
Stable oxygen isotope analysis and the seasonal exploitation of *Patella depressa* Pennant, 1777 during the Mesolithic in the Cantabrian region (N Iberia)

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Abstract

Investigations conducted during last few decades in the Cantabrian region (N Iberia) have greatly increased our knowledge in relation to littoral resources exploitation patterns during the Mesolithic period (ca. 10,500 - 6,700 cal BP). Stable oxygen isotope ratios ($\delta^{18}O$) can act as powerful recorders of the seasonal seawater temperature variations experienced by a mollusc in the past, enabling us to accurately establish the period of the year when it died/was collected by humans. Recent studies applying this methodology to mollusc shells have allowed us to properly determine seasonal exploitation patterns of the topshell *Phorcus lineatus* (da Costa, 1778) and the limpet *Patella vulgata* Linnaeus, 1758 in the Cantabrian region. Results obtained so far have reported differences collection strategies depending on the species, with *P. lineatus* collection patterns being driven by a cost-benefit principle. However, while the limpet, *Patella depressa* Pennant, 1777 is one of the most common mollusc species found in Holocene archaeological assemblages along the Atlantic façade of Europe, seasonal collection patterns in relation to this species have been under-studied. Here, we apply stable oxygen isotope analyses to *P. depressa* shells recovered from the shell midden site of El Mazo cave (Asturias, Spain) to determine if there are seasonal patterns in its exploitation by humans. We also undertake a modern experimental programme, collecting *P. depressa* individuals all year round from N Iberia, in order to establish whether the observed seasonality (if any) is caused by cost-benefit principles or other cultural factors. The results obtained allow us to better understand patterns of littoral resource exploitation and overall subsistence of some of the last specialized hunter-fisher-gatherers in western Europe.

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