

Inter-nodal archaeology, mobility, and circulation in the Andes of Capricorn during the Late Intermediate Period (AD 1000–1450)

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1. Introduction

The importance of interregional trade for prehispanic people in the southern Andes was recognized since the beginning of archaeological research (Boman, 1991 [1908]; Latcham, 1909). It was only in the 1970s and 1980s, however, when scholars began to discuss the practices that could account for the circulation of objects in different times and places, and the consequences they could have for understanding society at large (e.g., Berenguer et al., 1980; Browman, 1980; Cigliano and Raffino, 1977; Núñez and Dillehay, 1979; Tarragó, 1984). Fostered by those early formulations, research on traffic and mobility has grown steadily during the past three decades, incorporating new lines of evidence and analytical techniques, raising more specific questions, or advancing new concepts and interpretative models, as attested by several compilations that have focused on these issues (Albeck, 1994; Lechtman, 2006; Nielsen et al., 2007; Núñez and Nielsen, 2011; Tarragó and Núñez, 1997; Williams et al., 2007).

One of the novel approaches that emerged from this interest focuses on the *spaces in between* sedentary settlements or densely populated regions that functioned as nodes in macro-regional interaction networks. Unlike the nodes, “inter-nodal areas” should bear direct archaeological traces of mobility practices responsible for the circulation of goods in the form of roads or trails, shelters, campsites, shrines, and signals of various sorts, together with other evidence related to extractive activities carried out by travelers. Internodal areas have been largely ignored by archaeology worldwide on the assumption that they are empty or that the scattered remains they may contain are too difficult to find or interpret in meaningful ways (but see Upham, 1992). The main exception to this trend has been the study of relatively formalized road networks like the Inca road system (Hyslop, 1984), among others (Alcock et al., 2012; Förster and Reimer, 2013; Snead et al., 2009; Trombold, 1991).

In the southern Andes, the importance of the archaeological evidence between settlement nodes was initially pointed out by Núñez

(1976, 1985), who highlighted their potential for exploring the history of interregional mobility and exchange systems. Following his pioneering work, other scholars have focused their research on these areas, demonstrating that their archaeological record may be quite substantial, has considerable chronological depth, and can inform about a variety of issues (e.g., Berenguer, 2004; Berenguer and Pimentel, 2010, 2017; Briones et al., 2005; Cases et al., 2008; Martel, 2014; Nielsen, 1997, 2006; Núñez and Nielsen, 2011; Pimentel, 2009). The southern Andes offer especially good conditions for these studies because the resources which are key for human subsistence tend to concentrate in discrete zones (valleys, oases, lower parts of the altiplano or *puna*) separated by deserts, mountains, or high-plateaus which are too hostile to support dense or permanent populations. Consequently, the archaeological traces of human mobility that accumulated in these spaces are relatively visible and well preserved.

An “internodal archaeology” builds on the premise that the systematic study of intermediate spaces can make important and unique contributions to understanding interregional interaction. Firstly, it can provide direct data on who and how acquired, exchanged, and/or transported various items, thus helping to solve situations of equifinality that emerge when trying to test alternative interaction models with nodal data only, since different forms of mobility and trade may result in the presence of the same range of non-local items in settlements and cemeteries. Secondly, internodal research can also inform on other activities that are not represented in nodal regions, such as herding, hunting, mining, and various forms of ritual, among others, thus helping to place circulation and mobility in a broader context. This information, in turn, may help to understand the value or social efficacy of trade goods since, put simply, the meaning of the same non-local object –e.g., an obsidian nodule, a shell, or a feather– may be quite different depending on whether it was acquired by a household member during a logistical trip, taken as booty by a war party, given as a present by a foreign acquaintance at a seasonal camp, or traded in by a caravan coming from a distant community. In sum, when coupled with relevant

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<https://doi.org/10.1016/j.quaint.2018.09.044>

Received 22 December 2017; Received in revised form 22 August 2018; Accepted 30 September 2018

Available online 01 October 2018

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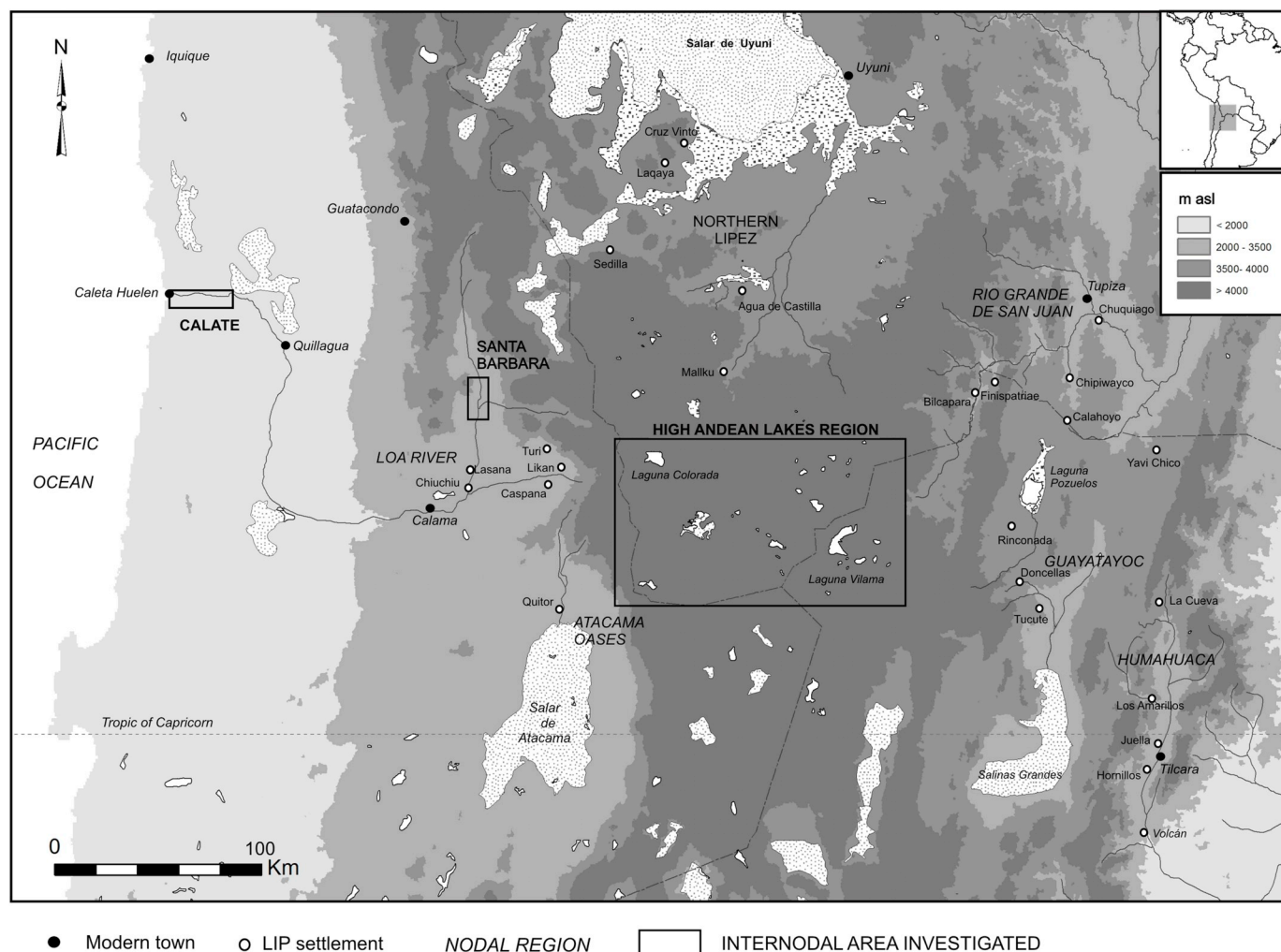


Fig. 1. The Andes of Capricorn. Main LIP settlements and location of the internodal areas studied.

nodal evidence from domestic and funerary contexts in consumer communities, the archaeological record of internodal areas can provide a more comprehensive view of social systems and their changes over time and through space.

In the following pages, the potential of this approach is illustrated through research conducted in three internodal areas along the “Andes of Capricorn” (Fig. 1), to wit, the Coastal Range and Intermediate Depression of the Atacama Desert (Calate, 700 masl), the Upper Loa River (Santa Bárbara, 3000–3200 masl), and the High Andean Lakes region (4200–4500 masl). Taking advantage of internodal evidence, our goal is to establish the different forms of interregional mobility that coexisted in this area during the Late Intermediate Period or LIP (ca. 1000–1450 C.E.), assessing their respective contributions to the circulation of various kinds of goods. It will be argued that, during this period, interregional mobility at this latitude involved at least three strategies characterized by different agents, goals, and organizing principles. The concatenation of these and other practices to be identified resulted in a complex circulation system that allowed objects to travel long distances through multiple traffic chains involving sequential movements and exchanges of different sorts.

Before going any further, a few conceptual precisions should be made. *Circulation* will refer generically to the movement of people, objects, or information, regardless of the specific activities which are responsible for *traffic*—understood as the physical dimension of circulation, the movement of things—and the *social transactions* that are always involved. *Mobility* will be used in a more restrictive sense to

designate regular practices that involve the movement of people, which is the instrumental cause of traffic although it may or may not result in the permanent displacement of objects or ideas. Rather than following a typology of mobility forms, we seek to establish concrete *mobility strategies* operating in different areas and periods, characterizing them in terms of specific actors (task groups, households, specialists), goals (herding, obtaining resources, visiting other groups, trading, warring, interacting with deities), transportation technologies (human carriers, pack animals, wheeled vehicles), and organizing principles (e.g., timing, necessary gear, forms of provisioning, logistics) (cf. [Wendrich and Barnard, 2008:6–9](#)). As far as places are claimed by people, circulation necessarily involves also transactions between groups, whether these take the form of transit agreements, exchange of goods, or permission to exploit resources, among other possibilities. The concept of *circulation mode* will designate a series of regular and functionally integrated practices that result in the circulation of goods across space and social units, including both mobility strategies and associated transactions, while *circulation system* will refer to all the modes of circulation used by a given population or present in an area during a particular period. In this paper, however, we limit ourselves to the identification of some of the mobility strategies developed in the Andes of Capricorn during the LIP, leaving aside the social transactions associated with them, as well as other factors that are crucial for understanding circulation and its social implications, such as the meaning of trade goods or their forms of consumption.

The paper is organized in five sections. The first one outlines the

geographical and historical setting of the Andes of Capricorn during the LIP and summarizes the evidence for interregional circulation produced by archaeological research on the main nodal regions. The following three sections present some results of archaeological research conducted in the internodal areas mentioned before, putting emphasis on data that are relevant for understanding mobility strategies. The final part characterizes some of the mobility strategies operating at the time and discusses their articulation in a complex circulation system.

