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Archaeological Digital Archiving in Turkey

Nurdan Atalan Çayırezmez, Piraye Hacıgüzeller and Tuna Kalayci

Summary

This article provides a brief overview of archaeological digital archiving in Turkey. It introduces the legal framework and the stakeholders involved in conducting archaeological excavations and surveys. The current situation in archiving born-digital and digitised documentation produced during archaeological fieldwork is then introduced. Existing repositories serving as hubs for archaeological and heritage archiving are listed and briefly discussed. Analysis of online publishing practices for archaeological digital resources points to an eclectic landscape that only minimally complies with the FAIR (Findable, Accessible, Interoperable, Reusable) principles. We conclude that guidelines for best practice in metadata and semantic technologies, locally applicable standards (especially controlled vocabularies), technical know-how, and a larger acceptance of open data and scholarship remain much-needed assets for archaeological digital archiving in Turkey. We also conclude that the future promises progress towards more interoperable archaeological digital archives thanks to international training, network and knowledge transfer opportunities (e.g. [SEADDA Project](#)).

1. Archaeology in Turkey

All immovable and movable cultural assets in the Republic of Turkey are state property whose protection is ensured by the Turkish State under the Constitution (*Constitution of the Republic of Turkey*, [1982](#), Article 63). Definitions of immovable and movable cultural assets are stipulated in the Law on the Conservation of Cultural and Natural Property (No. 2863) (henceforth the Law; *Law on the Conservation of Cultural and Natural Property*, [1983](#)). Responsibility for coordinating identification, registration, protection, conservation, restoration and maintenance of these assets is given to the [Ministry of Culture and Tourism](#) (henceforth the Ministry) under the same Law. The Ministry's responsibilities mainly concern the activities and duties of museums, superior and regional councils for the conservation of the cultural property (i.e. Conservation Councils), local governorships, municipalities, provincial administrations, and unions of local administrations. The Ministry and Conservation Councils may obtain feedback and viewpoints of any other institution and organisation as well as legal stakeholders (e.g.



university-led archaeological projects) relevant to the proceedings regarding the management of cultural assets.

Surveys, soundings (the preliminary assessments of the area of archaeological interest with small-size excavations) and excavations are regulated by Chapter 4 of the Law. The Ministry has the exclusive right to survey, sound and excavate with the prospect of recovering movable and immovable cultural and natural property. The Ministry issues scientific work-permits to Turkish and foreign scientific institutions (e.g. archaeological museums, Turkish and foreign universities) and individuals. All excavation and survey permits are approved by the Presidency (up until 2020 the Council of Ministers issued these permits). An authorised expert must participate in every project carried out by Turkish scientific institutions and teams on behalf of the Ministry. If the project is to be carried out by a foreign institution, one or more 'expert representative(s)' from the [General Directorate for Cultural Assets and Museums](#) (henceforth General Directorate or GD), affiliated to the Ministry, are required to be present. The permits cannot be transferred without the Ministry's consent. The Ministry holds the right to temporarily or permanently suspend the permits. The Department of Excavations of the GD publishes [an annual official list](#) of all archaeological excavation and survey activities carried out with the Ministry's permission. The Ministry does not issue permits directly to private archaeological contractors. Private archaeological consultancy companies may work with museums and relevant stakeholders within the context of rescue excavations that are often planned as part of large infrastructure projects (e.g. highways, pipelines). These companies then hire professional archaeologists to carry out the archaeological excavations and report the results.

The excavation and survey permits are valid for a year and are renewed through an annual application submitted to the Ministry by the excavation director. At the end of each excavation and survey year, the movable cultural property is classified as either 'to be inventoried' (Tr. *envanterlik*) or 'to be studied' (Tr. *etütlük*) by the experts in the excavation team and state museum affiliated with the excavation. This classification is subject to the Ministry's approval. Objects of the first type are transported to the affiliated state museum. Cultural property 'to be studied' may be stored in the excavation project depots (if available) with the permission of the museum. In the case of any project lacking secure storage facilities, these materials are also transported to the affiliated museum. There are specific regulations for the transportation and analysis of human and animal skeletons, fossils, and other specimens found during excavation and survey.

