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Paloma Vidal-Matutano, Auréade Henry, Isabelle Théry-Parisot, Bertila Galvan. Disentangling scattered charcoal assemblages for palimpsest dissection: Spatial analyses from El Salt Stratigraphic Unit Xb (Eastern Iberia). Ethnoarchaeology of Fire Symposium, La Laguna, Tenerife, Spain, 9-12 février, Feb 2017, La Laguna, Spain. 2017. hal-02102728

**HAL Id: hal-02102728**

**<https://hal.science/hal-02102728>**

Submitted on 3 Apr 2020

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# Disentangling scattered charcoal assemblages for palimpsest dissection: Spatial analyses from El Salt Stratigraphic Unit Xb (Eastern Iberia)

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## INTRODUCTION

Hearth-related accumulations are a common feature in Palaeolithic sites and their spatial characterization is fundamental to recognizing cultural processes involved in the formation of archaeological sites [1].



Charcoal analyses from Palaeolithic sites must take into account the palimpsest-like nature in order to provide significant implications for understanding firewood use and management by hunter-gatherer groups.

### scattered vs. concentrated charcoal

Concentrated	Last firewood collecting actions
Scattered	Not linked to a particular practice

Can we assess the possible origin of scattered charcoal assemblages?

## STATE OF THE ART

### Micromorphological studies:

- Black layers from combustion features could be linked with preceding activities [2]

### Experimental studies:

- Anatomical alterations on charcoal by fungal activity visible after combustion [3]

### Archaeological studies:

- Evidence of Neanderthal dead wood gathering applying the observation of fungal decay patterns and the fragmentation degree on charcoal [4]



Towards our better understanding of scattered charcoal assemblages:

spatial data & charcoal

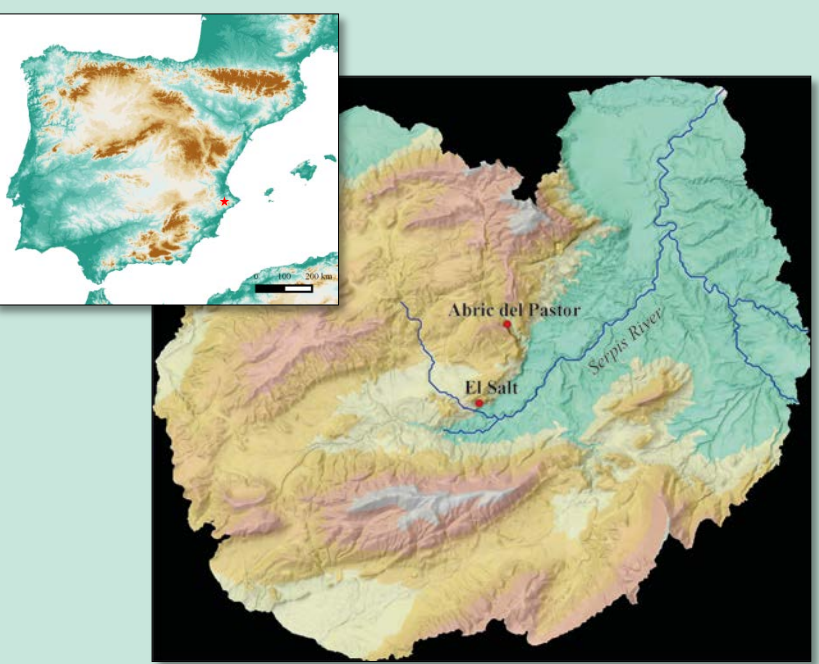
- How are charcoal size-classes spatially distributed?
- How are Alteration Levels (progressive intensities of fungal alteration) spatially distributed?

## MATERIAL & METHODS

1

### Geographical setting

**El Salt** (MIS 3) is a rock shelter located in Alcoy (Alicante, Eastern Iberia), a region with numerous valleys and natural corridors.

