

## Heritage Stones: Global relevance vis-à-vis architectonic heritage

# *“Heritage Building Stones from Évora, Portugal”*

**Luís Lopes**

Universidade de Évora, Escola de Ciências e Tecnologia, Departamento de Geociências  
Instituto de Ciências da Terra  
Associação Cluster Portugal Mineral Resources

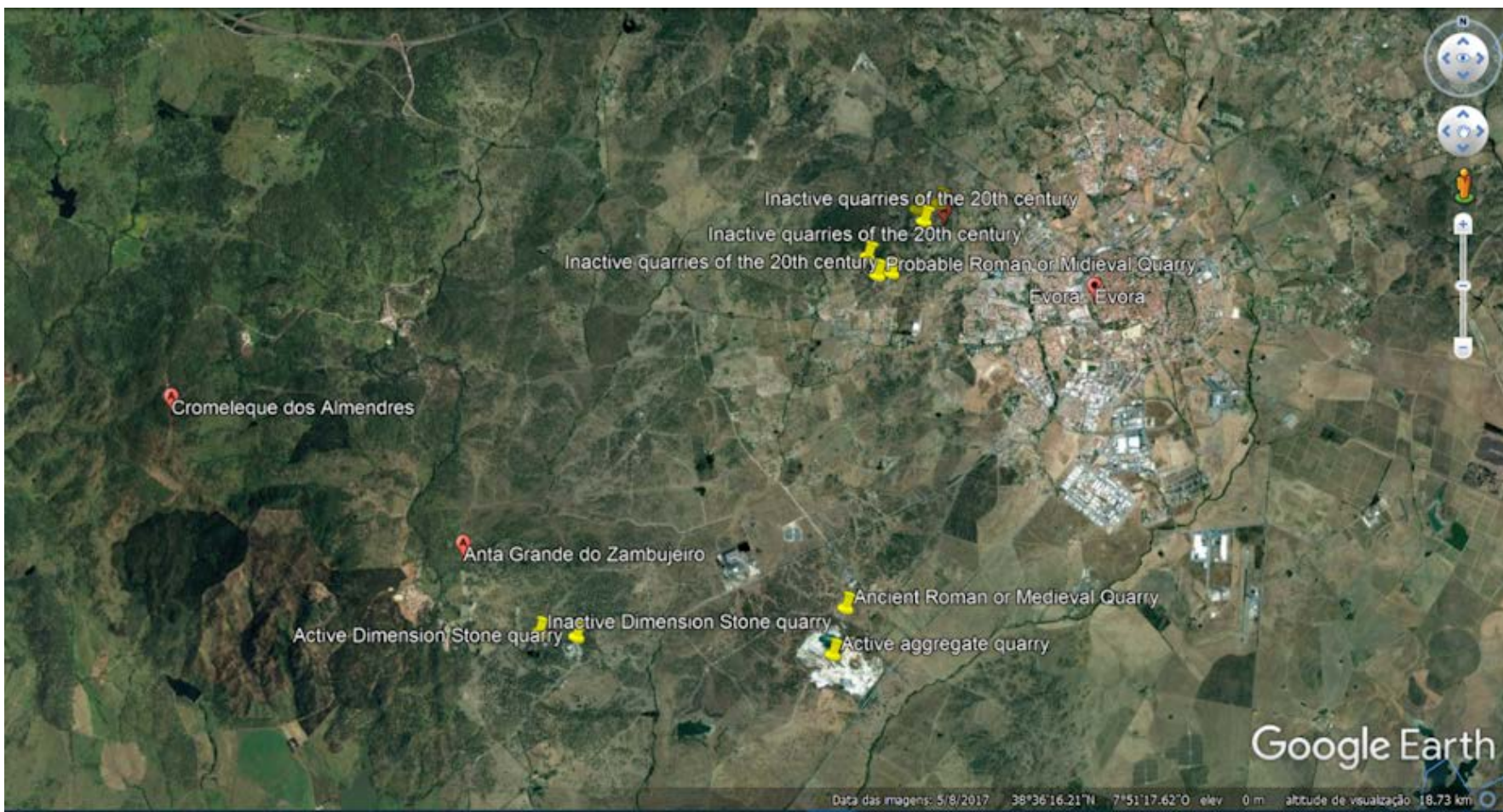
[lopes@uevora.pt](mailto:lopes@uevora.pt)

## Summary

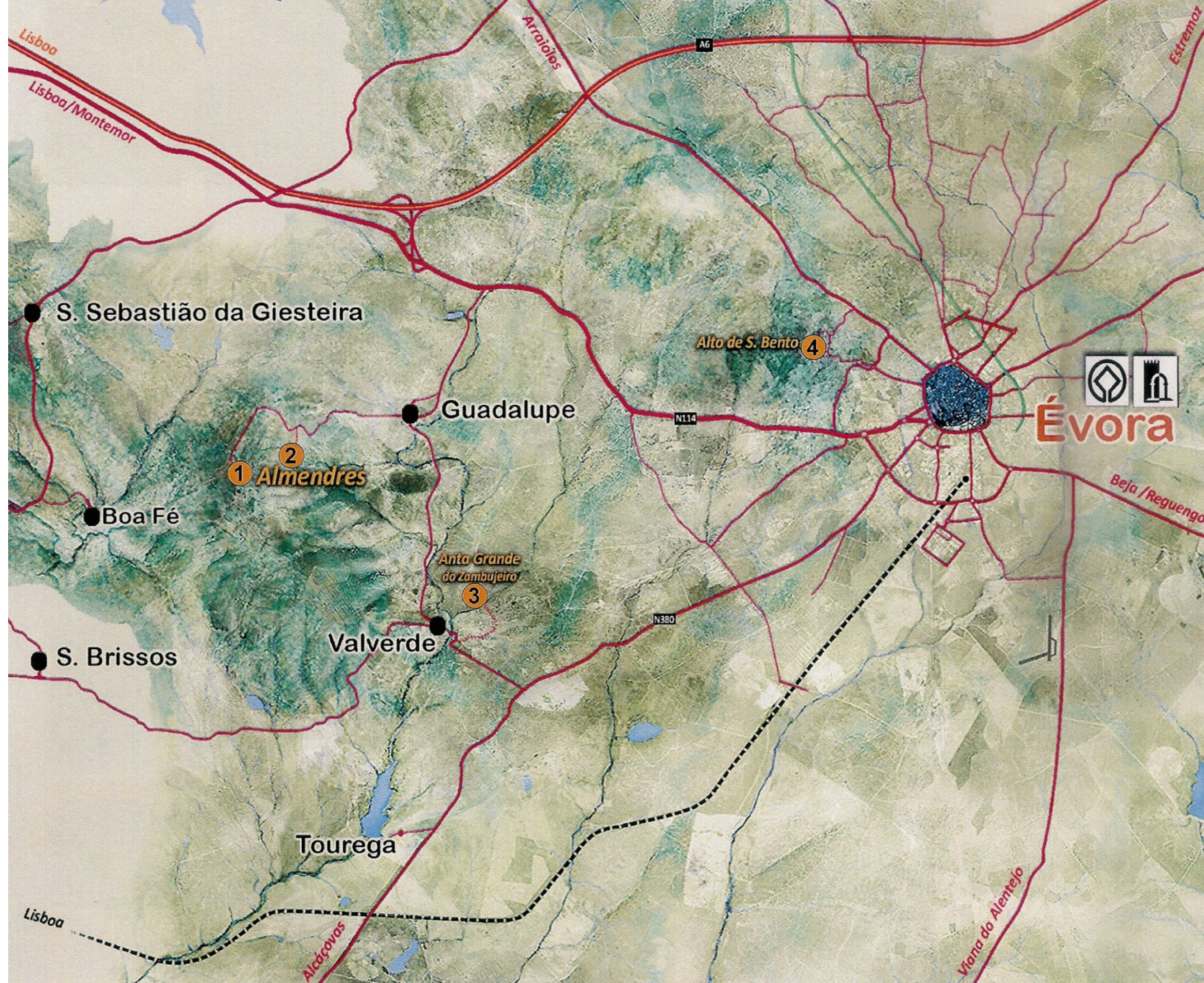
1. Introduction
2. Evora countryside, old quarries and geology
3. Building stones in Evora's Monuments
4. Stone decay and conservation
5. Provenance source and trading implications
6. Conclusions



