

**PETROGLYPHS IN CONTEXT:
ANOTHER LOOK AT THE CHILLIHUAY ARCHAEOLOGICAL COMPLEX IN SOUTHERN PERU**

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INTRODUCTION

The archaeological complex of Chillihuay is located on a mountain top overlooking the Chorunga River, close to the confluence with the Ocoña River and about seven kilometers east of the town of Iquipi, in southern Peru (Figure 1). These drainages are located at the heart of an extensive mineral rich zone known as the Nazca-Ocoña Gold Belt, named after the metallic ore that has been intensively mined in the region since pre-Hispanic times (Tripcevich and Vaughn 2013). Today, the local inhabitants continue to be fully immersed in the extraction of gold through artisanal and industrial mining operations, where mines function as economic, political, and ritual nodes in the landscape. These mining operations attract migrants, causing a demographic boom that has recently altered the social fabric of the local community, and have had a major impact on the environment and land use today.

The site of Chillihuay is primarily characterized by two dense concentrations of petroglyphs, distributed rather lineally along narrow canyons and slopes at varying elevations from 907 to 980 masl. Hundreds of designs are incised, pecked, and abraded into the soft outcrops that have a reddish patina typical of this volcanic rhyolite formation, known locally as *sillar* stone. Although relatively hard to reach, the lack of vegetation and the visually distinctive rock outcrops make this geological formation clearly visible from afar. This has drawn people to leave their mark at this site for thousands of years, even to this day.

Although exceptional in many ways, Chillihuay is not unique. This stretch of the Pacific piedmont had been known for its proliferation of other extensive petroglyph sites such as Caravelí, Illomas, Toro Muerto/Alto de Pitis, and Quilcapampa, among many others. Most of these had already been the subject of intensive

research, and thus offer an exceptional comparative framework for the current case study. At the same time, petroglyphs and petroglyph sites are notoriously hard to pin down culturally or chronologically and—with the exception of several diagnostic iconographic motifs discussed below—Chillihuay is no different. While the site has been previously explored by archaeologists, art historians, and petroglyph experts, earlier research has been mostly sporadic and focused on the stylistic analysis of individual petroglyphs. This has sparked ongoing debates in the literature regarding the chronology of the site and the accuracy of representation and interpretation of the petroglyphs, with only passing references to the associated archaeological record. Therefore, we maintain that the interpretation of any petroglyph site is best achieved when approached within its broader archaeological context and from multiple lines of evidence.

In this article, we present recent data from our regional surveys and excavations conducted as part of the Proyecto Arqueológico Corral Redondo (2018–2019), which included the utilization of modern analytical tools and methods to document this site and others in the Ocoña and Chorunga Valleys. Our main goal here is not to offer a new iconographical interpretation of the petroglyphs, but rather to better document and contextualize Chillihuay within more nuanced intersite, intrasite, and interregional spatial-temporal perspectives, which, in turn, will hopefully help steer future research into this little known archaeological complex. Finally, we discuss the importance of the site to the contemporary local community and our ongoing collaborative efforts to continue preserving this unique cultural heritage site for future generations.

SITE DESCRIPTION

The archaeological site of Chillihuay is located on top of a mountain by the same name,

rising 247 to 320 meters above the Chorunga Valley floor. While we could not pinpoint the etymology of the toponym, Faron-Bartels (following Galdos Rodríguez) includes in her maps a “Chilhuane” colony east of “Churunga”, both inhabited by the Aruni people before and after the Spanish conquest (2011:14, 143–144). This area may further correspond to the Quebrada Chahuane, which runs parallel to the Quebrada Chillihuay to the northeast. It is interesting that Bernedo Málaga originally attributed the Chuquibamba archaeological complex and style, prevalent in several sites in our research area, to the same Aruni ethnic group and further noted the profusion of petroglyphs in their sphere of influence (in Faron-Bartels 2011; see also Huasahuayo Chávez 2022).

The geological formation of the mountain is largely composed of volcanic aeolian sediments and granodiorite/tonalite (Barnard 2007), comprising mixed gray arenite and dark gray basalt slopes crowned by the distinct reddish rhyolite formation where the majority of the petroglyphs are found. We observed similar geological convergences framing the locations of other large sites in our survey area, and we suspect that such gray-reddish visual contrasts may have played a role in choosing their locations within the sacred landscape. While the natural vegetation on the valley floor is largely composed of perennial grasses and shrubs, there is hardly any vegetation along the upper slopes and ridgetops of this and adjacent mountains, and it appears that these were barren in the past as well.

The multitudes of petroglyphs were either incised, pecked, or abraded onto the reddish oxidized surfaces of the soft rock outcrops, thus exposing the underlying lighter volcanic rhyolite formation. This particular geological formation seems to have been a preferred medium for rock carving in other regional sites such as Illomas (Jennings *et al.* 2019:8). Most likely it was these combined characteristics of material pliability

and visual contrast that attracted the ancient artists to this particular promontory, although the above-described proximity to other archaeological sites in the valley and perhaps overall panoramic lines of sight and trade/pilgrimage routes within and outside the drainage may have played important roles in selecting this locus.

Today, the site is primarily accessible by an arduous climb along a winding path that accesses the western concentration from the southwest, departing from the valley floor where the Quebrada Chillihuay drains into the Chorunga Valley. Another, less clear path accesses the eastern concentration from the valley floor to the north. The presence of stacked-stone retaining walls and foot-traffic wear on outcrops along both paths suggest that these routes have been used for a long time, and we suspect may have been part of the original access points to the petroglyphs. Other possible access points may have existed along the upper pampa and ridgetops to the south and east, although this area has not yet been surveyed.

HISTORY OF RESEARCH

As far as we know, the Ocoña-Chorunga region was first explored scientifically in 1943 by Peruvian archaeologists Toribio Mejía Xesspe and Abelardo Santistéban Tello, and subsequently by Leonidas Bernedo Málaga, following the initial reports of looted materials from the site of Corral Redondo (King 2013; Lozada 2022; Mejía Xesspe and Santistéban Tello 2022). However, there is no record that either of these expeditions had visited or known about Chillihuay.¹ American archaeologist Gary Ves-

celius was active in the vicinity between 1958 and 1961, although his work was never published (King 2013:33). Eloy Linares Málaga visited Corral Redondo in 1964, 1970, and 1981, and at least on the first two occasions also documented the petroglyphs of “Cuno Cuno” (or “Cunu Cunu”) close to the confluence of the Chorunga and Ocoña Rivers (Linares Málaga 1970, 2013 [1973]). While it is not certain to which site this refers, his brief description of isolated carved boulders with a few geometrical and zoomorphic motifs does not seem to correspond with the profusion of designs found at Chillihuay.² Linares Málaga, who was instrumental in identifying many other similar sites in southern Peru, further postulated that due to the nature of this region’s geology, there were probably many more petroglyphs to be discovered here. Even though, in the following decades, several scholars and projects continued to document some of the key archaeological sites in the Ocoña and Chorunga drainages (Cardona 2004; Chávez Chávez and Salas Hinojosa 1990; King 2013), Chillihuay similarly escaped mention, and may have not been recognized.

The first mention of Chillihuay in the archaeological literature may have been in 1991 (cf. Van Hoek 2014). However, the first systematic mapping and registry of the petroglyphs was conducted between 1989 and 1990 by coauthor Damaso Wily Huashuayo Chávez, a local of this region and, at the time, an archaeology student at the Universidad Católica Santa María de Arequipa. Huashuayo Chávez made dozens of tracings of selected petroglyphs, and collected artifacts in and around the site, which he later deposited in a community museum he established in Iquipi’s Miguel Grau school. It was during this work that the black-painted inven-

¹ Mejía Xesspe and Santistéban Tello (2022) marked on their survey map a site by the name of “Champuni”, at approximately the same location of Lower Chillihuay on the Chorunga River. It is not clear if this is the same as the “Ichanpuni” site they mention in their field notes, although none is specifically associated with a petroglyph site, and they further deem this area of the valley to be “archaeologically unimportant” (2022:292).

² This may have been the same as the “Petroglifos de Portillo” site, first identified by Mejía Xesspe and Santistéban Tello on the road between Piuca and Ocoña and close to the pampa of Cuno Cuno (2022:189).

tory codes were added to some of the boulders, as was normal practice at similar sites at the time. Based predominantly on stylistic considerations, Huashuayo Chávez proposed a Middle Horizon occupation and specifically a Wari cultural affiliation to the majority of the petroglyphs, although he also posited continuous activity from the Early Horizon through the Late Horizon (Huashuayo Chávez 2022).

Archaeologist Daniel Chumpitaz Llerena and art historian Maritza Rodríguez Cerrón visited the site in the early 2000s, and presented some preliminary results from 2006 to 2009 (Hostnig 2022). In 2014, they surveyed the site in more detail with other colleagues (Chumpitaz Llerena and Rodríguez Cerrón 2014, 2020). In addition to describing some of the main petroglyphs, they documented some of the major sites in the region and collected surface materials, although these apparently were never published. Based on stylistic considerations, they posited that the production of the petroglyphs started as early as the Archaic Period. However, they assign most to the Formative/Early Horizon and Middle Horizon, and see little evidence for later use of the site. Chumpitaz Llerena and Rodríguez Cerrón further pointed to the ongoing destruction of the site due to mining and vandalism, and following their initial work, this was registered as a protected National Cultural Patrimony (Chumpitaz Llerena and Rodríguez Cerrón 2020).

In 2008, rock art expert Rainer Hostnig visited Chillihuay and created a detailed photographic inventory. Hostnig apparently never published on the site, and instead passed his images to another prolific rock art researcher, Maarten Van Hoek. Although he himself had not yet visited the site, Van Hoek published a series of articles, book chapters, and numerous notes on Chillihuay, focusing primarily on stylistic and iconographic parallels with other petroglyph sites in the Andes (most notably Van Hoek 2011, 2014, and 2018). Like Chumpitaz

Llerena and Rodríguez Cerrón, he too assigns most of the major petroglyphs to the Formative/Early Horizon, and especially to what he defines as the “Manchay-Sechin-Cupisnique” (MSC) Style. More specifically, Van Hoek identifies many motifs as originating from Paracas and/or Nasca iconography, which could either suggest a direct coastal contact from the northwest, a down-the-line influence from neighboring cultures, or a local tradition during the Early Horizon to the Early Intermediate Period. As he further noted, the MSC-Style imagery seems to be concentrated in the Caravelí-Chorunga nucleus (which he further assigns to an “Ocoña Rock Art Sphere”), perhaps introduced to Chillihuay from the coast via “Paracas traders” (2018). Van Hoek further questions Chumpitaz Llerena and Rodríguez Cerrón’s attribution of certain motifs to the Middle Horizon and specifically Wari, largely based on perceived inaccuracies in their drawings (Van Hoek 2014, 2020a). On the other end of the temporal spectrum, Van Hoek notes the presence of several “cross-on-altar” designs in the site that were most likely etched during the Colonial, Republican, or Modern Period.

CURRENT RESEARCH AND METHODOLOGY

The following study is based on the results of our regional reconnaissance in the summers of 2018 and 2019, conducted as part of the *Proyecto Arqueológico Corral Redondo* (PACR) (Lozada 2019, 2022). The project’s primary objective was the exploration of the eponymous huaca, or sacred ritual site. Archaeologists and collectors become aware of Corral Redondo after a looting event in 1943 flooded the market with the now-famous ninety-six blue-and-yellow feathered textiles, reportedly discovered inside eight Wari polychrome faceneck jars placed within a semi-circular enclosure³ (King 2013;

³ Several of the feathered textiles were carbon-dated to the Middle Horizon, supporting their probable Wari manufacture (see Jennings *et al.* 2022 for a summary).

