



**HAL**  
open science

# Genealogies and Juxtapositions: Traces of Potting Communities and Firing Facilities in Lake Titicaca Basin

Andrew P Roddick, François Cuynet

► **To cite this version:**

Andrew P Roddick, François Cuynet. Genealogies and Juxtapositions: Traces of Potting Communities and Firing Facilities in Lake Titicaca Basin. *Journal of Archaeological Method and Theory*, 2020, 10.1007/s10816-020-09491-6 . hal-03099339

**HAL Id: hal-03099339**

**<https://hal.sorbonne-universite.fr/hal-03099339v1>**

Submitted on 6 Jan 2021

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Genealogies and Juxtapositions: Traces of Potting Communities and Firing Facilities in Lake Titicaca Basin

Andrew P. Roddick<sup>1</sup> & François Cuynet<sup>2</sup>

Accepted: 26 October 2020/ Published online : 18 November 2020

Springer Science-Business Media, LLC, part of Springer Nature 2020

## Abstract

In this paper, we develop a genealogy of practice approach for the historical analysis and comparison of Andean ceramic firing. This effort was set in motion by the similarity of two sets of ash mounds observed in the Lake Titicaca Basin of Bolivia, one modern and one from the Late Intermediate Period (A.D. 1100–1450). We eschew an ethnoarchaeological perspective in favor of considering their position within a longer genealogy of potting practice. We argue that a genealogical perspective foregrounds ephemeral evidence that is often ignored in dominant narratives, highlights the emergent nature of practices, and draws attention to subject formation across generations. We examine the extant data for pottery firing in the region, drawing out the genealogy of practices involved in firing facilities and subject formation from the Formative Period (1500 B.C. –A.D. 450) through the present. We then return to the ash mounds, juxtaposing the practices and archaeological traces to consider their historical emergences. These two approaches allow us to begin to map out the particularities of Lake Titicaca Basin production locales and to pose new questions of the social relations associated with ceramic firing contexts.

Keywords: Genealogies of practice; Juxtaposition; Craft production; Ceramic firing; Lake Titicaca Basin; Andes

Andrew P. Roddick  
roddick@mcmaster.ca

François Cuynet  
francois.cuynet@sorbonne-universite.fr

<sup>1</sup>- Department of Anthropology, McMaster University, Hamilton, ON, Canada

<sup>2</sup>- Maître de Conférences, Sorbonne Université, Paris, France

## Introduction

In this paper, we develop an approach for the historical analysis and comparison of technical practices and their associated spaces. In particular, we track the genealogy of ceramic firing practices over the long term and juxtapose the archaeological traces of such practices in the Lake Titicaca basin, Bolivia. Our interest in this comparative enterprise emerged after observing the similarity in form between the residues from modern pottery manufacture in the community of Chijipata Alta and features associated with Konto Konto, a Late Intermediate Period (A.D. 1100-1450) site near the well-known site of Tiwanaku. In both cases, multiple generations of ceramic firing resulted in large ash mounds visible on the twenty-first century altiplano landscape. These flat-top mounds, known as Q'eya Konto (in Aymara), can be up to 2.5-m high and have stratigraphic layers dense with burn features and occasionally worked tools. The similarities of the form of these ceramic firing spaces might have been explored through the kinds of analogical reasoning associated with ethnoarchaeology. Instead, we recognized these features as the outcomes of complex historical trajectories (Stahl 1993, 2013), and thus we chose not to extract these features as “atomic elements” from one context and introduce them into another (Thomas 2004; 239). As Gosselain (2016: 223-224) reminds us in his recent ethnoarchaeology provocation, such formal continuities can produce a false sense of historical continuity and mask the essential historical dimensions of technical practice. These formal similarities might also inadvertently suggest shared worlds rather than foregrounding the situated nature of social space (Dreier 1993) and the divergent nature of emergent practices (Stengers 2011).

In this paper, we contribute to a different approach to historical analysis and comparison of ceramic firing spaces, one which takes contexts and specific trajectories into account. The “genealogy of practice” framework places elements of shared activity, such as firing traditions, within longer associated chains of practice, and related to broader historical dynamics. Like other genealogical approaches, this focuses on the emergent nature of particular practices and their role in constituting broader sociohistorical patterns. We suggest that this approach draws attention to traces in the archaeological record, kinds of evidence often relegated to reports, and unpublished theses and subsumed within larger master narratives. Genealogical perspectives also foreground the kinds of subject formation that can be produced within such craft production spaces across multiple generations and highlight historical fractures and disjunctures.

We develop this genealogy of practice approach by considering longer histories of ceramic firing in the Lake Titicaca Basin. We position the twenty-first century and thirteenth-to-fifteenth-century emergent ash mounds within their longer genealogies, beginning in the Middle Formative Period (800 B.C.–250 B.C.) and continuing through the twentieth century. We surface some of the extant evidence for potting communities and firing facilities in the Lake Titicaca basin, a trajectory defined by spotty evidence (we include several examples from slightly further afield to enrich our discussion), formal continuities, but also some significant historical disjunctures. We then return to juxtapose our ash mounds in light of their distinct positions within a longer historic trajectory and the different worlds in which these practices emerged. This discussion

into the formal similarities highlights several important issues pertaining to genealogies of ceramic firing and the dynamics of crafting communities of practice through time.

## **Genealogical Approaches**

Most genealogical approaches in anthropology draw on Foucault's (1984) interpretation of Nietzsche to trace the discourses, practices, and ruptures associated with the trajectories of particular institutions (Lucas 2006; Stoler 2016). Scholars have adopted this approach to produce "critical" and "effective histories" (Saar 2008: 298). Given the nature of the archaeological record, archaeologists' work on genealogies is somewhat distinct to discourse-oriented historical or sociological analyses. Over the past 20 years researchers working in a wide range of contexts have traced particular "genealogies of practice" (Gosselain 2018; Roddick and Stahl 2016: 16-17; Thomas 1999), developing approaches to explore how culture-making is about the interaction of the materiality of people, objects, and milieu (Richard 2018: 194). To archaeologically track a genealogy of practice means to document variability of a particular practice across space and time, which can then be compared to other genealogies at different scales (Stahl 2010: 154-155).

Those deploying genealogies of practice share some elements of Foucauldian approaches. Both reject efforts for origins in favor of embracing the messiness of beginnings (Lucas 2006: 40)<sup>1</sup> and both follow historical trajectories without homogenizing them into a narrative dependent on some sort of "master plan" (Stoler 2016: 23). Genealogical approaches provide alternatives to totalizing histories, simple linear trajectories, and the kinds of packages associated with evolutionary stages still central to much archaeological writing. Genealogies of practice are narratives focused on the historical emergence and transformation of practices and institutions concerning broader patterns of historical practice (Gilmore 2015: 125). Whether following the remains of post molds (Pauketat and Alt 2005), the deposits from ritual performances (Mills and Walker 2008), the traces of divergent plant and animal consumption events (Logan and Stahl 2017), or the spaces associated with pottery firing, each produces distinct histories. Such trajectories may not fit into "proper" historical events" (Robb and Pauketat 2013: 23; Saar 2008; Stoler 2016). Even when archaeological evidence has been produced, these traces may have to be teased out of the grey literature of site reports and field notes.

A genealogical approach brings into focus subject formation, an issue well-suited for scholars tracing the trajectories of pottery manufacture. Sites of pottery firing can be critical areas of social practice, "worked in spaces" that socialize potters (Fredriksen and Bandama 2016: 499), mediate human/non-human relations through ritual and taboos (Gosselain 1999), and contribute to the greater social structure of possibilities and actions (Dreier 1993: 114). Two brief ethnographic examples demonstrate how firing sites are where local norms and techniques materialize into cooperation networks and communities of practice. Corniquet's (2011) work in southwestern Niger shows how

---

<sup>1</sup> An exception, however, is seen in Harding's (2005) exploration of the temporality of events, which does argue the merits of identifying beginnings. Harding argues that once we have ordered the past into a kind of social biography, or what he calls a "chain of ordered presents," it is then possible to identify "an event or tear in history, which acted as a catalyst for particular developments." (Harding 2005: 199).



firing sites are places where potters' knowledge is shared and transferred, where particular techniques change due to participation in a joint venture. Social relations related to firing play out at varying scales, from the rules over who owns and maintains firing sites within villages to those relations stretching across neighboring villages, where potters encounter subtle variability in firing techniques, including how fuel is prepared for firing and the specific ordering of vessels within the firing structure (Corniquet 2011: 6-7). In her work in the Andean village of Las Animas<sup>2</sup>, Hosler (1996) observed upper and lower moieties producing pottery using distinct firing practices. Communities of practice in upper barrios fire their vessels for longer times with slow-burning hardwoods and higher temperatures, whereas potters in lower barrios use fast-burning woods (Hosler 1996: 64). These social and technical distinctions occurred rapidly, within one generation, and continue to emerge (Hosler 1996: 82).

Ethnographic studies into pottery production are limited in their historical reach, yet genealogies of firing practice likely extend across generations, involving a kind of citation to bridge across time and space (Mills and Walker 2008: 18). There are, however, practical issues in following chains of firing practice in the Andean highlands. It can be difficult to identify firing spaces outside of large-scale areas of production (Orton et al. 2013: 135-136; Stark 1985; Sullivan 1988). While a wide variety of kilns have been identified on Peru's north coast (Chatfield 2010: 728-729; De La Fuente 2007; De La Fuente and Vera 2016; Hayashida et al. 2003; Shimada 1997, 1998), simple dung bonfires or pit firings were the norms in the Andes (Cobo [1653] 1983: 114). Many of the techniques deployed today in the Andes, the re-use of production ash as fertilizer, and the transformation of firing areas into middens impact our ability to "see" such spaces (Sillar 2000a; Ramón Joffré 2013). Taphonomic processes and sampling strategies that tend to prioritize domestic and public architecture also contribute to the relative invisibility of such specialized spaces. These issues introduce archaeological gaps within what may have otherwise been long and continuous historical trajectories of potting practice.

Other absences, however, index the kinds of severed historical connections and fractures foregrounded in genealogical work (Brown 2001: 112). These are especially apparent in the disjunctures of the colonial period in the Andes, when potters "lived presents" (Harding 2005: 98) were transformed and, in some cases, their technological practices changed relatively quickly (Rice 1994). For instance, research into colonial period ceramics in Aqnapampa (near Cuzco) suggests that indigenous potters maintained their earlier Late Intermediate Period styles while deploying Iberian closed kiln technologies, resulting in higher firing temperatures (Chatfield 2010). Meanwhile, colonial period indigenous potters on the north coast used traditional open firing systems to produce the earliest glazed wares in Peru (Early Green Glazed ware) (VanValkenburgh et al. 2017). The juxtaposition of these cases reveals distinct technical choices across many generations. These patterns can also be compared across a longer trajectory of firing practices, centuries of shifting technical choices, and changing subjectivities (Ramón 2016). For instance, today in Charamoray (a village three valleys west of Aqnapampa) potters produce glazed ceramics in modern open firings, but several centuries earlier potters relied upon kilns for firing similar vessels

---

<sup>2</sup> Las Animas is a pseudonym used by Hosler.

(VanValkenburgh et al. 2017: 27). Clearly, the historical trajectories of firing spaces and technological choices are not as linear as often assumed. Below, we explore a multi-sited juxtaposition to further reflect on the value of the genealogical approach to firing practices. But first, we present a genealogy of firing practices for the Titicaca Basin.

## **A Genealogy of Firing Practices**

Over 40 years ago the renowned Andeanist John Murra (1978) called for ethnographers, ethnohistorians, and archaeologists to explore Late Horizon (A.D. 1475–1532) potting communities, or what was called “Ccopi”, in the Lake Titicaca Basin. Mapping out potting villages, Murra argued, was essential to archaeological work, since once connections were made to local raw materials, there was the potential for long-term, cross-generational continuity in production. Firing facilities are particularly important in defining such villages, since each firing produced deformed, misfired pieces that were generally abandoned around the kiln. Murra argued that even if there was no permanent structure, discarded sherds would accumulate, slowly stratifying into a feature for chronology building, creating a connection between the recent and deeper past. More recent scholarship demonstrates how firing facilities and production locales can inform not just chronological issues but also a number of social questions in the Andes (Hayashida 1999; Isbell 2007; Sillar 1996, 2000b) and beyond (Balkansky et al. 1997; Bernardini 2000; Becker 2003; Pool 2000; Rice 1997; Scarlett et al. 2007). Yet Murra’s call to arms in the Titicaca basin has yet to be answered, despite a growing sense that such spaces can be key in understanding craft production and broader social process. The studies of ceramic production locales that do exist are often buried in government reports and dissertations. What follows is our effort to surface some of the evidence for potting communities and firing facilities (Fig. 1).

