## Title
Exotic Goods, Chivay Obsidian, and Sociopolitical Change in the South-Central Andes



## Journal
Trade and Exchange: Archaeological Studies from History and Prehistory, 1

## Author
Tripcevich, Nicholas

## Publication Date
2010

## DOI
10.1007/978-1-4419-1072-1

Peer reviewed

# Chapter 4
# Exotic Goods, Chivay Obsidian, and Sociopolitical Change in the South-Central Andes

**Nicholas Tripcevich**

## 4.1 Introduction

Exchange of exotic goods generates interest among archaeologists because it is a theme that effectively links local phenomena with regional events, and human behavior with material evidence. This study concerns the role of exotic goods in contexts of changing sociopolitical complexity where procurement distance is frequently used to infer value, and differential access to goods is linked to status. The assumption that nonlocal goods are automatically status conferring goods connected to social competition can be problematic, as it depends upon a relationship between distance and scarcity, as well as the social and political consequences of these goods. This perspective often underestimates the importance of "ordinary" household goods both in terms of the circulation distance and the social information conveyed by such goods. Long-distance exchange in the highland Andes, described ethnohistorically (Murra 1980: 139–152), is also evident in the prehispanic distribution of sourceable materials, such as obsidian artifacts (Burger et al. 2000). Archaeological studies in the south-central Andes suggest that regional exchange expanded in quantity and frequency during and after the onset of an economy focused on agropastoralism. This study presents data from research at an obsidian source of regional importance, and examines the link between the circulation of goods like obsidian and the development of regular, seasonal exchange that included transport using llama caravan networks.

This study connects household-level long-distance exchange of ordinary goods with research into the emergence of complex societies at high altitudes in the south-central Andes. The domestication of South American camelids, the llama and the alpaca, opened a broad niche for a pastoral economy based in the high-altitude grasslands crowning the narrow Andean cordillera (Fig. 1). The highland region subsequently prospered from social and economic relations maintained with

N. Tripcevich (✉)
University of California-Berkeley, Berkeley, CA, USA
e-mail: nico@MapAspects.org

C.D. Dillian and C.L. White (eds.), *Trade and Exchange: Archaeological Studies from History and Prehistory*, DOI 10.1007/978-1-4419-1072-1_4,

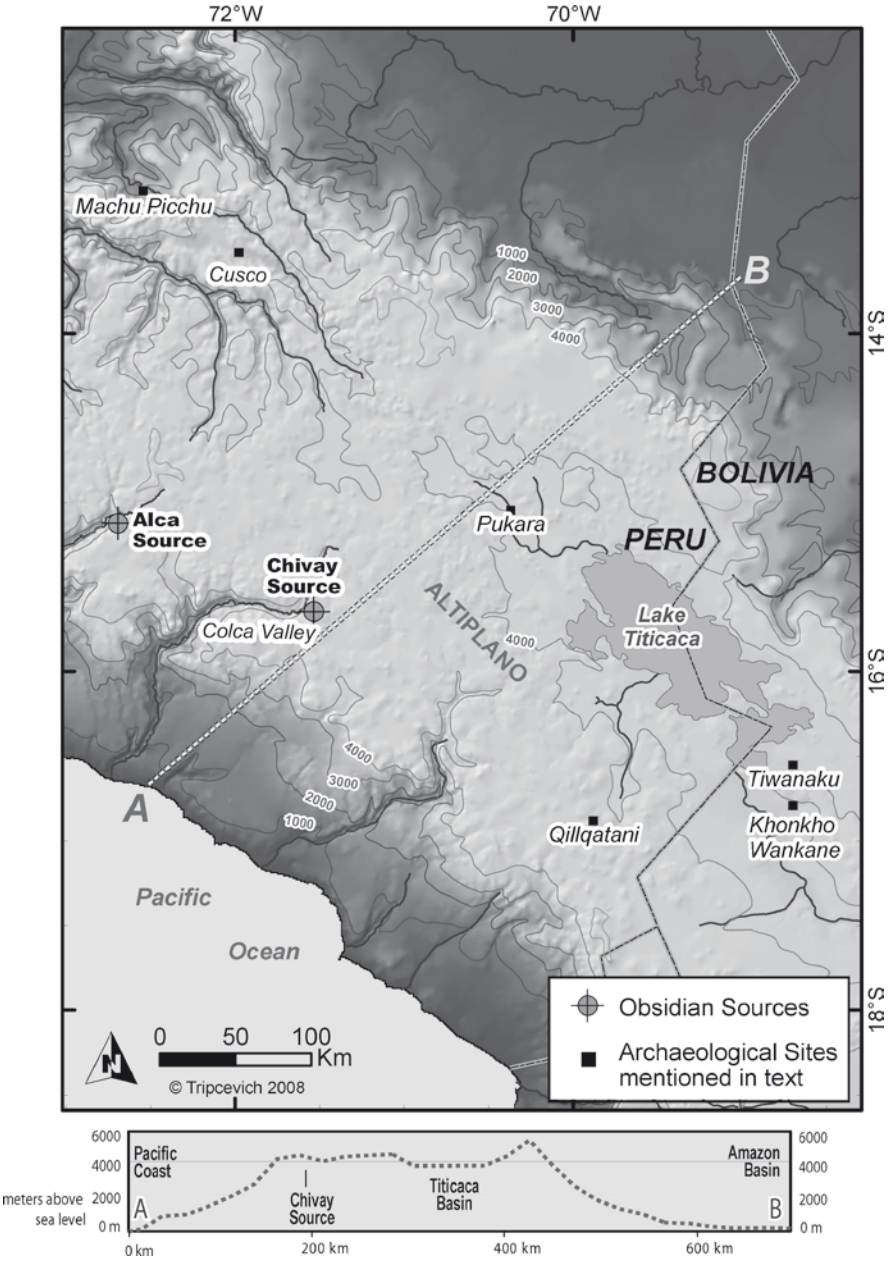


**Fig. 1** (**a**). Map of the South-central Andes showing Chivay and Alca obsidian sources, the Lake Titicaca Basin, and sites mentioned in the text. (**b**). Cross section of the Andes from the Pacific Ocean to the Amazon basin illustrates the steep flanks of the Andes and the relatively level Altiplano

communities on either side of the cordillera. The development of sustained regional interaction through the regular movement of llama caravans appears linked to an increase in the circulation of goods. This dynamic would have changed through

time in terms of the costs of transport, and, it is inferred, in the social significance of specific exotic materials.

