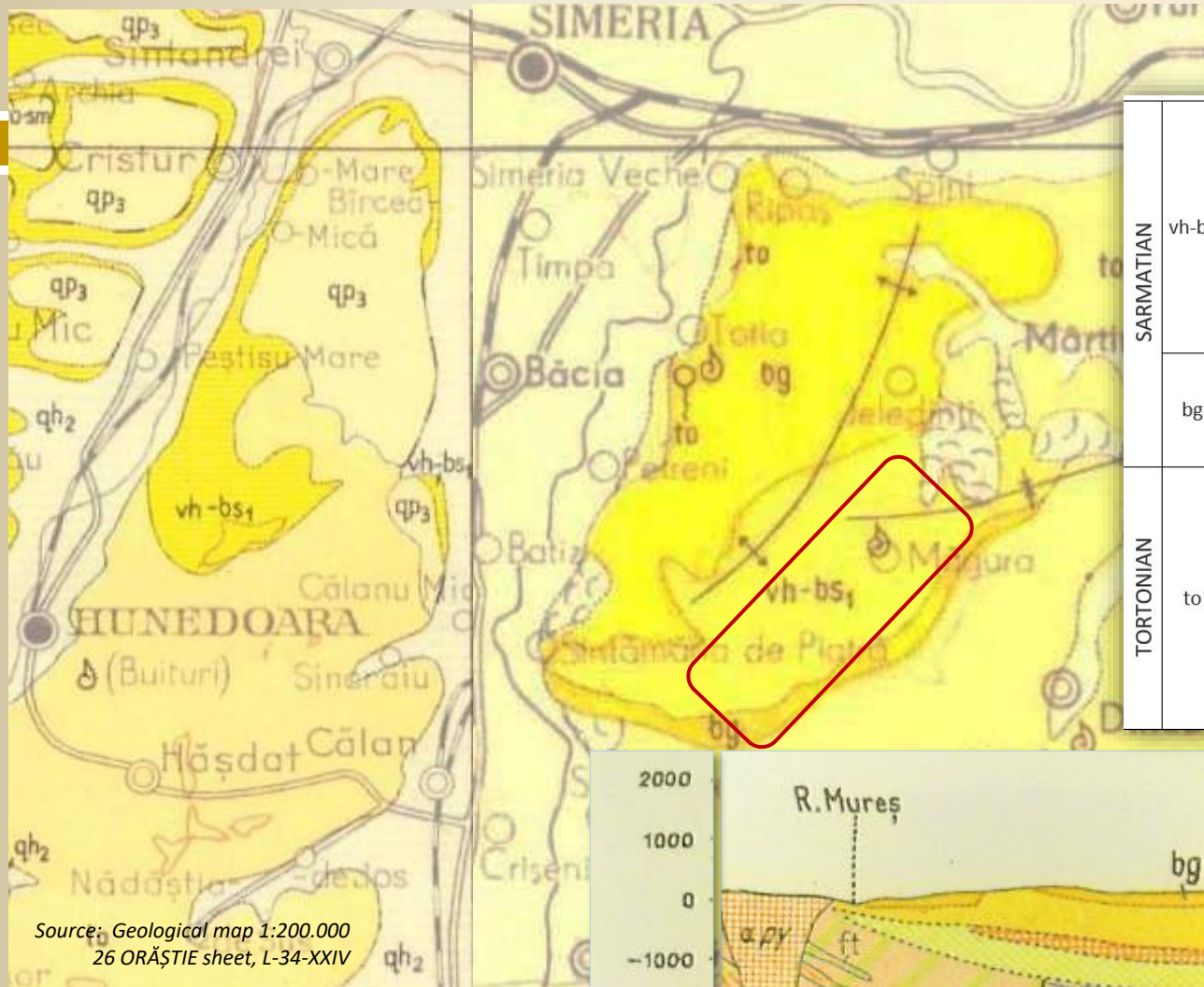
"Dacian stone quarries" independent project



Independent geo-archaeological investigations have been carried out during the past five years by the authors of this paper. The petrographic and optical microscopy analyses have highlighted several limestone varieties in the Măgura Hill, differentiated through the mineralogical constituents and physical characteristics.

