BEADS AND STAMPS IN THE MIDDLE ORINOCO: ARCHAEOLOGICAL EVIDENCE OF PRE-COLONIAL INTERACTION AND EXCHANGE IN THE ATURES RAPIDS

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Abstract

The Atures Rapids in the Middle Orinoco have been named a prominent center of commerce since early colonial times, where multiple indigenous communities gathered to trade goods. However, their precolonial role in exchange activities between local and non-local actors was poorly understood and demanded archeological research that contrasted the ethnohistoric record. This paper presents an archaeometric analysis of stone beads and ceramic roller stamps, items previously associated with trade practices, which were obtained in two recently excavated sites in the region, Picure (AD1030-1480) and Rabo de Cochino (AD1000-1440), to assess their provenance, production and value. This study proposes that the Atures Rapids, specifically Picure, ~~as~~ were a bead manufacture workshop site, as well as an exchange site for roller stamps. The stamps were acquired, as well as produced, by different potting groups. Their distinct *chaine opératoire* and production techniques, showed adaptation and emulation processes associated to the multiple and multi-ethnic communities in the late pre-colonial period (AD1000-1530). Both beads and stamps are linked to identity regalia likely used as part of ceremonies that took place in the rapids, supported by the numerous and monumental petroglyphs found on the islands.

Key words: ceramic roller stamps, beads, precolonial exchange, *chaine opératoire,* Orinoco

Resumen

Los Rápidos de Atures en el Medio Orinoco han sido reconocidos como un centro de comercio desde el periodo colonial, donde múltiples comunidades indígenas se reunían a intercambiar bienes. Sin embargo, su rol en el periodo pre colonial en las actividades de intercambio entre actores locales y foráneos no estaba bien estudiado y demandaba una investigación arqueológica que contrastara el registro etnohistórico. Este artículo presenta un análisis arqueométrico de cuentas de collar líticas y pintaderas de cerámica, objetos previamente asociados con prácticas de intercambio, obtenidos en dos sitios recientemente excavados en la región, Picure (1030-1480d.C.) y Rabo de Cochino (1000-1440d.C.), para evaluar su proveniencia, producción y valor. Este estudio propone a los Rápidos de Atures, específicamente Picure, como un taller de producción de cuentas de collar, así como un lugar para el intercambio de pintaderas. Las pintaderas eran adquiridas y producidas por distintos grupos alfareros. Sus distintas cadenas operativas, y su manufactura revelaron procesos de adaptación y emulación asociados con las comunidades múltiples y multiétnicas en el periodo pre colonial tardío (1000-1500d.C.). Tanto las cuentas como las pintaderas están asociadas a insignias usadas como parte de ceremonias que tenían lugar en los rápidos, asociadas con los numerosos y monumentales petroglifos que se encuentran en estas islas.

Palabras clave: pintaderas cerámicas, cuentas de collar, intercambio pre colonial, cadena operativa, Orinoco

Atures: a Trading Center in the Middle Orinoco

The first Spanish expedition to the Atures Rapids (1584) described the islands in the Orinoco River as a "center of commerce" (Ojer 1966:52), where different Indigenous groups from the Guianas, Llanos and Amazonia gathered to trade (Zucchi and Gassón 2002:68). The strategic location of the Atures Rapids (hereafter the Rapids) contributed to their prominence as a trading spot; since they are the first natural barrier to navigation upriver~~, making them~~ they are a mandatory stop. The Rapids have a rich fishing stock on a year-round basis, a highly regarded feature in a region where fish are a key protein resource (Tapia 1966[1715]:204-205). By the mid-sixteenth century, the exchanges described by the Europeans for the Rapids were affected by demands from a cross-Atlantic economy, including gunpowder, metal axes, knives, weapons and *poitos* (indigenous slaves) (Perera 2000:389). Given these circumstances, and limited prior archaeological fieldwork in the region, this paper will evaluate to what extent the Rapids were a center of production as well as a key place for the exchange of goods before the Conquest.

Early written sources described a cultural mosaic in the Middle Orinoco area at the time of European contact (1531-1585). Multiple indigenous ethnolinguistic groups were located between the

Cuchivero River mouth and the Atabapo-Orinoco confluence, including speakers of Arawak, Carib, Saliva, and independent languages (Aikenvald 2012:50-59) (Figure.1). The Adoles (or Atures) group were originally on the Orinoco riverbank and islands, from the mouth of the Apure River to the Rapids themselves (Rivero 1956[1736]:42-43). Following the first European expeditions, from 1690s through the 18th century, the distribution and composition of these ethnic communities were substantially impacted by epidemics, slave raids (Morey 1979), ~~and~~ the establishment of Jesuit missions, and other expeditions seeking the fabled El Dorado riches (Useche Losada 1987), resulting in forced relocation to mission settlements, while others abandoned settled life for a mobile existence (Rey Fajardo 2007). The importance of the Rapids during the late 17th to 18th centuries is indicated by the earliest foundation of three *reducciones* or mission towns in this area (Perera 2003: 189; Useche Losada 1987:62-62).

