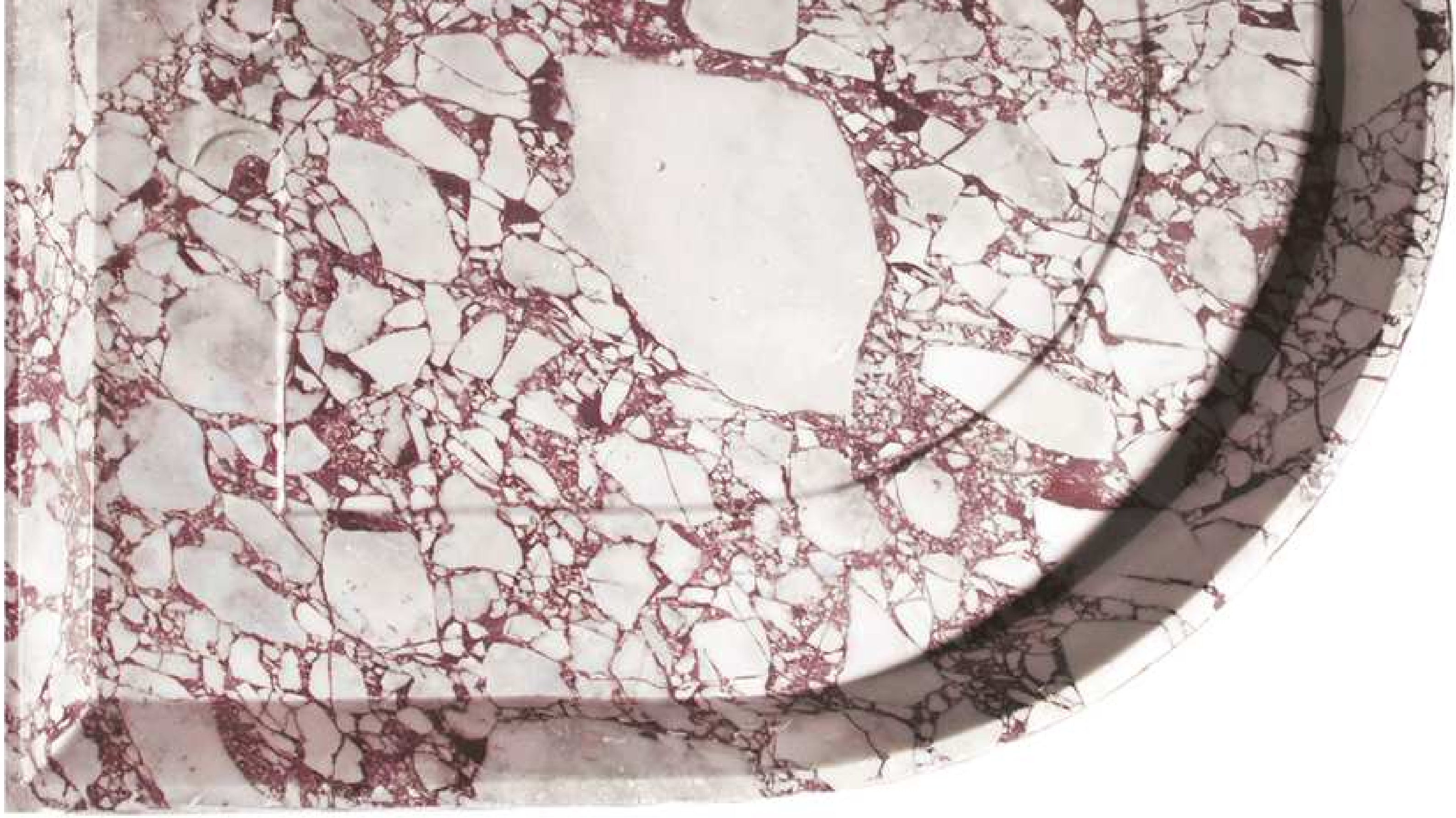

ASMOSIA XI

Interdisciplinary Studies on Ancient Stone

PROCEEDINGS

of the XI ASMOSIA Conference, Split 2015

Edited by Daniela Matetić Poljak and Katja Marasović

ARTS ACADEMY IN SPLIT

UNIVERSITY OF SPLIT

UNIVERSITY OF SPLIT,
FACULTY OF CIVIL ENGINEERING,
ARCHITECTURE AND GEODESY

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Proceedings of the XI ASMOSIA Conference (Split 2015)

Publishers:

ARTS ACADEMY IN SPLIT
UNIVERSITY OF SPLIT

and

UNIVERSITY OF SPLIT
FACULTY OF CIVIL ENGINEERING,
ARCHITECTURE AND GEODESY

Technical editor:
Kate Bošković

English language editor:
Graham McMaster

Computer pre-press:
Nikola Križanac

Cover design:
Mladen Čulić

Cover page:
Sigma shaped *mensa* of *pavonazzetto* marble from Diocletian's palace in Split

ISBN 978-953-6617-49-4 (Arts Academy in Split)
ISBN 978-953-6116-75-1 (Faculty of Civil Engineering, Architecture and Geodesy)

e-ISBN 978-953-6617-51-7 (Arts Academy in Split)
e-ISBN 978-953-6116-79-9 (Faculty of Civil Engineering, Architecture and Geodesy)

CIP available at the digital catalogue of the University Library in Split, no 170529005

