Journal of Archaeological Science: Reports xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

Journal of Archaeological Science: Reports

journal homepage: www.elsevier.com/locate/jasrep

Interpreting long-term use of raw materials in pottery production: An holistic perspective

Daniel Albero Santacreu

Departamento de Ciencias Históricas y Teoría de las Artes Facultad de Filosofía y Letras, Universitat de les Illes Balears, Campus UIB, Ctra. Valldemossa km 7.5, 07122, Balearic Islands, Spain

ARTICLE INFO

Article history:
Received 28 March 2015
Received in revised form 17 March 2016
Accepted 15 April 2016
Available online xxxx

Keywords:
Raw material exploitation
Pottery
Ceramic ecology
Functionalism
Landscape archaeology
Social theory of technology

ABSTRACT

Certain pottery-related resources may be exploited over a long time due to many different reasons. Hence, raw material collection can follow ecological, economic or functional concerns, as much as social and symbolic phenomena. The scope of these different theoretical perspectives is thus discussed to reach integrated and symmetrical explanations for the interpretation of raw material acquisition. This view is exemplified by the case study of the potters' communities inhabiting the Santa Ponsa area (Mallorca, Spain) during the Late Bronze Age and Iron Age. The evidence for the identification of the raw materials used is briefly explained by petrological, paleontological and chemical (XRF) characterisations of archaeological ceramics and clays from the area surrounding the site. Additionally, a discussion of the reasons leading to the prehistoric exploitation of certain kinds of clay through time is introduced, by considering the theoretical models of ceramic ecology, functionalism, and the combination of landscape archaeology and the social theory of technology.

1. Introduction

Archaeometric research is frequently focused on the composition of pottery to identify the raw materials used for the manufacture of different artefacts. Even though most studies aim at identification, they do not tend to consciously and explicitly consider the reasons and significance raw material exploitation had for past societies. In the few cases where this has been discussed, cultural ecology has been followed (e.g. Vaughn and Neff, 2004; Capelli et al., 2006; Maritan et al., 2005; Martineau et al., 2007) or, occasionally, the physical qualities of the materials involved (e.g. Wieder and Adan-Bayewitz, 1999; Fernández Navarro, 2008). However, a number of ethnoarchaeological works (e.g. Gosselain and Livingstone-Smith, 2005; Neupert, 2000; Stark et al., 2000) have already thrown light on the complex social dynamics embedded in raw material management.

This paper explores several useful perspectives to interpret the selection of mineral raw materials. It basically deals with three theoretical views: firstly, the cultural ecology perspective; secondly, the functionalist approach; and, finally, a sociocultural explanation, where concepts from landscape archaeology are combined with the social theory of technology. These theories are further exemplified in the analysis of Late Bronze Age and Iron Age potters' societies inhabiting western Mallorca (Spain).

This proposal aims to develop a holistic perspective by combining several views on raw material management so as to reach a more balanced and symmetrical explanation of the complex reality of past societies (see Albero, 2014). It is not the intention, however, to postulate the existence of a single answer or absolute truth to interpret the reasons for the extensive management of any particular clay material. Quite the contrary, it focuses on presenting an even and integrated position of several theoretical positions to reach an inclusive view of this phenomenon and of the agents participating in it. Consequently, it should be noted that the selected theories are here individually presented for two reasons. Firstly, they were originally developed independently, in different moments and responding to alternative archaeological research problems and questions. Secondly, the general aim of this article – as well as promoting a holistic perspective for this phase of the *chaîne opératoire* – is to stimulate theoretical reflection and discussion in the field of pottery technology, particularly regarding raw material management. Hence, it is more efficient and didactic to discriminate between the varied interpretations each of these theories can offer.

2. Case study: evidence and problem

The theoretical discussion presented above is here exemplified in a clearly defined case study focused on the sedimentary area of the Calvià Peninsula in southwestern Mallorca (Fig. 1), which contains several well-documented Bronze and Iron Age archaeological sites. Human settlement in this area over the past ca. 3000 years was organised around the prehistoric fortified site of Puig de Sa Morisca, located on a hill next to Santa Ponsa Bay, some 700 m from the shore. Puig de Sa Morisca has a long occupation from the Late Bronze Age (ca. 1200–850 BCE) to modern times. The site functioned as a visual reference for sailors

E-mail address: d.albero@uib.es.