Long-distance exchange networks existed between multiple indigenous groups of the Rapids and those in the Llanos, the northern Andes, the Guianas, and Trinidad (Arellano 1982:138). According to Morey (1975:556; Morey and Morey 1975), there was a complex system of interaction involving marriage alliances, warfare, and trade spurred by a desire for access to resources of different ecological settings and specialized manufactured *goods* (*sensu* Gregory 2015:1x-1xi, 20-21). Exchange was based on reciprocity and complementarity principles (Perera 2000:383) likely reflecting gift-giving rather than a commodity economy (Gregory 2015:13). This model of interaction was further developed as the System of Orinoco Regional Interdependence (SIRO by its Spanish initials, Arvelo-Jiménez and Biord 1994). SIRO proposed that trading occurred among small, dispersed and heterarchically organized groups that occupied different ecological areas. Exchange was used to reinforce political relations and avoid conflict over limited resources (Arvelo- Jiménez et al. 1989:150). Among the traded items are salt, clay, fish, turtle oil, canoes, hammocks, pottery,

beads, curare, *caraña* (*Euphorbia adinophylla*), hunting dogs and *corí* (*Cavia* sp.) (Morey and Morey 1975:332).

While SIRO may be valid to describe post-contact economic relations, it has been argued that it is not applicable for pre-colonial times. The exchange networks documented in ethnohistoric records, when held against archaeological reconstructions, surpass the posited model, since these also involved non-egalitarian and politically centralized societies, with elites controlling the redistribution of agricultural surplus (i.e., staple finance) and acquisition of prestige goods (i.e., prestige finance) (Gassón 2000:585-586; Gassón 2014:27-35; Johnson and Earle 2000:257-258). Indeed, hierarchical polities existed in the early years of Indo-Hispanic contact, such as the Caquetío (Arawak) in the Cojedes Llanos (Federman 1958[1557]). Thus, the SIRO model overemphasized the egalitarian ethos of the economic exchange system, neglecting to consider surplus use to reinforce political links between dissimilarly organized socio-political groups (Gassón 2014:25-27).

Historic and archaeological evidence throughout and beyond the Orinoco basin has revealed the exchange of a wide range of prestige goods (e.g., green stones, tumbaga) of which *quiripas* or freshwater shell bead are notable (Boomert 1987; Scaramelli and Scaramelli 2015). *Quiripas* were worn by chiefly elites around their necks and arms as symbols of wealth and power (Carvajal 1648 in Gassón 2000:595). They were likely manufactured by specialists and traded mostly among hierarchical groups such as the Caquetío, Achagua and Otomaco, (Alvarado 1966 [1767]:314-319). *Quiripas* are suggested to have functioned as a proto-currency with a standard exchange value, later adopted by the Spaniards (Briceño Iragorry 1928). Their symbolic and exchange values likely varied between pre-Hispanic and colonial times, especially when European glass beads (*mostacillas*) were introduced as currency (Gassón 1996:143; Gassón 2000:598). Other exotic items such as ceremonial

pots, smoking pipes and censers have also been connected to funerary offerings and/or shamanic practices in the Lower Orinoco-Trinidad (Boomert 2000:442-444), reflecting exchange circuits that did not necessarily involve the same groups or be driven by ecological interdependence. While the ethnohistorical record provides valuable insights into the extent and nature of Indigenous trade relationships, the time depth and characteristics of pre-Columbian exchange remains obscure and demands a comparison with the archaeological data.

Traces of Trade and Exchange in the Archaeological Record

Trade involves the interchange of material *goods* (Gregory 2015:1x-1xi,20-21). In contrast, exchange refers to any form of interaction between individuals and/or social groups, which involve ideas and objects being transferred from one to another (Oka and Kusimba 2008:339). The key difference is based on the distinction between commodity and gift exchange economies. The former refers to "a socially desirable thing with a use-value and an exchange value" (Gregory 2015:4,7) where the things traded are alienable. By contrast, a gift economy entails an "exchange of inalienable things between persons who are in a state of reciprocal dependence" (Gregory 2015:13). Value in a gift economy is vested in people, in the network of social relations, not on the things exchanged.

Archaeologically speaking, trading can reveal regular patterns, evidenced via continued presence of non-local items in archaeological assemblages associated with good exchanges. However, in non-industrialized societies it is difficult to differentiate gift from commodity, since exchanges can be performed to both cement social relations and to mobilize circumscribed resources under the

control of political elites or centers (Hodder 1982:200). To differentiate them depends on the identification of the source and distribution of certain materials and the strength of the inferences that archaeologists can propose regarding the value and motivations underpinning transactions. Thus, one may ask whether an object was exchanged for its subsistence or prestige value, esteemed for its material properties and/or its craftsmanship, its symbolic character and/or utility. One should also ask if the use-meaning value was maintained or altered once the item changed hands (Dillian and White 2010:10-11).

Archaeological evidence of trade in the Middle Orinoco region has mostly focused on the presence of rare pottery groups, beads and roller stamps. Ceramic vessels are mentioned as items of exchange in early written sources, for instance pots that contained turtle oil made by the Otomaco were widely traded (Zucchi and Gassón 2002:70). However, the archaeological evidence of imported trade pottery has been difficult to ascertain, starting with how it is defined, which relies principally on their scarcity and/or diagnostic temper differences (Lozada-Mendieta 2020:43-52).

Since the first excavations in the Middle Orinoco (Howard 1943), the occupation sequence has been disputed by the co-occurrence of multiple ceramic styles in common stratigraphic contexts, which continued throughout various periods (Lozada-Mendieta et al 2016; Boomert 2000:104). At Ronquín site, where Howard (1943) first defined the region´s main ceramic groups, a minority "Z" ceramic group was interpreted to be a trade ware. Later, at Corozal site Roosevelt (1990) interpreted various minority wares as products of interactions between diverse indigenous groups at this settlement, resulting in the hybridization of different tempering ingredients and decorative techniques. This phenomenon was further explored by Zucchi, Tarble and Vaz (1984) at Agüerito site, where the existence of a multi-ethnic community was suggested to explain the co-occurrence of different

wares with similar vessel forms and mixed decorative techniques. The identification of local and exogenous pottery styles is therefore problematic in the study area and cannot confidently be associated to a trade transaction.