Mejía Xesspe and Santistéban Tello 2022). This raises the possibility that this structure of two or three concentric walls may have once been a D-shaped Wari temple (see also Cook 2015). The reporting of numerous additional Inca ritual objects of textile, feather, spondylus shell, wood, copper, silver, and gold found by the looters as an intrusive offering at the same structure, suggests that Corral Redondo was further used in the Late Horizon as a site for low-elevation Capacocha rituals (King 2016).

Our two field seasons of systematic excavation in Corral Redondo provided contextual information on the Wari and Inca ritual activities at the site, and expanded its occupation history. Most notably, we identified an Early Horizon occupation level that predated the construction of the circular structure. In another excavation, placed on the unlooted exterior of the structure, we recorded three intact burials from the Colonial and Republican Periods (Lozada 2019, 2022; see also Mejía Xesspe and Santistéban Tello 2022; Neira Avendaño and Cardona Rosas 2000–2001).

In conjunction with the targeted excavations at Corral Redondo, we further conducted a regional survey in the Ocoña and Chorunga Valleys. Altogether twenty-four sites were recorded in a total survey area of thirty-six square kilometers, with a settlement pattern ranging from large ceremonial-administrative centers to small domestic sites, as well as special-use sites such as cemeteries, fortifications, storerooms, and other ritual sites (Figures 1 and 2). While the Chorunga River is largely arid today, the dense settlement pattern and associated terracing we recorded indicates that the environment was wetter in the past and the river valley could have sustained large populations. Another important archaeological feature recorded by the project was the ancient road system, likely of Wari-Inca origin, that ran along some sections of the Ocoña Valley mid-slopes.

A preliminary analysis of our surface collections points to human occupation dating from the Early Horizon through the Colonial Period and to the present, with a population apogee during the Late Intermediate Period and Late Horizon (Lozada 2019, 2022; see also Mejía Xesspe and Santistéban Tello 2022). As such, the PACR excavations and survey data fill an important gap in the earlier archaeological work conducted by Chumpitaz Llerena and Rodríguez Cerró (2014, 2020), who struggled to reconcile the presence of Early Horizon petroglyphs with what they perceive to be a total lack of contemporary occupation in the valley. In addition to Chillihuay, our survey identified two small boulders with petroglyphs at the sites of Jarana and Callanga (Figure 3). It is notable that these are the two largest sites in the project area, and date primarily to the Late Intermediate Period and Late Horizon⁴ with Chuquibamba-Inca and Inca occupation respectively.

At Chillihuay, project members in both field seasons surveyed and mapped the site with the assistance of local miner and cultural promoter Flower Huamani. In 2019, we were further accompanied by co-author Damaso Wily Huas-huayo Chávez, the aforementioned pioneer explorer of the site (Figure 4). The goals of our one to two day-long pedestrian surveys were to identify the site's components and boundaries, and create a photographic inventory of the petroglyphs as systematically as possible within the project's time constraints and respective crew size. Despite the demanding hike to the top of the mountain, the barren landscape

⁴ Chumpitaz and Rodríguez (2014) also mention a petroglyph site in Jarana, although they did not include a location map. From their brief description, it is not clear if they refer to this same isolated boulder, or to another cluster unidentified by our team, perhaps somewhere above the archaeological site. Based on his bibliographic survey, Van Hoek (2018:141) lists six other petroglyph sites in the "Río Ocoña Drainage" in addition to Chillihuay, the majority of which he marks as "doubtful" or "unknown" locations.

further facilitated our survey and documentation activities with respect to intrasite mobility and visibility.

Modern-day methods and technologies allowed us to build on previous research and further advance our understanding of this extensive site. We used a Trimble R1 GPS receiver to mark the location of the major petroglyph panels, although due to time constraints, we did not georeference the exact location of individual petroglyphs within the site. The boundaries of the two petroglyph concentrations were also mapped, determined by the team's visual detection of breaks in the distribution of anthropogenically modified features and our collaborators' intimate knowledge of the site. Another delimiting polygon, or site boundary, was marked for the purpose of establishing a protective buffer around all associated archaeological features, as described below.

All accessible petroglyph clusters were photographed with a scale and north arrow, including detail shots for most individual elements within each cluster. This approach was supplemented with overview shots of the supporting boulders' spatial contexts, and, in some cases, the landscape as viewed when facing towards and away from the rock face. In selected cases, we used structure-from-motion (SfM) photogrammetric methods. A Nikon D7200 camera and a DJI Phantom 4 Pro unmanned aerial vehicle (UAV, or drone) were used for in-field photocapture in combination with specialized photogrammetry scale bars⁵ for 3-D documentation. By taking a series of 2-D photos from multiple angles of targeted features or landscapes, we were able to use the software Agisoft Metashape Professional to digitally reconstruct photorealistic 3-D models that are measurable with virtual tools (Figure 5).

⁵ See <https://culturalheritageimaging.org/What-We-Offer/Gear/Scale-Bars/> (accessed 3 March 2024).

In cases when photos were taken at a close range, the geometry of the 3-D models captured the depth and width of incisions in high resolution. This can be particularly helpful in cases where reconstructions (*e.g.*, line drawings) based on photographs are thrown into question (*cf.* Van Hoek 2014; 2020a), and potentially also detect different execution techniques and chronological phases within individual petroglyphs or clusters (see further discussion below). To document the broader contexts of the petroglyph sites, we used UAV mapping methods to reconstruct 3-D models of their landscapes. Using the 3-D models from our documentation efforts, we have been able to revisit the sites using virtual reality, as well as print selected petroglyphs and even scale-models of entire sites⁶ (Figure 6). These digital tools allow for not just a continuous contextual analysis and interpretation of the site, but also for community and broader public engagement and teaching (see Berquist *et al.* 2018; Gonzales Ruiz *et al.* 2020).

SITE COMPONENTS AND THE ASSOCIATED ARCHAEOLOGICAL RECORD

Following previous studies and the results of our surveys, we divide the Chillihuay archaeological complex into two areas:⁷ 1) "Chillihuay West", an area measuring 8.4 hectares and composed of a dense concentration of petro-

⁶ See links to and details of the 3-D models and Virtual Reality test in the "Supplementary Materials" appendix.

⁷ This terminology is different from the one used in the original PACR survey and site designation, where several archaeological features and sites were grouped together. Compare also to Chumpitaz Llerena and Rodríguez Cerrón 2014 and Van Hoek 2014, where our "Chillihuay East" corresponds to their "Chillihuay 1" and "San Juan de Chorunga" respectively, and "Chillihuay West" to their "Chillihuay 2" and "Chillihuay" respectively. While in some publications Van Hoek seems to consider "Chillihuay" and "San Juan de Chorunga" as two distinct sites (*e.g.* 2018:141), in this paper we treat those as spatially separate components of the same activity area or archaeological complex.

glyphs along two narrow canyons and adjacent slopes on the western flanks of the mountain, and 2) “Chillihuay East”, an area measuring 5.8 hectares, which comprises another separate concentration of petroglyphs along a North-South canyon and adjacent slopes on the east side of the mountain. We marked the boundaries for each concentration once petroglyphs were no longer observed, although it is important to note that all others who previously studied the site reported that the one kilometer stretch of narrow canyons and ridges that separates the two areas was equally devoid of petroglyphs. Since the soft-reddish rhyolite formation is rather extensive and consistent throughout the mountaintop and adjacent slopes, it is quite clear that this spatial pattern was not the result of scarcity of the supporting medium, but, rather, a conscious choice by the artists to aggregate their petroglyphs in either one of these areas.

We further divided each petroglyph concentration into several subareas: A through D in Chillihuay West, and A through C in Chillihuay East⁸ (Figure 7). The subareas’ partition was largely determined following visually perceived drop-offs in petroglyph clusters and density, and topographically based on whether petroglyphs were located on a slope, along a canyon, or on a series of interconnected rocky outcrops. This facilitated a more nuanced spatial control of the petroglyphs’ relative locations and associations within each concentration, and further tests whether we can detect any emerging intrasite and intra-area patterns that can indicate intentionality in the placement of specific designs. An added benefit was the ability to compare our survey results to previous studies at the site. For example, some of the most idiosyncratic petroglyphs in subarea West-A were not refer-

enced in any of the aforementioned published literature on Chillihuay, and since these are flanking a separate ridge largely hidden from the main western concentration, we assume this section may have been missed by previous explorers.

Our regional surveys further suggest that the petroglyph concentrations may have been associated with neighboring archaeological sites. Chillihuay West extends towards an elevated architectural complex overlooking the Chorunga Valley, composed of several artificial platforms, small terraces, walls, structures, and fire pits. While quite small, the dominating position and the presence of two deep artificial trenches that restricted access from the southeast ridge suggest that this was a *pucara* fortification, although other activities such as rituals cannot be discounted. In fact, the most significant structure on site is comparable in shape and diameter to the circular structure at Corral Redondo.⁹ Interestingly, we further recorded on the *pucara* an assemblage of pebbles, possibly used as slingstones or projectiles.

Another series of small terraces and structures were documented at the foot of the mountain, dubbed Lower Chillihuay, and the presence of looted burials indicates that this was primarily a funerary complex. It is interesting that the PACR team, as well as the above mentioned previous surveys, all collected diagnostic Wari polychrome sherds, belonging to one or more faceneck jars (Lozada 2019, 2022; see also Chumpitaz Llerena and Rodríguez Cerrón 2020; Huashuayo Chávez, personal communication, July 2019). This complex is located at the trailhead that today leads to Chillihuay West, as we suspect may have been the case in antiquity. Chillihuay further overlooks several nearby small settlements on the valley floor such as Quebrada San Pedro, Rosario, and Gramadal

⁸ These differ from the letter-based subareas assigned by Van Hoek (2014). Huashuayo Chávez’s “Sector D” as discussed in his 2022 thesis largely corresponds to subarea “A” in this article.

⁹ See link and details to the 3-D models in the Supplementary Materials appendix.

Este, with the substantial Chuquibamba-Inca administrative and religious center of Jarana located only four kilometers to the west (Figure 2).

It is notable that we documented relatively few surface finds associated directly with either of the two petroglyph concentrations. These included an nondiagnostic textile fragment and a single, crudely made lithic tool. Previously, Huashuayo Chávez collected about fifteen similar lithic tools in and around subarea A, and which he labeled in the Iquipi Museum exhibit as “instrumentos de grabación” and “hachas de mano” (Figure 8). The tools are most likely made of basalt, granite, or arenite, harder stones than the soft rhyolite into which the petroglyphs were etched. It should be noted that although most of these were roughly shaped and flaked, and some may have been formed to accommodate a haft, none were ground or polished and all seem quite expedient. This suggests that rather than serving as weapons or as cutting implements, these tools were likely used in the pecking, abrading, and incising of the petroglyphs. Similar flaked lithic tools were also found associated with the Toro Muerto petroglyphs¹⁰ (Wołoszyn *et al.* 2019). We also assume that sharper tools, perhaps made of chert, obsidian, or even metal, were used to produce the fine incisions we noted in some of the petroglyphs.

REPRESENTED STYLES AND ICONOGRAPHY

In order to analyze this vast petroglyph corpus, we created a visual database based on our field documentation. Each iconographic element identifiable on the photographs was classified based on predetermined broad and

specific categories (specified below), and quantified in a spreadsheet. For the purpose of this study we define an “individual” petroglyph as a spatially distinct pictorial signifier (whether or not we were able to identify its meaning), and a petroglyph “cluster” as a tight grouping of such individual motifs on a single continuous surface such as the canyon’s rock face/panel or a boulder. The process of database creation was admittedly fraught with subjective judgments as to what constitutes a distinct unit of analysis, especially as we do not yet possess a clear understanding of the site’s chronology and of its visual and symbolic vocabulary. For these same reasons, we further indicate below other potential biases in our analysis and interpretation where possible.

