A GIS Spatial Analysis of Artifact Distribution in Domestic Spaces at the City of Huari, Ayacucho, Peru

Geoffrey L. Taylor[1] and Emily L. Roberts[2]
[1]University of California Berkeley, [2]State University of New York at Binghamton

Background

In the summer of 2017, the first season of excavations were initiated by the *'Programa Arqueologica Prehistoria Urbana de Huari',* a project directed by Dr. William Isbell, Dr. Barbara Wolff, and Lic. Ismael Perez Calderon. This poster represents a preliminary spatial analysis of artifact data from this first season of excavation, Work was carried out in the urban core of Huari, in the sector of Patipampa (located in Fig. 1A), within which the project uncovered orthogonal cellular architecture organized into large patio-group compounds, typical of other sectors at Huari, as well as the nearby Wari site of Conchopata, and others. Within such compounds, excavations focused partly on 11 architectural spaces or rooms (designated EA in Figure 1B). The following is a preliminary exploratory data analysis of the spatial distribution of spondylus, copper, lithic, and bone materials in an attempt to understand the nature and diversity of activities within these spaces.

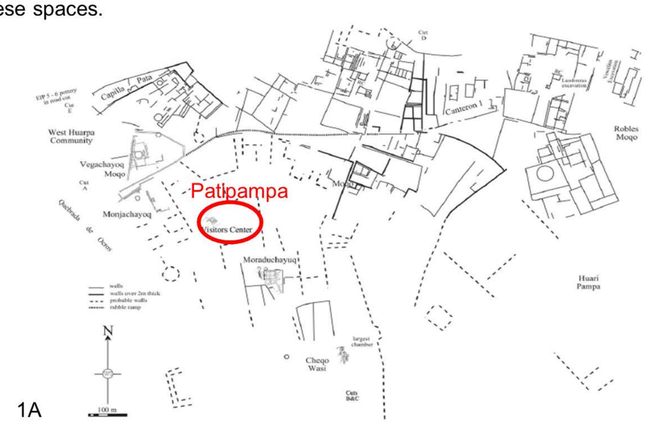

Fig. 1A: Map of Huari with 2017 Excavations Circled in red. Adapted from Isbell 2008.
Fig. 1B: Aerial Photo of 2017 Excavations with walls and Architectural spaces marked.

Methods

The data for this project was primarily recovered through analysis of the heavy fraction of soil flotation samples. The 2017 field season produced 368 flotation samples made up of on average 10 liters of soil which are point-provenienced using a total station. 200 of these were analyzed, generating weights and counts of the materials, in addition to more fine grained data such as number of types of lithic material, burned bone as a percentage, and more. Heavy Fraction data from soil samples can be useful, as all data can be standardized to volume measurements that are more precise than counted buckets for screened artifacts. Also, because our samples are tied to X,Y, and Z coordinates, all data can be easily spatially linked. The following analyses were carried out with qGIS, an open-source geographic information systems program that can run for free on much less powerful computers than more expensive GIS software bundles.

Fig. 2A: Huarpa style (common in our excavations ceramic spoon recovered in 2017 field season
Fig. 2B: Viñaque style pot from deposit in EA1

Results

While spondylus (*Spondylus sp.)* beads constituting finished products were present across Patipampa, spondylus fragments were found to be more isolated to EA 1 and various EAs in the Northeast corner of the patio group compound. This distribution of fragments, in opposition to the widely present finished products, may be interpreted as evidence of craft production in Patipampa. Those areas containing higher amounts of spondylus debris, such as EA1, may represent spaces where people manipulated the rare shell. It appears that finished spondylus products were distributed without much spatial discrimination, indicating that most living here had access to such items. This is not to say they were not special to the people of Huari - a collection of more than 2000 spondylus beads were found in an intentional depositional event in EA10, placed together with a fragmented copper tupu(shawl pin) (Fig. 3B). EA10 happens to be an area with no unfinished spondylus fragments. This reinforces the hypothesis that spondylus crafting, although it may have occurred at a household level, was isolated to only particular spaces within these patio group compounds.

