

Diasporic Foodways and the Transformation of Andean Agropastoralism in the Wake of Tiwanaku Collapse (11th–12th Century CE) at Los Batanes, Sama Valley

Sarah I. Baitzel, Maureen E. Folk, Lucia M. Diaz, Kurt M. Wilson, Arturo F. Rivera Infante, and BrieAnna S. Langlie

As communities develop alternative strategies to ensure resource availability and access, knowledge of distant resources, places, and people may incentivize migration. For migrants, food is not just about sustenance; it is also constitutive of social identity as cuisine, taste, and commensality maintain memories and a sense of belonging in the diaspora (Hastorf 2016). Modern diasporic foodways comprise the transformation of traditional cuisines into new constellations of familiar (yet distant) and exotic (yet nearby) ingredients (Tookes 2015). In the ancient Andes, diasporic foodways emerged in the context of increasing aridity and state collapse. In contrast to farmers for whom crises constrained food availability and access (Chiou, this volume), agropastoralists in the south-central Andes relied on expansive food environments that afforded food security and incorporated traditional and new ingredients in the wake of Tiwanaku state collapse. Our case study examines diasporic foodways of agropastoralists in the coastal desert of southern Peru during the eleventh and twelfth centuries CE. Paleoethnobotanical and zooarchaeological assemblages and stable isotopic analyses show how residents of the site of Los Batanes, a Tiwanaku-descendant Cabuza community located in a coastal-highland ecotone, exploited local and distant ecological niches. They maintained familiar foodways in the form of highland resources while their cuisine came to include lowland crops and marine resources. The juxtaposition of familiar and exotic resources characterizes the diasporic transformation of agropastoral foodways.

AGROPASTORALISM AND THE TIWANAKU STATE

Herders routinely pack up their worldly possessions and move to seasonal pastures. Andean pastoralism developed as a multiresource strategy to manage the risks associated with ecologically diverse but often marginal Andean highlands (Browman 1974). Transhumance provided access to different ecological niches that supported small-scale foraging, hunting, fishing, and horticulture or agriculture. Andean agropastoral settlements are commonly located between highland pastures and lower-elevation fields (Parsons, Hastings, and Matos Mendieta 1997). Vertical transhumance also facilitated direct access and exchange of complementary resources with the coast: fiber, salt, and *charqui* (dried llama meat) were traded for maize, chili peppers, and guano (Murra 1975). As a result, herders maintained extensive social networks with knowledge of and access to diverse food environments, an advantage for dealing with the challenges of migration and collapse.

Agropastoralism supported the emergence and expansion of the Tiwanaku state during the Middle Horizon between 400 and 1000 CE in the south-central Andean highlands (Browman 1984). Camelid populations provided food, fuel, and fiber for Tiwanaku's urban populations (Vallières 2016), and llama caravans mobilized regional exchange of key resources (Janusek 2008). Tuber and cereal cultivation—along with fishing, hunting, and foraging—complemented pastoral foodways across the region (Miller et al., this volume). By the eighth century CE, maize imported from Tiwanaku's lowland colonies formed a cornerstone of the city's diet and ritual economy (Knudson et al. and Berryman and Blom, this volume; Wright, Hastorf, and Lennstrom 2003). Together, this indicates Tiwanaku people maintained spatially extensive and economically diverse food networks characterized by a taste for highland and lowland resources.