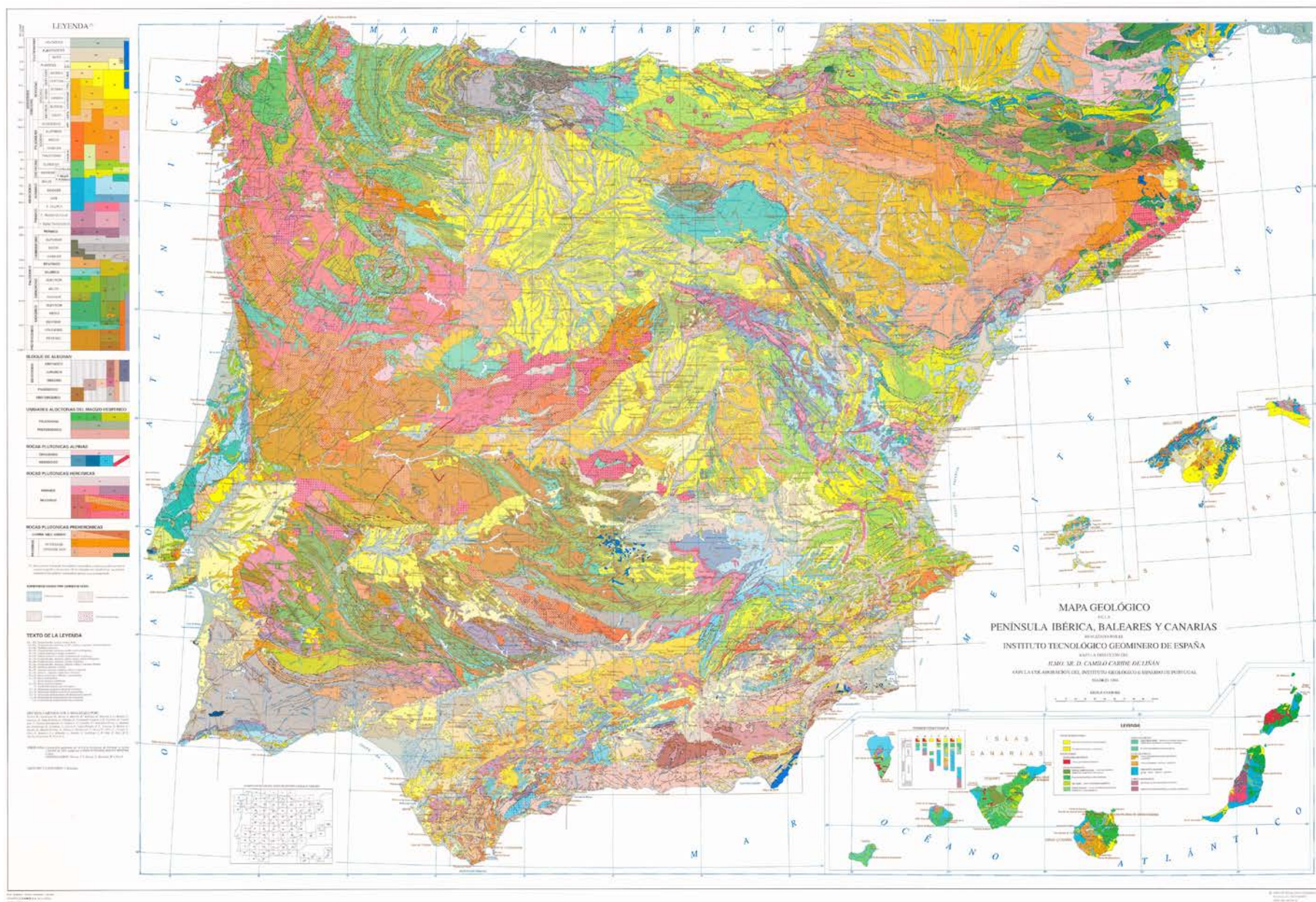




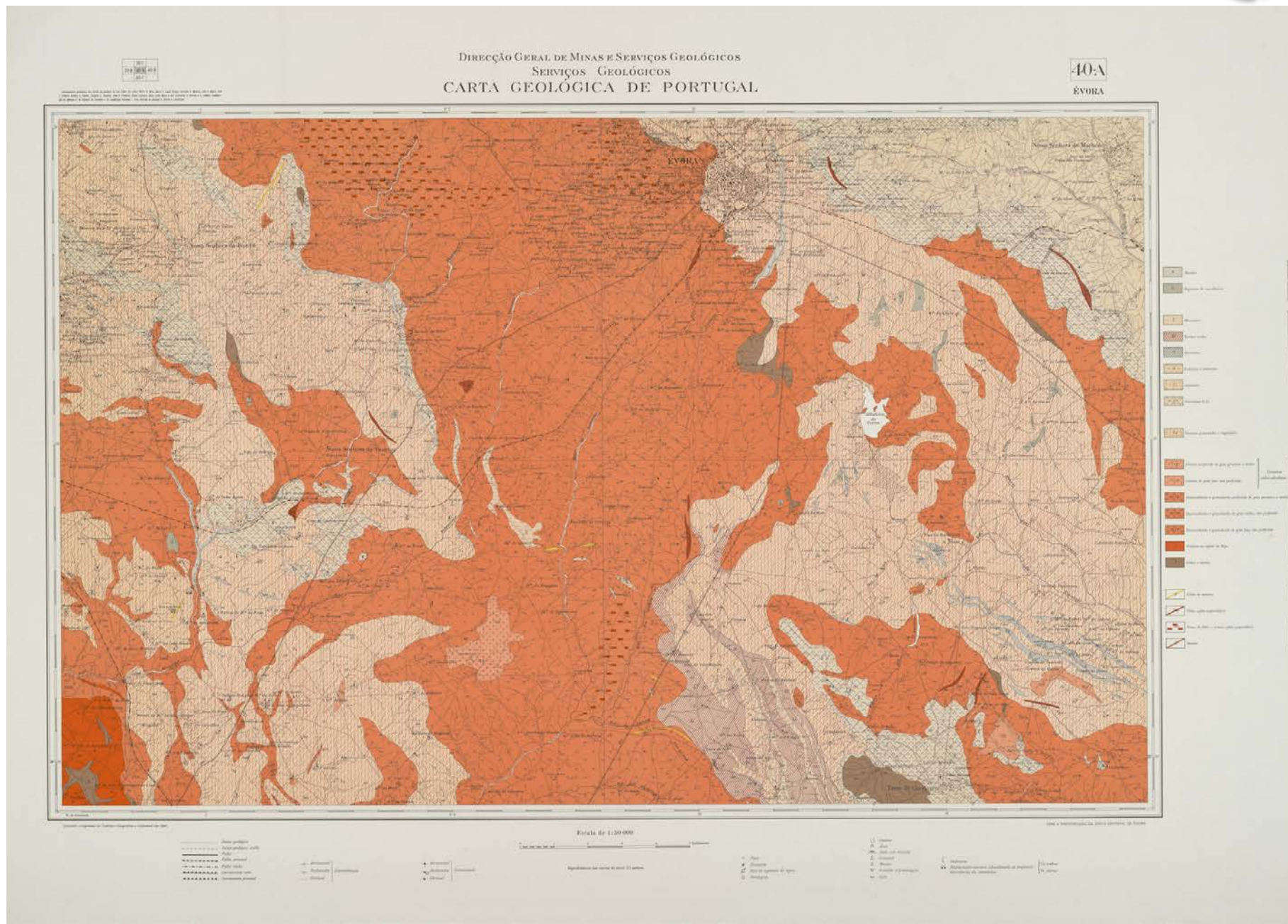




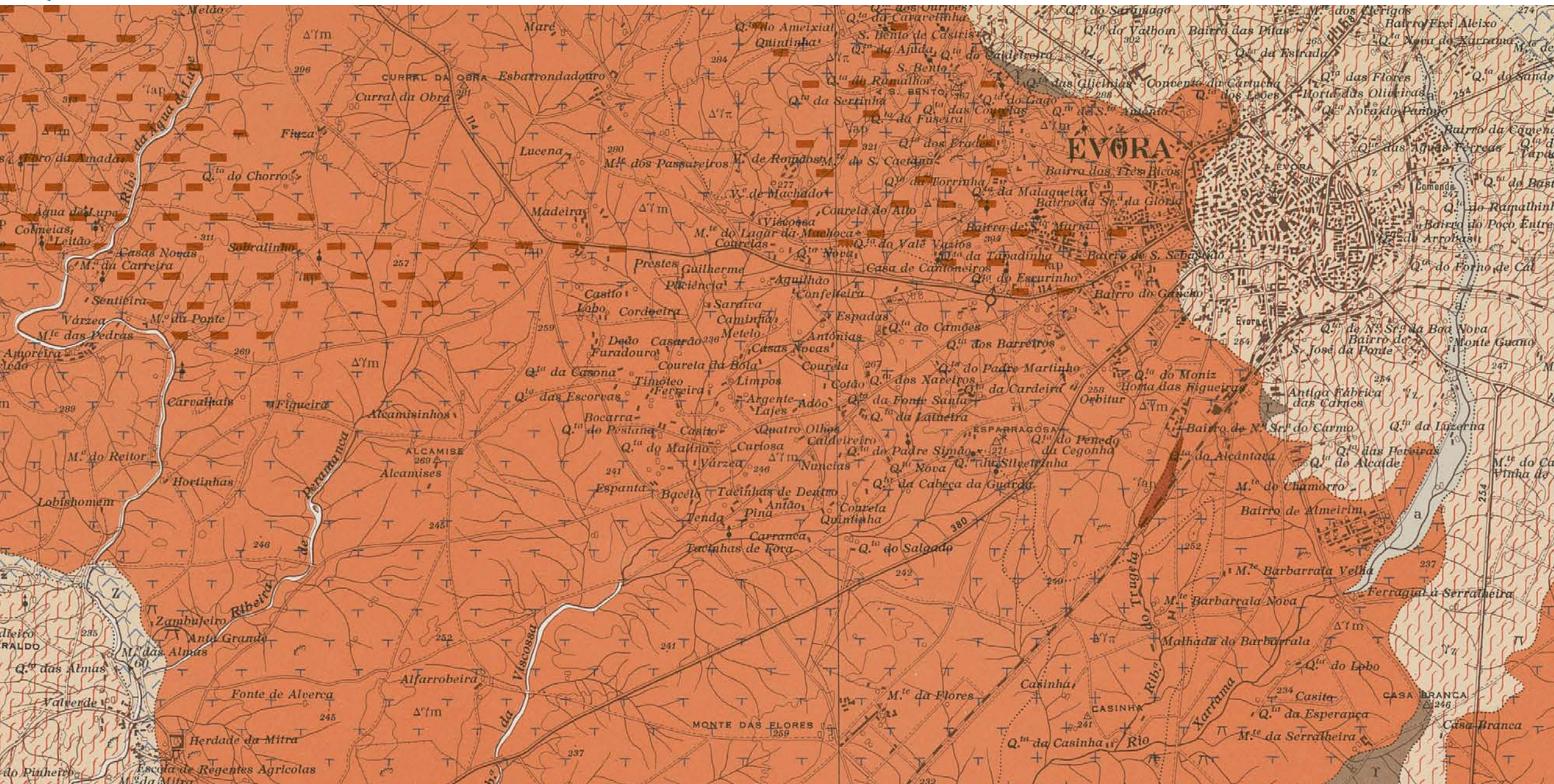




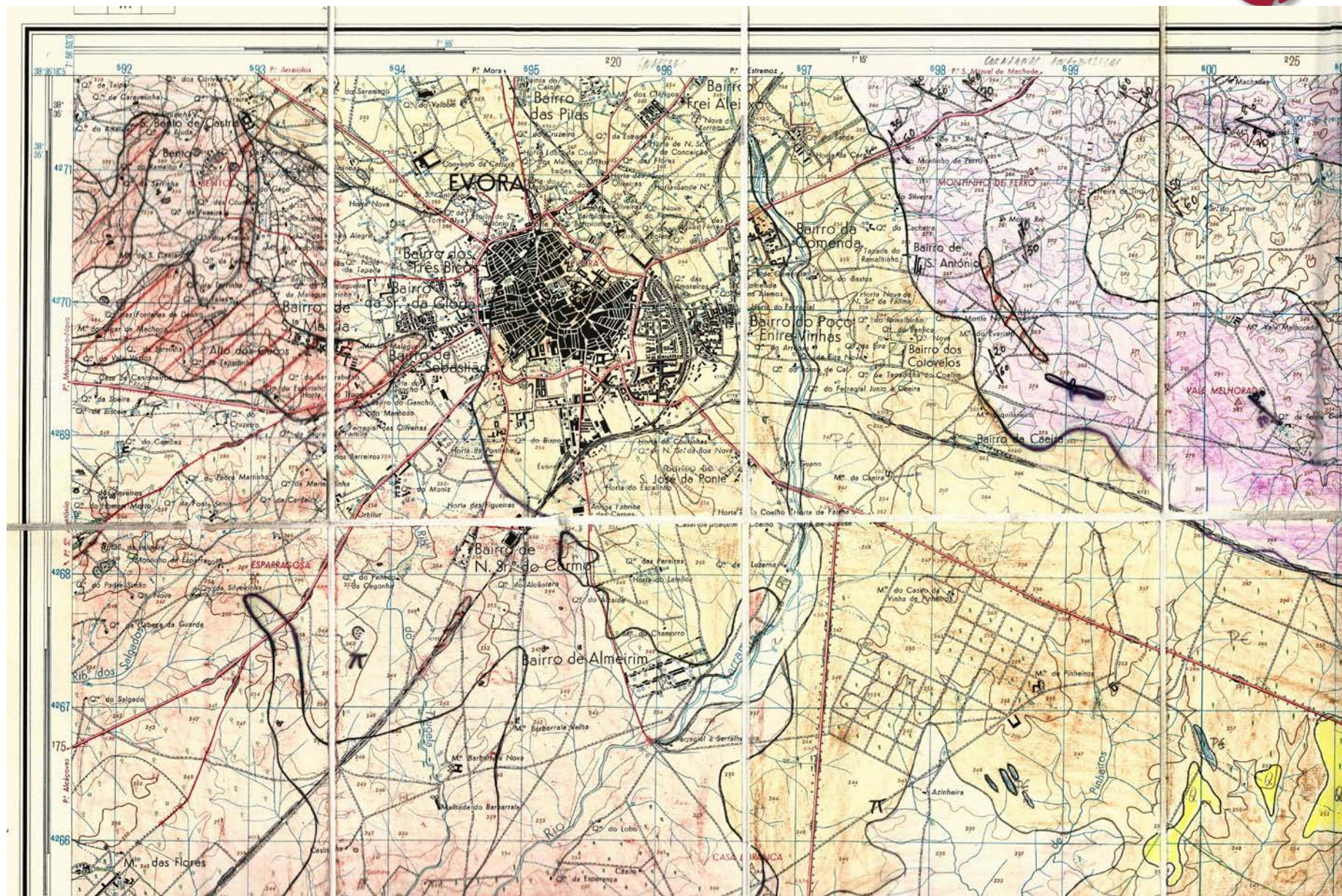
















*“The city of Évora, a World Heritage Site recognized by UNESCO in 1986, also owes this recognition to the stones that built its monuments and preserve them until today.”...but the (hi)story starts earlier, at least some 6000 years ago...*





*Almendres Cromlech Evora*

Images for the film provided by Maxim Bogdanowitsch



# ANTA GRANDE DO ZAMBUJEIRO

Monumento Nacional (Decreto n.º 516/71 - 22 de Novembro)

A Anta Grande do Zambujeiro é o maior monumento funerário megalítico de que há conhecimento na Península Ibérica.

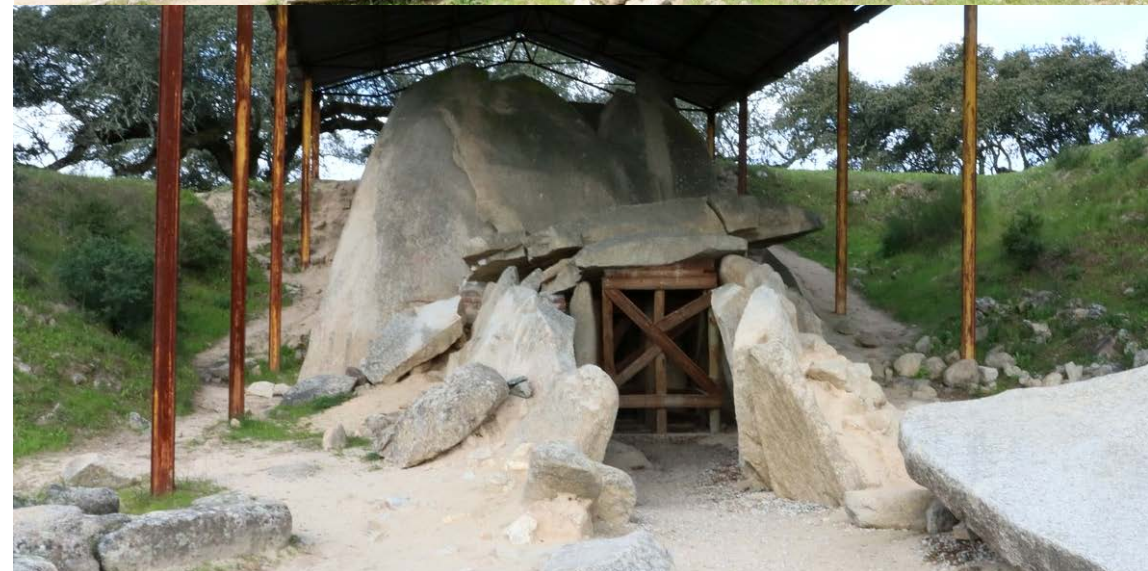
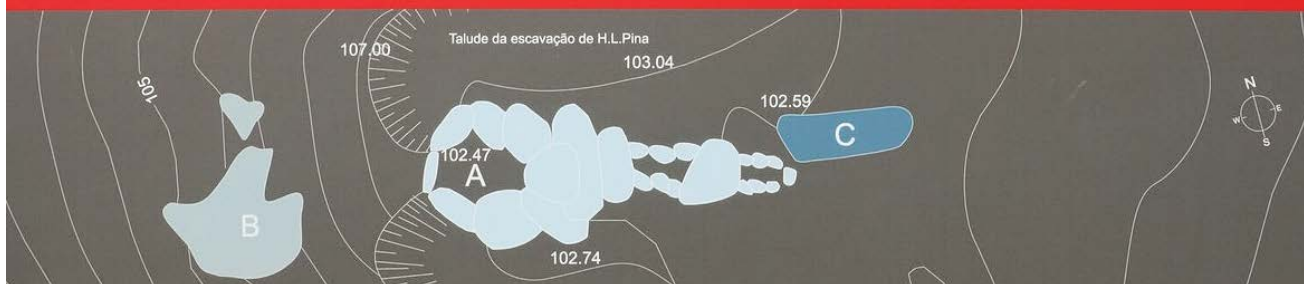
Foi erigida no Neolítico, entre inícios do 4º e meados do 3º milénio a.C., tendo como finalidade acolher no seu interior os corpos dos falecidos, que eram aí depositados juntamente com objectos do seu quotidiano e de uso ritual: recipientes cerâmicos, artefactos de pedra lascada ou polida e de cobre, placas de xisto decoradas e peças de adorno. A utilização deste monumento prolongou-se provavelmente até cerca de 1500 anos a.C., já na Idade do Bronze.