2. The circulation of goods across the Andes of Capricorn during the LIP: the nodal perspective

This paper focuses on an arbitrarily selected area across the Andes, following the Tropic of Capricorn between 20° and 24° southern latitude, from the coast of the Pacific Ocean to the forested plains of the eastern lowlands (cf. Berenguer and Gallardo, 1999). This transect is relevant to the goals of this paper because it encompasses the full range of ecological variation that characterizes the southern Andes. During the LIP, the population of the area lived in about nine nodal regions, which can be grouped into five types on the basis of the possibilities that each one of them offers for various productive activities and population aggregation: (1) coast; (2) pre-puna valleys and oases (800–3500 masl); (3) low puna basins (> 4000 masl); (4) high puna (> 4000 masl); and (5) eastern lowlands or *yungas* (< 2000 masl).

The coastal nodes were inhabited by specialized marine hunters and gatherers who developed a highly mobile lifestyle based on the use of rafts made with inflated sea lion skins. Their residential places (dwellings, middens, cemeteries) and temporary campsites were distributed along the coastline, mainly in association with freshwater springs and coves where they could launch their rafts (Ballester and Gallardo, 2011; Berenguer, 2009).

The pre-puna nodes are fertile valleys and oases of different sizes, located on both sides of the Andes, like the Atacama Oases and Río Loa on the western flank, or Río Grande de San Juan (or Chichas region) and Quebrada de Humahuaca on the eastern side. With altitudes ranging between 2000 and 3500 masl, approximately, these areas supported highly diversified economies which combined irrigation agriculture of meso-thermic crops (e.g., maize) and micro-thermic ones (tubers and grains) with llama herding. Diversified economies also characterized the lower oases of the desert, such as Pica (1300 masl) and Quillagua (800 masl), although they supported smaller populations than higher, pre-puna regions.

The low-puna nodes, on the other hand, correspond to endorheic basins in the south Andean high plateau—known as *altiplano* or *puna*—with basal altitudes of 3450 masl in Salinas Grandes-Guayatayoc (Argentina), and 3670 masl in Salar de Uyuni-Northern Lipez (Bolivia), where communities developed mixed economies based on herding and farming of microthermic crops mainly. Hunting and gathering were also important in both pre-puna and low-puna regions.

During the LIP, the population of pre-puna and low-puna nodes above 2000 masl aggregated in conglomerated villages, often located in defensive positions or associated with fortified refuges (*pukaras*) occupied in times of insecurity, perhaps seasonally (Nielsen, 2018). The sizes of these villages are very different, reflecting the unequal carrying capacity of valleys and *quebradas* (local Spanish term for deep, V-shaped valleys) of pre-puna nodes on both side of the Andes. Thus, the largest LIP villages in the Atacama-Loa River nodes have maximum sizes of 2–3 has (Turi, Quito), in the low-puna range between 7 has in Northern Lipez (Laqaya) and 14 has in Guayatayoc (Tucute), while those on the eastern flanks reach 10 has in Humahuaca (Los Amarillos) and 50 has in Río Grande de San Juan (Chipiwayco). Settlement changes were partially related to the onset of a state of interregional conflict, probably triggered by pronounced cycles of draught, which peaked during the late 13th and 14th centuries (Morales et al., 2012; Thompson et al., 1985) and apparently affected most communities above 2000 masl with significant agricultural components in their

economies. Such interpretation is independently supported by high rates of osteological trauma recorded in regions where relevant bioanthropological data are available (Gheggi and Seldes, 2012; Torres-Rouff et al., 2005), new weapons and armory, and depictions of warriors or armed confrontations in rock art (Berenguer, 2004; Nielsen, 2007). It should be stressed that fortified settlements are found neither in the western oases below 2000 masl nor in the coast.

A fourth type of nodal region comprises the high *puna* (> 4000 masl), where no economically significant agriculture can be practiced, so communities specialized in herding and long-distance trade using pack animals (caravans), keeping a strong emphasis on hunting and gathering. These groups lived dispersed in an area that goes from southeastern Lipez (Bolivia) to the western puna of Jujuy, in Argentina (Nielsen, 2013; Yacobaccio et al., 1998). They practiced different forms of transhumance between small homesteads and grazing posts distributed across their territories. Like coastal people, during the LIP, these specialized pastoralists or *llameros* (“llama breeders”) continued their dispersed way of life, apparently without changes in their settlement strategies, a fact that suggests they were not directly or actively involved in warfare.

The archaeology of the lower valleys to the east or *yungas* region—the fifth kind of node in the Andes of Capricorn—is still largely unknown. Archaeological studies have revealed the existence of nucleated, defensive sites in San Andres (e.g., Antiguito) and other valleys of Salta (Ventura, 2001), but the size and distribution of these populations or the nature of their economies—which probably emphasized the exploitation of wild resources—are poorly understood at present.

During the LIP, distinctive material culture repertoires, involving mainly domestic architecture, pottery, textiles and burial practices, developed in most nodes. This phenomenon justifies the notion that these populations represented themselves as different “regional collectives” of some sort. The hierarchical relationships among villages—in terms of site sizes and differential distributions of public spaces or plazas—reveal the emergence of multi-community political structures at the time, although none of these nodal populations coalesced into unified or centralized regional polities. The dynamics of segmentary integration documented for south-central Andean Aymara federations by ethnohistory and ethnography (Izko, 1992; Platt, 1987; Rasnake, 1989), offer good models to think about the political formations of this period. The organization of the dispersed communities of marine hunter-gatherers along the coast and of the specialized herders in the high puna probably followed different trajectories, but their forms of political action are less known.

Significant quantities of trade goods are found in domestic and funerary contexts of all the regions investigated, particularly in the pre-puna and low-puna nodes, but also in coastal cemeteries (Table 1). Little excavation has been conducted in LIP high-puna sites, but the high frequency of foreign ceramics found on the surface of residential areas and in campsites along the routes that lead into this region suggest that the groups of specialized pastoralists living there had a very active role in the long-distance circulation of goods (Nielsen, 2013). Non-local items are also present in the little-known valleys of the eastern lowlands or *yungas* (Ventura, 1985).

In the vast areas between nodal regions, permanent occupations were scant or non-existent. The main ones are the hyper-arid deserts of the Coastal Range and Intermediate Depression of Atacama, the High Andean Lakes region (HALR), and the massive mountain ranges of the Western Andes, the Eastern Andes, and the Lipez Cordillera. In the following sections, we summarize the results of archaeological research conducted in some of these internodal spaces, which can contribute to understand the variability of mobility strategies during the LIP.

3. Seasonal occupations and interregional routes in the High Andean Lakes region

Located on the triple frontier of Bolivia, Chile, and Argentina, the

Table 1
Nonlocal items found in LIP settlements of different nodes and their likely provenance.

From	To	western flanks	altiplano - puna	eastern flanks
		Coast	Northern Lipetz/Guayatayoc	Rio Grande de San Juan/Humahuaca
Coast Atacama-Loa River	–	metals, ceramics, wood (tubes, tablets), greenstone, textiles, chañar, algarrobo, maize, ceramics	shell ceramics, gourds, chañar, algarrobo, maize	shell greenstone (beads),
Northern Lipetz/ Guayatayoc (High Andean Lakes)	–	ceramics	–	chert, metals, flamingo feathers
Rio Grande de San Juan/ Humahuaca	–	obsidian ceramics	obsidian ceramics, gourds, maize	obsidian, flamingo feathers, chinchilla
Eastern valleys or Yungas	feathers	hallucinogenic plants, coca, nuts (rattles), wood (bows, arrows), canes, feathers and beaks of tropical birds, terrestrial shell, animal skins used for making cuirasses, quivers, and bags, pyro-engraved gourds	hallucinogenic plants, coca, nuts (rattles), wood (tubes, tablets, bows, arrows), feathers, terrestrial shell, gourds	hallucinogenic plants, coca, nuts (rattles), wood (tubes, tablets, bows, arrows), feathers, terrestrial shell

HALR comprises over 100 lake basins distributed between 4250 and 4700 masl (Fig. 2). This area did not support permanent occupations in the prehispanic era but offered resources that were important for groups who lived at lower elevations, including waterfowl species, wild camelids, and large rodents for hunting, as well as several rocks suitable for knapping (Nielsen, 2006). Indeed, one of the main obsidian sources used in NW Argentina during the LIP, Laguna Blanca/Zapaleri, lies in this area (Yacobaccio et al., 2004). Additionally, thousands of flamingoes arrive to these lakes to nest in the summer (January–February).

Survey carried out in several lake basins of the Bolivian and Argentine parts of this region revealed the existence of sites spanning the whole prehispanic past. Considering the duration and purpose of the occupations that produced them, they fall in two groups. The first one, organized around hunting and gathering, includes temporarily occupied residential sites and different types of extractive loci, including egg-processing stations, lithic quarries, and hunting features. The second one, related to traffic traversing the region, includes trails, overnight campsites, and ritual features. Only the main sites exemplifying each class and dating to the LIP will be considered.

3.1. Temporary occupations

Seasonal occupations pivoted on relatively large residential sites with substantial architecture, like Puerta de Chillagüita in Laguna Colorada and Chillagua Grande in Laguna Vilama (Fig. 3). These sites comprise several residential compounds each (13 and six, respectively), suggesting repeated occupation by sizeable groups. Although the two sites are contemporary (Table 2), they show different ceramic assemblages, dominated by diagnostic types of the Loa/San Pedro component in Puerta de Chillagüita and of the Yavi/Chicha component in Chillagua Grande. This contrast suggests that the groups occupying them were coming from nodes on the opposite sides of the Andes; from the Upper Loa in the former case (e.g., Likan, 35 km west) and from the Río San Juan basin (e.g., Bilcapara, 90 km to the northeast) in the latter one (Fig. 2). These differences notwithstanding, the refuse recovered in the excavations reveal a similar range of activities, including the consumption of flamingo eggs, the manufacture of lithic tools, and hunting.

Eggshells are abundant in both sites; the consumption of eggs in Chillagua Grande is further attested by the nearby site of Isla Vilama, located on the lakeshore in front of a small island offering flamingo nests some protection from predators. This site includes several stone-lined roasting pits and a dense scatter of egg shells, sherds, and lithic debris and instruments, including projectile points from different periods, attesting to the persistent use of this place since Archaic times. Similar sites have been recorded along the northern shore of Laguna Colorada, where refuse is so abundant that forms visible middens (Barfield, 1961).

Knapping is the second activity consistently represented at both sites. Of 430 débitage items recovered in Puerta de Chillagüita, 80% are obsidian, 19% chert, and 1% basalt, whereas in Chillagua Grande (N = 102) 85% are obsidian, 6% chert, and 9% basalt. Obsidian was used mainly for making arrowheads, most of which were probably taken back to the nodal settlements. The obsidians present in both sites are visually quite different; two samples from Puerta de Chillagüita analyzed by INAA revealed that they come from one source unknown at present, while one sample from Chillagua Grande comes from Laguna Blanca/Zapaleri, 65 km southwest of the site. Basalt and chert, on the other hand, are ubiquitous in the region and were used expediently, as indicated by the virtual absence of instruments on these materials.