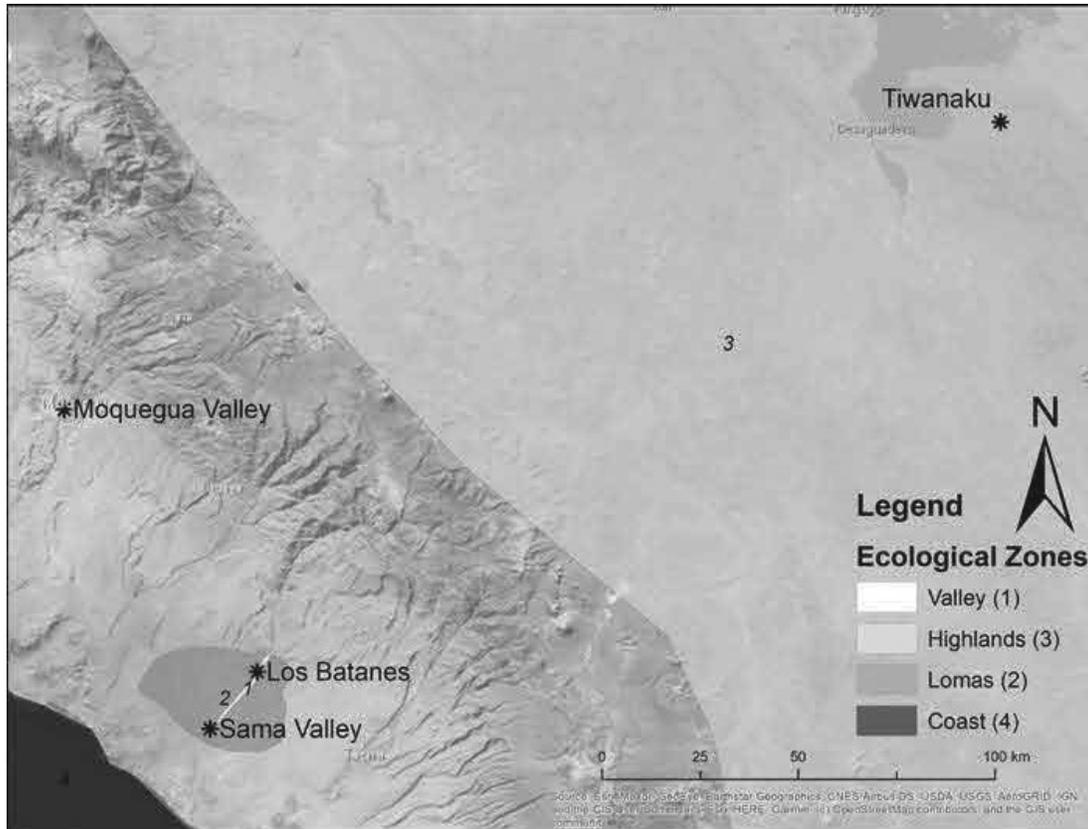
Nonetheless, Tiwanaku's economic and political systems were not immune to the climatic and political changes of the eleventh century CE. Colder temperatures and prolonged drought led to a shift toward rain-fed terrace agriculture and mobile camelid pastoralism (Abbott et al. 1997; Langlie 2018). Across the region, warfare dominated life in the highlands (Arkush 2011). Trade networks broke down, and Altiplano populations relied solely on locally produced foodstuffs, including quinoa

and potatoes. Maize imports ceased completely (Langlie 2020; Langlie and Arkush 2016). Tiwanaku-descendant communities in the western Andean valleys dispersed to smaller, more defensive settlements (Owen 2005). Ritual and material culture continuity characterizes Tiwanaku's diasporic communities. Colonial foodways supplemented highland crops (quinoa, potato, and oca) and camelids with lowland guinea pig, maize, beans, gourds, lucuma, and peanuts (deFrance 2016,127; Goldstein 2005). As trade networks and demand for maize declined, Tiwanaku-descendant communities in the lowlands relied more on locally available resources of grains other than maize, tubers, and legumes, and they consumed lesser quantities of animal meat (Quispe Vilcahuaman 2018).

Postcollapse resettlement near the coast reshaped diasporic foodways. Tiwanaku-descendant communities near the Pacific coast farmed the valley bottom for maize, beans, peanuts, and so forth; they kept small camelid herds, foraged *lomas*, or exploited marine and littoral resources depending on seasonal availability (Owen 2005). This diaspora, which extends from the far south coast of Peru to northern Chile, receives its name, Cabuza, from its distinctive Tiwanaku-derived material culture (Owen 2005, 72). In the Ilo and Azapa valleys where these post-Tiwanaku traditions were first identified, there is clear evidence for an earlier presence of Tiwanaku-affiliated settlers in the valley. In contrast, the Sama Valley, located between Ilo and Azapa, shows evidence of Cabuza settlement without prior Tiwanaku colonization.

THE ARCHAEOLOGY AND ENVIRONMENT OF LOS BATANES

The agropastoral Cabuza settlement of Los Batanes (500 masl) is located in the hyperarid lower Sama Valley. Architectural debris, subfloor storage, trash pits, and grinding stones that litter the surface attest to a multitude of economic activities. Residential compounds point to a year-round occupation, whereas open spaces may have accommodated seasonal encampments of herders. Clusters of burials found throughout Los Batanes substantiate and the site's use as a permanent homestead. Terminal Middle Horizon-style material culture and ritual practices indicate affinity with or descent from Tiwanaku. Research on the origins of these Cabuza migrants is ongoing to determine whether members of this



Map 10.1 Map of the South Central Andes with site locations and eco-zones. Image by S. Baitzel/Esri.

Cabuza community emigrated directly from the highlands or were part of Tiwanaku's lowland diaspora from regions like Moquegua. Certainly their settlement in this valley required knowledge of and adaptation to different landscapes and resources.

Los Batanes is located at an ecological nexus (map 10.1). The site overlooks the Sama Valley, a narrow stretch of arable land flanking the nonperennial Sama River. Temperate climate, soil salinity, and water alkalinity favor hardy crops such as maize, onions, and chili peppers. Desert plains surrounding the valley support seasonal *lomas* vegetation during the austral winter, when dense coastal fogs provide sparse precipitation. The herbaceous *lomas* attract and sustain rodents, foxes, and until recently camelids seeking pasture during the highland dry season (Masuda 1985). A day's walk west of Los Batanes, the Pacific littoral offers fish and marine mammals, shellfish, birds, and algae. Toward the east, the Sama Valley ascends into the highlands, where within a few

days' walk one reaches the intermontane Tarata Valley, where tubers and maize grow, and beyond it lies the Altiplano, the natal habitat of wild and domesticated camelids.