Ceramic roller stamps have also been used as proxies for trade. They are portable, have a restricted distribution in late Arauquinoid sites and bear stylistic similarities, suggesting a common origin (Tarble and Vaz 1986-87:2). Roller stamps were almost certainly used for body painting or textile imprinting. They are found in archaeological sites from the Caura-Orinoco River confluence to the westernmost Llanos of Barinas (Zucchi 1975:Fig.XVII; Novoa et al. 1981:Figs.15,17-18). This could be linked to either shared stylistic norms or the exchange of the stamps themselves throughout this vast region. Although there is no ethnohistoric evidence on roller stamp trade, there are descriptions of stamped body painting use to infer identity, status differences, ethnic frontiers, and/or symbolic affiliations (Gumilla 1944 [1741]:123; Chaffanjon 1986 [1889]:89, 97).

Unlike colonial glass beads (Scaramelli 1995; Scaramelli and Tarble de Scaramelli 2005), *quiripa* beads have not been recorded in the Middle Orinoco. Contrary to shell ornaments from the north-central and Caribbean coast in Venezuela (Guzzo et al. 2017) and the Tairona variscite beads linked to the Gran Roque Island (Acevedo et al. 2021), rare *quiripa*-like shell beads from funerary contexts in the Venezuelan Andean and sub-Andean areas are the only archaeological evidence for their pre-colonial exchange (Gassón 2000:586). Excluding ethnohistorical records describing shell bead trading activity, this is unknown in the archaeology up the Orinoco.

Considering the ethnohistoric and ethnographic data describing Orinoco indigenous groups as multi-ethnic communities who practice long distance trading (Hornborg 2005:591), it is necessary that

archaeologists approach this complex scenario in a systematic way. Roller stamps and beads, being portable materials, must be analyzed beyond their decorative motifs, relative chronology, or their rareness, but in terms of their technology and morpho-stylistic characteristics to better characterize their use and meaning by understanding their production and distribution. The reconstruction of the *chaine operatoire*, defined as technological knowledge or 'know-how' followed by a specific group to transform raw material into a product (Dobres and Hoffman 1994), will reveal learned practices and technical choices (i.e., raw materials, fashioning gestures) (Lemonier 1986, Bril 2002) that should help to identify distinct areas of manufacturing and circulation. This would allow to discriminate among a variety of practices —as locally produced or imported— and to better understand how beads and clay stamps fitted in the local occupation sequence and their role in regional interaction in this area.

Recent Archaeological Investigations in the Atures Rapids

We executed three field seasons of survey and excavations between 2015-2017 in the Rapids (Figure.2). The key site is on Picure Island (named after *Dasyprocta* sp.), which yielded abundant evidence of pre-Columbian occupations. We also present results from Rabo de Cochino site, located on an island 16 km downstream (Lozada-Mendieta 2020). These complementary records allow us to trace emerging patterns of exchange and interaction over several centuries. We focus on key material indices of these processes, specifically objects with an inferred aesthetic or prestige value, represented here by stone beads and ceramic roller stamps.

Survey and Excavations at Picure and Rabo de Cochino Sites

A systematic surface survey was conducted on Picure (Figure.2:B). The northern end of the island is covered by savanna, which burns seasonally, and is ringed by riparian gallery forest. Fires shortly before fieldwork provided us with optimum surface visibility allowing a rapid identification of the largest concentrations of archaeological material. We exhaustively sampled circular plots (2m radius) that were randomly located in areas bearing surface deposits. We recorded diagnostic artefacts separately, as well as the locations of mortars both fixed on freestanding and portable boulders. The absence of artefacts from the colonial and early modern period is noteworthy, despite abundant downriver evidence of Colonial to Republican-era occupations (Scaramelli 2005; Scaramelli and Table de Scaramelli 2005, Tarble Scaramelli 2006). On Rabo de Cochino an informal survey was conducted on the western margin of the island, adjacent to an area previously excavated by Barse (1989). Here we encountered abundant archaeological material eroding from the sandy bluffs, which aided in the demarcation of the site's extent (Figure.2:C). While multiple sedimentary layers with cultural deposits were evident in exposed bluffs, no pre-Hispanic surface material was visible on top of the bluffs or inland.

Excavations aimed to document the time depth, extent, and nature of the activities that took place on both islands during the pre-Columbian period. We excavated five units (2x1m) on Picure and three on the Rabo de Cochino by depositional context and by 5cm spits within contexts. On Picure (Figure.2:B,D), we documented continuous deposits of cultural material throughout the excavated sequence. The primary units TU1 and TU4 each yielded dense deposits (nearly 7,000 artefacts/unit) when excavated to a depth of 61-65cm below surface (hereafter cmBS). Soil composition was uniform throughout but more compact and darker towards the surface, owing to higher charcoal

inclusions from frequent burns. Artefact abundance increased considerably towards the surface. High rates of ceramic breakage suggest a complex depositional history and potential soil reworking as well as mechanical trampling.