Association for the Study of Marble & Other Stones in Antiquity

ASMOSIA XI

Interdisciplinary Studies of Ancient Stone

Proceedings of the Eleventh International Conference of ASMOSIA,
Split, 18–22 May 2015

Edited by
Daniela Matetić Poljak
Katja Marasović

Split, 2018

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CONTENT

ESPEJÓN LIMESTONE AND CONGLOMERATE (SORIA, SPAIN): ARCHAEOMETRIC CHARACTERIZATION, QUARRYING AND USE IN ROMAN TIMES[1]

Virginia García-Entero[1], Anna Gutiérrez Garcia-M.[2], Sergio Vidal Álvarez[3], María J. Peréx Agorreta[4] and Eva Zarco Martínez[5]

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Abstract

We present the first results of an on-going research project on a decorative stone that might have been one of the main ornamental stones in Roman Spain's inland, the limestone and conglomerate from Espejón. Within the framework of exploitation and uses of other Hispano-Roman stone resources, these results will add significant data to the whole picture of non-foreign *marmora* exploitation and use in *Hispania*. So far, the archaeological materials of several sites have been inspected, a survey to locate quarrying evidence has been undertaken and a multimethod analytical protocol has been initiated. Thus, we have established the basis for an archaeometric reference corpus, which will be henceforth enlarged and used as tool for comparison with archaeological items in order to determine the extent of this limestone and multi-coloured conglomerate's distribution and use.

Keywords
Espejón Limestone, *Hispania*, Roman times

1 This research was performed within the Project "*Marmora Hispaniae. The Quarrying, Use and Trade of Espejón Limestone in Roman and Late Antique Hispania*" (HAR2013-44971) funded by the Ministerio de Economía y Competitividad of Spain and directed by V. García-Entero, in collaboration with the project "*Lapides et Marmora Hispaniae*: …" of the LabEx Sciences Archéologiques de Bordeaux programme supported by the ANR (nº ANR-10-LABX-52), directed by A. Gutiérrez Garcia-M.

1. Brief location and context

The village of Espejón is located in the westernmost area of the province of Soria (central north Spain), bordering on the province of Burgos in the northern plateau. Yet the decorative limestone that takes its name also crops out in the nearby Espeja de San Marcelino and Cantalucia. Espejón limestone has been especially well known since modern times due to its intense exploitation between the 16th and 19th centuries for the decoration of the Escorial Monastery (16th c.) by Philip II, the Royal Palace of Madrid and other buildings built by the Bourbon dynasty[2]. Nevertheless, it was highly valued due to its macroscopic appearance not only in modern times but also in Antiquity[3]. As such, it was widely employed in Roman times in *Hispania* from the Augustan era onwards, both in the framework of major new urban ornamental programs and in the domestic sphere, for the decoration of *domus* and *villae*.

The archaeometric characterization of all existing lithological varieties is essential, as it can present very different aspects. Hence the importance of having a detailed reference core to be compared with archaeological objects supposedly made of Espejón limestone. This is especially important as this stone's chromatism (from red and yellow to pale ochre and white) makes it perfect for small *tessellae* used in mosaics. Moreover, we undertook a survey of the territory around Espejón in order to obtain a picture as complete as possible not only of where and how the different varieties of Espejón limestone crop out but especially of the quarrying points, as a first step towards understanding how the exploitation of this stone took place and was organized.

