Journal of open archaeology data

Wadi Naqqat (Eastern Desert, Egypt): Anchor Dataset for FAIR Assessment of Coptic Monastic Heritage

DATA PAPER

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ABSTRACT

This dataset on the monastic settlement at Wadi Naqqat, located in Egypt's Eastern Desert and dating to the 4th–6th centuries AD, is an exported subset of the Endangered Archaeology in the Middle East and North Africa (EAMENA) database, developed in collaboration with the Coptic Monastic Heritage Archive (CMHA) at the University of Ljubljana. It is based on an analysis of open-access satellite imagery and a cultural heritage survey of 14 heritage places conducted in 2018–2019 as part of the project "Endangered Hermitages: Documenting Coptic Monastic Heritage in Middle Egypt and the Eastern Desert", funded by the American Research Center in Egypt (ARCE). The CMHA, in its cultural heritage data management component, functions as a third-party project of EAMENA that provides a framework and open access to endangered cultural heritage across the Middle East and North Africa (MENA) region. The publication of a portion of the CMHA's data, including ground truth assessments and high-definition photographic archives, demonstrates how an Arches-powered information platform like EAMENA can effectively manage diverse cultural heritage data. This ranges from remote sensing to on-the-field evaluations, thereby making this data interoperable despite its scale and method of assessment. The current dataset on the monastic settlement in Wadi Naqqat aims to provide a standardized FAIR (Findable, Accessible, Interoperable, Reusable) assessment method along with structured publication and support for the reusability of Coptic monastic heritage data. This dataset shows that the EAMENA methodology, often used for a systematic remote sensing survey, is also effective for medium- to small-scale projects involving ground-based assessments and photographic documentation.

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KEYWORDS:
Wadi Naqqat; Egypt; Archaeology; Monasticism; Christianity; Cultural heritage

TO CITE THIS ARTICLE:
Cigleneški J, Huet T 2025 Wadi Naqqat (Eastern Desert, Egypt): Anchor Dataset for FAIR Assessment of Coptic Monastic Heritage. *Journal of Open Archaeology Data,* 13: 15, pp. 1–8. DOI: https://doi.org/10.5334/joad.170

(1) OVERVIEW

CONTEXT

Situated in Egypt's Eastern Desert, approximately 55 km west of the Red Sea city of Hurghada, the early monastic settlement (*laura*) of Wadi Naqqat lies nestled among the red granite peaks and steep slopes of Gebel Qattar [1]. Access to the remote archaeological site is gained via a path that follows Wadi Qattar for approximately 7 km southeast from the ruins of the eponymous Roman fort (WQ01), located along the ancient quarry road that once linked Abu Sha'ar on the Red Sea coast to the emporium town of Qena (ancient Kainopolis) in the Nile Valley [2]. On both sides of Wadi Qattar, numerous petroglyphs and rock art (WQ02 and WQ03), spanning a wide chronological range from the pre-Dynastic period to modern times, mark the vicinity of the water source at Bir Naqqat.

Geographically, the arid riverbed of Wadi Naqqat is divided into lower and upper sections by a massive cataract, where the drinking water trickles down the rocks. On the naturally protected plateau, situated on a 40-meter-high rock directly above the water source, stands the central building of the *laura*: the church (WN01) (Figures 1 and 2). This structure, dating to the earliest historical periods of Egyptian monasticism, was first discovered in 1823 by Sir John Gardner Wilkinson (1797–1875) during his pioneering exploration of the Eastern Desert [3, 4].

The monastic settlement of Wadi Naqqat extends southeast for approximately one kilometer from the church, following the course of the wadi uphill, and consists of 13 built hermitages, rock shelters, and other minor structures (WN02–WN014) [1, 5]. The 14 heritage places, with elevations ranging from 764 m (WN01) to 862 m (WN09) above sea level, are scattered across the plateaus on both sides of the upper Wadi and along the vertical cliffs of the arid riverbed. The settlement ends where the wadi narrows into a gorge with steep sides. (Figure 2) Due to the hyper-arid conditions and their remote location, most of the hermitages in Wadi Naqqat today still stand in an excellent state of preservation.

