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# Human Land Use Strategies in a Mediterranean Mid-Mountain Landscape (Montseny Massif, Barcelona). Analysing Human Landscape Impact through Archaeological and Geomorphological Analysis

Landscape archaeology; sedimentology; settlement patterns; field systems.

## Introduction

The main purpose of this research is to study the origin and the diachronic dynamics of cultural landscapes in Mediterranean mid-mountain areas, as a result of human-environmental interactions. First results from a case study in the Montseny Massif, a pre-littoral mountain range in the region of Barcelona, are presented. Nowadays, this area is characterized by intensive agricultural and industrial land-use which has provoked large changes to historical landscape morphology. A diachronic, interdisciplinary and multi-scale approach has been developed in order to identify settlement patterns, agrarian terraces, land use, environmental changes and sedimentary processes.

The research project has been developed by the Research Group in Landscape Archaeology (GIAP) at the Catalan Institute of Classical Archaeology (ICAC, Tarragona).

In this interdisciplinary study, human landscape impact in a micro-regional area has been analysed with the aim of establishing human-environment interactions and their traces in the archaeological and sedimentary record. The topography of the area had to be taken into account; it is characterized by gentle slopes resulting from marked spring and autumn rainfall seasons.

The project has focused the fieldwork in the micro-regional Samalús area, at the foothills of Montseny massif, close to the pre-littoral plain (Vallès basin). Nowadays, this area is characterized by a mixture of farmland, forest and scattered settlement. Although the area is not largely urbanized, the historical landscape forms are affected by the changes introduced by the mechanization of farming. Therefore, a number of small terraced areas have become major fields. We can find the ancient morphology preserved inside today's forested areas.

The study has been structured in two main phases:

In the first one, a digital archaeomorphological analysis has been correlated with historical and archaeological data in order to characterize the historical road network and territorial organization, together with settlement evolution and landscape dynamics in Roman times.<sup>1</sup>

1 Flórez 2010.

In the second phase, landscape shaping in the Samalús area has been analysed, integrating archaeological work in agrarian terraces<sup>2</sup> and geomorphological and sedimentological analysis.<sup>3</sup>

## Materials and Methods

Written sources, archaeological, sedimentological and palaeoenvironmental data have been integrated into a GIS environment.<sup>4</sup> A critical review of previous archaeological studies<sup>5</sup> and of the Vallès oriental archaeological inventory has been carried out in order to define the current status of archaeological research in the studied area. Old maps, aerial photographs, written documents and field surveys have been studied and/or carried out in order to define the landscape's historical morphology. This digital archaeomorphological analysis has been developed within a GIS environment. Aerial-photography and cartography (ancient and modern) have been analysed to restore the main axes that served as a road network.

Fieldwork included surveys and the excavation of trenches in agrarian terraces. Geological and geomorphological characterization of the slopes and terraces deposits and archaeological data has provided further information on the chronology and type of landscape changes. Archaeological structures and the excavation process have been modelled from photogrammetry, and a DEM model of the studied area has been created using GIS analysis. The anthracological study of charcoals from archaeological sites has given first indications of vegetation changes and forest resource exploitation by past human communities. Charcoals have been collected and provide eleven <sup>14</sup>C dates, improving our knowledge about the chronological evolution of human occupation and of erosion episodes.

## Preliminary Results

The studied sites allowed us to establish three phases in landscape shaping:

### First Phase (4th BC–3rd AD)

Intensive occupation of this inland area took place during the Iron Age, from the protohistoric to the imperial Roman period, with abundant archaeological remains (Fig. 1). Although there are some Neolithic and Bronze Age sites in the proximity, an Iberian 'Oppidum'—Puig Castell,<sup>6</sup> probably inhabited from the 4th century BC—is the first human settlement known in this sector.

The 2nd and 1st centuries BC are well represented by different structural remains and ceramic concentrations around the 'Oppidum' hill and also at different sectors of the studied area, with a more diffused presence of Iberian and Campanian pottery and Italic 'amphora.' These remains are correlated with the formation of a B horizon of a soil (caliche) that suggests warm and dry climate conditions for this period (Fig. 2).

The absence of the ceramic "Terra Sigillata" and of African pottery suggests that all these structures from the hill top and their base were abandoned during the 1st century BC.