O monumento foi referenciado por Henrique Leonor de Pina que o escavou na década de sessenta do séc. XX, e foi alvo de trabalhos arqueológicos posteriores. Os materiais exumados encontram-se no Museu de Évora.

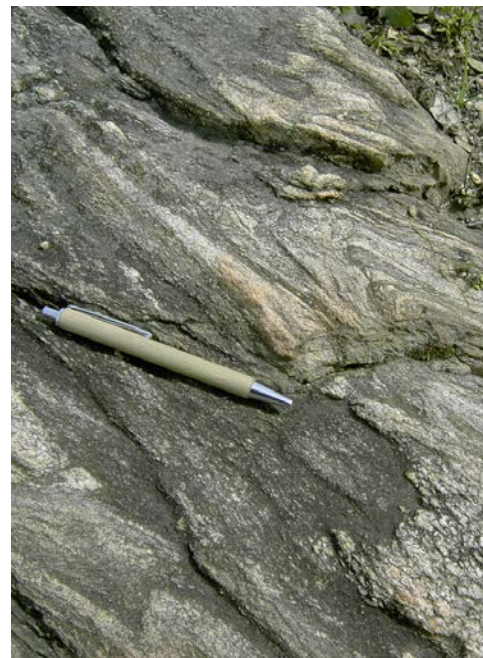
This massive funerary and megalithic monument is the largest of its kind known in the Iberian Peninsula.

It was built in the Neolithic, between the beginnings of the 4th millennium b.C. and the mid 3rd. Its purpose was to receive the bodies of the deceased, laid inside it together with several ritual and common use objects, including pottery, knapped and polished stone or copper artifacts, decorated schist slabs and adornments. The use of this construction extends to about 1500 years b.C., in the Bronze Age.

This monument was found by Henrique Leonor de Pina who excavated it in the sixties of the 20th century, and was object of later archaeological surveys. The uncovered artifacts are stored in the Museu de Évora.