SPATIAL COVERAGE

The Wadi Naqqat lies in the Red Sea governorate in Eastern Desert, Egypt.

Northern boundary: 33.29
Southern boundary: 33.28
Eastern boundary: 27.04
Western boundary: 27.05

TEMPORAL COVERAGE

The temporal coverage of the Wadi Naqqat site spans the Late Antique period.[1] The central building (WN01) was first discovered in 1823 by Sir John Gardner Wilkinson, who found a nearby Greek inscription that enabled its identification as a church and its dating to no later than 339 AD [6]. This timeframe is further supported by scattered literary records indicating that Christian hermits inhabited the broader Mons Porphyrites region between the 4th and 6th centuries AD [7]. Surface pottery discovered at the site provides material evidence that supports these historical sources, confirming the occupation and use of the settlement during this period.

(2) METHODS

STEPS

An initial site inspection of Wadi Naqqat was carried out during a short visit in spring 2014 by Jan Ciglenečki

Figure 1 Photo by Matjaž Kačičnik, 2018. © Coptic Monastic Heritage Archive. Southern view of Wadi Naqqat (Red Sea Governorate, Egypt), with the church (WN01) situated on the plateau above the cataract that divides the wadi into upper and lower sections. This photograph – along with 26 others, corresponding location data, and the results of the topographic and cultural heritage survey – is included in the presented dataset.

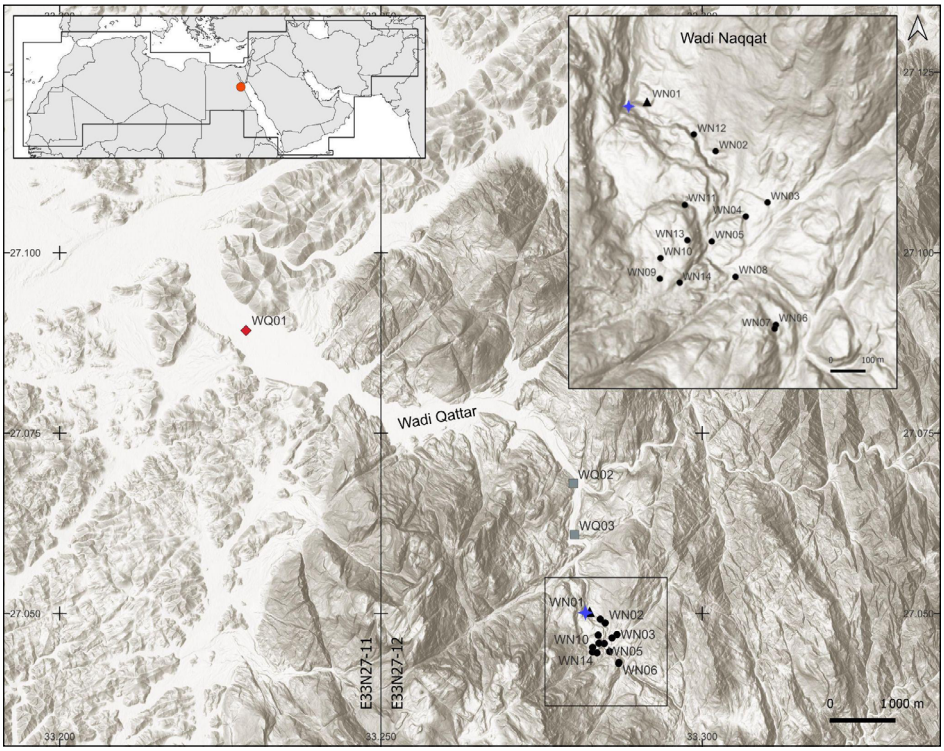

Figure 2 Location of the Wadi Naqqat dataset (map and right inset): black markers indicate the church (WN01) and other build structures (WN02 to WN14), with identifiers of EAMENA grid squares (E33N27-11 and E33N27-12). Not included in the current dataset, the area shows a Roman fort (red diamond: WQ01) and rock art (grey squares: WQ02 and WQ03) in Wadi Qattar, as well as the water source of Bir Naqqat (blue star). Left inset: the geographical scope of the EAMENA project (from Afghanistan to Mauritania) and the location of the Wadi Naqqat dataset area (red dot). Right inset (above): focus on the monastic settlement (*laura*) in Wadi Naqqat. Projection: WGS 84/Pseudo-Mercator. Basemap: http://services.arcgisonline.com.