2 TÁRRAGA 1992; 1999; 2002; 2009; FRÍAS 2005.

3 For a preliminary study see SALÁN 2012.

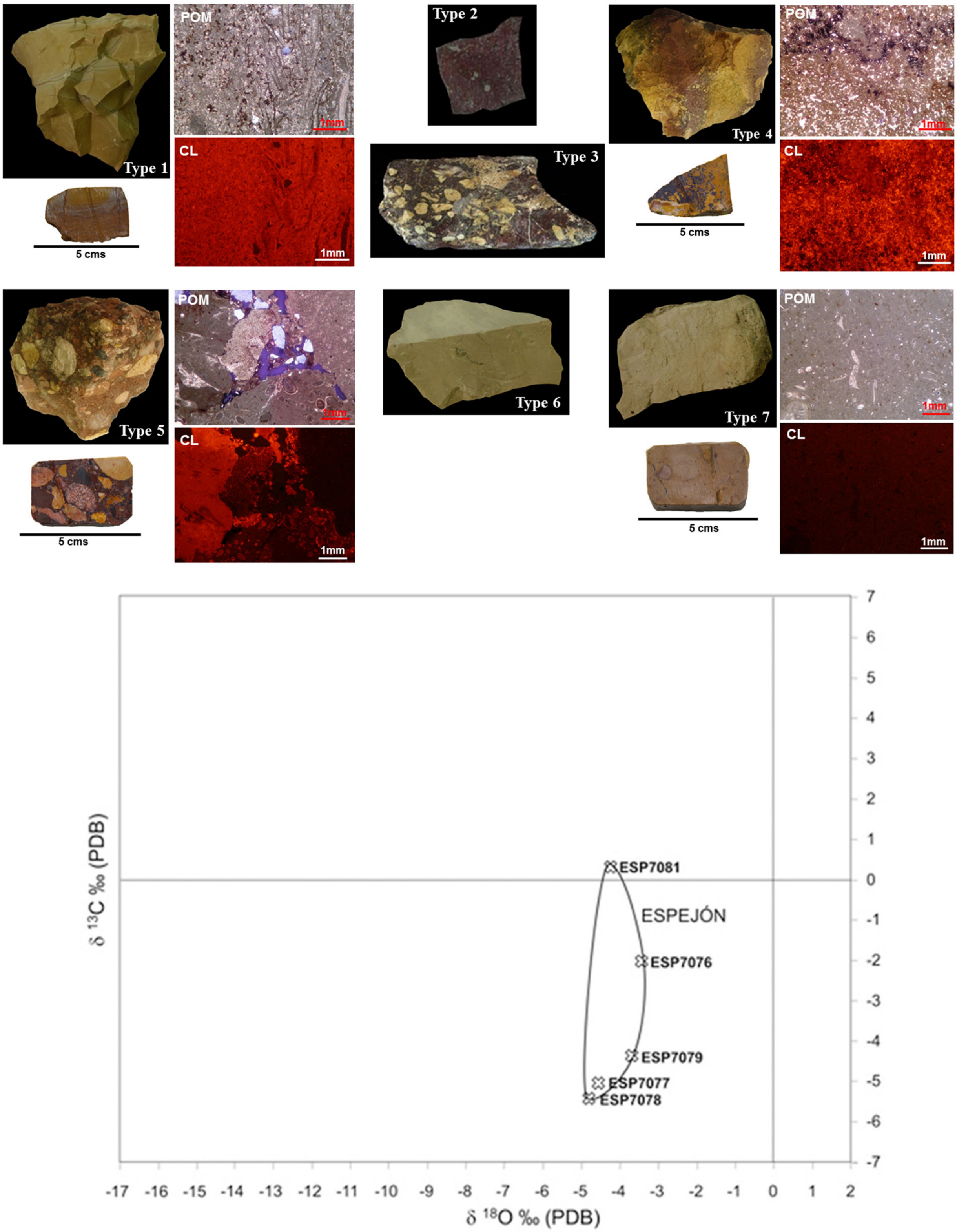

Fig. 1. Above: samples and photomicrograph of cross-polarized light and cathodoluminescence aspect of Espejon varieties 1, 4, 5 and 7. Below: Scatter plot with δ13C and δ18O isotopic values (in ‰, PDB) of samples corresponding to yellowish micritic fractions and equivalent clasts in breccia types. Initial proposal of general distribution field for the types of Espejón Stone

2. The archaeometric characterization (Fig. 1)

Espejón *marmor* is a highly variable Cretaceous stone[4] that presents seven main types:

- a mainly yellow quite homogeneous limestone (type 1),
- a mainly red-purple quite homogeneous limestone (type 2),
- a brecciated yellow and red-purple limestone (type 3),
- a red/purple-yellow banded limestone (type 4),
- a highly multicoloured brecciated conglomerate locally known as "Jaspe" (type 5), and
- a white (type 6) to pale-coloured variety (type 7).

They can all be found in Espejón municipality, but outcrops of type 4 can be also found in Espeja de San Marcelino while type 5 occurs both in Espeja de San Marcelino and Cantalucia.

The multimethod analytical protocol applied includes the following techniques: thin section/petrographic optical microscopy (POM), cathodoluminescence (CL), stable isotope analysis ($\delta^{13}C$ and $\delta^{18}O$), X-ray Spectrometry (XRS) and X-ray Diffraction (XRD)[5]. Four varieties of Espejón *marmor* have been so far analysed: types 1, 4, 5 and 7. The results provide information on the mineralogical and textural parameters of these varieties. They form the basis of a reference corpus that will be subsequently enlarged with the other varieties[6] and used for future comparisons with the archaeological materials.

Type 1. Yellow micrite, usually quite homogeneous but sometimes with yellow ochre and brown bands[7]. The yellow part (left half of the microphotograph in Fig. 1) can be classified as pelmicrite[8] or micro-packstone[9] with very fine allochems or micropeloids easily distinguished from the micrite-microsparite matrix due to its high iron content. Small bivalves and rare microforaminifers can be distinguished among the microfossils, which show a microsparite filling, as well as some irregular iron oxide concentrations. The brown part (right half of the microphotograph in Fig. 1) is classified as biopelsparite[10] or grainstone[11]. Bioclasts dominate over other allochems (peloids and intraclasts, some with embedded microfossils). The skeletal components are almost completely micritized and have elongated shapes and a subparallel orientation, which results in a strong lamination visible even at macroscopic scale. Among them, algae fragments and orbitolinids can be distinguished. All allochems show iron-rich rims or envelopes. Monocrystalline, angular quartz is present in both parts but particularly in the fossil-rich areas. Tourmaline has also been identified as accessory mineral. Irregular microcracks, subperpendicular to the bedding, are filled with sparite and present iron-rich nodules. Under CL, it shows a medium intensity in orange with a higher intensity in yellowish-orange of the sparry cement in the bioclastic and pelitic fraction of the biopelsparite. The CL intensity of these components decreases with the development of iron oxide envelopes. Siliciclastic quartz and calcite filling the microfractures show a very weak luminiscence.

Type 4. Red/purple and yellow banded limestone, often brecciated, classified as pelsparite[12] or grainstone[13]. It is composed of allochems remarkably uniform in size (mainly micrite peloids of *c.* 100 µm with circular or slightly elliptical sections and rare, fragmented bioclasts). The colour difference is due to the various concentrations of iron oxide coats around them and the presence of small opaque minerals. This variety also presents irregular yellowish micritic mud areas. Detritic tourmaline has been identified as accessory mineral in this type[14]. Interparticle and secondary porosity is filled by sparry cement, reduced by compaction. It has a heterogeneous-cathodoluminescence determined by the iron oxide concentrations (mainly on the allochems rims) which is predominantly of orange medium intensity, especially in areas of micritic mud. Sparitic crystals that fill the larger pores have typical zoned luminescence of druse growth, with low intensity core.

