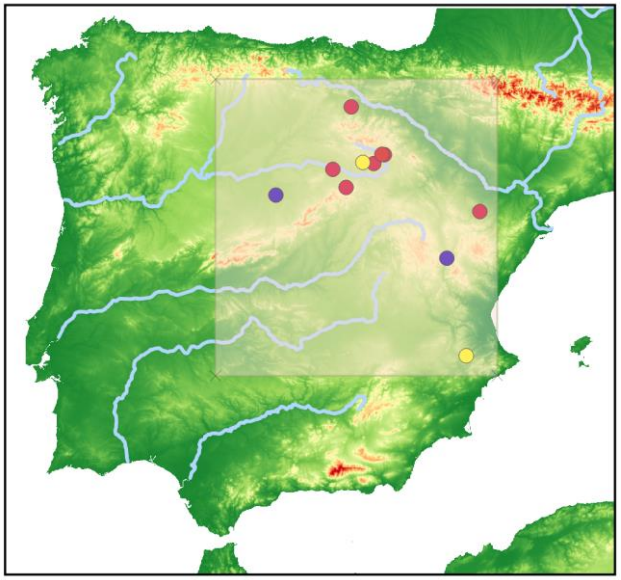
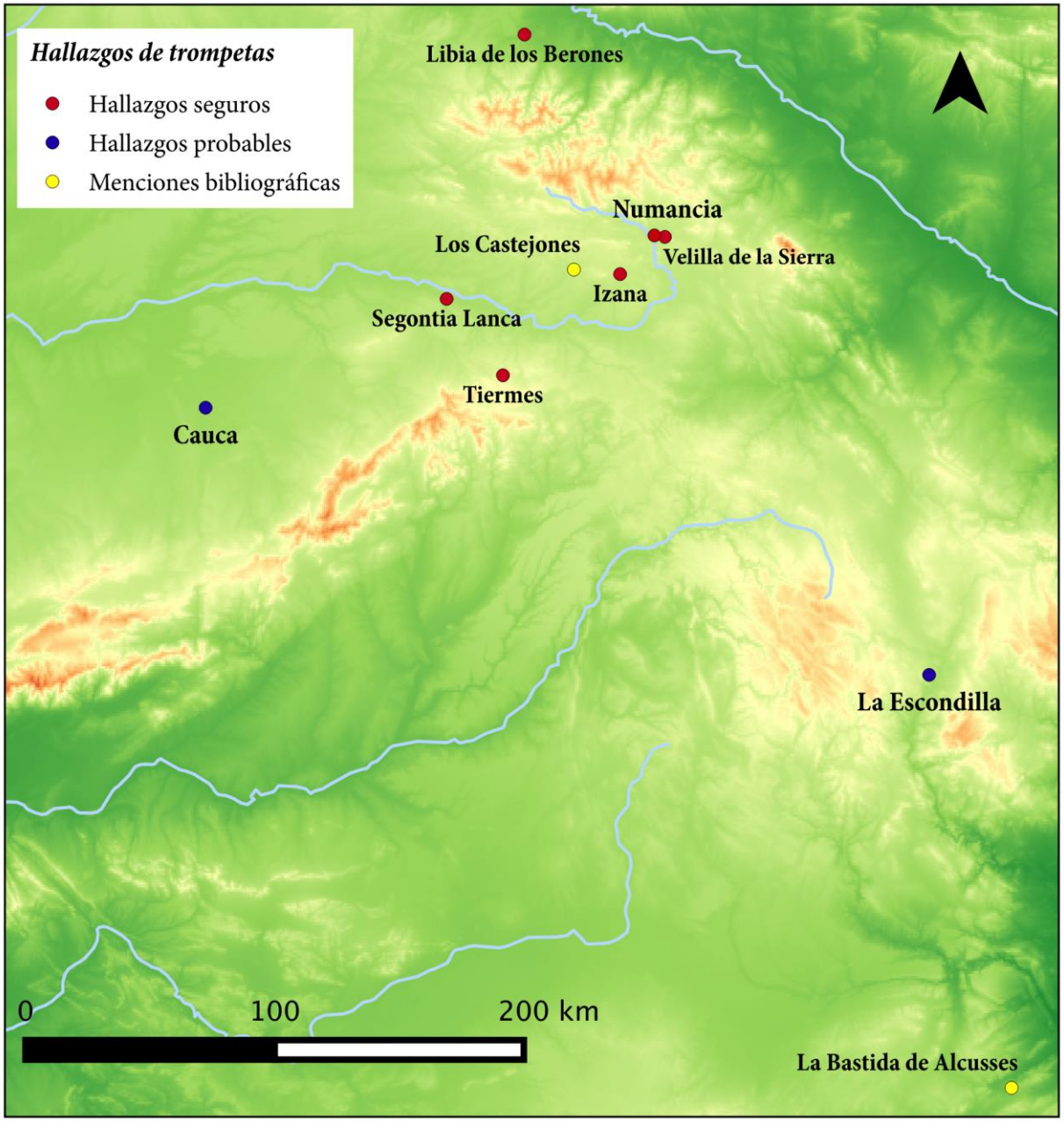
1912

“Pompeius, coming back to the siege of Numantia, endeavored to turn the course of a certain river in order to reduce the city by famine. But the inhabitants harassed him while he was doing this work. They rushed out in crowds without trumpets and assaulted those who were working on the river...”