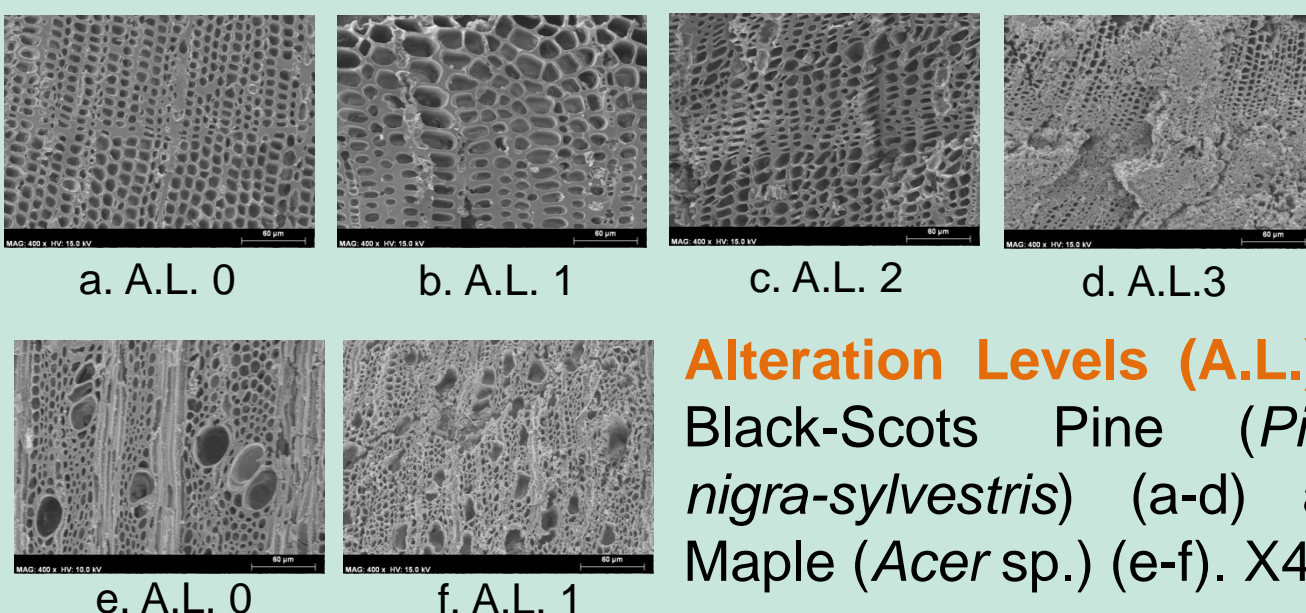


3

### Botanical identification & fungal decay patterns analysis

6 m<sup>2</sup> sampled area

2094 charcoal fragments



Alteration Levels (A.L.) in Black-Scots Pine (*Pinus nigra-sylvestris*) (a-d) and Maple (*Acer sp.*) (e-f). X400.

2

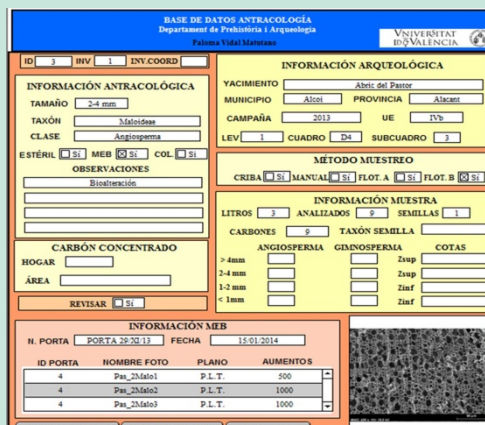
### Charcoal sampling



**Systematic soil sampling** of the entire excavated surface was conducted for water flotation to separate macrobotanical remains from sediments using meshes of 1 and 0.2 mm. The samples were air-dried separating the flotation residue from the large residue [5].

4

### Charcoal spatial analysis



Anthracological data was recorded in a **Filemaker Database**. Charcoal density was calculated using **GIS software** (*Quantum GIS v.2.10.1* "Pisa") from the total of wood charcoal fragments per 50 x 50 cm excavation units (0.25 m<sup>2</sup>).