### *The Formative Period*

Although pottery was produced in the Lake Titicaca region since 1,500 B.C., we have little evidence for production during much of this period. In the future, an earlier firing site might result in a distinct narrative, with distinct paths (Lucas 2006: 40). For the moment, however, we start like many genealogies, not with precise origins but with a rather messier beginning. The Middle Formative (800 B.C.–250 B.C.) in the southern basin is primarily defined by Chiripa-style ceramics with fiber-tempered pastes and simple cream on red decoration and highly burnished surfaces (Lémuz Aguirre 2001; Steadman 1999, 2007). Petrographic analysis suggests that most quotidian ceramics were produced by local populations (Roddick 2014). By the Late Formative (250 B.C.–A.D. 590), two styles dominate in the southern Lake Titicaca Basin: a red slipped/incised style called Kalasasaya, and an iconographically enigmatic polychrome and incised style known as Qeya (Janusek 2003; Marsh et al. 2019). Overall, there is little direct evidence for pottery production during this long period. For instance, work on the Taraco Peninsula discovered rich potting clay throughout the region and oxidation analysis suggests that local clays were being used, but little primary evidence for production was recovered (Roddick 2013; Roddick and Klarich 2013). This is not necessarily due to production occurring in only a few places, but rather because the technologies used were multipurpose, and left behind ambiguous traces that when recorded may also look like cooking pits. Other practices likely produced traces that

were easily eradicated through erosion, like thin lenses of fine clay spreading around a workshop area, or the redistribution of ash in farmers' fields (Sillar 2000b: 52).

*Fig. 1 Map of the Titicaca Basin, with archaeological sites and modern towns/villages mentioned in the text*

Re-used ceramic smoothers are common across many Formative Period Taraco sites. Moore (2013:179-180) notes that broad scrapers up to 15 cm in length only appear in the Formative when ceramics begin to be manufactured. Trimmed camelid ilium blades and scapula scrapers are worn to a bevel have also been recovered in excavations on the Taraco peninsula, and are similar to the modern "potter's ribs" of wood and plastic used to open and shape pots (ibid). Two ilium scrapers have rounded white grains of mineral lodged in the trabecular bone of the working edge, likely the residue of the material worked. These bone bools overlap with the worked sherds noted from Taraco sites, including over 50 polishing tools (Roddick et al. 2017) with striations associated with working leather dry clay (Vieugué 2015). These findings suggest some continuity in terms of the use of broken ceramics as expedient tools in craft production.

The Taraco Archaeology Project has also have recovered pits with llama dung, complete with the seeds of fodder plants that are ideal materials for pottery firings (Bruno and Hastorf 2016; Franke 1995: 116; Sillar 2000b; Winterhalder et al. 1974), which suggests most sites may have produced pottery. Llama dung fires would easily produce the temperatures required for most of the quotidian vessels and often oxidizes ceramics. But we have yet to find clear single-purpose facilities, and it is possible that multipurpose hearths were used in the production of these vessels. While some Late Formative period ceramics are higher fired, on the whole, the assemblage suggests that the high temperatures that characterize ceramics of the later period were not required.

A similar case has been found at Pukara in the Northern Lake Titicaca Basin. Sergio Chávez (1992: 510, 540) suggests standardized Pukara vessels were produced by attached specialists. In fact, Klarich found evidence for pottery production in the last occupation of Block 3 on the Pukara pampa, close to the ceremonial Qalasaya area (Klarich 2005: 163). While no large deposits of raw materials, drying areas, or centralized firing facilities were found, the presence in situ of eight ground stone artifacts, three clay features, small pits of clay and tempering materials (some clay and perhaps pigments), and production tools suggest smaller-scale household-level pottery production (Klarich 2005: 249). Large stone slabs may have been used as bases for producing coil-built pottery, and a small pit for firing vessels (Klarich 2005: 363). Utilitarian wares may have been manufactured at the household level, while decorated vessels produced in formal/regulated workshops, which have not yet been clearly identified (Klarich and Chávez Justo 2018).

The best current Formative Period example is found at the site of La Barca (Oruro), just south of the Lake Titicaca Basin. This case provides an important perspective on early ceramic production spaces. Here, Marc Bermann and his team uncovered a courtyard, defined by an exterior sandstone wall and an interior wall of 11 wooden sticks embedded in clay (Clavijo Prieto 2008: 76-78). They recovered ash and slag, ceramic, lithic and bone fragments in place. They found two uncooked clay chunks, five

grinding stones, pieces of fired clay, fragments of a ceramic spoon, and a vessel with crushed quartzite inside (probably for temper use). The presence of burned logs, pieces of clay, and burned inner wall suggest that the space was abandoned due to a strong fire (Clavijo Prieto 2008: 148-154). There were no wasters or other evidence for clear firing facilities, but they suggest the small burning areas were utilized in production. This workshop was associated with three domestic structures, where Chiripa-style trumpets – a ceremonial form characteristic of the Middle Formative Period – were found. The broader context of the structures suggests the workshop dates to approximately 800 BC–250 AD (A. Pérez Arias personal communication 2019).

### *The Middle Horizon*

Middle Horizon (A.D. 590–1100) ceramics in the Lake Titicaca basin are recognizable by their high-fired pastes, standardized form, red-slipped bodies, and rich iconography. This period marks a fundamental change in both the use and production of pottery, including firing practices (Janusek 2003). The best-known ceramic production area in the Lake Titicaca basin is the Ch'iji Jawira neighborhood of potters (Franke 1995). This 6-hectare neighborhood east of Tiwanaku's central monumental district is littered with high-fired Tiwanaku redwares, undercooked and vitrified sherds, and artifacts associated with ceramic production (Rivera Casanovas 2003: 297). Excavations recovered pigments, vessels filled with pigments and minerals, including sheets of biotite up to 10 cm in length, several small mold fragments, and many production tools including reused sherds and polishing stones (Rivera Casanovas 2003: 307).

Although few wasters were recovered (Franke 1995: 117), outside of Tiwanaku proper a number of vitrified sherds have been recovered in the survey. These sherds suggest some Tiwanaku potters were attaining temperatures in their firing beyond the maturation point of recipes developed for open methods (Rice 1987: 106-107), and the predominance of well-oxidized red wares suggests control of atmospheres. Less common are a number of coarse green-tinged found at Ch'iji Jawira and at the nearby site of Lukurmata (Janusek personal communication 2014; Rivera Casanovas 2014: 78). Both Rivera and Janusek suggest these sherds have lead copper glazes, although they have not been analyzed in any detail. They do suggest some potters were experimenting with new techniques, perhaps requiring different firing regimes.

Direct evidence for firing is seen in the remains of adobe and burned stones thought to delimit the firing area. Excavations recovered taquia (camelid manure), thola (*Baccharis macrophilia*, a shrub species that grows in the region), straw, and camelid bones. Domestic garbage was likely used in firing, not unlike modern potters who incinerate and sterilize garbage before being disposed (Franke 1995: 116). Also recovered were high densities of burned clay/earth, ranging from very hard to soft and friable, perhaps from the walls of the burning areas (Rivera Casanovas 2014: 79). In the Ch'iji Jawira sector, they found a 1-m diameter circle of contrasting heat signatures—a circle of black burning, followed by bright orange earth, and a white scorched earth circle in the center from the highest heat concentration. This pattern is like that seen in the modern village of Charamoray (near Chumbivilcas, Peru) where insulated bonfires reach temperatures around 900 °C and can melt lead oxides (Sillar 2000b: 47; VanValkenburgh et al. 2017). While temperatures certainly could be reached by such

open fires, they may not be ideal for producing the unblemished surfaces of the characteristic Tiwanaku red wares. Perhaps there was an internal structure to protect vessel surfaces, or maybe large coarse vessels were used as saggars as seen in Mesoamerica (Becker 2003: 102-103).

Also associated with this area were eight human burials, corporeal evidence of a community of potting practice. Becker's (2016) analysis found that Ch'iji Jawira peoples had significantly high modeled rates of osteoarthritis in the elbow and wrist joints, patterns that were unique to this area of the site. One particular burial, a 30-39-year old female, dated to the Late Formative and included a Late Formative Qeya ceramic in the burial (Becker 2016: 406-407). Becker identified markers associated with tasks involving the locking of the elbow in place, along with pronating and supinating forearm musculature. The metacarpals and medial/lateral finger phalanges showed high rugosity, often associated with precision gripping or precision handling of objects (Becker 2016:407)<sup>3</sup>. The forms and iconography of the vessels found here suggest that other individuals buried here may have been "in-migrants" associated with the Cochabamba region (Janusek 1999: 126).

Some suggest that potters working at Ch'iji Jawira were full-time "attached" specialists producing exclusively fine-wares for elites (Franke 1995: 113). Others argue that domestic wares were most commonly produced without the motifs of Tiwanaku state ideology (Rivera Casanovas 2014: 80). These ceramics have been found in elite neighborhoods such as the Putuni, but also in lower status parts of the site (ibid). Rivera suggests that potters worked "without direct elite intervention or control" (2003: 311-312). What about pottery manufacture across the rest of the site? Augustine (2019: 156) argues that there was both larger scale-production and household-based production in the city of Tiwanaku, including the kinds of small-scale crafting seen in other cultural contexts (Sullivan 1988). Support for this argument is found in the presence of tempering materials, including the mica so common in Tiwanaku domestic pottery found in burials in the Kalasasaya structure (Janusek personal communication 2009) and the high densities of smoothed sherds likely used for finishing vessels in domestic settings west of the Akapana pyramid (Yates 2005). In the Mollo Kontu area (south of the ceremonial center), a misfired vessel was recovered with the traces of the hands of an apprentice potter, with poorly executed lines and form (Augustine 2019: 189).

One option for such household production lies in the prominence of ash pits across the site of Tiwanaku. Once thought to be associated with new disposal practices in urban contexts (Janusek 2009: 161-162), they are also common in non-urban Middle Horizon contexts across the region, often intruding into lower Formative Period strata (Roddick and Janusek 2011). The larger pits recovered at the site of Muru Ut Pata (outside the ceremonial core of Tiwanaku) were likely used for both food and ceramic production (Chapa and Davis 2007). The size of the pits along with the presence of clay nodules, llama dung pellets, and high densities of ceramic fragments all suggest pottery firing (Druc 2005). Several similar pits were excavated at Kala Uyuni on the Taraco

---

<sup>3</sup> Similar patterns are associated with individuals buried in ash mounds at the Cochabamba potting community of Santa Lucia (discussed below). Gabelmann (2017) notes feature facets on the knees and fixation on the biceps and articulation of elbow associated with strenuous activity.

Peninsula, where a midden-like matrix with many clumps of burned clay, burned bone, ceramic sherds that appear to be fired to different temperatures (Bruno and Roddick 2011: 52). One pit at Kala Uyuni included 16 unfired clay objects, ceramics with very small fingerprints, perhaps indicating children learning to manufacture vessels that were not fired (Harkey and Steadman 2011: 84), as we see in modern potting villages in the region today (Roddick 2016: 138).

Recent work in a Tiwanaku occupied sector of the site of Khonkho Wankane has also recovered some evidence of ceramic production. The highest density of Tiwanaku occupation at this “proto-urban” Late Formative center (Janusek 2018) was on the north edge of the Wankane platform, right next to the location where modern potters in the community collect clay for ceramic manufacture (Ohnstad, personal communication 2019). Here a large Tiwanaku period multi-room structure was excavated, with ashy deposits, shallow pits, lenses of ashy lime, and a small deposit of raw mica (Janusek et al. 2018: 142-14). To the northwest of this structure, researchers found mica, gray-blue ash, a ring of carbonized organic matter likely from extensive in-situ burning, and a large deposit of powdered hematite (> 3 l), likely used for making the pigments associated with Tiwanaku period redwares (Janusek et al. 2018: 144). Beside this was a deep oven, lined with adobe bricks and angular field stones, creating a rounded-edge bell shape. The pit had chunks of partially baked clay, and ash mixed with carbonized dung pellets. Excavators recovered a small unfired clay vessel between ash layers and a number of bone and ceramic smoothing tools (Janusek et al. 2018: 146). Built into the south wall of the oven was a rectangular flue with two horizontally laid capstones covering one small wall stone. The multiple lines of evidence here support ceramic production (Janusek et al. 2018: 153).