The third important activity was hunting, with some differences in the animals exploited in each case (Nielsen et al., 2010). In Puerta de Chillagüita, 51% of the NISP (N = 404) were birds, 48% Artiodactyles, and 1% large rodents (*Chinchillidae*). Ethnographically, waterfowl is rarely eaten; even if it was consumed in the past, it is likely that these animals –particularly flamingoes– were valued mostly for their

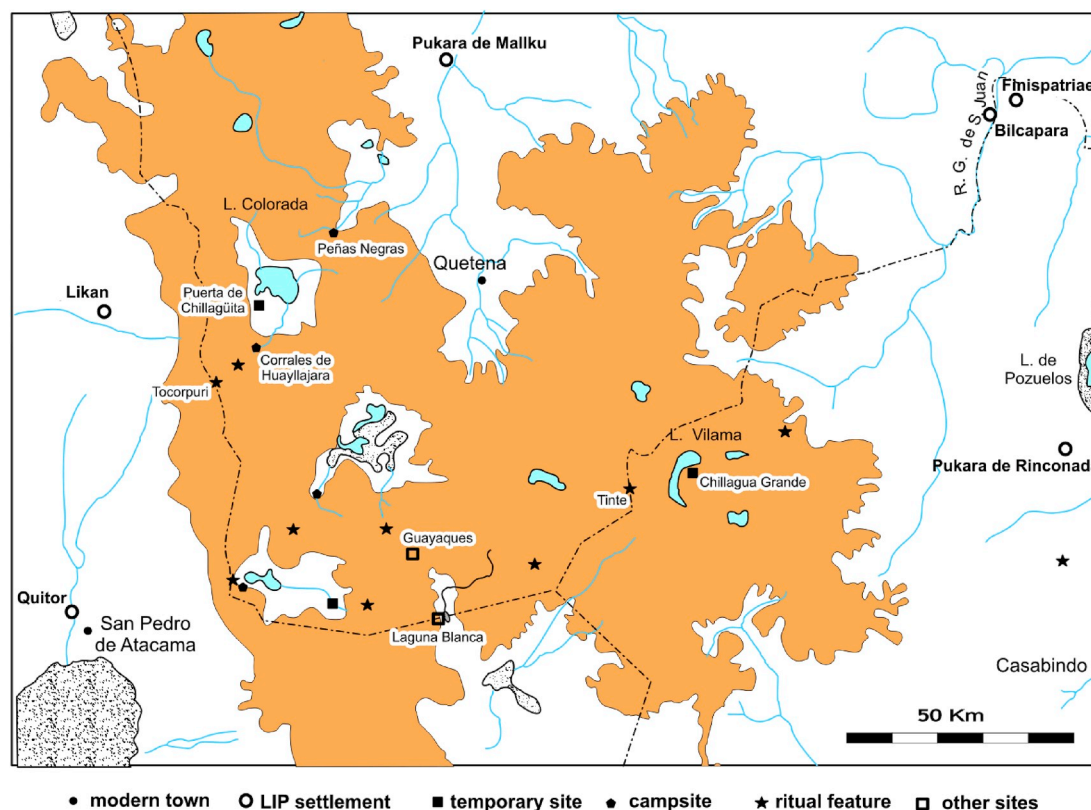


Fig. 2. The High Andean Lakes region showing the location of sites mentioned in the text.

feathers, which are found in ritual contexts throughout the area. The only Artiodactyles in the region are camelids; the few osteometrically diagnostic bones of this class correspond to small specimens, probably vicuña (*Vicugna vicugna*). In Chillagua Grande, on the other hand, only 6% of the NISP ($N = 1862$) were birds, 56% Artiodactyles (vicuña being the only identified species), and 38% rodents. The analysis of the rodent bones combining different osteometric techniques revealed that most of them correspond to large specimens of the *Chinchilla* genus ($MNI = 44$), and that 91% of them were chinchillas (*Chinchilla chinchilla*), animals that were highly valued for their pelts. This idea is supported by the differential representation of body parts, cut marks, and economic anatomy measures which reveal that the 41 chinchillas identified would have provided only 13.7 kg of meat, while the 20 vicuñas present would have rendered 600 kgs, 97% of the total amount of meat represented by the MNI in the assemblage (Maryański and Nielsen, 2015).

Vicuñas were hunted individually with bows and arrows or collectively using fences (fixed or mobile) to corner them, as in ethnohistorically described communal hunts (Cobo, 1990 [1653]: 241). Several hunting blinds recorded along the Zapaleri river, near Chillagua Grande, were probably associated with the first method, while a large stone fence closing a natural depression on the northern shore of Laguna Guayaques seems related to the second one (Fig. 4). Next to the fence, there are two stone domes, used as shelters and/or blinds, and several egg-roasting pits, attesting to the exploitation of a nearby flamingo nesting area as well. Surface material present at this site include a leaf-shaped projectile point (Archaic period), Sequitor polished gray pottery (late Formative period of the Atacama Desert), and Mallku pottery (LIP of northern Lipéz), suggesting that this hunting site was repeatedly occupied for millennia by groups coming from different nodal regions.

The manufacture of beads made of “greenstone” (copper minerals mainly) was another activity associated with these occupations, as indicated by 317 g of debris recovered in the excavation of Puerta de

Chillagüita and 50 g in Chillagua Grande. Lead isotope analyses ($^{206}\text{Pb}/^{204}\text{Pb}$ rate) of one sample of this material taken from each site, revealed that they both come from the isotopic province I, which includes northern Chile and the Western Andean range (Macfarlane and Lechtman, 2016). This means that, while the greenstone worked at Puerta de Chillagüita may have been obtained directly by the groups occupying the site, the raw material used for making beads at Chillagua Grande was probably acquired indirectly through trade.

3.2. Transitory occupations

The second group includes pathways, overnight campsites, and ritual features related to the transit of people and pack animals across the region. Almost all the prehispanic pathways recorded are informal trails, which become especially visible when approaching mountain passes and other places where topographic constraints produced high redundancy of transit. Some of them show the typical “raked pattern” of sinuous and partially intersecting paths that characterizes the pathways trafficked by llama trains (Berenguer, 2004), demonstrating the importance of caravans in the region.

Overnight campsites are numerous along interregional routes. The smallest examples have only one or two dry stone windbreaks, while others include dozens of these features, expediently built shelters, corrals, and abundant refuse. They frequently take advantage of natural features that offer protection against the cold winds, such as rocky outcrops, large boulders, or ravines. The presence of dung and features that facilitate the management of pack animals (U-shaped fences) at these sites, confirms the importance of caravans for prehispanic traffic across the region. The size differences among campsites seem mainly related to the intensity and persistency of use, as indicated by the presence of chronologically diagnostic materials of many different periods on the surface of the largest ones (Fig. 5).

The materials discarded at campsites could represent travel gear but could also relate to the cargo, particularly in the case of caravans, since

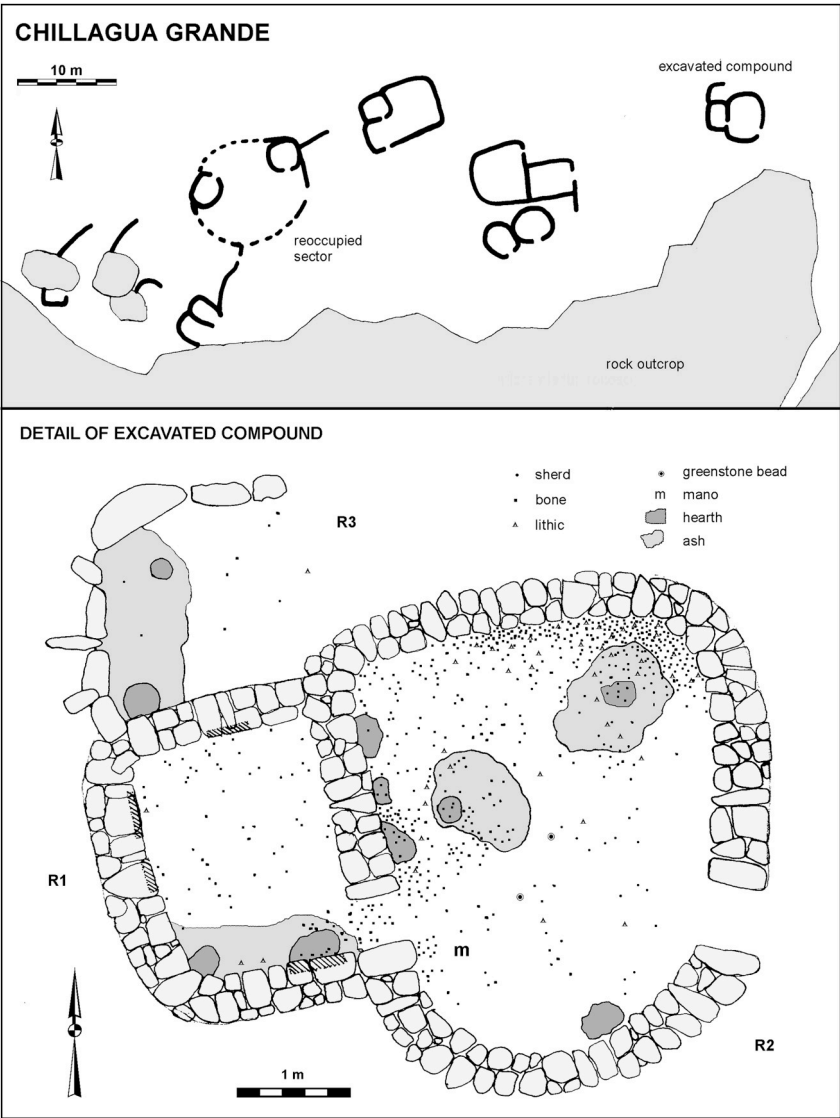


Fig. 3. Chillagua Grande (Jujuy, Argentina): site map and detail of excavated compound.

the operation of loading and unloading the animals afford many opportunities for the breakage and loss of transported items (Nielsen, 2001). This evidence can speak to many questions regarding ancient traffic, including its chronology and changing intensity in different periods, or the goods transported, among others. As mentioned before, during the LIP, the pre-puna and low-puna nodes of the Andes of Carpicorn developed distinctive ceramic repertoires, a phenomenon that

can be useful to determine the trade basins associated with different routes. A few examples can illustrate these possibilities.

Most of the campsites recorded around Laguna Colorada are associated with a heavily trafficked caravan trail traversing the basin, which connects Lipez with the Loa River and San Pedro de Atacama. A first cluster of campsites with LIP ceramics (N = 21) was found on the southwestern side of the basin, along the Huayllajara ravine, which

Table 2
Radiocarbon dates for contexts discussed in the text.