2. Documentation, Reporting and Archiving of Archaeological Fieldwork

The requirements regarding the content of the annual permit application reports and final annual reports that need to be submitted to the GD, and the procedure for submitting these reports are detailed in the Directive for Conducting Survey, Soundings and Excavations on Cultural and Natural Heritage (henceforth the Directive; see [Rules & Principles Conducting Survey, Sondage and Excavations on Cultural and Natural Heritage](#), 2020 Turkish official version). Guidelines of the GD for the preparation of these reports consist of templates providing only the main section titles. Although there are no clear guidelines that prohibit the submission of other information media (e.g. videos, CAD, GIS files, etc.), it is customary that both the permit application report and the final



report comprise files in well-known text and image formats (e.g. jpeg, pdf). The reports are submitted to the GD by post on DVDs or portable hard drives.

The Directive stipulates that all information (i.e. all documents, photographs, drawings, daily reports as well as scientific publications relating to the archaeological permit year) concerning excavation, sounding, survey, restoration, conservation, publication, depot and office work needs to be submitted to the GD as part of the final annual reports. The GD aims to collect this information in a central database, an ongoing initiative. The Directive also stipulates that failure to submit the final report together with the required information will end in rejection of the excavation/survey permit application renewal requests made by the project director in following years. Notwithstanding the GD's demands for 'all information', there is no practice of submitting entire archives of fieldwork documentation to the GD at the final reporting stage. Instead, information submitted with the final reports contains a selected digital copy of the resources from the entire excavation/survey archive (see below). The selected corpus of information to be submitted together with the final report, however, should be fully representative of the archaeological work carried out under the permit. Regarding the annual permit application reports, besides administrative and financial information, these reports include a summary of the excavation/survey, restoration, conservation, publication, depot and office work of the previous permit year, and a detailed work programme on what is planned to be achieved in the following year. The Ministry holds the right to publish the final reports if/when deemed necessary. The Law also gives the right to publish the material recovered during excavation, sounding and survey works to those actually managing and carrying out the excavation, sounding and survey on behalf of the team and institution that received the permit from the Ministry. As such, the Ministry encourages scientific publication of the excavation and survey results by those who are actively involved in archaeological fieldwork activities.

The Directive also refers to 'excavation archives' and 'survey archives' on several occasions without providing clear guidelines about how these must be curated, documented and cared for by the excavation or survey director who is responsible for them. Neither are there guidelines on how the findability, accessibility, interoperability and reusability (the FAIR Principles) of the resources in these archives can be enabled for specialists outside of the project team as well as the public. In terms of content, the archives should comprise a complete set of original analogue, and born-digital and digitised resources covering all research-related aspects of the archaeological project documentation, as well as some administrative and financial documents regarding each fieldwork season (e.g. team composition, budget). The GD can request information held in these archives through official letters written to excavation and survey directors. It is also worth noting in this context that, since 2020, building a website containing information about the artefacts and scientific data obtained during the archaeological surveys and excavations is also subject to the permission of the GD.

3. Analogue and Digital Repositories for Archaeological Resources

The General Directorate (GD) collects both analogue and digital information from the scientific excavations. The GD's physical archive comprises documents, drawings, slides, photographs and diskettes, compact discs, digital versatile discs and portable



hard discs. The GD sends directives and letters to the excavation directors in order to define the analogue and digital information format to be used for recording excavation and survey information (for more information see Directive 2020).