## CONCLUSIONS

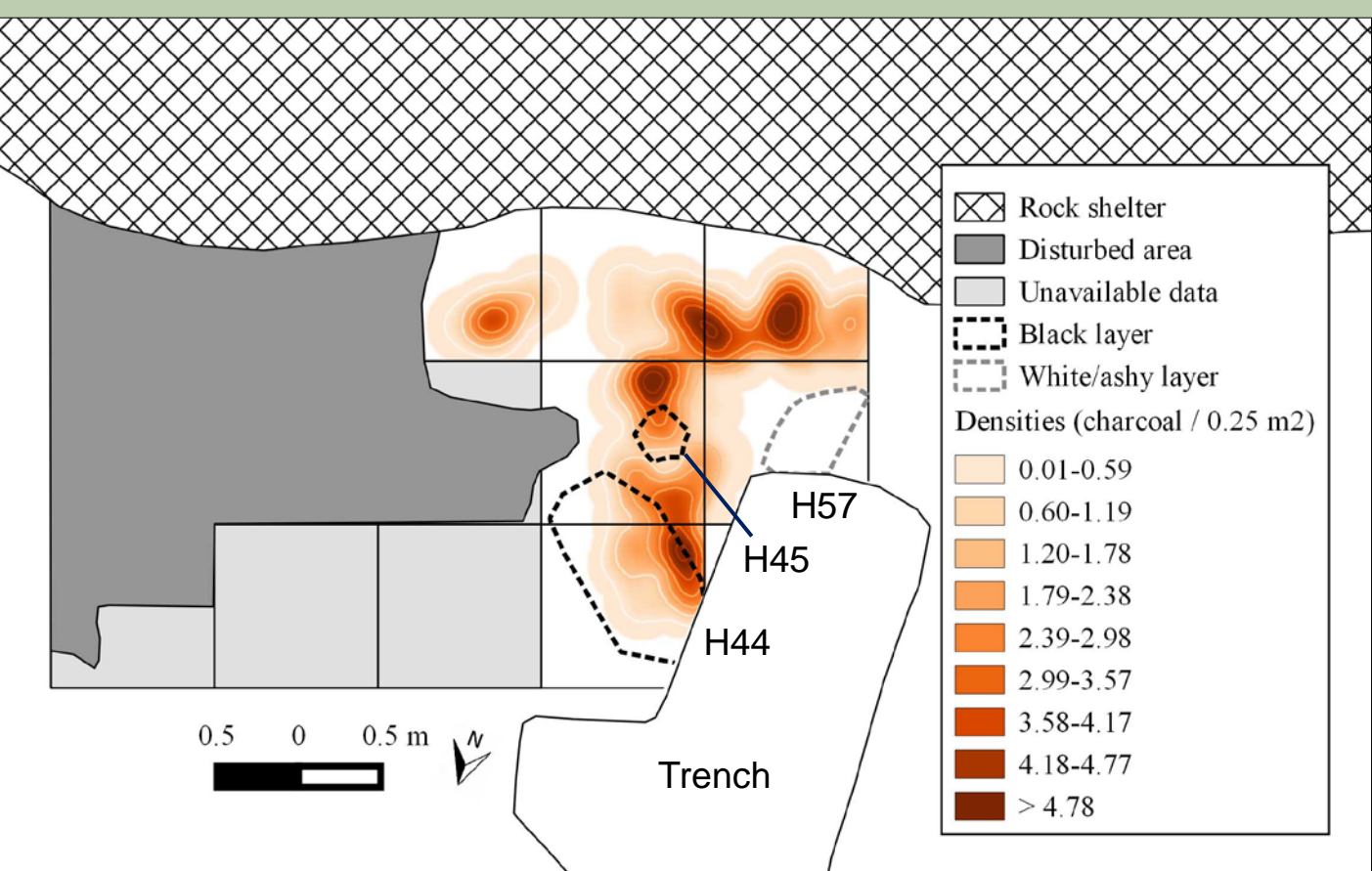
- Spatial analysis is a promising tool for **charcoal density** and **taxa distribution** visualization.
- GIS applied on charcoal distribution by size-classes and fungal Alteration Levels can provide further insight into the nature of the **last firewood used in combustion features**.
- Charcoal assemblages from black layers and scattered contexts should be spatially analyzed to obtain a more holistic **understanding of palimpsest deposits**.

