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The EAMENA database and its potential impact on research and heritage management: a case study of Crusader heritage in Lebanon

Letty ten Harkel  and Michael T. Fisher

This paper introduces the EAMENA database, from a user perspective, as a living document of archaeological datasets, assessing its utility for research and heritage management with respect to unfinished data collection and ongoing database development. An incomplete dataset of Crusader sites provides a useful case study of heritage places. First, through a simple analysis using the site function field, the paper demonstrates how users can query the database to identify areas or themes for future research. Second, it analyses condition assessments of Crusader sites in Lebanon to investigate whether these places are disproportionately affected by certain types of modern disturbance. Throughout, the paper discusses aspects of the EAMENA data recording process, highlighting several technical developments that the project has implemented since the public launch of its database in 2017. In doing so, it demonstrates the value of responsive database development to remain at the cutting edge of research technologies.

Keywords Heritage database, database vocabulary, Lebanon, Crusader archaeology

Introduction

The EAMENA project was established in January 2015 in response to increasing threats to archaeological and cultural heritage sites in the Middle East and North Africa (MENA region). One of the project's initial priorities was to develop an open-access database, using the Arches platform, to document archaeological and cultural heritage sites through a combination of remote sensing methodologies and on-the-ground survey (Bewley *et al.* 2016). The EAMENA project publicly launched the inaugural version of this database in 2017, showcasing a limited number of sites and thematic searches (see <https://eamena.org/database> and Zerbini 2018). Since then, data entry has continued, as has EAMENA's further development of the database in

response to feedback from MENA-based archaeological partners (Fisher *et al.* 2021: 7; Mubaideen *et al.* 2021) and in order to remain at the cutting edge of technological developments in the fast-moving field of digitalized archaeological documentation.

The Arches database platform is open-source, geospatial software that the Getty Conservation Institute and the World Monuments Fund developed specifically for the documentation, storage, dissemination and utilization of cultural heritage data (Barton *et al.* 2017). Although it features a relational, PostgreSQL back end equipped with PostGIS, Arches is a semantic graph database that enables ontological interoperability with other cultural heritage inventories through an integrated RDF (Resource Description Framework) using CIDOC-CRM, the international standard Conceptual Reference Model for cultural heritage information

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(see <https://www.archesproject.org/what-is-arches/>). Unlike relational databases, the architecture of a semantic database consists of graphs made up of ‘nodes’ (or fields) connected by ‘edges’ (or relationships between nodes), and the database designer assigns a specific CIDOC-CRM class (such as ‘E27_Site’ or ‘E55_Type’) for each node and a CIDOC-CRM property (such as ‘P2_has_type’) for each edge. Arches data are therefore ‘self-describing’, and so heritage professionals from all over the world, concerned with different types of datasets, can express, export and even interlink their digital inventories according to a standardized model (Myers *et al.* 2012: 216–17).

Between 2015 and 2020, the EAMENA project customized an instance of Arches v3; however, in 2020, EAMENA designed and migrated its data to an instance of Arches v5, released earlier that year. This latest version of Arches allows database projects to model their data hierarchically, with infinite levels of nesting and cardinality, across a series of self-contained but inter-relatable resource models. Each resource model represents a category of cultural heritage documentation, such as heritage places (‘sites’), information resources (imagery and reference materials), detailed condition assessments (on-site or otherwise methodologically specific condition assessments), or geoarchaeology (palaeolandscapes). Every ‘instance’ of a resource model (or ‘resource instance’ or record) represents a (typically) real-world example of that category, enabling recording in as much structured detail as each project deems necessary. Within each resource model, a project organizes its data according to a series of ‘top cards’, or branches, constituting that model’s main categories of documentation.

The EAMENA database currently has seven resource models but the project focuses primarily on heritage places. Within the heritage place resource model, project personnel record morphological and interpretive data about each site (archaeological assessment card), its location (geometry and geography cards), environment (environmental assessment card), its state of preservation (condition assessment card), and the documentation metadata (e.g. assessor and assessment date nodes) and paradata — or information about the process of data collection (e.g. assessment activity type node). Within each card, the user can action the resource-instance node (new to Arches v5) to create relationships with other instances, or the instances of other resource models. For example, a heritage place instance can be linked — through a resource-instance node within the condition

assessment card — to one or several detailed condition assessment instances.

Since the start of the EAMENA project, database development and data entry have occurred simultaneously. The ongoing character of the project dictates the ‘incomplete’ nature of the information contained within the database (something that arguably applies to archaeological and heritage databases in general; Gupta *et al.* 2020: S47); however, this does not preclude its meaningful use for research and heritage management purposes. With a user executing only a few simple searches, the database demonstrates its efficacy in suggesting future directions for research and heritage management. This paper explores the potential of the EAMENA database, from an end-user perspective, as a ‘living document’, in terms of both technical development and data entry completion.

The research presented here, like many of the other contributions to this volume, first appeared as a paper at the British Association for Near Eastern Archaeology (BANE) 2018 Annual Conference in Durham, focusing on a detailed dataset of Crusader sites in Lebanon. In April 2021 the EAMENA project launched a new version of the database that addresses several of the development needs that this research originally highlighted. These issues and their resolutions (or lack thereof) will be discussed below in order to document the process of data recording that has characterized much of the work of the EAMENA team to date.

The first part of this paper presents the dataset of Crusader-era sites, including all records that the EAMENA team recorded with the cultural period label “Crusader (Levant/Mesopotamia)”, downloaded from the EAMENA database on 19 June 2019. The featured version of this dataset is particular to that date because soon afterwards the project restructured the main thesauri of the database, as summarized (for the period c. 1100–1300 CE) in Table 1. This restructuring reflects the decision to move away from historically specific cultural periods, towards the recording of broader chronological and geographically demarcated spans; thus, the thesauri now subsume the once-separate period type “Crusader (Levant/Mesopotamia)” and other highly granular periods under wider cultural sub-periods such as “Islamic, Middle (Fatimid/Ayyubid/Crusader) (Levant/Arabia)”. This sub-period now has a broad date range of c. 1070–1300 CE. The impact and implications of this periodization will be revisited in more detail below.

Table 1 Overview of cultural periods in the EAMENA database in use until June 2019, covering the period c. 1100–1300 CE in the Levant, and the simplification to a broad category following a database vocabulary restructuring process

Cultural Period (before June 2019)	Chronology (CE)	Revised Cultural Period (after June 2019)	Chronology (CE)	Revised Cultural Sub-Period (after June 2019)	Chronology (CE)
Abbasid (Levant/Mesopotamia)	800–1300	Islamic (Levant/Arabia)	640–1900	Middle Islamic (Fatimid/Ayyubid/Crusader) (Levant/Arabia)	1070–1300
Fatimid (Arabia/Levant/Mesopotamia)	950–1200				
Seljuq Sultanate (Levant/Mesopotamia/Iran)	1055–1194				
Middle Islamic/Post-Antique (Arabia/Levant/Mesopotamia)	1070–1300				
Ayyubid (Arabia/Levant/Mesopotamia)	1200–1260				
Mamluk (Arabia/Levant/Mesopotamia)	1260–1500				
Islamic 3 (Levant/Mesopotamia)	1070–1150				
Islamic 4 (Levant/Mesopotamia)	1150–1260				
Islamic 5 (Levant/Mesopotamia)	1260–1400				
Crusader (Levant/Mesopotamia)	1100–1300				
Medieval (Levant/Mesopotamia)	1070–1300				

After presenting the data and their gaps, an analysis of their archaeological assessment information is offered. Within the EAMENA database, this includes site names or references (for example survey numbers), site locations, cultural periodization, descriptive information about the site and/or its site features (for example a “structure”, a “bank”, or a “pit/shaft/tunnel”), and interpretative information about the site and/or its site features (for example a “fort/fortress/castle” or a “well”), as well as an overall site function (for example “domestic”, “defensive/fortification”, or “religious”) (see <https://eamena.org/database> for more information). These are all ‘soft’ categories in the sense that a site can have multiple interpretations, functions, cultural periods and so on, and most fields within the database allow the user to record the certainty of the interpretation. In what follows, the focus will mainly be on the site function field to address two related questions: can we use a selection of ‘incomplete’ data to identify areas for further research? Can we identify themes that deserve more attention in future research?

