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

Paloma Vidal-Matutano<sup>1,2</sup>, Auréade Henry<sup>2</sup>, Isabelle Théry-Parisot<sup>2</sup>, Bertila Galván<sup>3</sup>

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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



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:

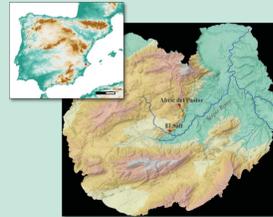
spatial data & charcoal

- 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.



### 2 Charcoal sampling

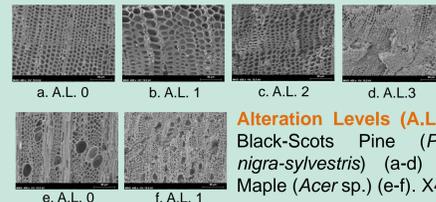


Systematic soil sampling of the entire excavated surface was conducted for water flotation to separate macrobotanical remains from sediments using meshes of 1 and 0.2 mm. The samples were air-dried separating the flotation residue from the large residue [5].

### 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.

### 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

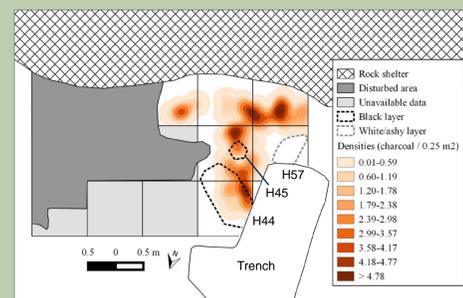
- Spatial analysis is a promising tool for charcoal density and taxa distribution visualization.
- GIS applied on charcoal distribution by size-classes and fungal Alteration Levels can provide further insight into the nature of the last firewood used in combustion features.
- Charcoal assemblages from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

## RESULTS & DISCUSSION

### Charcoal size plotting

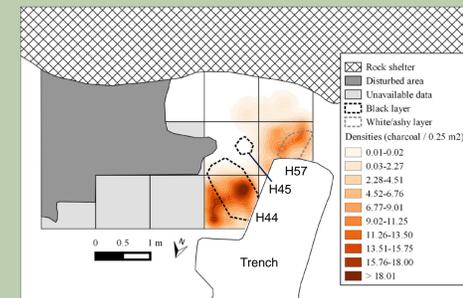
A differential spatial pattern by charcoal size-classes is observed. Larger fragments (> 4 mm & 2-4 mm) are spatially distributed around feature H57, while smaller charcoal remains (1-2 mm & < 1 mm) are concentrated inside and close to the combustion features.

#### 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)

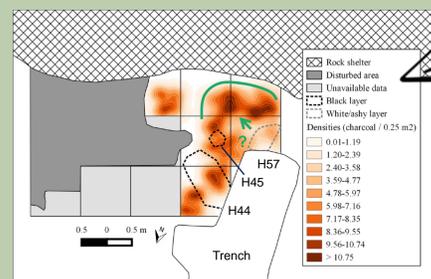


Could the concentration of the smallest remains be due to charcoal fragmentation derived from fire processes (H57 and H44)?

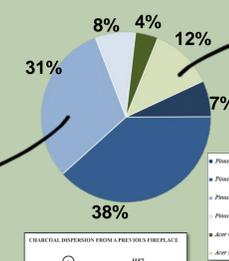
### Fungal alterations plotting

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

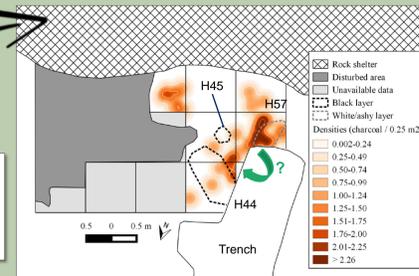
#### *Pinus nigra-sylvestris* charcoal remains Alteration Level 2



#### 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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