Area	Provenance	Context	Lab Code	¹⁴ C BP	Cal. 2σ AD	Material
Andean Lakes	Chillagua Grande	temporary	A-16293	639 ± 40	1298–1414	charcoal
	Puerta de Chillagüita	temporary	Beta 187360	670 ± 60	1277–1417	charcoal
Santa Bárbara	SBa-103, room 1	house	ISGS-2733	730 ± 70	1218–1403	charcoal
	SBa-103, room 31	house	ISGS-2732	720 ± 70	1222–1405	charcoal
	SBa-119, room 1/1	house	BETA-7319	480 ± 50	1400–1623	charcoal
Calate	Calate-3	shelter	AA98005	700 ± 34	1284–1392	charcoal
	CH6 E1 C4	shelter	Beta 275727	700 ± 40	1282–1393	wood
	Calate-6 (E1)	shelter	Beta 275731	520 ± 40	1396–1477	<i>Prosopis</i> sp.
	Calate-6 (E5)	ritual	Beta 275728	620 ± 40	1301–1429	<i>Prosopis</i> sp.
	Calate-6 (E5)	ritual	AA98006	550 ± 34	1395–1450	<i>Prosopis</i> sp.
	Calate-7	mortuary	Beta 476438	440 ± 30	1436–1622	textile

Dates calibrated with Oxcal 4.3 using the SHCAL13 curve.

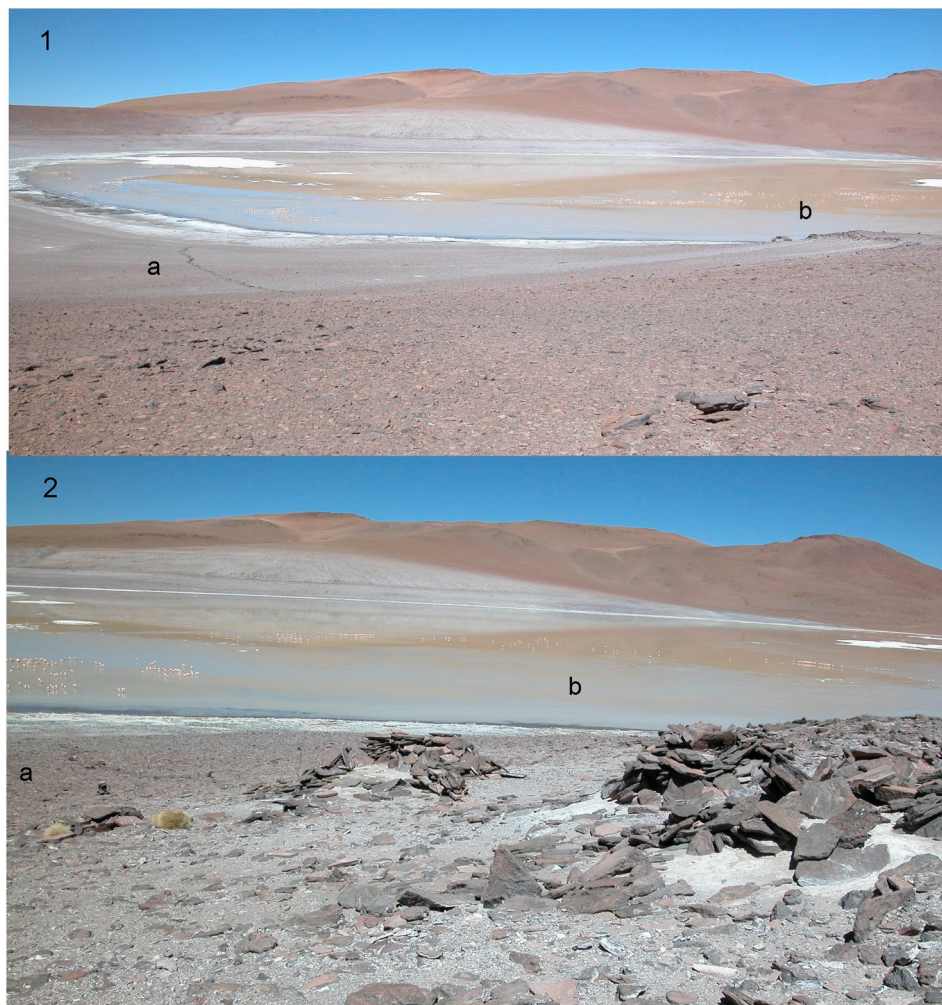


Fig. 4. Guayaques 3: (a) view of the hunting fence and (b) detail of the shelters/blinds.

offered a permanent water source and forage for the animals. A second concentration ($N = 10$) was identified in Peñas Negras, 10 km northeast of the lake and 20–25 km away from Huayllajara, approximately the distance that ethnographic llama caravans cover in a day (Nielsen,

2001). These clusters, then, probably represent consecutive overnight stops for interregional caravans travelling from the Atacama Desert nodes towards northern Lipez and beyond. These long-distance connections are confirmed by the LIP diagnostic ceramics found in these

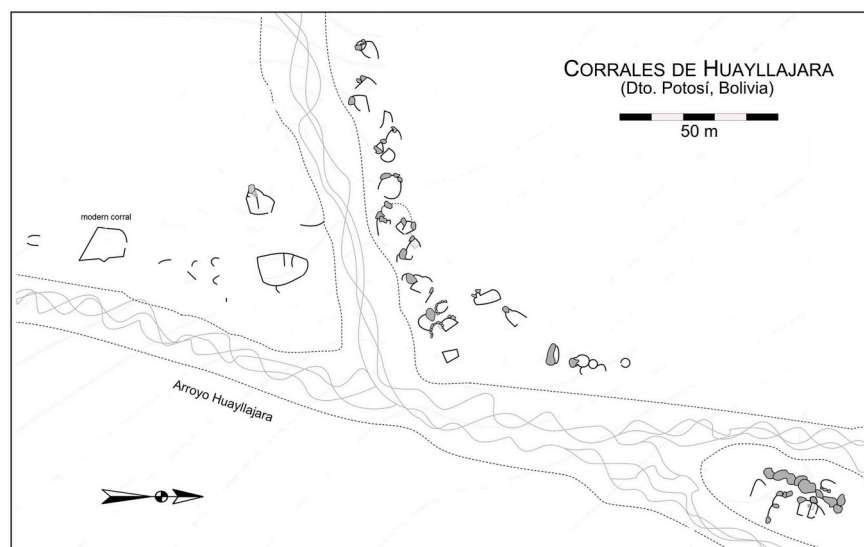


Fig. 5. Map of the multi-component caravan campsite of Corrales de Huayllajara.

campsites, which include mainly materials of the Loa/San Pedro (Atacama) and Mallku/Hedionda (Northern Lipez) components, but also low frequencies of Yura/Huruquilla (southern Potosi valleys) and Yavi/Chicha (Rio Grande de San Juan), attesting to links with more distant regions (Nielsen, 2013).

The LIP ceramics found in campsites associated with ancient trails in Laguna Vilama (N = 13) reveal connections with a different set of nodes. The most frequent diagnostic pottery is Yavi/Chicha, ratifying the close relationship between this basin and Río Grande de San Juan, followed by Loa/San Pedro, probably coming from the Atacama Oases. Less frequent ceramic groups include Casabindo black-on-red (Guayatayoc), Mallku/Hedionda (Northern Lipez), and Chilpe (Central Altiplano). An intensively used caravan trail runs from the lakeshore to the Tinte mountain pass, on the international Argentina-Bolivia border and 50 km northeast of the Laguna Blanca/Zapaleri obsidian source. Nodules occasionally found along this trail reveal its association with the distribution of this widely used obsidian toward NW Argentina, suggesting also that at least part of this material circulated as unworked cobbles.

Ritual features found along interregional trails are the third kind of evidence related to long-distance traffic in this region. The main ones are pits associated with offerings of “greenstone” and “whitestone” (tufa), including beads and residues of their manufacture (preforms, broken or rejected pieces, debris). These features are located on mountain passes and other points along the routes where pronounced changes in the landscape occur, from the eastern Andes to the Atacama Desert, a distribution that supports their connection with long distance trade (Nielsen et al., 2017). Offering pits have been dated to the LIP (Pimentel, 2009: 19), a chronology that is consistent with diagnostic ceramics occasionally found in them. Green or white beads and greenstone debris—interpreted as “food for the deities” (Berenguer, 2004)—are also very frequent in caravan campsites throughout the Andes of Capricorn, suggesting that the ritual gestures associated with them were common in the context of journeys.

4. Local herders and travelling caravans at Santa Barbara

Santa Barbara (3000–3200 masl) is a small place located on the upper Loa River, 65 km northeast of the city of Calama (Fig. 1). Since the Late Archaic Period (ca. 4000 BC), at least, people circulated along this part of the valley hunting, gathering, herding, and collecting raw materials, or stopped to rest on their way to farther destinations. Probably since the Early Formative Period (ca. 1000 BC), but more clearly since the first millennium AD, a caravan route coming from the agricultural nodes of the Middle Loa River ran up the valley. In Santa Barbara, this route split in different directions: north toward Tarapaca and the central Bolivian altiplano; west toward Quillagua, Guatacondo, and the oases of Pampa del Tamarugal; and east toward the salt flats of Ascotan and Carcote, and the Lipez altiplano (Bolivia).

Research in this part of the Loa River focused on the relationships between agro-pastoralists and pastoralists-caravaneers during the Late Intermediate Period, i.e., during the climax of prehispanic caravan trade in the region. Four lines of evidence were considered: pathways, small residential conglomerates, wall-and-box sites, and rock art (Fig. 6). Annual rainfall is low enough in this area to preserve the marks left by human activity on the land surface.

4.1. Pathways

Twenty-one pathway segments were documented, three of which show the raked pattern characteristic of caravan trails (Berenguer, 2004). These trails, which can be up to 7 m wide in some places, only converge between the *quebradas* of Quinchamale and La Isla, highlighting the importance that the southern part of the valley had for caravan traffic. One of them follows a south-north direction, connecting Lasana and Chiu Chiu with Tarapacá; another one runs southwest-

northeast, towards northern Lipez; the third one has a northwest-southeast, direction, communicating the Tarapacá region with the upper Salado river basin, Southeastern Lipez through the HALR, and, eventually, the Río Grande de San Juan or Chichas region. The materials found along the trails include camelid dung and LIP pottery, but also artifacts of the Colonial and Republican periods such as horseshoes, glass, and tin cans. There are also small rock cairns, probably serving as orientation marks for travelers, and simple windbreaks used as overnight protection for caravans.

4.2. Residential conglomerates: hamlets

Research on residential sites of this sector showed a clear change between the Laguna phase (AD 950–1200) and the later Quinchamale I and II phases. At some point in the late 12th century, Laguna phase sites SBa-153 through SBa-159—located in the central part of the valley—were abandoned; about the same time, the residential conglomerates of SBa-103 and SBa-119 were built in the Quinchamale-La Isla sector to the south, precisely where the caravan trails converge. The position of SBa-103 and SBa-119, next to the rock shelters on the talus of the canyon, resembles the campsites of the Laguna phase, but the new settlements are twice or three times larger, cover the entire talus down to the valley bottom, their structures (34 each) show more diversity (kitchens, possible sleeping areas, silos, and animal enclosures) and the associated deposits have more *de facto* refuse with higher diversity of functional classes. Moreover, rooms used for habitation have double stonewalls filled with mortar, stone foundations, and remains of collapsed roofs in their upper strata. These indicators suggest that the new sites were not intermittently used campsites, like those of the Laguna phase, but more complex residential bases. The presence of bone refuse and stone hoes, the proximity to wetlands and farmland, and the spatial organization of these settlements lead to the conclusion that they were small hamlets, permanently inhabited by herders-horticulturalists (Berenguer, 2004).