### *The Late Intermediate Period*

The Late Intermediate Period (LIP) begins with the collapse of the Tiwanaku state around A.D. 1100 and ends with the appearance of Inka-related ceramics around A.D. 1450. This rupture clearly had an impact on the Tiwanaku stylistic canon, but in the southern Titicaca Basin Pacajes style LIP vessels include plainwares that appear similar to the earlier Tiwanaku and Late Formative styles (Albarracin-Jordan and Mathews 1990; Bandy 2001: 230). This period is primarily identified by thin, decorated bowls manufactured with a compact, even-fired paste. The surfaces of the early Pacajes pots tend to be slipped yellow and orange, and occasionally red and brown. The decoration is simple, with dots, tabbed lines, parallel lines or cross-hatching, and less commonly the representation of llamas in a black pigment (Albarracin-Jordan 1992: 273; Janusek 2003: 83-85). In the northern Titicaca Basin, another variety of ceramic types have been identified (Carlevato 1988; Stanish et al. 1997; Tschopik 1946), some with pastes that continue to be used in the region today (Arkush 2005: 648). Like in the southern basin, motifs tend to be geometric (wavy lines, dotted circles, crosshatches) but occasionally include branching motifs.

Recent work in the northern basin into the Colla and Lupaqa groups has explored the rise and fall of interregional conflict as seen in defensive hilltop sites, or pukaras (Arkush 2011). Much of this work has been survey-based, and the few excavations have not recovered clear evidence for ceramic production. Excavations at Ayawiri did find

some remains possibly associate with small-scale production, but evidence for ceramic production was limited to possible polishing tools and lumps of clay near domestic compounds (Arkush 2017). Ongoing ceramic analysis, however, is suggestive of standardization across compounds, perhaps from a single workshop producing vessels for inhabitants (Arkush personal communication, 2019).

There is even less research in the southern basin, where populations re-settled across the region after the collapse of Tiwanaku but did appear to have the same degree of conflict as the northern basin (Albarracín-Jordan and Mathews 1990; Bandy 2001). Zovar's (2012) work at the non-defensive but dense residential site of Pukara de Khonkho, above the Formative/Tiwanaku site of Khonkho Wankane, did recover some evidence for LIP ceramic production. Her "type 2" structures at Pukara de Khonkho have specialized tools (grinding stones, obsidian flakes, and bone weaving tools), higher densities of ceramic materials, and outdoor work areas suggesting they may have been either domestic or workshop structures (Zovar 2012: 229). These structures also have hearths and burn features, and in one case, a chimney for venting smoke. In one example, a large concentration of possible "pottery quality clay" was found above the floor (Zovar 2012: 232). Zovar also argues for household-level products based on the low levels of technical standardization and variability in form and decoration attributes (2012: 493-494) (Fig. 1).

A recent finding—and one of the cases, discussed in our introduction to his paper, that generated our comparative enterprise—suggests the possibility for larger-scale ceramic production in the LIP. In 2016, the Misión Arqueológica Pucara-Tiahuanaco excavated the site of Konto Konto, in the pampa of Achaca community, 5 km south of the city of Tiwanaku (Cuynet and Cossío Carrillo 2017). At the center of the Achaca plain is an architectural complex characterized by at least 17-grouped mounds, of various sizes, arranged around a central plaza (Fig. 2). Despite its proximity to the monumental center, no systematic work had been conducted prior to this project. All 17 mounds had ash deposits and Pacajes ceramics on the surface. The highest mound is located at the southern end of the site, and approximately 2.50 m high, with a flat surface on top that researchers originally interpreted as an activity space. A 1 m × 14 m trench excavated down to the level of the central plaza did not recover the expected Tiwanaku architecture, but instead a dense sequence of stratigraphic levels suggesting a long history of ceramic production and firing.

*Fig. 2 Map of the Late Intermediate Period site of Konto Konto, showing the 17 grouped mounds*

The 47 stratigraphic levels suggest the slow and gradual accumulation of ash over the course of 2–3 centuries, mixed with inclusions of burned clay and carbonized materials (Fig. 3). The high volume of white ash in the mound suggests considerable high-temperature firing occurred in this area, perhaps associated with or several facilities or workshops. No formal ovens have been recovered, but the presence of the ash, burned clay, and carbon suggests an open system of firing. A small number of metal slags and concretions were found might indicate other uses here, but the predominance of tools suggests primarily pottery production. Camelid bone smoothers were recovered in the ash mound and the surrounding area, along with grinding stones, a variety of ceramic

miniatures and plugs, and two retouched scallops. A range of domestic midden material was also recovered, including lithic debris and burnt bones. Boiled fish remains (*Karachi Orestias Luteus*) were recovered in a few small circular hearths in the lower levels of the mound (stratigraphic units no. 15, 25, 27, 32, 42, and 46). Preliminary analysis of the ash suggests a higher proportion and density of carbonized seeds in the mound than other areas of the sector (Katuchka Geovanna Zuazo, personal communication). The evidence for production increases through a large number of micro-stratigraphic layers through the mound.

The Konto Konto sector appears to have been primarily associated with ceramic firing. Although a structure associated with stone tools and domestic debris was found in the northern sector of the site, this was likely directly associated with the production area. The associated LIP domestic occupation is found just 1 km to the south on the slopes of the Quayna Chata Hill (Cuyenet and Cossío Carrillo 2019: 59-60). The relationship with this LIP village is suggested by the well-preserved Pacajes phase diagnostic ceramics recovered at Konto Konto, especially bowls and cajetes with black painted geometric designs. Also present were vessels with lip attached handles often with small parallel incisions on the rim. A radiocarbon date from stratum 34 (mid-way through the stratigraphic sequence) puts it between 1230 and 1385 A.D. ( $750 \pm 30$  BP, 95.4% at 2 Sigma, lab C2RMF). Another date from 20 Amaranthaceae seeds from this same level recovered a date between 1321 and 1411 A.D. ( $615 \pm 15$  BP, 95.4% at 2 sigma, lab PSUAMS-3316). Intense and continuous specialized ceramic production thus occurred at Konto Konto through the Pacajes period.

### *The Late Horizon*

Ethnohistoric sources suggest there were four sixteenth century pottery production centers in the Lake Titicaca Basin (Spurling 1992: 244). An early relation noted that a community in the southern basin had “indios ollereros, que hacen cantaros y tinajas y ollas” (Mercado de Peñalosa [1586] 1965: 337). The settlement was founded by the Inka Tupac Yupanki, who settled around 5,000 people (half of them Uru and the rest from the eastern Omasuyu province). A 6-hectare site in Guaqui (LV-25) may have been this ceramic manufacture center (Albarracin-Jordan 1992: 316-319). Although most of the site lies under modern buildings, Albarracin-Jordan recovered high densities of Inka sherds, both of a local variant and imported Cusco-style vessels. Another site likely lay to the west of Lake Titicaca. Lupaca potters manufactured Chucuito Polychromes and a local Cuzco-Inka style in the “pueblo de ollereros” called Cupi (Diez de San Miguel ([1567] 1964: 14, 27), although this site has not yet been identified (Hyslop 1976; Julien 1983: 75). Another possible potting community is in the Llallahua-Pupuja area, near the modern town of Pucará, where witnesses in a 1680 litigation stressed the importance of keeping clay mines open for all potters (Spurling 1992: 245). Here potters continue to produce pots in a “traditional” mode (Klarich and Flores 2010; Roddick and Klarich 2013), although it is unclear how ruptures over the past centuries may have changed potting practices. Researchers have yet to identify Late Horizon firing facilities at this community, or any of the manufacturing villages discussed above.



*Fig. 3 Excavations at Konto Konto showing (A) stratigraphic profile of sondeo 1, (B) lithics mortar and stone tools (C) bone smoothing tools, (D) ceramic firing residues, (E) lithic smoothing tools. (Photos by F. Cuyenet- MAP-T)*

The best current example of a Late Horizon ceramic manufacturing center is the northern mitimae community of Milliraya, in the Umasuyu zone of the Collasuyu region (Alconini 2013: 281; Espinoza Soriano 1987; Spurling 1992). Our knowledge of Milliraya is based on an early colonial land dispute, land litigation that spanned three decades. Details of this Inka state artisan settlement were first explored by John Murra (1978). Here, the Inka settled supervisors from the upper (urco) half and artisans from the lower (urna) half of the Colla region (Hayashida 1998: 319; Julien 1983). Murra advocated for fieldwork at Milliraya, particularly since the boundary markers mentioned in the litigation made it possible to locate the site. Spurling took up this call in his 1992 PhD dissertation. He explored both the litigation in the archives and conducted archaeological research into the workshop that was buried under the ruins of a Catholic chapel and the modern village school. In the Milliraya litigation, potters stress the unique clay resources of the valley (white kaolin discovered nearby by Spurling). In fact, the litigants told the Spaniards in 1609 that the Inka settled the potters there because of the locally available high-quality clay (Spurling 1992: 273-274).

Four categories of evidence for pottery production were recovered at Milliraya (Spurling 1992: 272-289) First, a high surface sherd density, which included the Inka Taraco Polychrome style, the Polychrome Urcosuyo, and a style similar to Polychrome Chucuito (Spurling 1992: 325 and 384). Second, raw materials, including underfired and fired clay (including a local white kaolinitic clay called Llachajata), and clay mixed with temper. Third, there are a high number of tools, including 43 sherds likely used as scraper or smoothers, some with multiple working edges (Spurling 1992: 274-280). Finally, the presence of “firing affected sherds”, including 83 vitrified and bloated sherds and a stack of pots fused together (Spurling 1992: 280-286). Of particular note for our discussion here is the lack of a clear firing infrastructure, although he does note some bricks that could be the remains of a kiln or open firing structure. In the litigation, potters complained that the stones were taken away from their place of production (Spurling 1992: 288), which may refer to stones used as working surfaces or, alternatively, those associated with perimeter walls in a firing structure (Hayashida 1998: 319-20). Spurling believes the high number of overfired ceramics might signal proximity to the place of firing. Hayashida (*ibid*), in contrast, suggests this may have been a dump zone. The difficulty in isolating a firing area might be contrasted with her work at La Viña in the Leche valley (north coast of Peru), where large (4 m across) depressions filled with ash, overfired and underfired sherds, scrapers, and a variety of other secondary materials were recovered (Hayashida 1998: 325).

### *The Ethnographic Present*

It is clear that the dynamics of firing shifted considerably during the colonial period, indexing severed historical connections but also the introduction of new technological practices (VanValkenburgh et al. 2017). Nevertheless, no research has yet been conducted into the centuries between the Late Horizon and the 20th century specifically in the Lake Titicaca Basin. Pottery continues to be produced today in a variety of types

and styles. Tscopick's (1950) early study of production in the northern Titicaca basin community of Chucuito explored the firing of vessels on rises to take advantage of the wind. The "p'uk'upicana" firing structures are constructed by placing cow dung in a 2-3-foot diameter with field stones surrounding the fuel in a ring. Larger vessels are placed on the bottom, then bowls and smaller vessels are placed too top of them. Tschopik (1950: 215) notes that the fire burns and smokes until all fuel is consumed, usually around 2 h with a good wind.

In the southern basin, pottery continues to be produced in a number of communities, often recognized by the presence of broken and retired pots on the roofs in producing communities (de Zapata et al. 1997). In some communities, such as Khonkho Liqui Liqui and Kasa Achuta, Tiwanaku replicas are produced for tourists; and if made skillfully enough, they can be sold as genuine archaeological artifacts. These vessels are generally fired in family's personal earthen ovens, which are constructed out of mud-brick (non-refractory). Other communities, like Pajchani Grande, produce wheel-thrown, glazed enamel ceramics, some using lead oxides (often extracted from old car batteries) or antimony (Larrazábal et al. 1988: 71). There have been few detailed analyses of this ceramic technology, despite its ubiquity in regional markets. In the case of Pajchani Grande, artisans do not have ovens instead of firing vessels with dung in open fields.