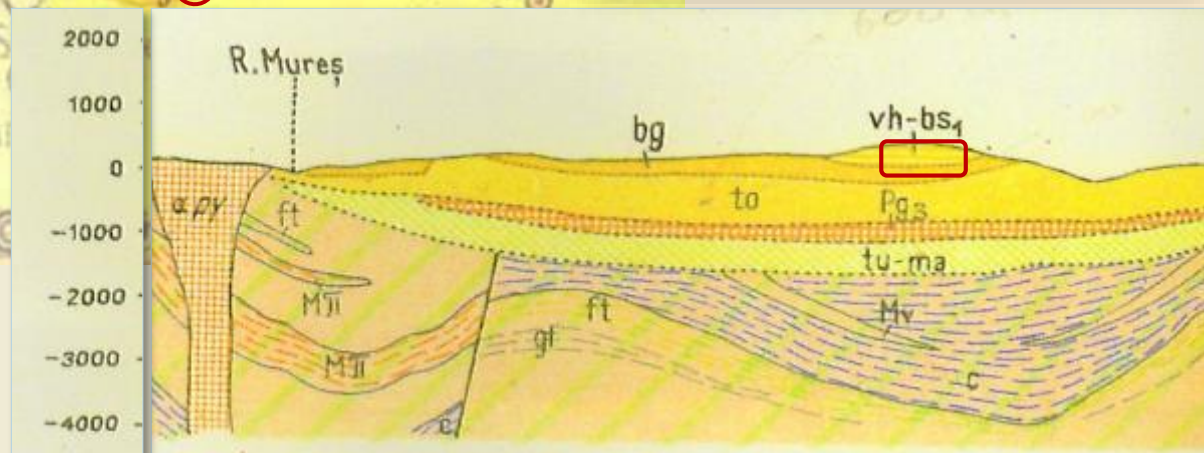


GEOLOGICAL FRAME



SARMATIAN	vh-bs	<ol style="list-style-type: none"> 1. Conglomerate, gresii, calcare oolitice și organogene, marne nisipoase cu <i>Cardium</i>, <i>Trochus</i>, <i>Cerithium</i> 2. Marne 3. Andezite cuarțifere de Barza-Săcărâmb
	bg	Argile marnoase, nisipuri cu <i>Ervilia</i> , <i>Syndesmya reflexa</i>
TORTONIAN	to	<ol style="list-style-type: none"> 1. Marne cu <i>Spiralis</i>, nisipuri, pietrișuri fosilifere, gipsuri, tufuri 2. Calcare cu <i>Lithothamnium</i>, marne 3. Marne tufacee cu <i>Condorbulina universa</i>, breccii, conglomerate

 Măgura Călanului quarry



PETROGRAPHICAL ANALYSIS



Oolitic limestone, light fossiliferous



Fossiliferous limestone



Oolitic limestone, light fossiliferous



Clastic oolitic limestone

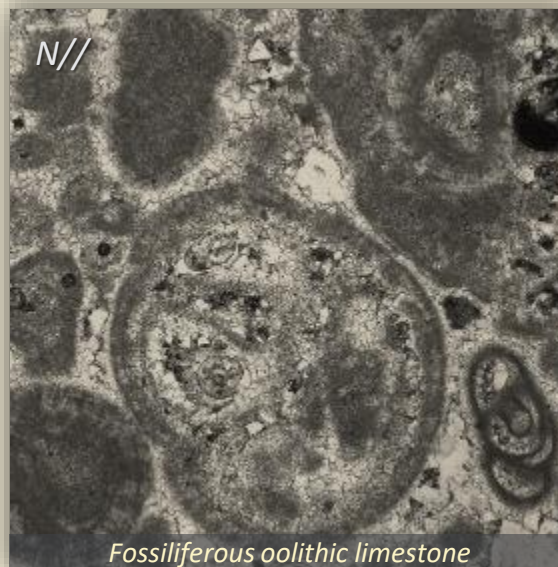
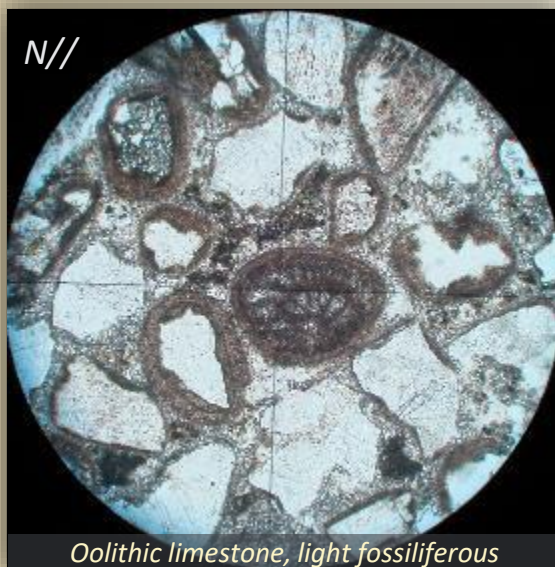
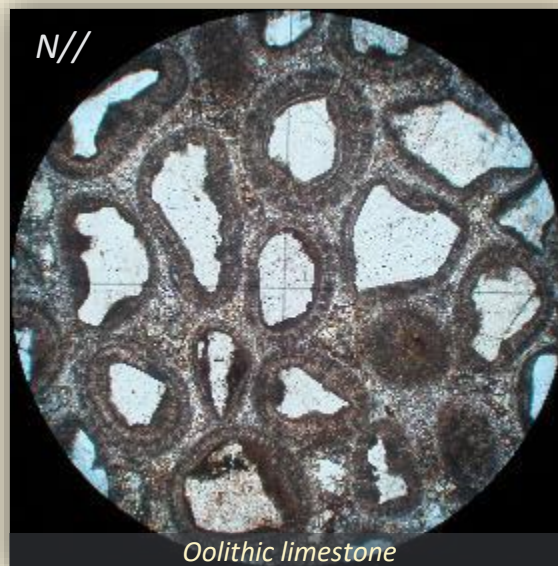
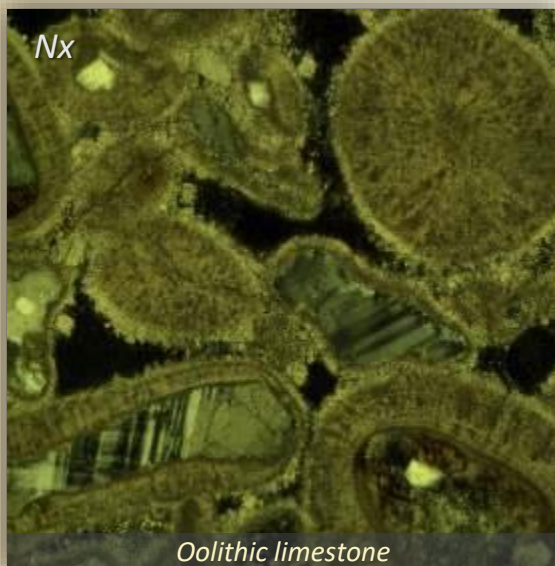