On Rabo de Cochino we placed two main units (TU-A and TU-C) on the exposed profile of a sandy bluff (Figure.2:C). The cleaned profiles of these units documented two distinct and discontinuous occupations, demarcated by successive deposits of river sediments. The youngest fluvial silt loam deposit, varied in thickness between TU-A (~60 cm) and TU-C (~128 cm) but was almost entirely devoid of cultural material. Below, in both units, we encountered a dark grey/brown and compacted soil, with a high density of artefacts and charcoal inclusions. In TU-A this deposit ranged between 60-125 cmBS while in TU-C between 128-210 cmBS. The basal stratum of silt loam, containing a low frequency of artifacts, was excavated to 190 cmBS in TU-A and 270 cmBS in TU-C, without reaching cultural sterility. TU-B, placed perpendicular to TU-A, encountered an ephemeral older occupation below slumped riverbank deposits, embedded in the basal context. Features were recorded *in situ* in the densest layers of both main units. In TU-A, we excavated a basin-shaped, charcoal-rich feature (probably a hearth) that was clearly visible in the exposed profile and cut into older deposits. This feature was intruded by a post-hole. In the analogous context in TU-C, detailed geoarchaeological analyses by Amaral (2019) confirmed two juxtaposed paleosols, which are related to an in situ living floor of a food processing activity area with intact flat grinding stones (*metates*), hand-held stones (*manos*), ceramic griddles (*budares*) and large fragments of ceramic vessels.

The recorded frequency of artefacts per unit of volume was an order of magnitude higher in the top archaeological layers, indicating that occupation intensified through time. Most finds were potsherds, followed by quartz artefacts. Organic remains and bones were very poorly preserved.

The Pre-Colonial Communities of Picure and Rabo de Cochino

Excavations and absolute dates (28 AMS, 9 TL and 3 OSL) obtained in Picure and Rabo de Cochino allowed us to reconstruct an occupational sequence to contextualize the excavated beads and stamps (Figure.3). In the Early Occupation period, Picure, is the furthest known point upriver featuring Saladoid-Barrancoid series ceramic complex and style, here designated the Early Picure Complex (hereafter EPC, ca. AD 310-620), which is also present in Rabo de Cochino island (ca.100BC-AD400) (Lozada-Mendieta 2019:325, 413). At both sites, the evidence suggests that EPC occupations were rather ephemeral and of low intensity, seemingly resulting from explorations upriver, in contrast to the larger and more stable Saladoid-Barrancoid settlements downriver in the Orinoco (Roosevelt 1978, 1990; Vargas 1981).

For reasons unknown, Picure and Rabo de Cochino ceased to be waystations or camp sites, for approximately 500 years, until ca.AD1000, when both sites were re-occupied, signaling the beginning of the Late Occupation period. The latter is associated with the Late Picure Complex (hereafter LPC; ca.AD1030-1480) and Late Rabo Cochino Complex (LRC); ca.AD1030-1440), each with its own local characteristics. Rabo de Cochino had a larger settlement that was stablished in this area between ca.AD1000-1440, consisting of Arauquinoid series ceramics. While much of the pottery was locally produced and tempered with *cauixí* (sponge spicules), there were a significant number of non-local vessels with distinct inclusions and tempering (i.e., granite and fiber), manufacture and decorative techniques. These other vessels, belonging to Valloid series and Nericagua style ceramics, had a better quality and wear resistance and were included with the local

suite of cooking wares. During this period ceramic roller stamps and stone beads first appear on Rabo de Cochino island (Lozada-Mendieta 2019:455-456).

In contrast, the community at Picure was more varied, as shown by techno-stylistic analysis of the LPC ceramic artifacts, which revealed practices of emulation, adaptation, and hybridization. Between ca.AD1030-1200, Picure potters mainly prepared ceramics with a granitic paste typical of the Valloid series, while also experimenting with other tempering techniques, plausibly resulting from short encounters with potters producing sponge spicule (*cauixí*) and fiber-tempered (*caraipé*) ceramics (Lozada-Mendieta 2019:463). The technological changes in this initial LPC stage suggest that a closer relationship must have existed with potters using distinct techniques, where they must have shared their knowledge in raw material procurement and paste preparation. It is not until later, between ca.AD1200-1400, that it is possible to detect different ceramic wares, demonstrating the presence of at least two different pottery-making groups on the island who shared certain stylistic or formal and decorative motifs, but not the same paste recipe (granite vs. sponge spicules) or production chain. During this period, roller stamps and beads first appeared in the sequence on Picure. Finally, after ca.AD1400, the consolidation of a multi-ethnic community on the island can be argued based on the appearance of mixed recipes and grog tempering, the development of different fashioning techniques, and the shared adoption of new vessel forms. All of these processes imply knowledge and motor skill transfers which were the result of regular encounters and shared learning (Lozada-Mendieta 2019:468-471).

Methods of analysis

To stablish a chronology, charcoal-dated samples were recorded close to the interfaces between depositional contexts to obtain dates for their onsets and terminations. In sum, the 45 radiometric determinations (Supplement-1) from the region scaffolds our record of pre-Columbian activity on Picure and Rabo de Cochino within a wider regional chronological context. We explore the overall temporal distribution using composite kernel density estimates (CKDEs, Brown 2017; McLaughlin 2019). Dates were calibrated with IntCal20 (Reimer et al. 2020) and their probability distributions were not normalized. We combined dates if they fell within 100 years of one another to reduce oversampling and constructed our CKDE with a smoothed kernel bandwidth of 50 years.

Independent analyses of the bead and roller stamp assemblages were undertaken in the field. The latter were classified in broad groups based on their paste. Seven ceramic roller stamps from Picure and six from Rabo de Cochino were further subjected to petrographic analysis, portable X-ray fluorescence spectroscopy (pXRF), and technical assessment of macro-scale traces to classify them and reconstruct their *chaîne opératoire* (Lozada-Mendieta 2020). Twelve roller stamps were highly fragmented (except RC-003), preventing reliable diameter and height measurements (Table-1).

