Rethinking the Andes–Amazonia Divide

Pearce, Adrian J., Beresford-Jones, David G., Heggarty, Paul

Published by University College London

For additional information about this book
https://muse.jhu.edu/book/81859

For content related to this chapter
https://muse.jhu.edu/related_content?type=book&id=2777638
4.4

The archaeological significance of shell middens in the Llanos de Moxos: Between the Andes and Amazonia

Umberto Lombardo and José M. Capriles

Introduction

The origin of complex societies in Amazonia in relation to the Andes has been one of the most debated topics in South American prehistory. The hypothesis that has driven much of the debate is known as the 'standard model' of Amazonian prehistory (Viveiros de Castro 1996), and suggests that social complexity could not have emerged spontaneously in Amazonia because of the harsh environment. Thus, complex pre-Columbian societies in Amazonia were thought to have been short-lived results of migrations from the Andean highlands, as any attempts to settle in the tropical forest environment by more highly evolved cultures would inevitably have ended in the decline of those cultures into small, nomadic groups (Meggers 1954). Also, the emergence of the pan-Andean ideological system associated with Chavin, often regarded as the mother culture of Andean civilization, was thought to have been rooted in the tropical lowlands of South America. This was due to the pervasive iconographic presence of jaguars, harpy eagles, alligators, snakes, and other animals typically associated with Amazonia (Lathrap 1977).

Although a growing body of research now favours the idea that Andean and Amazonian cultures developed independently (Heckenberger et al. 2007; Neves 2008; Quilter 2014), there are still many unresolved questions regarding the antiquity, direction, and strength of the interaction between Amazonian and Andean societies (Dillehay 2013; Stahl 2004). A particularly important issue is the sudden appearance of complex societies in Amazonia after 2500 BC. The Llanos de Moxos, located near the southern border of the Andes with Amazonia, may prove essential to the debate over if, whether and when cultures from the highlands entered and settled in Amazonia.
This chapter briefly reviews the recent discovery of shell middens dated between 10,600 and 4,000 years ago in the Bolivian Llanos de Moxos, and discusses the implications of these findings for understanding the early peopling, the origins of agriculture, and the emergence of social complexity in south-western Amazonia, and overall, the links between the Andes and Amazonia.

The Llanos de Moxos

During the last millennium before the arrival of the Spaniards, south-western Amazonia was home to important pre-Columbian agricultural societies. The Llanos de Moxos are a large, seasonally flooded savannah situated between the Andes and deeper Amazonia. The region hosts an impressive collection of pre-Columbian earthworks, including monumental mounds, raised fields, ring ditches, fish weirs, canals and causeways (Erickson 2008; Lombardo et al. 2011; Lombardo and Prümers 2010; Prümers and Jaimes Betancourt 2014a; Walker 2008a; Chapter 4.3). The states of Acre and Rondonia in Brazil also host significant evidence of pre-Columbian cultures, although without so diverse a range of earthworks. Taken together, these are the so-called ‘geoglyphs’, geometric ditches and ridges that probably enclosed ancient villages (Pärsinnen et al. 2009), and the oldest dated sites of terra preta de indios (Miller 1992 cited in Neves et al. 2003). Terra preta de indios, also known as Amazonian Dark Earths, are anthropogenic soils enriched in organic matter, charcoal, nutrients, and fragments of pottery, which resulted from long term occupation of generally nutrient-poor upland soils of the Amazon basin during pre-Columbian times (Arroyo-Kalin 2014; Neves et al. 2003). Finally, south-western Amazonia is also one of the most linguistically diverse regions in the world, home to over 50 languages from eight different lineages and 11 isolates (Crevels and van der Voort 2008; Chapters 3.4 and 3.6), suggesting that many different pre-Columbian societies occupied the area.

‘Andes–Amazonia’ contacts and influence have often been suggested based on the geographic proximity between Tiwanaku and the Llanos de Moxos (situated less than 300 km apart), the adoption of raised field agriculture in both regions, and the presence of stone axes and even stone monoliths in the lowlands (Hornborg 2005; Ponce Sanginé 1981; Walker 2008b). Although archaeological research in the region has intensified in recent years, we still know very little about the origins of these societies. It is not yet clear, for instance, when the Llanos de Moxos were first occupied by humans; nor how these early populations made the transition towards increasing social and economic complexity; nor how those trajectories were influenced by external forces such as environmental change; nor when and how agriculture here began and spread. The recent discovery of the earliest known archaeological sites in south-west Amazonia, dating back to the early and middle Holocene (Lombardo et al. 2013; Miller 2009; Schmitz et al. 2009;
Chapters 2.1 and 3.6) can help tackle these questions. It is these earliest sites that we report on here.