An important aspect of the EAMENA database is that, for each heritage place record, it combines an archaeological assessment with a site condition assessment. This includes a determination of the site’s overall condition (e.g. “good”, “poor”, etc.), a list of observed disturbances with their likely causes (for example “tourism/visitor activity” or

“natural”), the date range within which the disturbance occurred (e.g. based on noticeable differences between satellite images of different dates) and a list of threats. Through an analysis of the condition assessments of the Crusader-era sites, the second part of this paper will question whether certain types of disturbances can disproportionately affect sites represented by a particular dataset. This analysis will focus specifically on sites within Lebanon, because research for the BANE 2018 conference prepared relatively detailed datasets from a range of sources and the geographic distribution of the data there is comparatively even on a national level (Fig. 1). Contextual data from the *Atlas du Liban* (Verdeil *et al.* 2007) provides a useful backdrop.

Finally, the paper will return to the EAMENA database. Summarizing the main insights that simple analyses, like the one presented here, can offer, the final section of this paper further discusses the important new features of the EAMENA v3.0 database on Arches v5 that the project launched in 2021.

Methods: Crusader data in the EAMENA database

The Crusader period covers a relatively short time span, between approximately 1100 and 1300 CE. European crusading activity started after the Council of Clermont in 1095 CE, partially as a response to the expansion of Seljuk Turks that made

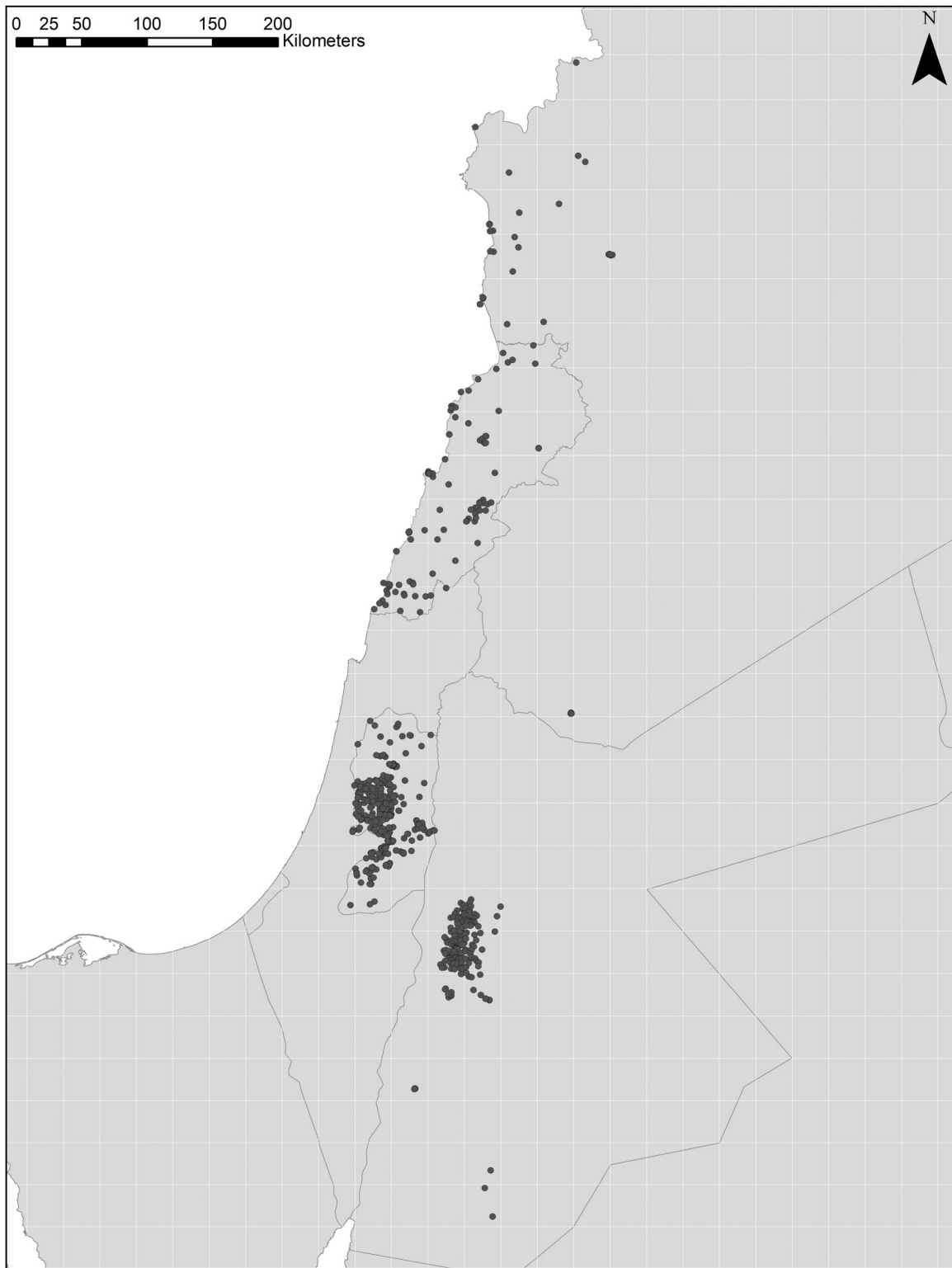


Figure 1 Distribution of all Crusader sites from the EAMENA database on 19 June 2019. Figure compiled in ArcMap 10.8; boundary data downloaded from <http://www.diva-gis.org>.

journeys to the Holy Land increasingly dangerous for Christian pilgrims (Boas 1998: 141; 1999; Hillenbrand 1999; Meens 2015: 81; Theron and Oliver 2018). The fall of Acre in 1291 CE is often seen as the end of

Crusader activity in the Levant (Boas 1998: 138, 141; Hillenbrand 1999). Throughout this roughly 200-year period, different Crusader states existed in the Levant. The Kingdom of Jerusalem covered, at

various times, parts of what is now southern Lebanon, Israel, the State of Palestine and western Jordan. To the north lay the County of Tripoli, in the region that is now the northern part of Lebanon and adjacent parts of Syria. The Principality of Antioch covered part of the coastal regions of what is now Syria and Turkey, and further north still were the County of Edessa and the Kingdom of Lesser Armenia or Cilicia, although these do not fall within the remit of the EAMENA project (see Ten Harkel *et al.* [forthcoming](#)). Spread across multiple modern political boundaries in a well-defined region, ‘Crusader’ sites — i.e. sites with evidence for the presence of ‘Frankish’ immigrants during the period c. 1100–1300 CE, for example, based on architectural or historical evidence, or on the presence of ceramics — therefore represent a useful case study to assess the potential of the EAMENA database for research and heritage management purposes.

The EAMENA project is a collaborative effort, so different individuals populated its database at different times with the data featured here. It was never the aim to enter all known Crusader sites into the database (or indeed all sites from any given period); inclusion depended on the geographical areas that were prioritized and the specific research interests or collaborative relationships of individual researchers. For example, the project prioritized data entry for countries where the Cultural Protection Fund (CPF)-supported training courses took place, which (in the Levant) included Lebanon, the State of Palestine and Jordan (for more information about the CPF training programme, see Fradley *et al.* [2021](#)). Project staff entered data from specific surveys or gazetteers into the EAMENA database, or — in the case of surveys that covered large areas — in designated grid squares designed to divide the EAMENA study region into more manageable blocks (for more discussion of the EAMENA grid, see Fradley *et al.* [2021](#); in the latest version of the EAMENA database, each grid square within the EAMENA grid is an instance of the grid square resource model and users relate a grid square to each instance of the Heritage Place resource model via the Arches v5 resource-instance node type).