Elemental concentrations obtained with pXRF (Supplement-2) were used to explore the chemical variability of the ceramic roller stamps. Nine elements (K, Sr, Zr, Ti, Fe, Rb, Nb, Ga, Co) were chosen to generate a Compositional Variation Matrix for each site. Logarithmic transformation of the raw data was performed to correct relative values (Aitchison 1986; Baxter and Freestone 2006) and to enable Principal Component Analysis (PCA) and Hierarchical Cluster Analysis (HCA).

Beads were recorded per arbitrary 5 cm spits, within contexts. Their metric dimensions and qualitative attributes (color, shape, condition, number of perforations, stage of production)

including preforms, pendants, and a single spindle whorl (*n*= 94, Supplement-3) were recorded, plus the raw material collected from Picure (*n*=25). To assess production techniques (Groman-Yaroslavski and Mayer 2015), a subsample containing a variety of shapes and raw materials was selected for examination with scanning electron microscopy (SEM). To formally compare the physical characteristics, we applied multidimensional scaling (MDS) to the set of whole beads and pendants from Picure (*n*=63), which includes incomplete (non-perforated or roughed out) beads. MDS reduces the dimensionality of the multivariate data to two dimensions, as determined by pairwise object similarity of attributes. Using R package 'vegan' (version 2.5-6, Oksanen et al. 2007), we standardize the data, generate a Euclidean dissimilarity matrix, and attempted 20 random starts to derive a stable stress value. The results are centered on 0 and ~~has~~ have a principal components rotation applied.

Beads and Roller Stamps: Analysis and Results

Our excavations and radiocarbon summaries provide complementary information on the relative occupational intensity in the Atures region over time. It suggests that activity in and around the Rapids attained several plateaus interspersed with phases of relatively quick growth, peaking around AD1400 (Figure.4:A). This trend is even more pronounced within the bead assemblage, nearly 80% of which concentrate on the surface and the upper 30 cm of deposits on Picure Island (TU-1: AD1200; TU-4: AD~1400). Similarly, our composite kernel density of regional radiocarbon dates (Figure.4:B) captures a steadily increasing pattern of activity over the late pre-Columbian period (AD1 onwards), also peaking around AD1400 (the LP and LRC complexes/periods, Figure.3).

This upward radiocarbon trend correlates with the volume of archaeological material recovered in final pre-Columbian contexts, although we caution that excavated contexts with ^{14}C dates from before AD~1000 are only documented in the Culebra (Riris et al. 2018) and Pozo Azul (Barse 1990) sites.

Roller stamps found on Picure were recovered from the surface (n=4) and in two trenches, from contexts dated around AD1287-1396 to AD1410-1447 2σ (n=3) (Table-1). At Rabo de Cochino, six stamp were recovered from Trench A, dated between AD1030-1166 (n=2) and AD1323-1348 2σ (n=3). Their appearance coincides with the radiocarbon upward trend from ~AD1000-1400, which marks the most intense occupation of the Atures region. Roller stamps have potentially earlier dates downriver, with ^{14}C dates of cal.AD559-1045 and cal.AD821-1267 (Zucchi, Tarble and Vaz 1984:174), although they remain more common between ~AD1000-1400 (Tarble and Vaz 1986-87:2).

Roller Stamp Characterization

The characterization of roller stamps reveals potential new interaction dynamics in the study area. Picure's roller stamps were classified macroscopically into *Cauixí*, *Cauixí* and Sand and Fine Sand paste groups, characterized as having freshwater sponge spicules and/or fine sand temper, respectively. Previous research in the area reported *cauixí* roller stamps only from macroscopic examinations (Tarble and Vaz 1986-87). Petrographic analyses confirmed the presence of sponge spicules in all except three stamps, which presented fiber and grog with fiber temper (Figure.5). This indicates at least two different tempering techniques, possibly by two different potting groups.

Two of the fiber-tempered stamps were recovered from the surface and the other came from TU-1 (Table-1) with an associated date of cal.AD1410-1447 2σ. This fiber paste recipe has only been reported in Picure and Culebra sites. It is grog-tempered with organic siliceous inclusions (xylem and phytoliths), which were added to a clay matrix with the same grog temper (Lozada-Mendieta 2020:145-146). Although dates associated with this paste recipe from Culebra site show it could date earlier upriver (AD775-967 2σ), the Culebra fiber potsherd did not correspond to a roller stamp, hence the latter might have been introduced later, perhaps influenced by the *cauixí*-tempered stamps that were already present in several sites downriver (Tarble and Vaz 1986-87:18-19) and in Picure itself. As described for the LPC period (Figure.3), this island might have been the meeting point where *cauixí* stamps were seen by potters using fiber-temper who decided to emulate that shape.

Rabo de Cochino roller stamps were all macroscopically classified as *Cauixí*, except for one Coarse Sand fragment. Petrographic analyses confirm the presence of sponge spicules and naturally occurring granitic rock and derived mineral inclusions, respectively. Moreover, one of the sponge spicule-tempered roller stamps also showed medium to coarse-sized granitic grog temper, likely obtained from broken sherds of a granitic fabric vessel. Sponge spicule and granitic potsherds appear during the LRC period (Figure.3), before roller stamps, and correspond to two different technological traditions (Lozada-Mendieta 2019:455). Here, the rare granitic stamp could relate to interaction between two groups in this site, or mimicry by Valloid potters of local Arauquinoid potters.