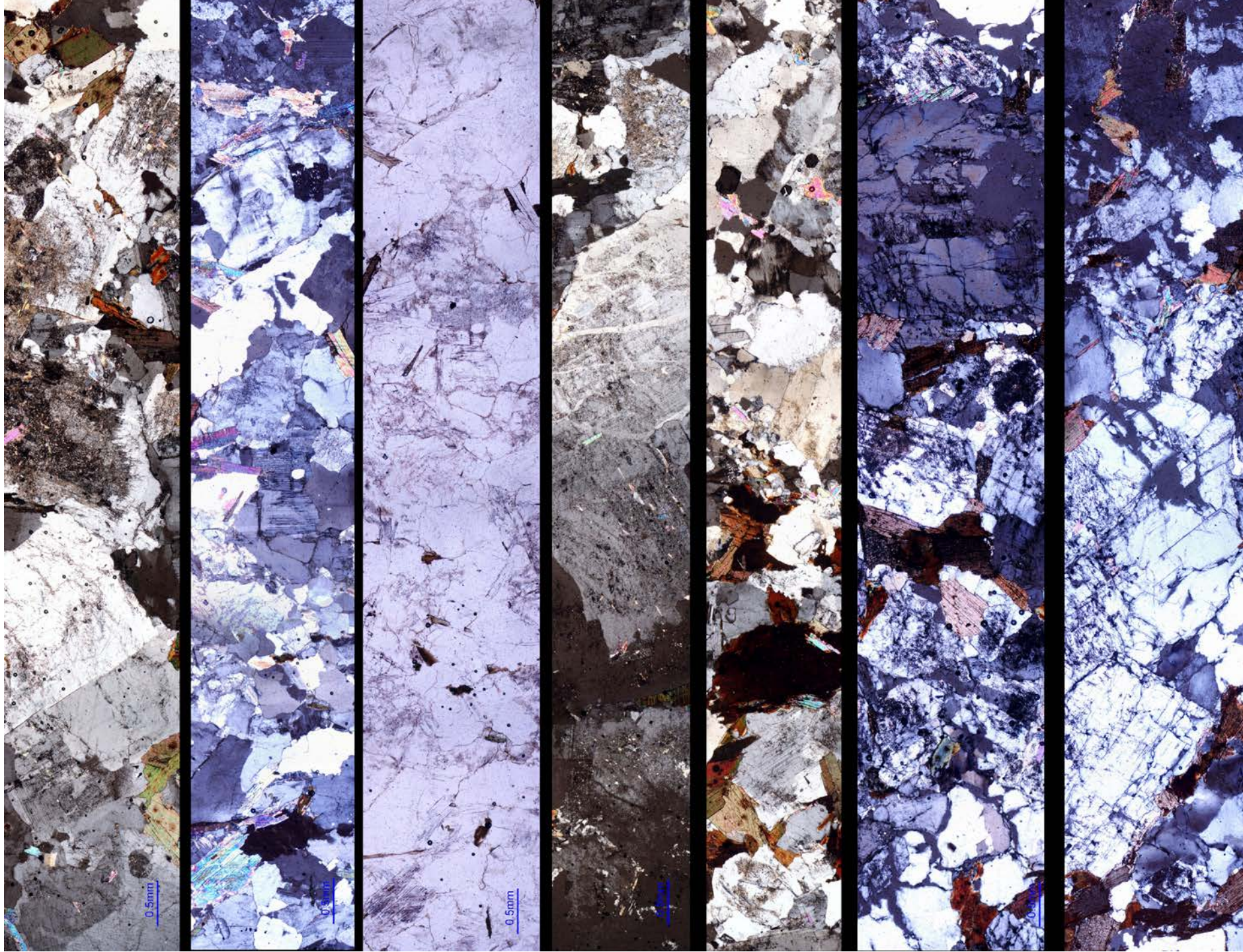




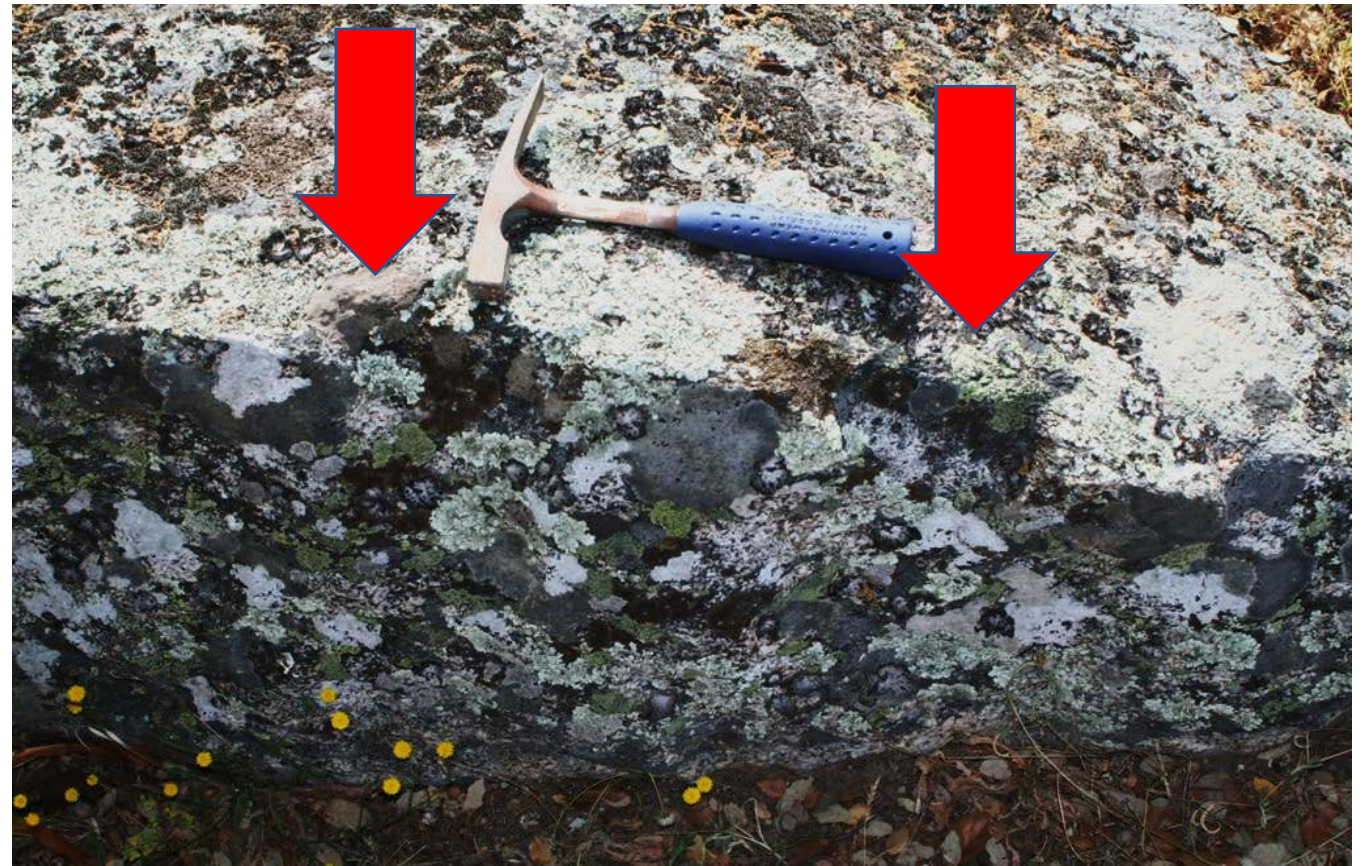




UNIVERSIDADE DE ÉVORA  
ESCOLA DE CIÊNCIAS E TECNOLOGIA









**Vila Viçosa, 1st Century**





Vila Viçosa, 2020











UNIVERSIDADE DE ÉVORA  
ESCOLA DE CIÊNCIAS E TECNOLOGIA









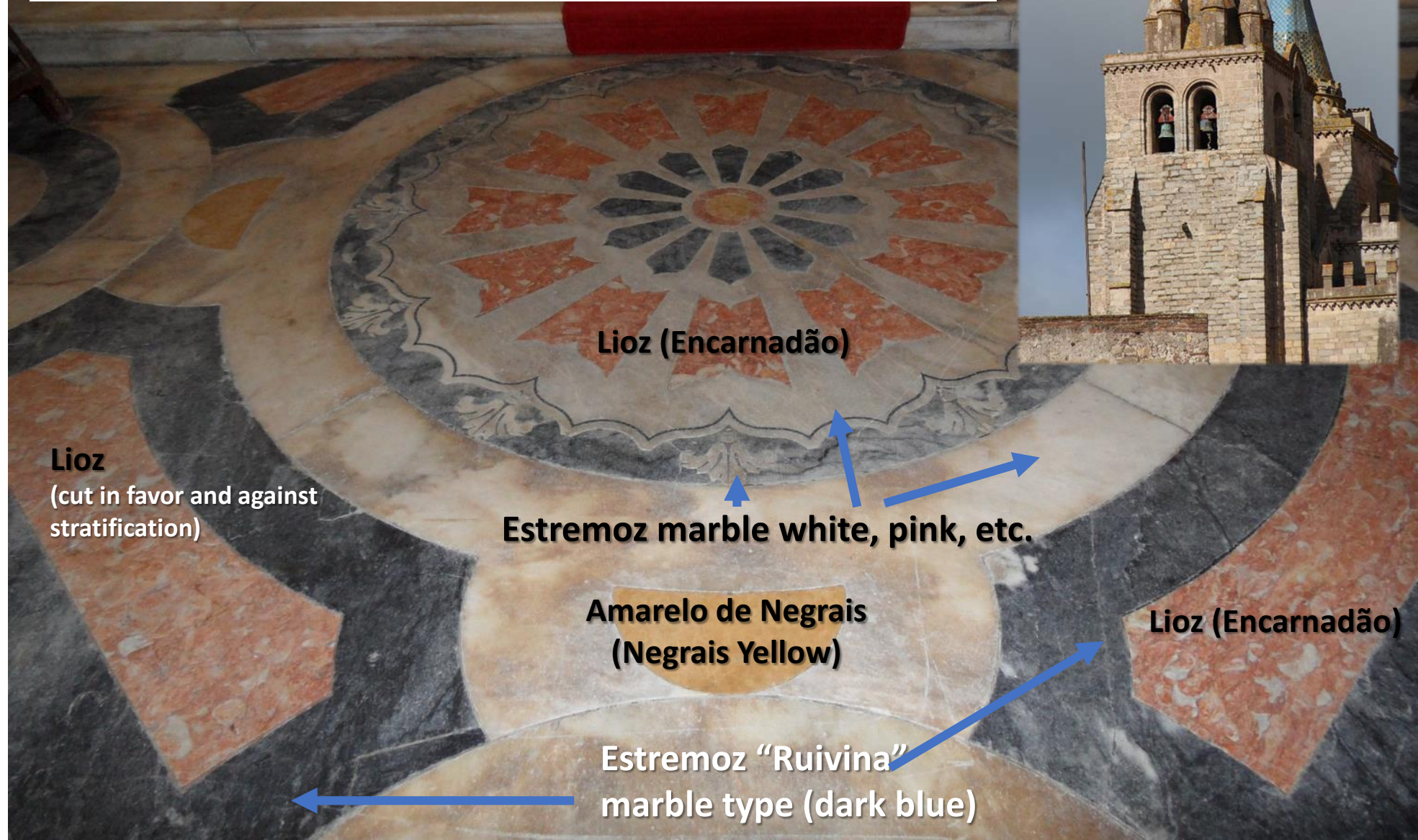


UNIVERSIDADE DE ÉVORA  
ESCOLA DE CIÊNCIAS E TECNOLOGIA



# Historically used ornamental rocks

The Cathedral of Évora was started to build in 1186 and finished in 1204, the Altar-Mor dates back to 1529



Lioz (Encarnadão)

Lioz  
(cut in favor and against  
stratification)

Estremoz marble white, pink, etc.

Amarelo de Negrals  