http://dx.doi.org/10.1016/j.jasrep.2016.04.008
2352-409X/

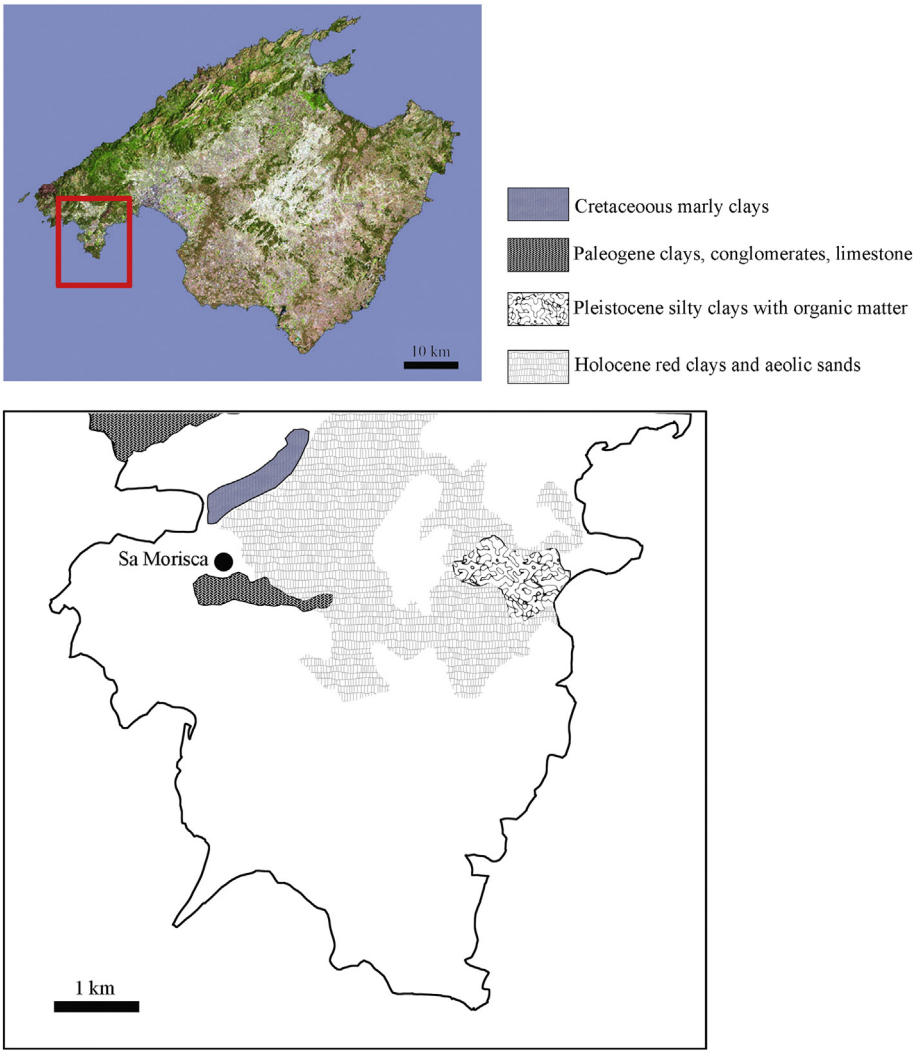

Fig. 1. Map of the study area with the location of the Puig de Sa Morisca and clay sources from the different geological deposits in the area (source: IGME, 1958; ITGE, 1991).

travelling from the island of Ibiza to Mallorca as well as for coastal trade along the south coast of Mallorca (Calvo et al., 2011). Archaeological findings such as a Phoenician arrowhead and scarab indicate that residents participated in some of the earliest contacts with the Phoenicians, between 900 and 790 BCE (Guerrero et al., 2002; Guerrero et al., 2007). The strategic role of the archaeological site was maintained in the transition between the Bronze and Iron Ages, when a tower (Tower III) was constructed on top of the hill (ca. 800–400 BCE) for a commanding view of the surrounding countryside, including the sea. Another tower (Tower I) was later constructed on the northeastern face of the hill. Prior to its construction, part of the hill was levelled ca. 800–540 BCE. The tower was occupied between 510 and 410 BCE, according to ^{14}C dating of animal bone and the presence of Attic pottery. During this time, residents of Puig de Sa Morisca were in contact with the Phoenician colony of Ebusus, on the nearby island of Ibiza. The use of the tower as a defensive structure seems to have been neglected at the beginning of the 4th century BC, coinciding with the decline of imported Punic material in the area. In fact, the structure was later modified into a domestic space ca. 400 BCE. According to the ceramic materials found there, the final abandonment of this tower may be dated to ca. 325 BCE (Guerrero et al., 2002).

The territory related to Puig de Sa Morisca extends across ca. 3500 ha of mountain topography and intervening valleys. The area is crossed by a well-defined mountain range which extends to the sea. Broad valleys between the hills are filled by a wide range of sedimentary calcareous clay deposits which cover Cretaceous, Tertiary, and Quaternary sedimentary formations (Fig. 1). The geological diversity of the clay resources in the area corresponds to specific sedimentary depositional environments, with distinctive qualities, composition, and plasticity (see García Rosselló and Albero, 2011; Albero and Mateu, 2012; Albero, in press).

Published pottery analysis for the materials recovered from the coastal site of Puig de Sa Morisca (Mallorca, Spain) indicates that potters favoured local Tertiary Palaeogene clays during almost the 900 years ranging from the Late Bronze Age (c. 1200 BCE) to the Late Iron Age (c. 325 BCE) (Albero 2011: 564; Albero and Mateu, 2012). Multiple lines of evidence support the relationship between the pottery found at the site and the clays sampled in these deposits, located in a restricted area of the territory (Fig. 1). The use of these clays was demonstrated to be independent from the recipes used for paste preparation or from ceramic form.

As already mentioned, there is a clear correspondence between the clays analysed and the pottery from this site in terms of their petrological and chemical composition. X-ray fluorescence analysis verified that Tertiary clay presents a chemical composition defined within the intervals set for the main reference paste group found at Sa Morisca (Table 1), particularly in terms of MgO, Al_2O_3, SiO_2, TiO_2, Fe_2O_3 and Zr concentrations (Albero, 2011: 569). Notwithstanding the kind of temper added to the paste (e.g. sparry calcite), the mineralogical composition of the several petrological groups identified at the site remained

Please cite this article as: Albero Santacreu, D., Interpreting long-term use of raw materials in pottery production: An holistic perspective, Journal of Archaeological Science: Reports (2016), http://dx.doi.org/10.1016/j.jasrep.2016.04.008