Archaeologists looking at exchange with respect to changes in sociopolitical complexity have argued that exotic goods are often linked to status, and are indicative of the long-distance trade connections and alliances of the individual or family in possession of these goods. Portable high-status goods that are carried greater distances are often categorized dichotomously against "staple products." For example, Earle differentiates wealth finance from staple finance, where wealth items are used for display and exchange, and the primary function is to represent status (Earle 1994: 427). Hayden defines items that have been carried for more than two days as "prestige technology" in contrast to "practical technology" (Hayden 1998: 44). In dual-processual theory, Blanton et al. (1996) present long-distance exchange as a principal element in "network strategies" linking elites across distance. These classifications are used in a general sense and focus on exchange as one of the strategies employed by emerging elites that contribute to explaining social evolutionary processes.

In an argument for the importance of exchange of "ordinary goods," Smith (1999) takes the position that the development and the long-term viability of trade networks in many regions were likely based on the demand for relatively commonplace items that were unavailable locally. She argues that these items often served important roles in household activities that were laden with social and functional meaning, and formed a prominent part of group identity. Applying the sociosemiotics of Gottdiener (1995), Smith argues that the consumption of particular materials can have social significance and convey information in a variety of sociopolitical contexts. Thus, the capacity for kin-based reciprocal exchange networks to distribute household items over distance, or household-level trading ventures to circulate relatively mundane products, should not be underestimated. Her thesis appears to explain, in part, the pattern observed in obsidian consumption in the south-central Andes, of which new data are presented here, of low but consistent quantities of obsidian being produced and transported throughout the region by the end of the preceramic period.

Sustained regional transport of obsidian in the south-central Andes occurred during a 3,000-year period of gradual social change, a time that includes the emergence of powerful regional centers in the Lake Titicaca Basin by approximately 200 BC. The role of political lineages and ethnic communities in Formative polities in the Lake Titicaca Basin has been the subject of recent research (Hastorf 2008; Janusek 2004; Stanish 2003). In the circumstances where exotic items were circulated widely at a household level, recognizably foreign goods have the potential for conveying ethnic or factional associations in the broader consumption area. In dichotomizing status items from commonplace goods, archaeologists may neglect valuable information conveyed in the study of common goods circulated regionally. Obsidian, in particular, eludes these distinctions because it may be considered a status good in some archaeological contexts and relatively commonplace in others. In fact, Hayden (1998: 45) allows for cultural goods that defy easy categorization between prestige and practical technologies. Obsidian as a cultural good reflects the difficulty in acquiring source material in some areas due to cultural barriers,

geological availability, inference based on obsidian artifacts found in archaeological deposits, and other factors.

As I will describe in more detail, the broad time period considered in this chapter spans dramatic changes in the economy and in sociopolitical organization in the south-central Andes. Despite the great changes that occurred, studies at a regional scale indicate that obsidian was disseminated into the region relatively consistently from the Terminal Archaic (3300 cal BC) onward. This study focuses on exchange between social units as small as household-level interaction, and thus the framework borrowed from other studies focusing on status items and commonplace is of limited utility.

## 4.2 Region

The regional focus of this research is the south-central Andes where the narrow Andean cordillera widens slightly at the high-altitude Lake Titicaca Basin. A cross-section of the Andes (Fig. 1b, profile) reveals the dramatic environmental contrasts that make exchange relationships particularly valuable (Sandweiss and Richardson 2008; Troll 1968). In the span of 150 km one goes from the verdant Amazon basin on the east side of the Andes through high-altitude grasslands and glaciated peaks, to the steep western slopes and the Pacific littoral. Each region offers particular resources that complement the other zones.

Archaeologists working in the south-central Andean highlands have developed a temporal sequence for the prehispanic period upon which there is general agreement (Fig. 2). The first peopling occurred sometime after 12,000 BC, with human occupation appearing first in coastal contexts and soon after in the highlands. The processes that led to full plant and animal domestication began sometime after 4,000 BC. The beginnings of sociopolitical differentiation appeared in architecture and crafts production by around 1,000 BC, the Lake Titicaca Middle Formative. These societies had growing influence in the region, and the largest of these Middle and Late Formative polities are viewed as chiefdoms. The expansive Tiwanaku polity, the first state in the highland region, existed between AD 500 and AD 1,100 and was generally contemporary with the larger, but shorter-lived, Wari state to the north that defines the Middle Horizon in central Andean archaeology. During a subsequent period of internecine conflict, fortified settlements were built on hilltops, and finally the Inka Empire emerged out of Cusco in the mid-fifteenth century to control the length of the Andes, although they would reign for less than 100 years before the Spanish arrived.