(Negrals Yellow)

Lioz (Encarnadão)

Estremoz "Ruivina"  
marble type (dark blue)





UNIVERSIDADE DE ÉVORA  
ESCOLA DE CIÊNCIAS E TECNOLOGIA



**Negro de Mem Martins**  
(Mem Martins black limestone)

**Estremoz white marble**

**Estremoz “Ruivina” marble**

**Amarelo de Negrals**  
(Negrals yellow limestone)





# Lioz, Pêro Pinheiro

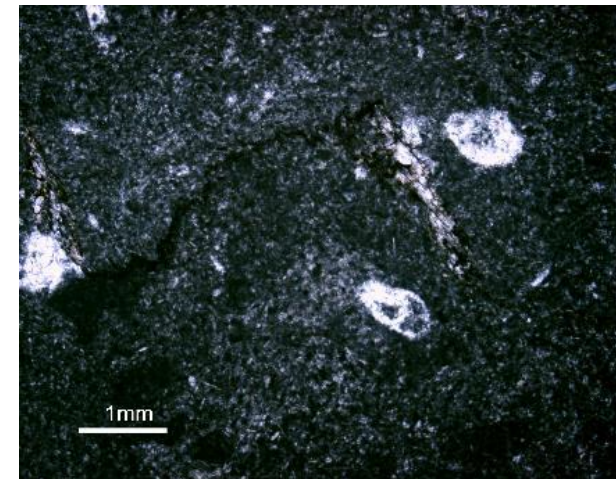
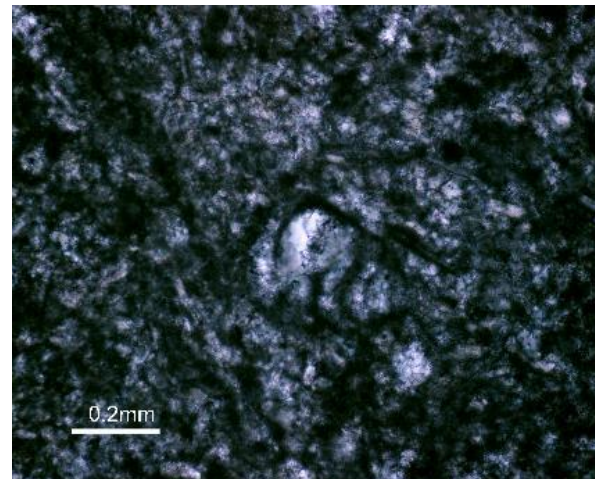
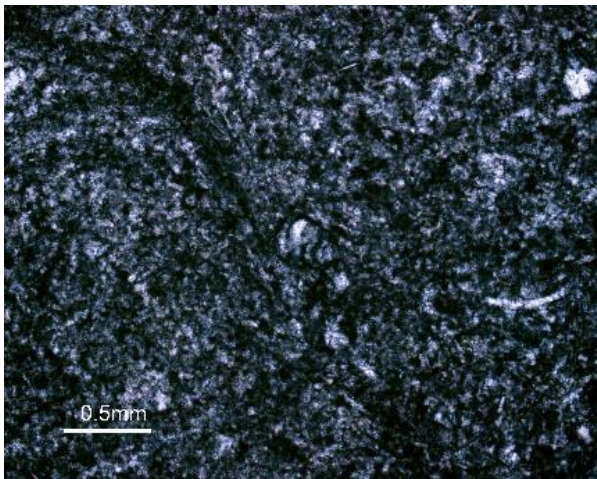
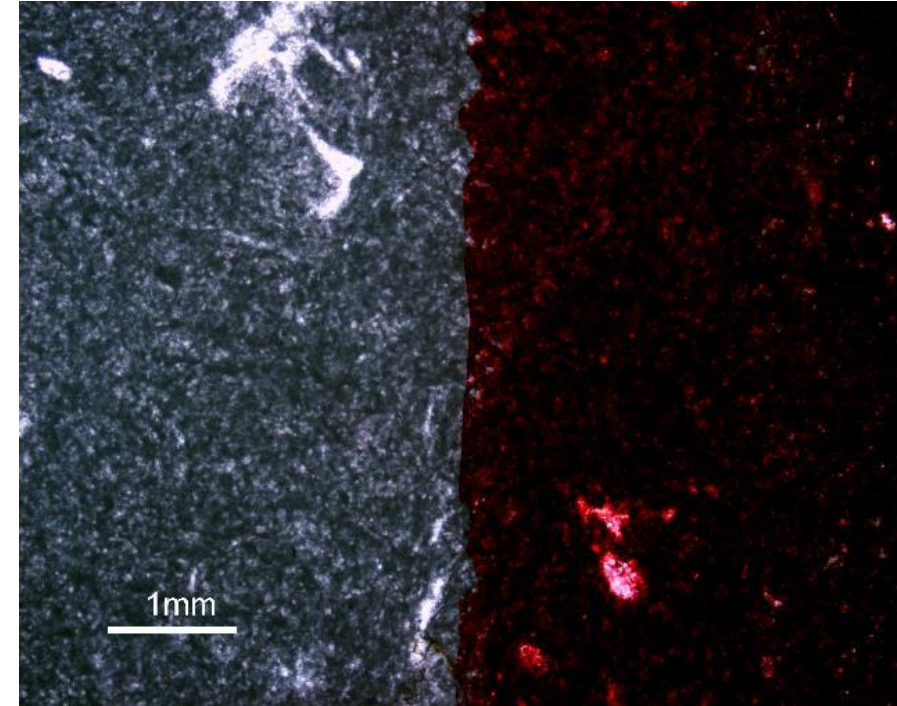








# Lioz







Silva, Z. C. (2007) – O Lioz Português, de lastro de navio a arte na Bahia. Edições Afrontamento, Porto, ISBN 978-972-36-0924-0, 156 p.