The ceramic assemblages recovered in the excavations reveal the same Loa-San Pedro component with two variants which correspond with two occupation phases. Quinchamale I (AD 1200–1300) is characterized by Dupont and Ayquina bowls, with higher frequencies of the former, while Quinchamale II (AD 1300–1450) has a majority of Ayquina bowls and large Turi-smoothed-red jars, with Dupont bowls only in small quantities (Berenguer, 2004). Both the architecture and pottery of these villages are very similar to those of late prehispanic settlements of the middle and upper Loa region, leaving no doubts about the affiliation of their residents with the Loa-San Pedro regional collective. A few fragments of late, exogenous ceramics like Chiza Modelado (Tarapacá), Mallku/Hedionda (Northern Lipez), and Yavi/Chicha (Rio Grande de San Juan), reveal connections between local herders and nodal regions more than 100 km away, precisely in the directions followed by the interregional trails that pass through this sector.

4.3. Wall-and-boxes sites

These sites are located on the upper, surrounding plains, close to the edge of the Loa canyon. They consist of one or more arc-shaped walls, with rows of small rectangular features inside made with four to six slabs set into the ground (Fig. 7). These “boxes” are associated with rock cairns and pedestrian trails. The bisector of the arc that links the wall with the cairn, is always aligned with the summit of one of the outstanding mountains of the area.

Of the 25 wall-and-boxes sites found in this sector, 22 were contemporaneous with the SBa-103 and SBa-119 villages, particularly with the Quinchamale II phase. Seven of them, located on the plain east of the canyon and including 19 walls and 69 boxes, were investigated. Narrow pedestrian trails connect the wall-and-boxes with the villages, indicating that the local population visited the ritual features

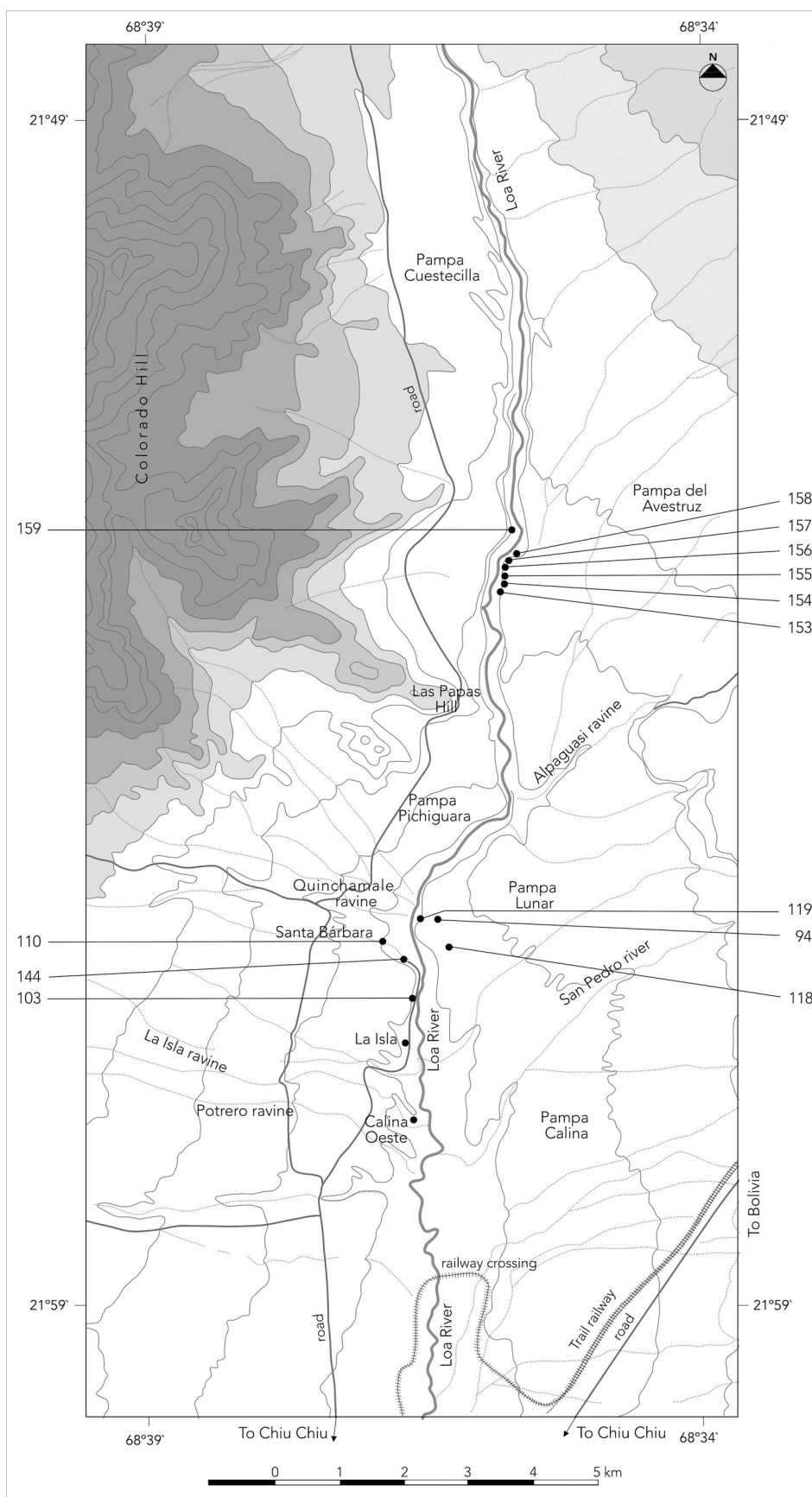


Fig. 6. The Santa Bárbara sector (Alto Loa) showing the main sites and the geographic features mentioned in the text.

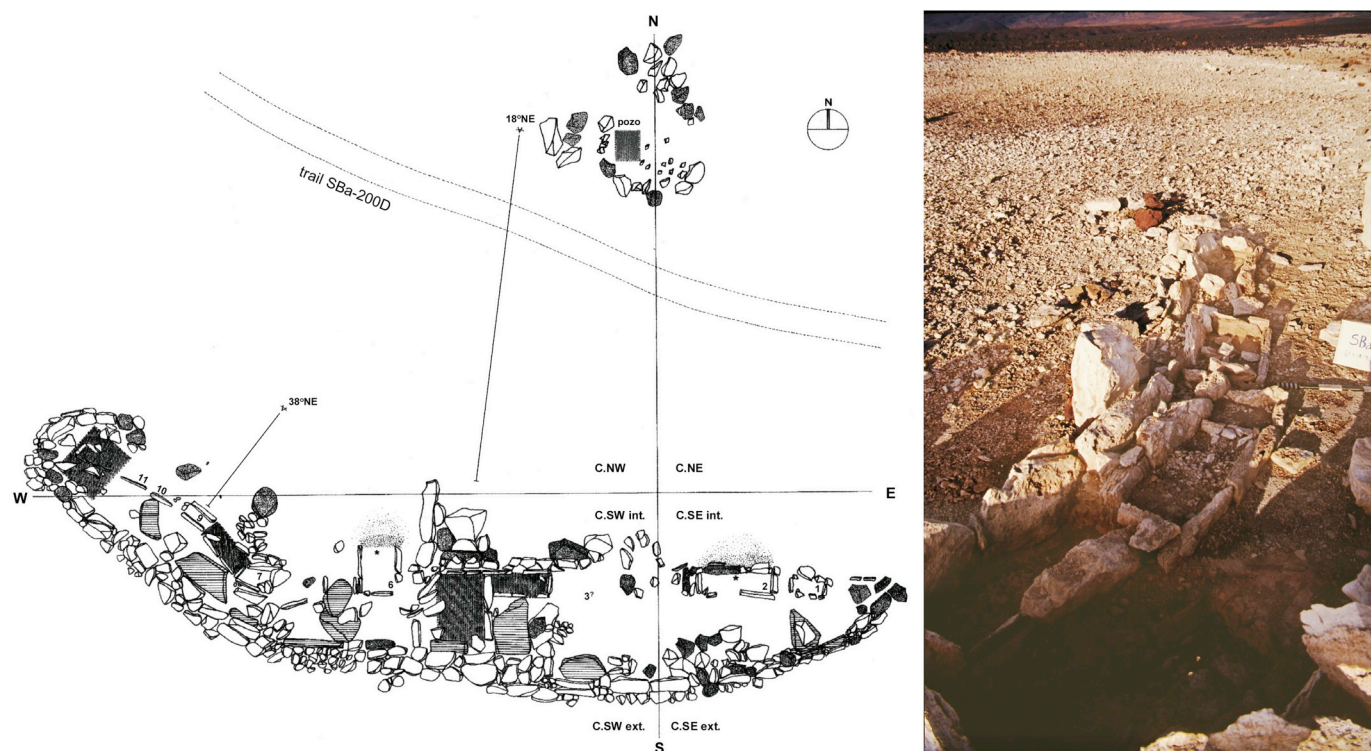


Fig. 7. (a) Plan of the wall-and-boxes site SBa-94. Crosshatching corresponds to slab stones and shaded rectangles to the excavated areas. The cord of the arc formed by the wall is 5.5 m long. (b) View of wall-and-boxes site SBa-118.

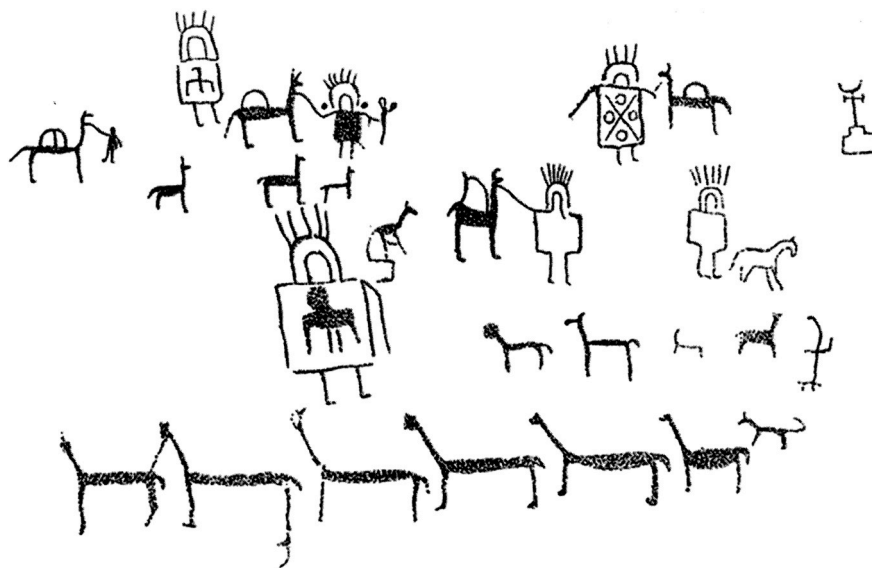


Fig. 8. Engravings of the Santa Bárbara I style, panel VIII, site of SBa-144.

frequently. Multiple lines of evidence, however, including the three interregional trails, indicate that these structures were also the focus of ritual activities conducted by caravaneers in transit, probably as part of travel ceremonies related with the earth and the mountains. Among other things, the offerings include fragments of marine shell, greenstone beads, and finely ground copper minerals like those found in ritual features and campsites along interregional routes throughout the area. There are refitting fragments of vessels with no use wear scattered around every cairn. The concentration of these sites almost exclusively in the area between the *quebradas* of Quinchamale and La Isla, and their connections with the villages of SBa-103 and SBa-119 through raked

trails, also single out the southern part of Santa Barbara from the perspective of caravan traffic (Berenguer, 2004).