To characterize the food environment of Los Batanes, we undertook macrobotanical, zooarchaeological, and human and camelid isotopic analyses of materials recovered from excavations in 2018 and 2019. Materials included in this analysis were collected from house floors, storage and trash pits, middens, patio surfaces, and burials. While the sample sizes are relatively small, materials preserve exceedingly well in the arid coastal desert, and the diversity of contexts sampled offer solid insights into food-related activities at Los Batanes.

CULTIVATING REGIONAL CONNECTIONS: RESULTS FROM PALEOETHNOBOTANICAL ANALYSIS

Macrobotanical analysis of desiccated and charred seeds elucidates evidence of food consumption, refuse, and natural intrusion from the local environment. Following standard paleoethnobotanical methods, 2-L samples were taken where possible (Lennstrom and Hastorf 1992), and all contents of vessels were collected (Pearsall 2015). Paleoethnobotanical samples from 21 contexts at Los Batanes were completely sorted. Based on gross morphology under lower-power binocular microscopy, a number of wild and domesticated food plants were identified (table 10.1). We employed various descriptive statistics to illustrate plant use at the site (Popper 1988). While the identified plants could have been locally grown, highland-adapted plants were found alongside typical lowland cultivars.

LOCAL CROPS AND WILD FOOD PLANTS

The most abundant food crop was maize (*Zea mays*). Fragments of cobs, cupules, and kernels indicate maize was processed, stored, and consumed on site. Maize could have been consumed as *chicha*, a sometimes-fermented beverage commonly drunk in the Andes. Or it could have been used in stews, as flour, or dried and stored. Chicha consumption was deeply embedded in Tiwanaku ceremonies to incorporate relationships of reciprocity (Janusek 2008). The ubiquity of maize at Los Batanes indicates that it was frequently consumed and played a role in burial rituals, as well. Chili

Table 10.1 Counts and ubiquity of plant taxa from Los Batanes ($n = 21$)

Taxon	Count	Ubiquity (%)
Cactaceae	101	47.6
Chenopod (<i>Chenopodium quinoa</i>)	131	71.4
Chili pepper fruit (<i>Capsicum baccatum</i>)	20	—
Chili pepper seed (<i>Capsicum baccatum</i>)	12	19
Maize cob (<i>Zea mays</i>)	962	—
Maize cupule (<i>Zea mays</i>)	134	61.9
Maize kernel (<i>Zea mays</i>)	38	61.9
Parenchyma	16	28.6
Portulaca	13	28.6
Solanaceae	38	52.4

peppers, ají, were also found in burials at Los Batanes. Ají consumption probably played a ritual role at Los Batanes based on its inclusion in burials. Chili peppers may have also been used as an anti-inflammatory (Zimmer et al. 2012). Today in the Sama Valley local varieties of ají are cultivated, including orange, red, and black.

Identified wild-plant remains could have entered the site through natural means, but they have documented human uses. Cactus seeds appear to come from the sweet fruits of the *Echinopsis* genus. Similarly, *Portulaca* sp. seeds point to the possible consumption of *Portulaca* (purslane) which can be eaten raw or cooked, or the seeds can be ground into flour (Irawan, Hariyadi, and Wijaya 2003). This plant may have grown in the nearby *lomas*.

HIGHLAND CROPS

The second most abundant food-plant remains found at Los Batanes were chenopod seeds, which are generally considered highland crops most likely domesticated in the Altiplano (Planella, López, and Bruno 2015). Two species of chenopods were domesticated for their culinary qualities in the highlands, quinoa (*Chenopodium quinoa*) and kañawa (*Chenopodium pallidicaule*), which are toasted, added to soups, ground into flour, or dried and stored. Based on gross morphology, the chenopod seeds recovered appear to be quinoa, which has been cultivated for more than 7000 years in the Andes and has long been appreciated for its high protein content and exceptional nutritional value (Bruno 2014). The

authors observed that Sama farmers who are first or second-generation immigrants from the Altiplano cultivate quinoa in the valley, where the plant usually does not exceed a height of about one meter, a notable size reduction compared to the highland variants grown today. Perhaps Los Batanes settlers brought quinoa with them from the highlands, or they locally cultivated the crop in their new homeland. Farmers have long been growing quinoa varieties on the coast of central and southern Chile (Bazile et al. 2015, 404). Ancient Sama residents could have also grown a coastal variety. Future paleoethnobotanical research may elucidate this issue.

Low numbers of Solanaceae seeds and parenchyma fragments were recovered. While countless Solanaceae species grew in the Andes, the identification of parenchyma that resembles tubers makes it plausible that Los Batanes residents consumed potatoes, one of the most abundant Solanaceae crops in the Andes. Tubers are boiled or mashed in preparation for consumption. The dense water content of tubers means that they also rarely carbonize wholly like grains (Pearsall 2015, 157). As such, archaeobotanists only expect to find small quantities of parenchyma. The quantities we found could reflect low importance in the diet or simply poor preservation. While they are primarily a highland crop, today, Sama farmers grow a variety of potatoes, proving they can be grown locally. Like quinoa, it is possible that Los Batanes settlers locally cultivated potatoes, or they procured them from the highlands.