The transformation and adoption of digitisation in the public sector, including archaeology, is part of the state Development Plans (DPs) in Turkey. The 2007-13 ([9th](#)), 2014-18 ([10th](#)), and 2019-23 ([11th](#)) DPs explicitly refer to the subjects of protecting and documenting cultural heritage as well as inventory building. Interestingly, the 10th and 11th DPs also include a clause covering the protection of heritage not only within, but also outside of the national borders of Turkey. The same DPs assert that all state inventories and any type of documentation should be transformed into digital format (State Planning Organisation [2006](#); [2014](#); [2019](#)). Running in parallel with these developments, the Department of Information Society was founded to coordinate the e-transformation Turkey Project in 2003 (State Planning Organisation, Department of Information [2003](#)). In 2005, 2006-10 and 2015-18, Information Society Strategy and Action Plans were published. Nevertheless, all ministries continue to have some form of independence to build their strategic plans as long as these plans are in accordance with the government's DPs and Information Society Plans. Of particular relevance, the Ministry of Culture and Tourism issued two strategic plans (*T.C. Kültür ve Turizm Bakanlığı 2015-2019 Dönemi Stratejik Planı*, [n.d.](#); *T.C. Kültür ve Turizm Bakanlığı 2020-2023 Dönemi Stratejik Planı*, [n.d.](#)) and made reference to two critical digital projects for inventorying cultural heritage data: the Turkish National Immovable Cultural Heritage Inventory System (Tr. Tescilli Kültür Varlıkları Taşınmaz Ulusal Envanter Sistemi/TUES) and the Museum National Inventory System (MNIS) (Tr. Müze Ulusal Envanter Sistemi/MUES). TUES is a centralised web-based geospatial information platform. Using this web-GIS, it is possible to cross-query around 10,000 protected areas and 100,000 monuments and registered historic buildings. TUES also includes information concerning more than 500,000 decisions made by various Conservation Councils, comprising nearly 20 million pages of documents (Boz *et al.* [2014](#)). MUES is the centralised database for movable objects in archaeological and ethnographic museums. The database has specific modules to store and manage information related to excavations, exhibitions, restoration and conservation processes that concern the lifecycle of objects in question. The initial phases of the project have been finalised. Currently, museum personnel are entering inventory records on objects into the database, while restoration laboratory staff are entering information about related projects. MUES modules on object excavation and exhibition processes are in progress (Atalan Çayırmez *et al.* [2017](#); Aygün, [2018](#)). Other than these two colossal infrastructure efforts, archaeology in Turkey has been benefiting from other digitisation initiatives, some pre-dating governmental DPs. We provide a descriptive list of some of these efforts below, grouped according to their main affiliations.

3.1 State initiatives

While governmental bodies have undertaken major digitisation efforts in the context of DPs, there have already been noteworthy digital initiatives from various governmental agencies running in parallel.

- Each year, archaeologists working in Turkey gather in a symposium. They present excavation, survey, and other scientific results to the public and other colleagues. The Ministry of Culture and Tourism [publishes the proceedings](#) of these symposia open-access, available in pdf format, starting in 1979.



- The Ministry of Culture and Tourism has been building a digital portal for culture, history, art and tourism following the directives of the Information Society Strategy Plan (2006-2010), namely the [Culture Portal](#) (Tr. Türkiye Kültür Portalı). The portal contains audio-visuals obtained from other public web pages as well as state-run Turkish Radio Television (TRT which has an Audio Visual Archive).
- A Ministry of Culture and Tourism project has been creating an inventory for cultural heritage resources, namely the [Inventory Archive Project](#) (Tr. envanter.gov.tr), located in the two major cities, Ankara and Istanbul. The focus of this inventory is the heritage resources exhibited or stored in the İstanbul Archaeological Museums and the Museum of Anatolian Civilizations in Ankara. The inventory includes records concerning heritage sites and monuments as well as related bibliographical and excavation project documentation information.
- Another exemplary public project, the [Kırklareli Cultural Assets Inventory](#) (Tr. Kırklareli Kültür Varlıkları Envanteri), was made available by a local state agency. It includes information about sites, monuments and intangible heritage information procured from the region of Kırklareli.
- The Scientific and Technological Research Council of Turkey ([TUBITAK](#)) published an open-science policy in March 2019. The policy dictates that TUBITAK grant holders publish their research in the state-managed open-access platform [Aperta](#). In a nutshell, Aperta collects, stores, archives, and safeguards data acquired by public funds.