It is worth noting that the wall-and-boxes sites of Santa Barbara are almost identical in form –and partially in content– to those in Lasana and Chiu Chiu (Pollard, 1970; Thomas, 1978; Pimentel, 2009), though much smaller and less numerous. Since similar concentrations of these kinds of sites have not been reported elsewhere, it can be concluded that these features are part of the cultural repertoire of the Lasana-Chiu Chiu community. In addition to their role as stages for the cult of telluric deities, these sites apparently served as identity markers for caravaneers affiliated to this node.

4.4. Rock art

There are two rock art styles related to the LIP occupations just discussed: Santa Barbara I and Santa Barbara II. The former consists in small camelid figures engraved with straight lines (15–20 cm wide and tall), sometimes represented in rows of three or more animals tied by a rope, on occasion preceded by a simple human figure (Berenguer, 2004). In only three sites of this style, the camelid motifs form more complex compositions, including frontally depicted human images with helmets and rectangular tunics with designs inside (circles, dots, Xs, birds), or wearing cuirasses (e.g., SBA-144). Many of these characters carry or are accompanied by objects such as scepters, feline pelts, disembodied heads, axes, or “Andean crosses.” Sometimes, one of them is joined to a loaded camelid by a rope; in others, they are associated with dotted felines, unidentified quadrupeds, and a variety of other designs without known referents (Fig. 8).

The Santa Barbara II style, on the other hand, consists of anthropomorphic figures with trapezoidal tunics and *escutiformes*, a motif that has been alternatively interpreted as personified axes or as individuals holding shields or wearing a particular kind of garment (López Campeny and Martel, 2014; Montt and Pimentel, 2009). These images were painted on the walls of the rock shelter SBA-110 and its close vicinity. There are also a few camelids in profile, amorphous smudges, and geometric labyrinthine motifs with no recognizable referents. Visually, the anthropomorphic figures wearing tunics and *escutiformes* are the most conspicuous motifs, mainly because of their central position in the shelter, but also because of their size (up to 45 cm tall), which is considerably larger than any other motif. The labyrinthine designs have intermediate sizes, but they are in a peripheral position within the site (Fig. 9).

An analysis combining iconographic comparisons with archaeological objects and well-dated rock art, superpositions, and dates of

deposits adjacent to rock art demonstrate that styles Santa Bárbara I and II do not belong to the local tradition (Berenguer, 2004), characterized by less-schematic forms tending toward naturalism (Berenguer, 2005). On the contrary, they correspond to a foreign and widely distributed caravan-related iconography, which breaks into Santa Barbara during the Late Intermediate Period, and is basically contemporaneous with the network of caravan trails, the hamlets, and the wall-and-boxes sites. The fact that almost all the sites and panels exhibiting these rock art styles, as well as the largest quantity, variability, and density of related motifs are located between Quinchamale and La Isla, points once more to the southern part of Santa Bárbara as an important place from the perspective of caravan traffic. Indeed, taking into consideration both styles, 22 sites with 107 rock-art panels cluster between these two *quebradas*, in an area no larger than 1 km². By contrast, only 10 sites with 11 panels are found outside, distributed over a valley area of almost 8 km².

We believe that the strong emphasis that Santa Barbara I and II rock art styles place on the representation of individuals carrying a variety of headdresses, garments, and other social diacritics, occasionally accompanied by loaded llamas, suggests that rock art served as a visible and durable mark of identity and group affiliation. It is possible to observe in these diacritics diversity, exaggeration, and redundancy, three aspects that are important when communicating cultural affiliation in contexts of interaction organized around scarce or critical resources (Schortman, 1989; Schortman and Urban, 1987). Such is the case of Santa Barbara, a strategic place for the logistics of long-distance caravans because it offered resources which pack animals could not do without if going into still more arid areas, where they had to endure several days without enough water or forage. This is probably the reason why personages with rectangular and trapezoidal tunics were represented in this place, considering that the former were typical Atacama, while the latter were characteristic of Tarapacá, to the north



Fig. 9. Paintings of the Santa Barbara II style, site of SBA-110.

(Agüero et al., 1997). This would also explain the portrayal of *escuti-formes*, an icon that is a hallmark of Northwest Argentina. Taking into account that both styles are relatively heterogeneous in iconographic and stylistic terms, and considering that both concentrate mainly between Quinchamale and La Isla, it can be concluded that different groups of caravaneers considered this place to be important, that they regularly held their contacts and interactions there, therefore, they proceeded to mark and signify it. Through the iconic materialization of their identity and affiliation on the rocks, they were proclaiming in public and durable ways their rights to traffic along the valley, to access its resources, and to use rock shelter SBA-144 as a regular resting area.

5. Calate: encounters between coastal travelers and inland caravans in the desert

Calate is a small area located in the transition between the Intermediate Depression of the Atacama Desert (*pampa*) and the Coastal Cordillera (700 masl), where the Loa river takes the last turn towards the west and 25 km before it reaches the Pacific coast. Currently, it is the border between the Antofagasta and Tarapacá regions of northern Chile (Fig. 1). Calate is a remarkable “archaeological laboratory” for the internodal study of mobility, firstly, because of its temporal depth and redundancy as a place of transit, beginning some 7000 years ago, and continuing with variable intensity until the mid-20th century. It is also important because it served as an “intercultural circulation funnel,” a bottleneck where pathways connecting the Pacific coast (Caleta Huelén) with the nodes of Tarapacá (Guatacondo, Pica) and Atacama (Quillagua, Calama) necessarily converge, generating frequent encounters among travelers coming from different regional communities.

Abundant evidence dating to the LIP was found in Calate, attesting to the diversity of practices and functions associated with mobility across the desert during this period. These include caravan trails and associated campsites, ritual features of various kinds, geoglyphs, rock engravings, and burials. The large number of sites with diagnostic LIP materials in this small stretch of desert (15 out of 28) and several AMS dates reveal that traffic was very intense during this period (Fig. 10, Table 2). One of the LIP sites has only rock engravings and 14 were used as overnight stops or resting camps, with two variants. One of them consists of semi-circular structures or windbreaks made of dry stone ($n = 12$ sites); the second one ($n = 6$ sites) corresponds to clusters of

oval depressions excavated into the ground, which have proven to be simple shelters used by travelers (Pimentel et al., 2017a). Two sites also have geoglyphs, eight have irregular cairns, seven have “stone lines” (Pimentel, 2009: 29–32), and one has a *camachico*, a type of LIP ritual feature associated with the most sophisticated offerings known from internodal contexts (Pimentel et al., 2017b).

Archaeological data (e.g., stable isotopes in human bone, burial artifacts) reveal the presence of coastal groups and caravaneers from the interior circulating through Calate since the Formative Period (Pestle et al., 2015; Pimentel et al., 2017a; Torres-Rouff et al., 2012). During the LIP, the great diversity of regions and geographic macro-zones represented in the archaeological materials reveal that this corridor was part of a vast trade network. Among the LIP pottery groups identified, for example, the Loa/San Pedro component from Atacama predominates, followed by typical groups from Tarapacá (e.g., Pica-Charcollo, Pica-Chiza). These results are consistent with previous studies in the nearby oasis of Quillagua, where multiple lines of evidence have demonstrated the coexistence of people from those two regional collectives (Agüero et al., 1997; Gallardo et al., 1993). There are also ceramic styles from more distant places, like San Miguel from Arica (> 300 km north), Mallku/Hedionda from Northern Lipéz (> 200 km east), Isluga from the altiplano of Tarapacá (> 250 km northeast), and –remarkably because it is the most frequent foreign component— Yavi/Chicha from Rio Grande de San Juan on the Eastern Andes (> 450 km).

The offerings deposited in *camachicos* (Pimentel, 2009) also reflect the vast scope of LIP trade. The excavation of one of these small mounds (Calate-6, E5) rendered materials coming from places distributed at different altitudes over 600 km along the Andes of Capricorn, from the Pacific coast to the eastern forests (Fig. 11). They include items from the Pacific Ocean (pelican feathers and bones, mollusks, fish remains), the oases and valleys (*Prosopis* sp. and *Geoffroea decorticans* fruits, maize, Loa/San Pedro pottery, textiles, camelid fleece), mineral districts of the desert and the highlands (small plaques of copper and gold, turquoise beads, hematite, gypsum plaques, lithic debris), and the eastern lowlands (feathers of guacamayo and other tropical birds). If materials were understood as somewhat “consubstantial” with their places and communities of origin, gathering the highest possible diversity of them in ritual may have been a powerful way of promoting fluid relationships among the contrasting ecozones and social worlds involved in the network (Pimentel et al., 2017a). This must have been

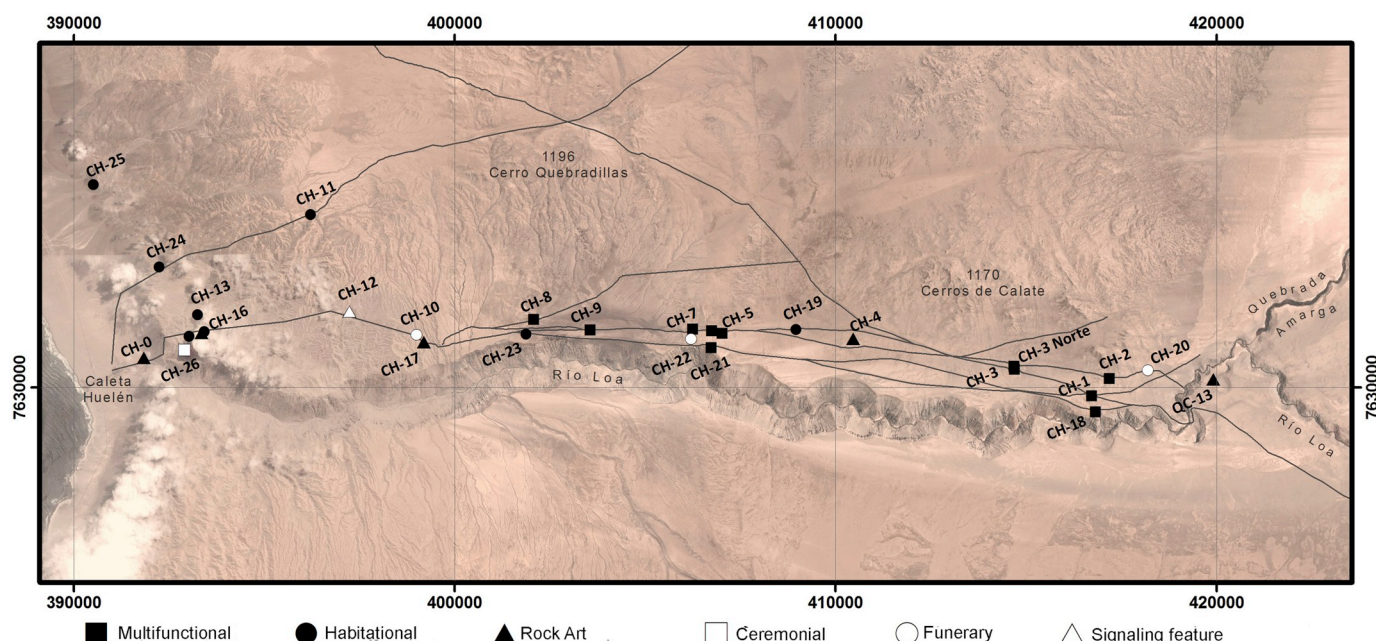


Fig. 10. Archaeological sites recorded in the Calate-Caleta Huelén sector.