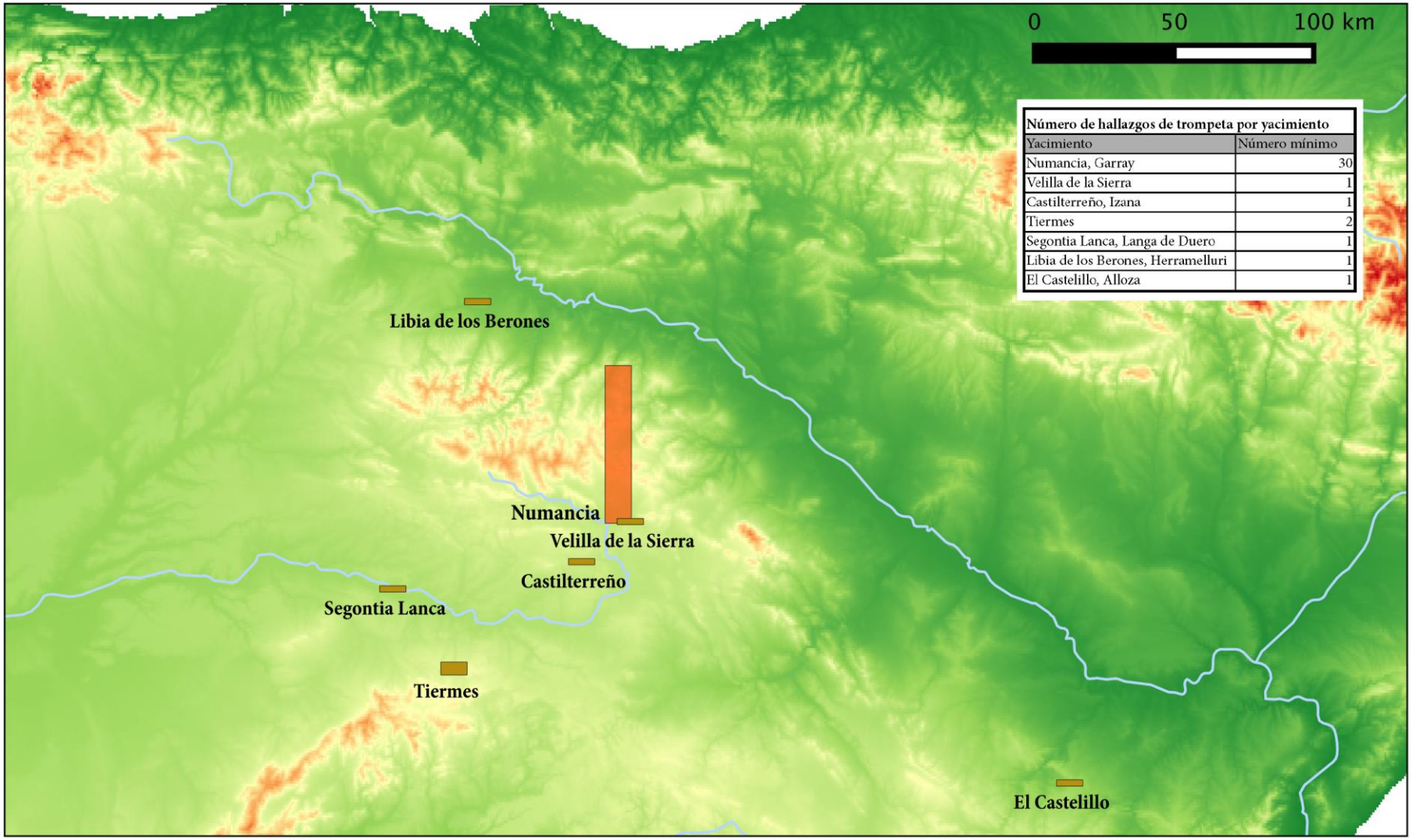
Appiano, Iber. 78



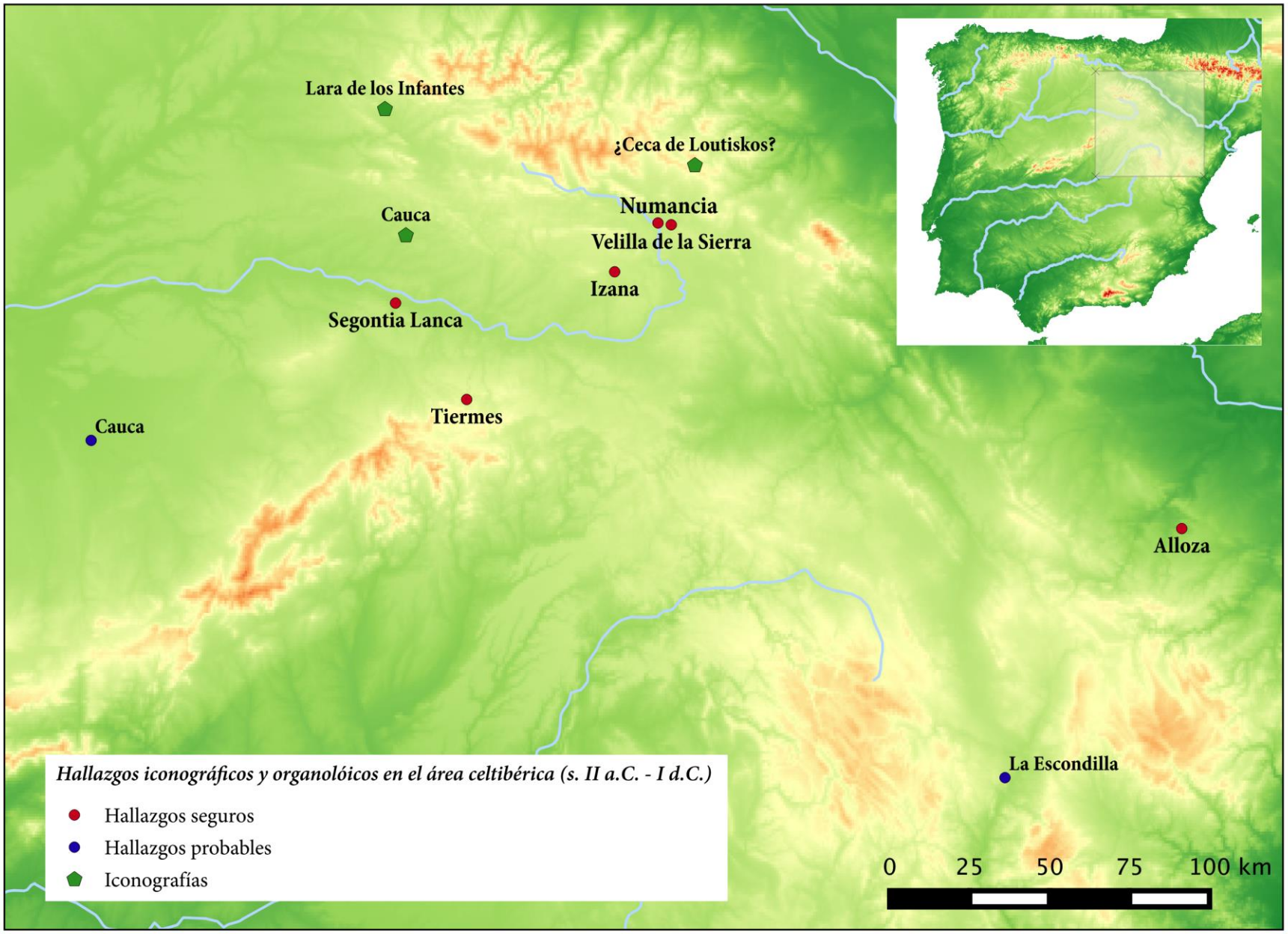


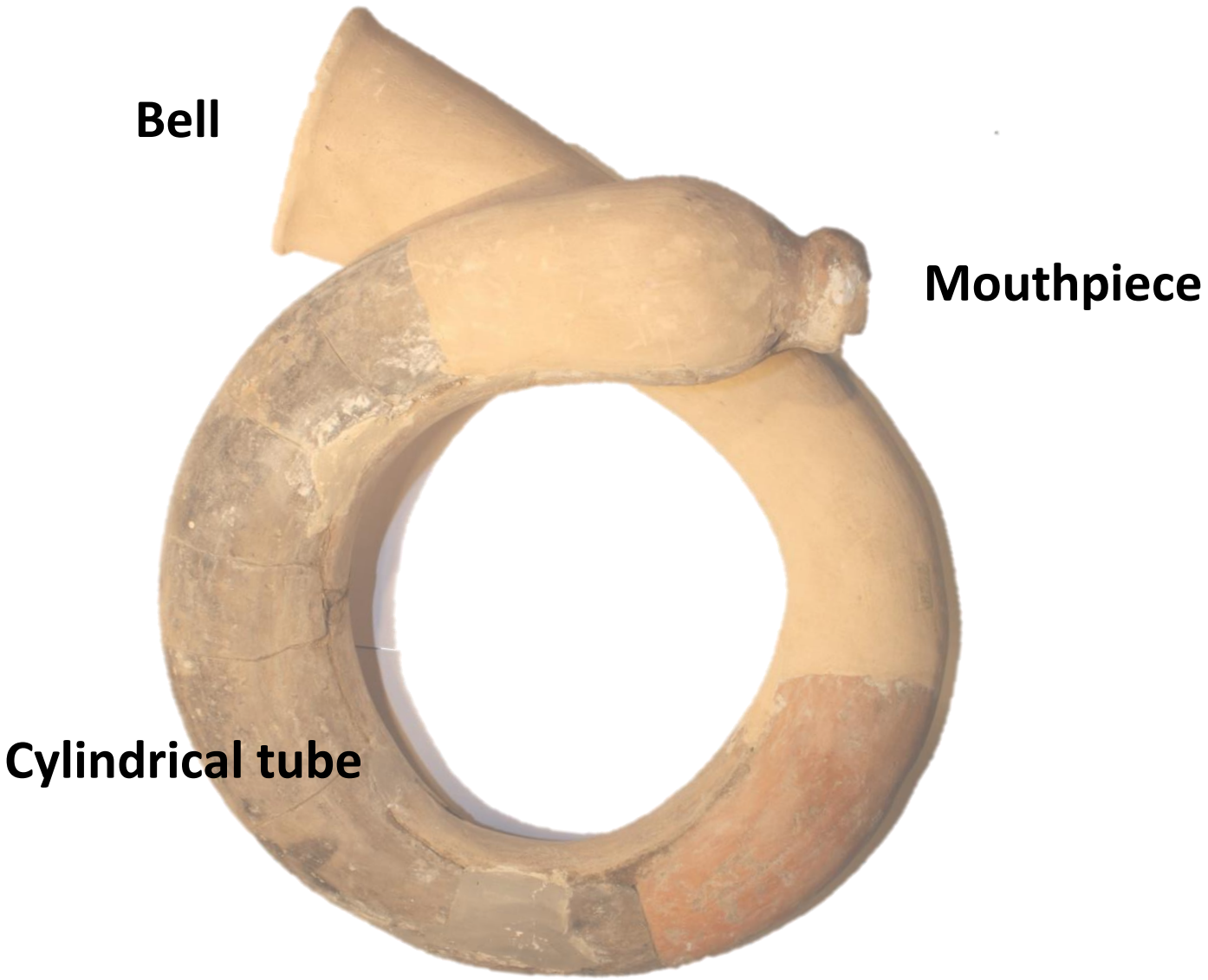
70 Fragments

Minimum of 39 trumpets

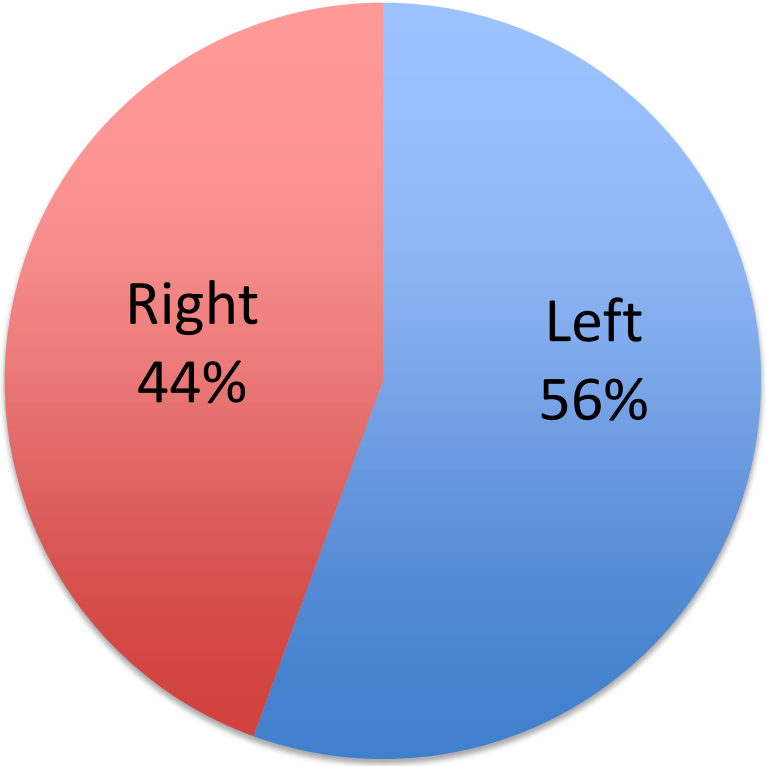


Número de hallazgos de trompeta por yacimiento	
Yacimiento	Número mínimo
Numancia, Garray	30
Velilla de la Sierra	1