(University of Ljubljana) and Guillaume Grac. A more detailed topographic survey, ground assessment, and photographic documentation were conducted during several visits between 2018 and 2019 as part of the project "Endangered Hermitages: Documenting Coptic Monastic Heritage in Middle Egypt and the Eastern Desert," led by Jan Ciglenečki and funded by the Antiquities Endowment Fund (AEF) of the American Research Center in Egypt (ARCE). During the project, GPS points of the newly discovered built structures were recorded. Photographic documentation of the site was carried out by photographer Matjaž Kačičnik, using a 36-megapixel Nikon D810 digital camera, and by Jan Ciglenečki, using a 21-megapixel Canon EOS 5D Mark II. In 2024, this documentation was integrated into the Coptic Monastic Heritage Archive (CMHA), housed at the Center for Middle Eastern Studies (Section for Egyptology and Coptology) at the Faculty of Arts, University of Ljubljana.

In collaboration with the EAMENA team, the GPS points of all heritage places in Wadi Naqqat were incorporated into the EAMENA database and Zenodo in 2024. The dataset follows the EAMENA project methodology for investigating and documenting endangered archaeological resources across the Middle East and North Africa region and complies with the Minimum Data Standards (MDS) (Figure 3) [9, 10].

The EAMENA database[2] is built on Arches software (version 7.3), developed by the Getty Conservation Institute. Arches[3] is a semantic, geospatial web-based platform specifically designed for cultural heritage management. This mature technology (e.g., PostgreSQL, JSON and derivatives, Python logic) is currently the most actively contributed open-source software in its category (cultural heritage and archaeology) [8]. Arches adopts numerous ISO standards and ontologies, ensuring compliance with Linked Open Data and FAIR principles. In the era of web accessibility, big data and open science, the FAIR principles have the ultimate goal of making research results reusable. It is based on CIDOC-CRM, the Conceptual Reference Model for cultural heritage information, incorporates controlled vocabularies, and provides a REST API delivering GeoJSON collections (as seen in the Heritage Place resource model). EAMENA thesauri draws on established resources such as FISH (Forum on Information Standards in Heritage) and the Getty AAT (Art and Architecture Thesaurus). Since version 7, Arches supports internationalization (i18n), and the EAMENA team has made significant contributions to its localization (l10n) in Arabic, French, and Central Kurdish (ar, fr,[4] and ckb,[5] respectively).

SAMPLING STRATEGY

The entire area of Upper Wadi Naqqat, stretching east and south from the cataract in the middle of the wadi, was systematically surveyed, and each heritage place was thoroughly documented through detailed high-definition

