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DATA PAPER

# Data from The Production and Exchange of Moulded-carved Ceramics and the 'Maya Collapse'

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This dataset comprises the bulk chemical composition and petrographic description of 62 samples of Ahk'utu' Moulded-carved vases selected from eight archaeological sites across Belize. The bulk chemical compositional data was produced by instrumental neutron activation analysis (INAA), whereas the mineralogical and textural features of the ceramics were highlighted by thin-section petrography. These two types of data are complementary to characterising the compositional variability within and between assemblages; and more importantly, contributing to a better understanding of the craft organisation of finewares in the Maya lowlands during the so-called 'Classic Maya Collapse' or the 'Terminal Classic' (ca. AD 800–950).

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**Keywords:** INAA, Thin-section petrography, ceramics, Maya Collapse, Belize

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## (1) Overview

### Context

The Ahk'utu' vases belong to the moulded-carved tradition that prevailed in the Maya lowlands dating to ca. AD 800–950 [1–3]. These vases are recognisable for the following features: (1) barrel-shaped vessel form; (2) hollow oven-shaped tripods, each containing a ceramic rattle and a circular perforation; (3) orange-red slip; and (4) gouge-incised decoration of iconographic scenes and glyphic texts [3]. The presence of Ahk'utu' vases was reported in 23 sites locating along the Belize River and its tributaries, forming a nucleated sphere of distribution in the eastern Maya lowlands [3].

The emergence of the Ahk'utu' vases and other moulded-carved types is often interpreted as the evidence indicating the changes that occurred to the socio-political order in the Maya lowlands from the 9<sup>th</sup> century onwards. Such changes are referred to by some scholars as the 'Classic Maya Collapse' [4], or more recently as the 'Terminal Classic' [5]; thus reflecting the highly debatable nature of these changes. With this in mind, the study of the ceramics of the moulded-carved tradition holds the key to unravel the process, event, and pace leading to these changes. Yet, in spite of their importance, only limited research has been done on the moulded-carved vases, with the majority of previous research focusing on their iconography. Hence, a technological investigation

of the moulded-carved tradition, as represented by the Ahk'utu' vases in this study, serves to provide an alternative approach to understanding the so-called 'Maya Collapse'. In particular, this study aimed at characterising the technology, production, and exchange of the Ahk'utu' vases, and ultimately, inferring to the socio-political contexts under which these vessels were produced and circulated.

Derived from the results of the doctorate research of Carmen Ting [6], the present dataset includes the bulk chemical compositional data and petrographic descriptions of 62 Ahk'utu' samples from eight sites across Belize (**Table 1**). These sites are Altun Ha (AH), Pook's Hill (PH), Baking Pot (BP), Marco Gonzalez (MG), Cahal Pech (CP), Mountain Cow (MT), Zayden Creek (ZC), Sapodillas Rockshelter (SDR) and Actun Lubul Ha (or Waterfall Cave 'WTC'). There were two major criteria guiding the selection of archaeological sites and their associated ceramic assemblages. The first criterion was the potentiality of reflecting a wide range of compositional variability, which was applied to Altun Ha and Pook's Hill, yielding two of the largest Ahk'utu' assemblages to date. The second criterion was by opportunity – which implied taking what was available – leading to the inclusion of smaller assemblages of the remaining sites as mentioned above in this study. In this way, the selected samples were capable of demonstrating both intra- and inter-site compositional

variability, even though the sample size and relative proportion might not necessarily be the same across assemblages.

### Spatial coverage

Eight sites across Belize, Central America. The coordinates of some of the sites included in this study are listed below:

Altun Ha: 17°45'50.22"N, 88°20'49.42"W  
 Baking Pot: 17°12'11"N, 89°01'10"W  
 Cahal Pech: 17°14'55"N, 89°07'31"W  
 Marco Gonzalez: 17°52'45"N, 88°0'54"W  
 Pook's Hill: 17°09'16"N, 88°51'08"W

Noteworthy is that the coordinates of the Actun Lubul Ha, Mountain Cow, Sapodillas Rockshelter, and Zayden Creek are not reported here because the coordinates of these sites are not reported in their respective excavation report.