The decision to focus on a dataset with clear chronological delimitation required amending the remote sensing methodology of the EAMENA project: instead of carrying out a systematic survey of satellite imagery across a given region (see, for example, Flohr *et al.* [2021](#)), the dataset — including archaeological and condition assessments — mainly comes from existing field surveys, published gazetteers

and further enhancement of the resulting records. EAMENA staff deployed a remote sensing methodology primarily in order to augment the condition assessment of each site.

In June 2019, when the dataset was downloaded, 746 records had a cultural period label of “Crusader (Levant/Mesopotamia)”, spread over Lebanon (109 records), the State of Palestine (416 records), Jordan (177 records) and Syria (44 records) ([Fig. 1](#)).

For Lebanon, the main datasets included:

- All records from an electronic dataset linked to Crowley’s (2016) PhD thesis, based on two gazetteers published by Pringle (1993–2009; 1997b);
- Sites within specific grid squares from the gazetteer of Marfoe’s (1978) doctoral dissertation on the Bekaa Valley, collating evidence from many surveys and investigations;
- Sites within specific grid squares from the Digital Archaeological Atlas of the Holy Land (DAAHL);
- A number of castles from the website *Forteresses d’Orient* (Goepp n.d.);
- Results from the regionally specific Kubba Coastal Survey project conducted by Bradbury *et al.* ([in press](#));
- Results from a regionally specific survey published by Gatier *et al.* 2001; and
- Sites within specific grid squares from Lehmann’s (2002) bibliography of archaeological sites and finds in Syria and Lebanon.

For the State of Palestine, EAMENA staff restricted their data recording to the Occupied West Bank. The main data sources, which overlapped in part with those from Lebanon, were:

- All records from an electronic dataset linked to Crowley’s (2016) PhD thesis, based on two gazetteers published by Pringle (1993–2009; 1997b);
- Sites within specific grid squares from the Palestine Archaeological Databank and Information System (PADIS, a collaboration between La Sapienza University of Rome and the Department of Antiquities and Cultural Heritage (MOTA-DACH) of the Palestinian National Authority);
- Sites within specific grid squares recorded in Abu-Sitta’s *Atlas of Palestine* (2010);
- Sites within specific grid squares recorded in Greenberg and Keinan’s (2009) archaeological sourcebook for Israeli archaeological activity in the West Bank between 1967–2007, downloadable via the website for *The West Bank and East Jerusalem Searchable Map*; and
- Sites recorded in a survey of the historic region of Samaria (Lederman *et al.* 1997).

For Jordan, records were compiled exclusively from field surveys:

- The Archaeological Survey of the Kerak Plateau (Miller 1991);
- The Wadi el Hasa Archaeological Survey (MacDonald 1988);
- The Limes Arabicus Survey (Clark *et al.* 2006);
- The Finnish Jabal Harun Project (Fiema *et al.* 2008); and
- The Great Arab Revolt Project (Faulkner *et al.* 2008; 2011; 2012).

Finally, for Syria, data collection focused predominantly on the recording of known UNESCO World Heritage Sites (30 entries) and other well-known archaeological sites.

The search results were exported from the database as shapefiles because certain types of analysis are more productively carried out in GIS than if done directly in Arches. While users can calculate simple statistics based on numerical fields effectively within the database, geospatial analysis and large-scale mapping require purpose-built geographic analysis programs such as QGIS in order to achieve optimal outcomes. However, the shapefile format has certain limitations as well, primarily that it restricts text string lengths to 255 characters, truncating sometimes essential data that can impact analysis outcomes. In 2019 Arches users had to rely heavily on shapefiles in order to move data across geospatial platforms and so the original analysis herein is affected. The discussion section, below, will present some solutions to this, and other problems posed by shapefile exporting, that the EAMENA project has addressed in the most recent versions of its database.

A preliminary glance at the distribution map immediately reveals that archaeological ‘affordances’ — factors that determine where archaeological investigations take place and which data users enter into the EAMENA database (for the concept of affordances, see Green *et al.* 2016; also see Bradbury *et al.* 2016) — have had a severe effect on site recording and inclusion. Furthermore, a reliance on existing surveys means that decision-making processes during different field projects also play a role in defining the character of the dataset, including questions such as which periods to record, what material types to collect, whether to include standing buildings or only artefactual material, and so on. This means that certain analyses — such as large-scale and trans-regional spatial analyses — are not guaranteed to produce meaningful results at this stage.

However, neither does this mean that the existing data are meaningless. The remainder of this paper will demonstrate how even a partial dataset can contribute to research and heritage management.

Results

Archaeological assessment of Crusader data

The first question to be addressed is, how can the EAMENA database help to identify areas for future research, including more in-depth field investigations, keeping in mind that the geographical spread of sites within the database, and as depicted in Fig. 1, is *not* representative of the entire field of Crusader studies? A useful approach here is to analyse the site function field. Table 2 summarizes the different site function values recorded in the EAMENA database.

The range of site function values, generally speaking, is distributed quite evenly across the geographical spread of sites. It is striking, however, that sites of “unknown” function are clustered in the State of Palestine and in Jordan (Fig. 2). The value “unknown” differs from a field that is left blank, in the sense that the user completed the data entry, having in these cases identified “Crusader (Levant/Mesopotamia)” as (one of) the cultural period(s) for this heritage place, but the user could not determine the site function due to a variety of possible factors, for example, later occupation, destruction, lack of investigation, etc. In the case of Palestine and Jordan, lack of investigation seems to have been an important cause, as users based many of the records on chance finds from field surveys, rather than including well-known, and often extensively investigated, ‘flagship’ sites included on World Heritage lists or in other prominent inventories. In other words, the EAMENA database and recording methodology can easily help identify where more in-depth investigations have the potential to shed important new light on our understanding of the nature of Crusader-period activity.

Another main question we are addressing is: can we identify themes that deserve more attention in future studies? Again, the site function field can provide useful insights. Figure 3 depicts the eight most common site functions in the Crusader dataset, normalized in relation to the total number of Crusader sites and compared against all sites extant in the EAMENA database. It is worth noting that not all sites in the database are fully enhanced (i.e. not all fields have been completed), either because data enhancement is still in progress, or because of deliberate decisions not to enhance certain sets of records

Table 2 Site functions from the EAMENA database

Site Functions	Description
Agricultural/Pastoral	Relating to the farming of land and/or the rearing of animals
Defensive/Fortification	Relating to the security or protection of people or an area, but not military in nature
Domestic	Relating to the habitation of people
Educational	Relating to the education of people, i.e. schools, madrasas, etc.
Entertainment/Leisure	Relating to activities which are largely for pleasure or enjoyment, for example a circus or a park
Funerary/Memorial	Relating to activities concerning the memorialisation of individuals, events and/or the treatment of the dead
Hunting/Fishing	Relating to the exploitation of (mostly) non-domesticated species, such as hunting traps or fish ponds
Hydrological	Relating to the management and movement of water
Industrial/Productive	Relating to the production of goods or other commodities, at large or small scale
Infrastructure/Transport	Relating to the sea, in particular shipping and/or the exploitation of maritime resources where these resources cannot be further defined
Maritime	Relating to maritime activity
Military	Relating to an organized and/or official group of armed forces
Public/Institutional	Relating to facilities and services that are intended for use by the community as a whole. Often, but not necessarily officially provided or sanctioned e.g. markets, courthouses, official/government etc
Religious	Relating to activities of a religious or ritual nature
Status/Display/ Monumental	Relating to structures which serve no functional purpose except to express a statement, usually relating to wealth, status, power etc
Trade/Commercial	Relating to facilities and or services that are predominantly economically orientated or mercantile in nature
Unknown	Unknown

(for example, for resource-limitation or training purposes). We have excluded all unenhanced data from our analyses in this paper. For the Crusader data, 681 records had recorded site function values (91%), compared to 42,196 records with site function values for the total EAMENA dataset (~25%).