Castilterreño, Izana	1
Tiermes	2
Segontia Lanca, Langa de Duero	1
Libia de los Berones, Herramelluri	1
El Castelillo, Alloza	1


Lara de los Infantes
¿Ceca de Loutiskos?
Cauca
Numancia
Velilla de la Sierra
Izana
Segontia Lanca
Tiermes
Cauca
Alloza
La Escondilla
Hallazgos iconográficos y organolóicos en el área celtibérica (s. II a.C. - I d.C.)
Hallazgos seguros
Hallazgos probables
Iconografías
0
25
50
75
100 km

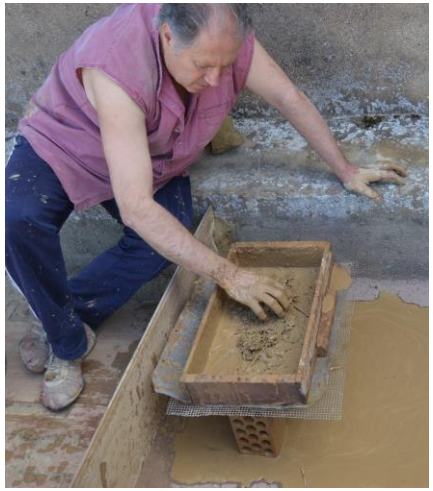

Bell
Mouthpiece
Cylindrical tube

Position of the mouthpiece



2. Chaîne-opératoire

Thanks to the collaboration of the traditional potter artisans from Bailén (Jaén), Antonio Padilla, we have prepared the different clays in the traditional fashion.



