

Geoarchaeological approaches for geomorphological and paleoenvironmental reconstruction during the Middle Paleolithic: Insights from the Vinalopó Valley (Alicante, SE Spain)

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Introduction

The integration of archaeological and geological methods is crucial for studying human activity, landscape evolution, and the use of resources in the past. This approach highlights the link between human presence and geomorphological and sedimentological processes, offering insights into environmental changes and hominin adaptations.

This study deals with the Middle Paleolithic sites of Los Aljezares and La Coca, open-air settlements in the Vinalopó valley, Aspe (Alicante), SE Spain. Both sites are associated with Quaternary deposits of the Vinalopó River system where significant lithic assemblages have been studied. However, a better understanding of their depositional and paleoenvironmental context is needed through geomorphological reconstruction.

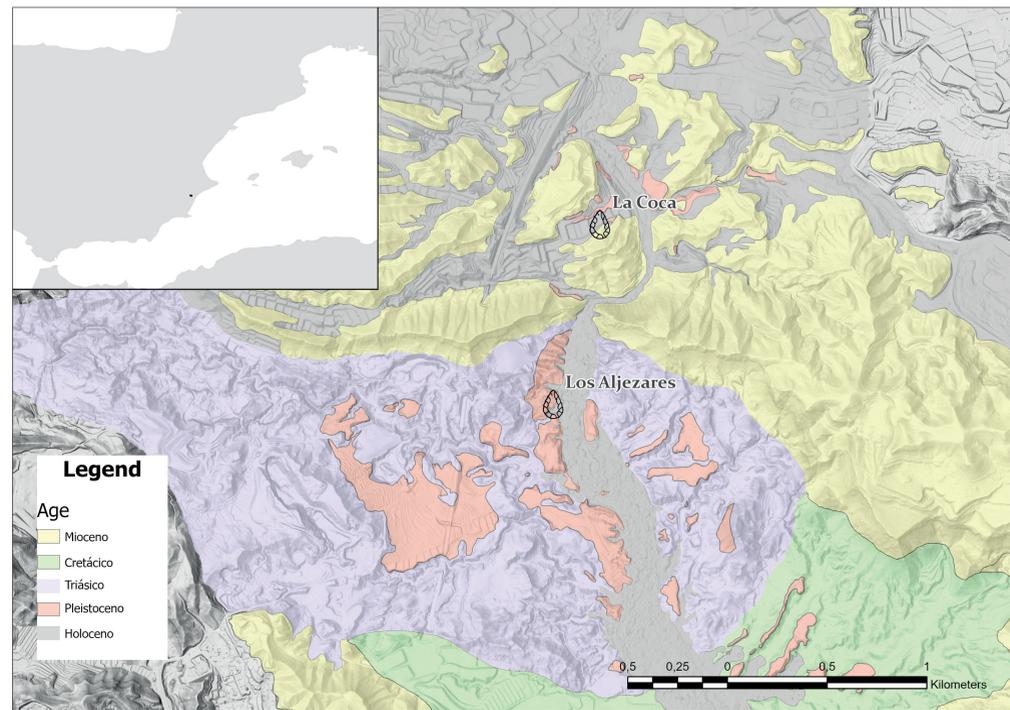


Figure 1. Geological mapping of the study area. The Miocene materials contain conglomerates where flint pebbles from other regions are found, which were later incorporated into the Pleistocene age materials from where they were easily exploitable for tool making. Modified from Civieta et al. and Eixea et al.

Methods

In this study, detailed geomorphological and geological mapping were carried out to reconstruct the depositional evolution of the Pleistocene sediments containing the archaeological record; geological data and geomorphological interpretation were integrated into the archaeological interpretation to enhance understanding, particularly at the La Coca site, where findings were based on surface collections.

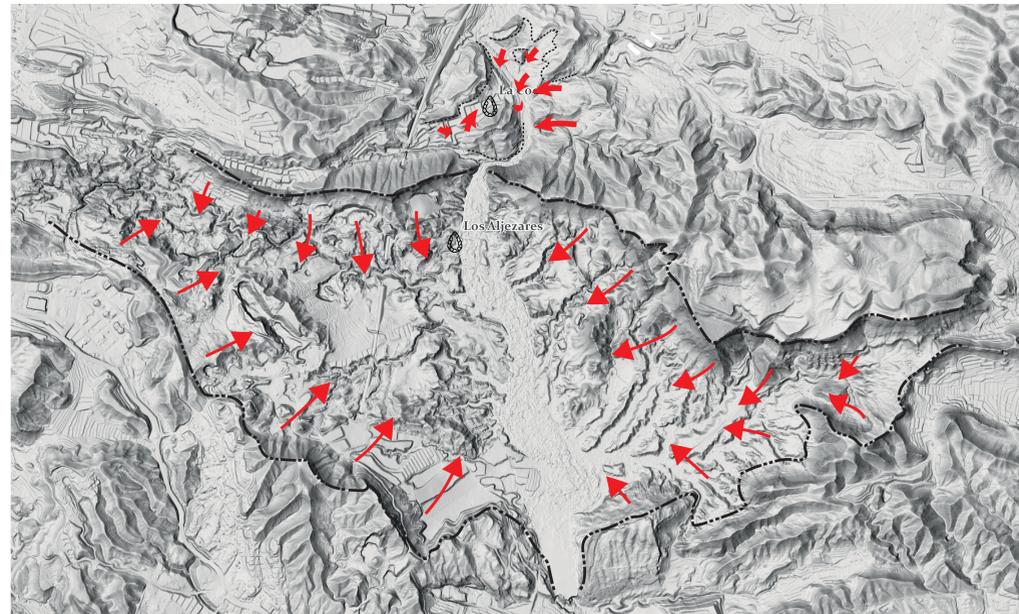


Figure 2. Relief shading map on which the boundaries (in black dashed line) of the two small watersheds discussed in this study have been drawn. The red arrows indicate the approximate direction of the Miocene materials that were being dismantled to form part of the Pleistocene sediments where the Los Aljezares and La Coca sites are located. The lithologies of the Miocene flint cobbles and those found in the Pleistocene sediments are coincident, so the simplest explanation is that this is their original source.

Results and Discussion

- Los Aljezares and La Coca sites were likely part of small, connected semi-endorheic basins with fluvio-lacustrine deposits, alluvial fans, and colluvial sediments during the Upper Pleistocene.
- The ancient fluvio-lacustrine system, now eroded by the Vinalopó River, points to a past highstand stage, indicating a significantly different base level and landscape compared to today.
- A contrast exists between the well-excavated “Los Aljezares” site and the “La Coca” site, known only from surface finds. However, integrating geological data helps understand La Coca’s formation and suggests a similar geological evolution.
- Comparing the sites showcases the benefits and challenges of integrating geological and archaeological data.
- Recognizing similar basin infilling stages at both locations suggests a shared geological evolution, highlighting the importance of understanding their connections despite differences in data quality.



Figure 3. Aerial image of “Los Aljezares” site showing the Quaternary deposits where lithic industry has been found together with uncut flint cobbles from the clearing of the Miocene materials. The highest reliefs in the image are formed mainly by Miocene materials, which are more resistant to erosion than the others in this area.

Conclusions

The geoarchaeological analysis of the Los Aljezares and La Coca sites has allowed us to reconstruct the common geological evolution of both sites, giving us a better view of the paleoenvironment and the lithic raw material supply areas.

The erosion of Miocene materials would be the source of most of the flint associated with human activity due to its proximity for provisioning, as well as its good quality for manufacturing lithic tools.

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