It is also worth noting that the numbers in Fig. 3 are a proxy. Given that the EAMENA methodology prioritizes rapid site documentation and assessment based on remote sensing, and avoids the data-structuring implications and redundancies of function-specific periodization, the project does not tie individual site functions to a cultural period, despite the potential analytical advantages of such an approach from a research perspective. More complex, multi-period sites recorded with multiple cultural period and site function values can, therefore, obscure the pattern to a degree; however, such complex sites comprise a relatively small number within the EAMENA database and especially within the Crusader dataset (see below for further discussion).

Unsurprisingly, the Crusader dataset stands out particularly for the relatively high numbers of “religious” and “defensive/fortification” or “military” sites. This reflects four inter-related aspects: the nature of past activity; the type of construction materials used for different site types; the dominant scholarly focus; and biases in heritage management strategies. First, it underlines the religious and military character of Crusader activity in the Levant during the 12th to 14th centuries CE. Crusaders, ‘as

an embattled minority seeking to establish themselves in an alien landscape ... took over existing structures as well as building many new castles — in the countryside, on strategic routes, near and even on occasion in the sea — in their efforts to defend themselves’ (Hillenbrand 1999: 331; see also Meens 2015). Second, it reflects the fact that the best-surviving sites were those whose construction was *meant* to be visually impressive and long-lasting, mainly including religious sites and castles that often still stand today, such as the World Heritage Site of Krak des Chevaliers/Qal’at al-Hosn in Syria, damaged during the recent Syrian conflict. Third, this has perpetuated a predominant focus on fortified and religious sites in modern scholarship dating back to the 19th century CE (Boas 1998: 141–42; Hillenbrand 1999; Pringle 1997a: 390, 400–05; Qadir 2007: 535). Fourth, it reflects a bias towards certain site-types — such as Crusader castles and religious architecture — in World Heritage and national listings.

The site function value “domestic” also comprises a disproportionately high percentage of Crusader-era sites, mainly reflecting the use of soft categories in the EAMENA database (see above). This means that a castle would often be recorded as having both “defensive/fortification” and “domestic” functionality, while a monastic site might be recorded as having “religious” and “domestic” functionality (also see Molin 1997; Pringle 1997a: 400–01). Identification of “domestic” sites that have no additional “defensive/fortification” or “religious” function, typically built from more perishable

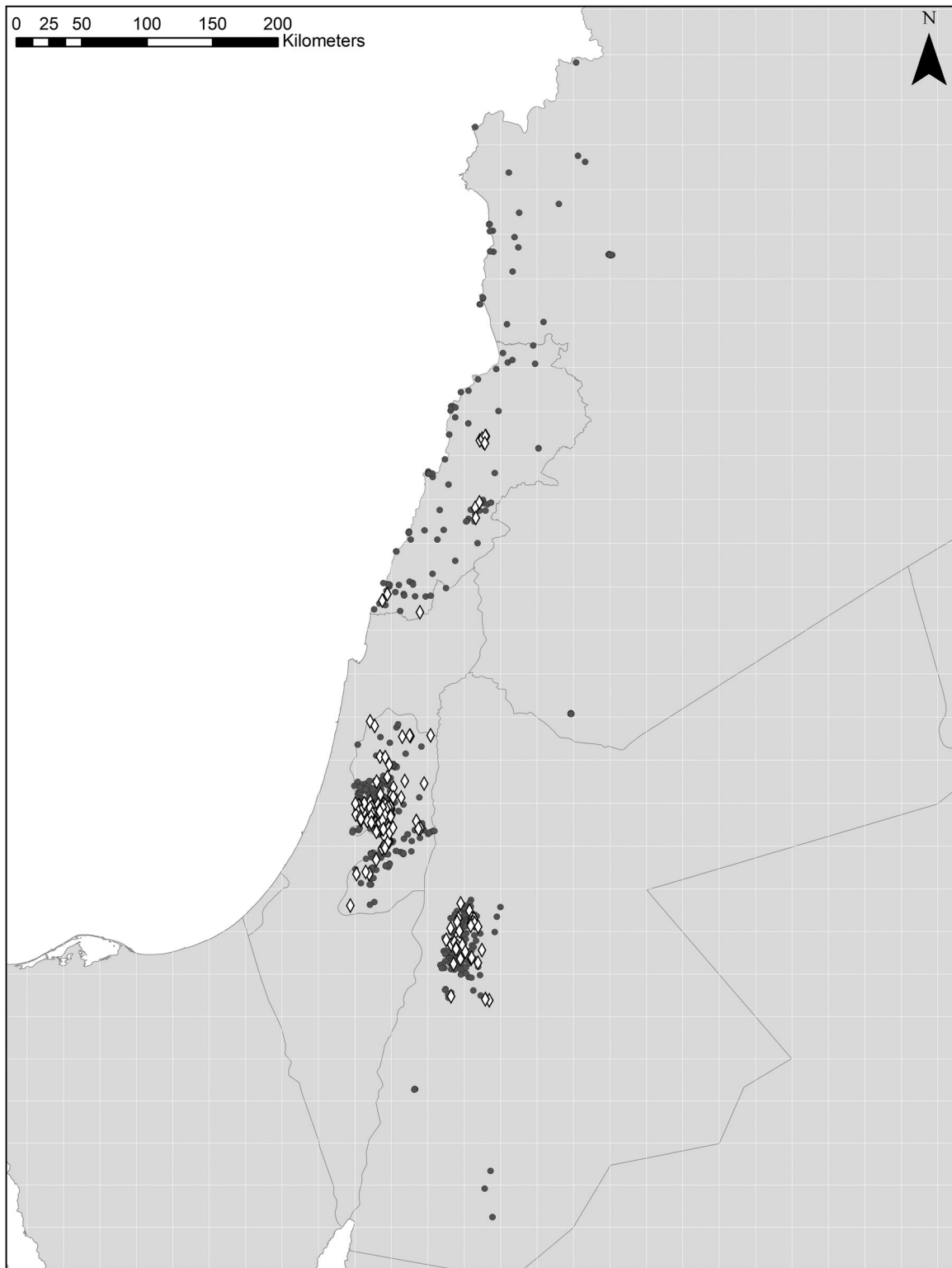


Figure 2 Distribution of all Crusader sites with “unknown” site function (in white), based on a selection from the EAMENA database from 19 June 2019. Figure compiled in ArcMap 10.8; boundary data downloaded from <http://www.diva-gis.org>.

materials, often relies solely on scatters of ceramic material.

Also of interest are the categories that are under-represented, including “funerary/memorial” and

“agricultural/pastoral” sites. Given the sometimes-incomplete nature of data recorded within the EAMENA database, total reliance on those data is not advisable: put simply, we cannot be sure at this

