Using Digital Methods to Document Pre-Hispanic Funerary Contexts in Difficult-to-Access Cliff Tombs at Diablo Wasi, Peru

Anzellini, Armando : Lehigh University, Pennsylvania, USA

Toyne, J. Marla : University of Central Florida, Orlando, Florida, USA

Ribera Torró, Esteve : Departamento de Pintura, Universitat Politècnica de València. València, Spain

Pans, Miquel : Department of Physical and Sports Education. Universitat de València. València, Spain.

Ribera Torró, Josep : Panograma Labs., Amazonas, Peru

Introduction

The funerary sites of the Chachapoya, dating between the 8th and 15th centuries AD, are located in the *ceja de selva* of the northern Peruvian Andes, and are characterized by their difficulty of access. Most are found high on cliff faces and are either individual standing sarcophagi or mausolea, constructed on natural ledges or built by enclosing a natural opening in the cliff face. The latter are more complicated contexts in that they often include multiple individuals that have been commingled through various taphonomic processes. Logistics are well developed for more “easily accessed” archaeological excavations, but planning for the excavation of contexts that require vertical access techniques and consist of cavernous spaces (restricted, narrow, and dark) is more complicated and less developed. For the excavations at the cliff-side necropolis of Diablo Wasi, we, as a team of multidisciplinary researchers, developed a methodology of documentation that takes advantage of photogrammetric models to record the dimensions of the structure and funerary chamber as well as create a digital plan and inventory of the surface remains before excavation begins. Through this research we can better explore the nature and creation of these unique sacred funerary spaces.

Context

The Chachapoya region, in the northern Peruvian Andes, demonstrates at least five different funerary practices: 1) individual, unfired clay sarcophagi placed on elevated cliff faces, 2) collective mausolea constructed on cliff faces, 3) burials under house floors, 4) commingled depositions in natural caves, and 5) honeycomb structures erected around multiple individuals (Ruiz Estrada 2009; Toyne and Anzellini, 2017). The site of Diablo Wasi is a necropolis of constructed mausolea enclosing natural caves/grottos with a collection of over 50 structures on vertical cliff faces located on the southern portion of the Chachapoya region. Within each of these tomb chambers were interred approximately 40-50 individuals over a period of 500 years. Human and natural taphonomic processes resulted in highly commingled remains for a complex process for documenting and interpreting the distribution of disarticulated individuals. Excavations during the 2023 field season focused on two structures, number EF-01 and EF-17, which represent some of the more elaborate tomb constructions.

Methodology

Vertical access experts as well as a digital media specialist visited the site prior to archaeological intervention using established rope access (spelunking) methods for these contexts (Toyne et al., 2018). The process of site documentation begins with the creation of a gigaphoto, a collage of high-resolution photos taken with a telephoto lens. The resulting image allows for the identification and documentation of the complete site as well as individual structures and the planning of rope installations and access to minimize impact. Once the exterior of a structure is accessible by rope, a 360-camera on an extension pole and an omnidirectional light source are inserted into the funerary chamber to capture multiple photos. With the Agisoft Metashape software, a textured photogrammetric model of the room is created from which dimensions, volume, and details can be obtained, in addition to generating sections and plan views. Scaled plan views, created with QGis software, are then used to create the excavation grid and all surface finds are numbered and given a location using an alphanumeric code that translates to a location along the grid and a unique find (object) number. With the excavation program in place, the archaeologists can then enter the chamber and begin the recovery of the material with much easier and more efficient provenience documentation of the excavation than would have been possible without the prior models. The entire excavation process can be sequentially documented with the same precision until the conclusion of excavations by repeating this process at various intervals.

Discussion & Conclusions

The methods presented here provide a solution to the difficulty of planning excavation at sites that require complex methods to access and creates a more well-documented and more efficient excavation of these contexts. The use of photogrammetric modeling is not only a much faster method of documentation compared to traditional measurements and hand drawn plans, profiles, and sections, but also provides a more efficient, accurate, and detailed representation. This process also led to subsequent improvements in the inventory of recovered material and in the documentation available for lab analyses. The system allows for the creation of inventories that maintain the *in situ* relationships of individuals or skeletal elements that were articulated or in association in these commingled contexts. These contextual relationships aid in laboratory analyses and in the re-association of individuals and isolated skeletal elements. Documentation of the surface and subsequent documentations in layers can therefore occur before archaeologists arrive at the site and can begin their work with a more detailed and knowledgeable understanding of the context and have downstream positive effects for the rest of the archaeological project. This methodology can be applied to all difficult-to-access sites and investigators would benefit from the plethora of data provided by photogrammetric and digital models of archaeological sites.

References

Ruiz Estrada, A. (2009). Sobre las formas de sepultamiento prehispanicas en Kuelap, Amazonas. *Arqueología y Sociedad*, 20 pp. 1-16.

Toyne, J. M. and Anzellini, A. (2017) ‘Sociedad, identidad y variedad de los mausoleos de La Petaca, Chachapoyas.’ *Boletín de Arqueología PUCP*, (23) pp. 231–257.

Toyne, J. M., Anzellini, A., Epstein Mičulka, L., Mejías Pitti, I., Puig Castell, J. and Guinot Castelló, S. (2018) ‘Going Vertical: Using Vertical Progression Techniques to Explore a Cliff Necropolis in Late Precolumbian Chachapoyas, Peru.’ *Advances in Archaeological Practice*, 6(4) pp. 298–311.