Fossiliferous sub-oidal limestone

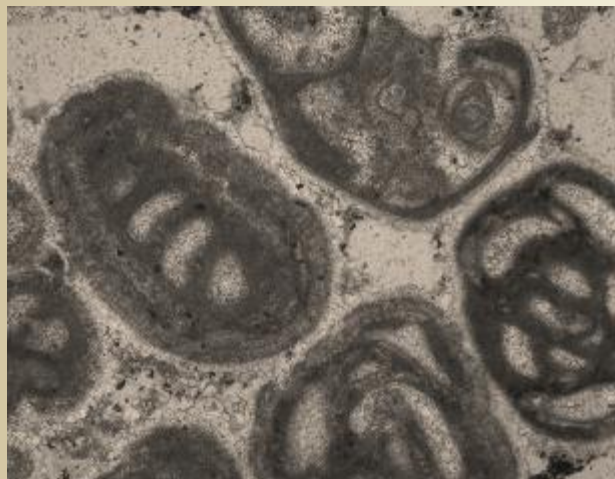


Oolitic limestone, light micaceous

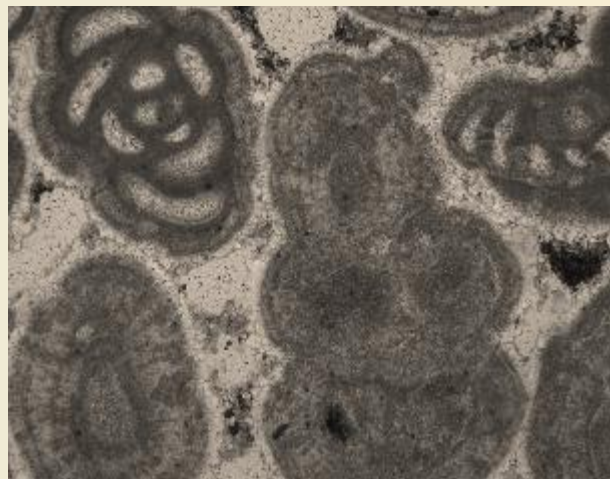
MINERALOGICAL ANALYSIS - optical microscopy