Recent work of the Proyecto Ollero Titicaca Sur has explored the communities of potters inhabiting the village cluster (*sensu* Mohr Chávez 1992: 88) near the city of Batallas (Plaza Martínez and Roddick 2014; Roddick 2016, 2019). These communities are widely known to produce the best cooking vessels, or ollas, of the southern Lake Titicaca Basin. The small village of Chijipata Alta, along with the neighboring villages of Igachi, Cotusuma, Chiarpata, and Pantini (all located southwest of the main La Paz-Copacabana highway) are all involved, to a varying degree, in pottery production. Potting in the Batallas region extends back at least to 1864 when the hacienda system was implemented across Bolivia, and likely much earlier to the colonial period (Gosalvez Sologuren 2003; Roddick 2019). Chijipata pottery is sold in local markets and through a variety of bartering mechanisms common in the Andean region (Mayer 2002: 143-171). Potters still active in the community create several fairly standardized forms, using the same quarry, and many of the same tools and techniques of their grandparents.

Each family in Chijipata Alta has its own firing space, a 2 × 3 m area usually within several meters from the potter's residence (Fig. 4). A layer of dung is applied on the base surface - usually cow dung, but sometimes sheep dung, or a mixture with llama dung. This dung is either from local cows (this is a dairying community) or is purchased from neighboring communities. Co-operation networks, particularly between kin, are important in attaining larger amounts of dung for the firings. A truckload of dung costs about 160 Bolivianos, which results in 3–4 firings. This dung spread in the firing space is about 5 cm deep and covers the entirety of the base—a process that can take about half a day. Vessels are then placed on the base, usually in two layers, with the larger vessels on top and dung interspersed between them. Lateral walls are built up with broken pots or adobe bricks to a height higher than the second row of vessels. A final cap of dung is then placed on the top. These insulated firing structures accommodate

100–150 pieces<sup>4</sup>. While there is some slight variability in the structures, most are similar in size and orientation. We do not have evidence for the kind of intra-community variability noted by Hosler in Las Animas (1996).

Potters start the fire through holes left at the western base (where the wind comes from) on one of the sidewalls, a kind of small windows arranged in some places on the fronts that protect from the wind. The flow of air that enters through such spaces ensures that the flame expands inside the burning zone. Although we have not yet measured the heat of such firings, similar structures elsewhere have maintained temperatures of 750 °C and perhaps up to 865 °C (Chatfield 2010: 729; Nicklin 1981). The firing lasts about 6 h, from three or four in the afternoon until ten or eleven at night. It is a social affair, family and friends often help in structuring the firing and keeping the fuel burning. The firing is clearly seen by neighboring communities. Potters know when others are firing (and how frequently), and potters often remark on the intensity of firing by other communities through the potting season. The potter collects the vessels from the firing area the next day. Approximately ten percent of the vessels are cracked, chipped, or deformed. Vitrified ceramics (or *caracha* in Aymara) are rare (Fig. 5a, b). The potters assess their fired vessels, separating some out due to defects, others packed up for distribution through either barter or sale at weekly/annual markets, others for later trade.

*Fig. 4 Stages of Firing in Chijipata Alta. A) Preparing the area; B) stacking the mound; C) Collecting fired vessels. (Photos by A. Roddick)*

*Fig. 5 Wasters from Chijipata Alta (A and B), the Tiwanaku valley (C), and from Konto Konto (D). (A, B, C photos by A. Roddick, D) by Irene Delaveris–MAP-T)*

Some potters (particularly newer members of the community) change their area of firing over the pottery producing season. Most potters, however, fire over decades and across generations in the same place, resulting in the mountains of ash that appear so similar to those of Konto Konto. These *Q'eya Konto* (in Aymara) are in some cases up to 2.5 m in height (Fig. 6). As a potter told us in 2016, histories of these firings are scattered across the countryside: “Antes hacían siempre por eso hay esos montones de ceniza aquí de mi abuelo. Ahora igual haya se está juntando también más va ir creciendo.” (“Before they all made pottery. This is why there are these ash mounds here from my grandfather. I make pots now, and more will grow.”) Potters have suggested that they build up approximately 10 cm a season, although we have little sense of how they may compact down over time. Many potters have found that there are advantages to allowing these mounds to grow, as they provide some height to the firing area allowing potters firing their vessels to take advantage of predominant afternoon wind that blow across Chijipata Alta. But in other cases, these mounds have been preserved (and perhaps in some cases, conserved). Although we have yet to excavate one of these mounds, we have cleaned the profiles and noted alternating layers of clay and ash. Also embedded in these mounds are the traces of generations of choices in firing materials. Several potters discussed how in the past they used to use other material, including turba

---

<sup>4</sup> The form of this firing structure might be comparable to the case of Machaca, sketched out by Sillar (2000b: 181).

(a kind of grass native to the Bolivian altiplano), and other kinds of dung. Elders have explained that sheep herds were very important in the past, and we believe we have recovered carbonized sheep dung from the base of several of these mounds, pointing to generations of sustained technical choices but also some innovations in practice (Larrazábal et al. 1988: 66).

### **Historical Trajectories: Subjectivities and Spaces of Ceramic Firing**

Genealogical approaches stress subject formation, and in terms of ceramic production, we might ask questions about identity and skill across the historical trajectory sketched out above. Specifically, how might the practices associated with pottery firing coalesce into the very notion of a “potter” (Budden and Sofaer 2009: 210; Michelaki 2008)? Our current data suggest that Formative Period potters were mostly produced in domestic settings at a local scale, although the nature of that scale is still not clear. Communities of practice were likely interspersed across communities, although some argue for the presence of attached specialists during this period based on the standardization of vessel forms and iconography. By the Middle Horizon, pottery production certainly becomes more standardized, yet also much more diversified in form, and entangled in explicitly political and ritual practices such as libation and feasting. The presence of ceramics tools suggests that some potters are continuing to use domestic spaces, including perhaps deep pits and possibly multi-purpose hearths, for the production of ceramics. These may have been a similar kind of potter of earlier phases. Yet there are also facilities suggesting highly skilled potters, producing high-fired pottery in specialized places in proto-urban and urban spaces like Tiwanaku and Khonkho Wankane. The oven with the flue from Khonkho Wankane provides a rare well-preserved view of the technology employed in the Middle Horizon. The current evidence is suggestive of different firing technologies, with open firings (such as those found at Ch’iji Jawira) and oven firings for settings where more control was needed, perhaps for decorative wares.

*Fig. 6 Ash mounds or “Q’eya Konto” resulting from repeated dung firings A) A mound still in use and B) a relic mound in a community no longer producing pottery. (Photos by A. Roddick)*

We know very little about production in the Late Intermediate Period, but it is possible that such variation continued into this period, with both domestic kinds of production and other specialized facilities like the mounds of Konto Konto. We explore this further below. The Late Horizon sees the incursion of the Inka into the region, with several ccopi communities found throughout the region. These communities were positioned so that mitimae populations to exploit local resources for crafting and subsistence, where entire communities of expert potters learned and produced high-fired ceramics. Ethnohistoric documents provide a rich sense of the practice-oriented identities associated with these skilled practitioners (Hayashida 1998; Spurling 1992). Today, there are highly skilled potters working throughout the Titicaca basin, with islands of particularly skilled (although still part-time) potters who self-identify as potters or “olleros” (Klarich and Flores 2010 2018; Roddick 2016; de Zapata et al. 1997).

Genealogies are as many histories with “accidents, haphazard conflicts, and unrelated events” (Brown 2001: 112), of “arrested and failed experiments” that were never “fully realized” (Stoler 2016: 23). We certainly have examples of this in our trajectory mapped out above, including some of the brief technological choices seen at Middle Horizon Tiwanaku. Yet evidence for production is rather patchy across our archaeological periods, and particularly notable are the colonial and Republican period absences. Few sites have yet to yield the kinds of deep histories of production hinted at by Murra (1978). For long swaths of time, we are defined by limited data sets, in particular those associated with defining production spaces in the context of the archaeological traces produced through firing, complex local taphonomies, and archaeological sampling choices. For instance, the Formative Period production spaces are ephemeral, and difficult to isolate from a range of other practices within particular spaces. Firing pottery was likely integrated into a larger taskscape (Roddick 2013: 297-299).

Our narrative relies rather heavily upon the recovery of in-situ tools and wasters to define those “worked in spaces” where firing techniques were learned and deployed by communities of potting practice (Fredriksen and Bandama 2016: 499). In ethnographic contexts in the basin, objects for smoothing (river smoothed stones, reworked sherds, and plastic/metal tools) are passed down through the generations but occasionally are discarded in these same areas. Similar tools are found in excavated contexts at sites like Konto Konto and Tiwanaku period workshops. But these tools may have been used in a variety of other daily tasks in addition to producing ceramics, and we still need systematic analysis of these tools across this genealogy of practice (Geib and Callahan 1988; Moore 2013; Vieugué 2015). Overfired and misfired ceramics are found (in some cases sintered and others with prominent vesicular slag blooms), although not in great quantities (Fig. 5). The low number of wasters in clear production spaces is important to stress, particularly given many archaeologists rely upon them to identify production areas. We might expect higher numbers of them in open firings, where sudden temperature changes are more common (Reina and Hill 1978 24; Stark 1985: 174). Potters, however, may employ strategies to control the firing temperature and atmosphere to minimize the loss of vessels, thus producing fewer wasters (Shimada 1998: 13). Or they simply may have been regularly cleaned and deposited in trash sectors (see below for such an example from south of the Titicaca basin).

We clearly need detailed analyses of firing temperatures in the Titicaca Basin. Andean dung firings achieve high temperatures with a success rate, resulting in fewer wasters (Sillar 2000b: 47), yet there does seem to be a significant shift in the Middle Horizon. There is a wide range of variables - structures, fuels, schedules, and scales—that permit what appears to be a high-fired vessel. An overfired/highly vitrified sherd may be the product of a simple kiln, a pit, or a bonfire with heavy isolation such as those of Chijipata Alta (Livingstone Smith 2001: 1000). Franke notes the high density of “rough fired clay or adobe pieces” at the Ch’iji Jawira sector and suggests they may have served as insulating covers of “temporary kiln structures” (1996: 11). This term is perhaps inappropriate in contexts where the residues from such firings build up over generations, ultimately “anchoring” production to particular spaces (Arnold III 1991: 105-107). Konto Konto potters may have been using similar systems of insulated bonfires to attain high fired pottery. Yet temperatures also depend on the kinds of fuels

and the various possible firing schedules (Livingstone Smith 2001). The ongoing study of traces of Formative Period fuel (Bruno and Hastorf 2016), Middle Horizon pit ash (Roddick and Janusek 2011), and the ongoing analysis of deposits by the Misión Arqueológica Pucara-Tiahuanaco at Konto Konto and the Proyecto Ollero Titicaca Sur in modern potting communities may provide some future inroads.

## **A Juxtaposition**

The process taken thus far, of tracking similarities and disjunctures across phases, is strengthened by tacking between the ethnographic and deeper past. Such an approach highlights the kinds of analogical possibilities so common in Andean archaeology (Sillar and Ramón 2016). Yet they also demand critical reflection regarding formal continuities in form across radically different social and political landscapes (Roddick and Stahl 2016: 25). In juxtaposing firing spaces at Konto Konto and Chijipata Alta, we highlight the material traces of particular practices in the past, identify possible sampling protocols, and foreground potential shared physicality of the experience. But this juxtaposition also shows fundamental dissimilarities, disjunctures across the temporal divide that often get explained away in linear archaeological narratives or collapsed in ethnoarchaeological logic. These divergences (*sensu* Stengers 2011, see also Strathern 2018: 28-29) demand a different kind of comparison as the practices being compared are not part of the same worlds. Clearly, the lives of those currently firing ollas at Chijipata Alta (and the lives of the vessels themselves) are completely different from their great-grandparents during the late 19th century (Roddick 2016), let alone those firing pots in the centuries after the dissolution of Tiwanaku at Konto Konto.