3.2 Initiatives of universities and other research institutes

Other than state-led initiatives, foreign archaeological missions in Turkey and other initiatives have been influential in digitisation efforts.

- The [Archaeological Settlements of Turkey](#) (TAY) project was initiated in 1993. The aim of the project is to build an inventory of archaeological settlements in Turkey and share location and bibliographic information. The TAY Project is probably the earliest example of an online GIS in Turkey.
- The [German Archaeological Institute](#) (DAI) provides a digital research infrastructure for scholars. The institute created a central object database and internet research tool for archaeology, [ARACHNE](#). Another project, [IANUS](#), funded between 2011-2017 by DAI, offers a complete technical infrastructure for digital long-term archiving.
- The [British Institute at Ankara](#) (BIAA) is setting up a digital repository for Turkey and the Black Sea region. The repository will serve as a digital hub for the research community to organise, manage and preserve digital data, especially in archaeology (Vandeput and Atalan Çayirezmez [2019](#); Atalan Çayirezmez [2020](#)).

3.3 Individual efforts and commercial activities

The concern and need for heritage documentation as well as increasing know-how in digital safeguarding are setting the stage for individual projects and commercial activities in Turkey, albeit at a slow pace.



- The [Culture Inventory Atlas](#) (Tr. Kültür Envanteri) aims to compile an inventory of historical monuments for Anatolia and the Balkans. The project follows a citizen science approach and crowd-sources data based on individual contributions.
- Private companies specialising in archaeological information systems provide services for building customised project databases (e.g. [Arkeolab](#)).

3.4 External infrastructures

Some archaeological projects in Turkey publish data using overseas open-access digital repositories, such as the Digital Archaeological Record ([tDAR](#)), the Archaeobotanical database of the Eastern Mediterranean and Near East ([Ademnes](#)), the Archaeology Data Service ([ADS](#)) or [Open Context](#). [ARIADNE Portal](#) brings together existing datasets for archaeology from ARIADNE partners and includes archaeological datasets from Turkey. These repositories are important resources as they allow us to understand the online publication practices of archaeological projects. In the next section, the results of a search of archaeological projects in Turkey will be shown.

4. Online Publication Practices of Archaeological Datasets

In order to investigate the status of online information publication in archaeology in Turkey, we compiled a list of archaeological projects that were conducted from 2017-19. The inventory contains a list of foreign and Turkish excavation and survey projects approved by Ministers of Council (*Excavation and Survey Research Activities 2020*). In the list, we only included projects with 'generic' permits given to projects led by Turkish and foreign universities and excluded those that were conducted by museums or fell into the category of 'rescue excavations'. In these three years, researchers conducted 167 excavations (134 Turkish and 33 foreign) (see Table 1).

Table 1: List of archaeological excavations in Turkey carried out by Turkish and foreign teams with corresponding website information

City	Site	Permit Holding Country	URL
Hatay	Aççana Höyük	Turkey	NA
Aksaray	Acemhöyük	Turkey	NA
Bitlis	Ahlat Selçuklu Meydan Mezarlığı	Turkey	NA
Manisa	Aigai	Turkey	http://www.aigai.info/



Edirne	Ainos	Turkey	NA
Kütahya	Aizanoi - Çavdarhisar	Turkey	http://www.aizanoi.com
Bursa	Aktopraklık Höyük	Turkey	NA
Aydın	Alabanda	Turkey	NA
Çorum	Alacahöyük	Turkey	https://arkeoloji.beun.edu.tr/alaca-hoyuk-kazisi.html
Antalya	Alanya Kalesi	Turkey	NA
Çanakkale	Alexandria Troas	Turkey	NA
Erzincan	Altıntepe	Turkey	NA
Afyon	Amorium	Turkey	https://www.amoriumkazisi.com/
İstanbul	Anadolu Kavağı- Beykoz	Turkey	NA
Mersin	Anemurium	Turkey	NA
Kars	Ani	Turkey	NA
Hatay	Antakya Hipodromu ve Çevresi	Turkey	NA
Balıkesir	Antandros	Turkey	https://antandros.org/
Antalya	Antiocheia ad Cragum	USA	https://antiochia.unl.edu/
Aydın	Aphrodisias	USA	http://aphrodisias.classics.ox.ac.uk/
Antalya	Arykanda	Turkey	NA
Aksaray	Aşıklıhöyük	Turkey	http://www.asiklihoeyuk.org/
Malatya	Aslantepe	Italy	http://www.arslantepe.com/tr/
Antalya	Aspendos	Turkey	http://aspendosexcavation.ankara.edu.tr/
Çanakkale	Assos	Turkey	NA
Van	Ayanis Kalesi	Turkey	NA