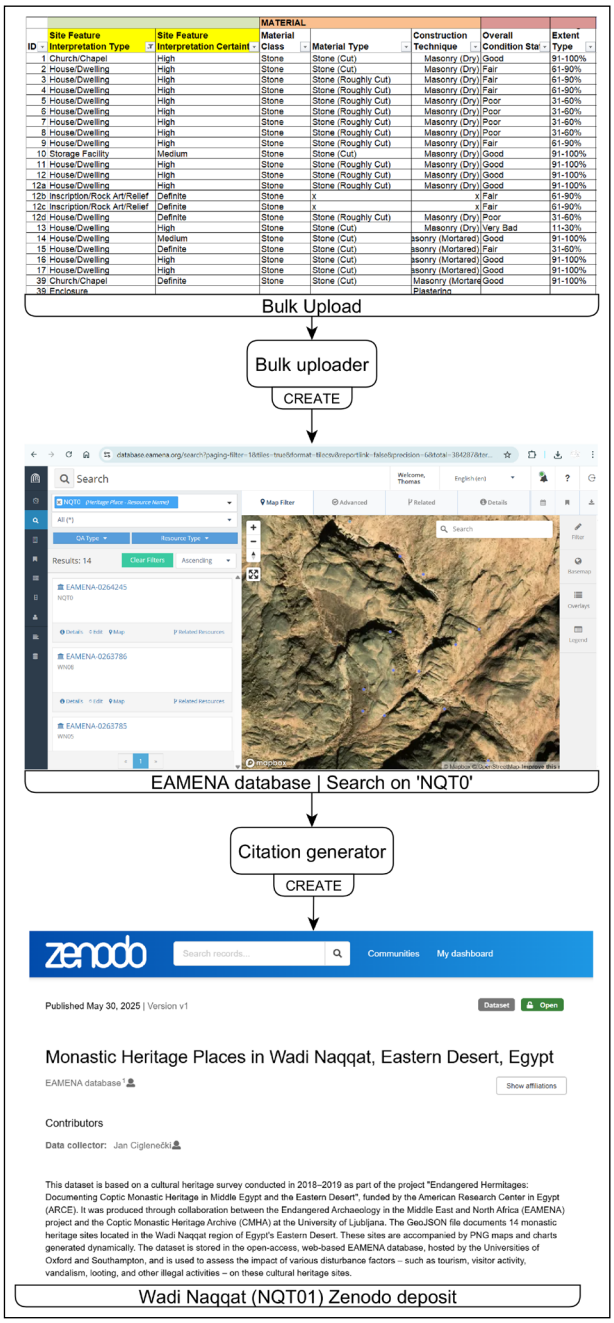

Figure 3 Database Data Entry and Zenodo Export Workflow. For the data entry process, heritage places information is typically recorded in an XLSX file (the Bulk Upload file), which includes dropdown menus and worksheets containing glossaries in both English and Arabic. Once validated through error control and uploaded using the Bulk uploader plugin, the data can be searched in the database (e.g., using the tag 'NQT0'), and the unique URL of the search results can be retrieved. This search URL can then be pasted into the Citation generator plugin, along with metadata (e.g., dataset title and description), and automatically pushed to the EAMENA Zenodo account as a GeoJSON file, along with automatically generated maps and diagrams (e.g. see Figure 4). Photographs, along with their metadata, are uploaded separately to Zenodo.

photographic recording. Particular emphasis was placed on capturing the broader desertscape context of the monastic settlement, as well as detailed documentation of architectural elements (both exterior and interior) and the associated surface pottery assemblages.

While the Wadi Naqqat database records offer a comprehensive assessment of the monastic heritage in the area, we have included a selection of 26 photographs to provide a clear and unambiguous means of identifying each heritage place from the ground.

During the topographic survey, GPS coordinates were recorded, sketches of ground plans of each heritage site drawn, general site features described (e.g., types of structures, architectural details, terrain characteristics, preservation state), materials used documented, and the potential endangerment of the archaeological remains assessed.

Following this ground assessment, the EAMENA heritage place forms were completed, including estimates of overall condition, types and causes of disturbances, and identified threats.

QUALITY CONTROL

Uncertainties during the overall assessment (e.g., Geographical Assessment, Archaeological Assessment, Condition Assessment) are handled by the EAMENA Heritage Place card,[6] which allows for multiple interpretations and the recording of different levels of certainty (from 'Definite' to 'Negligible,' passing by 'Not Applicable'). Data entry is constrained by controlled vocabularies and automatic checks for missing mandatory fields and error detection mechanisms. The EAMENA team has also developed an interactive online-hosted table providing field and value descriptions, with localization in English and Arabic for the latter.[7] Furthermore, HTML links within the table describing the fields allow for the discussion of possible values in a GitHub thread.[8]

CONSTRAINTS

The monastic settlement at Wadi Naqqat is one of the most remote monastic locations in Egypt. The primary challenges encountered during the topographic survey were its extreme isolation and the harsh wilderness environment. Due to limited time, the photographic documentation could not be conducted under consistent lighting conditions at all heritage places. Only non-intrusive techniques, such as digital photography, were used, and no archaeological excavation or artifact collection was conducted. The focus remained solely on documenting potentially endangered architectural surface features and visible surface materials, such as pottery, glass, and stone objects (e.g., grinding stones).