Such a juxtaposition might begin with the affordances of the spaces themselves, including natural resources such as raw materials and water (Arnold 1985: 20-60; Spurling 1992: 273-274). Chijipata Alta, like many contemporary potting communities, is near key resources of clay and temper quarries and red clays are readily available around the Pacajes settlement near Konto Konto. Small rivers are within a 5-min walk of both production spaces discussed here. Also critical is the presence of afternoon winds. Middle Horizon Ch'iji Jawira was well-positioned in terms of wind, helping generate high-temperature fires and carry the smoke away from the city (Franke 1995: 114), and the Khonkho Wankane facility was located on the north edge of the platform to take advantage of northwesterly winds (Janusek et al. 2018: 147). Data from the Global Wind Atlas (<https://globalwindatlas.info/>), a website developed to assess the potential of wind energy, provides empirical scaffolding for the practical knowledge of Chijipata Alta potters. The wind arrived from the northwest in a relatively consistent pattern, picking up after noon and peaking around 11 PM at the time when most firings end. It also is seasonal, overlapping with the dry season (July to November), the same time potters are active. The Achaca plain a stronger and more consistent wind throughout the day and across the seasons when compared to Chijipata Alta. Yet winds appear to shift from the east, to the northwest in afternoon, perhaps the period when potters required wind in the open firings at Konto Konto.

These findings have implications for how we might seek out ceramic production areas in the future. Much of the judgmental sampling strategy employed in Lake

Titicaca Basin archaeology has been geared towards architecture, residential or otherwise. Such a protocol may be appropriate in certain contexts; for instance, residences are within steps of firing spaces in most contemporary potting communities in the region, and similar spatial relations may be seen in the courtyards outside of residential structures in the Formative Period (Roddick 2009). Yet in the Middle Horizon and Late Intermediate Period, specialized facilities are often located outside densely populated areas, as seen at Konto Konto. Research in the US Southwest and some Mesoamerican sites, where firing often took place downwind from residences (Bernardini 2000: 365; Becker 2003: 100-101), has impacted sampling strategies with wind patterns in mind. At Chijipata Alta most mounds are located to the north or northeast of residential structures, taking advantage of the wind for late afternoon firings, and a similar pattern is seen on the Achaca plain during the Pacajes phases, with the ash mounds found to the north of the Quayna Chata residential site.

The decision to allow the mounds of Chijipata Alta and Konto Konto to accumulate, rather than using the ash for fertilizing fields, may have been to permit for further exploitation of the winds. The global wind atlas suggests that at Chijipata Alta, wind intensity is not as high at ground level, supporting the idea that they were used to take advantage of the wind. The maximum height of the large mound at Konto Konto is similar to the largest recorded in the area around Chijipata Alta. Whereas the Chijipata Alta potters produce just outside their residences, it appears that the LIP mounds are a unique space of production, some distance from the principal associated settlement (Cuynet and Cossío Carrillo 2019: 59-60). Yet there is reason to suspect some closer domestic occupation at Konto Konto. The mound is defined by a carbon-rich matrix, but also one hinting at domestic activities. For instance, the burned surface of level 22 had high numbers of camelid bones and some Karachi fishbones (Cuynet and Cossío Carrillo 2017). The material associated with the mound is quite similar to that mentioned by Rivera (2014: 79) in the production area of Ch'iji Jawira, where remains of adobe, burned shrubs, and domestic garbage was found in production area.

We might briefly compare the mounds of Chijipata Alta and Konto Konto with an example from outside of the Lake Titicaca Basin in Cochabamba. Investigations at the 16-hectare Late Formative site of Santa Lucia recovered a high number of over-fired sherds, shaping tools, scrapers, and ceramic tubes likely for igniting bonfires (Gabelmann's 2012a, b). Gabelmann excavated a series of domestic structures surrounded by 200-eroding firing facilities for open firings. These features consisted of fired daub with hand imprints, a kind of modeled basin used for open firings. Outside of these firing facilities, as the periphery, were a number of large ash mounds in a semi-circular pattern, with the largest mound at a 1.5-m high, but which were once likely much higher (Gabelmann 2012b: 99-100). Excavations in the mounds recovered soft sand mixed with ash, lenses of clay, and high densities of pottery and production tools (a composition very close to that of the mound of Konto Konto, created several centuries later). While originally thought to simply ash dumps from cleaning the firing facilities, the recovery of burials and the presence of huaquero pits suggests those other kinds of activities may have been associated with these mounds (Gabelmann 2012b: 101). The ash mounds at Santa Lucia show reverse stratigraphy, and many of the burials appear to be secondary. Unlike the Lake Titicaca Basin example, the ash layers in the mound did not gradually accumulate over generations of practices. Instead, the mounds

were a quick event to move ash materials from production facilities across the site, perhaps homogenizing distinct firing spaces (Gabelmann 2012b: 108-109).

While the Cochabamba mounds are deposits from a circumscribed period of time, the Konto Konto and Chijipata Alta mounds truly are “worked in-spaces”, perhaps the product of improvisation and intergenerational praxis across a longer genealogy of practice, as suggested by Walls and Malafouris (2016: 634). These spaces encourage us to consider the kinds of associated socialization in ceramic production. At Chijipata Alta, we observed children learning how to prepare the firing, which included learning the proper protocols of firing and how to read wind patterns. Potters explain that in the recent past, the firing was associated with particular taboos and ritual practices. For instance, non-family members were discouraged from watching the firing (for a similar case at Raqchi see Mohr Chávez 1984: 172). We observed less regulation around the firing process, but firing is still a fairly serious affair, with little talking or laughing, and fighting or conflict is especially seen as problematic and plays a role in assessing success and failure. For example, if vessels come out with white color, it is understood that a soul has walked by during the firing, and potters recount stories of the negative impact of such problematic firings. Similar beliefs and ritual practices may be associated with firing in the Late Intermediate Period. Indeed, at Konto Konto, several ritual inflected contexts were recovered across the production sector (Fig. 7). These were primarily associated with the end of occupation in the upper strata. In one shallow, 4-m square unit in front of the ash mound, Cuynet recovered a clay-capped deposit with human remains (an infant burial, an adult skull associated with an articulated leg and foot, and several long bones), four groups of superimposed vessels (cajetes, bowls, pots), a lithic offering (2 batanes) and another infant associated with a set of ceramics (Cuynet and Cossío Carrillo 2017: 56-61, 64). This deposit likely extends further, as these remains continue into the unit wall. The trench excavated into the mound also recovered a sacrificed Andean deer (likely Taruca *Hippocamelus antisensis*), which was laid into a deposit that cut into several top layers of the mound (ibid, 2017: 41-43). It is unlikely that this animal was consumed, as the articulated complete skeleton was found in association with a dark organic-rich fill, suggesting the animal was deposited with the meat in place. The mounds of Chijipata Alta and Konto Konto are thus places of ritualized practice.

Ongoing work with potters firing on ash mounds around Chijipata Alta suggests the features are not simply productive spaces, but also important elements on a social landscape, where community members have strong family memories with these places (Roddick 2019). We might compare these to the producers in Los Tuxtlas (Mexico), where some artisans used a fixed location kiln and others used more expedient open-air sites (Arnold III 1990: 926-927). None of them used both, suggesting that the technological choices associated with firing may be associated with particular descent lines (Becker 2003: 99). The potters of the Chijipata Alta region also suggest a close connection between mounds and descent lines, although we have yet to explore the specific family histories. We know so little about Late Intermediate Period contexts, that it is difficult currently to assess potters’ broader social, political, and ecological landscapes. Were potters at Konto Konto producing vessels only for nearby residents, or did they also make vessels for sites like Pukara de Khonkho? What was the tempo of production here, and how different was it than seen in modern Chijipata Alta? How



many generations are indexed in the compacted strata of both the recent and ancient ash mounds? Or perhaps the mounds are the result of a very different kind of social relation, a firing group not seen in the ethnographic present but perhaps associated with the nearby Quayna Chata residential site? Either way, such an approach to these firing sites stresses not only a craft production tradition with a broad cultural context, but also querying local histories of firing practice.

*Fig. 7 Ritual deposits in Konto Konto sector. (A) The Taruca sacrifice on the top of the ash mound; B) One of the ceremonial deposit complexes from the central space (Photos by F. Cuyner-MAP-T)*

Such histories are visible in and around Chijipata Alta. The project has mapped and analyzed several of the ash mounds scattered in other neighboring potting communities of Igachi, Tacanoca, and Cutasuma, and in several communities that no longer produce pottery. This suggests that the social relations of firing spread to the intra-community scale (Corniquet 2011). This is perhaps due to the regional sharing of a key temper source (Roddick 2016), but whatever the cause the shared practices of firing materialized into a larger landscape of practice recognizable archaeologically as ash mounds. The firing seen at Chijipata Alta is likely part of a wide distribution of highland potters who share similar forming and firing traditions associated with cooking pot (*manca* in quechua, *olla* in Spanish) production and dung fuel firing in the South-Central Andes (Bill Sillar personal communication, 2019). There certainly are some similar histories of firing mounds in the South-Central Andes (Murra 1978: 417). For instance, researchers working in the northern Lake Titicaca Basin community of Pucará observed landforms that at first glance appeared to be small hills were, in fact, archaeological features. These mounds of ash developed from many repeated dung firings, and associated ceramic remains accumulated over many years, and continue to serve as the basis for pottery firing (Zuñiga Rivero et al. 1966: 106). Potters of Machaca (near Urcos, Peru) who are said to originate from the northern Lake Titicaca area (Sillar 2000a) make similar pots and fire in a similar manner to those of Totorani (Dept. of Potosi, Bolivia) and to the potters of Charamoray (discussed above). The latter has incorporated the use of lead glaze but continue to make similar coil-built cooking pots fired in dung fueled open firings (Sillar 2000a). All three of these share many similarities to Chijipata Alta, including temper choices and the specific way that open firings are structured. Unfortunately, Sillar never completed a systematic regional survey around potting communities, so we do not know if there are similar clusters of producers as we see in Chijipata Alta. On a smaller scale, it may be that the artisan “islands” seen here developed along important territorial boundaries to serve different groups (Mohr Chávez 1992: 88). As Ramón and Bell (2013: 610) recently argued, Andean archaeologists are in desperate need of maps of production sites and elements of particular technical styles in both the ethnographic present and the pre-colonial past to track social relations across ceramic landscapes<sup>5</sup>. Such an approach would work hand-in-hand with the kinds of mapping of primary evidence for production locales envisioned by Murra, and help address questions for the Late Intermediate Period, including the distinctions between seemingly specialized spaces such as Konto Konto,

---

<sup>5</sup> See Mohr Chávez (1984: 166-167) for a similar argument around the movement of ceramic turntable disks between the south coast and the Altiplano.

and the patterns observed for more small-scale sites of ceramic production during this period (Arkush 2017; Zovar 2012).

To conclude, scholars in a range of fields have shown that genealogical approaches provide a kind of “perspectival agility” (Stoler 2016: 24) and can re-structure history as “a palimpsest of qualitatively different processes” (Robb and Pauketat 2013: 26). Ceramic traditions are particularly well-suited for such an approach, as they are heterogeneous aggregates that arrange people, materials, representations, and knowledge within a wider context of social, historical, and ecological relations (Gosselain 2018). Yet despite John Murra’s urging for attention to such spaces more than 40 years ago, few scholars have focused on the genealogy of firing practice in the Titicaca Basin. While some mention the possibility for craft production in domestic settings in dissertations and gray literature, this is often included as an aside. As we have shown here, the Lake Titicaca Basin has a rich history of production, including a long tradition of household-level production, Tiwanaku workshops, and specialized Inka facilities. Further work is desperately needed to tease out the traces of these local histories of craft production. Just as important, however, is the need for critical comparative frameworks for mapping out the continuities and disjunctures in these broader genealogies of firing practice in the Andean region.

### **Acknowledgments**

We extend our great thanks and appreciation to the potters in Chijipata Alta, with whom we worked closely in learning about their history of pottery production, and members of the Proyecto Ollero Titicaca Sur (Victor Plaza, Oswaldo Plaza, Gladys Ramos, and Roger Mamani). Erik Marsh was an important sounding board and pointed us toward the Global Wind Atlas. Thank you to the Ayllu Originario Achaca, UDAM, and CIAAAT. Thanks also to members of the Taraco Archaeological Project, UMSA laboratories, Katuchka Geovanna Zuazo (seed study), Velia Mendoza (bones studies), and Elizabeth Arratia Velasco (Karachi identification). Thanks to José Capriles and Pascale Richardin (C2RMF analytic laboratory) for the C14 dates. Financial support for fieldwork comes from the Wenner-Gren Foundation, McMaster’s Arts Research Board, the French Ministry of Europe and Foreign Affairs, CeRAP, and Sorbonne University. Finally, thanks to our three reviewers, who pushed us to substantially improve the arguments of this manuscript.