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4 ÀLVAREZ *et al.* 2009, 54-59.

5 Petrographic (POM), cathodoluminescence (CL) and X-ray Spectrometry (EDX) analyses were conducted at the Unitat d'Estudis Archeomètrics (UEA) of the Institut Català d'Arqueologia Clàssica (ICAC) at Tarragona. Mass Spectrometry Isotopic Relations (IRMS) analysis was conducted at the Istituto di Geologia Ambientale e Geoingegneria (IGAG) of the CNR at Rome. X-ray Diffraction (DRX) is in progress at the Institut de Recherche sur les ArchéoMATériaux (IRAMAT)- Centre de Recherches Physiques Apliquées à l'Archéologie (CRP2A) at Bordeaux. See GARCÍA-ENTERO *et al.*, 2017.

6 The study of types 2, 3 and 6 is currently in progress.

7 Description based on sample ESP7076 from El Piñueco outcrop (Espejón).

8 FOLK 1959; 1962.

9 DUNHAM 1962.

10 FOLK 1959; 1962.

11 DUNHAM 1962.

12 FOLK 1959; 1962.

13 Description based on samples ESP7077 and ESP7078 from Matalea and Hoyancos quarries (Espejón). DUNHAM 1962.

14 ÀLVAREZ *et al.* 2009, 126.

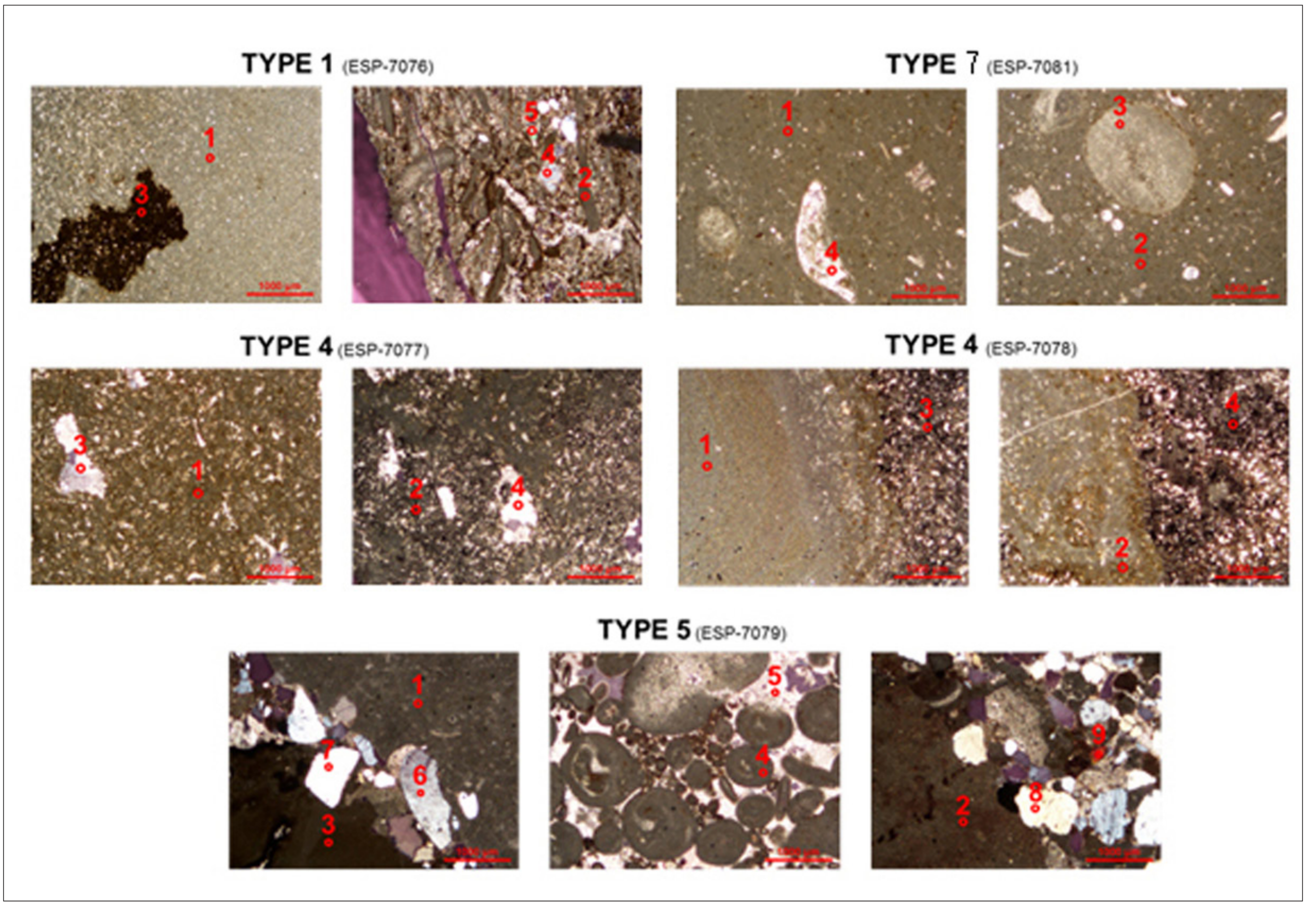


Fig. 2. Chemical composition analyses. Photomicrographs of the components analyzed with the exact point of measurement, in each lithotype. The correspondence of numbering analysis points is shown in Fig. 3

