



# Providing a Comparative Geo-referenced Database for Religious Artefacts in Ai Khanoum and Taxila's Sirkap Mound

DATA PAPER

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## ABSTRACT

The cities of Taxila in Pakistan, and Ai Khanoum in Afghanistan, are emblematic of the post-Alexandrian and post-Mauryan political landscapes of the broader South and Central Asian regions. While both have been thoroughly excavated, there has been little comparison of their material culture. Through the construction of repositories with artefacts of religious nature for both cities and through illustrating maps for the two cities with the distribution of variables such as material or item categorization can serve as a springboard for studies of hybridity in the ancient world. In addition, I hope to build on larger depositories of said resources for other scholars to use in the future and to have a common resource of artefact databases to build upon. The databases can provide research with templates for the two cities and a corpus of their artefacts for future research.

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## KEYWORDS:

Religion; Hybridity; Urbanism;  
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## (1) OVERVIEW

### SPATIAL COVERAGE

Description: Ai Khanoum, Afghanistan (collected from excavation reports; includes the entirety of the site's buildings and its outskirts) Taxila, Pakistan (collected from excavation reports; includes the Sirkap mound, its buildings and Dharmarajika Stupa)

Northern boundary: 37.164722/33.745833

Southern boundary: 37.164722/33.745833

Eastern boundary: 69.408611/72.7875

Western boundary: 69.408611/72.7875

### TEMPORAL COVERAGE

200 BCE–100 CE

### CONTEXT

In this data paper, I present a collection of artefacts of religious significance and iconography of the cities of Taxila and Ai Khanoum, as well as all major architectural features of both cities. These were previously dispersed in various excavation reports, and I have specifically selected artefacts which show religious function (such as votive offerings, or ritual vessels) or iconography. I have done this in conjunction with their collecting their coordinates from Google Maps based on findspots (based on last excavated deposition, if available) in buildings within both sites and providing coordinates of each artefact's location in both cities. The aim is to provide a framework for comparative spatial analysis of religious ecosystems between sites in the region. This framework will focus on the sites at large and enable scholars to compare various aspects of religious devotion such as investment based on material, temporal changes based on stratum, and the distribution of diverse types of imagery in either city. I also provide neutral descriptions of the items, to avoid Eurocentrism in future analyses. Given their importance in archaeological research of the Hellenistic period in the region, it is necessary to have a common database where all architectural features are recorded and all known artefacts with a religious function and iconography are provided for comparative study. The materials collected can then be compared in their distribution as well as imagery as well as how specific variables such as material of construction correlate to specific iconographic depictions, and the database is set up in a way that allows for people to use statistical analysis to measure correlations [1].

Scholarship for both cities is critical in understanding how the record has been biased and how this affects material culture accessible to us. Ai Khanoum's position in Bactria has given it a prominent place in scholarship. The main excavators of the site included Daniel Schlumberger and Paul Bernard, both of whom focused on the city itself. The excavations focused on the main

occupation period of the site. Excavations began at the upper part of the city [2]. The excavations slowly moved out of the citadel, excavating specific finds like the theatre [3]. Excavations of the palace drew attention for its mixture of Greek pilasters and Persian divan designs [4]. The large team of archaeologists focused on many specialized finds, like the Greek inscriptions [5] and solar clocks [6]. The specialist analysis of various parts of the site usually focused on the Hellenistic character of the city. More recently, this has been questioned in favour of more composite designs [7]. With the advent of the Soviet-Afghan war, excavations ceased, with most work being archival. Looting has taken place, which has been recorded via GIS [8]. The initial excavations focused on the Hellenism of the site [9], as well as establishing periods of habitation.