## References

- Albarracin-Jordan, J. (1992). Prehispanic and early colonial settlement patterns in the lower Tiwanaku valley, Bolivia. Unpublished Ph.D. Dissertation. Southern Methodist University, Dallas.
- Albarracin-Jordan, J., & Mathews, J. (1990). Asentamientos prehispánicos del Valle de Tiwanaku. La Paz: Producciones CIMA.
- Alconini, S. (2013). El territorio Kallawayá y el taller alfarero de Milliraya: Evaluación de la producción, distribución e intercambio interregional de la cerámica Inka provincial. *Chungara*, 45(2), 277–292.
- Arkush, E. (2005). Colla fortified sites: warfare and regional power in the late Prehispanic Titicaca Basin, Peru. Unpublished PhD Dissertation. Department of Anthropology. University of California, Los Angeles, Los Angeles.
- Arkush, E. (2011). Hillforts of the ancient Andes: Colla warfare, society, and landscape. Gainesville: University Press of Florida.
- Arkush, E. (2017). The end of Ayawiri: abandonment at an Andean hillfort town of the Late Intermediate Period. *Journal of Field Archaeology*, 42(3), 241–257.
- Arnold, D. E. (1985). *Ceramic theory and cultural process*. Cambridge: Cambridge University Press.
- Arnold III, P. J. (1990). The organization of refuse disposal and ceramic production within contemporary Mexican houselots. *American Anthropologist*, 92(4), 915–932.
- Arnold III, P. J. (1991). Domestic ceramic production and spatial organization: a Mexican case study in ethnoarchaeology. Cambridge: Cambridge University Press.
- Augustine, J. (2019). Style, aesthetics, and politics: polychrome ceramic iconography in the Tiwanaku valley, A.D. 500–1100. Unpublished Ph.D. Dissertation. Department of Anthropology. University of Chicago, Chicago.
- Balkansky, A. K., Feinman, G. M., & Nicholas, L. M. (1997). Pottery kilns of ancient Ejutla, Oaxaca, Mexico. *Journal of Field Archaeology*, 24(2), 139–160.
- Bandy, M. S. (2001). Population and history in the ancient Titicaca Basin. Unpublished PhD Dissertation. Department of Anthropology. University of California, Berkeley.
- Becker, M. J. (2003). A Classic-Period “barrio” producing fine polychrome ceramics at Tikal, Guatemala: Notes on ancient Maya firing technology. *Ancient Mesoamerica*, 14, 95–112.
- Becker, S. K. (2016). Skeletal evidence of craft production from the Ch’iji Jawira site in Tiwanaku, Bolivia. *Journal of Archaeological Science: Reports*, 9, 405–415.
- Bernardini, W. (2000). Kiln firing groups: inter-household economic collaboration and social organization in the northern American Southwest. *American Antiquity*, 65(2), 365–377.
- Brown, W. (2001). *Politics out of history*. Princeton: Princeton University Press.
- Bruno, M. C., & Hastorf, C. A. (2016). Gifts from the camelids: archaeobotanical insights into camelid pastoralism through the study of dung. In J. M. Capriles & N.

- Tripcevich (Eds.), *The archaeology of Andean pastoralism* (pp. 55–65). Santa Fe: University of New Mexico Press.
- Bruno, M., & Roddick, A. (2011). Trinchera este-oeste de 8x2 m (n893/e641). In C. A. Hastorf (Ed.), *Excavaciones en Kala Uyuni: Informe de la temporada 2009 del Proyecto Arqueológico Taraco*, Report presented to the Unidad Nacional de Arqueología de Bolivia (pp. 44–55). Bolivia: La Paz.
- Budden, S., & Sofaer, J. (2009). Non-discursive knowledge and the construction of identity: potters, potting and performance at the Bronze Age tell of Százhalombatta, Hungary. *Cambridge Archaeological Journal*, 19(02), 203–220.
- Carlevato, D. (1988). Late ceramics from Pucará, Peru. An indicator of changing site function in Andean archaeology. *Expedition*, 30(3), 39–45.
- Chapa, R., & Davis, K. (2007). The role of analogy in archaeological interpretation: the case of aptapi celebrations in the community of Kasa Achuta, Bolivia. Paper presented at the 72nd annual meetings of the Society for American Archaeology, Austin.
- Chatfield, M. (2010). Tracing firing technology through clay properties in Cuzco, Peru. *Journal of Archaeological Science*, 37, 727–736.
- Chávez, S. J. (1992). The conventionalized rules in Pucará pottery technology and iconography: Implications of socio-political development in the northern Titicaca Basin. Unpublished Ph.D. Dissertation. Department of Anthropology. Michigan State University, East Lansing.
- Clavijo Prieto, P. (2008). Identificación de áreas residenciales y actividades en el montículo formativo Wankarani: El caso del sitio La Barca, Oruro - Bolivia. Tesis de Licenciatura. Universidad Mayor de San Andrés, La Paz.
- Cobo, B. [1653] (1983). *History of the Inca empire: an account of the Indians' customs and their origin, together with a treatise on Inca legends, history, and social institutions*. Austin: University of Texas Press.
- Corniquet, C. (2011). Cadres de pratiques et circulation des connaissances chez les potières de l'Arewa (Niger). *Cahiers d'études Africaines*, 201, 87–114.
- Cuynet, F., & Cossío Carrillo, R. Á. (2017). Misión arqueológica Pucara-Tiahuanaco: Informe de la segunda temporada de excavaciones (agosto-septiembre 2016).
- Cuynet, F., & Cossío Carrillo, R. Á. (2019). Misión arqueológica Pucara-Tiahuanaco: Informe de la cuarta temporada de excavaciones (agosto-septiembre 2018).
- De La Fuente, G. A. (2007). Producción y tecnología cerámica en Batungasta: Estandarización, especialización y procedencia. Unpublished PhD dissertation. Department of Anthropology. Universidad Nacional de La Plata, La Plata.
- De La Fuente, G., & Vera, S. D. (2016). Pottery kilns and firing technology during the Late and Inka Periods in the southern Abaucan valley: a contribution through ceramic petrography and XRD (Catamarca, northwestern Argentina, southern Andes). In E. M. Stovel & G. De La Fuente (Eds.), *Vessels explored: applying archaeometry to South American ceramics and their production* (pp. 89–100). Oxford: British Archaeological Reports.

- De Zapata, S. S., Rassit, V. M., & Uzieda, J. V. (1997). *Inventario de la cerámica Aymara y Quechua*. La Paz: Union de Ceramistas Aymaras Quechuas de Bolivia.
- Diez de San Miguel, G. [1567] (1964). *Visita hecha a la provincia de Chucuito por Garcí Diez de San Miguel en el año 1567*. In *Versión paleográfica de la visita y una biografía del visitador por Waldemar Espinoza Soriano*. Lima: Casa de la Cultura del Perú.
- Dreier, O. (1993). Re-searching psychotherapeutic practice. In S. Chaiklin & J. Lave (Eds.), *Understanding practice: perspectives on activity and context* (pp. 105–124). Cambridge: Cambridge University Press.
- Druc, I. C. (2005). *Producción cerámica y etnoarqueología en Conchucos, Ancash, Perú*. Lima: Instituto Cultural Rvna.
- Espinoza Soriano, W. (1987). Migraciones internas en el reino Colla: Tejedores, plumereros y alfareros del estado imperial Inca. *Chungara*, 19, 243–293.
- Foucault, M. (1984). Nietzsche, genealogy, history. In P. Rabinow (Ed.), *He foucault reader* (pp. 76–100). New York: Pantheon.
- Franke, E. (1995). Chiji Jawira: a case for attached specialization at Tiwanaku. *Journal of the Steward Anthropological Society*, 23(1&2), 111–119.
- Fredriksen, P. D., & Bandama, F. (2016). The mobility of memory: space/knowledge dynamics in rural potting workshops in Limpopo province, South Africa. *Azania: Archaeological Research in Africa*, 51(4), 489–506. <https://doi.org/10.1080/0067270x.2016.1220056>.
- Gabelmann, O. U. (2012a). A changing society? Craft specialization and complementarity systems during the Formative Period in the Cochabamba Valley, Bolivia. *Andean Past*, 10, 27–67.
- Gabelmann, O. U. (2012b). Complejidad social y organización de la producción artesanal durante el Período Formativo en el valle alto de Cochabamba. *Arqueoantropológicas*, 2(2), 97–141.
- Gabelmann, O. U. (2017). En búsqueda de la mujer en la producción alfarera. Resultados paleo-patológicos preliminares de Aranjuez-Santa Lucía, Cochabamba. In W. Sanchez Canedo & C. Rivera Casanovas (Eds.), *Otros miradas: Presencias femeninas en una historia de larga duración* (pp. 115-133).
- Geib, P. R., & Callahan, M. M. (1988). Clay residue on polishing stones. *Kiva*, 53(4), 357–362.
- Gilmore, Z. I. (2015). Pit events and place-making in late archaic Florida. In Z. Gilmore & J. M. O'Donoghue (Eds.), *The archaeology of events: cultural change and continuity in the Pre-Columbian Southeast* (pp. 119-140). Tuscaloosa: University of Alabama Press.
- Gosalvez Sologuren, R.G. (2003). *Subsunción del trabajo campesino familiar-comunitario al capital - el caso de la comunidad: Chijipata Alta*. Unpublished licenciatura thesis. Department of Economics. Universidad Mayor de San Andrés, La Paz, Bolivia.

- Gosselain, O. P. (1999). Not so much a pot, more a way of life: Current approaches to artefact analysis in archaeology. *American Journal of Archaeology*, 103(2), 382–384.
- Gosselain, O. P. (2016). To hell with ethnoarchaeology. *Archaeological Dialogues*, 23(2), 215–228. Gosselain, O. P. (2018). Pottery chaînes opératoires as historical documents. In *Oxford research encyclopaedia of African history*. Oxford: Oxford University Press.
- Harding, J. (2005). Rethinking the great divide: long-term structural history and the temporality of event. *Norwegian Archaeological Review*, 38(2), 88–101.
- Harkey, A., & Steadman, L. (2011). Cerámica de la temporada 2009 en Kala Uyuni. In C. A. Hastorf (Ed.), *Excavaciones en Kala Uyuni: Informe de la temporada 2009 del Proyecto Arqueológico Taraco*, presented to the Unidad Nacional de Arqueología de Bolivia (pp. 76–85). Bolivia: La Paz.
- Hayashida, F. (1998). New insights into Inka pottery production. In I. Shimada (Ed.), *Andean ceramics: technology, organization, and approaches* (pp. 313–338). Philadelphia: University Museum of Archaeology and Anthropology, University of Pennsylvania.
- Hayashida, F. (1999). Style, technology, and state production: Inka pottery manufacture in the leche valley, Peru. *Latin American Antiquity*, 10, 337–352.
- Hayashida, F., Häusler, W., Riederer, J., & Wagner, U. (2003). Technology and organisation of Inka pottery production in the Leche valley. Part ii: study of fired vessels. *Hyperfine Interactions*, 150(1), 153–163.
- Hosler, D. (1996). Technical choices, social categories and meaning among the Andean potters of Las Animas. *Journal of Material Culture*, 1(1), 63–92.
- Hyslop, J. (1976). An archaeological investigation of the Lupaca kingdom and its origins. Unpublished PhD Dissertation. Department of Anthropology. Columbia University, New York.
- Isbell, W. H. (2007). A community of potters or multicrafting wives of polygynous lords. In I. Shimada (Ed.), *Craft production in complex societies: multicraft and producer perspectives* (pp. 8–96). Salt Lake City: University of Utah Press.
- Janusek, J. W. (1999). Craft and local power: embedded specialization in Tiwanaku cities. *Latin American Antiquity*, 10(2), 107–131.
- Janusek, J. W. (2003). Vessels, time, and society: towards a chronology of ceramic style in the Tiwanaku heartland. In A. L. Kolata (Ed.), *Tiwanaku and its Hinterland: Archaeology and paleoecology of an Andean civilization* (Vol. 2, pp. 30–92). Washington, DC: Smithsonian Institution Press.
- Janusek, J. W. (2009). Residence and ritual in Tiwanaku: hierarchy, specialization, ethnicity, and ceremony. In
- L. R. Manzanilla & C. Chapdelaine (Eds.), *Domestic life in prehispanic capitals: a study of specialization, hierarchy, and ethnicity* (pp. 149–169). Ann Arbor: University of Michigan Museum.