In the Lake Titicaca Basin, one notable aspect of the emergence of the Tiwanaku state is that it occurred in a steppe-like environment at nearly 4,000 masl, making it the highest-altitude in situ development for state-level society anywhere in the world. Tiwanaku had colonies in rich agricultural lands on either side of the Andes, together with vast herds of camelids and raised field agriculture in the vicinity of the Tiwanaku core area (Goldstein 2005; Janusek 2008). It appears that Tiwanaku

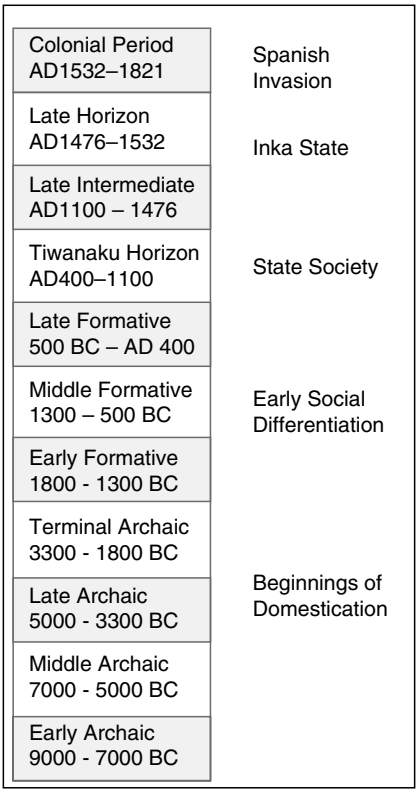


**Fig. 2** Calibrated Titicaca Basin chronology used in the text with major sociopolitical developments indicated

supported an economy with craft specialists and an elaborate ritual hierarchy (Kolata 2003), but most Andeanists believe that a prehispanic market-based economy (with prices reflecting supply and demand) played a minor role, or was absent, in this part of the Andes (LaLone 1982: 300; Stanish 2003: 69). In lieu of a market-based system, the evidence suggests that the dominant mechanisms were reciprocity and redistribution, as well as a more regionally specific interaction. As in mountain regions worldwide, communities residing in different ecological zones in the Andes had long engaged in reciprocal exchange relationships based on mutualism. In a pattern that is more distinctively Andean, polities would attempt direct control rather than exchange to acquire resources from an archipelago of productive lands at different altitudes on the flanks of the Andes in a colonial strategy known as "vertical complementarity" (Murra 1972). The vertical complementary model has been the subject of much discussion in the Andes (Aldenderfer 1993; Masuda et al. 1985; Van Buren 1996), with related models proposed such as the "altiplano mode" of integration which proposes extensive networks based on trade in the

altiplano grasslands of the south-central Andes beginning in the Formative (Browman 1981, 1990). In support of Browman's "altiplano mode," regional distributions of Chivay obsidian appear to be confined to middle- and high-altitude sites throughout Andean prehistory (Burger et al. 2000; Craig et al. 2007; Frye et al. 1998; Giesso 2000; Tripcevich 2007: 183–191).

Recent studies suggest that domains within the Tiwanaku state, including those in the core area, were heterogeneous and included ethnically diverse communities (Janusek 2008). Tiwanaku prospered for centuries in a location that is productively limited due to altitude and seasonality, yet on a regional scale the place provides access to a variety of goods such as maize, from other regions through long-distance trade (Hastorf 2006). Ethnohistoric evidence shows that the mobile sector of the Andean economy provided a vital articulation between regions with productive ecological niches, such as valleys rich in complementary products (Browman 1981; Casaverde Rojas 1977; Diez de San Miguel 1964 [1567]). The organization of regional caravan exchange was variable through the prehispanic period, as evidence points to long-distance caravans being used by a wide range of social groups. Contemporary caravans are typically coordinated by individuals representing local households and the *ayllu,* or lineage group (Harris 1985; Nielsen 2001). Ethnohistoric texts describe some caravans as under the aegis of elite administration in chiefdoms and states (Murra 1965; Stanish 2003: 69).

Drawing upon the example provided by modern-day Andean caravans, archaeologists use both material evidence and inference to describe the types of goods that likely circulated in the past. While the long-distance trade of heavy staple foods by way of llama caravans would have been costly, relatively portable goods of limited geographical availability such as peppers, herbs, dried fruit, salt, and obsidian were conveyed in regular and perhaps seasonal schedules that likely interfaced with annual festivals and rituals (Browman 1990; Dillehay and Nuñez 1988; Nuñez and Dillehay 1995[1979]). Other items, including coca leaf and other ritual and medicinal herbs, may have been part of household exchange. But, it is also possible that these materials belong among another class of cultural goods that had a political dynamic different from ordinary household goods. Altiplano residents had some staple agriculture, primarily in seed-plants and tubers, yet their most abundant products, much in demand by lower-elevation peoples, were derived from their substantial herds of camelids, including meat, wool, and leather, as well as associated transport capabilities.

## 4.3 Regional Circulation

Nonlocal goods have been present in much of the Titicaca Basin subsistence economy throughout the prehispanic period – albeit often appearing in small quantities. These regional consumption patterns of nonlocal goods may reveal significant differences in spatial and temporal distributions. In particular, does evidence from an underlying subsistence economy persist despite larger political changes

during the Formative period preceding the emergence of Tiwanaku? Furthermore, is there reciprocal evidence of exchange occurring between regions, or were principal communities participating disproportionately in regional exchange?

Numerous regional centers dominated the Titicaca landscape in the Middle Formative, and it appears that by the Late Formative power was consolidated into a few large centers that lay on either end of Lake Titicaca along the north-west to south-east axis (Bandy 2005; Stanish 2003: 159). These prominent centers, including Pukara to the north-west and Tiwanaku and Khonkho Wankane on the south-east, would have had unfettered access to both sides of the Andes by virtue of their geographical position (Fig. 1). It follows that if the emergence of these powerful centers altered the economic landscape in their hinterlands, what do longstanding regional exchange relationships tell us about the communities that made up these larger emerging polities?