Taxila's position is similarly important due to its long-term habitation and presence in the historical record. Initially, survey visits by Sir Alexander Cunningham [10] showed the site's links to Greek and Indian sources. Later, Sir John Marshall [11] conducted excavations in all the mounds of the city and separated the mound of Sirkap into blocks and habitation spaces. Later excavations also occurred, but mostly for revision purposes. He also tried to build a chronology of the various polities which occupied the site [12]. Erdosy [13], later re-evaluated said chronology, with the 'Mauryan' stratum being Indo-Greek, and thus Sirkap being the likeliest mound for the majority of Indo-Greek habitation. In terms of the religious makeup of Sirkap, Rienjang [14] has provided re-evaluations of the exclusivity of Buddhist beliefs in Sirkap. Structures such as Jaulian are considered having been of a local cult linked to a version of Vasudeva, while for Colliva [15], a local city deity was worshipped in the Apsidal Temple. Dharmarajika Stupa's earliest layers also date from this period [16, 17]. These analyses reveal that Taxila has a long history of habitation, linked to its location [18, 19, 20, 21]. Both sites were excavated with Hellenocentric interpretations in mind, and this has biased the archaeological record. Scholarship has recently acknowledged this and provided springboards for more nuanced analyses of both cities.

## (2) METHODS

I provide a database with buildings and religious artefacts found in the cities of Ai Khanoum and Taxila, [22], with various recorded variables such as chronology based on deposition, material and provenance based on excavated deposition. The article also provides examples of maps and graphs to show how said database can be used for identifying how religious diversity manifests in Hellenistic urban landscapes. Both cities had diverse populations and continuities of settlement, and although Taxila was occupied for a longer period, the Sirkap mound provides

an adequate proxy to understand the Hellenistic period of the city. Forming this repository can provide space for comparison of iconographic depictions and religious objects between both cities.

## STEPS

The database was compiled by going over the various excavation reports of both sites to collect both architectural features and artefact entries [23, 24, 25, 26, 27, 28, 29]. These were cross-checked and updated with more recent re-appraisals [30, 31] as well as evaluations of chronology or topography. These entries were entered into a database with tables contains all the architecture in the city, as well as all artefacts with religious iconography (coins are excluded due to their mobile nature) or function (such as ritual vessels) separated by and with variables such as provenance based on last deposition, chronology, and material. In addition, through Google Maps, the coordinates of the excavated building findspots of both artefacts and architectural features were georeferenced and put next to each entry for use in GIS analysis. The entries include the buildings of each city (blocs in the case of Taxila) in separate tables, as well as tables with items with either religious iconography (such as reliefs, statues, terracotta, and even earrings) or may have had a religious function (such as votive bowls or altars). This was done to ensure a holistic view of the religious ecosystems, both in iconography and in item usage in relation to the urban landscapes of both sites. The two cities were chosen because of their prominent role in scholarship and the abundance of artefacts, as well as their multitude of structures which can be used for comparing artefact distribution within and between cities.

Sampling includes all the recorded buildings or blocks of the cities of Ai Khanoum and Taxila to allow for a comprehensive approach to the material culture of the site. Included are large public buildings, such as the Heron of Kineas in Ai Khanoum [32] or buildings assigned religious importance, such as the Sanctuary near the Palace of Ai Khanoum (See Figures 1 and 2). For chronological consistency, only the mound of Sirkap was used for this database, as it lies in a period close to Ai Khanoum's habitation and thus can be used in the future for comparative study. For Taxila, this is confined to Sirkap mound, with the Dharmarajika stupa also considered due to its diachronic occupation and religious importance. Artefacts sampled include statues, reliefs, iconographical artefacts, as well as terracotta. Votive items such as the ritual vessels in the Temple of Indented Niches are also included. I also have added material which appears in a religious setting in a ritual function, but also in non-religious spaces. For instance, since terracotta appears in Stupas in Taxila and the Temple of Niches in Ai Khanoum, I include similar figures from houses in both sites. To ensure they are from the two sites, I have only used data from articles and excavation reports. My sampling

also includes taking Google Earth imagery and data to produce accurate maps of the sites and then map both art and architecture on each site. This is done to have the most accurate and up-to-date layouts of the sites (See Figures 3 and 4).