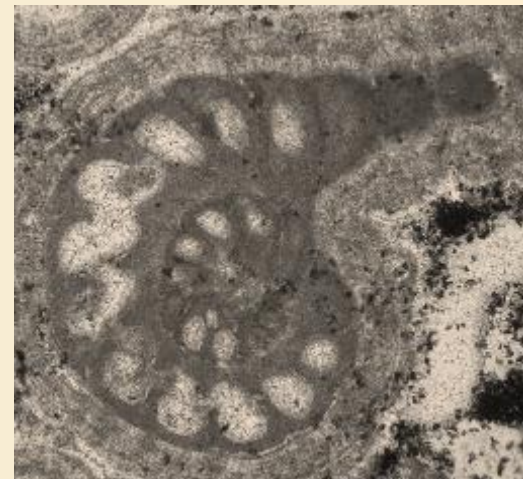
MINERALOGICAL ANALYSIS - optical microscopy



Fossiliferous oolitic limestone



Graptolite



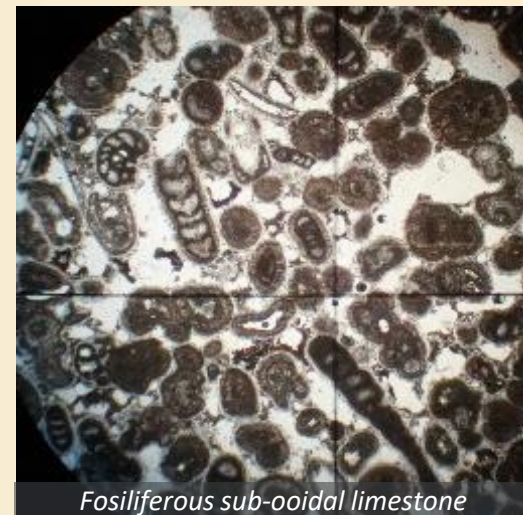
Fossiliferous ooidal limestone



Fossiliferous sub-oidal limestone



Bio-peloidal ooidal limestone



Fossiliferous sub-oidal limestone

The current state of conservation of the historical – geological site



This ancient quarry needs to be preserved and protected, both for its heritage value and for the ongoing availability of the stone for potential restoration purposes.

RoQ-STONE

Romanian stone
for construction - quality,
cultural heritage value,
scientific designation

*Rocile de construcție din Romania -
caracteristici calitative,
valoare de patrimoniu cultural,
importanță științifică*

Cod proiect: PN 19-45-02-01

Durata: 2019-2022

Autoritatea contractantă:

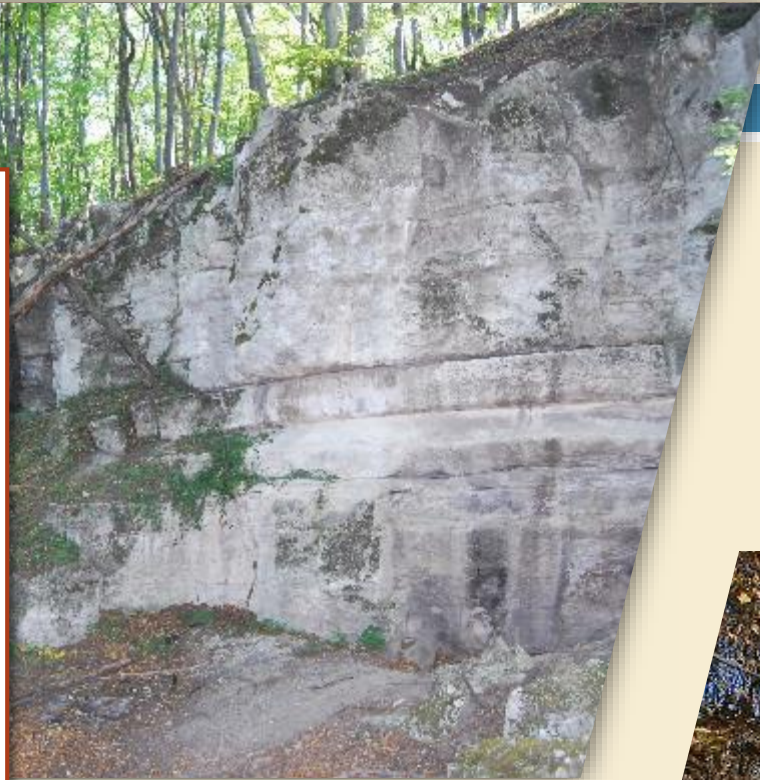
Ministerul Cercetării și Inovării

Contractor:

Institutul Geologic al României

Director proiect:

dr. Valentina Cetean



Following these first investigations, a project has been initiated at the end of 2018 in order to develop a wider multidisciplinary research of this important geosite, associated with historical monuments defining national identity.





The ooidal limestone from Măgura Călanului fulfils all the requirements to candidate for designation as global heritage stone resource (<http://globalheritagestone.com/>), totally deserves the scientific recognition of its importance for the world culture and civilization.