**Older than we realized: Forest islands and shell middens in south-western Amazonia**

There are a number of reasons why, notwithstanding a century of archaeological research (Prümers and Jaimes Betancourt 2014a; Chapter 4.3), no early human occupation was reported in the Llanos de Moxos until very recently. Perhaps the most important is that most of the early archaeological sites in the region were later buried by fluvial alluvium c. 4,000 years ago (Lombardo et al. 2013, 2018). The central and southern Llanos de Moxos form part of the southern Amazonian foreland basin of the Andes where sediments eroded from the mountains are constantly deposited by rivers (Lombardo 2014). Also, because the region lacks any stone outcrops, people could not build using stone or make lithic projectile points or other stone tools, but had to use organic materials instead, which decay too fast in Amazonia for sites to be discovered easily. Nevertheless, thanks to a combination of palaeo-environmental and geoarchaeological surveys, including remote sensing, coring and sediment analysis, we have recently identified and dated four early human occupations in the eastern Llanos de Moxos, and test-excavated three of them (Capriles et al. 2019).

The early Llanos de Moxos sites are found underneath what are known as Forest Islands, alias Islas de Monte in Bolivia and Ilhas or Aterros in Brazil. Islas de Monte are conspicuous patches of forest that grow on slightly elevated platforms surrounded by savannah (see Figure 4.4.1).

They normally cover less than one hectare and are less than a metre high. Archaeological findings had already suggested that during the late Holocene (roughly between 2,000 and 500 years ago) almost all Islas de Monte here were in some way used by pre-Columbian peoples (Erickson 2006; Langstroth Plotkin 1996). Quite how they originated, however, remains controversial. While some authors consider many Islas de Monte to be natural formations, mostly the remains of old fluvial levees (Hanagarth 1993; Langstroth Plotkin 1996), others believe that the great majority were actually built by complex societies during that same period of the late Holocene (Erickson 2006).

That is, hitherto these forest island sites had been thought to be associated with human activity only during the last two millennia. The most significant new finding is that a series of forest islands in south-west Amazonia are now revealing evidence of human presence dating back 10,600 years. These early sites are shell middens (Lombardo et al. 2013; Miller 2009; Capriles et al. 2019), that is, prehistoric waste dumps made up of shells intentionally accumulated by humans (Balbo et al. 2011).
Shell middens are found worldwide, mostly along oceanic coastlines, but also along several inland river systems (Claassen 1998). In South America, there are hundreds of shell middens along the Atlantic coast of south-eastern Brazil. Locally known as *sambaquis*, they are often several metres high (Wagner et al. 2011). Smaller shell middens are also common in southern Argentina, where they are known as *concheros* or *conchaletes* (Briz Godino et al. 2011). Shell middens have also been reported along the Pacific coast, sometimes associated with seasonal oases known locally as *lomas*, but more often with springs and good sources for collecting shellfish (Beresford-Jones et al. 2015; Kennett et al. 2002; Lanning 1967; Latorre et al. 2017). Most of these shell middens date from the early and middle Holocene (between 10,000 and 3,500 years ago) often predating the introduction of cultigens and irrigation agriculture (and see Chapter 3.6 for a discussion of the association between shell middens and early ceramics). In fact, the emergence of social complexity in the Andes has been often associated with the resources provided by coastal environments (Moseley 1974; Quilter et al. 1991; Chapter 1.1). Interestingly enough, some shell middens near the Pacific coast were also associated with the exploitation of inland resources including land snails (see Beresford-Jones et al. 2015).