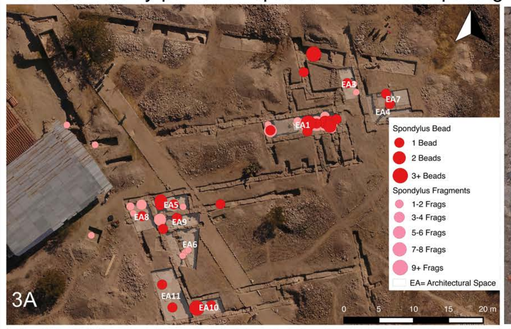

Fig. 3A: GIS map of sector-wide distributions of spondylus bead (Red) vs. spondylus fragment (Pink)
Fig. 3B: Photo of yellow and red spondylus shell beads in association with copper tupu (EA10)

Fig. 4A: GIS map of sector-wide distributions of copper products (light green) vs. copper fragments (dark green)
Fig. 4B: Copper tupu fragment with sculpted Wari person wearing four-cornered hat (EA11)

Overlap exists between spondylus and copper distribution, though copper is not a perfect match to the patterns identified above. A lack of clarity with regard to metal fragments versus "finished products" could be attributed to the incredible variation in the ways that archaeological metal material degrades and corrodes. Any number of factors--including source ore, soil composition, and taphonomic processes--may impact the integrity of a metal artifact. Given the similarities in overall distribution with the locations of excavated spondylus, however, the copper material excavated from Patipampa supports preliminary evidence of spatially discrete craft production of mixed materials. EA10 where the deposit of beads was located, and its neighboring room, EA 11, were home to a number of copper tupus including one with a Wari person (Fig. 4B) sculpted or molded on the pin. EA1 again shows a high density of fragmentary crafting materials.

Lithic materials are ubiquitous across the sector of Patipampa, but more densely situated in EA1 and the Northeast corner of the patio group compound (Fig. 5A). Of particular interest is the remarkably high diversity of material types including rare stone such as chrysacolla. The highest degree of lithic diversity is located in previously established potential craftworking activity areas.

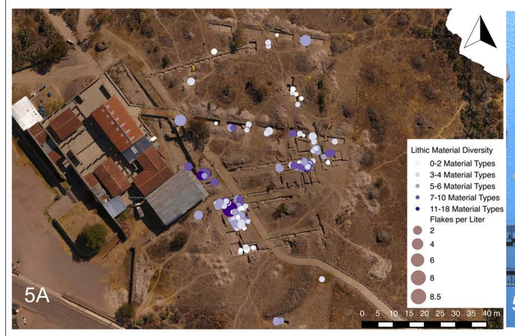

Fig. 5A: GIS Map of sector-wide distributions of lithic material. Size is determined by density. Color is determined by Diversity.

Fig. 5B: Example of diversity of lithic material from 2017 excavations

Fig. 6: GIS Heatmap of percentage and density of burned bone

Conclusion

Contrasting the previousartifact distributions with burned bone, a probable indicator of domestic activity or trash deposition, we see that the crafting of spondylus, copper, and lithic materials probably occurred in spaces that housed everyday domestic tasks such as cooking. Craft production operated at some scale within the well-constructed, planned cellular orthogonal compounds, and the people living here seemed to have relatively equal access to the finished products. This research is a preliminary examination of the use of space and urban living at Huari, guiding a second season of excavation and laboratory analysis in 2018.

Acknowledgments

This research is supported by the National Science Foundation (Award #1631412) and the Curtiss T. and Mary G. Brennan Foundation. The primary author was also supported by the UC Berkeley Stahl Grant and Lowie Olsen Fund. Thanks go to the three directors of the project, the hard working crew of Ayacucho workers and archaeologists that made this possible, and our field crew and flotation team during the 2017 field season at Huari, Ayacucho, Peru. Also, thanks to Steve Wernke, Justin Jennings and their crew for the excellent aerial imagery.