İzmir	Ayasuluk-St. Jean Kilisesi	Turkey	https://www.pau.edu.tr/ayasuluk/tr/sayfa/st-jean-kilisesi-2
Antalya	Aziz Nikolaos	Turkey	NA
İzmir	Bağlararası Yerleşimi	Turkey	http://ankusam.ankara.edu.tr/cesme/
Sinop	Balatlar Kilisesi	Turkey	NA
İstanbul	Bathonea	Turkey	http://bathonea.org/
İzmir	Bayraklı	Turkey	NA
Muğla	Beçin Kalesi	Turkey	https://www.pau.edu.tr/becinkalesi/tr/sayfa/becin-kalesi
Denizli	Beycesultan Höyüğü	Turkey	http://www.beycesultan.org
Konya	Boncuklu Hoyuk	UK	http://boncuklu.org/
Kırıkkale	Büklükale	Japan	http://www.jiaa-kaman.org/en/excavation_buklukale.html
Muğla	Burgaz	Turkey	http://burgaz.metu.edu.tr/
Yozgat	Çadır Höyük	USA	http://cadirhoyuk.org
Konya	Catalhoyuk	USA	http://www.catalhoyuk.com/
Van	Çavuştepe Kalesi	Turkey	NA
Diyarbakır	Çayönü Tepesi	Turkey	NA
Çankırı	Çorakyerler Fosil Lokalitesi	Turkey	NA
Balıkesir	Daskyleion	Turkey	https://arkeoloji.nevsehir.edu.tr/tr/daskyleion
Aydın	Didyma	Germany	https://archaeology.altertum.uni-halle.de/3436_1059273/grabungen_didyma/
Kahramanmaraş	Direkli Mağarası	Turkey	NA
Sivas	Divrigi Kalesi	Turkey	http://www.divrigikalesi.com/
Gaziantep	Doliche/Duluk	Germany	https://www.doliche.de/



Kahramanmaraş	Domuztepe	Turkey	http://www.arkeo.hacettepe.edu.tr/domuztepe.html
İzmir	Efes	Austria	https://www.oeaw.ac.at/en/oeai/institute/units/ephesos
Mersin	Elaiussa Sebaste	Italy	http://elaiussa.uniroma1.it/en
İzmir	Erythrai	Turkey	http://ankusam.ankara.edu.tr/erythrai/
Bitlis	Eski Ahlat Şehri	Turkey	NA
Van	Eski Van Şehri, Kalesi ve Höyüğü	Turkey	NA
Çorum	Eskiyapar Höyük	Turkey	http://www.eskiyapar.org/
Muğla	Euromos	Turkey	NA
Ankara	Gordion	USA	https://www.penn.museum/sites/gordion/tum-makaleler/
Mersin	Gözlükule Höyüğü	Turkey	http://www.tarsus.boun.edu.tr/
Çanakkale	Gülpınar	Turkey	NA
Aksaray	Güvercinkaya sı	Turkey	NA
Burdur	Hacılar Höyük	Turkey	NA
Antalya	Hacımusalar	Turkey	NA
Elazığ	Harput İç Kalesi	Turkey	NA
Şanlıurfa	Harran	Turkey	http://web.harran.edu.tr/arkeoloji/tr/harran-kazilari/
Amasya	Harşena Kalesi- Kızlar Sarayı	Turkey	NA
Batman	Hasankeyf	Turkey	https://hasankeyf.batman.edu.tr/
Çorum	Hattuşa	Germany	NA
Tekirdağ	Heraion Teikhos	Turkey	NA