One constraint in completing the EAMENA Bulk Upload was the five-year gap since the last site visit, during which changes may have occurred. This delay potentially affects the accuracy of the information regarding the overall condition of the heritage places and their endangerment assessment.

(3) DATASET DESCRIPTION

The dataset comprises 14 heritage places located in the EAMENA grid square E33N27-12. Each of these has both a database record (exported from the database) and one or more ground-based photographs (n = 26). All heritage places are georeferenced with a central point as their primary geometry. As ground-truthed sites, they have undergone detailed assessment, with an average of 67 populated fields out of the 98 possible in the Heritage Place (HP) form – well above the average fill rate in EAMENA.[9] In addition to meeting the Minimum Data Standards (MDS, ibid.), ground verification enabled documentation of detailed attributes such as architecture (e.g., Construction Technique, Material Class), past damage, and potential future threats (e.g., Effect Type, Threat Probability), as well as informed preservation recommendations (e.g., Priority Type, Recommendation Type).[10]

The photographic dataset consists of 26 high-definition ground-based images, each containing embedded metadata, including EXIF (e.g., GPS location, technical specifications), IPTC-IIM (e.g., credits, caption), and XMP information.

OBJECT NAME

Heritage places database records are recorded under the "Heritage Places in Wadi Naqqat, Eastern Desert, Egypt"[11] Zenodo deposit, while heritage places photographs are under the "Coptic Monastic Heritage Archive (CMHA): Photographic Dataset of Monastic Settlement in Wadi Naqqat, Egypt"[12] Zenodo deposit. Both datasets are attached to the EAMENA Zenodo community.[13]

DATA TYPE

Primary data, secondary data, processed data, interpretation of data.

FORMAT NAMES AND VERSIONS

GeoJSON, PNG, JPG.

CREATION DATES

The dataset was compiled from data collected during the period 21/07/2018–12/04/2019.

DATASET CREATORS

Contributors to the database:

- **Jan Ciglenečki** (University of Ljubljana) – Author, surveyor, photographer
- **Thomas Huet** (University of Oxford) – Author, IT manager (database design and technical implementation)
- **Matjaž Kačičnik** – Photographer

LANGUAGE

English

LICENSE

As part of the database.eamena.org, the Wadi Naqqat dataset and the photographs are licensed under Creative Commons Attribution 4.0 International License (CC BY 4).

REPOSITORY LOCATION

The database records of the 14 heritage places are hosted on https://zenodo.org/records/15554618 while the 26 related photographs are hosted on https://zenodo.org/records/14246277.

PUBLICATION DATE

The photographs dataset (JPG) was published on November 29, 2024 and the database records (GeoJSON) on May 30, 2025.

(4) REUSE POTENTIAL

The case study of the monastic settlement in Wadi Naqqat demonstrates the application of a structured workflow for entering ground assessment data into the EAMENA database template. This process incorporates the recording of coordinates and detailed information on the current condition, endangerment, and threats to the monastic monuments, complemented by the upload of a representative selection of photographs for each site to the EAMENA Zenodo community. This work constitutes an initial step towards establishing a comprehensive resource for the systematic documentation and long-term preservation of Egypt's monastic heritage by integrating the extensive CMHA photo archive with the methodological framework of EAMENA. The CMHA encompasses numerous little-known and remote monastic sites across the country, many of which are endangered by various factors, damaged, or, in some cases, recently destroyed. Integrating this documentation into the EAMENA database is important not only from a heritage preservation perspective but also for its significant potential to advance scholarly understanding of the spatial and temporal patterns of Egyptian monasticism during Late Antiquity and the medieval period. As the photographs uploaded to the EAMENA Zenodo community represent only a carefully selected subset, researchers can consult the CMHA for more extensive photographic documentation on each specific site.