The firing

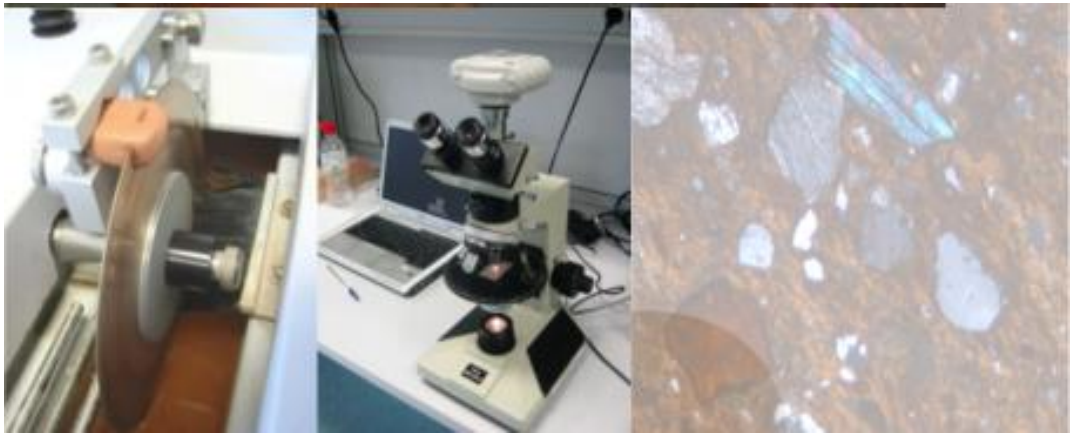


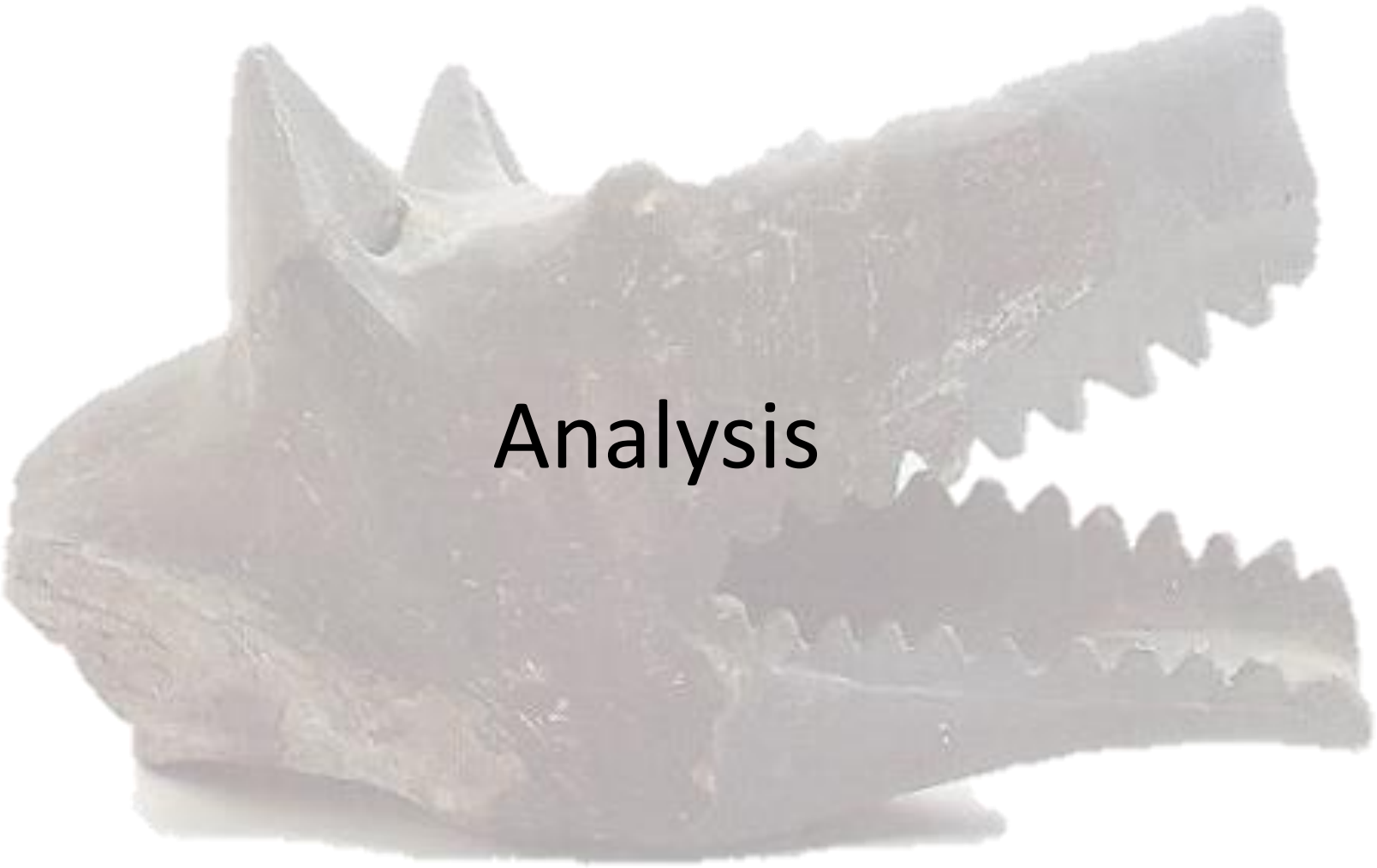




After three days, the kiln is open and the pieces are fired, ready to be played and studied.

Archaometric analysis will be carried out in the lab of the CERVITUM study group of the CSIC (EMAP´s associated partners). X-ray Diffraction (XRD) and X-ray Fluorescence (XRF) can tell us about the firing temperature, the clay components and some acoustic properties of the material, permitting us to compare the results with the ones of the original archaeological findings.





Analysis

Project EMAP-Universidad de Valladolid and CSIC (Consejo Superior de Investigaciones científicas

GI CERVITRUM (CSIC)

M.A. Villegas
M. García Heras
F. Agua
J.F. Conde

Raquel Jiménez

Univ. Valladolid

Juan Jesús Padilla

Univ. Complutense
A.e.E.c.A.

Santiago Expósito Paje

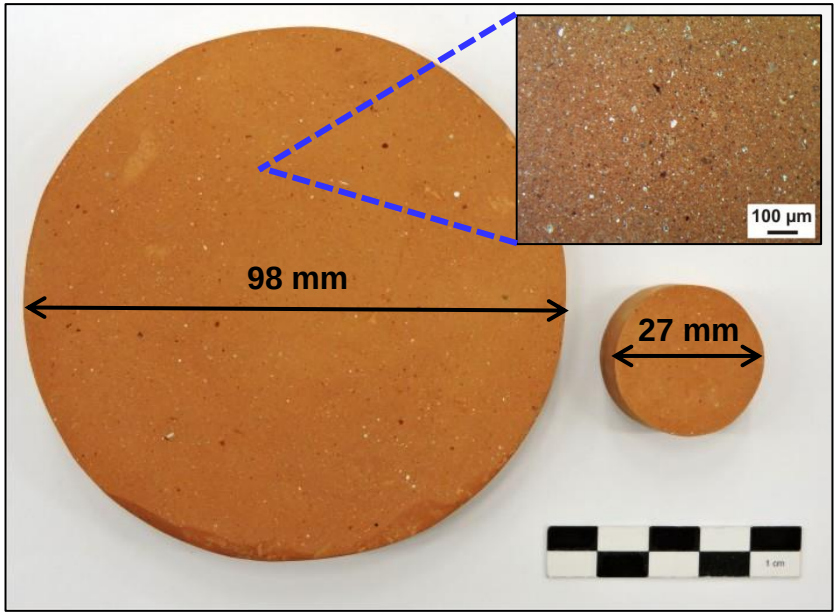
Lab. Acústica Aplicada
ETSI Caminos
Univ. Castilla-La Mancha