Based on our preliminary classification, altogether we documented about 310 individual petroglyphs in Chillihuay East and 726 in Chillihuay West. While some panels consisted of just one or of only a few elements, others had dozens. The most densely carved continuous panel was recorded in Chillihuay West-A, containing over 120 individual elements (Figure 9). These numbers are likely to increase through further surveys between and beyond Chillihuay East and Chillihuay West. Additional petroglyphs may be currently buried by falling debris and eroded sand that had accumulated and partially covered the base of some panels, as well as under boulders that had shifted due to seismic and mining activities, as described below. Some of the carved rocks were located in high and extremely hard to reach places, and we were able to detect those only with the use of the UAV (see also Berquist *et al.* 2018; González Ruiz *et al.* 2020; Van Hoek 2021c). This suggests that the ancient artists were either highly adept at rock climbing, used scaffolding, or that any natural access that once existed has long collapsed. If so, in future explorations, we should also expect to find additional petroglyphs hidden away in largely inaccessible crevices.

¹⁰ The stone tools and other artifacts were collected by French archaeologist Henry Reichlen in 1965. Photos of these and numerous petroglyphs can be accessed through the online catalog of the Musée du quai Branly, Paris (<https://www.quaibranly.fr/en/explore-collections/> accessed 3 March 2024).

The majority of the designs fall within the broad categories of anthropomorphs, zoomorphs, composite/abstract, and geometrical motifs (Figure 10). It should be noted that many individual elements may belong to more than one category, and our decision to include those in one or the other may have little to do with their intended meanings. Wavy lines, for example, can be either geometric or zoomorphic abstractions, and the abstract/composite category may include anthropomorphic, zoomorphic, or inanimate representations. In such cases we used our best judgment to assign each of the cataloged elements to one category only, primarily to avoid statistical redundancy. As such, our database should be considered only tentative, and will likely improve in future studies of the site.

A detailed comparison of our database with published literature confirms that the iconographic motifs represented in the Chillihuay corpus were anything but random in shape, design, or placement. The iconographic inventory was overall quite limited and often repetitive between the site's subareas, and echos other petroglyph sites in the region such as Caravelí, Illomas, Toro Muerto, and Quilcapampa, as well as many others throughout the Andes. At the same time, our database further allows us to ascertain that categorical motifs were not distributed evenly or randomly across the site and within each concentration. Subarea East-B, for example, was distinct from East-A and C in that it largely lacked any representations of masks/trophy heads, certain zoomorphs like serpents, avians, and monkeys, and most distinctly had no spirals or concentric geometrical elements, which were otherwise abundant throughout Chillihuay East. If not a result of our documentation bias, this and similar patterns described below may be due to any combination of factors including chronology, function, and group affiliation, among others.

The respective and relative chronology of these motifs was often extremely difficult to determine, and in fact is still debated among those who have studied this site and similar ones. For example, while Chumpitaz Llerna and Rodríguez Cerrón (2014, 2020) prefer to assign some of the anthropomorphic and zoomorphic stick figures to the Archaic Period, they provide little contextual data to support such a hypothesis.¹¹ Similarly, much of the complex imagery that the same authors assign stylistically to the Middle Horizon (Chumpitaz Llerna and Rodríguez Cerrón 2014), Van Hoek (2014) sees as purely Early Horizon iconography.

With that, it was clear by the stylistic diversity and varying degrees of natural patination of the exposed surface, that the site has been continuously used for an extended period of time.¹² In some cases, the artists deliberately or inadvertently superimposed later petroglyphs over older ones, and, in others, carefully avoided or interacted with earlier messages (see also Ambrosino 2019). In some cases, it appears that incision, pecking, and abrading techniques were all used in the production of a single petroglyph, although it is quite possible that these also reflect later modifications to the same design. All the above suggest a premeditated design for each creative episode. For this purpose, in the following discussion we focus on the most diagnostic motifs and imagery with each category, especially as compared to other petroglyph sites and securely dated material culture from the Andes.

¹¹ The zoomorphs of Archaic Period rock art are quite different, and in Peru are typically represented as full-bodied in petroglyphs and painted rock art (Guffroy 1999).

¹² While the hue of patination can generally serve as a means of relative dating, it is important to note that this is also affected by the specific location and direction of the rock face within the site, as well as other factors such as petrographic composition, execution techniques, and any additional surface treatments. Deep incisions, for example, will oxidize at different rates than shallow abraded designs.

Anthropomorphs

Within the first category, anthropomorphs, we find various examples ranging from simple stick figures to complex outlined human figures, as well as the so-called “carcanchas” or partially-skeletonized beings (Cardona Rosas 2016; Van Hoek 2018, 2019). The majority of these anthropomorphs have one or both arms raised to the sides or above the head, and many display three to five (and rarely six) digits for each hand. Partial anthropomorphic representations include abstractions of trophy and other detached, square heads, possibly representing mummy bundle masks. While the percentage of anthropomorphic representations was similar between the two petroglyph concentrations—13.8 percent for East and 15.8 percent for West—the more elaborate examples were found in the latter. Certain subareas seem to have been favored over others for the carving of human figures, with the highest concentrations recorded in East-A and West-A.

The most visited and referenced anthropomorphic representations on Chillihuay are undoubtedly the so-called “lord” and “warrior” petroglyphs in Chillihuay West-B (Figure 11), two imposing figures measuring respectively 94 and 90 centimeters from head to toe. As such, Van Hoek (2014) proposes that these highly visible petroglyphs may have further served as “territorial markers or as warning signs for the uninvited or the uninitiated” approaching along the canyon from the east. The distinct gradient patination coupled with the distribution of petroglyphs on the bottom of the rock panel, further support the notion that the differences in height between the two figures are likely a result of an ancient sloping surface that once partially covered the rock face, as is still the case in nearby panels.¹³

Similar, albeit smaller scale full-bodied human figures were noted in Illomas, Toro Muerto, and Caravelí, (Jennings *et al.* 2019; Juszczuk *et al.* 2017; Van Hoek 2014, 2018). The “lord” further features a distinct iconographic element of a striped “X” design on the torso, and this was noted in several other anthropomorphs in Chillihuay subareas West A and B, and in Illomas, Quilcapampa, and other sites (Berquist *et al.* 2021; Jennings *et al.* 2019; Van Hoek 2018, 2021c).

In terms of chronology, we concur with earlier observations (Chumpitaz Llerena and Rodríguez Cerrón 2020; Van Hoek 2011, 2014, 2018) that certain motifs in the “lord” and “warrior” figures, and particularly the nearby “shaman” petroglyph in subarea West-A, may all draw from Early Horizon iconography, while the posture of the “lord” largely resembles “Staff God” representations such as in the famous agnathic being on the Raimondi Stele and other Chavin-related objects bearing iconography (see further discussion below). At the same time, Van Hoek (2018:56) points out that the “warrior” and the “lord” are seemingly armed with atlatl and spears and, citing Donald Proulx, proposes that the profile-facing stance of the “warrior” may allude to a later production date, influenced by Middle Nasca militaristic iconography (see also Carmichael 2015, 2016, for discussion on feet position and atlatl-carrying warriors in Nasca art). With that, the parity with other Middle Horizon iconography is also intriguing, such as the feet position paralleling that on one or more of Corral Redondo’s Wari faceneck jars (King 2013) or the stepped facial decoration (*cf.* Chumpitaz Llerena and Rodríguez Cerrón 2020). It is, therefore, possible that either one (or all three) of these figures are composite creations to which different elements were added through time (see also Van Hoek 2014, 2018). As we did not discern any clear variations in execution techniques or levels of patination during the physical and photographic examination of these figures, testing this hy-

¹³ See link and details to the 3-D model in the Supplementary Materials appendix.

pothesis further will likely require a digital or optical inspection at a higher resolution or magnification.

In addition to those published petroglyphs, we documented other large, rectangular-outlined anthropomorphs in Chillihuay West B, C, and D. One depicts a fully-articulated anthropomorph with raised hands, and another donning two elongated cephalic appendages and holding what may be a trophy head; similar iconography often appears on Early Horizon Paracas objects (e.g. Carmichael 2016:59). Two other partial busts or heads are depicted side by side, one boasting a serrated element that may parallel that of the “lord” petroglyph’s “crown”. Van Hoek (2014) further pointed out an isolated element that is “floating” between the “lord” and the “warrior”, which resembles the latter’s headdress. Although technically not an anthropomorphic representation, we identified almost identical “headdresses” in Chillihuay West-A and B, and East-A.

Zoomorphs

The zoomorphs category also exemplifies a wide range of imagery, from generic quadrupeds, camelids, serpents, avians (raptors, owls, herons, etc.), felines, deer, monkeys, insects, fish, and what seems to be hybrid fantastic beings (Figure 12). The monkeys (12B), certainly not native to this arid environment, further point to connections with the Amazon region. We recorded both stick-figure zoomorphs as well as full-bodied curvilinear ones; the latter were often “spotted” as commonly observed in petroglyph sites such as Toro Muerto and Illomas (12A). Most recently, Chumpitaz Llerna and Rodríguez Cerrón (2020) proposed that some of the quadrupeds may represent *canidae*, and in the case of one distinctive and detailed petroglyph, the hairless Peruvian *Calato* dog (12C). Cordy-Collins (1994) suggested that this canine was introduced to Peru around 750 C.E., which

would overall agree with the proposed Middle Horizon occupation of the site.

A statistical comparison between the two sites’ concentrations reveal a higher percentage of zoomorphs in Chillihuay East (43 percent) than Chillihuay West (29 percent), with camelids representing the bulk of this representational category in both areas. An interesting intrasite pattern appears in regard to the execution styles of zoomorphs. The majority of the abraded full-bodied camelids were recorded in Chillihuay East-A and C, but only a few in Chillihuay West. In contrast, spotted curvilinear camelids (and spotted quadrupeds in general) were almost exclusive to Chillihuay West.

Similarly, the only felines identified at the site are restricted to Chillihuay West. In the case of the spotted examples, these are also prevalent in Chavinoid-Paracas iconography and their plethora in the Majes Valley petroglyphs sites brought Van Hoek (2021a) to propose the existence of a “cult” during the Early Horizon (see also Guffroy 1999; Sawyer 1972; Wallace 1991). Equally, the bicephalic serpents, and especially the elaborated one in Chillihuay West-E, is a repetitive motif in Paracas textiles dating to the Paracas-Nasca transition (350 B.C.E. and 250 C.E.) (Peters 2020; see also Van Hoek 2015).

Abstract/Composite

In the abstract/composite category we include biomorphic petroglyphs and other representations of complex iconography. The most diagnostic elements were formerly identified as “Chavinoid”—after the famous Early Horizon ceremonial center of Chavín de Huantar in the highlands—although many scholars now consider the Peruvian coast as the likely origin of certain elements within this style (Bischof 2008; Burger 1995; Burger and Salazar 2008; Guffroy 1999; Sawyer 1972). In Chillihuay, this included the clear and emblematic representations of what Van Hoek refers to as the “Manchay-Sechin-

Cupisnique” style agnathic head (2011, 2014, 2018), a zoomorphic-associated abstract representation which appears in Chavin and other Early Horizon sites and artifacts (Figures 5 and 13). Agnathic (jawless) traits appear on the so-called “shaman” petroglyph (Chumpitaz Llerena and Rodríguez Cerrón 2014, 2020; Van Hoek 2014) and on another elaborate representation of an extended bicephalic serpent, both on the same rock panel in Chillihuay West-A. In addition, we recorded at least six suspected instances of fanged agnathic iconography in Chillihuay West and East, including a partially pecked one adjacent to the example previously published by Van Hoek¹⁴ (2014). Similar agnathic motifs to those at Chillihuay were recorded at other petroglyph sites in the region of study, particularly at the neighboring site of Caravelí (Van Hoek 2011, 2018). Further up the coast, akin agnathic imagery appears in the petroglyph site of Tolón in the Jequetepeque Valley (Bischof 2008:129) and painted on Paracas textiles from the site of Carhua, described as “Frontal agnathic feline head with recurved ray headband and trilobe side ‘whiskers’ with simple fanged mouth elements”¹⁵ (Wallace 1991:91).