**Brecha da Arrábida**



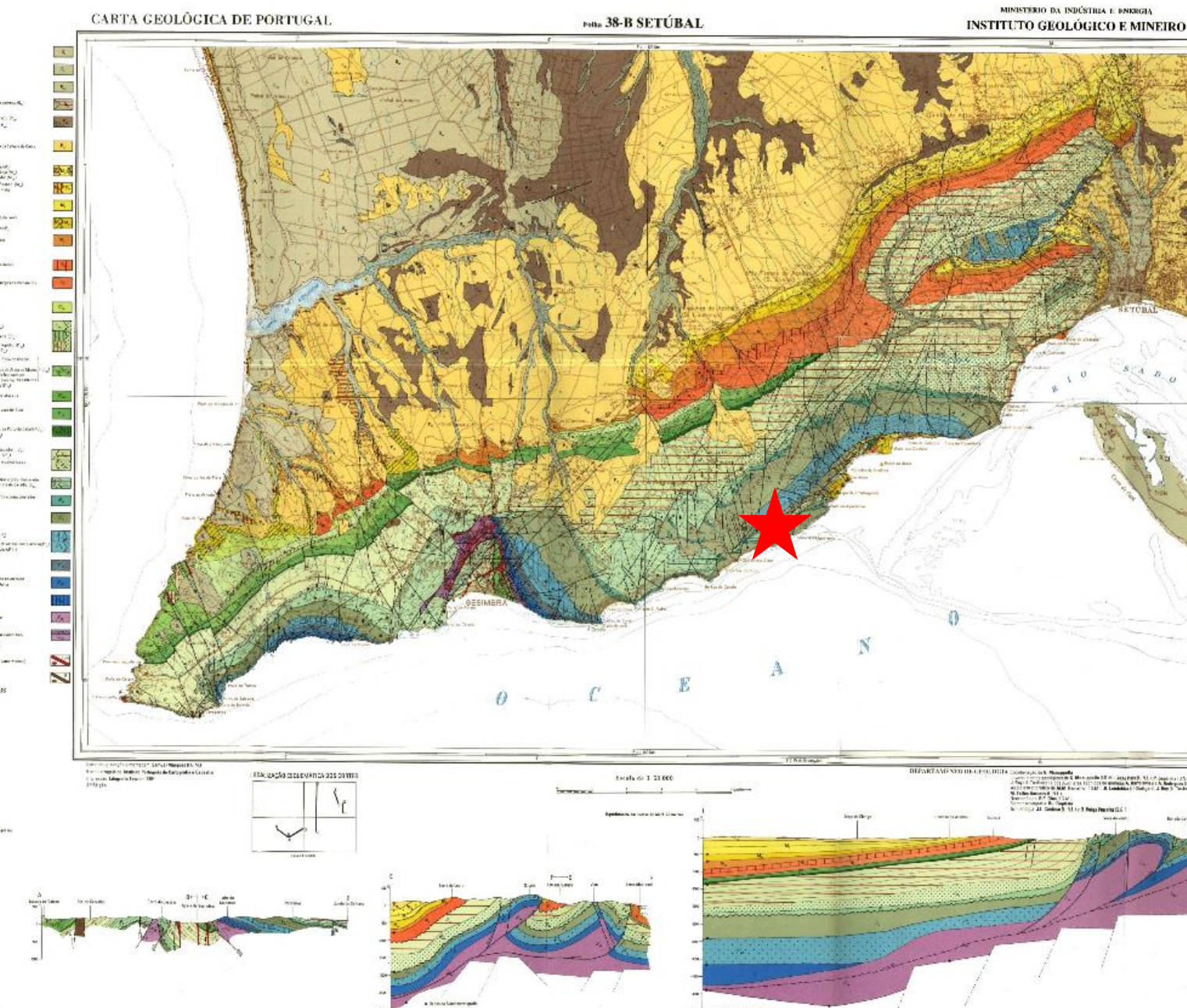
# Serra da Arrábida



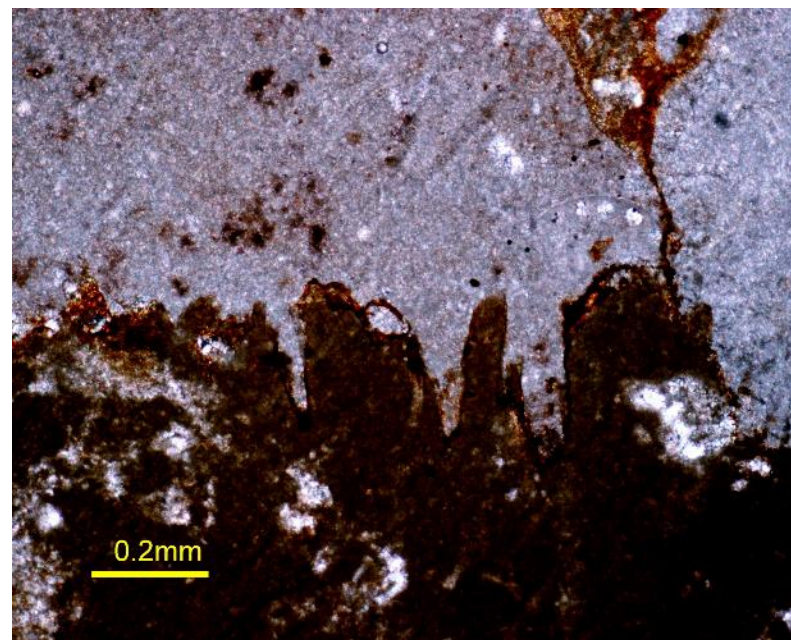
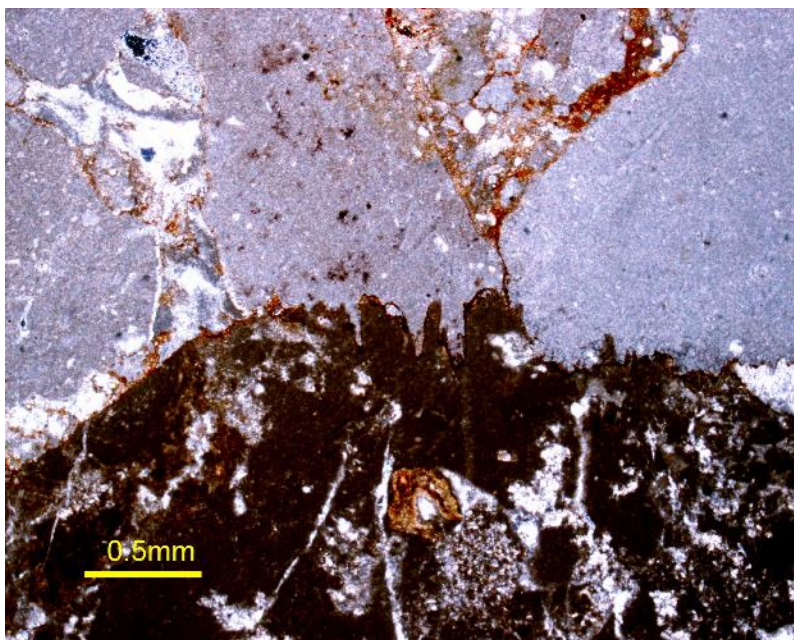
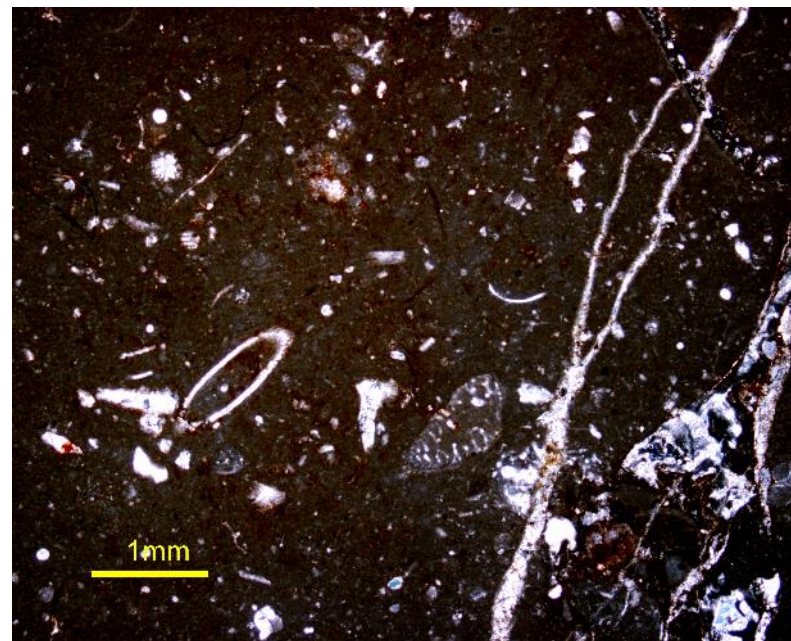
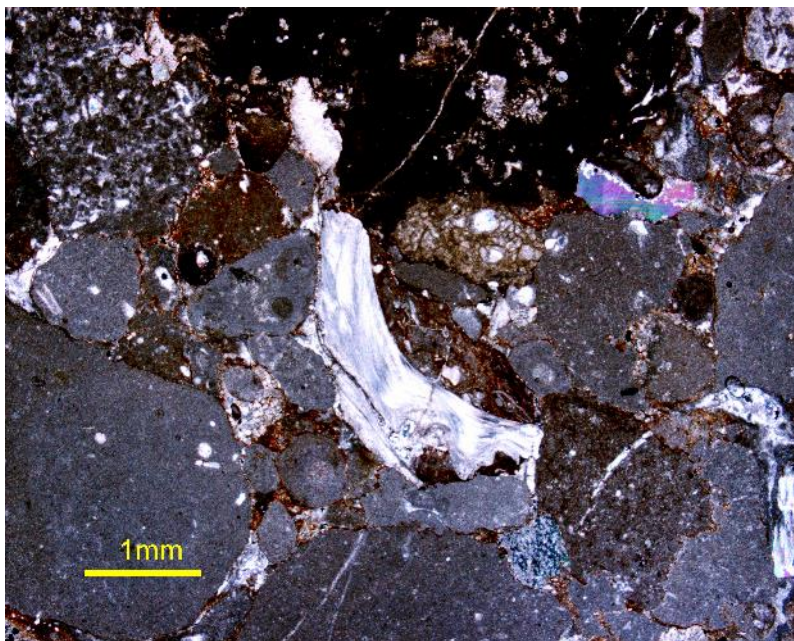
## Convento















**Global Heritage Stone:  
Towards International Recognition  
of Building and Ornamental Stones**

Edited by  
D. Pereira, B. R. Marker, S. Kramar, B. J. Cooper  
and B. E. Schouenborg