Estefanía García

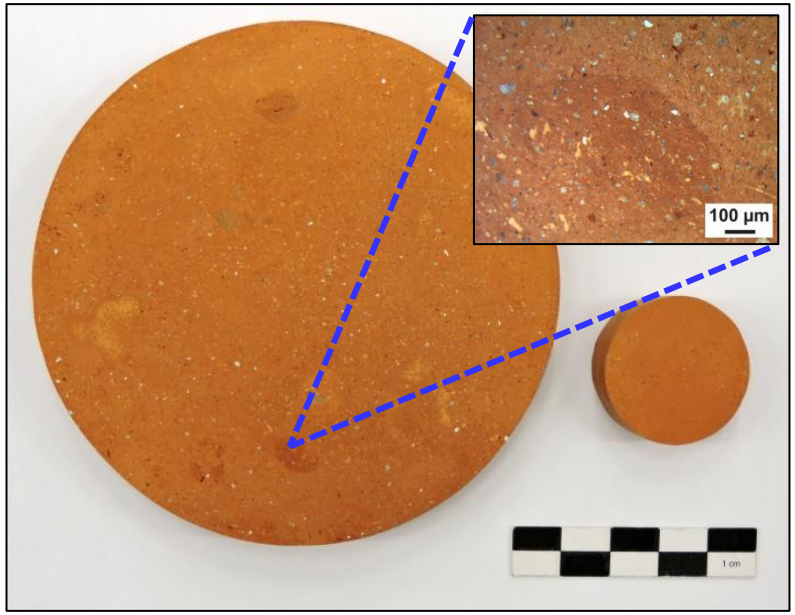
Profesora Superior
de Bombardino

Materiales necesarios para realizar el estudio

- Archaeometric analysis of the replicas



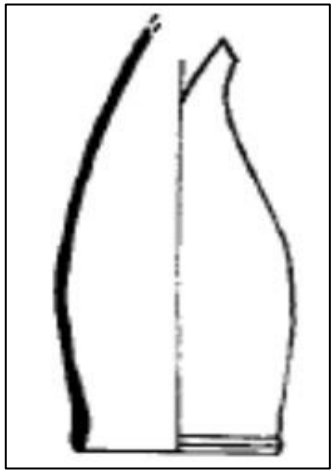
Bailén



El Castillejo
(Numancia)

Materiales necesarios para realizar el estudio

- Analysis of the original fragments



Muestra N-49 (N-8222).Tesis de García Heras.

Materiales necesarios para realizar el estudio

Espectrometría de fluorescencia de rayos X (FRX).

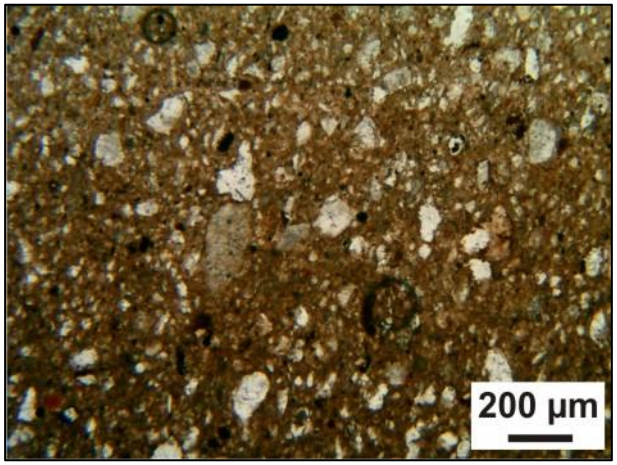
(% en peso)

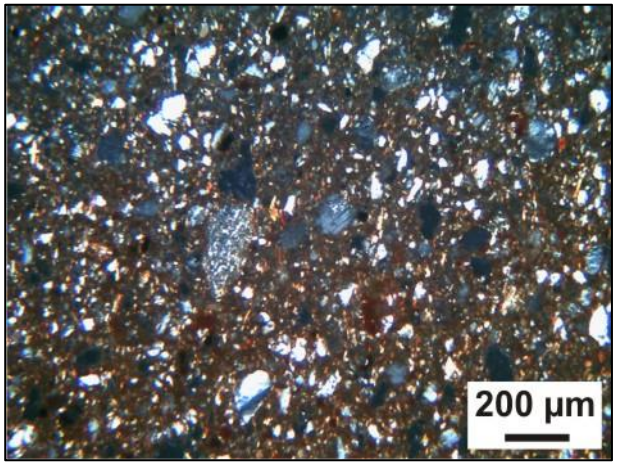
Muestra	Na_2O	MgO	Al_2O_3	SiO_2	P_2O_5	K_2O	CaO	TiO_2	MnO	Fe_2O_3	ZnO	Rb_2O	SrO	BaO
Grande (Bailén)	---	1,87	14,49	60,32	0,27	3,21	12,37	0,95	0,06	6,32	0,01	0,02	0,05	0,06
Pequeña (Castillejo)	---	2,20	14,95	61,11	0,09	2,87	11,59	0,95	0,05	5,84	0,02	0,02	0,25	0,06
Otra (Graderío)	2,21	1,07	12,14	40,08	0,21	2,14	35,50	0,77	0,08	5,52	0,02	0,02	0,19	0,05
N-49	---	0,52	25,07	61,97	0,05	4,53	0,64	0,86	---	6,32	0,01	0,03	---	---

--- no determinado

Lámina delgada y microscopía petrográfica

Grande (Bailén)

