



Retention of hunter–gatherer economies among maritime foragers from Caleta Vitor, northern Chile, during the late Holocene: evidence from stable carbon and nitrogen isotopic analysis of skeletal remains

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ABSTRACT

On the basis of stable carbon and nitrogen isotope analysis of human remains, this paper provides evidence for the retention of hunter–gatherer economies among coastal inhabitants in northern Chile during the late Holocene – at the same time that inland populations were adopting agricultural economies. Coastal diets from the Caleta Vitor region of the Atacama Desert were dominated by marine-based foods, predominantly from upper trophic levels. The focus on reliable marine food resources is interpreted as a risk minimisation strategy in this marginal arid environment. Although these coastal hunter–gatherers adopted other goods and traditions from agricultural populations, their participation in this larger interregional exchange network did not affect their basic subsistence economies.

Associated new radiocarbon dates from the site are also discussed. Skeletal remains and artefacts associated with the Caleta Vitor shell middens generally originate from sites with dates ranging from c. 9000–476 BP. However, the human remains that are the subject of this research cover the time period c. 4000–476 BP.

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1. Research aims

The aims of this research were to employ stable isotopic data to test the hypothesis that marine economies were retained by coastal hunter–gatherers in northern Chile during the late Holocene when other inland populations were adopting agricultural economies with diets dominated by cultivated plants.

To test this hypothesis human remains were sampled from four archaeological sites in the Caleta Vitor area in the Atacama Region and the results were compared with previous data derived from coastal and inland Chilean sites. Associated dating was required to provide temporal control. Radiocarbon dating involved both direct dates on human remains as well as associated archaeological remains.

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2. Regional background and relevant prior research

2.1. The Atacama Region

The Atacama Region of northern Chile and southern Peru is one of the driest areas on earth – much of it receives less than 1 mm of rainfall per annum and is generally devoid of vegetation. Despite such harsh conditions humans settled the general area over 11,000 years ago (Núñez et al., 2002; Sandweiss et al., 1998; Santoro et al., 2005a). Indeed, there is growing evidence that “ancient people settled by the coast early and rapidly” (Arriaza et al., 2008). Early coastal sites in the region include: Quebradas Tacahuay, Jaguay, the Ring site, in southern Peru and Cascabeles on the coast of Taltal (Arriaza et al., 2008; Castelleti, 2007; Ugalde et al., 2012).

Paleo-environmental reconstructions indicate that more water resources than today were available along the coast as

a consequence of an important increase in precipitation over the Pacific side of the high Andes by the end of the Pleistocene/early Holocene (ca. 15,000–9500 cal BP). Although these differences were not striking in comparison to modern conditions the increase in precipitation assured the existence of water reservoirs for several millennia and human survival in the region (see Arriaza et al., 2008; Latorre et al., 2003, 2005; Nester et al., 2007; Santoro et al., 2011).

As a consequence of this extreme environment conditions are excellent for the preservation of human remains (Arriaza et al., 2008; Aufderheide et al., 1993: 190; Santoro et al., 2005b, 2012). Indeed, the region is well-known for its naturally mummified human bodies, but above all for the artificially mummified procedures that the Chinchorro people applied to their dead. The origin of this mortuary practice began about 9000 years ago, with an onset by 7500 BP, and persisted for nearly four thousand years (see Allison et al., 1984; Arriaza, 1988, 1995; Arriaza and Standen, 2002; Arriaza et al., 2008; Aufderheide et al., 1993; Bittmann and Munizaga, 1976; Marquet et al., 2012; Standen and Santoro, 2004). The placement of the Chinchorros in the broader chronology of the area is further discussed below.

Occupation of the region, while continuous, was restricted to areas with reliable sources of water with an economy based on sparse terrestrial and rich marine resources. The Pacific coast of Chile is generally rich in food resources, including shellfish, fish, sea-birds, marine mammals and algae – a consequence of the nutrient-rich, cold Humboldt Current flowing north along the coast. However, the flow of this current started to be affected by *El Niño-Southern Oscillation* (ENSO) cycles around 6000 to 5000 BP when warmer Pacific water flows south from the equatorial regions became more intense and frequent. As a result ENSO environmental patterns have profound effects on the marine biomass and prehistoric populations (Sandweiss et al., 1996; Williams et al., 2008).