These new results reveal a broader range of paste recipes for roller stamps, which had only been associated with the sponge spicule tempered ceramics of the Arauquinoid series. Although the

stamps made with fiber, granitic and grog inclusions are rare, their manufacture can potentially be associated with local traditions, suggesting circulation networks are not necessarily extensive. The manufacturing process for the predominantly c*auixí* roller stamps included the collection and grinding of the sponges, and mixing with the dried, cleaned clay (Lozada-Mendieta 2020:130-139). Siliceous-rich sponges usually adhere to tree branches found along flooded meadows in the margins of rivers and/or lagoons (Volkmer-Ribeiro and Viana 2009). This suggests that they were not procured directly in the strong currents of the rapids, where Picure site is located, but in close proximity, considering the floodplain within 1 km of each site. Fiber tempering is not as well characterized since siliceous inclusions were not fully identified as part of the *Gramineae* family, present on riverbanks and inland areas. Finally, granitic sherds do not present additional inclusions. Granitic derived clays are ubiquitous along the riverbanks and are potentially locally sourced in both sites.

Grog tempering (Figure.6) constitutes a newly identified technique that shows knowledgeable, though experimental, local potters. Fiber-tempered clay with equally tempered fiber grog in Picure suggests the potter knew that the broken vessel had fiber temper and added it intentionally. This is a cost-effective technique since it uses a readily available material with similar thermal expansion properties. It must have been preferred over other grog, as confirmed by the absence of any other type of grog in fiber sherds in all of the excavated sites. On the contrary, sponge spicule stamps with granitic grog follows a different principle. Since it was only found in one more potsherd besides the roller stamp at Rabo de Cochino site, this tempering practice could be considered opportunistic. Likewise, granitic grog in a sponge spicule sherd suggests both *cauixí* and granitic potsherds were found together or in proximity, indicating shared refuse areas that coincided with the common distribution of both fabrics recorded in the island (Lozada-Mendieta et al 2016).

All roller stamps from Picure site belonged to the same geochemical group, except for one sponge spicule tempered stamp (Figure.7). Despite being tempered with either *cauixí*, fiber, or grog with fiber, all but one stamps were made with a similar clay, characterized by low concentrations of Fe (≈2.6), Zr (≈0.03), Nb (≈0.002) and K (≈0.77). The remaining sponge spicule stamp presented higher Zr and K values, probably associated with a more weathered clay fraction and K-feldspars. Sherds from both geochemical groups presented few mineral inclusions, mainly coarse silt to fine sand grain sized quartz, supporting an alluvial silty clay source, derived from a highly weathered granitic parent rocks on the banks of the Orinoco.

Rabo de Cochino stamps belonged to three different geochemical groups (Figure.7). Only one of the *cauixí* stamps pertains to a different group, with high Ti values and low Fe. The granitic stamp constitutes a separate group based on its highest concentrations of Fe ($\bar{x}$ =4.86092), K ($\bar{x}$ =2.44490), Rb ($\bar{x}$ =0.01825) and Sr ($\bar{x}$ =0.00746). K, Rb and Sr values are all related to the conspicuous presence of K-feldspars, while Sr values are also linked to more carbonates and higher weathering (Degryse and Braekmans 2014:195). Higher Fe values are related to ferric oxides in the clay fraction, corroborated by the strong red color of the base clay. Remaining *cauixí* stamps presented slightly lower concentrations in Fe ($\bar{x}$ =4.41269), K ($\bar{x}$ =1.11022) and Rb ($\bar{x}$ =0.00895), based on more common medium coarse grain sized quartz and feldspars. Rabo de Cochino's pXRF analysis confirmed the division between *cauixí* and granitic groups, however, further difference among sponge spicules stamps suggests two different clay sources for their production. The latter could be interpreted as several clay deposits being exploited by the local Arauquinoid community that lived on the island or two different Arauquinoid communities producing these items for a wider network of exchange.

Based on these results on raw materials and paste preparation techniques, most of the stamps from both sites were made from local alluvial and sedimentary clay sources to which the potters added either sponge spicules, fiber and/or grog. Only one stamp found at Rabo de Cochino was made with a granitic non-tempered residual clay source, also potentially local. While clay deposits are most likely near excavated sites, tempering techniques and chemical characterization suggest they are used by distinct workshops with independent paste recipe preparations, supporting their classification as items of exchange.

All roller stamps shared the same modelling forming technique (Figure.8), which did not vary between sites or through time. It was recognized from a continuous profile with horizontally oriented inclusions on the radial section, with no associated equidistant cracks or concavities and associated compression fold. There is no consistency in measurements because of high fragmentation (Table-1).

In terms of decorative motifs, stamps were subdivided in four main groups (Table-1, 2). Picure samples belonged to two groups, which are also present in Rabo de Cochino with two additional types. *Cauixí* stamps belong to all four groups, signaling their wide range of decorative motifs. Groups 2 and 4 were not exclusively related to a particular fabric, encompassing sponges, fiber, granitic and mixed or grog tempered fabrics. While both sites share friable and incised stamps (Figure.5), there are certain particularities. In Rabo de Cochino, the granitic stamp exhibited imprecise parallel lines excisions, with narrower bands than similar *cauixí* stamps. Fiber with grog with fiber stamps from Picure were the only ones with punctuation.