Overall, the paleobotanical analysis reveals that residents of Los Batanes maintained familiar foodways through the consumption of highland resources while their diet also expanded to include more local crops (fig. 10.1). We see the maintenance of familiar foodways most strongly with the consumption of highland crops, quinoa, maize, and possibly potatoes along with the expansion of the diet in local cacti and chili peppers. Whether this Cabuza community descended from Altiplano populations or migrated from a lowland Tiwanaku colony, they brought with them highland agricultural goods and practices.

CAMELIDS AND MOLLUSKS: RESULTS FROM ZOOARCHAEOLOGICAL ANALYSIS

Zooarchaeological remains from six contexts were recovered using ¼ inch and 2 mm mesh screens. Because of the small size of this sample, these

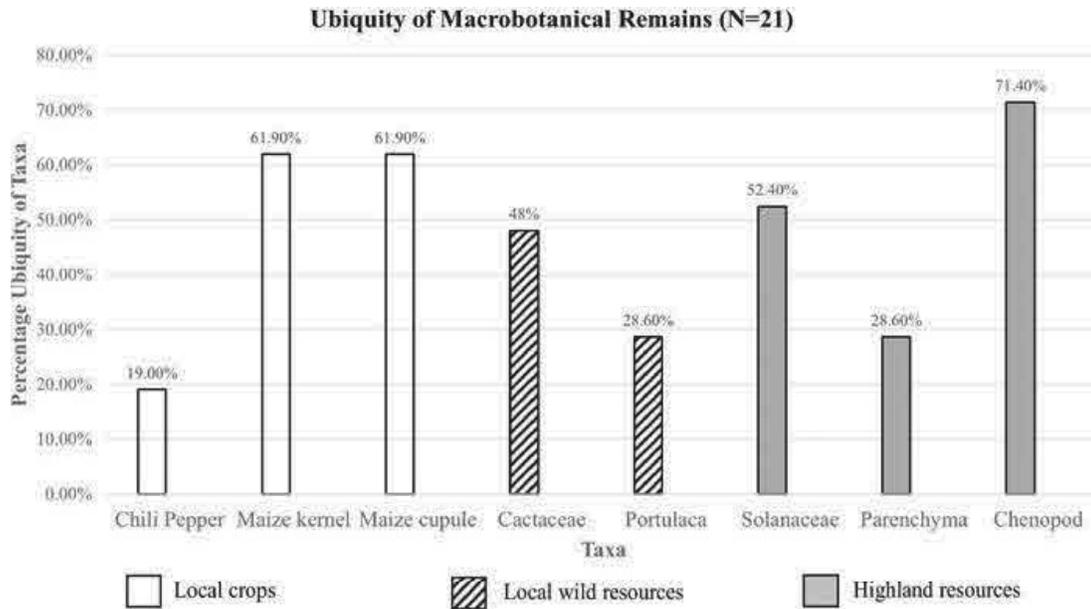


Figure 10.1 Ubiquity of macrobotanical remains from Los Batanes ($n = 21$). Image by S. Baitzel.

data prohibit a meaningful quantitative comparison. Nonetheless, the diversity of contexts sampled reveals the breadth of animal resources used by the site's residents as shaped by natural availability, anthropogenic access, and desirability. At the most basic interpretative level, the seven terrestrial faunal and nine marine taxa identified in the samples from Los Batanes (table 10.2) represent local faunal and coastal exploitation as well as highland-derived taxa.

ANIMALS CLOSE TO HOME

Four of the identified taxa (rodents, dogs, amphibians, and birds) occur naturally near Los Batanes. Dogs and guinea pigs probably co-resided with humans at the site as shown by guinea pig dung found in various contexts. Guinea pigs in the Andes are raised as domestic livestock for household consumption. Dogs are known hunting companions of Andean people and were rarely eaten. Food production, processing, and storage at the site would have attracted commensal rodents. The Sama River and its wetlands sustain seasonal crayfish populations, amphibians (frogs, lizards), and birds that the site's residents may have gathered.

Table 10.2 Fauna Number of Individual Specimens (NISP) and Minimum Number of Individuals (MNI), analyzed from selected contexts at Los Batanes ($n = 6$)

Taxon	NISP (n)	NISP (%)	MNI
Mammalia			
Camelidae	954	77.8	9
Canidae	17	1.4	4
Rodentia— <i>Cavia</i> sp.	126	10.3	12
Rodentia—other	18	1.5	3
Bird	3	0.2	1
Fish	9	0.7	3
Amphibian	100	8.1	5

COASTAL ANIMALS

The Pacific littoral and ocean, a day's walk from the site, offer diverse resources. The intertidal rocky coastline harbors a plethora of edible marine species, including bivalves (*Choromytilus* sp., *Perumytilus* sp.), sea snails (*Concholepas concholepa*, *Fissurella peruviana*, *Oliwa* sp.), and sea urchins (*Echinoidea* sp.). Chitons (*Tonicia chilensis*) inhabit the coastal beaches. Deep ocean waters offer an abundance of fish species that can be extracted with net and line fishing.