The shell middens our team has discovered in south-west Amazonia consist of inland deposits formed by the accumulation of fresh-water snails. *Isla del Tesoro,*
excavated in 2012 (see Figures 4.4.1 and 4.4.2), is made up primarily of apple snail (*Pomacea* spp.) shells. The earthen platform that forms the forest island is about 4 metres in diameter, stands one metre above the savannah, and descends a metre and half beneath it. The site is surrounded by a depression, which at the end of the rainy season forms a ring of water that encloses the site. A surrounding moat-like ditch is a feature commonly associated with forest islands in Bolivia (Erickson 2008). Like other early Holocene sites, *Isla del Tesoro* at first sight resembles one of the many earthworks that date instead to the late Holocene, millennia later. Archaeological excavations at *Isla del Tesoro* have confirmed its anthropogenic origin, by unearthing dense shell deposits, faunal remains, burnt earth and two human skeletons buried within the shell midden (Lombardo and Capriles 2013). Radiocarbon dates indicate that the site was occupied between 10,500 and 4200 BP (all dates BP herein are calibrated radiocarbon ages BP). The shell midden formed synchronously with a palaeosol (buried soil) that abuts onto it (see Figure 4.4.2). Both the midden and palaeosol were later buried, c. 4,000 years ago, by alluvium deposited by the Grande River (Lombardo et al. 2012). The site was abandoned during this period of environmental instability, and reoccupied c. 2,500 years later (Lombardo et al. 2013).

Another three sites have been investigated in the Llanos de Moxos that also attest to human occupation in the early and middle Holocene (see Figure 4.4.3). We have excavated human burials at two other sites, *Isla San Pablo* and *Isla La Chacra*, although fewer shells were found in these sites suggesting that different sites could have been used in different seasons and for different purposes (Capriles et al. 2019). For instance, snails are most easily collected in the late dry season but hunter-gatherers, being highly mobile, could have exploited different niches at the same time. In addition to the middens in Bolivia, two other early sites have been found in Brazil: in the state of Rondonia, on the eastern bank of the Guaporé River (Miller 2009; Hilbert et al. 2017), and on the banks of the Paraguai River (Schmitz et al. 2009). Both are about 8,000 years old.
The discovery of 10,000-year-old shell-midden sites in the Llanos de Moxos, as well as in western Brazil, suggests the presence of humans in the region several thousand years earlier than previously known. Therefore, it would seem that knowledge of these sites may contribute to the discussion about the nature of the long relationship between the Andes and Amazonia, including aspects such as the peopling of South America, the emergence of social complexity, and changing human-environment interactions.

The peopling of inland South America

The earliest archaeological sites in South America have been found along the Pacific and Atlantic coasts (see Borrero 2015; Dillehay 2008). Although the initial
peopling of the continent might have followed the coasts, there has been a research bias that has impeded the identification of earlier inland settlements (Capriles and Albarracín-Jordan 2013). At the geographical centre of South America, the shell middens of south-west Amazonia stand between the geographical barrier of the Andes and several thousand kilometres of tropical lowlands. The earliest radiocarbon ages from Isla del Tesoro go back to c. 10,600 BP, demonstrating that humans had already occupied the region by the beginning of the Holocene.

Least-cost path analyses have previously suggested that inland routes could have been explored by humans early on, particularly along river systems (Anderson and Gillam 2000). The discovery of the Llanos de Moxos shell middens seems to support this assertion. In contrast to the generalist and highly mobile foraging strategy that might have characterized the earliest human explorers, the shell middens suggest that by the early Holocene, foragers in south-west Amazonia were following increasingly specialized subsistence strategies (cf. Chapter 2.1). The sites studied suggest a pattern of economic reliance on specific resources such as apple snails, wild game and fish, as well as cyclical mobility involving repeated visits to particular sites. In fact, the deep, stratified middens bear evidence of progressive growth over several thousand years as well as their symbolic importance as resting places for human burials (see Figure 4.4.2). We hope that studies of ancient DNA from the bones and teeth retrieved from these sites might greatly further our understanding of the early peopling of South America.