## SAMPLING STRATEGY

The database was structured in a way as to allow for future statistical visualization of the distribution of items in terms of variables like material. All artefacts and buildings were collected from previously published academic work with the hope of compiling all currently available knowledge for religion in both sites into one accessible source [33, 34, 35, 36, 37, 38, 39, 40]. For architectural entries, the type of the building (I.e., if it is public access, a private building, or a religious shrine) is recorded, as well as the utility function were recorded. Ai Khanoum has another column for the post-145 BCE function by later inhabitants. This included the size of the buildings in a separate column. Two columns describing the buildings were constructed, one for more general categories of buildings (e.g., Temple or House) and one for the specific building in question. There was another column describing which section of a city a building was excavated in (such as the blocks of Sirkap). Separate columns were made for the material a building was made of and the period in which they were recorded. The periodization is either the one in excavation records or an updated chronology based on more recent scholarship, such as Petrie's updating of the chronology of Sirkap Mound. Columns also include an 'Other' column, which includes additional information was acquired that did not fit in the other categories. Columns of the general descriptions of the contents in each building also exist in the database. Lastly, columns with the coordinates of the buildings exist for mapping purposes.

For the Items database, a similar structure was adapted to enable statistical analysis and mapping in both sites. Emphasis was placed on items with either a religious function, such as votive stupas, or religious imagery, such as earrings or terracotta figures. Selection took place from excavation reports or other relevant literature. There is a column on the size of the item, but a column on the function of the item as recorded in excavation records (i.e., if it is Ritual or Administrative). In terms of location, columns were structured to show the provenance of the items in terms of the buildings they were in. Of note is that for Sirkap, blocs were used instead due to the difficulty of confirming Marshall's assumptions on where the houses began and ended. Description columns were added with neutral terms describing the items by the types of figures, environment, and action taking place, in order to allow for easy statistical analysis. In addition, columns were added describing their periodization; the mode is different in each urban site due to the different methods of chronologies that are prevalent for buildings the items are found in. In