## RESULTS & DISCUSSION

### Charcoal size plotting

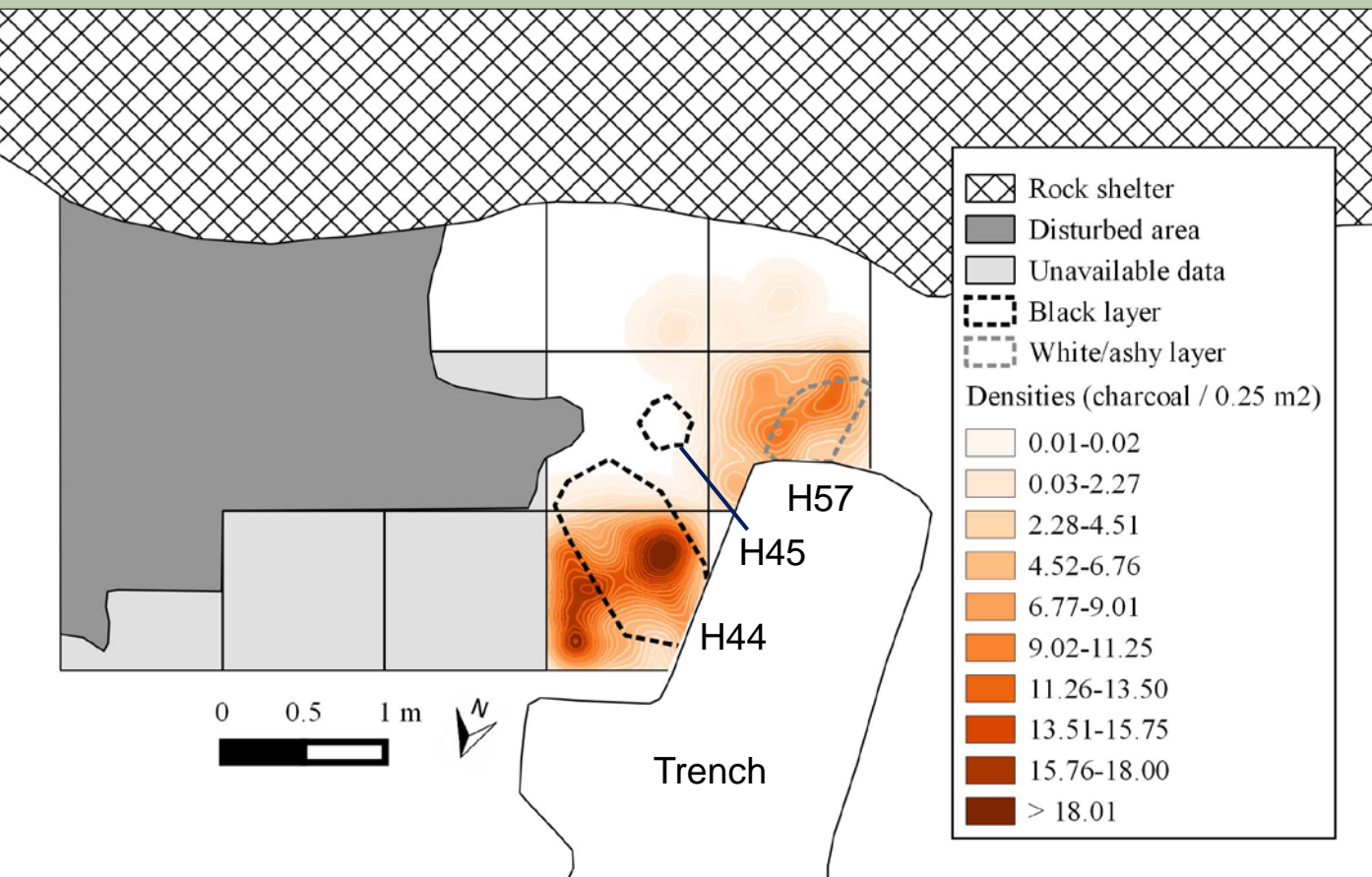
A differential spatial pattern by charcoal size-classes is observed. **Larger fragments** (> 4 mm & 2-4 mm) are spatially distributed **around feature H57**, while **smaller charcoal remains** (1-2 mm & < 1 mm) are concentrated **inside and close to the combustion features**.

#### Larger fragments (> 4 mm & 2-4 mm)



Could the spatial location of the larger charcoal remains be related to **social practices linked to feature H57** (hearth cleaning and management)?