The predominance of mussels, sea snails, and chitons in our sample points to the exploitation of the littoral rather than open waters. We recovered no fishing implements during excavations. The site's residents may have acquired coastal resources indirectly through exchange, but the focus on accessible shoreline resources supports direct procurement through shoreline gathering. Other resources that have historically attracted highland populations to the coast, such as guano and seaweed, have not been recovered at Los Batanes but may also have been desirable to agropastoralists.

HIGHLAND ANIMALS

Camelid (alpaca or llama) make up the largest portion of the zooarchaeological samples (table 10.2). They are highland species that forage on bunchgrasses but may have been raised locally on lomas or fallow fields (Santana-Sagredo et al., this volume). The ubiquity of camelid dung and

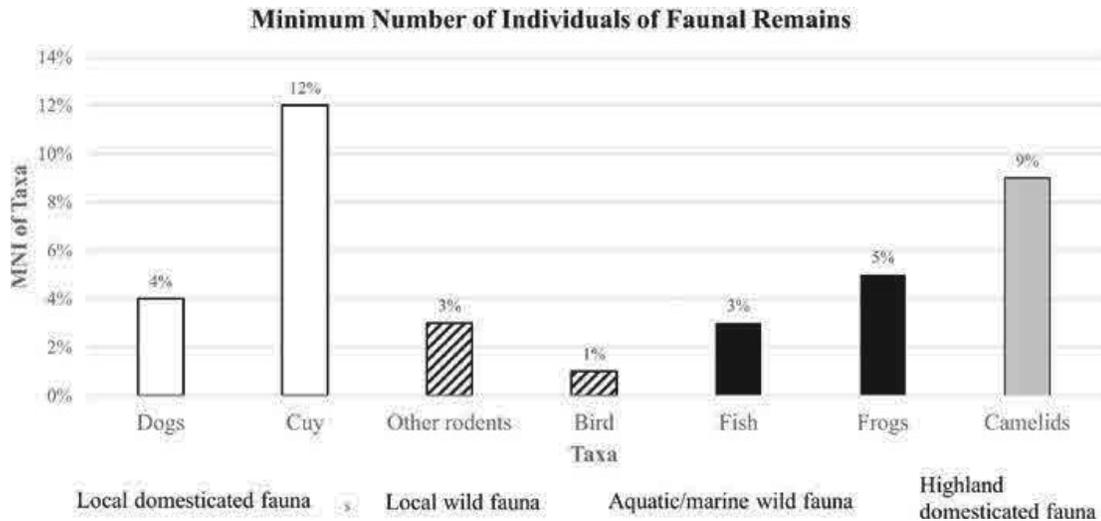


Figure 10.2 Taxonomic diversity of faunal remains at Los Batanes. Image by S. Baitzel.

fiber at Los Batanes indicates that animals were kept near or at the site to facilitate easy access to fuel and weaving materials. Less than 10% of the analyzed sample showed breaking or burning from human processing. Although limb bones account for two-thirds of the camelid assemblage, head and axial elements were also present. This supports the hypothesis that camelids were a local resource and processed in full at the site, rather than imported as fresh or freeze-dried meat.

Zooarchaeological remains from Los Batanes speak to exploitation of distinct ecotopes near the site (valley, lomas, coast) as well as at some distance (highlands) for food and nondietary purposes (fig. 10.2). Although we are unable at this point to establish the relative dietary contributions from each of these environments, taxonomic diversity of faunal evidence from the site suggests that its residents counteracted the constraints of their marginal surroundings by exploiting a range of locally available domesticated and wild edible fauna. Mobility played a key role in providing access to nonlocal resources from the highlands and coast.

INCORPORATING NEW ENVIRONMENTS: RESULTS FROM STABLE ISOTOPE ANALYSIS

Paleodietary reconstruction using stable isotopic analysis presents an additional dimension for studying foodways because it discriminates between availability and actual consumption of food resources. Human and

animal paleodiet reconstructions at Los Batanes were derived from the stable carbon and nitrogen isotopic values from human (rib) and camelid (mandible) bone. Bone collagen samples were prepared following a modified method by Richards and Hedges (1999) at the Laboratory for the Analysis of Early Food-Webs at Washington University in St. Louis. Measurement uncertainty was monitored using in-house standards, and precision and accuracy were determined using standards by Szpak, Metcalfe, and Macdonald (2017).