Ethnohistoric documents describe aspects of regional trade relationships during the early colonial period, presenting evidence on how emerging elites and commoners might have made use of long-distance interaction. Garci Diez's Titicaca Basin *visita*, a sixteenth century Spanish census document (Diez de San Miguel 1964 [1567]), relates how local elites in the Lake Titicaca Basin would have their constituents organize llama caravans for trading expeditions to adjacent, lower elevation regions where corn, fruits, and other products were sweeter, faster growing, and more abundant than in the Titicaca Basin.

Stanish uses such accounts to argue that administered trade benefited elites because they were able to appropriate this difference in value, and through feasting and other ceremonial functions, a portion of this wealth was redistributed to commoners (2003: 69). Diez describes how herders fulfilled their corvée labor obligations by participating in these elite-organized trading ventures, but that they also conducted private barter exchange on the side (Diez de San Miguel 1964 [1567]). Murra (1965: 201) writes, "those in Lupaca country [the south-western Titicaca Basin] 'who had their own cattle [*cargo llamas*]' (Diez de San Miguel 1964 [1567], f. 13v) went to the coast and to the lomas to barter on their own. …the maize growers on the irrigated coast were eager for the highlander's animals, their wool and meat." It appears that the herders were able to embed household economic transactions within their labor obligations by conducting barter activities on the side. Modern-day llama caravans bearing salt, animal products, and other goods from the altiplano to the adjacent lowlands (Browman 1990; Nielsen 2001) are a testament to the persistence of certain forms of exchange despite sweeping changes in the social and economic parameters that underpin these relationships.

## 4.4 Obsidian Exchange

As a resilient stone tool material that is visually distinct and can be geochemically linked to its geological source area, obsidian is exceptional for reconstructing the ancient movement of certain classes of artifacts (Shackley 2005). In the Andes,

there are relatively few nonperishable artifacts that circulated in the region consistently over long time periods that can provide a gauge of changes in exchange patterns. Obsidian was conveyed in the highland Andes throughout the prehispanic period despite a range of functional alternatives, such as high-quality chert. Over 90% of the obsidian in the Titicaca Basin came from a single source, called Chivay, that lay 175 km to the northwest of the Lake Titicaca (Fig. 1) above the Colca Valley in Arequipa, Peru (Burger et al. 1998; Burger et al. 2000). In the south-central Andes, obsidian was predominantly used for biface production, with projectile points representing the vast majority of obsidian artifacts. More specialized obsidian industries, such as prismatic blade production, have not been encountered in this area. Visually, Chivay obsidian is a light gray and sometimes banded glass that has a translucent appearance.

Despite the persistent diffusion of Chivay obsidian into the Titicaca Basin over a 3,000-year period, little evidence for the reciprocal movement of Titicaca Basin goods has been found in the Chivay area (Brooks et al. 1997, Burger et al. 2000: 340–342). In recent survey work, pottery sherds were found in Titicaca Basin styles known as Colla (Late Intermediate Period) and Chucuito (Late Horizon), dating to the last 400 years before the Spanish invasion (Tripcevich 2007: 259–263: 782–783).

Materials from the Titicaca Basin are recognized in the Colca area using stylistic attributes like pottery manufacture and iconographic elements rather than geochemical evidence. Geochemical and stylistic data sets, together with biological evidence, can be complementary and provide compelling multiple lines of evidence for understanding past geographical relationships (Burger et al. 2000: 268; Lazzari 2005). On the other hand, the contexts of transfer for stylistic attributes are largely cultural, so it may often be the case that stylistic distributions are not directly commensurate with geochemical evidence, and therefore such comparisons must be approached with caution. The geographical structure of single-source geological resources is a centrifugal network configuration distinctive from other phenomena because the goods are diffusing into the region (Haggett 1966; Tripcevich 2007: 67–68). These may be considered in terms of three patterns: (1) A network based on emanation from a sole source such as an obsidian source, (2) exchange of other subsistence products that will often be reciprocal and go both directions, and (3) stylistic attributes that can be conveyed through a variety of mechanisms including cultural and historical relationships.

Distinctive goods from Titicaca Basin polities dating to the Late Formative Period (400 BC–AD 500) and Tiwanaku Period (AD 500–AD 1100) have been encountered in distant lowland sites on both sides of the Andes. These goods consist principally of pottery, textiles, and Tiwanaku wooden snuff tablets (Blom et al. 1998; García Márquez and Bustamante Montoro 1990; Goldstein, 2000; Rivera 1991). Yet, interestingly, with the exception of one decorated Pukara sherd in the Colca valley (Wernke 2003: 137–138), these goods are not found at the Chivay obsidian source, the origin point of the predominant obsidian type found in Titicaca Late Formative and Tiwanaku sites. Given the presence of the Wari state immediately to the north and west, Colca residents may have operated within a frontier

situation where raw materials were exported toward the Titicaca Basin but stylistic affiliation was not well defined. During the subsequent Late Intermediate Period (AD 1100–1472), following the decline of the Tiwanaku state, strong stylistic similarities in burial practices, architecture, pottery, as well as the Aymara language, linked the upper Colca with the Titicaca Basin (Tripcevich 2007: 264).

Evidence for regional interaction is strong during later time periods and for certain groups, such as Pukara, with distinctive stylistic attributes that are recognizable throughout the larger region. In contrast, geochemical evidence is not similarly confined by the availability of diagnostic styles and therefore provides evidence of interaction across a wider range of contexts. Evidence from obsidian exchange is one of emanation from the geological source, providing evidence for exchange over a 10,000-year time period. This reveals long-term relationships between Chivay and the Titicaca Basin, including exchange that may predate both the emergence of diagnostic regional styles and the onset of social complexity in the Andean highlands.