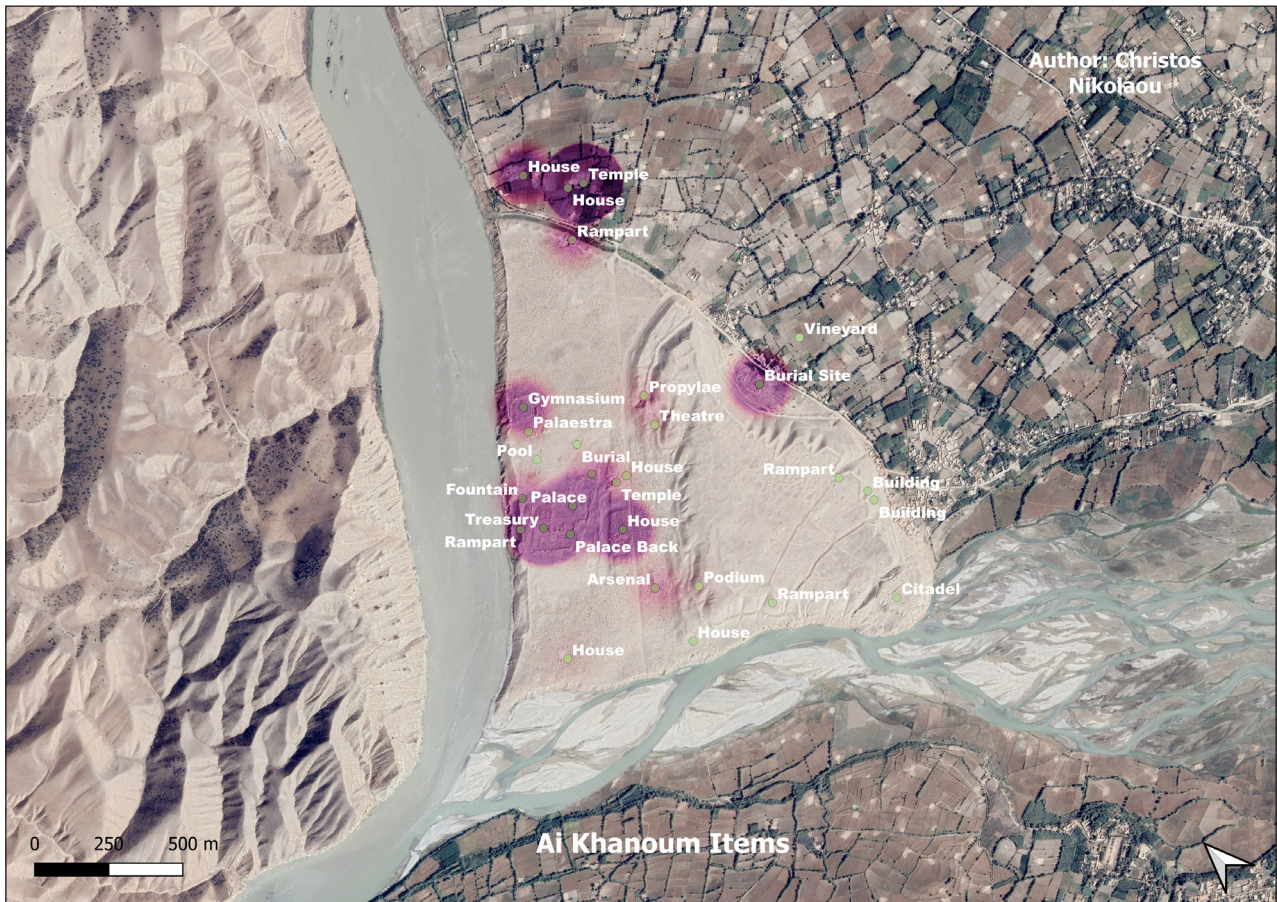


Figure 1 Ai Khanoum Heatmap of Distribution of Religious Artefacts.