2 Garcia, PhD thesis.

3 Lladó MSc thesis.

4 Flórez In press; Riera and Palet 2008.

5 Estrada and Villaronga 1967; Aquilue and Pardo 1990.

6 An excavation program of this site started last summer.

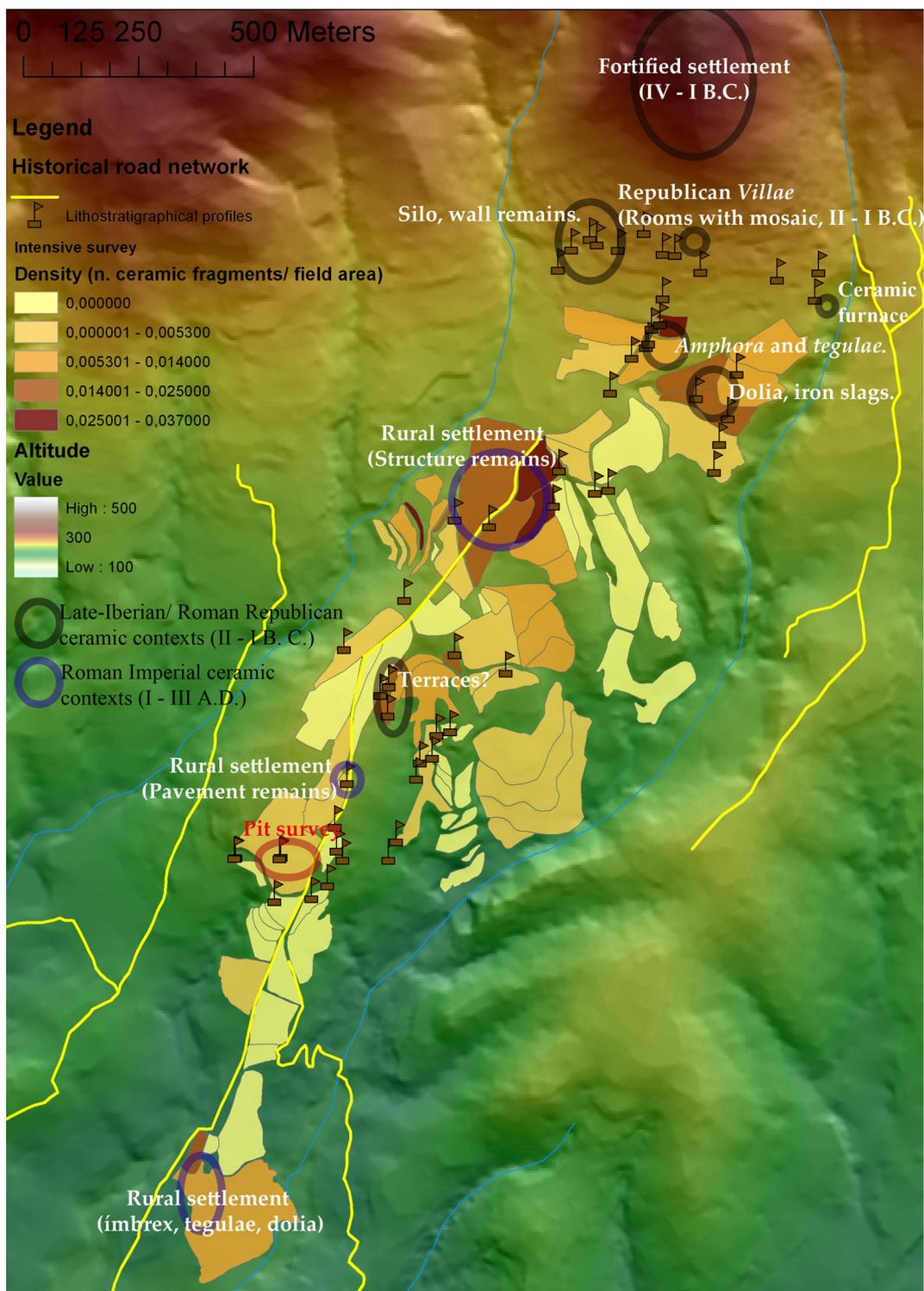


Fig. 1 | Iron Age archaeological remains.

Remains from the Early-Imperial Roman period are more scattered over the study area. Like the previous period, these archaeological remains are also associated to a B horizon soil. In fact, sedimentary processes suggest the continuity of the same conditions as the previous period, evidenced by the development of soils used for agrarian purposes. According to the archaeological data, change in the settlement pattern has been evidenced; however, a continuity (or an increase) of economic activities has been identified.