Based on stylistic analysis, there is a tendency in both sites towards complicated designs executed with a less precise technique. Precise deep excisions were identified only in earlier stamps from

Rabo de Cochino (ca.AD1000-1300). Picure's stamps displayed mostly linear imprecise incisions with complex geometrical designs in their earlier stage (ca.AD1200-1400) but later incorporated uneven punctuation (ca.AD1400-1480). This trend coincides with what Tarble and Vaz (1986-87:5, 23) described previously for stamps from other sites of the Middle Orinoco area. It could also be explained by the multi-ethnic scenario described for the LPC period (Lozada-Mendieta 2019:468).

Bead Analysis

No *quiripas* were detected in either site, probably due to preservation bias. The sample of lithic beads is overwhelmingly skewed towards recent deposition; 55/63 whole beads (88.7%) we analyzed in detail originated from the surface or the uppermost strata, which at Picure (Figure.4:A), date from the late thirteenth to fifteenth centuries. Similarly, the two pendants recorded on Rabo de Cochino, which were excluded from the statistical analysis, were retrieved from the youngest depositional contexts. Cylindrical beads form a large subgroup within our sample, broadly located towards the right of the scatterplot (Figure.4:C) while others are less clearly clustered. Long cylindrical beads (pendants) towards the top left may also form another subgroup, albeit with relatively high internal variability. Overall, the MDS pattern (Figure.4:C) indicates there is little to distinguish groups by metric attributes. Similarly, bead morphology and raw material color do not appear to be associated to any one cluster.

Beads recorded in Picure bear strong resemblances to one-another, with the most common morphology being thin, flat cylinders (discs) with a single hole (Figure.9). Similarly, the drilled and initiated holes have very similar dimensions (≤2mm) despite variation in the faces intended to bear the holes (3-18mm), in turn suggesting their mounting on strings with a consistent thickness. Except

for a single bead manufactured on hyaline quartz, chert beads have a similar degree of polish and luster. Examining bead surfaces under high magnification typically reveals only a single, coarse stage of polishing or abrasion (Figure.9: top row), with a minority of beads also displaying slightly finer but less systematically applied stage of polishing. We suggest that the relative uniformity of metric, morphological, and aesthetic attributes of the beads indicate closely linked sequences of production. These fundamental similarities in the process of roughing out, abrading, and polishing the raw material could be adapted to the aims of the producer to create different morphologies (lenticular, circular, discoidal, cylindrical, teardrop).

We interpret the beads as forming part of a single tradition of late pre-Columbian craft production centered upon Picure, noting the quantity of unfinished beads characterized by a high consistency in form and appearance. The first archaeological reconnaissance in the Atures Rapids (Cruxent 1950; Cruxent and Rouse 1958-59:235-236) reported several “lenticular” and one circular basin on the basalt outcrops on the north edge of Picure island (formerly María Auxiliadora Island), and several more besides in other locations in the rapids (Figure.2:D). Our surveys re-located the workshop on Picure, adjacent to several large panels of petroglyphs on its northern tip (Riris 2017). The lenticular basins are likely axe polishers or grinders (Figure.10). However, it appears plausible that the circular basins identified by Cruxent (1950: Fig.5) on Cotúa were used for bead production. The broad striations visible under extreme magnification of the beads is consistent with the coarse grain of the polishing basins’ granitic substrate. Finally, the only beads recorded on Rabo de Cochino were finished or broken following completion, rather than during production. Picure is, thus far, the only pre-Columbian site in the region where the full production sequence of beads is represented *in situ*, alongside raw materials and likely means of abrading beads into their final shape. Together, this evidence indicates that Picure was a center of pre-Columbian bead production.

Discussion

The occupation of the Atures Rapids intensified ca.AD1200 accompanied by an increased production of stone beads and a diversification of roller stamps. Both items date earlier downriver, but they appear ca.AD1000 in Rabo de Cochino and ca.AD1200 in Picure, suggesting that as groups were moving upriver and settling on these two sites, they also brought finished items and the knowledge to continue to produce them locally. While beads were manufactured in Picure (and possibly in neighboring Cotúa island), ceramic roller stamps were common in both and were most likely produced in several sites since they are non-standardized, were sometimes made with different clay sources, followed distinct paste compositions, and displayed various decorative motifs. Both beads and stamps might be engaged in different interaction spheres since their distribution between the two sites is contrasting and might not have involved the same people.

Even though beads and stamps can be locally made, the stone, clay and temper materials used for their production are ubiquitous and do not rule out they resulted from exchange with other communities along the river. Exchange is suggested by their different craftmanship and their use as adornments with decorative patterns related to ethnic identity or affiliations. The standardized production of beads might indicate a single production area but their shape diversity might be associated with demand for certain forms stemming from individuals or certain communities also to be used as individual and/or group markers.

Roller stamps are more varied than previously thought and do not only belong to the Arauquinoid series. Though the earliest stamps are made with *cauixí* and probably originated in the Middle Orinoco-Parguaza Area, the stamps from Rabo de Cochino and Picure exhibit local recipes and decoration techniques that exemplify how this shape was adapted and emulated by local groups in the Rapids. Granitic and Fiber with grog with fiber fabrics are local paste recipes that preceded the *cauixí* cylindrical stamp shape. Local Valloid and fiber-tempering potters likely imitated the stamp following their own paste recipes and, sometimes, altering decorative motifs, as shown by the idiosyncratic punctuation on fiber-tempered stamps.

Chemical and petrographic characterization also allowed us to explore other aspects of stamp production and regional circulation. Analysis showed that production workshops involved different local potting groups. Raw materials were not necessarily exotic but were transformed by different specialists that sometimes-used common clay deposits but varied their tempering and decorative techniques. Likewise, Arauquinoid *cauixí* stamps feature internal variability in clay, grog temper and decoration, suggesting that Arauquinoid potters exploited a wide variety of sources and techniques, or that there are different communities with distinct practices producing *cauixí* stamps that arrived to Rabo de Cochino site.