Denizli	Hierapolis	Italy	https://www.hierapolis.unisalento.it
Van	Hoşap Kalesi	Turkey	NA
Muğla	Iasos	Turkey	http://iasoskazisi.selcuk.edu.tr/
Diyarbakır	İç Kale Artuklu Sarayı	Turkey	NA
Bursa	İzmit Çini Fırınları	Turkey	NA
Bursa	İzmit Roma Tiyatrosu	Turkey	NA
Aydın	Kadikalesi	Turkey	http://www.kadikalesianaia.com/
Kırşehir	Kalehöyük	Japan	http://www.jiaa-kaman.org/en/excavation_kalehoyuk.html
Eskişehir	Kanlıtaş Höyüğü	Turkey	http://www.kanlitas.com/
Eskişehir	Karacahisar Kalesi	Turkey	NA
Şanlıurfa	Karahantepe	Turkey	NA
Antalya	Karain	Turkey	NA
Gaziantep	Karkamis	Italy	NA
Osmaniye	Kastabala	Turkey	NA
Muğla	Kaunos	Turkey	NA
Sivas	Kayalipinar	Germany	NA
Manisa	Kaymakci	USA	NA
Mersin	Kelenderis	Turkey	NA
Erzincan	Kemah Kalesi	Turkey	NA
Yozgat	Kerkenes	USA	https://sciences.ucf.edu/anthropology/kerkenes/
Kayseri	Keykubadiye Sarayı	Turkey	NA
Burdur	Kibyra	Turkey	NA
Çanakkale	Kilisetepe Höyüğü	Turkey	NA



Niğde	Kınık Höyük	Italy	https://www.kinikhoyuk.org
Kırklarerli	Kırklareli Höyük	Turkey	http://kirklareliprojesi.org/
Antalya	Kızılin	Turkey	NA
İzmir	Klaros	Turkey	http://klaroskazisi.org/
İzmir	Klazomenai	Turkey	NA
Muğla	Knidos	Turkey	NA
Tokat	Komana	Turkey	https://komana.org/
Konya	Kubad-Abad	Turkey	https://www.kubadabad.com/
Eskişehir	Küllüoba	Turkey	https://en.kulluoba.org/
Kayseri	Kültepe	Turkey	NA
Kırşehir	Kurutlu Antropolojik kazı	Turkey	NA
Balıkesir	Kyzikos	Turkey	http://www.kyzikos.net/
Muğla	Labraunda	France	http://www.labraunda.org
Denizli	Laodikeia	Turkey	http://laodikeia.pau.edu.tr/
Muğla	Letoon	Turkey	NA
İzmir	Limantepe	Turkey	http://ankusam.ankara.edu.tr/limankara/
Antalya	Limyra	Austria	NA
Aydın	Magnesia	Turkey	https://www.magnesia.org/
İzmir	Metropolis	Turkey	NA
Aydın	Milet	Germany	https://www.ruhr-uni-bochum.de/milet/
Antalya	Myra Andriake	Turkey	NA
İzmir	Nif Dağı	Turkey	https://fb-design.wixsite.com/nifdagikazisi
Aydın	Nysa	Turkey	http://www.dtcf.ankara.edu.tr/nysa-antik-kenti/
Mersin	Olba	Turkey	http://olbakazilari.com/
Amasya	Oluzhöyük	Turkey	NA
Antalya	Olympos	Turkey	https://www.olymposkazisi.com/