Type 5. Highly multicoloured framework-supported conglomerate or a poorly to moderately-sorted petromict orthoconglomerate[15] with a scarce iron-rich matrix, hence its reddish colour[16]. The clasts are subrounded and of carbon nature: micrites or mudstones, biomicrites or mudstones with <10% bioclasts, oosparites or oolitic grainstones, intrasparites or intraclast grainstones, peloid micrites or wackestone according to Folk and Dunham[17]. Monocrystalline, subrounded to subangular quartz form most of the terrigenous fraction but there is also tourmaline as accessory mineral. This variety shows a sparite cement and sutured grain contacts that reveal a major compaction process. Under CL this stone presents different intensities of luminescence: the limestone fragments show reddish brown to reddish orange colours depending on the iron content of their components; the sparry cement and irregular sparitic areas show a bright luminescence of yellowish-orange hue; the micrite matrix with iron oxides has a medium intensity luminescence in orange, particularly visible between darker components. Only the siliciclastic quartz are slightly- to non-luminescent.

Type 7. Pale yellow to white biomicrite[18] or wackestone[19]. Allochems are scarce but > 10% and among the larger bioclasts skeletal fragments of algae, gastropods, bivalve shells (some very fine or filamentous) and possible echinoderm plates, along with many microforaminifers and circular microspines of echinoids can be distinguished. There are very few carbonated intraclasts. The dominant micrite matrix presents dispersed iron oxides and patchy microsparite recrystallization. The fraction of terrigenous quartz is not significant while stylolities in which iron oxides accumulated are characteristic. This stone shows a homogeneous cathodoluminescnce of low intensity and reddish-brown hue, which decreases in intensity where iron oxides accumulate. Rounded, carbonated, intraclasts stand out due to their slightly lower intensity.

15 BOGSS, 1992.

16 Description based on sample ESP7079 from the "Abandoned quarry" (Espejón).

17 FOLK 1959; 1962 and DUNHAM 1962.

18 FOLK 1959; 1962.

19 Description based on sample ESP7081 from La Corta outcrop (Espejón).

TYPE 1 (ESP-7076)	**SiO_2**	**TiO_2**	**Al_2O_3**	**Fe_2O_3**	**MnO**	**MgO**	**CaO**	**Na_2O**	**K_2O**
1 Cal (micrític matrix)	0,0		0,0			0,0	100,0		
2 Cal (orbitolinid)	0,0						100,0		
3 [Ox(Fe)]	10,0		4,3	11,8		3,6	70,3		
4Qtz	100,0						0,0		
5Tur	43,2	0,4	19,9	2,5		7,8	24,2	2,1	
TYPE 4 (ESP-7078)	**SiO_2**	**TiO_2**	**Al_2O_3**	**Fe_2O_3**	**MnO**	**MgO**	**CaO**	**Na_2O**	**K_2O**
1 Cal (micrític matrix)	0,0		0,0	0,0		0,0	100,0		
2 Cal (micropeloid)	0,0		0,0	0,0		0,0	100,0	0,0	
3 Cal + Ox(Fe) (micropeloid ox.)	4,2		1,5	5,4			89,0		
4 Cal + Ox(Fe) (micropeloid ox.)	5,5			3,7			90,9		
TYPE 4 (ESP-7077)	**SiO_2**	**TiO_2**	**Al_2O_3**	**Fe_2O_3**	**MnO**	**MgO**	**CaO**	**Na_2O**	**K_2O**
1 Cal (micropeloid)	0,0						100,0		
2 Cal(micropeloidox.)	0,0		0,0	0,0		0,0	100,0		
3 Cal (sparry cement)	0,0						100,0		
4 Cal (sparry cement)	0,0					0,0	100,0		
TYPE 5 (ESP-7079)	**SiO_2**	**TiO_2**	**Al_2O_3**	**Fe_2O_3**	**MnO**	**MgO**	**CaO**	**Na_2O**	**K_2O**
1 Cal (micrític matrix)	0,0						100,0		
2 Cal (micrític matrix)	0,0		0,0				100,0		
3 Cal (micriticox.matrix)	0,0			0,0			100,0		
4 Cal (ooid)	0,0						100,0		
5 Cal (sparry cement)	0,0						100,0		
6 Qtz	100,0						0,0		
7 Qtz	100,0						0,0		
8Qtz	100,0						0,0		
9Tur	51,9	0,6	21,3	3,2		7,7	13,2	2,1	
TYPE 7 (ESP-7081)	**SiO_2**	**TiO_2**	**Al_2O_3**	**Fe_2O_3**	**MnO**	**MgO**	**CaO**	**Na_2O**	**K_2O**
1 Cal (micrític matrix)	0,0		0,0			0,0	100,0		
2 Cal (micrític matrix)	0,0		0,0				100,0		
3 Cal (micrític filling)	0,0						100,0		
4 Cal (bivalve)	0,0						100,0		

Fig. 3.
Point-by-point chemical analysis of the carbonate components and accessory minerals distinguished microscopically in each of the samples considered for each rock type defined visually. Cal: calcite, Ox (Fe) iron oxide, Qtz quartz, Tur: tourmaline. []: Masked by other adjacent majority mineral (calcite)

EDX analysis results (Fig. 2 and Fig. 3)

EDX was carried out to check indirectly the type of carbonate in the different carbonate components of the rock as well as the nature of the accessory minerals[20]. The results confirmed that types 1, 4, 5 and 7 present a low content of non-carbonated components, generally less than 10% and never exceeding 30% even in the detrital case (type 5). The presence of quartz, a common accessory mineral, is ratified but most interestingly, tourmaline has been detected in types 1 and 5. Although it is found in very low percentages, its presence constitutes a more discriminating element.