Collagen was extracted by demineralizing ~500 mg of bone in 0.5 M HCL, which was then rinsed with deionized water. Samples were submerged in pH3 water, heated at 75°C, and then freeze-dried. Collagen samples were analyzed either in replicate or duplicate using a Flash2000 EA coupled to a Thermo Fisher Scientific Delta V Plus continuous-flow IRMS through a ConFlo IV interface (Bradley Lab, Washington University in St. Louis). Stable carbon and nitrogen isotope compositions were calibrated to VPDB and AIR with USGS 40 ($\delta^{13}\text{C} = -26.39\text{‰}$, $\delta^{15}\text{N} = -4.52\text{‰}$) and USGS 41 (glutamic acid, accepted $\delta^{13}\text{C} = +37.63\text{‰}$, $\delta^{15}\text{N} = +47.57\text{‰}$).

Measurement uncertainty was monitored using two in-house standards with well-characterized compositions: IRM-1 (IU acetanilide, $\delta^{13}\text{C} = -29.53\text{‰} \pm 0.16\text{‰}$, $\delta^{15}\text{N} = 1.18\text{‰} \pm 0.07\text{‰}$) and IRM-2 (protein, $\delta^{13}\text{C} = -26.98\text{‰} \pm 0.12\text{‰}$, $\delta^{15}\text{N} = 5.94\text{‰} \pm 0.12\text{‰}$). Precision ($u(\text{Rw})$) was determined to be $\pm 0.12\text{‰}$ for $\delta^{13}\text{C}$ and $\pm 0.29\text{‰}$ for $\delta^{15}\text{N}$. Accuracy or systematic error ($u(\text{bias})$) was determined to be $\pm 0.24\text{‰}$ for $\delta^{13}\text{C}$ and $\pm 0.18\text{‰}$ for $\delta^{15}\text{N}$, based on the difference between the observed and known δ values of the check standards and the long-term standard deviations of these check standards (Szpak, Metcalfe, and Macdonald 2017). Total analytical uncertainty was estimated to be $\pm 0.26\text{‰}$ for $\delta^{13}\text{C}$ and $\pm 0.34\text{‰}$ for $\delta^{15}\text{N}$ (Szpak, Metcalfe, and Macdonald 2017, app. F).

Results from five samples were deemed to be of good quality according to the following criteria: atomic C:N ratio of 2.9 to 3.6 (DeNiro 1985), collagen yield of >1% by mass, final carbon yields of >13%, and final nitrogen yields of >4.8% (Ambrose 1990). Although our sample is too small to be representative of human and animal populations from Los Batanes, the analysis to date complements other lines of evidence of Cabuza diet.

Isotopic compositions of bone collagen from two camelid specimens have similar mean $\delta^{15}\text{N}$ values but different $\delta^{13}\text{C}$ values, reflecting diverse grazing or feeding practices (table 10.3). The carbon isotopic values

Table 10.3 Stable carbon and nitrogen isotopic values from human and camelid specimens

Taxa	Specimen	Context	Age/sex	Lab ID	$\delta^{13}\text{C}$ (‰ VPDB)	$\delta^{15}\text{N}$ (‰ Air)	C:N	Mean C	Mean N
Human*	S45 = 601	U:4, ENT-9	17-19 y/M	V12	-13.8	17.3	3.4	-13.6	16.3
				V1a	-13.4	16	3.3		
				V1	-13.5	15.7	3.1		
	S45 = 588	U:6, ENT-8	25-35 y/F	V2a	-16.5	12.5	3.2	-16.5	12.2
				V2	-16.6	12.2	3.1		
				V3	-16.3	12	3.1		
S45 = 403*	U:6, ENT-6	4-7 y/-	V13	-13.1	15.7	3.3	-13	15.3	
			V13a	-13.1	15.6	3.3			
			V4	-12.9	14.6	3.1			
			V18	-18.6	8	3.3	-18.4	7.9	
Camelid	S45 = 150_17	U:2, C:3	adult/-	V18a	-18.6	8	3.3		
				V8	-18.1	7.8	3.2		
				V16	-15.7	8	3.3	-15.7	7.9
	S45 = 150_18	U:2, C:3	juv/-	V16a	-15.7	7.9	3.3		

*Three samples were not included because of poor quality.

are congruent with high-altitude grazing (Santana-Sagredo et al., this volume; Thornton et al. 2011). The elevated $\delta^{13}\text{C}$ value in one camelid may indicate dietary contributions from C_4 plants such as maize either as fodder or pasture on harvested fields. Pasturing on wild lowland C_4 grasses or seasonal lomas may also raise $\delta^{13}\text{C}$ signatures.

All three human individuals (ENT-6, ENT-8, ENT-9) were buried with Cabuza-style vessels and textiles. To interpret their stable isotopic data, we refer to previously published paleodietary data from south-central Andean Altiplano agropastoralists, mid-valley Tiwanaku-affiliated maize agriculturalists, and coastal maize-farming and marine-fishing populations (fig. 10.3; see Knudson et al. and Berryman and Blom, this volume).