Çorum	Ortaköy	Turkey	NA
Nevşehir	Ovaören	Turkey	NA
Kilis	Oylum Höyük	Turkey	NA
Samsun	Oymaağaç Höyük	Turkey / Germany	https://www.nerik.de/
İzmir	Panaztepe	Turkey	http://www.arkeo.hacettepe.edu.tr/panaztepe.html
Çanakkale	Parion	Turkey	http://www.parion.biz/index.php
Bursa	Paşalar	Turkey	NA
Antalya	Patara	Turkey	https://pataraexcavations.org
Muğla	Pedasa	Turkey	http://www.pedasa.info/
İzmir	Pergamon	Germany	http://www.nekropergeol.org/
Antalya	Phaselis	Turkey	NA
İzmir	Phokaia	Turkey	NA
Isparta	Pisidia Antiocheia	Turkey	NA
Niğde	Porsuk Höyük	France	NA
Aydın	Priene	Turkey	NA
Çorum	Resuloğlu Mezarlığı ve Yerleşim Yeri	Turkey	NA
Burdur	Sagalassos	Belgium	https://www.arts.kuleuven.be/sagalassos/
Manisa	Sardis	USA	https://sardisexpedition.org/
Artvin	Şavşat Kalesi	Turkey	NA
Isparta	Seleukeia Sidera	Turkey	NA
Antalya	Side	Turkey	NA
Mersin	Silifke Kalesi	Turkey	http://www.silifkekalesikazisi.com/
Adana	Sirkeli Hoyuk	Switzerland	https://www.sirkeli.ch



İzmir	Smyrna-Agora	Turkey	http://antiksmyrna.com/
Nevşehir	Sofular Fosil Lokalitesi	Turkey	NA
Mersin	Soli Pompeiopolis	Turkey	http://www.soli-pompeiopolis.com/
Muğla	Stratonikeia ve Lagina	Turkey	http://stratonikeia.pau.edu.tr/
Adana	Tatarlı Höyük	Turkey	http://tatarli.cu.edu.tr/
Hatay	Tel Tayinat	Canada	https://tayinat.artsci.utoronto.ca/
İzmir	Teos	Turkey	http://www.teosarkeoloji.com
Niğde	Tepecik / Çiftlik Höyük	Turkey	https://www.tepecik-ciftlik.org/
Aydın	Tepecik Höyük	Turkey	http://www.arkeo.hacettepe.edu.tr/cinetepecik.html
Manisa	Thyateira	Turkey	http://thyateirakazisi.com/
Muğla	Tlos	Turkey	http://www.tloskazilari.com/
Aydın	Tralleis	Turkey	NA
Denizli	Tripolis	Turkey	https://www.pau.edu.tr/tripolis
Çanakkale	Troia	Turkey	https://www.troyexcavations.com/
Hatay	Üçağızlı Mağarası	Turkey	NA
İzmir	Ulucak Höyük	Turkey	NA
Yozgat	Uşaklı Höyük	Italy	http://usaklihoeyuk.org/en/site
Mersin	Uzuncaburç-Olba	Turkey	http://kaam.mersin.edu.tr/page12.html
Antalya	Xanthos	Turkey	NA
Kırşehir	Yassihoyuk	Japan	NA
Çanakkale	Yeni Bademli Höyük	Turkey	NA
Nevşehir	Yeniyaylacık Fosil Lokalitesi	Turkey	NA



İzmir	Yeşilova Höyüğü	Turkey	http://www.yesilova.ege.edu.tr/
Mersin	Yumuktepe	Italy	NA
Diyarbakır	Zerzevan Kalesi	Turkey	http://www.zerzevan.org/
Gaziantep	Zeugma	Turkey	http://zeugma.org.tr/
Çanakkale	Zeytinlik Höyüğü	Turkey	NA
Gaziantep	Zincirli Hoyuk	USA	https://zincirli.uchicago.edu/

Following the completion of the inventory, we performed a search using Google, since this platform has the highest number of indexed pages. As the keyword, we used the official name of the project as reported in the ministry document as well as the terms 'excavation', *kazısı* and *kazıları* (the latter two having the meaning 'excavation(s)' in Turkish). Next, we manually cycled through the first five result pages to locate a dedicated website for the project, under the assumption that a project website would be at the top of the index. For 167 excavation projects, we were able to identify 62 official and 21 unofficial websites. We defined an official website as a dedicated website that is directly managed by the project. An unofficial website comprises an institution/university website that contains scientific information about the project alongside other projects conducted by the same institution/university. In terms of the total project numbers, 76% of foreign projects and 43% of Turkish projects disseminate information using websites (Table 2).