Around 5000–4000 BP agriculture became part of the economy of people that centred their permanent settlements along highland and coastal valleys and oases. Camelid pastoralism was also carried out in the Altiplano (>4000 m) at this time. The introduction of these technologies was a consequence of the influences from the coast of central Peru, the tropical forest, the Titicaca region (Tiwanaku polities) and the central Andes (Inka Empire), through to the

Spanish who arrived in the 16th century. People along the coast changed their way of life as consequence of this “Neolithization” (Núñez and Santoro, 2011; Santoro et al., 2005b). However, the extent of the integration of these economies varied from region to region as is further explored in this paper.

2.2. Caleta Vitor

Caleta Vitor, the area the subject of this research, is located 25 km south of Arica and at the mouth of the Quebrada Chaca (Fig. 1). The Quebrada Chaca is a steep-sided ravine which is cut into the Pampa to a depth of 400 m. The valley bottom has a narrow, sandy floodplain with limited natural benches. While surface water is rarely present, subterranean sources provide water for irrigation agriculture in modern times.

Caleta Vitor consists of a broad sandy beach flanked to the north and south by cliffs reaching 800 m above sea level. The beach is bounded to the east by a series of low dunes.

The archaeological sites at Caleta Vitor, as recorded through a broader research project, are extensive and cover a vast geographical area and temporal span (Early Archaic Period-Late Period). The archaeology of the area includes: occupation sites, middens, mounds, human remains (including burials and mummy bundles) and a range of materials such as lithics, ceramics, faunal/floral remains, textiles and woven matting.

Military and mining activities as well as casual visitors and looters have unfortunately disturbed a number of sites in the region. This damage provided the impetus for the larger research program (developed by Chris Carter and Calogero Santoro) the aims of which are to document and analyse the archaeology and human remains to both preserve knowledge for the future and ultimately educate the public about these important places. The isotopic and dating research discussed in this paper sits within this broader context.

The four Caleta Vitor sites relevant to the isotopic analysis are: CV1, CV2, CV3 and CV6 (see Fig. 2). Site CV1 is a broad area midden with burials. CV2 consists of niche burials and a deep archaeological deposit containing burials and occupation debris. CV3 consists of a series of three artificial mounds with associated burials. CV6 is an extensive shell midden including human burials.

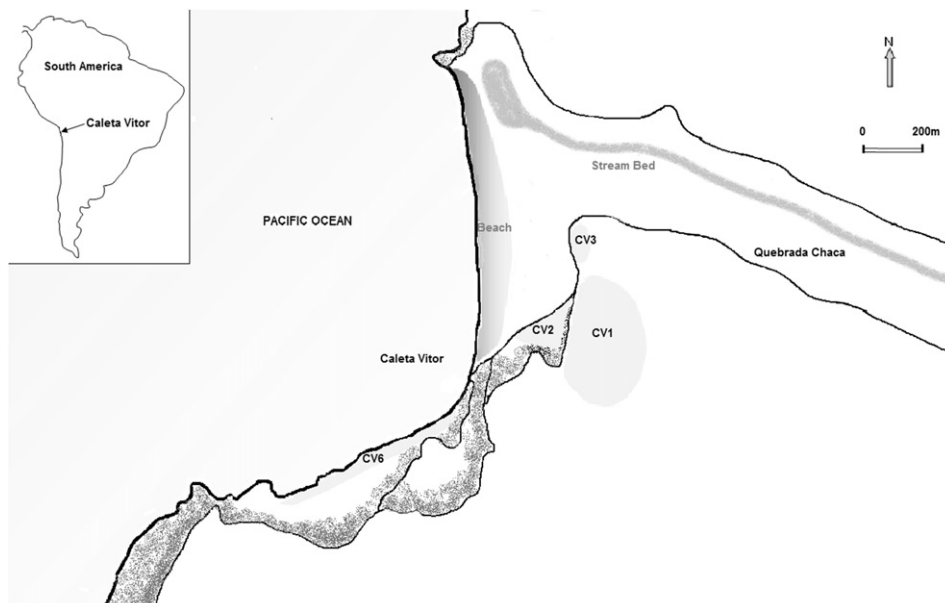


Fig. 1. Location of Caleta Vitor, Chile, with marked site zones. Image by Chris Carter.

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