Mean $\delta^{13}\text{C}$ values are consistent with a mixed C_3/C_4 marine diet (Tieszen and Chapman 1992). Individual ENT-8 has carbon isotopic values similar to highland agropastoralists, whereas individuals ENT-6 and ENT-9 have enriched carbon isotopic values similar to mid-valley maize agriculturalists or coastal maize-farming and marine-fishing populations (fig. 10.3). Mean $\delta^{15}\text{N}$ values exceed the expected trophic-level offset of $>4\text{‰}$ – 8‰ between humans and camelids at Los Batanes (DeNiro and Epstein 1981). Instead, they signal consumption of marine resources or crops grown in arid environments (fig. 10.3). Together, stable carbon and nitrogen isotopic values of humans from Los Batanes are characteristic of terrestrial and marine fauna and C_3/C_4 plant consumption.

Paleodietary reconstruction confirms that the foods identified by paleo-ethnobotanical and zooarchaeological analyses variably contributed to a diet of legumes, highland grasses, tubers, and maize, with substantial contributions from highland and lowland-pastured camelids and some marine resources. Despite the small sample size, dietary heterogeneity of humans and animals requires further investigations of site-wide diet and mobility.

DISCUSSION

Intersecting archaeological methods in this study capture the variability in subsistence strategies that constituted the Cabuza food environment at Los Batanes. Despite small sample sizes and the nascent state of this research, we identified a diversity of wild and domesticated taxa of local

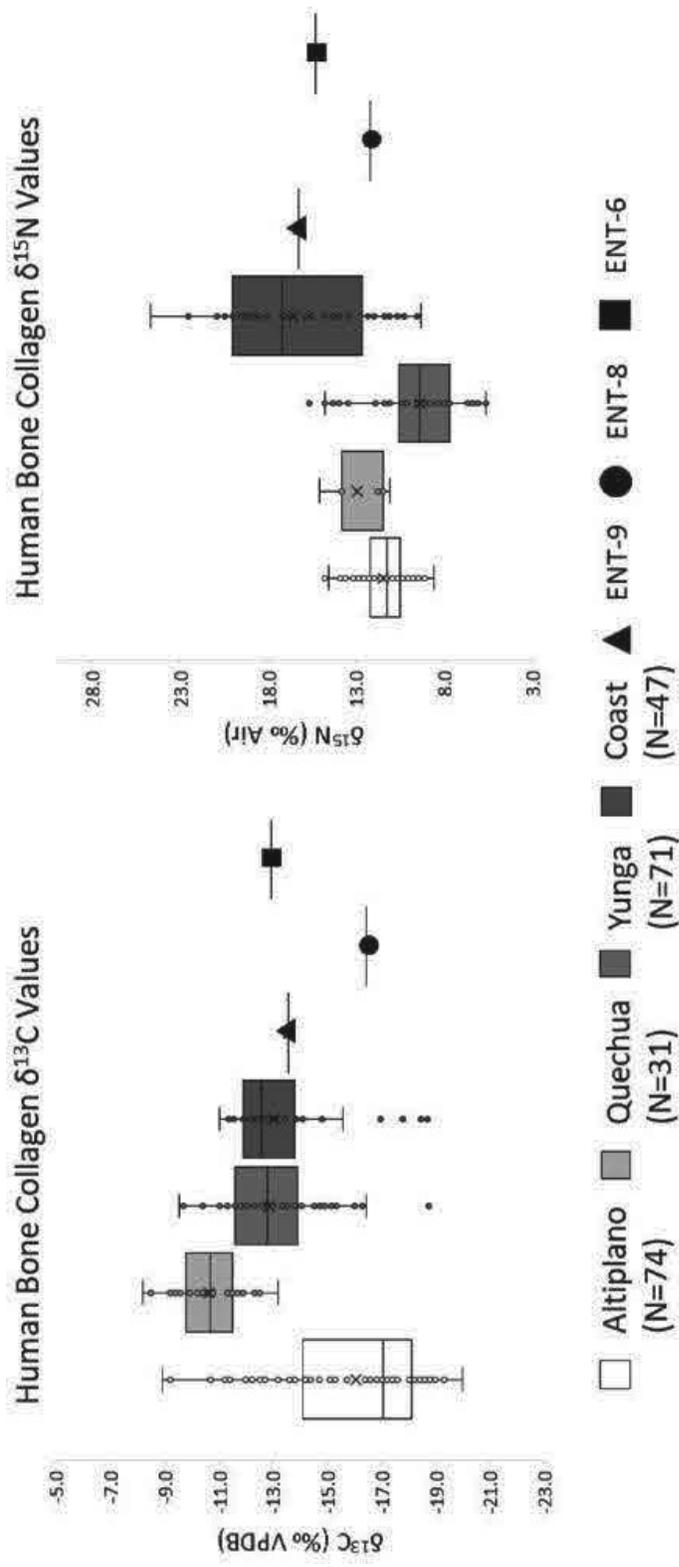


Figure 10.3 Stable carbon (*left*) and nitrogen (*right*) isotopic values from Los Batanes compared to data sets from different ecoregions (Berryman and Blom, this volume; Finucane, Agurto, and Isbell 2006; Knudson, Aufderheide, and Buikstra 2007; Sandness 1992; Somerville et al. 2015). Image by [S. Baitzel](#)

and distant origins that reflects how this diasporic community forged its identity by integrating new ingredients into established foodways.