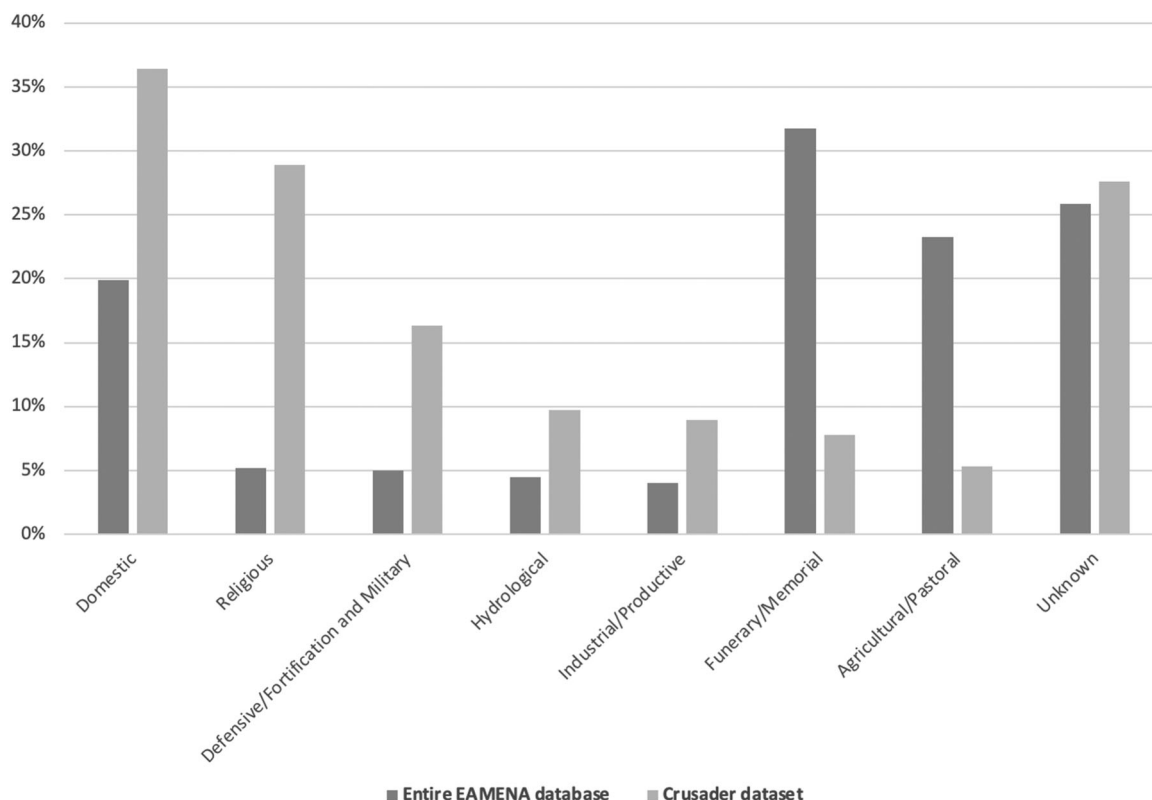


Figure 3 Relative distribution of the eight most common site functions from the Crusader dataset in comparison to their occurrence across the entire EAMENA database.

stage — or generally as archaeologists — that absence of evidence is indeed evidence of absence. If under-represented categories correspond to acknowledged gaps in scholarly knowledge, however, these patterns become more meaningful.

The low rate of occurrence of the “funerary/memorial” category reflects an on-going relative lack of scholarly knowledge about funerary practices in the Latin East; for Lebanon, this has also been noted for other time periods (see e.g. Flohr *et al.* 2021). The combination of limited textual references (and their bias toward high-status individuals) and few excavated cemeteries (Boas 1998: 150–51; Bradbury *et al.* 2016; Thompson 2006: 48–64) contributes to this issue. Potentially the most important issue, however, is the fact that there may be difficulties in distinguishing the majority of ‘Crusader’ graves (i.e. graves from ‘Frankish’ immigrants to the region) from other contemporary burials. Scientific techniques such as stable isotope or aDNA analyses could shed some light on this issue, but isotopic baseline data is still incomplete and aDNA research for the Crusader period in this part of the world is in its infancy. One recent aDNA study of human remains from a mass grave in Sidon has suggested that there was intermarriage (or at least procreation) between Crusaders and

local inhabitants, raising the question, what did it mean to be a ‘Crusader’ (Haber *et al.* 2019).

Finally, the limited representation of the “agricultural/pastoral” category in the Crusader dataset partially reflects the urban character of Frankish settlement in the Levant (or the predominantly urban focus of modern scholarship; see Boas 1998), but also reveals a gap in archaeological knowledge of rural life and agricultural subsistence strategies of the Crusaders (Boas 1998: 151–52; 2012; 2016: 550, 552–53; Crowley 2016: 342; Pringle 1997a: 396–400). A lack of attention to the peaceful interactions between the ‘Frankish’ invaders and the existing populations of the Levant has long characterized scholarship of the topic (Hillenbrand 1999). Although, more recently, aspects of daily life have attracted greater popular interest, scholars have predominantly focused on the Kingdom of Jerusalem, the investigation of which is heavily dependent on written sources and urban sites (e.g. Boas 1998: 139–43; 2016; Crowley 2016; Pringle 1997a). The wealth of data generated through field surveys in particular has potential to shed more light on the rural component of Crusader-era settlement, but only by prioritising an examination of socio-economic interactions on a landscape scale (Crowley 2016: 342).

Acknowledging the importance of this type of investigation has led the project to incorporate palaeolandscapes as a unit of recording and analytical methodology in the latest version of the EAMENA database (see below for further discussion).

In sum, despite the partial nature and uneven distribution of Crusader data in the EAMENA database, they are still useful for the identification of areas that are ripe for further research, or as a first step toward identifying themes that need more in-depth investigation. In this way, the EAMENA database serves as a useful tool for research, and as data entry continues, its utility will only further improve. The next section of this paper considers the implications for research-driven heritage management strategies and will focus on a subset of Crusader data from the modern state of Lebanon.

Condition assessment of Crusader data

Researchers can use a powerful tool such as the EAMENA database for the analysis and presentation of archaeological data and in doing so, can have a substantial impact on decision-making processes in heritage management contexts. This can be effective for assessing whether a particular dataset is affected disproportionately by certain types of disturbances and threats, as well as the severity of each disturbance. This section takes a brief look at the condition assessments of different types of Crusader sites in Lebanon. Figure 4 distinguishes between “definite”, “probable” and “possible” Crusader sites in Lebanon, based on the positive identification of ceramic data, architectural features, or references from textual sources. The analysis only includes sites considered to have a “definite” or “probable” Crusader phase (92 in total).

Figure 5 maps the main site function values across Lebanon, simplified to their ‘dominant’ value. For example, castles that also have a chapel are classed as “defensive/fortification”, while monastic establishments or churches with burials are classed as “religious”. The majority of sites fall into the “defensive/fortification” category (34), followed by “religious” (29), “domestic”, (18) and “unknown” (9). The cluster of “domestic” sites in one grid square in the Bekaa Valley largely reflects the contribution from Marfoe’s (1978) doctoral thesis, based to a significant degree on pottery data. The higher number of “domestic” sites in the south of the country reflects the area covered by Pringle’s (1997b) *Secular Buildings in the Kingdom of Jerusalem*, which did not stretch further north than Beirut.

Figure 6 depicts the overall condition for the three main site function values. It is interesting to note

that the condition of religious sites largely follows a two-way split between 1) “good” to “fair” and 2) “destroyed” (sites with the latter designation are located predominantly in Beirut and Sidon). This is explained by the fact that many religious sites were destroyed prior to the 20th century CE and are only known from written sources, on the basis of which Pringle (1993–2009) included them in the gazetteer. Surviving religious structures, on the other hand, are typically still in use as religious buildings and thus have remained relatively well preserved. The al-‘Umari mosque in Beirut particularly exemplifies this, as in its original incarnation it was the Cathedral Church of St John the Baptist.

The condition of sites in the “defensive/fortification” category ranges from “good” or “fair” (the majority) to “destroyed” (only a few). For domestic sites the situation is reversed. This is to some degree a result of data entry decisions: a “domestic” interpretation comes, in some cases, from the presence of pottery scatters found during field surveys in association with a suspected settlement site, such as a tell. A substantial number of these are located in the Bekaa Valley, where long-term agricultural activity has severely affected some of these sites.

The differences in condition also reflect the original function of the sites, as well as their relative ‘appeal’ to modern audiences. Whereas “domestic” sites can take a variety of forms, many of the “defensive/fortification” sites (basically, castles and forts) were built to last and continued to be important landmarks. Nowadays, as a result of the appeal that Crusader archaeology has amongst certain tourist demographic groups, the sites have often become tourist attractions. Examples include the Château St Gilles/Qala’at Tarablus, which has undergone continuous refurbishment and repair, in part because of its continuing role as the Museum of Akkar/North Lebanon, and the Crusader castle at Jbeil/Byblos.