## 4.5 The Chivay Obsidian Source

The area of the Chivay obsidian source and adjacent high-altitude lands (4,000–5,000 masl) were the subject of a survey and testing program in 2003 using a mobile GIS-based recording strategy (Tripcevich 2004, 2007). One of the patterns that emerged from this study is that intensified obsidian production appears to correlate spatially with pastoralist areas. The research documented a quarry area, a workshop, and a narrow unsurfaced road leading away from the quarry area. Research into deposits at the workshop suggest that intensified production at the source was occurring by around cal 1800 BC, which is substantially earlier than expected, based on known regional distribution of obsidian.

The spatial arrangement of the quarry, the workshop, and the location of the road also strongly suggest that camelids were involved in transport and that a priority was placed on their well being. That is, these facilities were positioned adjacent to the best water and grazing lands in an arid volcanic landscape largely devoid of suitable grasses. It is not surprising that people with llama caravans would have been responsible for obsidian production and circulation. After all, at 5,000 masl the high-altitude obsidian source falls clearly in the pastoralist domain, and caravans would have provided the cargo animals to help move the stone, as well as other products such as herbs, dried fruits, or maize found in the adjacent agricultural lands below.

The regional demand for obsidian is more intriguing. It seems obvious that herders would circulate obsidian; pastoralists work with hides, meat, and wool, and there is scarcely a better sharp-edged cutting tool for most tasks than obsidian. In fact, research at the pastoralist rock shelter of Qillqatani, 200 km away has found concentrations of Chivay-type obsidian contemporaneous with the early dates encountered at the Chivay source reported here, including obsidian fragments up to five cm in length that were

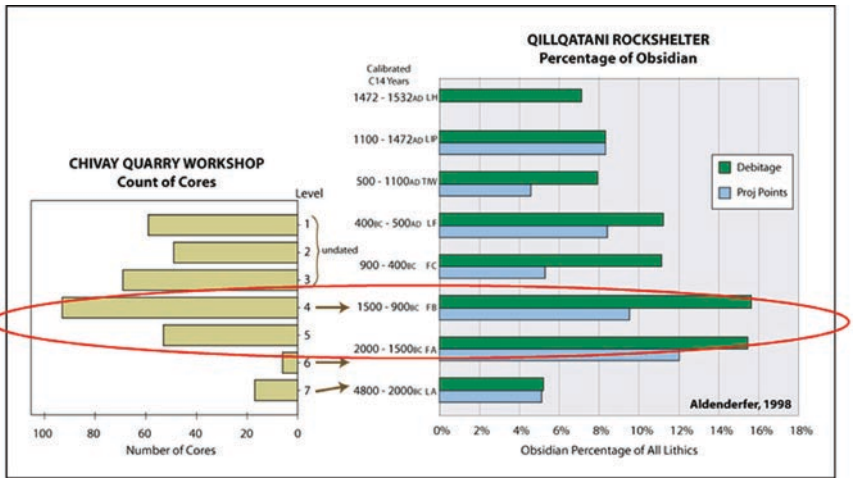


**Fig. 3** Graph showing obsidian by excavation level at the Chivay source workshop and the Qillqatani rockshelter that lies 200 km to the south-east. Of the obsidian samples analyzed from Qillqatani, 29 out of 36 (81%) were from the Chivay source

being discarded during the Early Formative (Aldenderfer 2005: 20; Tripcevich 2007: 190–197). Steady quantities were available in all levels in a manner that suggests consistent supply, not merely sporadic down-the-line availability, from 3300 cal BC onward (Fig. 3). Small quantities of obsidian are found in varied archaeological contexts in the region through to the Middle Horizon, particularly in areas frequented by herders but also in ritual contexts such as burials and ceremonial mounds (Burger et al. 2000; Couture 2003; Craig and Aldenderfer in press). Subsequently, while obsidian was still largely circulated by herders, current evidence suggests that obsidian procurement declined during the subsequent Late Intermediate and Inka periods even though the herds of camelids were reportedly very large (Murra 1968: 120). The apparent functional need for obsidian by pastoralists should have increased with these large herds, but archaeological evidence for obsidian circulation was relatively limited. This suggests that other motivators, besides a need among pastoralists for sharp stone, prompted regional demand for this material.

## 4.6 Interpreting Obsidian Use in the Highland Andes

These patterns of obsidian transport can be interpreted beyond the functional aspects of this unusual stone in terms of two major types of obsidian circulation. The first mode of circulation relies on the political competition in the highlands during the earlier periods. The earliest intensification on the Chivay source, during the Terminal Archaic and Early Formative, follows upon early archaeological evidence for social differentiation and political competition in the highland archaeo-

logical record (Aldenderfer 1998: 243–261). The possession and maintenance of large herds of camelids, a visible marker of surplus wealth, may have served as a costly signal and an early status marker (Aldenderfer 2006). Prior to this time, obsidian was present but not common throughout the region. After approximately 3000 BC obsidian occurred in burials, along with the earliest gold pendants, lapis, and other nonlocal items (Craig 2005: 570; Craig and Aldenderfer in press). In addition, Chivay obsidian was found on Lake Titicaca's Island of the Sun, requiring boat travel (Stanish et al. 2002), and it was used in much greater proportions in the production of small, triangular projectile points diagnostic to this period (Klink and Aldenderfer 2005).

The second mode of circulation, as a marker of ethnicity or affiliation with the western margins of the Titicaca Basin, occurs later in the Formative period around AD 0. During this period obsidian distribution is much more widespread in the Titicaca Basin. Obsidian seems to have become more available in the Basin through regional interaction, arguably through direct procurement by caravans or through fewer down-the-line intermediaries. Over centuries of regular acquisition at the Chivay source, and by the Late Formative, political power became consolidated in the region (Bandy 2005; Janusek 2006; Stanish 2003). One possible explanation is that status markers from earlier millennia, such as obsidian, had become routinely available in the northern and western Titicaca Basin and these items had perhaps lost some of the exclusivity of earlier times. However, obsidian persisted in some demand at a household level in a pattern that is perhaps best compared to product like salt – one that is widely transported because the natural distribution is not ubiquitous.

