

---

# Site formation and use of wetland plant resources in the Mesolithic occupations of La Fragua Cave (Cantabria, Spain).

Sara Núñez\*<sup>†1</sup>, Carlos D. Simões<sup>2</sup>, Roberto Suárez-Revilla<sup>1</sup>, Igor Gutiérrez-Zugasti<sup>1</sup>, Manuel González-Morales<sup>1</sup>, and Pablo Arias<sup>1</sup>

<sup>1</sup>Instituto Internacional de Investigaciones Prehistóricas de Cantabria [Santander] (IIIPC) – Edificio Interfacultativo Avda. de los Castros,s/n Tel. 942 202090 E-39005 Santander Cantabria, Spain

<sup>2</sup>Interdisciplinary Center for Archaeology and Evolution of Human Behaviour. (ICArEHB) – Portugal

## Abstract

La Fragua is a small cave on a vertical cliff at ~130 m directly above the shoreline of the Bay of Biscay, in northern Spain, with Upper Paleolithic and Mesolithic occupations, separated by stratigraphic layer 3, radiocarbon dated to 10 000 cal BP. Layer 3 is a distinct and exogenous deposit of algal carbonate mud rich in marine organisms, closely packed with phosphatic bird guano, non-edible small crustaceans and gastropods, and an outstanding presence of *Phragmites* sp. pollen. The deposit exhibits micromorphological signatures of structural compaction and is located at the base of a Mesolithic succession of lenses corresponding to combustion features, where fibrous charred organic matter, resembling grassy material, is recognizable along with algal sedimentary materials. The hypothesis of the grassy material being linked with the wetland reed pollen identified is addressed combining micromorphological, palynological and malacological data. This interdisciplinary micro-contextual approach allowed to characterise the functionality of the Mesolithic fires at the site. This hypothesis implies behaviourally relevant aspects suggesting activities like site maintenance, reuse of hearths and middening. The use of such wetland resources furthermore reflects coastal adaptations of the early Holocene hunter-gatherers, besides the shellfish exploitation widely documented for the Cantabrian Mesolithic, in a moment of sea level rise, when the coastal wetlands were starting to develop in the surroundings of La Fragua cave.

**Keywords:** Shell midden, archaeobotany, micromorphology, pollen, malacology

---

\*Speaker

<sup>†</sup>Corresponding author: sara.n.delafuente@gmail.com