The manufacturing and stylistic differences of stamps in both sites confirm their exchange character. Originating both on the islands and nearby areas, stamps were produced from the interaction with Arauquinoid groups and their circulating stamps in the area, inspiring locals to both mimic and transform it. Shared decorative techniques found in the fiber and granitic stamps from Picure and Rabo de Cochino respectively, could suggest that the imitation not only included the items but also the affiliation with Arauquinoid people from downriver. However, the innovative motifs also in fiber

and the *cauixí* tempered stamps at both sites suggest there were local patterns that were maintained and even claimed by the Arauquinoid outsiders themselves, as part of a more mixed environment during the LPC (ca.AD1400-1480) and LRC (ca.AD1400-1440) periods. Stamps could be used to both show alliances and frontiers between the groups that were settled and/or visited the area.

Regarding the beads, we hypothesize that wrist, ankle bracelets and necklaces produced in Picure were likely destined for local use, as part of the bodily accoutrement to identify gender, age, and/or group identity. Concurrently, aspects of the production could be earmarked for future exchange with guests and visitors to the island. The unique monumental rock art at Picure (Riris 2017) plus the unusually rich concentration of petroglyph iconography engraved on the Rapids, would provide the context for the inter-group exchange. One of the most distinctive petroglyph motifs (a face with spiral "ears") on Picure is also found in a polychrome-painted, *cauixí* Arauquinoid open bowl, recovered from Rabo de Cochino surveys, indicating shared artistic conventions across different media (Riris and Oliver 2019).

This rock art, we argue, was not just significant for the local Picure and surrounding islands pre-Contact residents, but also for a variety of mainland groups today. Each group has incorporated the personages and figures represented in rock art into their narratives relating to foundational mythological characters (*Wajari* for Piaroa or *Kúwai* among Arawak groups) who engaged in several mythical journeys along the Orinoco, bringing forth cultural knowledge and naming places of significance (Vidal 2000). One such place in the journey is the panel of "monumental" petroglyphs on ~~Picure~~Picure (Riris 2017), where a Piaroa informant remarked on the icon of a flute-player, indicating that a *Warime* ceremonial feast was conducted there by the "ancients", as narrated in

myths (Boglár 1978). *Warime* (like the Yurupari in NW Amazon) is a feast where flutes are used (Mansutti 2019), that is still performed today at the start of the wet season, when the river water-level rises and the Picure petroglyphs begin their journey into the underwater world.

We suggest that in LPC times (AD1200-1500) Warime-like ceremonies and other feasts called for gatherings on Picure of both locals and guests (with rock art personages "participating"), which most likely presented the setting for trading and gift exchanges. Bodily decorative etiquette for such ceremonial events perhaps required acquiring beads, on offer for exchange at Picure, given their local manufacture and preeminence in the excavated materials. The greater formal variation of beads may correspond to local and visitor's demands, which would also account for non-standardized roller stamps, likely produced in several sites. Assuming that these stamps are indicators group or ethnic identity (beside gender, age, or status), the variety in design and technique could very well be accounted for such ceremonial events, as locals and guests dressed for the occasion, with proper beads and paint-stamped body designs (perhaps also on *guayucos* or cotton loincloths).

Feasts and ceremonies also provide opportunities for gift-exchanges, and also to search for potential marriage partners, which may partially account for the shift from a multi-cultural community to a much more hybridized, integrated one from ~AD1400 onwards on Picure. The same ceremonial context would also account for the various instances of emulation and adoption described in ceramic materials, including the roller stamps. This model does not exclude exchanges and interactions outside ceremonial contexts, that is, in gatherings to exclusively conduct economic transactions. Unfortunately, the overwhelming majority of potential items for trade are highly perishable materials that left no trace.

Conclusions

Archaeological fieldwork in the Middle Orinoco has offered partial, but compelling, answers to the questions raised here. First, nowhere in the Middle Orinoco region do we have any archaeological evidence to argue for hierarchical, politically centralized societies with a paramount chief as in the Western Llanos, where surplus redistribution and labor control is evident. Likewise, there is yet no sign of warfare, a situation which could lead to temporary hierarchy, as militaristic structures tend to promote. Here one wonders what caused the ca.400-year occupation hiatus in Picure and Rabo de Cochino: with its "sacred" rock art connotations and prime locus for exchange and rich fishing, was it territorially contested? If this pattern of long-term abandonment is confirmed at other sites, then this would be a large-scale phenomenon, which ended at the start of the first millennium of this era, and the arrival of Arauquinoid and Valloid ceramic series.

Finally, the archaeological data does not support the Rapids attaining the characteristics of a *center* of "commerce" in the late pre-colonial period (ca.AD1030-1500) as was later witnessed by Berrío (1584) and the Jesuits. As noted, this is quite probably because a great deal of the potential evidence of trade consisted of perishable materials. Archaeological research suggests the late occupants of these islands practiced a gift-economy, where what was valued was the social relations established through the reciprocal transaction. The apparent relative "invisibility" of salient exotic pottery and other artifacts, clearly coming from further afield, is masked by the fact that the same range of

techno-stylistic wares are present in a large area along the river and possibly on the Colombian side, but further research is needed for future comparisons.

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Supplemental materials. For supplemental material accompanying this article, visit www.journals.cambridge.org/[Journal].

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