The early Holocene anthropogenic landscape

In a land characterized by minimal topographic relief and seasonal floods, the shell middens of the early and middle Holocene could effectively represent the very first earthworks in the Llanos de Moxos. Besides the four early Holocene sites dated thus far (see Figure 4.4.3), it is likely that many more early sites exist across the vast area of the Llanos de Moxos. For instance, in a recent survey of forest islands in an area of 200 km² near Isla San Pablo, another nine potential sites were found (Zihlmann 2016). Although these have not yet been dated, their stratigraphy is similar to the shell-midden sites already studied, suggesting that they too are early archaeological sites. It seems that the pattern of early human settlement we have identified was more widespread than first anticipated, and that the cultural landscape of south-west Amazonia is much older than has previously been realized. By accumulating snails and other trash remains, early foragers here began to modify their landscape, enhancing its heterogeneity and setting in motion a positive feedback loop of seasonal re-occupation of the same sites. In turn, the activities of these early populations probably contributed to changing the environment itself, by the use of fire. The amount of charcoal, burnt earth, burnt shells and bones found in these sites indicates that fire was used very frequently. Palaeoclimatic data
suggests that from 8000 to 4000 BP the climate in south-western Amazonia was
drier than today, and the landscape dominated by savannah and dry forest (Carson
et al. 2014; Lombardo et al. 2018), more susceptible to natural fires. The discovery
of these early sites in what today is part of Amazonia is therefore important
for reconstructing human environmental disturbance throughout the Holocene. In
Amazonia, lake-core charcoal records of the Holocene show great temporal and
spatial variability (Mayle and Power 2008; Urrego et al. 2009), hardly compatible
with climate forcing alone. The discovery of early and mid-Holocene archaeologi-
cal sites supports the hypothesis that this variability could be due in part to human
activity (Mayle and Power 2008).

Domestication and the origins of agriculture in Amazonia

Our limited knowledge of the early peopling of Amazonia goes together with a lack of
data about plant domestication in the Americas (Piperno and Pearsall 1998). Genetic
studies suggest that of all the domesticated cultigens of the Americas, about half
seem to have originated in the Amazon basin (Clement 1999), including cassava (or
manioc, *Manihot esculenta*), the third most important staple food in the tropics today.
Recent studies based on plant genetics indicate that the wild ancestor of domes-
ticated cassava is probably *M. esculenta* ssp. *flabellifolia* (Olsen 2004), which today
occurs naturally in the Brazilian states of Mato Grosso, Rondonia and Acre, as well
as in neighbouring areas of north-eastern Bolivia (Olsen and Schaal 2001). South-
west Amazonia has also been proposed as a possible area for the domestication of the
peanut (*Arachis hypogaea*), jack bean (*Canavalia plagiosperma*), two species of chilli
pepper (*Capsicum baccatum* and *C. pubescens*) (Piperno 2011a), and the peach palm
(*Bactris gasipaes*) (Clement et al. 2010), the only palm domesticated in the Americas.

As yet, however, there are no archaeological data to support these deductions,
which are based only on molecular and bio-geographical evidence, mostly because so
few early archaeological sites are known in the region (cf. Chapter 1.1). This creates
something of a paradox, because the earliest archaeological evidence for some of these
crops comes from sites far outside Amazonia (for example, Dillehay et al. 2007; Iriarte
2009; Chapters 2.1 and 2.4). Cassava, for instance, has been found in Colombia dated
to 5539–5351 BP, in coastal Chile at 5260–5000 BP, and in coastal Peru at 8500 BP
(Piperno 2011a). Moreover, chilli pepper and peanut probably spread in association
with cassava (Pickersgill 2007). For these plants to have spread throughout South
America during the mid-Holocene, they must have been domesticated earlier.

Arroyo-Kalin (2010) has noted that the starch grains used as archaeological
evidence to infer the early domestication of cassava do not in fact necessarily dis-
 criminate between wild relatives and the cultigen, so the interpretation of domes-
tication may not be reliable. He argues that cassava may have been domesticated
during the mid- to late Holocene, possibly in association with *terra preta* sites. The
Llanos de Moxos shell middens offer an ideal depositional context for sampling
food residues. Moreover, isotope analysis of dietary staples and human bones, as well as micro-botanical analysis of starch grains and phytoliths within the teeth calculus from burials, may shed light on key questions about the first cultigens in the Americas.

In addition to plant domesticates, south-west Amazonia also offers significant evidence of the domestication of the Muscovy duck (*Cairina moschata*) (Stahl 2005). Preliminary morphological comparisons from specimens found in archaeological sites in eastern Bolivia provide empirical evidence that this species was already being managed, at least, during the late Holocene (Von den Driesch and Hutterer 2012). Yet even though Muscovy duck bones have been found at an increasing number of late Holocene archaeological sites from western Amazonia, it remains uncertain exactly where and when humans began managing this species (Stahl et al. 2006).