IRMS analysis results[21] (Fig. 1)

The study of the carbon and oxygen stable isotopes ratio ($\delta^{13}C$ and $\delta^{18}O$) is commonly used to characterize

20 DUNHAM 1962; CAPEDRI *et al.* 2004. It was performed by an electron emission device with an EDX detector (CITL CL8200 Mk5-1 with an Amptek Axis SDD raig X detector) coupled to a polarized light microscope and a Germanium (Ge) standard was used due to the reliability of its spectrum. Measurements were made with an electron beam at 200 µA of and 18 kV at points of 50 µm in diameter.

21 It was carried out by using a FINNIGAN GasBench II belonging to IGAG-CNR and according to the usual procedure (MCCREA 1950; CRAIG 1957). The results are expressed as a relative percentage to international reference standard PDB (Pee Dee Belemnite).

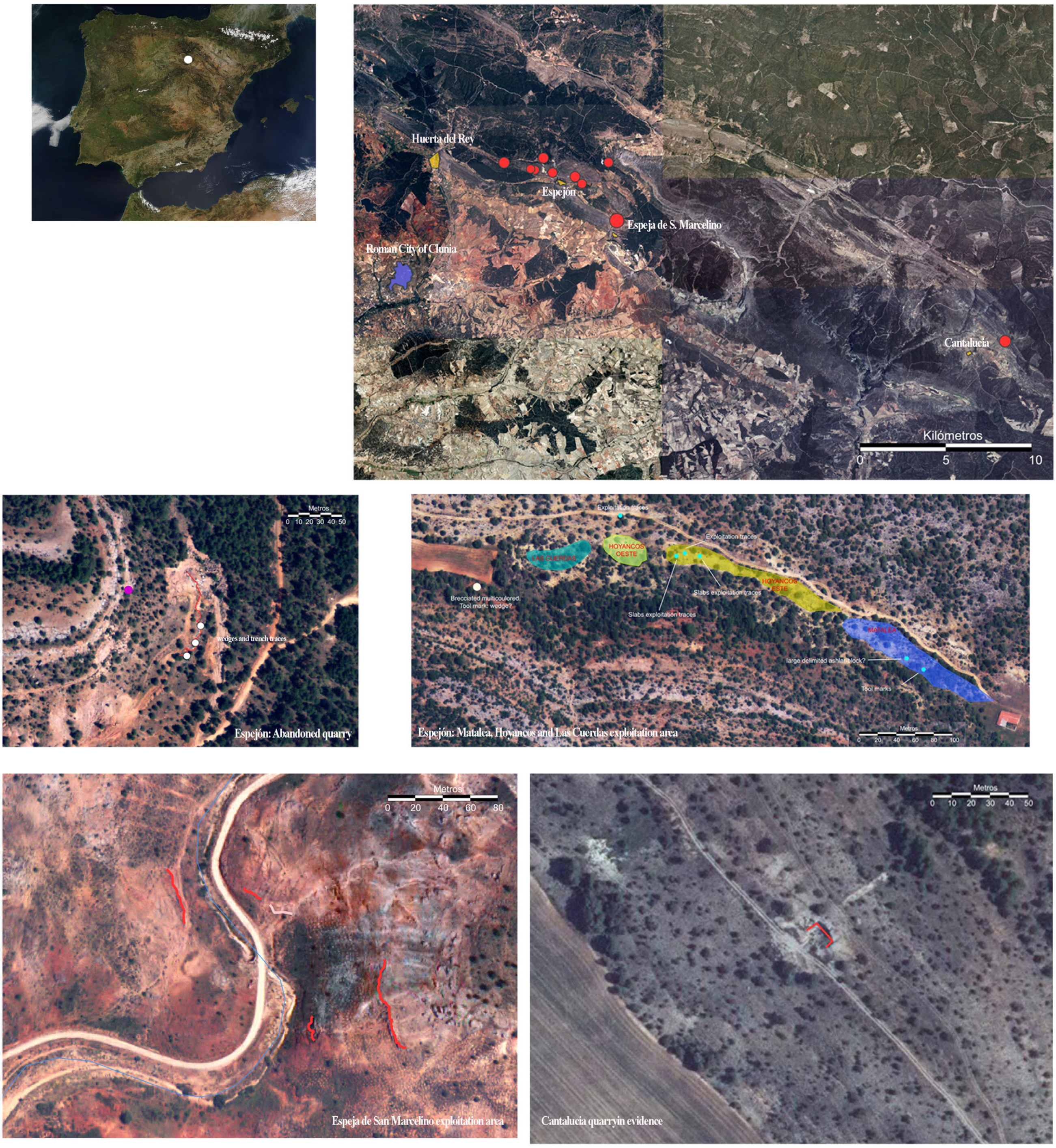


Fig. 4. Exploitation and quarrying evidences in Espejón, Espeja de San Marcelino and Cantalucia municipalities

carbonate rocks. To obtain this initial proposal of Espejón limestone and multi-coloured conglomerate isotopic distribution field, we have included the four lithotypes already described. The samples were taken from the yellow micrite fraction of each of them or the equivalent clasts in the breccia and conglomerate types.