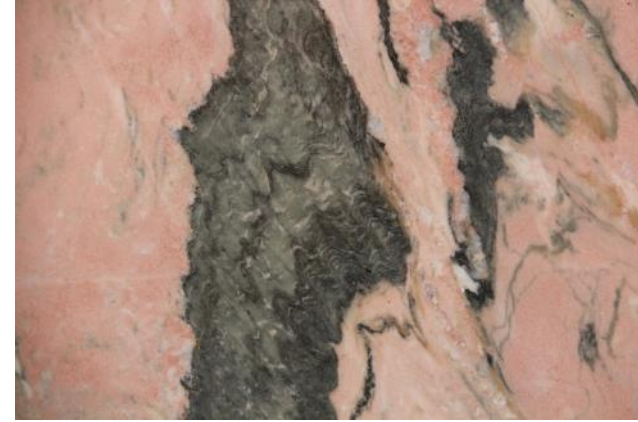


Geological Society  
Special Publication 407





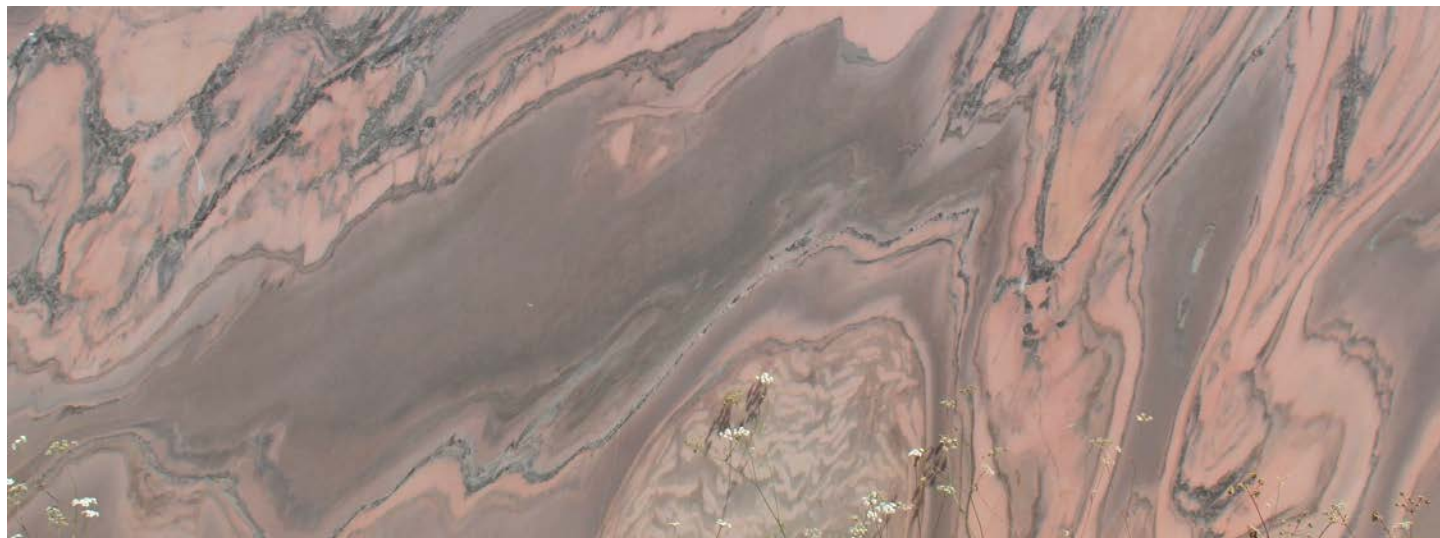
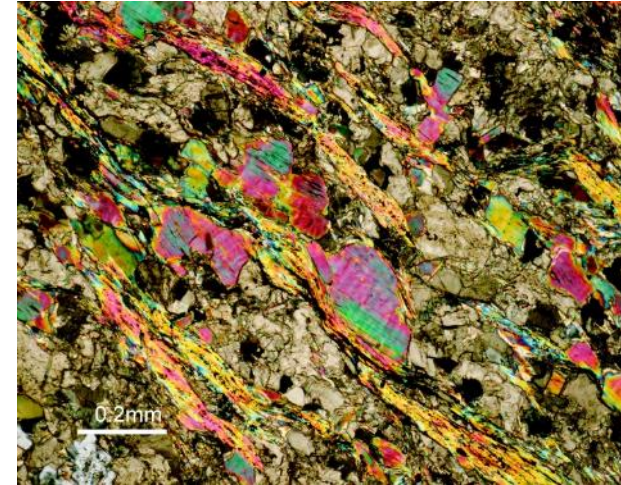
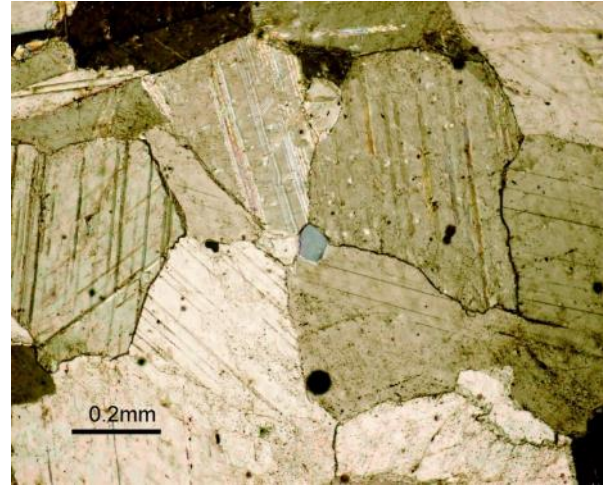
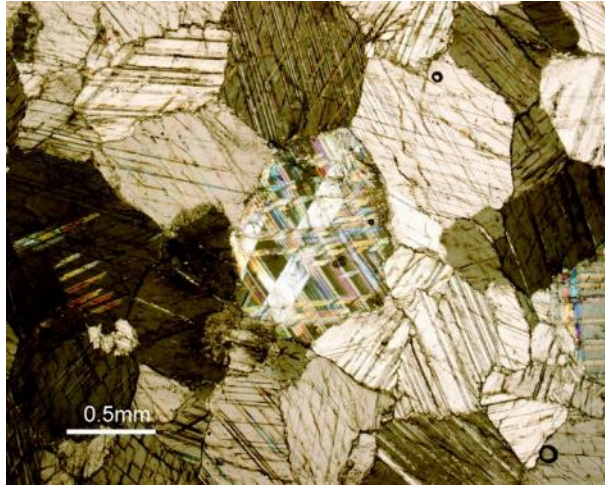
# Natural Variability





# Petrographic Name and Characteristics

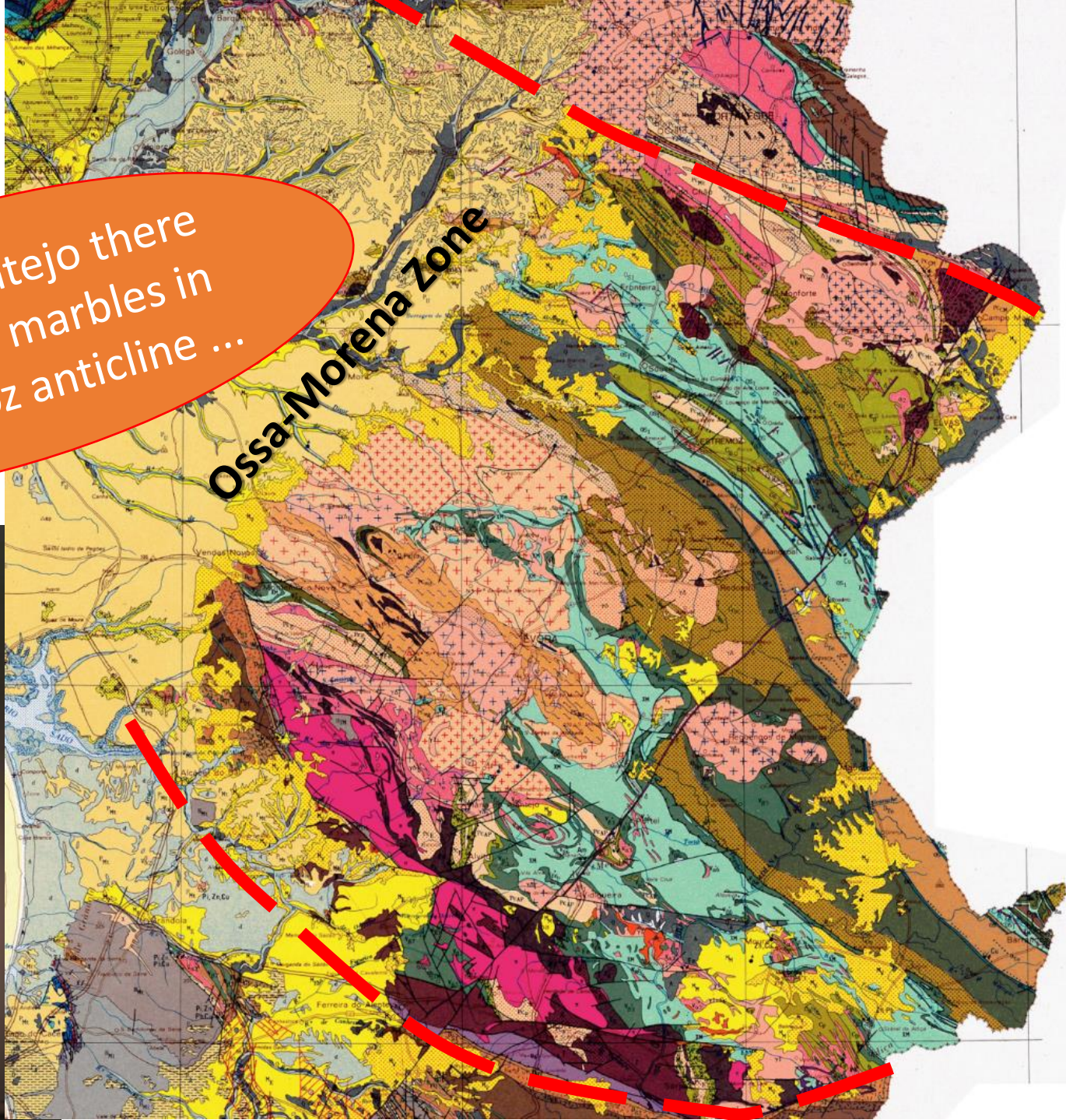
- Calcite Marble;
- Fine to medium, rarely coarse grain texture;
- Mainly granoblastic texture; Milonitic texture is always present;
- Occasionally nematoblastic texture can be found in more heterogeneous varieties.







... but in Alentejo there  
are not only marbles in  
the Estremoz anticline ...