#### Smaller fragments (1-2mm & < 1 mm)

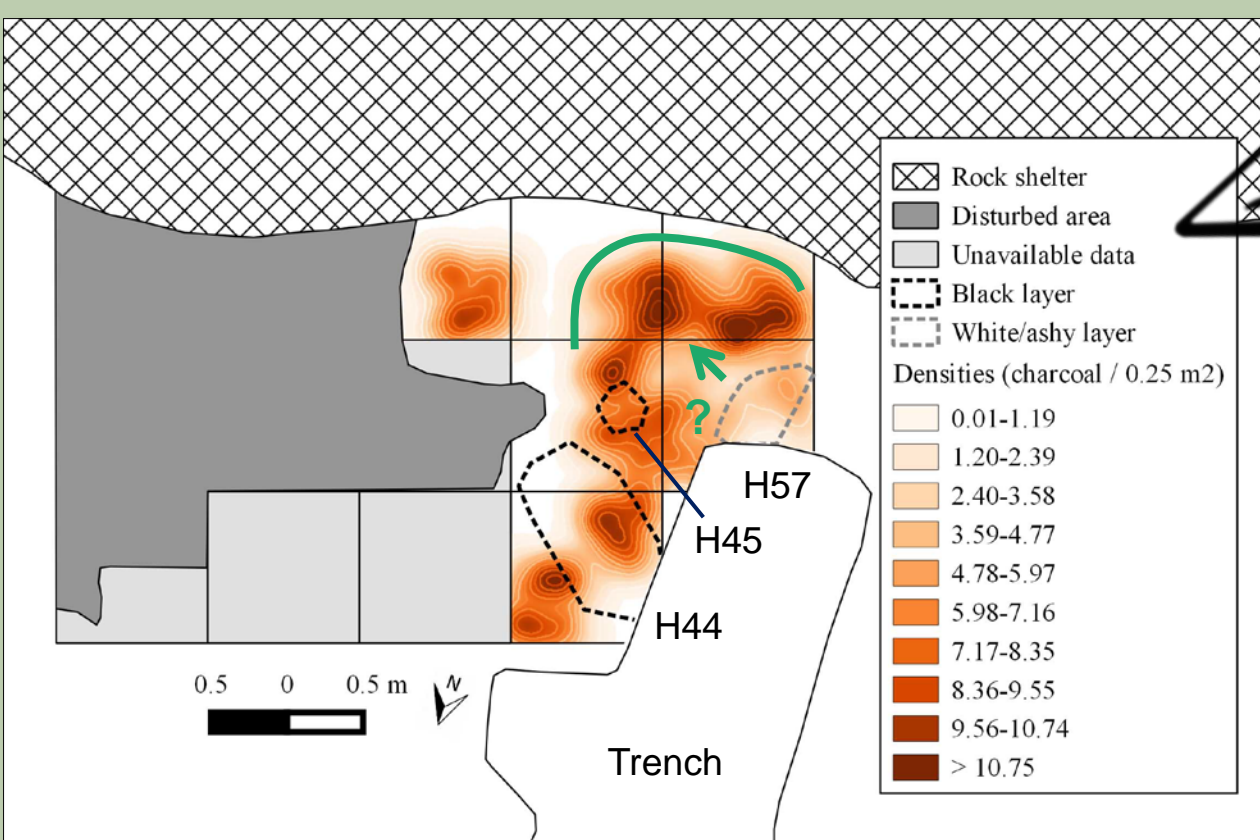


Could the concentration of the smallest remains be due to **charcoal fragmentation derived from fire processes** (H57 and H44)?

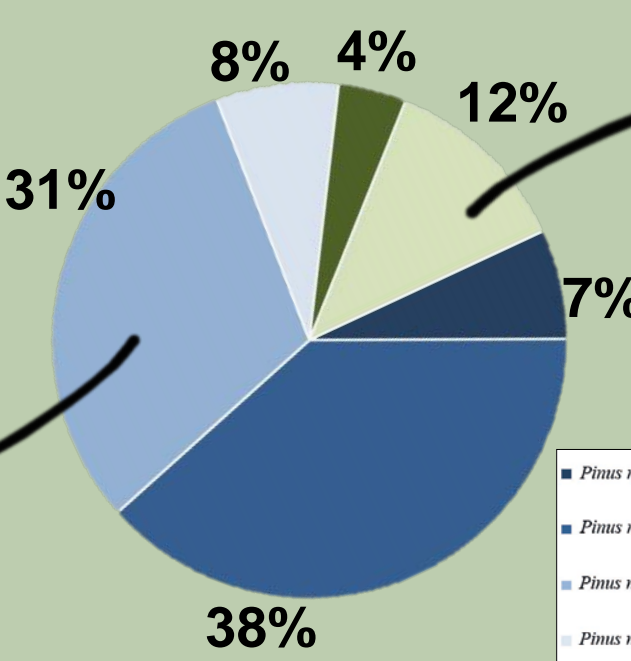
### Fungal alterations plotting

**S**patial distribution of degraded *Pinus nigra-sylvestris* and *Acer sp.* scattered fragments could be linked to its **spread from feature H57**.