The range of isotopic values is relatively wide, especially for $\delta^{13}C$, which shows mostly negative values. Indeed, they fluctuate from -5.39 to 0.32 ‰ (PDB) for $\delta^{13}C$ and from -4.81 to -3.44 ‰ (PDB) for $\delta^{18}O$. Although the discriminating capacity of this method for this lithology is for the moment limited due to the lack of reference isotopic studies in other, similar, stones used in antiquity, it is an essential step towards the definition of the discriminating traits of Espejón limestone and multi-coloured conglomerate.

3. Exploitation and quarrying traces (Fig. 4)

The field survey has led to the identification of several exploitation fronts and quarrying traces. Unfortunately, the intensive extraction activity from the 16th c. onwards and the fact that the extraction techniques have changed very little over the centuries[22], makes it very difficult to distinguish the Roman traces from those of modern age.

Espejón municipality: five areas have been surveyed:

"**Abandoned quarry**": Located northwest of the village, this quarry exploited a highly coloured conglomerate (type 5) outcrop until the 1980s. On the hillside, we have detected a 30 m long and 4 m high front where trenches and wedges are visible.

Matalea-Las Cuerdas exploitation area: A wide pit-type exploitation area (c. 1 km long and 15/20 m high) lies west of the village. Three zones can be distinguished: Matalea, Hoyancos and Las Cuerdas. It is a very clogged extraction area where some exploitation traces are preserved: a large delimited rectangular block, slab extraction traces, trenches, wedges and pick and chisel marks on the bedrock. Types 3, 4 and 5 crop out here.

Pico La Cantera quarry: It is a large quarry still exploiting the white and pale-yellow varieties (types 6 and 7) northwest from the village. Yet there is no evidence of ancient exploitation, since it has been intensively exploited until very recently.

La Corta and El Piñueco areas: Two areas east of Espejón were explored due to the large outcrops existing (of type 7 and type 1 varieties) and the common belief of the villagers suggesting a possible ancient extraction. Nevertheless, no evidence of ancient activity were found.

Espeja de San Marcelino municipality: West of the town of Espeja de San Marcelino, there is a wide area with types 4 and 5 outcrops. Three lineal fronts of about 40 m long and 2 m high each prove that extraction was quite intense here.

Cantalucia municipality: North of the little village of Cantalucia we discovered a lineal extraction front which seems to have been used during two different moments: in modern times and then in the 19th c. (until 1960s). This outcrop provides the multicoloured conglomerate variety (type 5).

4. Use and distribution of Espejón *marmor* (Fig. 5)

Although the information available is still partial, this *marmor* seems to have been one of the main ornamental stones in the Peninsular inland. We can thus leave behind the previous idea of it being a secondary material linked almost exclusively to the nearby Roman city of *Clunia* (Burgos) where Espejón limestone was abundantly used from Julio-Claudian times onwards both in the public and in the private sphere[23]. Indeed, Espejón limestone was widely employed in *Hispania* from the Late Augustan era, in the framework of new public ornamental programs of towns immersed in "marbling" processes. The city of *Segobriga* (Saelices, Cuenca)[24], provides a good example: together with other Hispanic and imported marbles, Espejón limestone slabs[25] were used in the Late Augustan period in the pavement of the *Curia*[26]. Evidence of the use of Espejón limestone in public buildings from the Claudian and Flavian times is found at the Roman towns of *Uxama Argaela* (Burgo de Osma, Soria)[27], *Legio* (León)[28] and *Asturica Augusta* (Astorga, León)[29].

Its use continued in Late Roman official ornamental programs. At *Complutum* (Alcalá de Henares, Madrid)[30] Espejón limestone was used in the *Forum Basilica* –originally built in mid-1st *c*. AD- and in the great

22 Until the introduction of explosives and drilling tools.

23 Only at 10 km from the exploitation area, *Clunia* received all types of Espejón stone. They were extensively used in the ornamental programs of the public buildings (Los Arcos I and II baths, the *Forum* baths, the *Basilica*, the *Forum* and the Theater) and domestic buildings (i.e. Taracena House) not only for architectural elements (pilaster and column shafts, base and capitals), pavement and wall revetment slabs, mouldings cornices and plinths, *opera sectilia crustae*, mosaic *tessellae* but also for epigraphy (GUTIÉRREZ BEHEMERID 2003; PALOL, VILELLA 1987; RODRÍGUEZ, SALIDO 2014).

24 In the Southern plateau and 300 km far from Espejón.

25 Of about 116 x 58 x 8 cm.

26 CEBRIÁN 2004, 2012.

27 Located at 36 km from Espejón; despite the lack of specific studies on the use of *marmor* at this town, some *crustae* of the red/purple brecciated type are visible in "Los Plintos" and "Sectile" houses. About this Roman town, see GARCÍA MERINO, 1999.

28 Where one of the most outstanding pieces of Espejón limestone was found: it is a quite large (1.8 m diameter and 25 cm high), 2nd c. AD, basin –*labrum*- made in the red/purple and yellow brecciated type probably from the public baths. It was carved from a single block but only three fragments have survived after its destruction in mid-3rd c. AD, when the baths underwent some improvements (MORILLO, SALIDO 2010).