Fig. 11. Examples of the diversity of goods offered in the *camachico* site Calate-6, E5.

of special concern for travelers, given the conflicts that characterized the period.

At this point, it is relevant to consider an individual who died on the road and was buried in Calate (Calate-7, E5), because he synthesizes the intercultural character of long-distance journeys in the 15th century and the complex role that social diacritics played in this practice. The calibrated range of the associated date is AD 1437–1621, but the event can be confidently attributed to the end of the LIP, given the characteristics of the context (Pimentel et al., 2017a; Torres-Rouff et al., 2012). The body was bundled and naturally mummified, with three leather sandals placed on his feet, knees, and left shoulder, respectively. He also had two complete wooden spindles with their whorls and a small bag made of fine, white weaving containing an ear of corn and a few *Prosopis* pods. Removing the textile bundle, a small pin (*tupu*) was found on his chest and a necklace made of (yet unidentified) black seeds, probably coming from the eastern lowlands. Most importantly, he was buried with three tunics, two blankets, a bag made with camelid fiber, and a skirt. According to the analyst (Cases, 2010), the tunics belong to the LIP, but two of them show the characteristic Tarapaca style while the third one is typical Atacama. In other words, he could dress as a herder-farmer from Tarapacá or from Atacama, but he also carried a skirt, probably a reference to coastal communities, who still wore this kind of clothing during the LIP. Even if the relationships among these particular regions and social collectives were regulated by alliances and other territorial agreements (e.g., Agüero et al., 1997; Núñez and Briones, 2017), this heterogeneous dressing kit suggests that certain ability to manipulate identities in different contexts was important for travelers in a period riddled with interethnic conflicts across the Andes.

A LIP geoglyph associated with a trail variant connecting Quillagua with Caleta Huelén depicts a scene where four anthropomorphic figures seem to enact one of these encounters between coastal and inland people (Fig. 12). Note in the upper part that the former are represented with semi-flexed legs and standing on rafts, with animation gestures and in perspective, creating the illusion that they are “navigating through the desert.” They seem to be moving eastward, with their heads

turned back towards the coast located some 50 km away. Beneath them, there are two frontally depicted anthropomorphic figures, in a rigid attitude and wearing exaggerated social diacritics (trapezoidal tunic and half-moon headpiece), proclaiming their collective affiliation with the inland oases in this symbolic encounter. The four “Andean crosses” next to these human figures, together with other simple geometric motifs (cross, circle), complete the eastern part of the scene. Whether these signs place a frontier between coastal and inland territories or represent an alliance between these groups, they leave no doubts regarding the importance of collective identities in the context of inter-regional mobility.

6. Discussion

The research summarized before illustrates some of the possibilities offered by an internodal approach for studying circulation, mobility, and the changing social conditions in which they took place. It demonstrates, for example, that long-distance traffic in the Andes of Capricorn during the LIP was the aggregate result of multiple mobility strategies, with their own agents and social constraints, operating simultaneously but in different areas, interaction settings, and socio-political conditions. This idea is not new; decades ago, ethnohistorians had anticipated that late prehispanic trade in the Andes involved pack animals and human carriers, highland caravans and coastal merchants, ethnic archipelagoes and specialized traders (Murra, 1965; Rostworowski, 1977). Relying mainly on non-local items found in nodal settlements, early archaeological models also proposed a range of possibilities, including various forms of “verticality,” caravans operating under different socio-political arrangements, itinerant fairs, sequential exchange, etc. (Berenguer et al., 1980; Browman, 1980; Núñez and Dillehay, 1979; Pollard, 1984). Internodal archaeology, however, can contribute data that are directly relevant for testing the validity of these general hypotheses in specific times and places, reveal new, unanticipated strategies and variants, or inform on significant details of all these practices that are beyond the reach of written sources or nodal perspectives.



Fig. 12. Geoglyph of “Los Balseros”, near Quillagua. The individual on the largest raft is 12.60 m long (Photo courtesy Fundación Patrimonio Desierto de Atacama).

Table 3

Three mobility strategies and their characteristics.

strategy	seasonal verticality	Inland		caravans
		residential	logistical	
nodal origin	pre-puna to high-puna	Pacific coast		lower oases to high-puna
agents	households, task groups?	households	task groups	herders “caravaneers”
economic goals	hunting & gathering, lithic procurement	gathering, exchange	lithic procurement	exchange
transport; kg/person	human back, llamas?	human back, wooden carriers; < 50 kg		llamas; up to 600 kg
circulated materials ^a	lithics, kill, chinchilla pelts, vicuña fleece, feathers	shell, dry fish, harpoons, <i>Prosopis</i> , <i>Geoffroea</i> , maize, manufactured goods	chert	all sorts & different regions
range ^b	< 100 km	100 km		300–400 km

^a All strategies involve the circulation of personal gear.

^b Estimated linear distances.

The internodal studies presented provide direct information on three mobility strategies that coexisted in the study area during the LIP, which we call seasonal verticality, inland mobility, and caravan. Certainly, these were not the only ones effective at the time (node-to-node personal or political visits, raids, itinerant specialists, and migrations are some of the other possibilities), but their combination was probably responsible for the bulk of interregional traffic. We characterize each one of them (Table 3) and their articulation into more complex circulation chains, discussing also the ways in which they may have operated in the context of social unrest that characterized the LIP.

6.1. Seasonal verticality

This kind of mobility, which has ancient roots in the area (Núñez and Santoro, 1988), was probably practiced by communities from all the nodes surrounding the HALR above 2000 masl, including agropastoralists and specialized pastoralists alike. Its main economic goals were hunting camelids and large rodents, procuring high-quality lithic materials, and collecting flamingo feathers and eggs; therefore, it clearly took place during the summer.

The substantial temporary settlements recorded suggest that some of these were “residential moves” (*sensu* Binford, 1980) involving entire households, perhaps several families from the same villages who co-operated in collective hunts, as observed by Bowman in the early 20th century in Atacama:

“Late in February or early in March, the men of Aguas Blancas and Toconao go into the mountain country in search of vicuña. On the fifteenth day after the carnival the villages are almost depopulated.

The women string threads across the valleys down which the animals are to be driven –for the vicuña will not pass a thread or rope stretched across his path. The men scatter widely in order to keep the quarry in the ravines. The hunters are mounted, and when the vicuña become confused and huddled they are easily shot.” (Bowman, 1924:247–248)

It is also possible that some communities accessed these resources through logistically organized task groups, as indicated by smaller and more precarious sites related to similar activities. The LIP levels at the site of Laguna Hedionda (Barfield, 1961), associated with Mallku/Hedionda ceramics from Northern Lipez, is a case in point.

Nonlocal materials circulating into the nodal regions involved in this strategy were lithics (obsidian, basalt, and chert), feathers, and hunted animals, both their carcasses (perhaps as dry meat or *charki*) and derived products, such as chinchilla pelts and vicuña fleece. It is possible that a similar strategy of seasonal verticality was practiced between pre-puna nodes –like Quebrada de Humahuaca— or low-puna nodes –like Guayatayoc— and the heights of the Eastern Andean Cordillera, resulting in the circulation of different high-altitude resources. If this was the case, it is likely that this “eastern variant” of seasonal verticality was closely tied to herding, taking into consideration that those areas offer better opportunities for summer grazing than the western Andes.

In the cases analyzed, these movements covered minimum distances of 40 km (e.g., Likan-Puerta de Chillagüita) to 90 km (Bilcapara-Chillagüa Grande). The distances between other nodes and the closest lakes fall within this range, e.g., 40–60 km for Northern Lipez, 60 km for Guayatayoc. The concentration of regionally diagnostic ceramics in

temporary sites located in different sectors of the HALR, suggests that there may have been territorial agreements whereby each group had especial rights over areas closest to their nodal regions. Communities from Atacama, then, would occupy the western lakes, from Northern Lipéz the northern ones, and from Rio Grande de San Juan the eastern ones.

6.2. Inland mobility

A second strategy involved the movement of coastal groups inland. These movements, which left substantial traces in the archaeology of Calate, also have deep temporal roots (Pimentel et al., 2011). It had two variants with different agents, goals, and logistical constraints. One of them featured individuals and whole family groups who temporarily moved residence to the lower oases, like Quillagua, to obtain wild fruits (*Geoffroea decorticans*, *Prosopis* sp.), agricultural products (e.g., maize), and other goods offered for exchange by local communities (Pimentel et al., 2017a; Torres-Rouff et al., 2012). In addition to the inland resources and other goods that these groups brought back to the coast, this strategy also involved the circulation of coastal items for exchange and consumption by local farmers and herders. This would account for the high incidence of marine resources in the diets of many individuals buried in the cemeteries of Quillagua and Pica (Santana-Sagredo et al., 2015a, 2015b). Framed by broader alliances between coastal and oasis communities, some of these inland excursions may have resulted in longer stays, even permanent migrations (Núñez and Briones, 2017). This strategy covered distances up to 90 km, taking the oasis of Pica as a reference.

A different variant of inland mobility documented by other studies in the low desert internode (Borie et al., 2017; Pimentel et al., 2011), probably engaged only small, logistically-organized task groups in search for chert and other raw materials for knapping, which are scarce along the coast. These expeditions, which could reach up to 100 km inland, resulted mainly in the flow of high-quality lithics and perhaps other mineral resources (e.g., gypsum [Blanco et al., 2017]) to the coast.