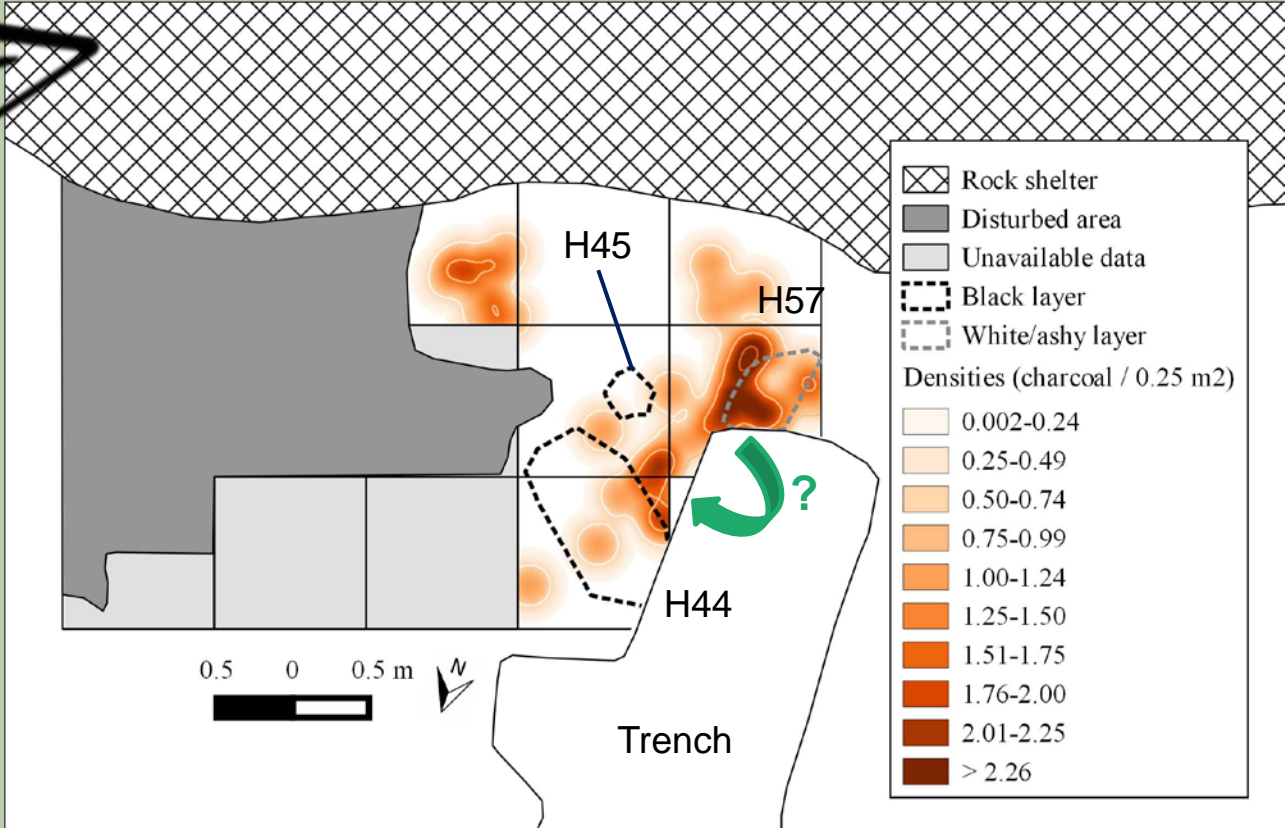
#### *Pinus nigra-sylvestris* charcoal remains Alteration Level 2



#### H57 firewood remains



#### *Acer sp.* charcoal remains Alteration Level 1



Charcoal fragments from **black layers** of features H44 and H45 may be deposited during **previous combustion events** (e.g. H57)

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## ACKNOWLEDGEMENTS

This work was carried out as a component of a Ph.D Dissertation at the University of Valencia with the financial support of a VALi+d pre-doctoral grant (ACIF/2013/260). Archaeological research at El Salt was funded under the Spanish Government projects HAR2012-32703, HAR2015-68321-P and Direcció General de Cultura (Conselleria d'Educació, Cultura i Esports, Generalitat Valenciana). Microscopic characterization of fungal decay patterns on El Salt charcoal fragments was performed during a research stay at the CEPAM (Nice, France) under the supervision of I. Théry-Parisot.