Households continued the maintenance of relationships, probably through caravans, with social groups affiliated to western lands. Those in the volcanic Arequipa highlands would have had consistently greater access to the translucent obsidian from Chivay. With further archaeological research and geochemical sourcing from domestic contexts in the Titicaca Basin, these patterns in use of exotics may become more apparent.

Finally, one may make further inferences about the importance of the geological origin of stone in the Andes. The ritual significance of stone is a persistent theme in the region. The significance of the origin place of stone in the Andes is documented in the Late Horizon, where, for example, the Inka transported massive andesite blocks over 1,600 km from their capital in Cusco to lands in Ecuador (Ogburn 2004). The furthest conveyance of Chivay obsidian in the prehispanic Andes, 291 linear kilometers, was material in the form of unmodified pebbles left at the gateway to Machu Picchu (Burger et al. 2000: 347) – as if the stone alone, and not the artifacts that could be made from it, were the essence of the offering.

Similar patterns were evident in the Titicaca Basin Formative. For example, stone monoliths were transported between sites at opposite ends of Lake Titicaca (Chávez and Mohr Chavez 1975). Provenance analysis of obsidian samples from Mollo Kontu, a ceremonial mound at Tiwanaku (Couture 2003; Giesso 2003), showed that the variability in obsidian types was much greater in samples collected from mound fill than in tool use as a whole. This material seems to have been

deliberately placed fill, as if an artificial mountain was being made from stone contributed by various distinct social groups with links to the furthest reaches of Tiwanaku's domain of influence.

## 4.7 Conclusions

It appears that an emphasis on differentiating status goods from ordinary goods is overly influencing our interpretations of regional circulation, examined here through nonlocal stone. While a focus on status items highlights the sociopolitical role of exotic goods and the emergence of early leaders in the region, evidence of circulation of more common items provides insights about communities and geographical affiliation that may otherwise go undetected. Obsidian in the Titicaca Basin Formative was both a relatively mundane good in common use, and simultaneously a conveyor of geographical and perhaps ethnic or factional information about those who had access to obsidian from the volcanic region, directly or indirectly, to the west of the Lake Titicaca Basin. Exotic goods represented an opportunity for displaying distant linkages for ambitious political actors when the circumstances warranted, and are valuable to evolutionary models in that respect. However, the underlying persistence of these goods in a range of contexts from household middens to burials and ritual mounds – despite large scale sociopolitical changes – indicates that some exotic goods also had a more ordinary role but with historical and cultural significance. Although differentiating direct llama caravan interaction from down-the-line trade with portable goods like small obsidian artifacts is a difficult issue, the sustained presence of a material in stratified excavations over thousands of years as demonstrated at the Qillqatani rockshelter suggests a regular flow of goods and a relatively direct access to these products.

How does this contribute to our understanding of the development of political power in the Titicaca basin? From the perspective of dual-processual theory, there is little evidence of the use of exotic obsidian as part of a network strategy of differentiation; however, it could be argued that evidence from obsidian at Tiwanaku points to a corporate strategy in particular cases. For example, flakes of obsidian were contributed from six different nonlocal obsidian sources that lie to the northwest and to the south of Tiwanaku (the furthest lying 700 km away), in the construction of the ceremonial mound of Mollo Kontu (Couture 2003: 215; Giesso 2003). In the multiethnic patchwork that some have argued comprised the Tiwanaku state and perhaps the Late Formative polities that preceded it, this use of an exotic material demonstrates access to nonlocal stone that was more available to particular segments of the population participating in caravan trade on the western margins of the basin.

Perhaps this collective use of nonlocal, but available, obsidian in mound construction is the geological equivalent of demonstrating long-distance links through consumption of goods. Communities might demonstrate nonlocal knowledge through food preparation, a particular hat design, or a regional style of singing, in that

it expressed a horizontal type of affiliation between social groups. This contrasts with attributes that linked elites from different areas in an exclusionary, network model. Furthermore, as obsidian was used predominantly for projectile point production, this social signal was also perhaps an important, highly visible indicator of alliance in conflict or for protecting cargo-laden caravans. Viewed over the long term, obsidian had become an exotic that was not exclusive, but continued to have meaning beyond the functional cutting properties of sharp stone.

**Acknowledgments** I would like to thank the organizers of the SAA symposium "Xenophile: the lure of the exotic," the discussants, and fellow participants in the symposium. This chapter benefited from constructive comments from Andy Roddick, although errors remain those of the author.

## References

Aldenderfer, M.S. (Ed.) (1993). *Domestic architecture, ethnicity, and complementarity in the south-central Andes.* Iowa City: University of Iowa Press.

Aldenderfer, M.S. (1998). *Montane foragers: Asana and the south-central Andean archaic.* Iowa City: University of Iowa Press.

Aldenderfer, M.S. (2005). Preludes to power in the highland Late Preceramic period. In K.J. Vaughn, D. Ogburn, and C.A. Conlee (Eds.), *Foundations of power in the prehispanic Andes* (pp. 13–35). Arlington, VA: American Anthropological Association.

Aldenderfer, M.S. (2006). Costly signaling, the sexual division of labor, and plant and animal domestication in the Andean highlands. In D.J. Kennett and B. Winterhalder (Eds.), *Behavioral ecology and the transition to agriculture* (pp. 167–196). Berkeley: University of California Press.

Bandy, M.S. (2005). Trade and social power in the Titicaca Basin Formative. In K.J. Vaughn, D. Ogburn, and C.A. Conlee (Eds.), *Foundations of power in the prehispanic Andes* (pp. 91–111). Arlington, VA: American Anthropological Association.