- Janusek, J. W. (2018). *Khonkho Wankane: archaeological investigations in Jesus de Machaca, Bolivia*. Berkeley: Regents of the University of California eScholarship.
- Janusek, J. W., Ohnstad, A., & Rodas, D. (2018). Tiwanaku period residence and specialized production at the north edge of the Wankane platform. In J. W. Janusek (Ed.), *Khonkho Wankane: Archaeological investigations in Jesus de Machaca, Bolivia* (pp. 139-153). Berkeley, CA.: Regents of the University of California eScholarship.
- Julien, C. J. (1983). *Hatunqolla: a view of Inca rule from the lake Titicaca region*. Berkeley: University of California Press.
- Klarich, E. A. (2005). *From the mundane to the monumental: defining early leadership strategies at late formative Pukara, Peru*. Unpublished Ph.D. Dissertation. University of California Santa Barbara, Santa Barbara.
- Klarich, E. A., & Chávez Justo, C. (2018). Late Formative period ceramics from Pukara: insights from excavations on the central pampa. In W. H. Isbell, M. I. Uribe, A. Tiballi, & E. P. Zegarra (Eds.), *Images in action: the southern Andean iconographic series* (pp. 53–73). Los Angeles: UCLA Cotsen Institute of Archaeology Press.
- Klarich, E. A., & Flores, L. A. (2010). Continuidad e innovación de la cerámica Pucará: 3000 años de producción alfarera en la cuenca norte del Titicaca. In Toro, torito de Pucará: Galería y estudios. Ministerio de Comercio Exterior y Turismo Lima.
- Larrazábal, H., Pita, E., & Toranzo, C. (1988). *Artesanía rural Boliviana*. La Paz: CEDLA en cooperación con ILDIS.
- Lémuz Aguirre, C. (2001). *Patrones de asentamiento arqueológico en la península de Santiago de Huata, Bolivia*. Unpublished licenciatura thesis. Universidad Mayor de San Andres, La Paz, Bolivia.
- Livingstone Smith, A. (2001). Bonfire II: the return of pottery firing temperatures. *Journal of Archaeological Science*, 28, 991–1003.
- Logan, A. L., & Stahl, A. B. (2017). Genealogies of practice in and of the environment in Banda, Ghana. *Journal of Archaeological Method and Theory*.
- Lucas, G. (2006). Historical archaeology and time. In D. Hicks & M. C. Beaudry (Eds.), *The Cambridge companion to historical archaeology* (pp. 34-47). Cambridge, UK; New York: Cambridge University Press.
- Marsh, E. J., Roddick, A. P., Bruno, M. C., Smith, S. C., Janusek, J. W., & Hastorf, C. A. (2019). Temporal inflection points in decorated pottery: a bayesian refinement of the Late Formative chronology in the southern Lake Titicaca Basin, Bolivia. *Latin American Antiquity* 73.
- Mayer, E. (2002). *The articulated peasant: household economies in the Andes*. Boulder: Westview Press. Mercado de Peñalosa, P. [1586] (1965). *Relación de la provincia de los Pacajes*. In M. Jiménez de la Espada (Ed.), *Relaciones Geográficas de Indias - Perú* (pp. 334-341). Madrid: Ediciones Atlas.
- Michelaki, K. (2008). Making Pots and Potters in the Bronze Age Maros Villages of Kiszombor-Új-Élet and Klárafalva-Hajdova. *Cambridge Archaeological Journal*, 18(3), 355–380.

- Mills, B. J., & Walker, W. H. (2008). Introduction: memory, materiality, and depositional practice. In B. J.
- Mills & W. H. Walker (Eds.), *Memory work: archaeologies of material practices*, School for Advanced Research Press (pp. 3–23). Santa Fe: SAR Press.
- Mohr Chávez, K. (1984). Traditional pottery of Raqch'i, Cuzco, Peru: a preliminary study of its production, distribution and consumption. *Nawpa Pacha*, 22-23, 161–210.
- Mohr Chávez, K. (1992). The organization of production and distribution of traditional pottery in south highland Peru. In G. J. Bey & C. A. Pool (Eds.), *Ceramic production and distribution: an integrated approach* (pp. 49–92). Boulder: Westview Press.
- Moore, K. M. (2013). Economic and social context of bone tools use, Formative Bolivia. In A. Choyke & A. O'Conner (Eds.), *Raw and worked bone materials, social aspects of raw material selection* (pp. 174-185). Oxbow Books.
- Murra, J. V. (1978). Los olleros del Inka: Hacia una historia y arqueología del Qollasuyu. In F. Miro Quesada, F. Pease, & D. Sobrevilla (Eds.), *Historia, problema y promesa: Homenaje a Jorge Basadre* (Vol. 1, pp. 415-423). Pontificia Universidad Católica del Perú.
- Nicklin, K. (1981). Ceramic pyrometry: two Ibibio examples. In H. Howard & E. Morris (Eds.), *Production and distribution: a ceramic viewpoint* (pp. 169–186). Oxford: British Archaeological Reports.
- Orton, C., Hughes, M., & Hughes, M. (2013). *Pottery in archaeology*. Cambridge: Cambridge University Press. Pauketat, T. R., & Alt, S. M. (2005). Agency in a postmold? Physicality and the archaeology of culture-making. *Journal of Archaeological Method and Theory*, 12(3), 213–237.
- Plaza Martínez, V. M., & Roddick, A. (2014). *Modelando la tierra: Practica tradicional de los olleros de Chijipata Alta del altiplano de Bolivia*. Pamphlet produced for community of Chijipata Alta.
- Pool, C. A. (2000). Why a kiln? Firing technology in the Sierra de los Tuxtlas, Veracruz (Mexico). *Archaeometry*, 42(1), 61–76.
- Ramón, G. (2016). Producción y distribución alfarera colonial temprana en los Andes centrales: Modelos y casos. *Boletín de Arqueología PUCP*, 20), 25-48.
- Ramón, G., & Bell, M. (2013). Re-placing plainware: production and distribution of domestic pottery, and the narration of the pre-colonial past in the Peruvian Andes. *Journal of Anthropological Archaeology*, 32(4), 595–613.
- Ramón Joffré, G. (2013). *Los alfareros golondrinos: Productores itinerantes en los Andes*. Lima: IFEA Instituto Francés de estudios Andinos and Sequilao Editores.
- Reina, R. E., & Hill, R. M. (1978). *The traditional pottery of Guatemala*. Austin: University of Texas Press.
- Rice, P. M. (1987). *Pottery analysis: a sourcebook*. Chicago: University of Chicago Press.

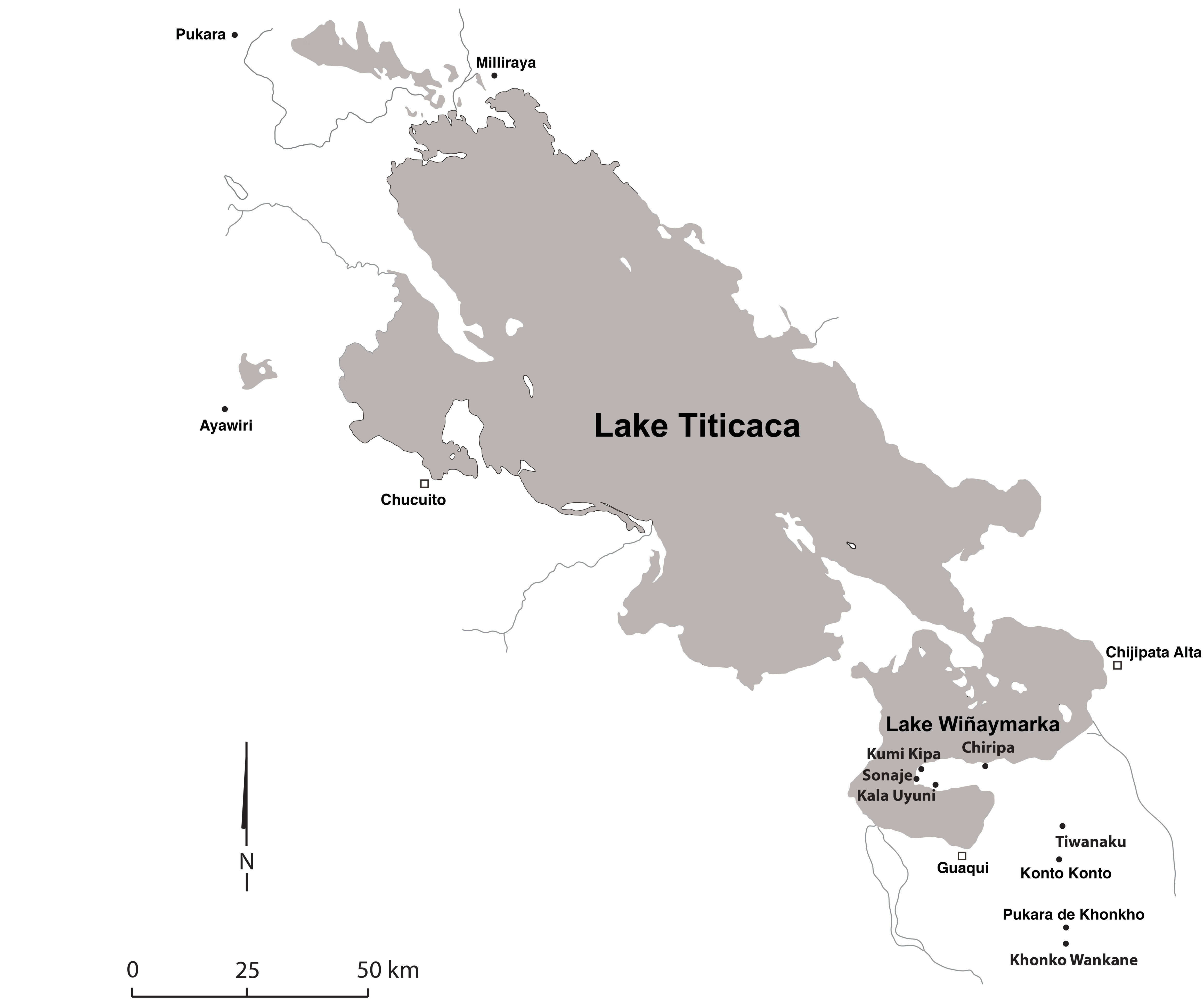


- Rice, P. M. (1994). The kilns of Moquegua, Peru: Technology, excavations, and functions. *Journal of Field Archaeology*, 21(3), 325–344.
- Rice, P. M. (1997). *The prehistory and history of ceramic kilns*. Westerville, Ohio: The American Ceramic Society.
- Richard, F. G. (2018). *Reluctant landscapes: historical anthropologies of political experience in Siin, Senegal*. Chicago: University of Chicago Press.
- Rivera Casanovas, C. (2003). Chi'iji Jawira: a case of ceramic specialization in the Tiwanaku urban periphery. In A. L. Kolata (Ed.), *Tiwanaku and its hinterland: archaeological and paleoecological investigations of an Andean civilization* (Vol. 2, pp. 296–315). Washington, DC: Smithsonian Institution Press.
- Rivera Casanovas, C. (2014). La cadena operatoria de la cerámica en Tiwanaku: El caso de Ch'iji Jawira. In *La rebelión de los objetos. Enfoque cerámico. Anales de la XXVIII Reunión Anual de Etnología* (pp. 65-88). La Paz: MUSEF-FCBCB.
- Robb, J., & Pauketat, T. R. (2013). From moments to millennia: Theorizing scale and change in human history. In J. Robb & T. Pauketat (Eds.), *Big Histories, Human Lives: Tackling Problems of Scale in Archaeology* (pp. 3–33). Santa Fe: School for Advanced Research Press.
- Roddick, A. P. (2009). *Communities of pottery production and consumption on the Taraco Peninsula, Bolivia, 200 B.C.-300 A.D.* Unpublished PhD dissertation. University of California, Berkeley, Berkeley.
- Roddick, A. P. (2013). Temporalities of the Formative Period Taraco Peninsula, Bolivia. *Journal of Social Archaeology*, 13(3), 287–309.
- Roddick, A. P. (2014). *Pastas del Formativo Tardío, recursos y fronteras en práctica: Informe de diagnóstico e investigación en los valles de Tiwanaku, Desaguadero y Santiago de Huata*. Report submitted to the Unidad De Arqueología Y Museos, La Paz.
- Roddick, A. P. (2016). Scalar relations: a juxtaposition of craft learning in the Lake Titicaca Basin. In A. P.
- Roddick & A. B. Stahl (Eds.), *Knowledge in motion: constellations of learning across time and place* (pp. 126-154). Tucson: University of Arizona Press.
- Roddick, A. P. (2019). Archaeologies of the present and sedimented futures: reflections from Lake Titicaca, Bolivia. *Journal of Contemporary Archaeology*, 6(1), 101–119.
- Roddick, A., & Janusek, J. (2011). From profanity to profundity: (grudgingly) learning to appreciate Tiwanaku 'ash pits' as Tiwanaku cultural practice. Paper presented at the 51st Annual Meeting of the Institute of Andean Studies, Berkeley.
- Roddick, A. P., & Klarich, E. (2013). Arcillas and alfereros: clay and temper mining practices in the Lake Titicaca Basin. In N. Tripcevich & K. Vaughn (Eds.), *Mining and quarrying in the ancient Andes: sociopolitical, economic and symbolic dimensions* (pp. 99-122).
- Roddick, A. P., & Stahl, A. B. (2016). Introduction: knowledge in motion. In A. P. Roddick & A. B. Stahl (Eds.), *Knowledge in motion: constellations of learning across time and place* (pp. 3-35). Tucson: University of Arizona Press.