6.3. Caravans

The third strategy involved llama pack trains or caravans. The great diversity of regionally diagnostic ceramics found in LIP campsites and the importance that “caravan motifs” acquired in rock art throughout the Andes of Capricorn, indicate that most communities who engaged in pastoralism, whether specialized or diversified, from the high puna to the lower oases of Atacama and Tarapacá, participated to some extent in this kind of mobility. Substantial traces of caravan traffic have been identified, not only in the three areas discussed in this article, but in all the internodal spaces of the southern Andes which have been systematically studied, from Arica to the southern puna, from the pampa to the eastern forests (e.g., Briones et al., 2005; Martel, 2014; Nielsen, 1997; Valenzuela et al., 2011). Taking this evidence into account, the large quantity of goods that caravans can transport, and the long distances they can travel, there is no doubt about the importance that this form of mobility had for prehispanic traffic, probably since the beginnings of pastoralism (Núñez and Dillehay, 1979).

Exchange was the main goal of long-distance caravans, but they also obtained resources on the move. Hunting and gathering allowed caravans to get supplies during the journey, while other resources may have been collected along the way for later exchange, as exemplified by the association of campsites, quarries, and raked trails at the obsidian source of Laguna Blanca/Zapaleri. Given these goals, their transport capacity, and the diversity of regions connected, it is likely that caravans carried all sorts of goods from many different regions. This conclusion finds support in ethnographic data showing that modern *llameros* take a variety of goods with them in order to take advantage of different trading opportunities that may come up along the journey. It is

also consistent with the remarkable diversity of goods offered in ritual features associated with this form of mobility (*camachicos*, wall-and-boxes, etc.).

These advantages notwithstanding, caravans posed significant logistical demands; therefore, they were more sensitive to changing sociopolitical conditions than other forms of mobility. Most importantly, llamas need to be fed daily and periodically must rest for several days to graze properly and replenish their strength. Even if they carried some forage to supplement local resources in the most difficult parts of the route, long-distance caravans could not operate without access to resting areas with good pasture distributed throughout the area covered by their journeys (Nielsen, 1997). This constraint is not as restrictive in the altiplano or in the eastern Andean flanks, where pastures are relatively abundant, supporting many different routes to reach the same destinations and offering many areas for caravans to rest. But it is critical in the desert, which is impossible to traverse with llamas unless one has access to the oases. The great visibility that emblems of social affiliation had in the caravan-related rock art of Santa Barbara, or the participation of local and foreign herders-caravaneers in the ceremonies held at wall-and-boxes, are eloquent expressions of the importance that the access to these resource patches had for caravans. These negotiations must have been especially difficult and unstable during the LIP, given the general state of conflict that characterized the latter part of the period throughout the Andes (Arkush and Tung, 2013). The weapons and armory depicted in the rock art of Santa Barbara and other sites associated with both herding and caravans across the Andes of Capricorn (Nielsen, 2007), are consistent with this interpretation.

The situation may have been different in the lower oases (< 2000 masl) of the western flanks. Agüero et al. (1997), for example, argue that communities from Atacama and Tarapaca shared the strategic oasis of Quillagua during the LIP without resorting to violence, while Núñez and Briones (2017) envision an alliance between coastal and inland people in the Tarapacá region which secured access to complementary resources for both groups. Even if these political agreements granted the movement of members of these three collectives across their territories, it is unclear to what extent these privileges applied to caravans coming from the altiplano or beyond. Were they able to reach the coastal nodes with their animals or they had to stop at the higher oases, leaving the distribution of goods among the lower nodes in the hands of caravaneers from Tarapaca and/or Atacama? Further internodal research in the pampa, where the bodies of travelers who died on route are occasionally found, can contribute to answer this question (Pimentel et al., 2017a).

6.4. Mobility practices, sequential exchange, and circulation chains

Each one of these forms of mobility –and others yet to be studied– made distinctive contributions to the circulation of goods across the Andes of Capricorn during the LIP. Even if –arguably– caravans carried the bulk of this traffic, the importance of other practices should not be underestimated but rather assessed for specific cases against relevant data. Internodal studies are critical in this regard, since they allow to identify the intervention of different practices contributing to the total pool of non-local goods found in consumer nodes. To approach the real complexity of the processes underlying broad scale circulation patterns, however, one also needs to consider the articulations among different mobility strategies and the transactions involved.

Consider the obsidian from Laguna Blanca/Zapaleri reduced into projectile points at Chillagua Grande as a first example. The temporary inhabitants of this site may have gone to the source to collect the obsidian directly, a journey that would have taken a total of three or four days, at least. Alternatively, they may have traded it from passing caravans, like those travelling along the raked trails that enter the Vilama basin through the Tinte mountain pass, clearly associated with the movement of this material.

The copper minerals worked into greenstone beads at the same site

point to other possibilities. As mentioned before, the origin of this material lies in the western Andean flanks, so it is unlikely that people coming from the eastern nodes to Chillagua Grande in the summer procured it directly from the source. Certainly, they could have acquired it from passing caravans as well, but it is also possible that they exchanged it with groups coming from the Loa or Atacama nodes to temporary settlements like Puerta de Chillagüita, on the western part of the region. In other words, the convergence of groups of different origin engaged in seasonal verticality would have turned the HALR into a privileged stage for interethnic exchange. Considering that these transactions would have been subordinated to movements, activities, and encounters organized around hunting and gathering, the concept of “embedded traffic” was proposed to refer to the circulation of goods resulting from this kind of practice (Nielsen, 2006).

A different situation is represented at Santa Barbara, where caravans of different origin stopped to rest for several days during long-distance journeys (Berenguer, 2004). Ethnographic observations show that when caravans stop to rest, they reward local herders who share their resources through presents and preferential trade opportunities (Nielsen, 2001). During the LIP, wall-and-boxes probably staged rituals of hospitality of this sort, which resulted in the exchange of significant amounts of goods of distant origin. Some of them may have been carried further west by the residents of Santa Barbara –perhaps with the aid of their own pack animals— and eventually traded at other nodes of the desert or of the coast. If highland caravans were able to proceed into the desert, they may have exchanged directly with the farmers of the lower oases like Pica or Quillagua, or even with coastal people visiting them as part of their inland rounds. Similar exchanges could also take place at specially designated places or ports of trade, as proposed by Núñez and Briones (2017).

These examples do not exhaust the possibilities, but they suffice to conclude that the circulation of goods at long distances in the Andes of Capricorn during the LIP involved complex chains combining different transactions, intermediate agents, and mobility strategies. They also suggest that people could access items from distant places in more than one way, a redundancy that would have made very difficult for any group or social sector to control traffic or to prevent others from obtaining highly valued goods in circulation.

6.5. The social context of LIP mobility

It could be argued that these multiple forms of mobility are incompatible with the state of endemic warfare that has been inferred from the evidence of most nodal regions. One way of solving this apparent contradiction, is to consider the existence of norms regulating hostilities, “rules of engagement” that granted the minimum conditions necessary for the material reproduction of the communities involved. Again, a combination of nodal and internodal data seems the best way of approaching the problem.

Evidence of conflict has been recorded in the Atacama valleys and oases, Northern Lipez, and Río Grande de San Juan, but seems to be absent in the HALR, where groups from these three nodal regions converged in the summer. Two kinds of rules could allow peaceful coexistence and even exchange in this context. One of them would involve territorial agreements that entitled each group to exploit different areas, a possibility that finds support in the distribution of diagnostic ceramics in discrete sectors of the region. Another one would be the prohibition of hostilities during certain parts of the year, during the rainy season in this case. Such a rule would also grant temporary safety to a significant part of the nodal populations who would need to stay away from the protection of pukaras and defensive villages during this same season, working the fields and tending the herds, among other tasks (Nielsen, 2018).

Long-distance caravans may have operated under different rules. Ethnographically, this activity is concentrated between May and August, a timing that facilitates the articulation of this mode of

circulation with various productive cycles. Thus, caravaneers leave their homeland when the demands of agro-pastoral labor wane and take part of the herd away when pasture becomes scarce in the highlands. This also leaves enough time after the harvest for agricultural products such as maize and potatoes to be dehydrated, so they can be effectively carried on pack trains. There are limits to this analogy, because pre-hispanic caravans carried a wider variety of goods, which may have posed different temporal constraints. But the possibility that these journeys concentrated in the winter, the most likely warfare season according to the previous argument, justifies entertaining other hypotheses to reconcile war and trade, e.g., that caravaneers –or some of them— enjoyed a special status *vis a vis* armed hostility. This idea finds support in the absence of fortified sites in the high-puna regions of the Andes of Capricorn, associated with a specialized herding economy, which suggests that at least these pastoralists were less threatened by the conflicts of the time.

The elaborate ritual protocols and iconographic investments regulating the encounters between caravaneers of different origin and local communities in Santa Barbara, the concentration of geoglyphs in key segments of the routes that cross the desert (e.g., Calate), and the importance that social diacritics have among these representations (Núñez, 1976) are all consistent with the idea that territorial constraints weighted selectively on caravans during the LIP.

The coexistence of groups from Atacama and Tarapaca in Quillagua (Agüero et al., 1997; cf. Santana-Sagredo et al., 2015b) may have involved political agreements between these groups which also cleared the way for caravans and other travelers along shared routes such as Calate, but it is still open to question whether members of other communities enjoyed similar rights. Even in this case, the data suggesting situations of conflict in this internodal corridor or the case of the man carrying different emblematic attires, attest to the conflicts that must have occasionally occurred at “intercultural circulation funnels” like this one in times of turmoil.

7. Conclusion

It was proposed that archaeological research in internodal spaces can provide important and non-redundant information to understand the mobility strategies responsible for the circulation of goods at long distances and their socio-political context. The possibilities of this approach for the study of LIP circulation systems in the Andes of Capricorn were illustrated through research conducted in three such spaces distributed in different ecological zones.

These data revealed three mobility strategies –among others to be identified—operating simultaneously in different parts of the study area. One of them involved task groups and entire households converging in the HALR to hunt, gather, and exchange. This high-altitude internode was also traversed by caravans coming from various parts of the altiplano and from pre-puna nodes on both flanks of the Andes. Some of these caravans reached resting areas located in the high oases and valleys of the Atacama region, like Santa Barbara, where they exchanged with local pastoralists and perhaps with caravans coming from other regions. The evidence from Calate show both caravans travelling to the coast and coastal groups moving inland. The former involved herders from Atacama and Tarapacá, although the possibility of highland caravans reaching the lower oases and the coast cannot be ruled out at present. The articulation of these and other forms of mobility simultaneously practiced during the LIP resulted in complex circulation chains or sequential trade (*sensu* Pollard, 1984).

The vast and highly connected network that resulted from these practices kept a relatively de-centralized structure in the long term and managed to survive even in the climate of endemic, interethnic hostility that characterized the LIP across the highlands. A combination of nodal and internodal evidence suggests some testable hypotheses regarding the social norms that allowed different mobility strategies to operate during this “Age of Warriors.”

Acknowledgements

Research was funded by National Geographic Society (Grant # 7552-03) and FONDECYT (Proyecto 1181750). Michael Glascock analyzed the obsidian samples from the High Lakes region through INAA. Heather Lechtman and Andrew MacFarlane analyzed the lead isotopes in malachite samples.

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