Blanton, R.E., Feinman, G.M., Kowaleski, S.A., Peregrine, P.N. (1996). A dual-process theory for the evolution of Mesoamerican civilization. *Current Anthropology*, 37(1), 1–86.

Blom, D.E., Hallgrimsson, B., Keng, L., Lozada, M.C., Buikstra, J.E. (1998). Tiwanaku 'colonization': bioarchaeological implications for migration in the Moquegua valley, Peru. *World Archaeology*, 30(2), 238–261.

Brooks, S.O., Glascock, M.D., Geisso, M. (1997). Source of volcanic glass for ancient Andean tools. *Nature*, 376, 449–450.

Browman, D.L. (1981). New light on Andean Tiwanaku. *American Scientist*, 69(4), 408–419.

Browman, D.L. (1990). Camelid pastoralism in the Andes: llama caravan fleteros, and their importance in production and distribution. In P.C. Salzman and J.G. Galaty (Eds.), *Nomads in a changing world* (pp. 395–438). Naples: Istituto Universitario Orientale.

Burger, R.L., Asaro, F., Salas, G., Stross, F. (1998). The Chivay obsidian source and the geological origin of Titicaca Basin type obsidian artifacts. *Andean Past,* 5, 203–223.

Burger, R.L., Mohr Chávez, K.L., Chávez, S.J. (2000). Through the glass darkly: prehispanic obsidian procurement and exchange in southern Peru and northern Bolivia. *Journal of World Prehistory,* 14(3), 267–362.

Casaverde Rojas, J. (1977). El trueque en la economía pastoril. In J.A. Flores Ochoa (Ed.), *Pastores de puna: Uywamichiq punarunakuna* (pp. 168–191). Lima: Instituto de Estudios Peruanos 5.

Chávez, S.J., and Mohr Chavez, K.L. (1975). A carved stela from Taraco, Puno, Peru, and the definition of an early style of stone sculpture from the altiplano of Peru and Bolivia. *Ñawpa Pacha*, 13, 45–83.

Couture, N.C. (2003). Ritual, monumentalism, and residence at Mollo Kontu. In A.L. Kolata (Ed.), *Tiwanaku and its hinterland: archaeology and paleoecology of an Andean civilization, vol. 2* (pp. 202–225). Washington, DC: Smithsonian Institution Press.

Craig, N.M. (2005). The formation of early settled villages and the emergence of leadership: a test of three theoretical models in the Rio Ilave, Lake Titicaca Basin, southern Peru. Unpublished Ph.D. dissertation, Department of Anthropology. University of California, Santa Barbara.

Craig, N.M., and Aldenderfer, M.S. (in press). Trends in early non-local obsidian artifacts from the Rio Ilave viewed from surface survey and late archaic excavations. In C. Stanish and E.A. Klarich (Eds.), *Advances in Titicaca Basin Archaeology-2*. Los Angeles: Cotsen Institute of Archaeology.

Craig, N.M., Speakman, R.J., Popelka-Filcoff, R.S., Glascock, M.D., Robertson, J.D., Shackley, M.S., Aldenderfer, M.S. (2007). Comparison of XRF and PXRF for analysis of archaeological obsidian from southern Perú. *Journal of Archaeological Science*, 34(12), 2012–2024.

Diez de San Miguel, G. (1964 [1567]). *Visita hecha a la provincia de Chucuito por Garci Diez de San Miguel en el año 1567. Versión paleográfica de la visita y una biografía del visitador por Waldemar Espinoza Soriano.* Lima: Documentos Regionales para la Casa de la Cultura del Perú.

Dillehay, T.D., and Nuñez, L. (1988). Camelids, caravans, and complex societies. In N.J. Saunders and O. de Montmollin (Eds.), *Recent studies in precolumbian archaeology* (pp. 603–633). Oxford: BAR International 421 .

Earle, T.K. (1994). Positioning exchange in the evolution of human society. In T.G. Baugh and J.E. Ericson (Eds.), *Prehistoric exchange systems in North America* (pp. 419–437). New York: Plenum Press.

Frye, K.L., Aldenderfer, M.S, and Glascock, M.D. (1998). The Aconcahua obsidian source and its relation to south-central Andean exchange systems. Paper presented at the 38th Annual Meeting of the Institute of Andean Studies, Berkeley, CA.

García Márquez, M.S., and Bustamante Montoro, R. (1990). Arqueología del Valle de Majes. *Gaceta Arqueológica Andina,* 5(18/19), 25–40.

Giesso, M. (2000). Stone tool production in the Tiwanaku heartland: the impact of state emergence and expansion on local households. *Anthropology,* 402.

Giesso, M. (2003). Stone tool production in the Tiwanaku heartland. In A.L. Kolata (Ed.), *Tiwanaku and its hinterland: archaeology and paleoecology of an Andean civilization, vol. 2.* (pp. 363–383). Washington, DC: Smithsonian Institution Press.

Goldstein, P.S. (2000). Exotic goods and everyday chiefs: long-distance exchange and indigenous sociopolitical development in the south central Andes. *Latin American Antiquity*, 11(4), 335–361.

Goldstein, P.S. (2005). *Andean diaspora: the Tiwanaku colonies and the origins of South American empire.* Gainesville: University Press of Florida.

Gottdiener, M. (1995). *Postmodern semiotics: material culture and the forms of postmodern life.* Oxford: Blackwell.

Haggett, P. (1966). *Locational analysis in human geography*. London: Edward Arnold.

Harris, O. (1985). Ecological duality and the role of the center: northern Potosí. In S. Masuda, I Shimada, and C. Morris (Eds.), *Andean ecology and civilization* (pp. 311–335). Tokyo: University of Tokyo Press.