Another diagnostic composite/abstract motif are several “sun-faces” (or “rayed heads”) recorded throughout Chillihuay, with the highest concentration recorded in Chillihuay West-A. This element is common in petroglyph sites to the east of Chillihuay such as Illomas, Toro Muerto, and Quilcapampa, and is generally believed to be related to Paracas/Nasca imagery dated to the Early Horizon-Early Intermediate Period (Jennings *et al.* 2019, 2021a; Peters 2020;

Van Hoek 2018). An elaborate abstract in subarea West-A depicts inverted stepped designs around a triangular element, and is also common in Toro Muerto. This was previously dubbed as a “dagger” design, and was tentatively associated with Wari iconography (Van Hoek 2018; 2021c). As noted above, the crosses-on-altar could also be considered as composite religious iconography dating to the Colonial, Republican, or Modern Period (see also Hostnig 2007).

Geometrical

In the geometrical category the most common designs were dots, circles (single or connected, with attached or radiating lines), concentric designs, spirals, lines (straight, curved, wavy, parallel, intersecting), polygons, zigzags, diamonds, “Venus” crosses, “pipettes” (Van Hoek 2017), and numerous combinations of these elements. It should be acknowledged that this petroglyph type was the most challenging to categorize and quantify, as distinct boundaries between one geometrical motif and another were not always clear. In addition, the diachronic superposition of petroglyphs added another complicating factor when determining where to aggregate or divide certain elements. Although this is hard to ascertain at the moment, some of the geometrical imagery depicting stems and offshoots may represent trees or plants. If so, it may deserve a separate “phytomorphic” categorization (see also Huashuayo Chávez 2022).

One of the most interesting geometrical elements recorded is the “connected circles” motif (Figure 14A). This, too, had a distinct spatial distribution, with the majority of the examples recorded in Chillihuay West-B and to a lesser extent A, whereas not a single representation was identified in Chillihuay East. Chumpitaz Llerena and Rodríguez Cerrón (2020) recently proposed that these represent

¹⁴ The pecked agnathic motif seems to have escaped the attention of earlier scholars who published on the site, but is clearly visible in our 3-D model of this rock panel to the upper left of the incised agnathic head. See link and details to the 3-D model in the ‘Supplementary Materials’ appendix.

¹⁵ We thank Jessica Lévy Contreras for pointing this out.

stars, although without much supporting evidence. While such a particular geometrical or abstract arrangement seems unique to Chillihuay and we could not find any exact analogs in the Peruvian rock art literature we consulted, variations of circular motifs connected with lines do appear at other sites. In Quilcapampa, for example, Berquist *et al.* 2021 suggest that several “line-node glyphs” are abstract representations and markers for major trails that connected multiple sites. However, these particular petroglyphs are more elaborate than those at Chillihuay, and the spatial distribution of the “connected circles” petroglyphs in Chillihuay would not necessarily conform to the above interpretation.

Instead, we propose that these may represent *bolas* or *boleadoras* weapons or hunting devices, while we note that most of those motifs are represented with three “stones” as used historically in the Andes, along with additional circular appendages (Figure 14B). A similar interpretation was proposed for Boulder PAJ-001 at Illomas, where a group of felines are depicted in association with “recessed discs plus short ‘cords’, possibly representing hunting devices, like bolas” (Jennings *et al.* 2019:18). In Toro Muerto, a group of three anthropomorphic figures are each depicted holding a circular object with a radiating line—perhaps a string.¹⁶

Scenes

In both areas of the site, we identified thirty-four possible scenes, where the artists may have consciously grouped anthropomorphic, zoomorphic, and/or abstract and geometrical motifs together. Similarities in execution style and degree of patination increased the likelihood

that these were produced at the same time, and therefore meant to be “read” as interrelated rather than as isolated elements. One boulder in Chillihuay West-D may have had as many as five or six such scenes executed on its face in one single creative episode.

Among the scenes, the clustering of quadrupeds was the most common theme (Figure 15A). While some seem to represent camelids breeding, or feeding their young, the majority of the grouping probably represent llama caravans, and similar scenes were interpreted as such in numerous other petroglyph sites throughout the Andes. However, it is highly unlikely that any highland-coastal caravans would have been brought through this relatively inaccessible mountaintop passage, especially when nearby routes would have been more suitable such as the upper pampas, the valley floor, and the Wari-Inca roads we recorded on the western slopes of the Ocoña Valley¹⁷ (see also Bikoulis *et al.* 2018; Jennings *et al.* 2018, 2019). Rather than directional guideposts for traders and herders, the intended purpose of these scenes was probably more symbolic and associated with rituals, commemoration, or narratives related to the political economy of the region.

Other scenes involve humans in the act of trapping, hunting, herding, or mounting animals, most commonly quadrupeds such as camelids. In at least one case in Chillihuay West, it appears that a person is handling a horse (Figure 15B). Another representation in Chillihuay East is almost certainly a representation of a donkey or a mule. Although both petroglyphs clearly postdate the European contact and their crisp incision style seems to support a late execution date, similar scenes of humans interacting with

¹⁶ Photo by Henry Reichlen; inventory no. PF0115757; Musée du quai Branly in Paris online catalog (<https://www.quaibranly.fr/en/explore-collections/> accessed 3 March 2024).

¹⁷ Other portable goods could have been transported via the rivers. Flower Huamani, our local project collaborator, informed us that in the past the Ocoña River carried more water and was navigable in some sections.

equidae were documented in other petroglyph sites in southern Peru (Hostnig 2007; Jennings *et al.* 2021a). If not entirely contemporary, these could echo other instances where mule caravans complemented, and then largely replaced, the camelid caravans in the Colonial Period (see Jennings *et al.* 2021a:89–94, 109). If so, it may have been that whichever rituals associated previously with camelid caravans were replaced with those directed towards mule-based transport.

Perhaps the most evocative scene we recorded in Chillihuay East-B is that of a human with hands raised high above the head, and completely framed by an undulating line (Figure 15C). While we could not find parallel imagery at other petroglyph sites, it is tempting to interpret this in the context of the millenary mining tradition in the Chorunga and Ocoña valleys, perhaps as a person enclosed within a mountain range. Interestingly, this section of the site is located immediately above one of the richest gold veins in the valley, and an entrance to a modern mine shaft is found on the slope below. If so, this may be the only known pre-Hispanic pictorial representation of such an important activity in the ritual economy of the Andean people.

DISCUSSION: CHILLIHUAY IN CONTEXT

While our database does not seem to support the previous identification of Archaic Period petroglyphs (cf. Chumpitaz Llerena and Rodríguez Cerrón 2014, 2020), we concur that the earliest and perhaps the majority of pictorial motifs that can be dated with some certainty are from the Early Horizon. The most diagnostic of those are the “Chavinoid” agnathic representations, although much of the iconographic parallelism comes from the Paracas or the “Manchay-Sechin-Cupisnique” style (Van Hoek 2011, 2014, 2018). Regionally, this time period saw the proliferation of other major petroglyph sites

such as Caravelí, Illomas, Toro Muerto, and Quilcapampa. This further corresponds with other archaeological evidence we recorded throughout the Chorunga and Ocoña Valleys, where Early Horizon ceramics were identified in Corral Redondo, Rio Chorunga, Piquillay Sur, and Santa Marta. As such, our survey data fills in the chronological lacuna noted by earlier explorers of Chillihuay (Chumpitaz Llerena and Rodríguez Cerrón 2014, 2020). It is further notable that at least in terms of its sheer extent, Chillihuay may represent the largest Early Horizon site in our survey area.

Continued petroglyph production throughout the subsequent periods is also likely, and iconographic elements and influences were proposed for the Early Intermediate Period and Middle Horizon, possibly influenced by Nasca and later Wari iconography (Huashuayo Chávez 2022). For the Middle Horizon, Wari polychromes were identified in several archaeological sites throughout the survey area such as Corral Redondo, Lower Chillihuay, Quebrada Santa Rosa, and La Ancha, whereas Ramada tradition ceramics were collected from the surface of Ispana, Callanga, Iquipi, and Lloklla. For Quilcapampa, Jennings *et al.* proposed that it was precisely the presence of an early ritual petroglyph site that may have played a role in the preference for establishing a Wari colony there during the Middle Horizon (Jennings *et al.* 2018; see also Berquist *et al.* 2021). Although no equivalent large Middle Horizon settlement was identified so far in our survey region, it is quite possible that settlements may be buried under later occupation phases.

The focus on ritualistic behavior in Chillihuay is similarly echoed in Corral Redondo, raising the possibility that these sites were associated culturally and, perhaps, functionally. There is a line of sight between the two sites, and although the petroglyphs would not have been visible, on a clear day, one can spot the

reddish outcrop of Chillihuay from Corral Redondo. Both are the only sites so far identified in the project area that represent long-term loci for ceremonial activities, with little to no evidence for domestic or other activities. Our excavations at Corral Redondo indicate an Early Horizon occupation, a time period represented in the iconography and artistic style of the petroglyphs. For later periods, fragments and complete Wari faceneck jars associated with (looted) burials were recorded exclusively at Corral Redondo and the Lower Chillihuay site, suggesting a shared funerary function during the Middle Horizon (Lozada 2019). Chumpitaz Llerena and Rodríguez Cerrón (2020) went as far as to propose that the “lord” and “warrior” figures represent Wari individuals who lived in this valley floor site, although our survey shows little evidence for domestic architecture. Future explorations should also explore the possibility that the circular structure on top of the *pucara* may have been equivalent to Corral Redondo’s enclosure and other Wari D-shaped temples.

The close association with the *pucara* further suggests that some of the petroglyphs, such the atlatl-armed “warrior” and the “lord”, the trophy heads, the “carcanchas”, and the possible representations of *boleadoras*, may have been meant to commemorate or ritualize militaristic themes. An analogous argument was recently made for similar petroglyphs from the Majes Valley (Scaffidi *et al.* 2021; Scaffidi and Tung 2020), as a supporting line of evidence for primarily bioarchaeological indices for conflict.¹⁸ For the neighboring petroglyph site of Illomas, Jennings *et al.* propose that, “As population increased in the Upper Manga drainage at the end of the Middle Horizon, the site appears to have served

as an important aggregation site to help negotiate the inevitable conflicts that population expansion brings” (2019:26).

In the Chorunga Valley, the close geographical association with Jarana, a Late Intermediate/Late Horizon site with a strong Chuquibamba influence, is also paralleled in Quilcapampa’s dense settlement during this time in conjunction with a major petroglyph site (see also Jennings *et al.* 2021b). As noted above, the only other isolated petroglyphs we identified were in Jarana and Callanga, precisely the two largest Late Intermediate/Late Horizon sites in our survey area. These geometrical or abstract designs were carved on small boulders of a different geological formation than that of Chillihuay, although it is not clear if these were contemporaneous to these sites’ occupation or, judging by the deep patination and weathering, possibly even predate those.