Of course, the condition of a site can also change. Due to its use of soft categories of recording, which is especially well supported by Arches v5 hierarchical data structuring capabilities, in conjunction with basic metadata such as condition assessment dates, the EAMENA database enables easy reporting on changes to site conditions: for example, in response to Yemeni heritage officials’ requests, EAMENA developed a simple graph that charts deterioration or improvement of a site’s condition. An example of this phenomenon, relevant to this paper, is the Land Castle at Sidon, originally recorded as being in “poor” condition, but after important restoration

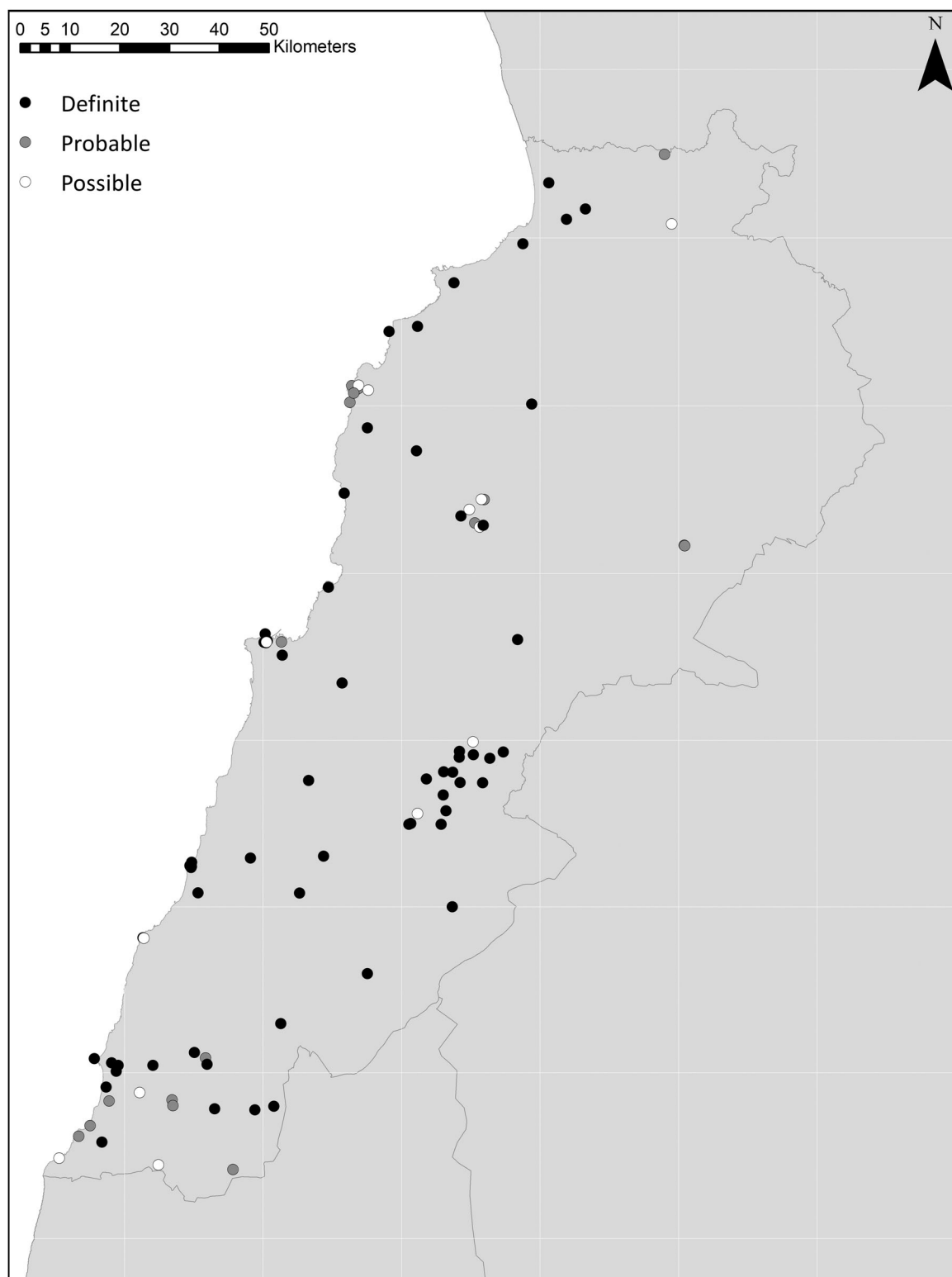


Figure 4 “Definite”, “probable” and “possible” Crusader sites in Lebanon, from the EAMENA database (June 2019). Figure compiled in ArcMap 10.8; boundary data downloaded from <http://www.diva-gis.org>.

initiatives by the municipality of Sidon, and in co-operation with the Ministry of Culture and the Council for Development and Reconstruction, major improvements to the site’s condition were

made with the aim of integrating it with Sidon’s tourist trail (Bozzi *et al.* 2016).

The issue of tourism is important. The commodification of heritage to promote tourism is widespread,

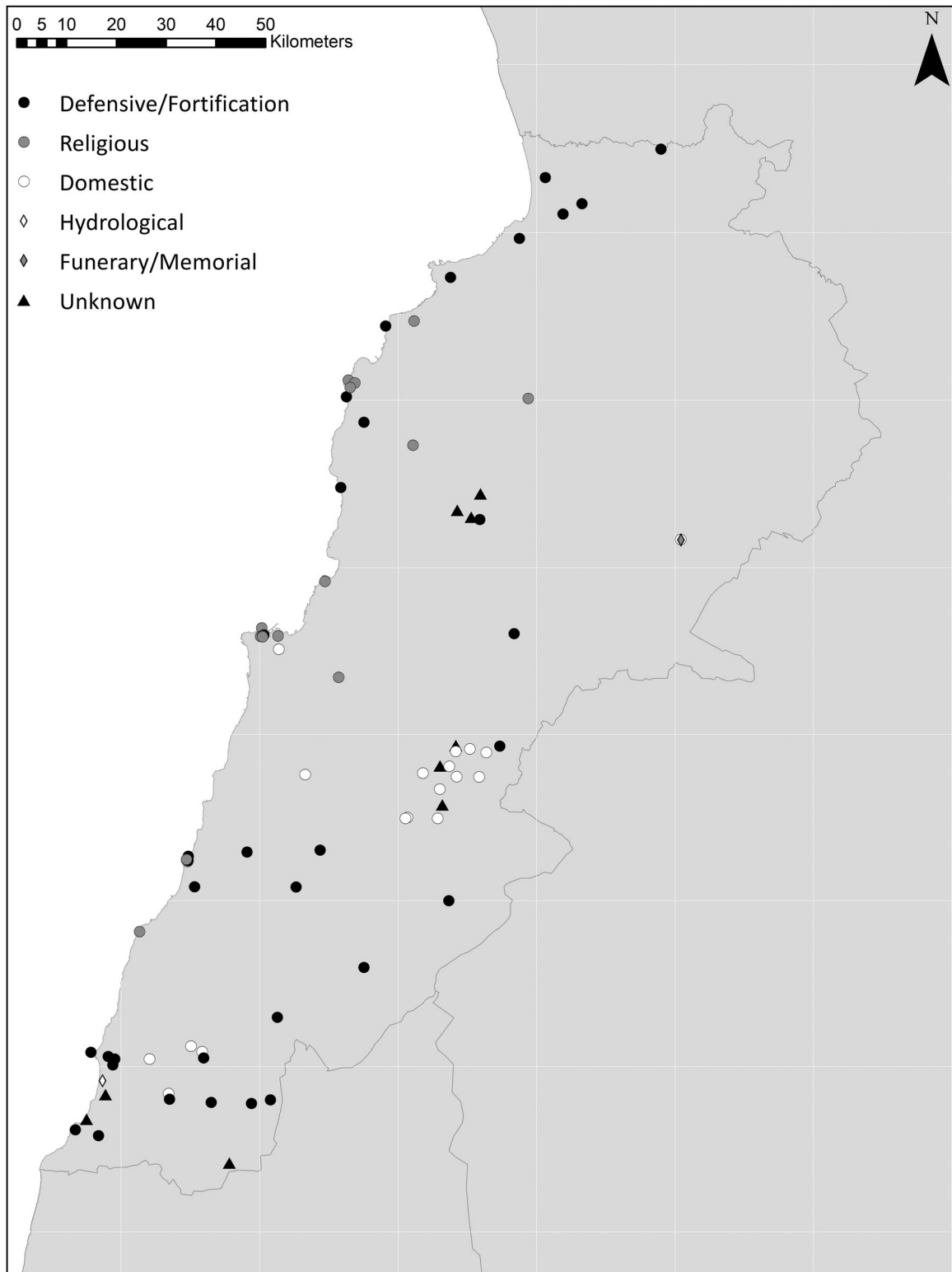


Figure 5 The site functions from the Lebanon Crusader dataset, restricted to “definite” and “probable” Crusader sites. Figure compiled in ArcMap 10.8; boundary data downloaded from <http://www.diva-gis.org>.