Building on this broader context, the present dataset focuses specifically on the monastic settlement in Wadi Naqqat. It can be retrieved in the EAMENA database through a simple search for the code "NQT0" (Naqqat, n-q-ṭ, ن-ق-ط).

EAMENA provides online documentation and tutorials at https://eamena.org/. Following the approach used in the publication of the Sistan dataset [9], this data paper aims to help establish a standardized framework

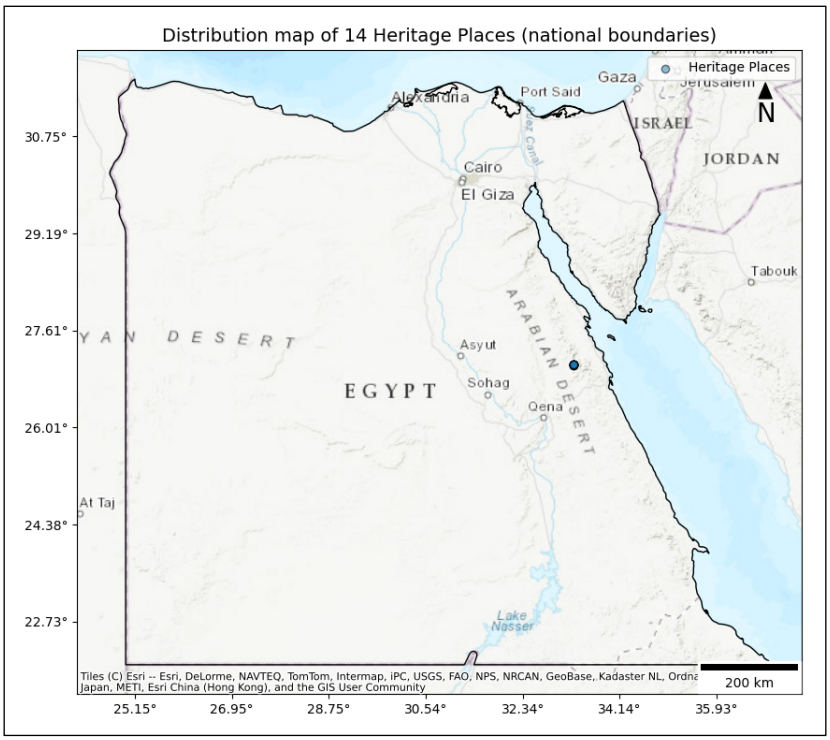

Figure 4 Location of the Wadi Naqqat dataset in Egypt. This map is one of several visualizations generated dynamically from the dataset (a selection of heritage places) using the EAMENA database's "citation" plugin for export to Zenodo. The resulting digital object on Zenodo is authored by EAMENA, with the University of Oxford and the University of Southampton credited as institutional authors. Individual dataset contributors are acknowledged and ranked by the number of contributions. For an example, see: [11].

for publishing cultural heritage data in accordance with the FAIR principles.[14] Based on the Arches open-software stack, the EAMENA database comes with analytic software (eamenaR) and a workflow promoting the documentation and the publication of data on endangered cultural heritage. The key element of this EAMENA workflow is the so-called "citation" plugin,[15] which enables users to export search results directly to the EAMENA Zenodo community[16] generating the dataset metadata and basic statistics on the fly (Figure 4).