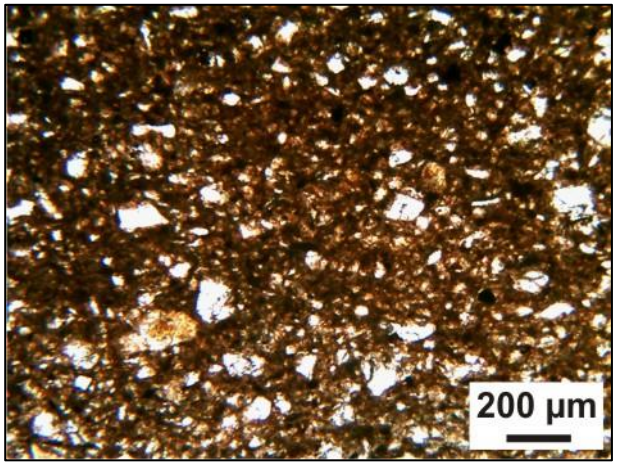


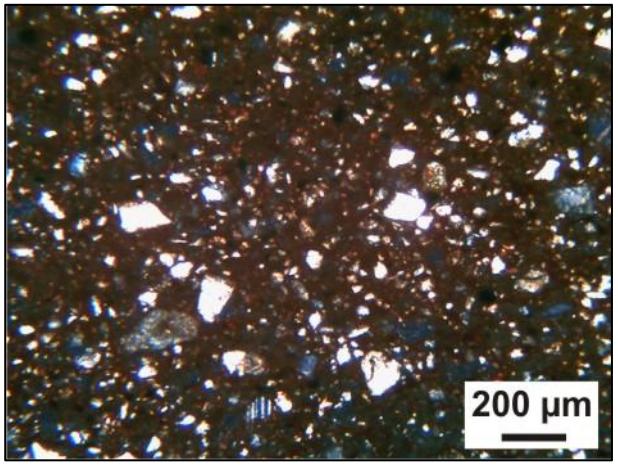


Inclusiones hasta ~400 µm

LP **NC**

Pequeña (Castillejo)

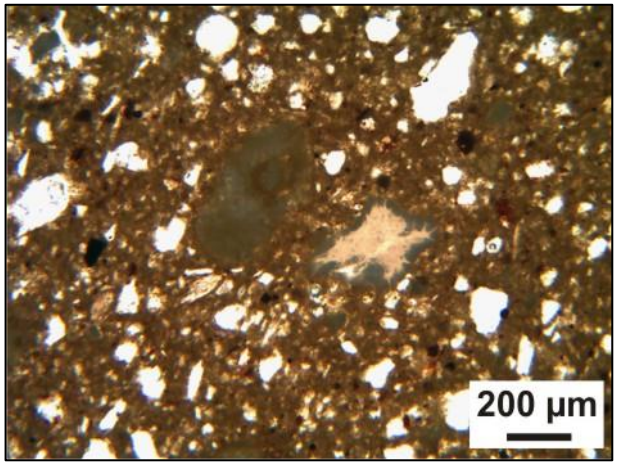


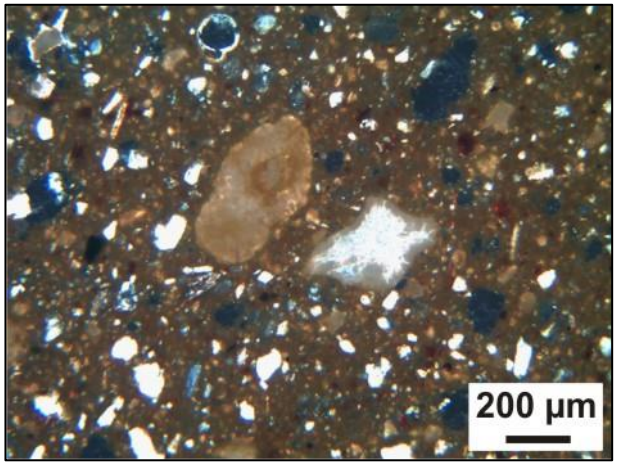


Inclusiones hasta ~350 µm

Lámina delgada y microscopía petrográfica

Otra (Graderío)

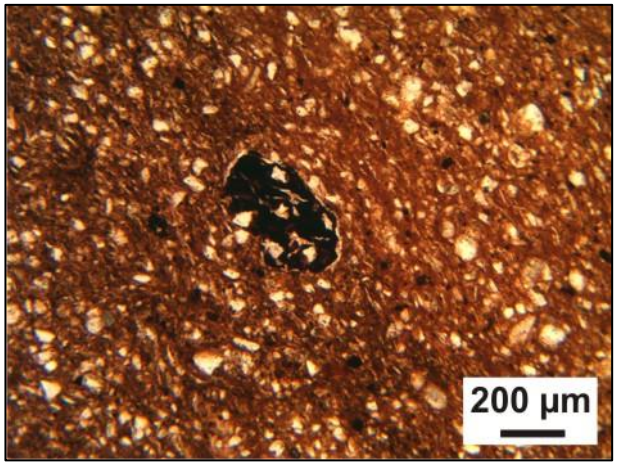


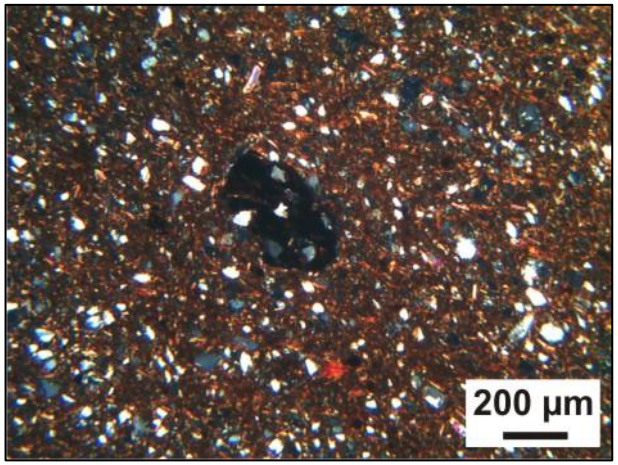


Inclusiones hasta ~900 µm

LP **NC**

N-49 (Numancia)