The site's proximity to multiple ecozones ensured year-round availability of resources that can be cultivated in the valley or foraged from nearby lomas or along the coast. The prevalence of maize throughout the site and the human (and possibly camelid) paleodiet highlight its continued desirability as a legacy of Tiwanaku. Whether the Cabuza community at Los Batanes hailed from the highlands or a lowland Tiwanaku colony, they brought with them the knowledge to produce the crop and a taste for maize-based foods and drinks that embodied relationships between the living and their ancestors. The Los Batanes community also seized the opportunity to cultivate chili peppers, a valued exotic foodstuff to highlanders. The social importance of chili peppers is emphasized in their use as burial offerings, likening it to maize as food for the dead.

Wild animal species reflect the customary agropastoral hunting and foraging of earlier times (Miller et al., this volume). The pasturing of camelids on seasonal lomas as indicated by stable isotopic data supports awareness of changing food environments. In fact, this short-lived but vibrant ecosystem offered sustenance to humans and animals en route to the Pacific coast, and it may have given the initial impetus to agropastoralists in search of a new home. The littoral is located far enough from the site to require some travel yet near enough to be reliable and sustainable. The emphasis on littoral species in the Los Batanes assemblage indicates a preference for accessible resources that did not require seafaring technologies, which were unlikely to be part of the agropastoral subsistence "package."

The ubiquity of highland resources at Los Batanes indicates a spatially extensive food environment. Although it is possible to grow and keep quinoa, tubers, and camelids at the site based on modern observations, the arid conditions of the lower Sama Valley are not ideal for these species and would have posed a challenge to their sustained use as reliable foodstuffs. The emergence of local variants of highland crops because of migration into the lowlands is a possibility that remains to be investigated. It is more probable that some highland resources were acquired directly or via exchange from the highlands with the help of camelid caravans, using familiar routes and social networks. Although Altiplano trade networks broke down during this time, coastal communities such

as Los Batanes maintained trade and exchange with the highlands. We look forward to carrying out further analyses that may shed light on this matter, including radiogenic and stable isotopes on human and animal bones, morphological analysis of seeds, and possible ancient DNA analysis on flora and fauna samples.

Even though highland crops and animal resources were essential foodstuffs in the everyday meals of the Los Batanes community, they also subsisted on local foods, such as maize, shellfish, wild plants, and animals. The exclusive cultivation of maize and chili peppers at Los Batanes contrasts with the diversity of local plant cultivars found at Tiwanaku-descendant communities in Moquegua, where archaeologists also found chili peppers, squash, cotton, lucuma, beans, and other crops (Gaggio 2014). These findings point to different strategies being employed within the Tiwanaku diaspora. More specifically though, they suggests that Los Batanes agropastoralists did not invest in a broad agricultural subsistence base. Instead, the Sama Valley tells a unique story of migration, adaptation, and foodways different from that of diasporic Tiwanaku communities in other regions of the south-central Andes. Cabuza peoples in Sama seem to have maintained mobility networks that provided access to familiar highland foodstuffs. Maize, chili peppers, and shellfish in Los Batanes cooking pots and burials embody the transformation of highland agropastoral foodways into a diasporic cuisine. This incorporation of the local “exotic” into the familiar-but-hard-to-get may reflect both the desire for something new in the wake of Tiwanaku’s collapse as well as the need to adapt subsistence strategies as regional drought conditions persisted.

CONCLUSION

The economic and dietary variety at Los Batanes as implied by the results of paleoethnobotanical, zooarchaeology, and stable isotopic analyses provides an exciting first step toward understanding agropastoralist agency through foods in the wake of sociopolitical collapse and climate change in the south-central Andes. The multimethodological approach used in this study will be essential to increasing the temporal resolution of different data sets and connecting them with regional dynamics of culture and climate change in the south-central Andes during the Late Intermediate Period. Many of the data sets on which we base our interpretations need

to be expanded into more robust sample sizes to address questions of intrasite variability at Los Batanes.

The ecological niches exploited by the Cabuza formed a shifting mosaic of seasonally productive and complementary food sources. Evidence for farming, herding, hunting, and foraging at Los Batanes align with the diverse multiresource strategies of Andean highland agropastoralists. Counter to archaeological narratives of the early Late Intermediate as a period of hardship conditioned by increasing aridity, social conflict, and population dispersals, the case of Los Batanes exemplifies how mobile pastoralists are uniquely positioned to succeed as migrants. Our findings highlight the locally contingent and diverse economic strategies of the Tiwanaku diaspora. At Los Batanes, diasporic identities emerged through foodways that fused distant homelands and new homesteads.

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