Global South-based cultural heritage professionals, from surveyors to museum curators, frequently have better access to archaeological sites, heritage places, unpublished or not digitised reports, national protection schemes, etc., and possess deeper knowledge of their national heritage than the EAMENA and CMHA core team. However they often face limited opportunities to publish in peer-reviewed international journals (lack of time, research fundings, lack in English-language, etc.). The "Wadi Naqqat" dataset publication has been managed through an IT workflow that promotes the CARE principles (Collective Benefit, Authority to Control, Responsibility, and Ethics). Indeed, the EAMENA workflow we used and improved, aims to pave the way and support regional experts in aligning their knowledge with Global North academic standards for further data papers and research paper publications. In this way, using EAMENA to publish data on endangered cultural heritage in the MENA region contributes to sharing a common heritage and addressing inequalities in access to digital tools and academic visibility across regions.

NOTES

1 Heritage places (WN01–WN14) thus belong to the Classical/Protohistoric/Pre-Islamic period in North Africa, spanning from 500 BC to 640 AD. This timeframe corresponds to an entry in the space-time gazetteer PeriodO, created by the 'University of Oxford and University of Southampton. EAMENA Database. 2021' authority (http://n2t.net/ark:/99152/p0m64td). PeriodO (http://perio.do) provides standardized definitions for cultural-historical periods, enhancing the reusability and interoperability of linked open data (LOD).

2 https://database.eamena.org/.

3 https://github.com/archesproject/arches.

4 ISO 639-1:2002.

5 ISO 639-3:2007.

6 A pair of Django and Knockout files, customized according to the EAMENA heritage place reference model, serve as a user interface (UI) for data editing and visualization in Arches, see: https://github.com/eamena-project/eamena/tree/master/eamena/pkg/extensions/cards/eamena-default-card.

7 https://eamena.org/advanced-use#rm-hp-fields.

8 See, for example, the discussion on this issue: *EAMENA Project*, GitHub repository, Issue #91, available at: https://github.com/eamena-project/eamena-arches-dev/issues/91.

9 The MDS cover 32 mandatory fields. Because most heritage places recorded in EAMENA are assessed using satellite imagery, with only partial knowledge – such as chronological attribution and detailed construction techniques – fewer than half of the 98 available fields describing heritage places are actually recorded in the database.

10 For field descriptions, see: https://eamena.org/advanced-use#rm-hp-fields.

11 monastic_heritage_places_in_wadi_naqqat_eastern_desert_egypt.zip.

12 Wadi Naqqat_photographs.zip.

13 https://zenodo.org/communities/eamena.

14 https://github.com/eamena-project.

15 EAMENA Database Citations. *Endangered Archaeology in the Middle East and North Africa*. Available at: https://database.eamena.org/citations/ (accessed 30/05/2025).

16 https://zenodo.org/communities/eamena.
17 https://arcadiafund.org.uk/.

ACKNOWLEDGEMENTS

The topographic survey, ground assessment, and photographic documentation of the monastic settlement at Wadi Naqqat were made possible through the generous support of the Antiquities Endowment Fund of the American Research Center in Egypt (ARCE), which funded the project "Endangered Hermitages: Documenting Coptic Monastic Heritage in Middle Egypt and the Eastern Desert."

We also thank Julie Marchand for her assistance in verifying the surface pottery from Wadi Naqqat using the photographs provided.

The analysis of the collected data and the integration of the photographic documentation into the Coptic Monastic Heritage Archive (CMHA), housed at the University of Ljubljana, were enabled by the infrastructural support of SloveNile: Slovenian-Egyptian Heritage Science Platform.[17]

FUNDING INFORMATION

The contribution is a result of the research work conducted within the research program P6-0252, financed by ARIS, the Slovenian Research Agency. The EAMENA project is funded by Arcadia,which supports work to preserve endangered cultural heritage, protect endangered ecosystems, and promote access to knowledge.

COMPETING INTERESTS

The authors have no competing interests to declare.

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TO CITE THIS ARTICLE:
Ciglenečki J, Huet T 2025 Wadi Naqqat (Eastern Desert, Egypt): Anchor Dataset for FAIR Assessment of Coptic Monastic Heritage. *Journal of Open Archaeology Data,* 13: 15, pp. 1–8. DOI: https://doi.org/10.5334/joad.170

Submitted: 04 June 2025 **Accepted:** 10 September 2025 **Published:** 17 September 2025

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