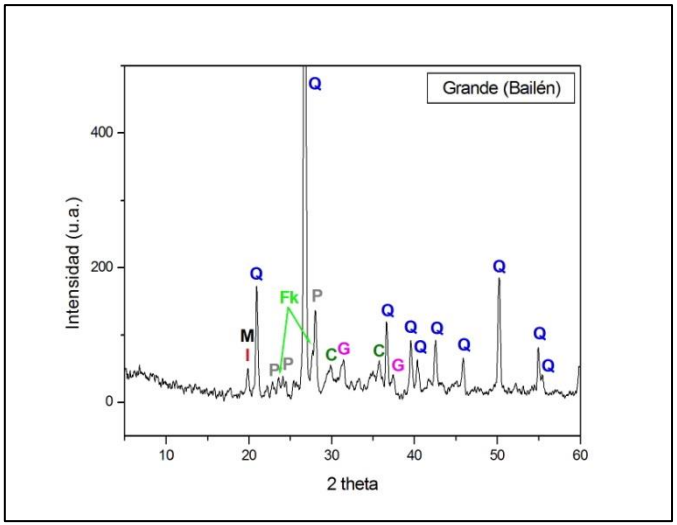




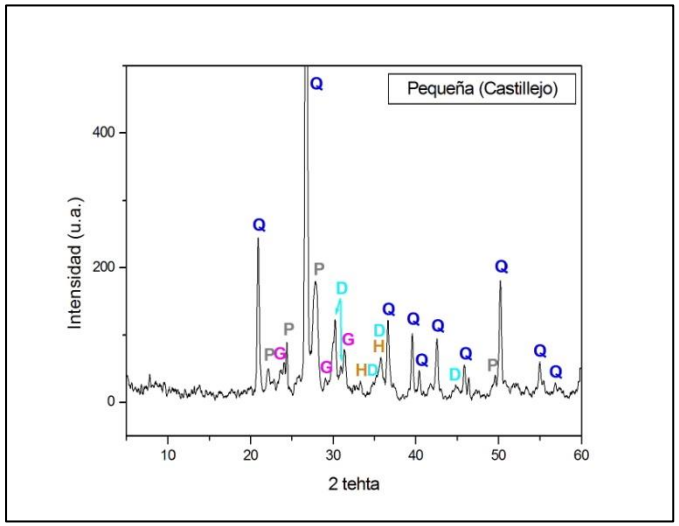
Inclusiones hasta ~500 µm

Difracción de rayos X (DRX)

Grande (Bailén)



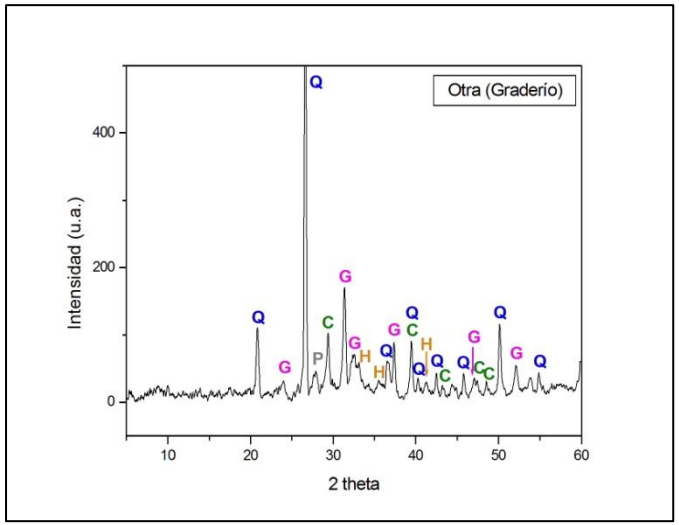
Pequeña (Castillejo)



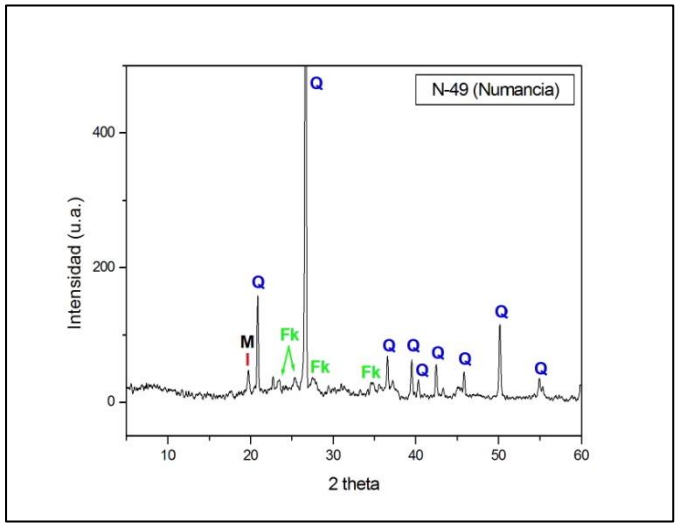
Firing temperatures ~940 °C

- **C** Calcita
- **D** Diópsido
- **Fk** Feldespato potásico
- **G** Gehlenita
- **H** Hematita
- **I** Illita
- **M** Mica
- **P** Plagioclasa (feldespato sódico)
- **Q** Cuarzo

Otra (Graderío)



N-49 (Numancia)



Firing temperatures ~940 °C

C Calcita
Fk Feldespato potásico
G Gehlenita
H Hematita
I Illita
M Mica
P Plagioclasa (feldespato sódico)
Q Cuarzo

Porosimetría de intrusión de mercurio

Muestra	Porosidad total (%)	Intervalo presión (psi)	Intervalo tamaño de poros (µm)	CaO (% peso)
Grande (Bailén)	36,79	1,19 - 29.852,66	0,007 – 178,759	12,36
Pequeña (Castillejo)	37,91	1,37 – 29.989,88	0,007 – 155,939	11,59
Otra (Graderío)	40,21	44,33 – 29.458,14	0,007 – 191,004	35,47
N-49 (Numancia)	31,67	43,42 – 29.535,31	0,007 – 4,913	0,64

Datos y resultados preliminares

Sonómetros

CARACTERIZACIÓN ACÚSTICA