- Roddick, A., Fontenla, R., & Reilly, S. (2017). Análisis de cerámica. In C. A. Hastorf (Ed.), *Informe de investigación, proyecto arqueología del paisaje y comunidades de producción en la Península de Taraco, Bolivia 2016*. Report presented to the Ministerio de Culturas y Turismo, Viceministerio de Interculturalidad, Unidad de Arqueología y Museos (pp. 14-33). La Paz, Bolivia.
- Saar, M. (2008). Understanding genealogy: history, power, and the self. *Journal of the Philosophy of History*, 2(3), 295–314.
- Scarlett, T. J., Speakman, R. J., & Glascock, M. D. (2007). Pottery in the Mormon economy: An historical, archaeological, and archaeometric study. *Historical Archaeology*, 41(4), 72–97.
- Shimada, I. (1997). The variability and evolution of prehispanic kilns on the Peruvian coast. In P. Rice (Ed.), *The prehistory and history of ceramic kilns* (pp. 103–127). Westerville: The American Ceramic Society.
- Shimada, I. (1998). Andean ceramics: an introduction. In I. Shimada (Ed.), *Andean ceramics: technology, organization, and approaches* (pp. 1-22). Philadelphia: University Museum of Archaeology and Anthropology, University of Pennsylvania.
- Sillar, B. (1996). The dead and the drying: techniques for transforming people and things in the Andes. *Journal of Material Culture*, 1(3), 259–289.
- Sillar, B. (2000a). Dung by preference: the choice of fuel as an example of how Andean pottery production is embedded within wider technical, social, and economic practices. *Archaeometry*, 42, 43–60.
- Sillar, B. (2000b). *Shaping culture: making pots and constructing households: an archaeological study of pottery production, trade and use in the Andes*. Oxford: J. and E. Hedges.
- Spurling, G. E. (1992). *The organization of craft production in the Inka state: the potters and weavers of Milliraya*. Unpublished PhD dissertation. Department of Anthropology, Cornell University.
- Stahl, A. B. (1993). Concepts of time and approaches to analogical reasoning in historical perspective. *American Antiquity*, 58(2), 235–260.
- Stahl, A. B. (2010). Material histories. In D. Hicks & M. Beaudry (Eds.), *Oxford handbook of material culture studies* (pp. 148–170). Oxford: Oxford University Press.
- Stahl, A. B. (2013). Archaeological insights into aesthetic communities of practice in the western volta basin. *African Arts*, 46(3), 54–67.
- Stanish, C., de la Vega, E., Steadman, L., Justo, C. C., Frye, K. L., Mamani, L. O., Seddon, M. T., & Chuquimia, P. C. (1997). *Archaeological survey in the Juli-Desaguadero region of Lake Titicaca Basin, southern Peru*. Chicago: Field Museum of Natural History.
- Stark, B. L. (1985). Archaeological identification of pottery production locations: ethnoarchaeological and archaeological data in Mesoamerica. In B. A. Nelson (Ed.), *Decoding prehistoric ceramics* (pp. 158– 194). Carbondale: Southern Illinois University Press.

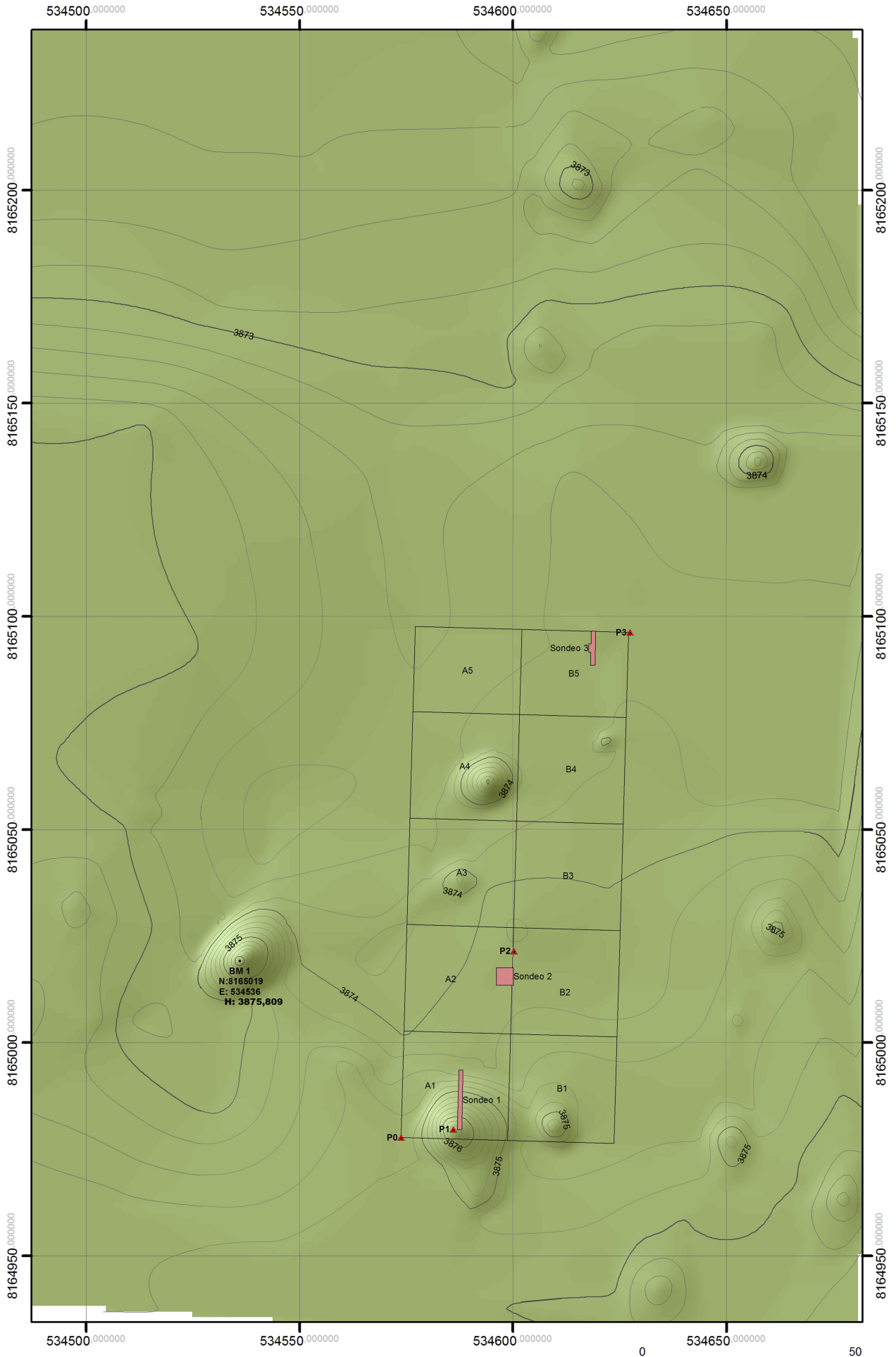
- Steadman, L. H. (1999). The ceramics. In C. A. Hastorf (Ed.), *Early Settlement at Chiripa, Bolivia: research of the Taraco Archaeological Project* (pp. 61–72). Berkeley: University of California Archaeological Research Facility.
- Steadman, L. H. (2007). Ceramic analysis. In C. A. Hastorf & M. S. Bandy (Eds.), *The Taraco Archaeological Project's 2003 excavations at Kala Uyuni* (pp. 67–112). Berkeley: Archaeological Research Facility.
- Stengers, I. (2011). Comparison as a matter of concern. *Common Knowledge*, 17(1), 48–63.
- Stoler, A. L. (2016). *Duress: imperial durabilities in our times*. Durham: Duke University Press.
- Strathern, M. (2018). Opening up relations. In M. B. de la Cadena, Mario (Ed.), *A World of Many Worlds* (pp. 23–52). Durham: Duke University Press.
- Sullivan, A. P. (1988). Prehistoric Southwestern ceramic manufacture: the limitations of current evidence. *American Antiquity*, 53(1).
- Thomas, J. (1999). *Understanding the Neolithic*. London: Routledge.
- Thomas, J. (2004). *Archaeology and modernity*. London: Routledge.
- Tschopik, M. B. (1946). Some notes on the archaeology of the department of Puno, Peru. Cambridge: Peabody Museum of American Archaeology and Ethnology.
- Tschopik, H. (1950). An Andean ceramic tradition in historical perspective. *American Antiquity*, 15(3), 196–218.
- VanValkenburgh, P., Kelloway, S. J., Privat, K. L., Sillar, B., & Quilter, J. (2017). Rethinking cultural hybridity and technology transfer: SEM microstructural analysis of lead glazed ceramics from early colonial Peru. *Journal of Archaeological Science*, 82, 17–30.
- Vieugué, J. (2015). What were the recycled potsherds used for? Use-wear analysis of early Neolithic ceramic tools from Bulgaria (6100–5600 cal. Bc). *Journal of Archaeological Science*, 58, 89–102.
- Walls, M., & Malafouris, L. (2016). Creativity as a developmental ecology. In V. P. Glăveanu (Ed.), *The Palgrave Handbook Of Creativity and Culture Research* (pp. 623–638). Palgrave Macmillan.
- Winterhalder, B., Larsen, R., & Thomas, R. B. (1974). Dung as an essential resource in a highland Peruvian community. *Human Ecology*, 2(2), 89–104.
- Yates, D. (2005). Unidad 1-14: Investigación al lado occidental de la pirámide de Akapana proyecto arqueológico Pumapunku-Akapana 2004, Tiwanaku, Bolivia. In A. Vranich & J. M. López (Eds.), *The 2003-2004 Field Season: Investigations in the Monumental core*. Report submitted to the National Institute of Archaeology of Bolivia.
- Zovar, J. M. (2012). Post-collapse constructions of community, memory, and identity: an archaeological analysis of Late Intermediate Period community formation in Bolivia's Desaguadero Valley. Unpublished PhD Dissertation. Department of Anthropology. Vanderbilt University, Nashville.

Zuñiga Rivero, T., Naja Vizcarra, Y., Flores Ochoa, J., Carmona Cruz, A., Tapia Bueno, W., & Zans Candia, L. (1966). El torito de Pukara: Cerámica tradicional de Ch'eqa Pupuja. *Folklore: Revista de Cultura Tradicional*, 1(1), 103–145.









• Archaeological Site

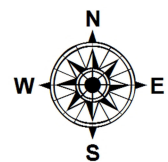
□ Modern town/village



**Referencia**

-  BM 1
-  Puntos de referencia
-  Unidades de sondéo
-  Cuadrantes
-  Curvas de nivel c/1m
-  Curvas de nivel c/20cm

ESC.: 1:750







A)



C)



D)



B)





A)



B)



C)





A)



B)



C)



D)



A)



B)





A)



B)