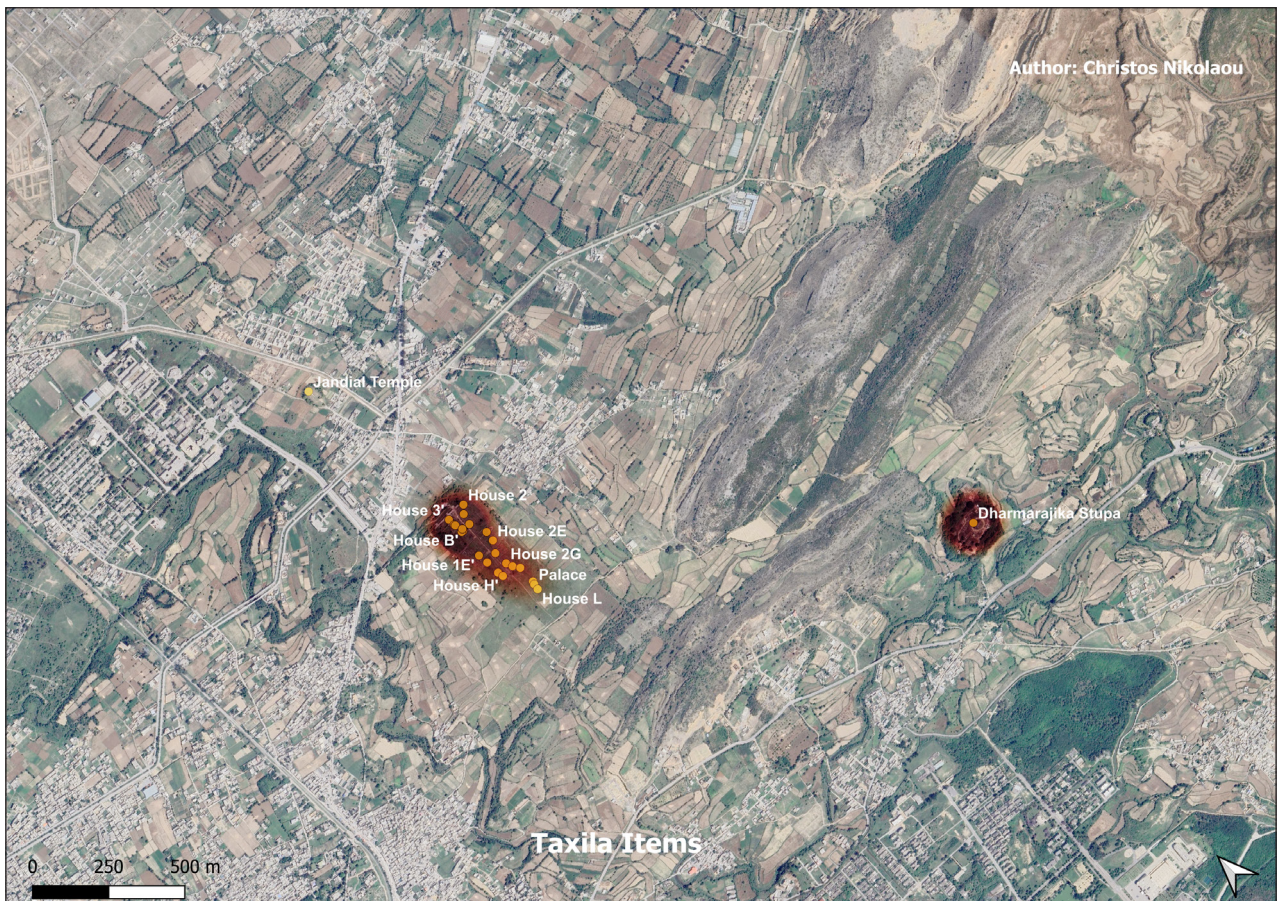


Figure 2 Taxila Heatmap of Distribution of Religious Artefacts.



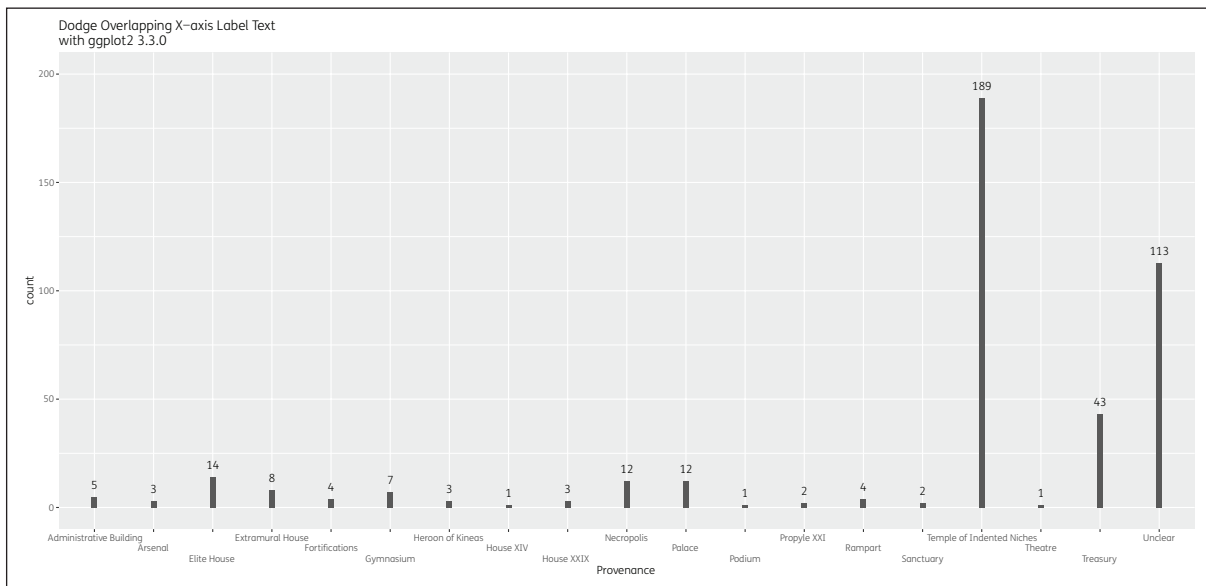


Figure 3 Ai Khanoum Religious Artefacts Distribution Graph.