Hastorf, C.A. (2006). The movements of maize into middle horizon Tiwanaku, Bolivia. In J.E. Staller, R.H. Tykot, and B.F. Benz (Eds.), *Histories of maize: multidisciplinary approaches to the prehistory, linguistics, biogeography, domestication, and evolution of maize* (pp. 429–448). Amsterdam: Elsevier Academic Press.

Hastorf, C.A. (2008). The formative period in the Titicaca Basin. In H. Silverman and W. Isbell (Eds.), *The handbook of South American archaeology* (pp. 454–561). New York: Springer.

Hayden, B. (1998). Practical and prestige technologies: the evolution of material systems. *Journal of Archaeological Method and Theory*, 5(1), 1–55.

Janusek, J.W. (2004). *Identity and power in the ancient Andes: Tiwanaku cities through time.* New York: Routledge.

Janusek, J.W. (2006). The changing 'nature' of Tiwanaku religion and the rise of an Andean state. *World Archaeology*, 38(3), 469–492.

Janusek, J.W. (2008). *Ancient Tiwanaku.* Cambridge: Cambridge University Press.

Klink, C. and Aldenderfer, M.S. (2005). A projectile point chronology for the south-central Andean highlands. In C. Stanish, A. Cohen, and M.S. Aldenderfer (Eds.), *Advances in Titicaca Basin Archaeology-1* (pp. 25–54). Los Angeles: Cotsen Institute of Archaeology.

Kolata, A.L. (2003). The social production of Tiwanaku: political economy and authority in a native Andean state. In A.L. Kolata (Ed.), *Tiwanaku and its hinterland: archaeology and paleoecology of an Andean civilization, vol. 2* (pp. 449–472). Washington, DC: Smithsonian Institution Press.

LaLone, D.E. (1982). The Inca as a nonmarket economy: supply on command versus supply and demand. In J.E. Ericson and T.K. Earle (Eds.), *Contexts for prehistoric exchange* (pp. 292–316). New York: Academic Press.

Lazzari, M. (2005). The texture of things: objects, people, and landscape in northwest Argentina (first millennium AD). In L. Meskell (Ed.), *Archaeologies of materiality* (pp. 126–161). London: Blackwell.

Masuda, S., Shimada, I., and Morris, C. (Eds.) (1985). *Andean ecology and civilization.* Tokyo: University of Tokyo Press.

Murra, J.V. (1965). Herds and herders in the Inca state. In A. Leeds and A.P. Vayda (Eds.), *Man, culture, and animals: The role of animals in human ecological adjustments* (pp. 185–215). Washington, DC.: American Association for the Advancement of Science 78.

Murra, J.V. (1968). An Aymara kingdom in 1567. *Ethnohistory*, 15, 115–151.

Murra, J.V. (1972). El "control vertical" de un máximo de pisos ecológicos en la economia de las sociedades Andinas. In I. Ortiz de Zúñiga (Ed.), *Visita de la provincia de Léon de Huánuco en 1562,* I. Huánuco, Peru: Universidad Nacional Hermilio Valdizán.

Murra, J.V. (1980). *The economic organization of the Inca state.* Greenwich, CT: JAI Press.

Nielsen, A.E. (2001). Ethnoarchaeological perspectives on caravan trade in the south-central Andes. In L.A. Kuznar (Ed.), *Ethnoarchaeology of Andean South America: contributions to archaeological method and theory* (pp. 163–201). Ann Arbor: International Monographs in Prehistory 4.

Nuñez, L., and Dillehay T.D. (1995 [1979]). *Movilidad giratoria, armonía social y desarrollo en los Andes meridionales: patrones de tráfico e interacción económica.* Antofagasta: Universidad de Chile.

Ogburn, D.E. (2004). Evidence for long-distance transportation of building stones in the Inka empire, from Cuzco, Peru to Saraguro, Ecuador. *Latin American Antiquity*, 15(4), 419–439.

Rivera, M. (1991). The prehistory of northern Chile: a synthesis. *Journal of World Prehistory*, 5(1), 1–47.

Sandweiss, D.H., and Richardson, J.B. (2008). Central Andean environments. In H. Silverman and W. Isbell (Eds.), *The handbook of South American archaeology* (pp. 93–104). New York: Springer Press.

Shackley, M.S. (2005). *Obsidian: geology and archaeology in the North American southwest.* Tucson: University of Arizona Press.

Smith, M.L. (1999). The role of ordinary goods in premodern exchange. *Journal of Archaeological Method and Theory*, 6(2), 109–135.

Stanish, C. (2003). *Ancient Titicaca: The Evolution of Complex Society in Southern Peru and Northern Bolivia.* Berkeley: University of California Press.

Stanish, C., Burger, R.L., Cipolla, L.M., Glascock, M.D., and Quelima, E. (2002). Evidence for early long-distance obsidian exchange and watercraft use from the southern Lake Titicaca basin of Bolivia and Peru. *Latin American Antiquity*, 13(4), 444–454.

Tripcevich, N. (2004). Flexibility by design: how mobile GIS meets the needs of archaeological survey. *Cartography and Geographic Information Science*, 31(3), 137–151.

Tripcevich, N. (2007). Quarries, caravans, and routes to complexity: prehispanic obsidian in the south-central Andes. Unpublished Ph.D. Dissertation, Department of Anthropology, University of California, Santa Barbara.

Troll, C. (1968). *Geo-ecology of the mountainous regions of the tropical Americas.* Bonn: Dümmler in Kommission.

Van Buren, M. (1996). Rethinking the vertical archipelago: ethnicity, exchange, and history in the south central Andes. *American Anthropologist*, 96(2), 338-351.

Wernke, S.A. (2003). An archaeo-history of Andean community and landscape: the late prehispanic and early colonial Colca Valley, Peru. *Anthropology*, 641.