The emergence of social complexity in south-western Amazonia

Moving on to the last 2,000 years, the presence of extensive pre-Columbian earthworks, sophisticated pottery, differential burials, and evidence of long-distance trade, attest that complex societies already existed in south-west Amazonia by AD 400 (Erickson 2006; Lombardo and Prümers 2010; Pärssinen et al. 2009; Prümers and Jaimes Betancourt 2014a). Social complexity is here understood as the combination of subsistence intensification, political integration and social stratification following population growth (Johnson and Earle 2000).

Thus far, the limited archaeological evidence available from the Llanos de Moxos has suggested that at least some of these cultures came from outside the region. For instance, similarities in pottery and language have been suggested as evidence that some of the Llanos de Moxos cultures originated in central Amazonia (Michel López and Lémuz Aguirre 1992; Walker 2011b). On the other hand, the uniqueness of some pottery styles found in the Llanos de Moxos (Jaimes Betancourt 2013); the fact that some of the languages spoken here do not seem to have any relation with languages spoken elsewhere (Crevels and van der Voort 2008); as well as the peculiarity of some of the earthworks found (Lombardo et al. 2011), suggest that the Llanos de Moxos was a centre of innovation where social complexity emerged, rather than a recipient place that was ‘invaded’ by groups stemming from other regions.

The identification, dating and description of early foraging practices in the Llanos de Moxos and along the Guaporé and Paraguai Rivers is important for understanding the period before social complexity emerged in south-west Amazonia. The discovery of early shell middens in the Llanos de Moxos supports the hypothesis of the independent emergence of social complexity in the region. However, some level of social interaction between the Andes and Amazonia cannot be ruled out. Given the finding of copper ornaments in a burial in *Loma Salvatierra* (Prümers...
and Jaimes Betancourt (2014a) suggesting the existence of trade, and the proximity between the two regions, it is likely that some experimentation with domestication and exchange of plants did occur. As research carried out by Dillehay (2013) on the north coast of Peru implies, people throughout South America might have been experimenting with a variety of cultigens for a very long time (see also Kistler et al. 2018; Chapters 2.1 and 2.4).

Demographic pressure has been identified as a key element for triggering the processes that lead to social complexity (Smith et al. 2012). In the Llanos de Moxos, a demographic surge in the mid-Holocene could have led to increasing pressure on wild resources, explaining the recourse to low-return resources such as apple snails. This could eventually have led to increasing reliance on cultivated plants, and at length to the emergence of institutionalized social inequality during the late Holocene. Given that the two shell middens we have excavated also contain human burials, one might speculate that these sites could effectively have functioned as territorial markers legitimized by social memory and ancestor veneration (see Hastorf 2003).

An intriguing question on the relationship between the shell middens of the early and mid-Holocene (10,600–4000 BP) and the complex societies of the late Holocene (AD 400–1500) emerges from the time gap of 2,500 years that separates these occupations. It is still not fully understood why the sites we have so far investigated were abandoned after 4,000 BP, but in the case of Isla del Tesoro, we believe that it was caused by a change of course of the Grande River, which flooded the area and covered the site with a 1.5-metre-thick layer of sediments (Lombardo et al. 2012). It is certainly possible that a synergy between environmental instability and population migrations led to the abandonment of the shell midden mode of life in the Llanos de Moxos. The time gap observed between the hunter-gatherer occupation of the early and middle Holocene and the complex societies of the late Holocene in the Llanos de Moxos coincides with important innovations such as the adoption of ceramics, and of maize as a staple cultigen. Interestingly enough, this time gap also coincides with the emergence and consolidation of a number of regional ‘formative’ polities in the Andes, including Chavín (cf. Chapter 2.4). Unfortunately, we are still far away from understanding the exact processes that were involved in shaping these cultural changes. Further research is needed to delimit the area that was affected by the mid- to late Holocene environmental change, and to identify new sites outside this area that bear a continuous archaeological record, such as the shell midden in Rondonia recently investigated by Neves (personal communication).