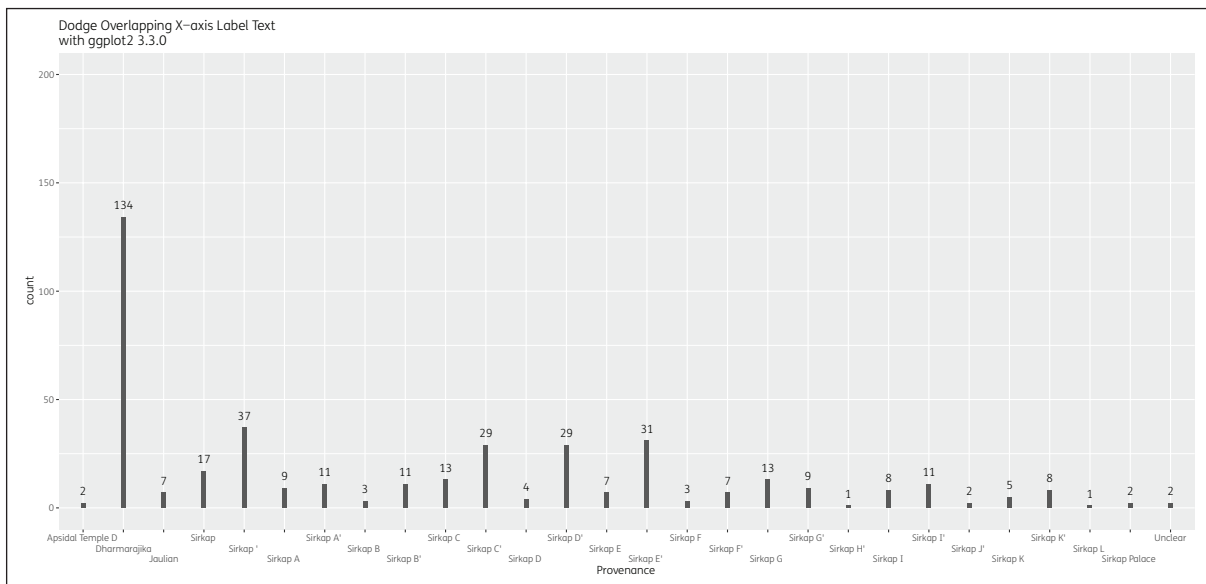


Figure 4 Taxila Religious Artefacts Distribution Graph.

addition, columns were added mentioning the citations, as well as other relevant miscellaneous information. The condition and materials of construction of the items involved were also recorded in two columns specifically for that purpose.

**QUALITY CONTROL**

The Access database is divided into architecture and item sections, divided by city (See [Tables 1](#) and [2](#)). It has multiple variables to capture a holistic view of the objects and interpretations. For the architecture database, there is one category describing the type of building in question, and what its function is assumed to have been. Here there must be some clarifications to the status of Taxila. As it is unclear whether the divisions into houses in initial excavations are accurate, the location of artefacts was instead produced by block as seen in Marshall's excavation

reports. In addition, Taxila's specific chronology is shown using both Marshall's initial strata, as well as the Phasing used by Behrendt (2004), for his images showing the development of Dharmarajika Stupa's art. These phases have been transplanted this to Sirkap mound by looking at the strata as well as the occupation description of various blocks. There is a column describing the size of the building, as well as a column with a general description of the building. Another column is about the condition of the building, and another is about the period of occupation. I also describe what materials were used in the construction of the building. For reference, there is also a column about what contents were found within each building. The Object database also takes these variables into account. An additional column exists describing the type of the object in question, such as terracotta or statue. Another column was added

DATAFIELD (ARTEFACTS)	DESCRIPTION
ID (numeric)	Unique number for each Artefact within the database
Object Size (character)	Size of the Artefact
Object Type (character)	Utility of the Artefact (e.g. Administrative, Ritual etc; this is done for iconography)
Provenance (character)	Building Provenance of the Artefact
Description (character)	General Description of the Artefact
General/Sub Description I (character)	Description of the Artefact by Figures in Iconography
General/Sub Description II	Description of the Artefact by Environment and Activity in Iconography
Material (character)	Material of the Artefact
Condition (character)	Condition of Preservation of the Artefact
Period (character)	Periodization of the Artefact based on site stratigraphy
Citation(s) (character)	Citation(s) where the Artefact is described
Longitude (numeric)	WGS84 eastings
Latitude (numeric)	WGS84 northings
Phasing (character, Taxila Only)	Chronological Phasing based on Behrendt (2009)
Other (character)	Other noteworthy information about the Artefact