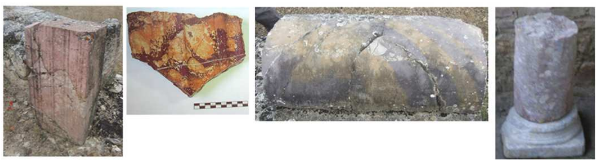
29 Capital of the *Conventus Asturicum* and 300 km distant from Espejón, where Espejón limestone was used at least from Claudian to Flavian times at the "Wall House" (CISNEROS *et al.* 2010-2011, 111). However, new findings are expected as a study of this town marble is in process.

30 Located in the Southern plateau and distant more than 200 km from Espejón.

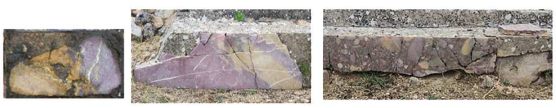

Tessellae for mosaics:


Epigraphy: *Clunia*. 1st c. AD


Furniture elements: *Legio*. *Labrum* Roman basin from the Public Baths. 2nd c. AD


Architectural elements: pilaster and columns shafts: Clunia and Roman *villae* of Quintana del Marco and La Olmeda


Architectural moulding elements:
Complutum Basilica (3rd c. AD) and Carranque Late Roman Palace (4th-5th c. AD)


Pavement and wall revetment slabs: *Segobriga Forum* (Late Augustan era), *Clunia* (1st c. AD), Carranque Roman Palace (4th-5th c. AD), etc.

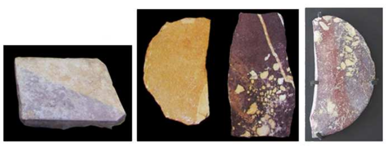

Opera Sectilia crustae: *Clunia*, *Uxama*, *Complutum*, Carranque, *Asturica Augusta*, Cuevas de Soria, etc. (1st to 4th c. AD)

Fig. 5. The use of Espejón limestone in *Hispania*

monumental façade added to the *Curia* at the end of 3rd *c.* AD[31]. These two public buildings provide abundant evidence of types 1, 3 and 4 being used for wall and floor *opus sectile crustae*, wall revetment slabs, mouldings cornices and plinths[32]. On the other hand, Espejón limestone was rarely used at *Caesaraugusta* (Zaragoza), where it has been attested only in the Late Roman pavement of the *orchestra* theatre[33]. This is the easternmost testimony in *Hispania* and the only example of the use of Espejón limestone in the Ebro Valley[34]. Pending further evidence, the question remains whether or not the Ebro Valley represents a boundary for the distribution of Espejón limestone.

As already mentioned, Espejón limestone was also abundantly used in urban and rural domestic contexts where the massive use of *marmora* had a prominent role in the self-representation strategies of the elite, especially in Late Antiquity. Espejón limestone played a major role on the decoration of the large rural complexes of Carranque (Toledo), where types 1, 2, 3 and 4 were very abundantly used in pavement and revetment panels, moulding cornices and *crustae* for *opera sectilia* in the Late Roman palatial building. Moreover, they were employed next to more than 30 varieties of marble imported from Egypt, Asia Minor and Greece, which demonstrates the importance of and prestige associated to this stone[35]. Espejón limestone was also used, although rarely,[36] at Las Pizarras (Coca, Segovia), a major Late Roman building (4th-6th c. AD) where dozens of Mediterranean and Hispanic marbles were used[37]. Espejón limestone (type 3) *crustae* for *opus sectile* have also been uncovered at the Roman villa of Cuevas de Soria (Dehesa de Soria, Soria). The small, conglomerate (type 4), column shaft found at the Roman villa of La Olmeda (Saldaña, Palencia) (4th-5th c. AD) and the fragment of the type 3 Espejón limestone pilaster shaft from the Roman villa of Los Villares (Quintana del Marco, León) (1st-5th c. AD) add significantly to our knowledge of its use in the rural context[38].

31 RASCÓN, SÁNCHEZ 2010.

32 DURÁN 1998, 102-103.

33 CISNEROS 2012, 129. For the ornamental program of the Theatre of *Caesaraugusta* see also LAPUENTE *et al.* 2009.

34 As shown by the in-depth studies of the marble assemblages from *Bilbilis* (Calatayud, Zaragoza), *Celsa* (Velilla de Ebro, Zaragoza), Los Bañales/¿*Tarraga*? (Uncastillo, Zaragoza), *Labitolosa* (Puebla de Castro, Huesca) and Osca (Huesca) and other sites of "Alto Aragón" where the Espejón limestone and Conglomerate are absent. (see CISNEROS 2012; LAPUENTE *et al.* 2011; ANDREU *et al.* 2015; LAPUENTE *et al.* 2015; GISBERT, CISNEROS 2015).

35 GARCÍA-ENTERO, VIDAL 2007; 2012.

36 Only five small fragments of revetment panels belonging to type 3 variety have been found. Our warmest thanks to Olivia Reyes and César Pérez for this still unpublished information.

37 PÉREZ *et al.* 2012.

38 It must be noted that in spite of what was published by RODRÍGUEZ and SALIDO (2014, 639) Espejón limestone has not been found during the detailed inspection of the whole *marmor* assemblage from the Late Roman *villa* of Noheda (Cuenca) that we undertook as part of this project. Our thanks go to Miguel Valero for kindly allowing this study. For a preliminary study of the *marmora* of this *villa*, see VALERO *et al.* 2015.

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