and Lebanon is no exception in this regard (Perring and Van der Linde 2009: 203). The appeal of high-status Crusader sites, especially to Francophile and Eurocentric elements of Lebanese society, as well as

certain groups of international visitors, is apparent, but it has perpetuated a focus on well-known ‘flagship’ sites, in particular well-preserved castles and religious architecture (Boas 1998: 142). This runs the risk

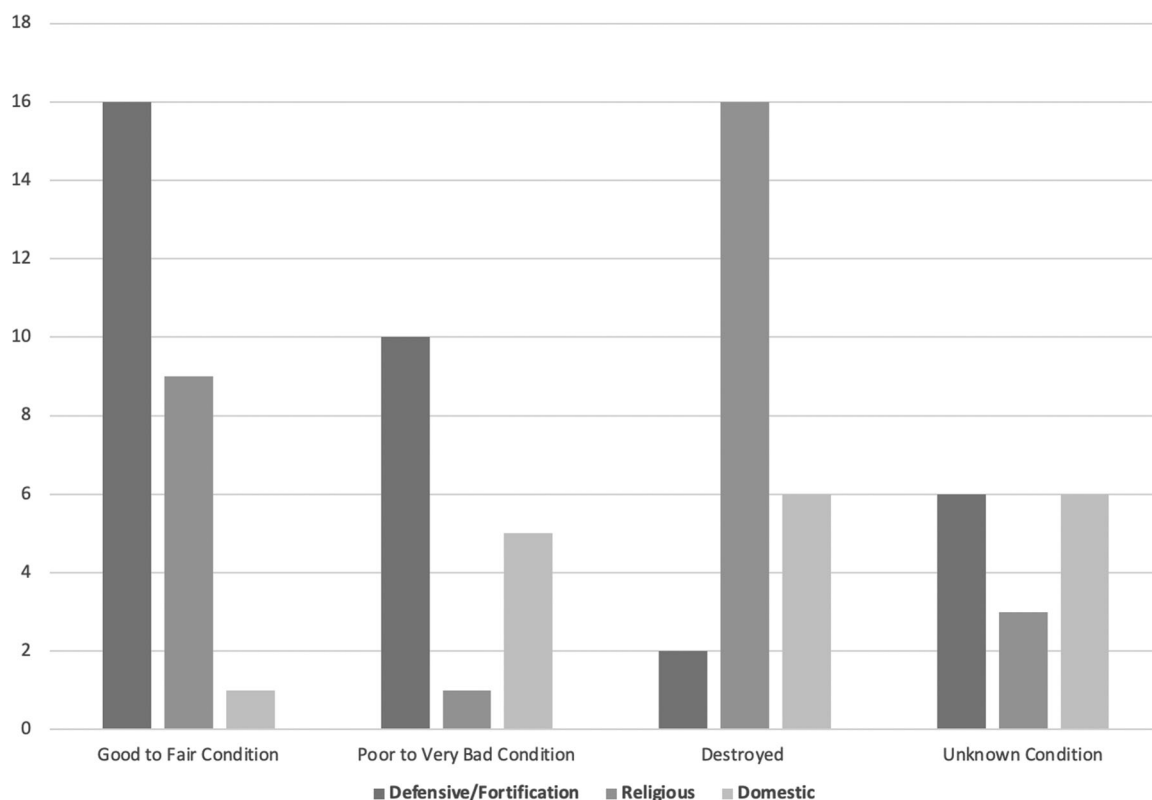


Figure 6 The condition of “defensive/fortification” sites in comparison to those of “religious” and “domestic” sites.

of undervaluing the context of their disposition within a landscape that also features lesser-known archaeological sites. In turn, this negatively impacts our understanding of more mundane aspects of life that can help characterize this period, such as agricultural subsistence strategies or different types of interactions between Crusaders and pre-existing, local populations of the region (see above).

The extensive impact of tourism is also apparent in the relatively high occurrence of “tourism/visitor activities” as a disturbance type value for the Lebanon Crusader dataset, at least compared to the total number of records associated with Lebanon (Fig. 7). The degree of impact, however, is usually low, as tourist sites tend to be managed and maintained: 11 of the 13 Crusader sites in this selection were recorded as having a “good” to “fair” overall condition. The same is true for the impact of continuous religious use of Crusader churches or chapels, reflected in the relatively high occurrence of this disturbance type value within the Crusader dataset; again, this is usually of relatively low impact, with 10 out of 11 sites recorded as being in “good” to “fair” condition. (One could argue, therefore, that the term ‘disturbance’ to describe these contemporary usages of the sites is slightly too negative, but in the context of the EAMENA recording methodology a

disturbance is to be understood as any kind of activity that has an impact on a site, and does not carry exclusively negative connotations.)

Like most database categories, disturbance type in the EAMENA database is a soft category in the sense that each record can have multiple disturbance types listed. Each condition assessment can have only one overall condition, however, and in the 2019 version of the database the overall condition related to each site record on a one-to-one basis. The fact that sites with on-going “religious” or “tourism” functions are relatively well preserved means that this type of continuous use protects these sites to a significant degree from other, more destructive disturbance types.

An example of destructive disturbances is the combination of “domestic use” and “building/development”, a widespread and well-known problem across many parts of Lebanon. This is especially detrimental to the dataset of Crusader sites because many of these sites are located in heavily developed and agricultural regions of the country (or, as Fig. 8 depicts, areas with relatively low percentages of “natural” land use), reflecting the longevity of occupied spaces within the landscape. (This is, of course, to a degree determined by the character of the Lebanese landscape, with parts of central and eastern Lebanon too mountainous for