**Table 1** Artefacts Tables Columns.

DATAFIELD (BUILDINGS)	DESCRIPTION
ID (numeric)	Unique number for each Building within the database
Building Size (character)	Size of the Building
Building Type (character)	Utility of the Building (e.g. Administrative, Ritual etc; this is done for iconography)
City District (character)	Provenance of the Building within each city
Description (character)	General Description of the Building
Contents (character)	Description of interior artefacts found in each Building
Material (character)	Material from which the Building is made of
Condition (character)	Condition of Preservation of the Building
Period (character)	Periodization of the Building based on site stratigraphy
Citation(s) (character)	Citation(s) where the Building is described
Longitude (numeric)	WGS84 eastings
Latitude (numeric)	WGS84 northings
Function post-145 (character, Ai Khanoum Only)	Whether said Building was used post-145 BCE and how it was used
Other (character)	Other noteworthy information about the Building

**Table 2** Building Tables Columns.

describing the size of the object, as well as three columns describing what iconography the object depicts, based on a general description, a description based on the figures used, and a description based on the context of the iconography. If the object has no iconography but has a possible religious function, this is recorded instead. Citations are recorded in separate column, as is the conservation condition of each object. Another column describes whether said artefact was purely ritual in nature or had another function such as administrative or clothing uses. The building provenance is also recorded in its own column, as well as one describing the museum location of each entry for reference.

An important aspect of quality control for both sites is demonstrating data in a manner which does not fall prey to Hellenocentric biases seen in previous excavation reports. As this database is hoped to provide scholars with descriptions of the artefacts for various uses, I have used neutral descriptions of buildings, as well as more common descriptions. I have also done this for artefacts, while also allowing more common descriptions in other columns. I have also added citations as to where these artefacts may be found, so scholars can be easily directed to their original descriptions and consult with said sources for more original descriptions. However, as this database is meant to be used for statistical analysis

as well as mapping, there have been standardized descriptions for the artefacts (such as ‘Animal Figure’) in order to allow scholars to make analyses in R and GIS using these standardized descriptions.

### CONSTRAINTS

In terms of constraints, both sites were excavated decades ago, with Ai Khanoum being particularly prone to damage and illicit excavations since the Soviet-Afghan War began in 1979. As such, the site has not been excavated since then, and has faced damages [33] making updating any such databases difficult. In addition, excavations in both cities have certain biases, such as Ai Khanoum’s emphasis on the elite buildings, obfuscating the private sphere. Taxila, for its part, is nucleated and as such it is difficult to pinpoint specific houses. Both sites were dug with Greek influence in mind; as such emphasis has been placed in sites such as the Amphitheatre in Ai Khanoum, but not less ‘Greek’ ones like the Podium. It is for this reason that the columns with more neutral descriptions exist, in order to allow scholars to use these descriptions instead of more Hellenocentric ones usually present in older excavation reports. The same can be said with surrounding temples. Kunala Stupa, for instance, is close to Sirkap, as is Jandial and Dharmarajika. However, given their longer occupation periods, chronology is difficult. As such, the only structures in the outskirts included in this database are Jandial and Dharmarajika’s early occupation as parts of an extended landscape for Sirkap.

Another difficulty lies in the chronology. While Ai Khanoum is easy to date to the Greco-Bactrian period, some pre-Greek settlement is visible, as is some post-palatial habitation. For Sirkap, it has been revised to the Indo-Greek period, but it does still have differential strata. As such, it is possible that there are post-palatial artefacts in situ, particularly for buildings with long habitation such as Sirkap. The site was, thus updated with a convenient phasing system from Behrendt to streamline the process of dating objects and it is hoped that the open access of the data will help with fine-tuning the chronological uncertainties as well as the religious ecologies of the sites. More recent excavation or conservation work including unpublished material was also used for a more extensive database [41, 42, 43, 44, 45].