### Lithostratigraphical and archaeological profile example:

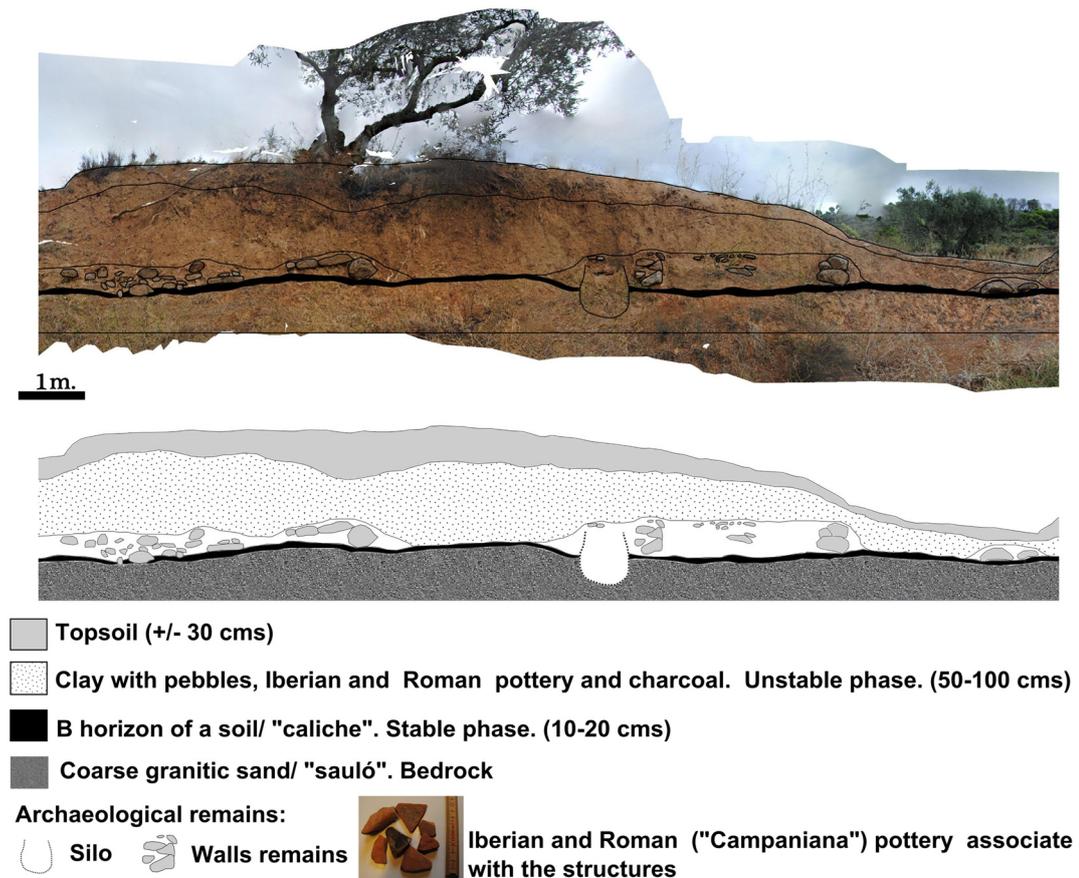


Fig. 2 | Lithostratigraphical and archaeological profile example.

The excavation of the agrarian terraces has shown that the deepest layers associated with the construction and use of these field systems might have been formed in this period. Our preliminary results suggest that two moments of construction (defined by different types of wall construction) can be related to different stratigraphic layers:

A first moment is associated to ancient Roman and Iberian pottery and radiocarbon dated at 370–155 cal. BC (Poz-44022)

A second moment is related to ancient material mixed with modern pottery and it is radiocarbon dated at 18th–19thC. Cal. AD (Poz-44020).

Therefore, the possible ancient origin of these field systems would be related to intensive agricultural activity attested with settlement patterns.

### Second Phase (Medieval)

Sediments covering Iron Age structures show different processes of erosion and deposition of alluvial sediments, possibly related to the destabilization of climatic conditions that occurred from the end of the Roman Period. Although some  $^{14}\text{C}$  samples from these sediments gave us ages from the 8th to 9th centuries cal. AD (Poz-45696), the Medieval period is poorly represented in the archaeological and stratigraphic records.

### Third Phase (17th – 20th AD)

Overlying these previous phases, the modern phase has been found. Written documents from the 18th and 19th centuries show the existence of cultivated agrarian structures in continuous transformation, at least from the end of the 17th century. According to the first archaeological and sedimentological results, all or most of the terrace walls, field systems and their associated sediments are related to this period.

Archaeomorphological analysis of the road network allowed us to define road traces preserved in the present-day landscape as eroded and deep paths and stretches. Although we do not know their chronology, they precede the modern road network and connect archaeological sites with the main Roman and Medieval road between the Roman towns of Barcino (Barcelona) and Ausa (Vic) (the “Congost Roman road”).

### Conclusion

From a methodological perspective, field data has to be the basis of archaeological work, allowing us to introduce new elements to the historical discourse. In addition, a multi-disciplinary approach, integrating data from different sources in a teamwork context, has accurately shown the environmental, climate and human shaping of the landscape.

Data collected in the study area allows us to propose an initial approach to different phases of this landscape shaping in which human and non-human factors have been involved:

- A phase of sedimentary stability contemporary to an intensive occupation dated on Iberian and Roman periods.
- A phase characterized by a hydro-sedimentary crisis has been related to the abandonment of the ancient settlement-agrarian system.
- The modern phase has been built directly on the remains of the first phase.

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