### Temporal coverage

ca. AD 800–950

## (2) Methods

### Steps

The samples were first studied macroscopically, which involved the documentation of their stylistic and technological attributes. The samples were then submitted for further chemical and petrographic analyses. INAA was conducted by Bishop and Blackman at the NIST Centre for Neutron Research to measure the bulk chemical composition of the samples. The execution of INAA followed the analytical protocols of the Smithsonian's Archaeometry Programme [7]. Although 28 elements were detected, only 19 elements were reported and included for principal component analysis because they display the greatest total variance. These elements are Na, K, Ca, Sc, Cr, Fe, Rb, Zr, Sb, Cs, Ba, La, Ce, Sm, Eu, Tb, Yb, Lu, Hf, Th, and U. Thin-section petrography was employed to describe the mineralogical and textural characteristics of the samples. The thin sections were prepared by Ting by polishing the ceramic samples to 30 $\mu$ m, which were then analysed by

using the polarising microscope. The petrographic data was recorded using the Whitbread's ceramic thin-section descriptive system [8].

### Sampling strategy

Owing to the varying size of the Ahk'utu' assemblages, different sampling strategies were used. For such larger assemblages as Altun Ha and Pook's Hill, variation in the macroscopic characteristics (e.g. paste colour and composition, the presence of firing core, and the presence of slip and its colour etc.) served to divide the sherds into strata from which samples were randomly selected for further analyses. For the smaller assemblages, a total sample was submitted for analyses in order to ensure that all sites were represented.

### Quality Control

Two certified reference standards, NIST SRM 1663 and a check standard, were irradiated with the Ahk'utu' samples for each analysis to monitor the accuracy of the data produced.

### Constraints

The inherent difference in the size of assemblages, coupled with the fragmentary nature of the sherds, may result in the over-representation of some fabric groups. As for the INAA data, sample no. BPMC 4 is not reported in the dataset due to problems with measuring the elements.

## (3) Dataset description

### Object name

Ahk'utu' Vases INAA Data; Ahk'utu' Vases Petrographic Description

### Data type

Primary data, processed data

### Format names and versions

.csv and .pdf

Site	No. of sherds recovered	No. of sherds sampled	% data in the no. of sherds sampled	Remarks
Altun Ha	ca. 180	22	ca. 12%	One of the largest Ahk'utu' assemblages
Pook's Hill	>200	20	ca. 10%	One of the largest Ahk'utu' assemblages
Baking Pot	15	8	ca. 53%	
Marco Gonzalez	5	5	100%	
Cahal Pech	2	2	100%	
Mountain Cow	2	2	100%	
Zayden Creek	1	1	100%	
Actun Lubul Ha	ca. 3	1	33%	On-going research
Sapodilla Rockshelter	1	1	100%	On-going research

**Table 1:** The Ahk'utu' samples selected for chemical and petrographic analyses [6].

**Creation dates**

The dataset was created between May 2008 and September 2013.

**Dataset Creators**

Carmen Ting (UCL Qatar) was responsible for producing the petrographic data and processing the INAA data. Ron Bishop (Smithsonian) and James Blackman (Smithsonian) were responsible for producing the INAA data.

**Language**

English

**License**

CCO

**Repository location**

<http://discovery.ucl.ac.uk/1462143/>

**Publication date**

19-02-2015

**(4) Reuse potential**

The use of INAA in characterising the bulk chemical composition of the Ahk'utu' vases has made the resultant data comparable with that of other moulded-carved types, notably the Pabellon vases. In fact, the Pabellon vases and other fine paste counterparts were among the first ceramics that were investigated by INAA [9]. Since then, INAA has remained as the principal method in measuring the bulk chemical composition of Maya ceramics. In this way, the INAA data of the Ahk'utu' vases can also be compared with that other vessel types typical of different time periods and different regions in the Maya lowlands.

Although thin-section petrography has not been as readily used by Mayanists in their study of ceramics, there are increasing number of research employing this analytical method, especially in the last decades [10–11]. With this trend in mind, the systematic description of the mineralogical and textural features of thin sections produced by this study has the potentiality of constituting the basis of comparison with other petrographic description in the future.

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