Curiously, complex motifs from the Late Intermediate Period or Late Horizon have yet to be securely identified at Chillihuay, although many of the geometrical designs and stick figures and especially the less patinated llama caravan scenes, easily could have been etched during these time periods (compare to López *et al.* 2021; Sepúlveda 2004; Troncoso 2022; and see also Jennings *et al.* 2018 for Quilcapampa). Nevertheless, the settlement boom during the Late Horizon as expressed in sites with clear Inca presence such as Callanga, Jarana, Ispana, Lloklla, and Corral Redondo itself, does not seem to have had parallel expression in the production of petroglyphs for this time period. This could indicate a shift in ritual patterns and loci during this time, as local practices declined in favor of more hegemonic religious traditions imposed by the Inca. A similar hypothesis was proposed for Quilcapampa (Jennings *et al.* 2018) and Toro Muerto (Wołoszyn *et al.* 2020), and could be explored through future research in the region.

¹⁸ See Van Hoek (2021b) for a critique of this iconographic analysis. However, we concur with Scaffidi and Tung that the motifs of severed heads and armament are in themselves direct allusions to violent conflicts, even if the intergroup confrontations were not represented graphically.

As it is clear that the represented iconography places Chillihuay firmly within one or more stylistic spheres in southern Peru, it is the archaeological evidence that is *not* represented on site which makes it unique. Beyond the few lithic tools described above, the overall lack of surface finds seems particularly significant considering the longevity of the site's use and the excellent preservation of organic and other materials in this dry environment. While it is quite possible that future surveys and excavations will reveal more artifacts, this stands in stark contrast to the abundance of surface finds in the valley floor sites. One possibility is that the site was “picked clean” by earlier researchers and tourists as was proposed for Toro Muerto (Wołoszyn *et al.* 2019), but we also note that Chillihuay does not have a comparable history of research and systematic collections, and typically does not see much traffic from visitors.

More likely options are that Chillihuay's immediate environs were left intentionally clean, or that any ritual residue was purposely buried deep beneath the surface. This in itself may suggest an idiosyncratic local practice that differs from other contemporary ritual loci in the southern Andes, whereas despite the similarities between petroglyphs sites, each was managed differently by the local group that controlled it. In this regard, it is interesting that the typical painted sherds or small stone slabs (*lajas/placas pintadas*) that were found associated with petroglyphs in other nearby sites such as Illomas, Toro Muerto, and Quilcapampa (Jennings *et al.* 2018, 2019; Wołoszyn *et al.* 2019, 2020), were recorded by our team in the large valley-bottom sites of Jarana and Ispana but none so far on the mountaintop petroglyphs or the *pucara* (see also Linares Málaga 1970:86 and Faron-Bartels 2011). No visible signs of feasting were detected either, as were commonly associated with boulders in Toro Muerto (Wołoszyn *et al.* 2019, 2020). The above-described stone tools, if indeed originally associated with the petro-

glyphs, seem to be related to execution rather than consumption through ritualistic behavior such as the placement of offerings. Also absent were any signs of architecture associated directly with the petroglyphs, such as those recorded at the other major rock art sites. However, this apparent lack of associated material evidence does not preclude other intangible cultural expressions taking place in front of and in between the petroglyphs, such as processions, oral discourses, dance and song, and reenactments (see also Jennings *et al.* 2019).

The particular topographical context of Chillihuay may offer additional clues to these material lacunae. The hard to reach mountaintop setting and placement of petroglyphs along narrow canyons and steep paths stand in contrast to other nearby petroglyph sites, such as Illomas and Toro Muerto, which were largely located in open areas with relatively easy access from the valley floor (Jennings *et al.* 2019; Juszczak *et al.* 2017; Wołoszyn *et al.* 2019). The petroglyphs themselves would have not been visible by those who moved across the flood plain, which would also explain why this vast site had also escaped the attention of early archaeological expeditions to the region. It is also not likely that the petroglyph concentrations were located directly along regional or interregional travel or trade routes. As such, one would need to know of the petroglyphs' existence in the first place, before making the hike up to this location. In addition, only a few of Chillihuay's petroglyph clusters can easily accommodate a large crowd of practitioners or spectators at any given time, which suggests a more restricted, if not exclusive, access in comparison with other similar sites. The lack of directly associated architecture, features, or artifacts similarly supports the notion that, despite the effort to get to the site and the time investment in producing the petroglyphs, people did not camp or stay here for extended periods.

For post-Contact periods, the most obvious elements are the crosses-on-altar and the modern-day graffiti (see also Hostnig 2007). The representations of *equidae* may allude to the colonial period economy, which, in part, replaced indigenous production modes but, at the same time, may have continued to demand ritualistic behavior on the mountaintop. The nearby site of Jarana was modified and perhaps extended during the Colonial Period, and the corresponding architecture suggests that it was still occupied by the local people. Like many of the sites on the valley floor, Chillihuay may have been used continually for centuries or even millennia. Although people continued to make the arduous climb and leave their marks upon the mountain, the nature and meaning of the petroglyphs would have constantly changed to accommodate new realities.

Yet another interesting pattern emerges on an interregional scale, in respect to the location of Chillihuay relative to other known major petroglyph concentrations in southern Peru such as Caravelí, Illomas, Toro Muerto, and Quilcapampa. As illustrated in Figure 1, these recorded sites are distributed along a very narrow piedmont stretch and are parallel to the Pacific coast, which Jennings *et al.* (2019, 2021a) proposed likely had to do with a northern route that crossed through Arequipa's so-called "breadbasket" zone. The imposing snowy *cordillera* to the north may have also guided the sites' locations; Van Hoek considers the sacred *Apu* Coropuna as "one of the main reasons for the concentration of rock art at this spot" (2011:38; see also Cardona Rosas 2016 and Van Hoek 2020b), whereas the Toro Muerto team point to possible astronomical alignments between the petroglyph field and the Chachani and Misti snow peaks (Wołoszyn and Gonzales Ruiz 2022).

Indeed, routes connecting Chillihuay and some of these sites were already proposed and

partially mapped, for example to Illomas (Jennings *et al.* 2019; Van Hoek 2022), Caravelí (Bar Esquivel *et al.* 2020; Van Hoek 2018), and Quilcapampa (Bikoulis *et al.* 2018; Berquist *et al.* 2021; Jennings *et al.* 2021a; Van Hoek 2021c). This is hardly surprising, considering that these neighboring highland-coastal river valleys shared many cultural traits and historical processes, from the Early Horizon onwards, which were expressed in an iconographic vocabulary shared among the petroglyph sites (Jennings *et al.* 2018, 2021a, 2022). In this regard, Van Hoek further (2022) proposes that some geological formations were chosen by people as suitable for leaving their marks precisely because these were already positioned along an existing route. Still, it is often quite difficult to ascertain what came first, the sites or the roads that connected them.

It is further notable that these large petroglyph hubs are roughly equidistant from one another, all within the range of thirty to forty kilometers in linear distance. Clearly, this distance does not reflect actual pedestrian routes, which were likely not laid out on straight lines as in Nazca and other parts of the Andean world. In addition, because the petroglyph sites are located along major river valleys, and petroglyph sites are often associated with particular rock formations, the above distance is likely a reflection of the particularities of this region's natural hydrology, topography, and geology. However, unlike major settlements which are distributed all along the highland-coastal drainages, the major petroglyph sites seem to be concentrated along a narrow longitudinal corridor. In fact, if the origins of those major petroglyph sites indeed correspond to the Early Horizon, this would predate the construction of large settlements in this stretch of the Pacific Piedmont.

If not a coincidence or a by-product of a non-contiguous survey coverage, this roughly equidistant pattern may hint at a certain degree

of decision-making. One possible correspondence would be equal stretches of travel time, e.g., a two or three days' journey between each of these sites. In this scenario, the profusion of smaller and intermediate petroglyph sites would have offered some sort of "way-stations" to those who were intent on producing and consuming these carved messages.¹⁹ Similarly, some of the striking parallels in this region's artistic repertoire could be explained by the possibility that many petroglyphs were produced by the same people who traveled between the different sites, starting from the Early Horizon. If so, in the future it may be useful to test the hypothesis of a long-distance and long-term pilgrimage route, perhaps even an early form of a *ceque* line, focused on petroglyph sites and petroglyph-associated rituals.

TAPHONOMY AND COMMUNITY RELEVANCE

During our surveys, we were interested in documenting the state of preservation and taphonomic processes at Chillihuay, primarily because we noted that many of the carved petroglyphs are no longer *in situ*. Understanding the causes for these ancient and modern-day natural and anthropogenic transformations is critical both for the analysis and interpretation of the site, and for conserving its integrity for future generations (Huashuayo Chávez 2022).

An inevitable long-term threat affecting the petroglyphs is the natural erosion caused by winds, annual precipitation, exfoliation, and thermal weathering, all slowly but constantly eating away at the soft rhyolite stone. We suspect that many of the dislocated boulders were also the result of earthquakes and even rare flash floods. We recorded such destructive

episodes, perhaps related to El Niño storms along the coast, at the site of Quebrada Santa Rosa and others throughout the valley, where entire settlements were partially or completely buried by geological processes. These natural processes are particularly relevant to the preservation state of the petroglyphs along the narrow canyons.

Even more destructive to the cultural heritage is the active gold mining on the slopes of the mountain, and the associated drilling, quarrying, and dynamiting that cause the bedrock and petroglyph panels to crack. In fact, many of the petroglyphs recorded on loose boulders in Chillihuay East are located immediately above some of these contemporary mine shafts,²⁰ and, as a consequence, tumbled down the slope, and, in some cases, were recorded completely upturned. Archaeologist Daniel Chumpitaz Llerena attempted to plead with the local mining companies to halt or curb their activities, although with seemingly little effect.

Finally, in acts that most archaeologists will consider vandalism, while others may perceive as cultural appropriation, the ancient petroglyphs inspired some of the more recent visitors to carve their names or even add akin pictorial motifs on the rocky surfaces. In total we counted thirty-seven such cases of contemporary graffiti and intentional defacements of ancient petroglyphs. Quantifying those inter-

¹⁹ One such small, intermediate petroglyph site was documented in the Quebrada Chilhuane, fourteen kilometers east in linear distance from Chillihuay (David Reid, personal communication, August 18, 2020).

²⁰ A 2007 technical report prepared for Century Mining Corporation shows that the entire archaeological site of Chillihuay is, or was, under their concession (Barnard 2007: figures 6–4). The report further identifies the "Chillihuay 1" and "Chillihuay 2" mines as being among the larger veins in the Chorunga Valley, and designates their production as "important" but "idle". The "Chillihuay 2" mine shaft, which seems to be drilled right under the Chillihuay East petroglyph area, is about 1.5 kilometers long (Barnard 2007: figures 11–12). In 2019, we were able to inspect briefly this ongoing quarrying operation and one of the abandoned shafts on our two-day ascent to survey the site.

ventions per concentration and subareas further allows us to assess the respective impact and, accordingly, devise potential solutions. For Chillihuay West, for example, it is hardly surprising that the majority of the graffiti concentrate around the famous “lord” and “warrior” petroglyphs of subarea B, while hardly any are found in the less accessible subarea A below the *pucara*. However, it was quite unexpected to find that the largest number of graffiti are in subareas A and C of Chillihuay East, despite its relatively restricted access compared to Chillihuay West.

Even though the site is still quite hard to reach, Chillihuay stands today as one of the most iconic places in the landscape and a source of local pride for the people of the region. Among others, the school children from Iquipi often come here on field trips. This may have to do in part with the fact that the first archaeologist to document the site, Damaso Wily Huasahuayo Chávez, a coauthor of this study, later became Iquipi’s school director. This is precisely where intensive documentation becomes crucial to academics and local people who are equally interested in preserving this fragile cultural patrimony, and where 3-D models, VR, and other visualizations can offer alternatives to experiencing the site and petroglyphs. Prints of the “warrior” and “lord” petroglyphs currently decorate the walls of Iquipi’s renovated school museum, and the PACR team further filmed and edited a short educational video which will be shown in a closed-circuit TV installed in this space in the near future²¹ (see also Muros and Bowen 2018; Muros and Rezes 2019).