Table 2: Website counts for archaeological excavations in Turkey carried out by Turkish and foreign teams

	Turkish	Foreign	Total
Official	43	19	62
Unofficial	15	6	21
Total	58	25	83

When we identified a project website (official or unofficial), we looked for sections on bibliography, database, and a visual archive. For bibliographic information, we were interested in whether the researchers provided open-access publications, persistent identifiers (e.g. Digital Object Identifiers (DOIs) for bibliographic entries), or any other form of connections to open/closed access publication repositories. We were also interested in visual archives to evaluate if researchers provided traceable identifiers for their object images or drawings. Finally, we looked for open or closed databases or datasets on these websites.

We found that while 48 websites (created by Turkish or foreign excavations) provide a bibliography list, only 26 of these provide some form of access to the publications. Forty-



five project websites provide an image gallery, none of which contains traceable identifications. Finally, five websites have databases, while only two of the five provide direct access to these datasets.

To further explore the open-access data publication efforts of these projects, we investigated two major data portals: [Open Context](#) and [ARIADNE](#). ARIADNE contains entries for 71 of the projects, from historical entries to current data. Open Context contains information on eleven of the projects. Almost all of the projects in Open Context, however, contribute data as part of special research projects (e.g. botanical studies, dendrochronological studies). Finally, we cross-compared the projects' web presence with their efforts in publishing open access data. Our aim was to evaluate whether the projects that had a tradition of public access (via website dissemination) were also leading the way for open-access data. We used phi-coefficient to evaluate binary variables (web: presence, absence vs data portal: presence, absence). There appears to be a very low association (<0.2) between website presence and open-access data presence, suggesting older dissemination practices have been discontinued in the new data-sharing paradigm.

Finally, we analysed the occurrence of projects in the [TAY](#) database and the current portal of the Ministry ([Cultural Portal](#)). It is important to bear in mind that there is a bias in the TAY comparison since some projects began after the core data collection phase of the TAY database, resulting in their under-representation on the platform. It appears that while TAY researchers keep updating the inventory, the initial coverage remains the most comprehensive. Despite the temporal mismatch, 77% of the current 167 projects had been registered by TAY researchers. The statistic supports the early digital vision behind the TAY database. The Culture Portal, however, mentions only 56% of the archaeological projects.

5. Conclusions

Use of digital technologies for fieldwork documentation in Turkey has almost a three-decade-long history. The need for databases by various archaeological projects and individual researchers associated with public and academic institutions during these thirty years led to the creation of individual databases as closed systems, i.e. data silos. As it stands, the interoperability between and integration of datasets in these silos remains a major issue, owing to the limited investment in high-quality metadata creation and data modelling using standard ontologies such as [CIDOC CRM](#). For settlement sites, although digital gazetteers exist covering archaeological sites in Turkey (e.g. [Getty TGN](#), [Pleiades](#)), resolving the issue of toponyms, verifying existing data and aligning different gazetteers still requires a lot of work. One of the goals in building MUES and TUES, discussed above, has been to start indexing archaeological places in Turkey as linked open data and aligning these index entries with existing gazetteers.

At the moment, there are no good guidelines for best practice and standards for archaeologists working in Turkey when it comes to creating, curating and archiving archaeological digital resources. Such guidelines and standards are especially crucial when it comes to publishing archaeological resources online using semantic web protocols and technologies and in accordance with the FAIR guiding principles. By sharing best practices and translating useful guidelines into Turkish (e.g. the PARTHENOS Guidelines; Morselli *et al.* [2020](#)) it should at least become possible to increase awareness about and make progress in archaeological digital archiving in



Turkey. In addition, issues related to the new open science paradigm, including publication rights and research ethics, are still topics under discussion among the Turkish archaeological community. The introduction of international open science efforts through training and network events should be helpful here in explaining the logic of these efforts and making progress in practice.

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