Estremoz – Borba – Vila Viçosa

Estremoz, Portugal

Escoural

OSSA-MORENA ZONE  
Tectonostratigraphic Terrain

Viana do Alentejo

Trigaches

Vila Verde de Ficalho

Serpa

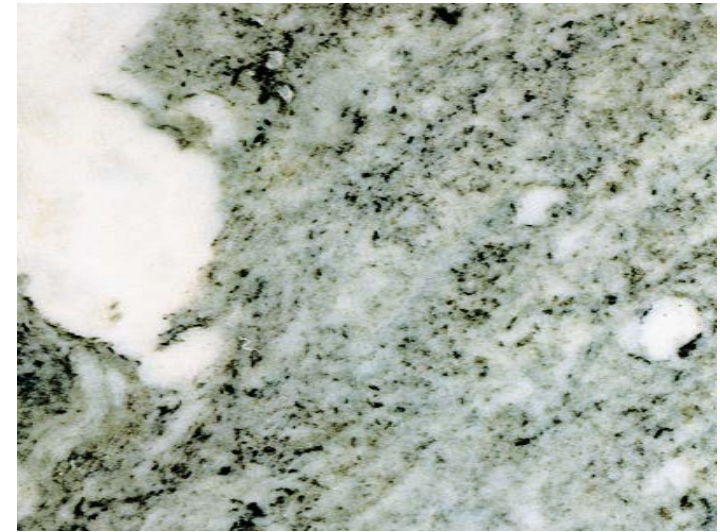
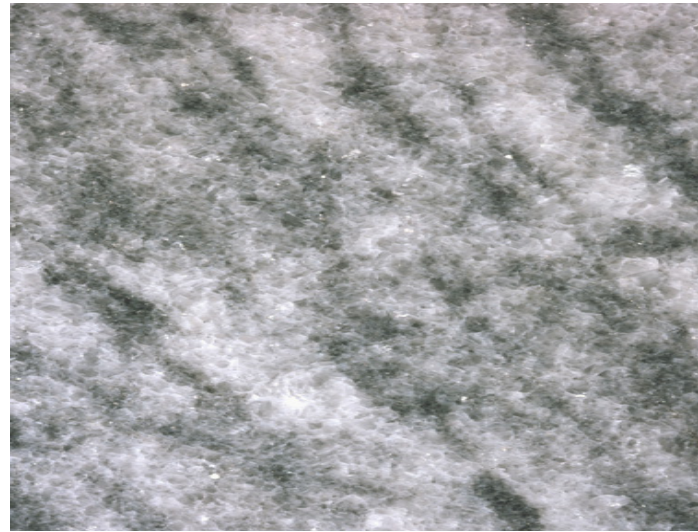
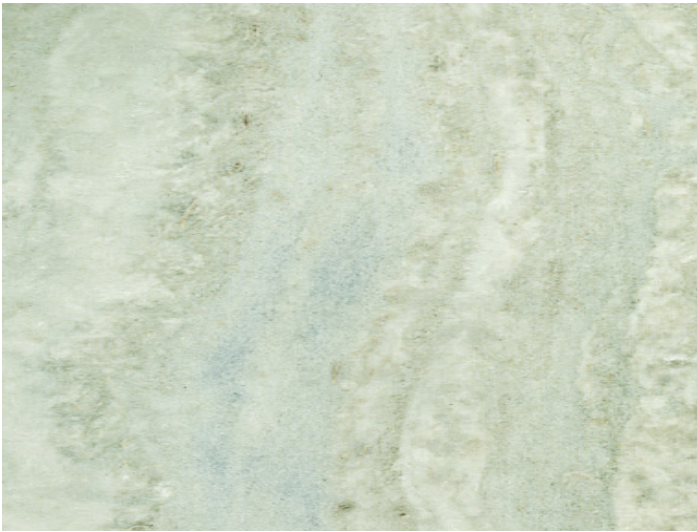
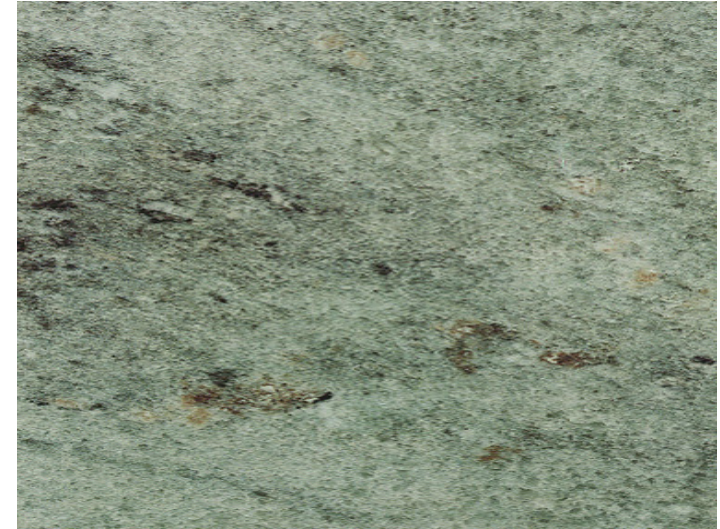
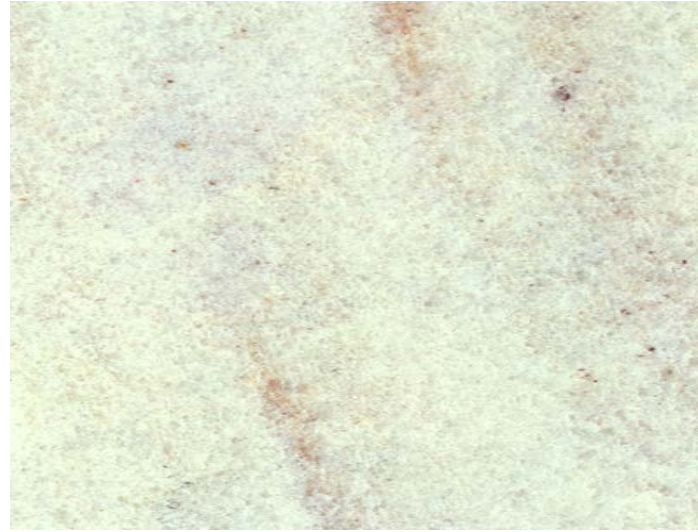
Image © 2011 IGP/DGRF  
© 2011 Europa Technologies  
Image © 2011 DigitalGlobe

38°55'34.91"N 8°39'00.33"E elev 33 m

Altitude de visualização 179.33 km



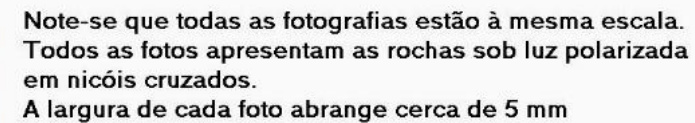
## MARBLES IN PORTUGAL: What varieties?



<http://rop.ineti.pt/rop/images/intro/intr.php>



## Comparação dos mármore do anticlinal de Estremoz com os de outras formações geológicas do Alentejo





## ...so what!

The igneous rocks and gneisses are part of the “Massif of Évora” on which the city is built. Thus, and quite naturally they are by far the most represented group in monuments from all historical periods. Its function is essentially structural, but there are also functional, ornamental and decorative objects. For example, the oldest megalithic structures found in the vicinity of the city are made up of large granite blocks that often had to be transported to their locations.

Many gargoyles and statues that decorate the churches are also made up of these granite rocks. The natural erosion of centuries of exposure to the environment has led to a state of alteration, sometimes very accentuated, which would justify its replacement by replicas sculpted in similar rocks.

Provenance studies identified old quarries in the vicinity of the city where the ancient rock extraction techniques can be observed, they could allow obtaining of the raw material necessary for these restoration and conservation works.

Some places need to be inventoried and protected, with the municipality already aware of their existence.

Many others stones are found in the monuments, by the variety and number of examples, it could be stated that for centuries an rich and well related Society, not only the Church, ruled and made huge investments building this amazing city.



## REFERENCES

Casal Moura, A.; Carvalho, C.; Almeida, I.; Saúde, J. G.; Farinha Ramos, J.; Augusto, J.; Rodrigues, J. D.; Carvalho, J.; Martins, L.; Matos, M. J.; Machado, M.; Sobreiro, M. J.; Peres, M.; Martins, N.; Bonito, N.; Henriques, P. & Sobreiro, S., 2007. Mármore e Calcários Ornamentais de Portugal. INETI (National Institute of Engineering, Technology and Innovation), ISBN 978-972-676-204-1. 383 p.

Espanca, Túlio, Artes e Artistas em Évora no séc. 18, A cidade de Évora, vols. 21-22, Évora, 1950; Espanca, Túlio; Inventário Artístico de Portugal – Concelho de Évora, Vol.7, Lisboa,

Lopes, L., Carrilho Lopes, J. C., Cabral, J. P. & Sarantopoulos, P. (2000) – Caracterização Petrográfica dos Monumentos Romanos de Évora. Revista “Cidade de Évora”, II Série, Nº4. pp. 129-142.

Menningen, J., Siegesmund, S., Lopes, L., Martins, R., Sousa, L. 2018. The Estremoz marbles: an updated summary on the geological, mineralogical and rock physical characteristics. Environ. Earth Sci. (2018) 77: 191. <https://doi.org/10.1007/s12665-018-7328-3>

Lopes, Luís. As Pedras Portuguesas dos Edifícios e Monumentos Brasileiros. Revista Geonomos, [S.l.], dez. 2016. ISSN 24466964. <http://dx.doi.org/10.18285/geonomos.v24i2.840>.

Lopes, L. 2019. Pedras dos Monumentos de Évora, in: Soler, M.; Valente, M.; Candeias, A. Eds. Évora com Ciência - Percursos. Universidade de Évora. ISBN 978-972-778-135-5, pp. 137-163. Soon will be also available in English.

Moreira, N., Lopes, L. 2019. Caracterização dos Mármore de Estremoz no contexto dos Mármore da Antiguidade Clássica da Zona de Ossa-Morena. In: Serrão, V., Soares, C.M., Carneiro, A. (coord.). PHIM – Património e História da Indústria dos Mármore: Mármore: 2000 anos de História. Volume 1: Da Antiguidade à idade Moderna. Theya Editores, Lisboa, 13-54. ISBN: 978-989-99164-3-2.

Silva, Z. C. (2007) – O Lioz Português de lastro. De navio a arte na Bahia, Edições Afrontamento, Porto, ISBN 978-972-36-0924-0, 156 p.

Dear friends, take care, stay safe!

As soon as possible we will provide information about the next Global Stone Congress, Batalha – Portugal 2021(!?)...









***“Heritage Building Stones from Évora, Portugal”***

***Thank You!***  
***Muito obrigado!***

***Luís Lopes***  
***lopes@uevora.pt***



Este trabalho é financiado por fundos nacionais através da FCT - Fundação para a Ciência e a Tecnologia, I.P., no âmbito dos projectos Ref<sup>as</sup> UIDB/04683/2020 e UIDP/04683/2020 and COMPETE POCI-01-0145-FEDER-007690.