CONCLUSIONS

Chillihuay ranks as one of the largest petroglyph sites in southern Peru, yet our understand-

ing of it remains incomplete. Scholars have attempted to interpret the petroglyphs since the late 1980s. However, published works have largely focused on the stylistic analysis of specific designs and clusters within the corpus of over one thousand elements. Our study contributes to the existing literature by broadening the scope of the study to include all of the elements in our survey area, the full site, and the broader regional settlement context. Additionally, we used structure-from-motion photogrammetry for 3-D documentation to record selected rock faces that contained unique and numerous elements. This technique has allowed us to continue to study specific petroglyphs, and has enabled us to share these with the local and wider public, and with other scholars.

Stylistically, it seems that people began carving petroglyphs at Chillihuay as early as the Early Horizon. Early Horizon ceramic evidence from settlement surveys of the surrounding region and excavation at the site of Corral Redondo corroborate this stylistic interpretation. Since then, people have been drawn to the site and have modified and added to the growing number of petroglyphs. Carving continued through the Middle Horizon as corresponding styles, and, specifically, Wari iconography, began to appear. This is supported by a broader settlement survey of the region where Wari influence, and possibly occupation, appear during the Middle Horizon as seen through clear ceramic and some architectural similarities. Later, during the Late Intermediate Period and Late Horizon, production of carvings seems to wane or cease altogether. Interestingly, this runs counter to the archaeological settlement patterns during these later two pre-Hispanic periods when we see a boom rather than an attenuation or absence of settlement.

In terms of Chillihuay’s function, it is clear that this was a locus for ritual activities of artistic expression. A still enigmatic aspect is the

²¹ See link and details to the video in the Supplementary Materials appendix.

absence of surface artifactual remains and architecture, save a few examples of lithic tools, which are now in the local museum. This is in contrast to petroglyph sites within southern Peru such as Illomas, Toro Muerto, and Quilcapampa. Sites and features located near the petroglyph concentrations had evidence that would suggest a defensive, mortuary, and/or habitation function; however, our survey of the site of Chillihuay did not turn up material evidence that would suggest the same. Interestingly, iconographic evidence displaying militaristic themes does seem to align with the defensive nature of the *pucara* immediately to the south. We assume the site was used ritualistically, based on what other scholars have written about similar petroglyph sites. Despite the lack of evidence, it is possible that intangible ritual activities such as processions, oral discourses, dances and songs, and/or reenactments were performed in the canyons where these petroglyphs are largely found.

When viewed within the broader context of southern Peru, Chillihuay is part of a larger constellation of petroglyph sites within the piedmont zone that share stylistic influence. Chillihuay, Caravelí, Illomas, Toro Muerto, and Quilcapampa are distributed along the piedmont, parallel to the Pacific coast, and are roughly equidistant from one another. This pattern should be further investigated, as it may enrich our understanding of each of these petroglyph sites, including how they relate to one another, and of the history of the piedmont zone of southern Peru.

It is our hope that this study will springboard further inquiry into the petroglyphs of Chillihuay. While we have contributed to the growing literature about the site, and offer some possible interpretations, the points of discussion outlined in this article remain open avenues for further research. Furthermore, we hope that our intensive documentation strategy will provide some

level of digital preservation, as the site is in danger of natural deterioration and nearby mining activities. Additionally, we hope to continue to find ways that these digital data can be used within Iquipi's local museum and schools, and promote the safeguarding of the archaeology and heritage of the region by local people.

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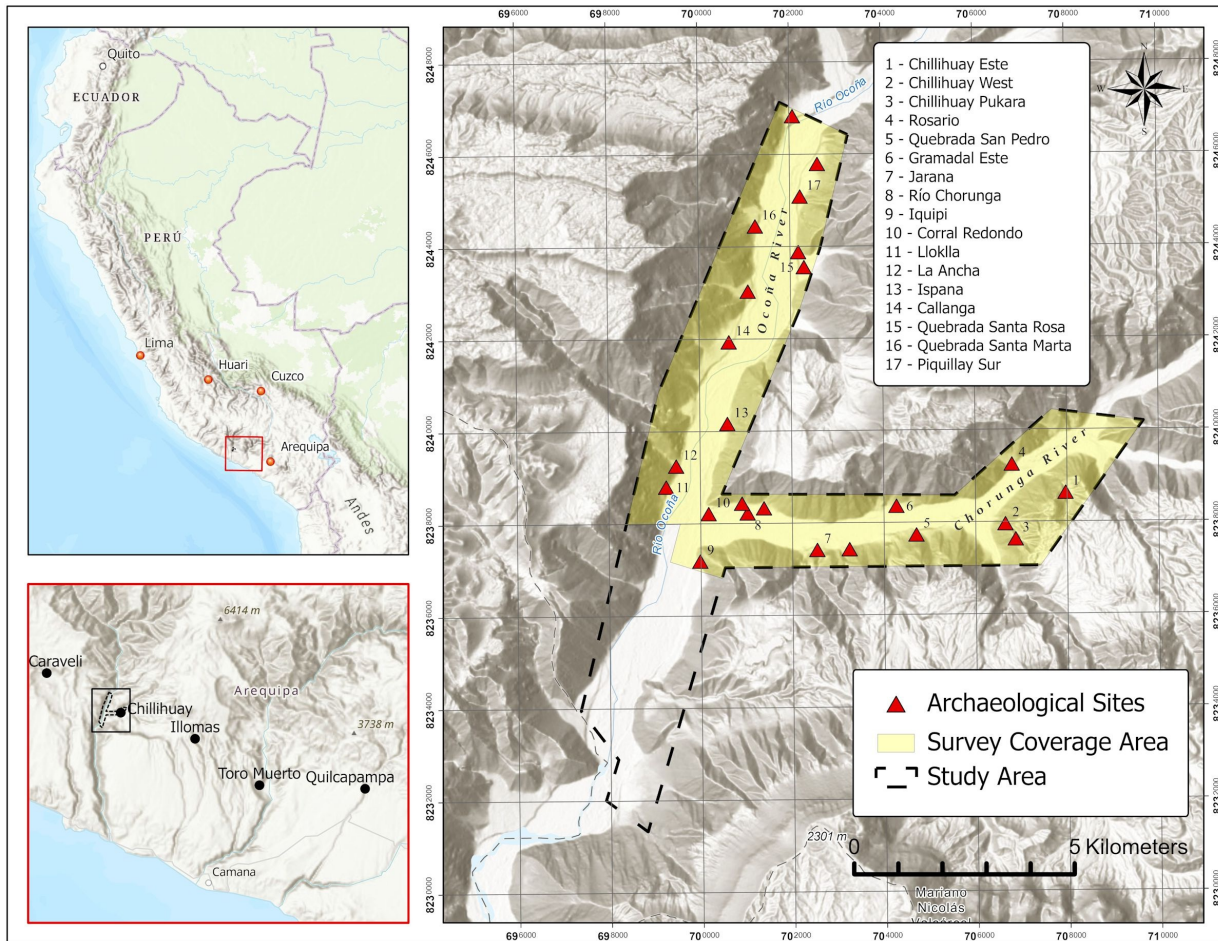


Figure 1: National, regional, and area maps with sites mentioned in the text.

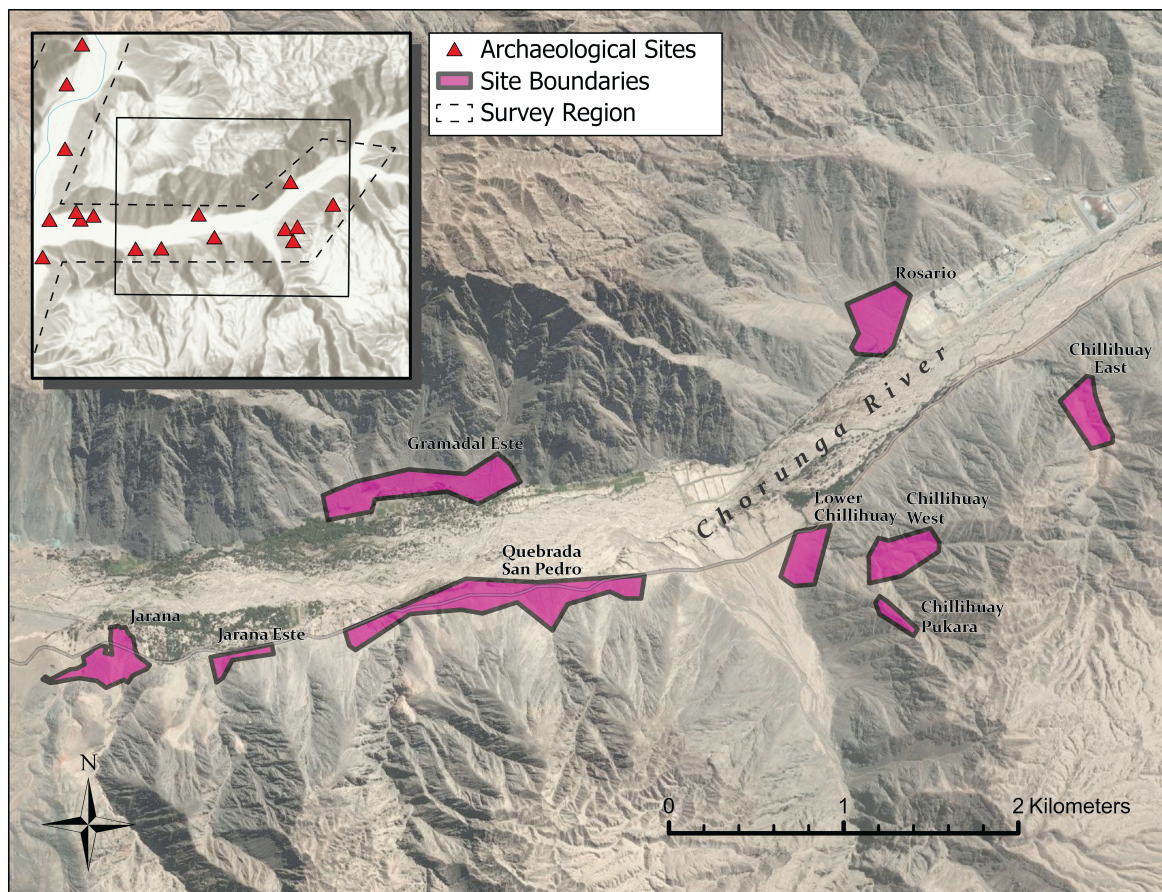


Figure 2. Sites documented by the PACR in the Chorunga Valley.



Figure 3. 3-D model of a petroglyph in the site of Callanga. See link and details to the 3-D model in the Supplementary Materials appendix.



Figure 4. Huashuayo, Huamani, and Badillo surveying Chillihuay. Note the elevated location and the uneven terrain of the petroglyph fields.