### (3) DATASET DESCRIPTION

The dataset includes References from which the dataset was compiled, a README text with the relevant descriptions of the columns (See [Tables 1](#) and [2](#)), as well as files of the database in both non-proprietary (xlsx, accdb), and non-proprietary formats (.csv). UTF-8 format is provided. Users may download or modify, as well as reference the dataset by using the DOI provided by Apollo (see below).

### OBJECT NAME

Comparative Database.xlsx, Comparative Database.csv, Comparative Database.accdb, README.txt, References.txt

### FORMAT NAMES AND VERSIONS

.xlsx, .csv, accdb., .txt, Coordinates included in databases for both buildings and artefacts.

### CREATION DATES

05/01/2021–09/09/2022

### DATASET CREATORS

*Christos Nikolaou*

### DOI

<https://doi.org/10.17863/CAM.95163.2>

### LANGUAGE

*English*

### LICENSE

CC – BY 4.0

### REPOSITORY NAME

Apollo, University of Cambridge

### PUBLICATION DATE

20/03/2023

## (4) REUSE POTENTIAL

The database has proven an adequate method for the comparison of sites, as has the use of maps for the comparison of artefact distributions. These two sites are the most well-known in the Hellenistic East, and thus comparative analysis of their religious landscapes can provide fruitful regional analyses of religion in the region. Qualitative analyses and heat maps, as well as data analysis using R and GIS, can help provide a clearer picture of the religious landscapes of the two cities. For instance, it is possible to map out the distribution of various materials and types of depictions using heat maps (See [Figure 1](#)). As an example, one could see if Ai Khanoum has more equestrian imagery than Ai Khanoum, and where that is present within the city. Another possible utility would be to compare how a specific type of imagery or artefact, such as wine imagery or votive tanks respectively, were spatially and temporally distributed in either city via maps in GIS and graphs in R to consider the implications for religious patronage in both sites and how they developed over time in different trajectories. On the qualitative front, it is possible to select specific artefacts with similar iconography and compare differences in said imagery. Combining that with other information from the database, such as similarities or differences in material

or context, can enable richer and more streamlined comparative analysis of religious artefacts.

The use of variables allows for putting the art and architecture in their proper context. Material, for instance, can connect to status or scarcity, whereas chronology ensures that artefacts in the database are contemporaneous in the city itself [41]. The databases also account for the imagery that is depicted, with three columns describing the scene from different perspectives, such as background environment and types of figures present [42]. This is helpful in terms of providing the cultural background as well as the spatiotemporal one and assist in outlining hybridity. I also provide example maps and graphs created in GIS and R respectively, to show the applications for visualizing and analysing data in the two cities for comparative purposes. A database such as this can hopefully serve as a starting point for expansion of Open Access data for comparative purposes in the Hellenistic Far East and beyond. Given the fact that many other sites were excavated by multiple teams with different publications in different languages, that databases such as this can provide the means to bridge these gaps by compiling large databases which everyone can access and use. The archival use of this database is useful as data like original citations or important information such material, provenance and description, as well geographical coordinates can provide the basis for easy access of all this information in the future. It is possible to expand this with other scholars producing their own databases or expanding and adding on existing ones, both for other sites as well as other artefacts such as coins or pottery. This can enable open and easy research for many archaeologists who would otherwise lack access to said sources, or the sites themselves which may be inaccessible for current research. The possibilities of expanding this database to other sites in Bactria and Gandhara are also possible, in which case large analyses of the spatial distribution of, for instance, depictions of Dionysiac imagery across both regions. Comparisons of the distribution of images within and between urban sites is also important. For instance, one could compare the distribution of statues or ritual tanks in cities, or cross-reference whether one site's inhabitants preferred depiction of floral imagery in limestone or terracotta. As such, high-resolution comparison of the religious ecosystems in these cities, or even expanding this methodology to domestic or economic material, can help future scholars make comparisons between urban sites in the Hellenistic Far East, and see how their political, religious, and economic trajectories differed or complemented each other.

## DATA ACCESSIBILITY STATEMENT

Data supporting this study are openly available from Apollo, University of Cambridge at (DOI: <https://doi.org/10.17863/CAM.95163>).

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## COMPETING INTERESTS

The author has no competing interests to declare.

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