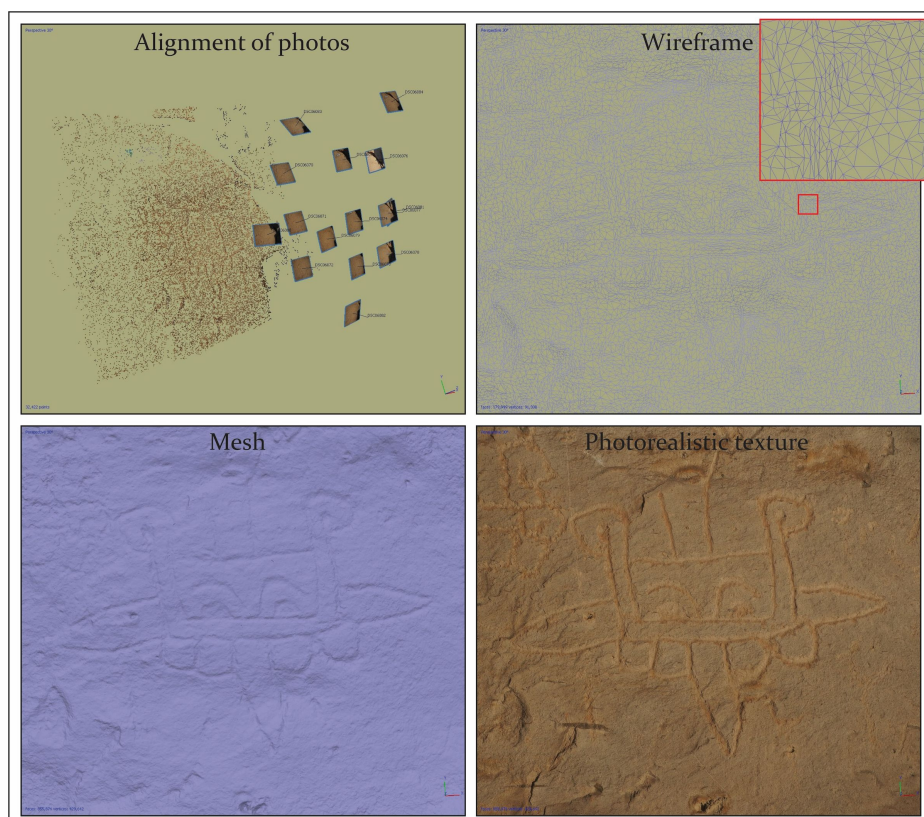


Figure 5. Structure from Motion (SfM) documentation of the “agnathic head” petroglyph in area West-A. See link and details in the Supplementary Materials appendix.

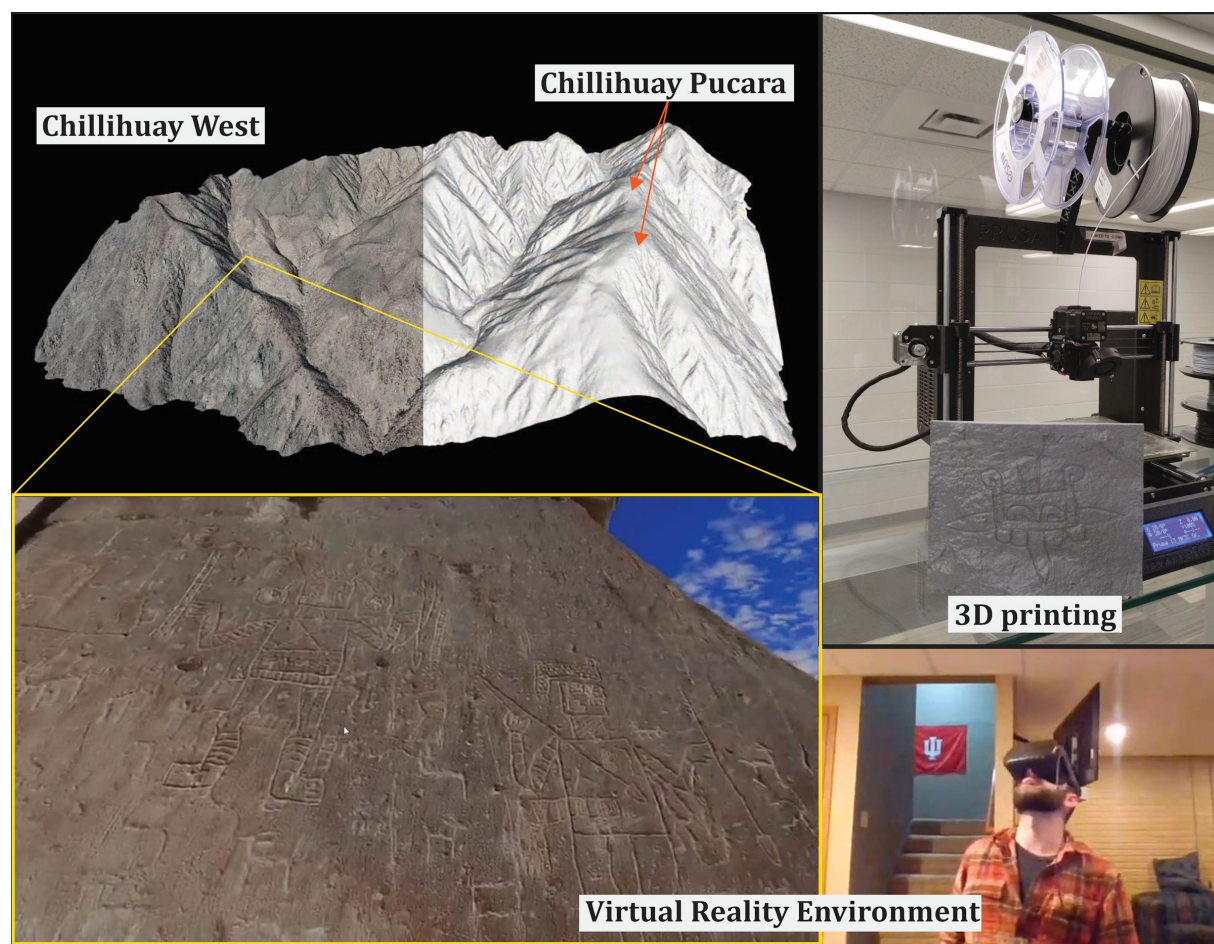


Figure 6. Some of the digital applications created from the data collected in Chillihuay.

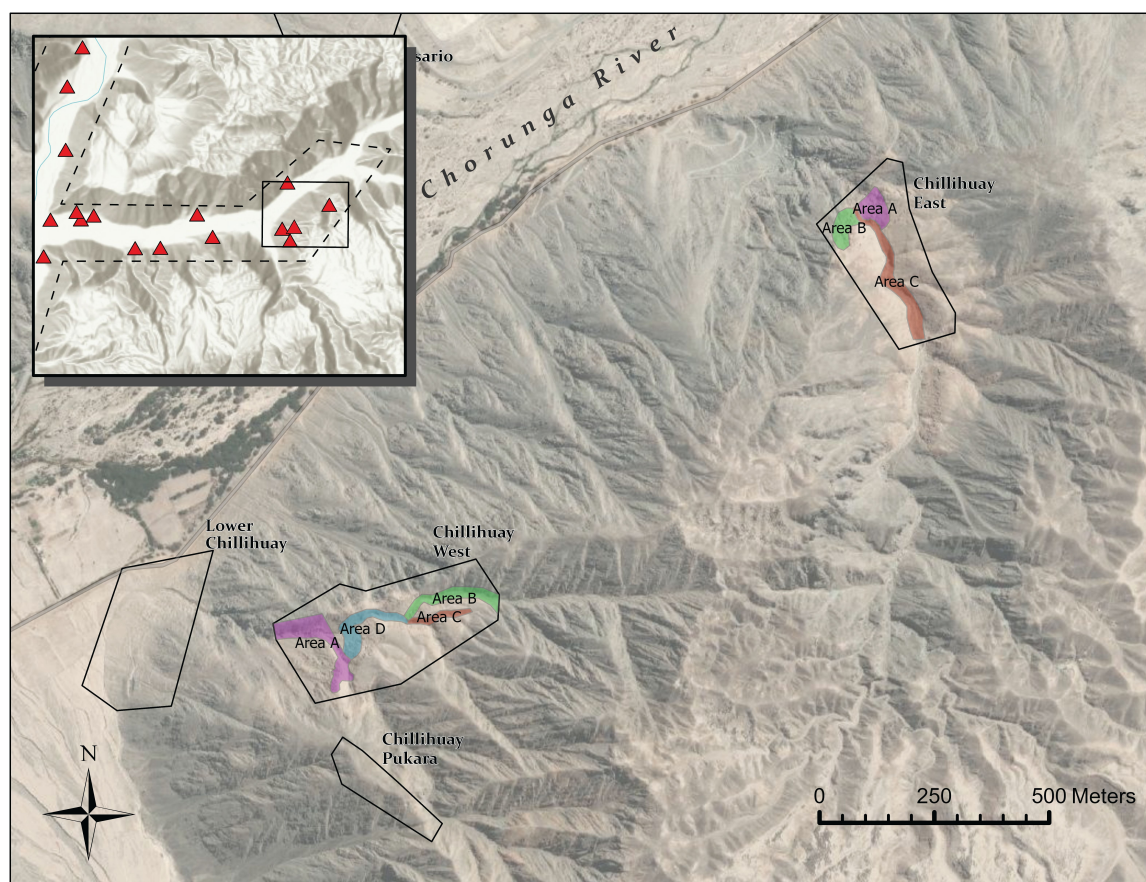


Figure 7. Chillihuay site components and associated archaeological record.



Figure 8. A sample of stone tools collected by Huashuayo Chávez from the surface of the site (currently at the Museo Escolar Luis Guillermo Lumbreras Salcedo in Iquipi).



Figure 9. 3-D model of a petroglyph panel in Chillihuay West-A. See link and details to the 3-D model in the Supplementary Materials appendix.

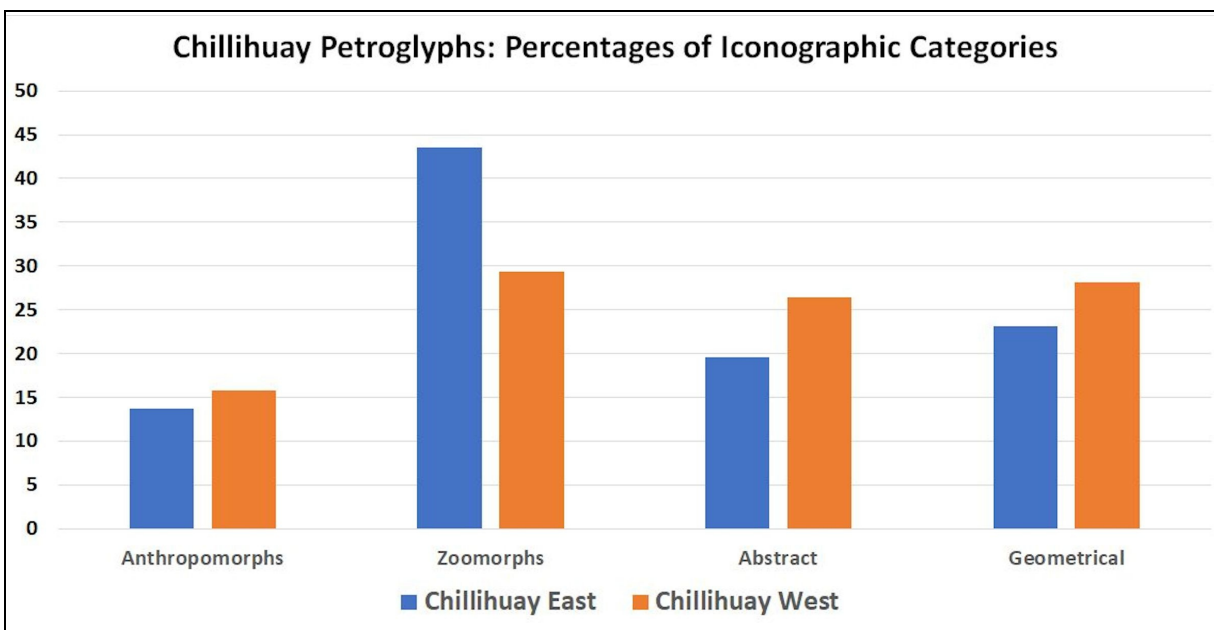


Figure 10. Percentages of major iconographic categories.

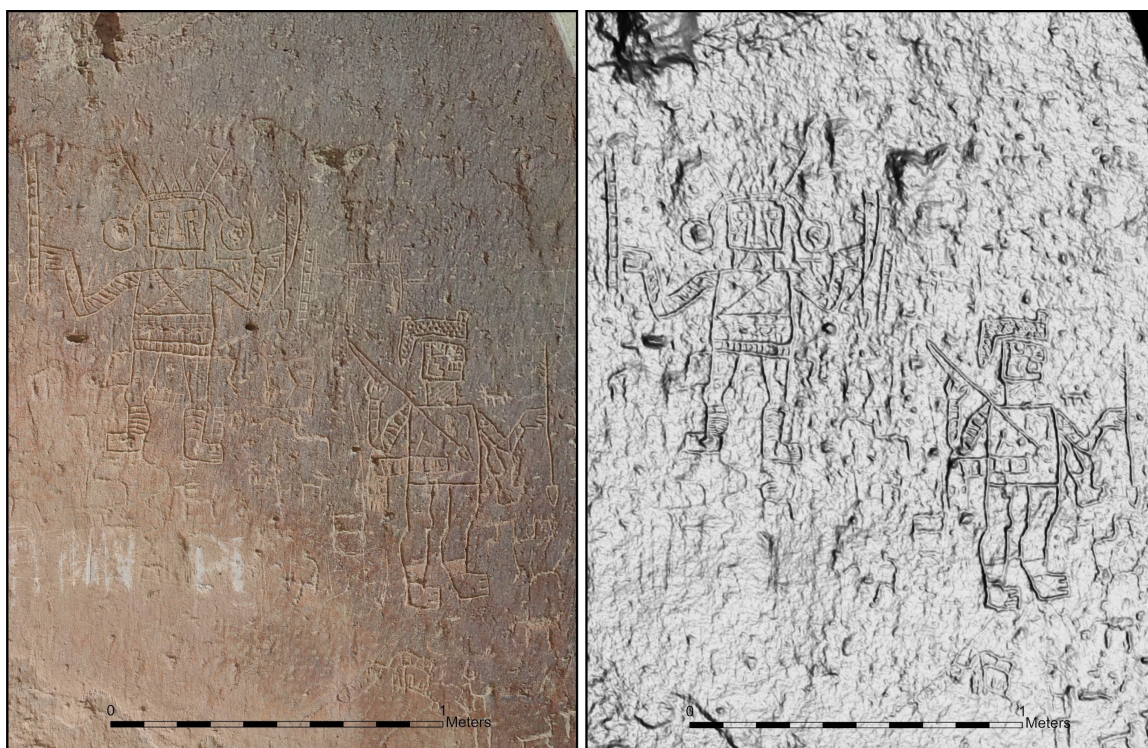


Figure 11. SfM documentation of the “lord” and “warrior” petroglyphs in area West-B.

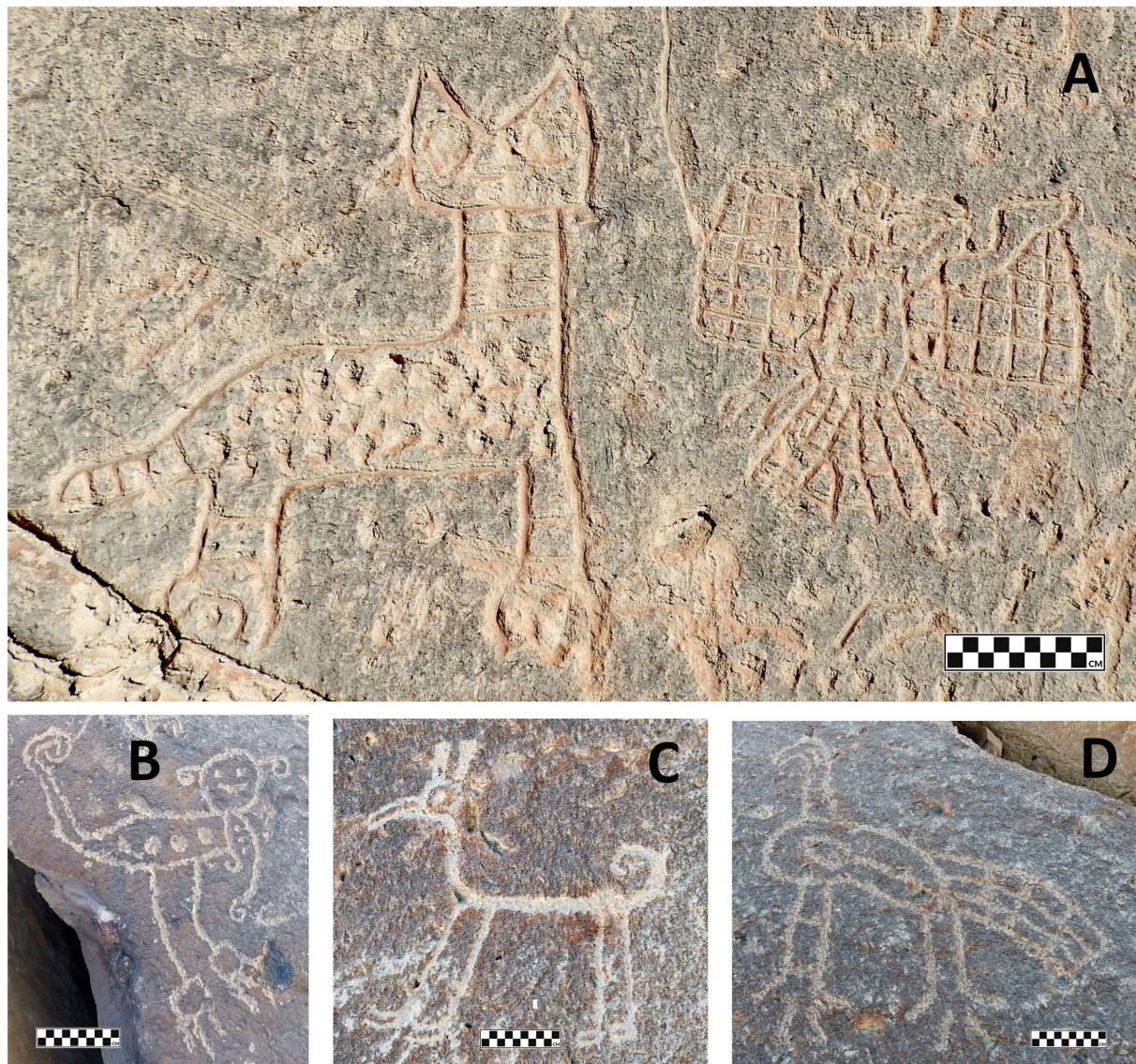


Figure 12. A sample of zoomorphic representations at the site.



Figure 13. The “agnathic head” petroglyph in area West-B.

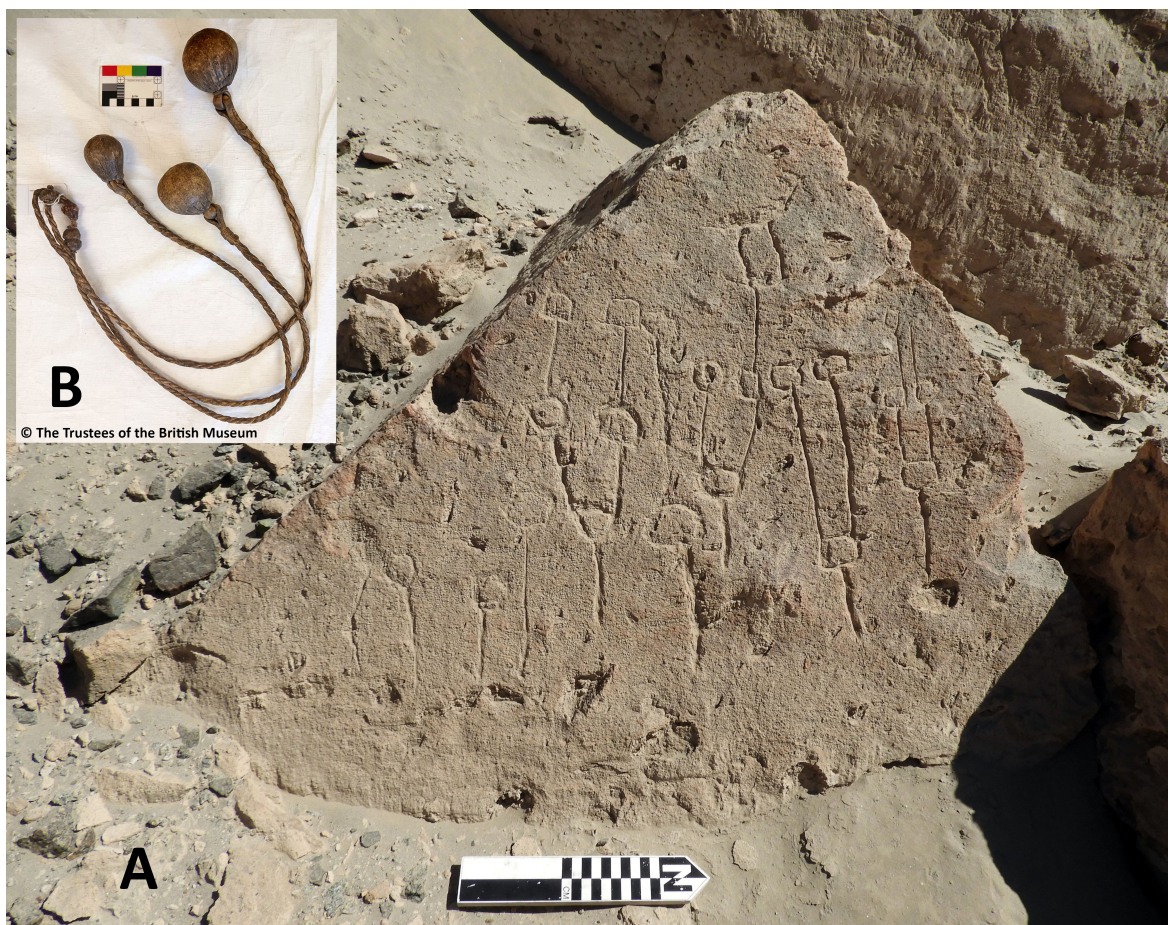


Figure 14. One of several panels with the “connected circles” motif in Chillihuay West. In the inset, contemporary South American bola (currently in the British Museum collections).



Figure 15. Selected scenes represented in the petroglyphs.

APPENDIX 1 SUPPLEMENTARY MATERIALS

3-D models

Petroglyph in Callanga

<https://sketchfab.com/3d-models/piedra-grabada-of-callanga-42b29a94129041bcb57934d54621b8b8>
(accessed 4 March 2024)

Agnathic Face Petroglyph

<https://sketchfab.com/3d-models/abe-glyph-chillihuay-southern-peru-dd7671edd14749bab677c8ca3ad6b548> (accessed 4 March 2024)

Videos

Chillihuay Landscape:

<https://youtu.be/00thyZvefeg> (accessed 3 March 2024)

Structure on top of Chillihuay Pucara:

<https://youtu.be/S7co2FP2j5Q> (accessed 3 March 2024)

Chillihuay West Petroglyph Panels (North):

<https://youtu.be/2LbQWgxueWw> (accessed 3 March 2024)

Chillihuay West Petroglyph Panels (South):

<https://youtu.be/ZWtizepaikE> (accessed 3 March 2024)

Chillihuay Virtual Reality test:

<https://youtu.be/0UcyvmioDc4> (accessed 3 March 2024)

Educational Video for the ‘Museo Escolar Luis Guillermo Lumbreras Salcedo’ in Iquipi:

<https://youtu.be/LEek4MWjqFY> (accessed 3 March 2024)