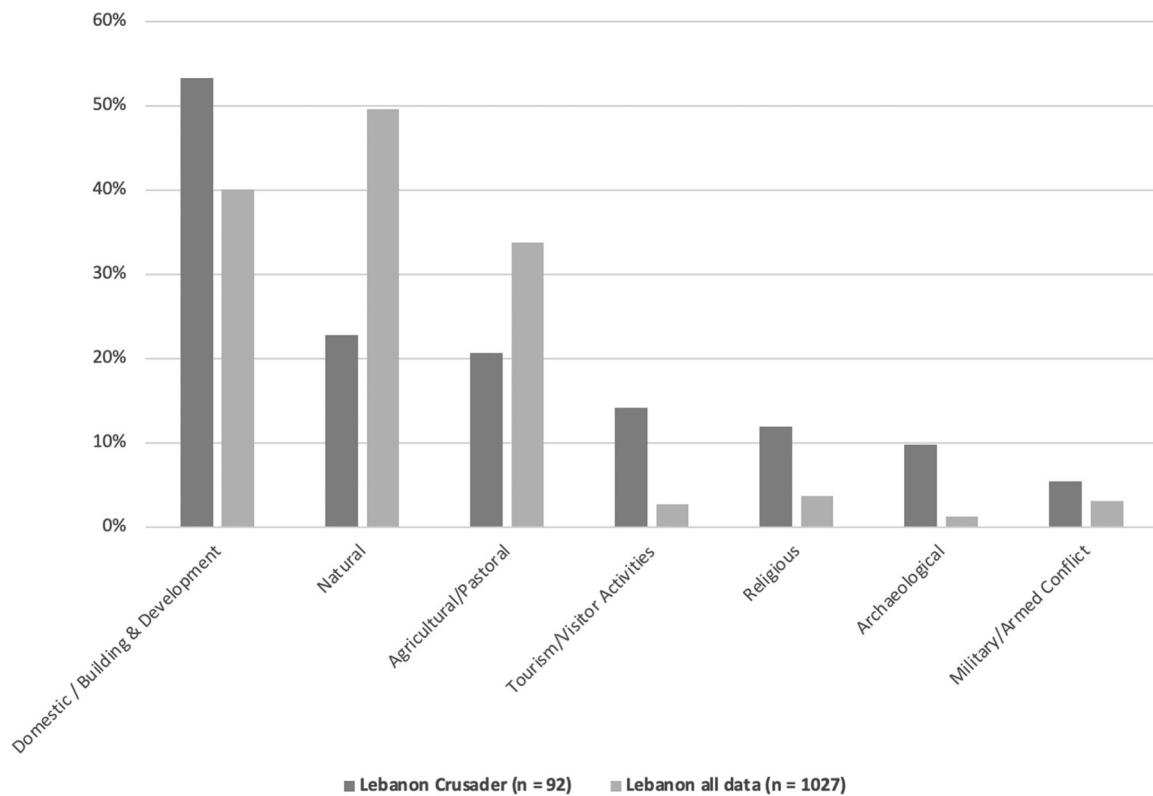


Figure 7 The most common disturbance types for the Lebanon Crusader dataset in comparison to those identified for all records in Lebanon.

dense occupation and/or agriculture; these are areas where on-the-ground data is relatively thin.) This type of disturbance has much greater impact on the archaeology: no fewer than 28 of the 49 sites (over 50%) were recorded either as “poor” to “very bad” or as “destroyed”.

“Natural” factors (mainly the typically dense vegetation) are the most commonly recorded disturbance type for all Lebanese data and occur in second place for the Crusader dataset, causing varying levels of impact on the archaeology (just over 50% of sites fall within a “good” to “fair” range under overall condition) (Fig. 7). The “agricultural/pastoral” disturbance type occurs in third place for both datasets; unsurprisingly, this value applies mainly to sites located in areas characterized by agricultural land use (Fig. 9). At first glance, this may be the most damaging disturbance type of all: only three out of 19 sites listed with an “agricultural/pastoral” disturbance had an overall “good” to “fair” condition recorded. However, it is not necessarily the local farming or herding operations that are so destructive; sites that are affected by agricultural activity tend to not enjoy the same level of protection as sites that are still in use as religious buildings or tourist attractions, and are thus more likely to be affected by a

range of other factors as well as agriculture and pastoralism. This is an area where advanced statistical methods such as probabilistic modelling could be applied for a more holistic or accurate understanding of multi-hazard threats to cultural heritage sites (see e.g. Howard *et al.* 2016; Lombardo *et al.* 2020). The Arches database platform is not itself equipped with statistical programming capabilities, and in 2019 it was not possible to export Arches’ hierarchical data structures accurately into a flat file format (such as .csv) for advanced analysis. The discussion section, below, considers further approaches to help mitigate this issue.

As a result of these limitations, EAMENA database users, currently, typically deploy monofactorial, non-Bayesian analyses in order to identify the relative impact of different disturbance types on the archaeology of a region or period, with the potential to contribute to preservation solutions (but see below). According to the database, “agricultural/pastoral” activities, “building and development” and “domestic use” tend to have the most negative impact. Heritage sites that are located in areas affected by these disturbances need protecting, or at least recording, so that their spatial location is known and knowledge about their character and

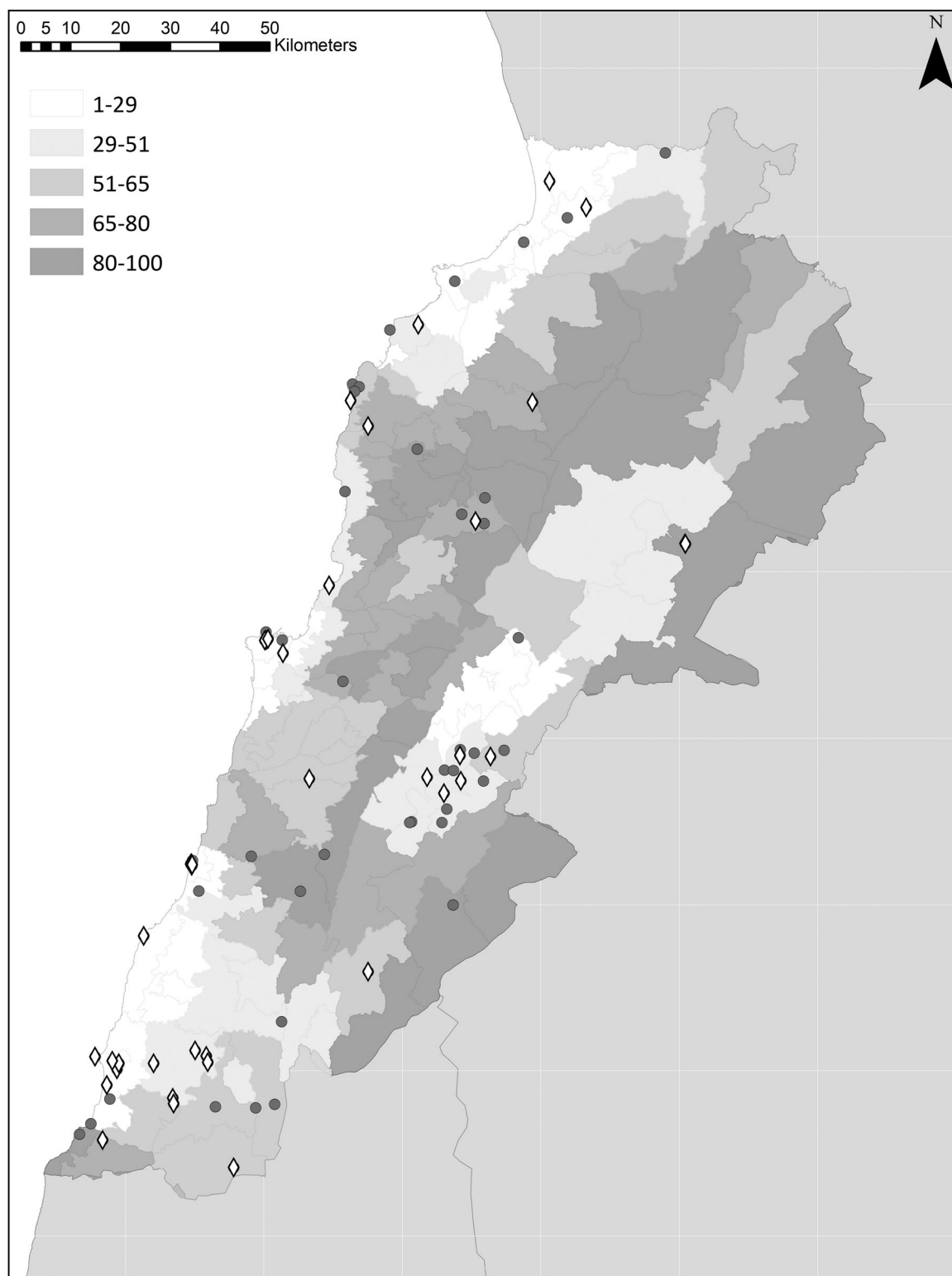


Figure 8 Crusader sites with “domestic use” or “building/development” as a recorded disturbance type (in white) against all Crusader sites. Background data depict the percentage of each area that is characterized by natural land use, based on Verdeil et al. 2007. Figure compiled in ArcMap 10.8.

period of occupation is preserved. Although these activities can be destructive to archaeology, they can also provide opportunities, as ground excavation in preparation for construction creates the

opportunity for documentation and research, while frequent ploughing of large areas of land provides prime conditions for surface survey. This, in turn, can help archaeologists fill some of the above-

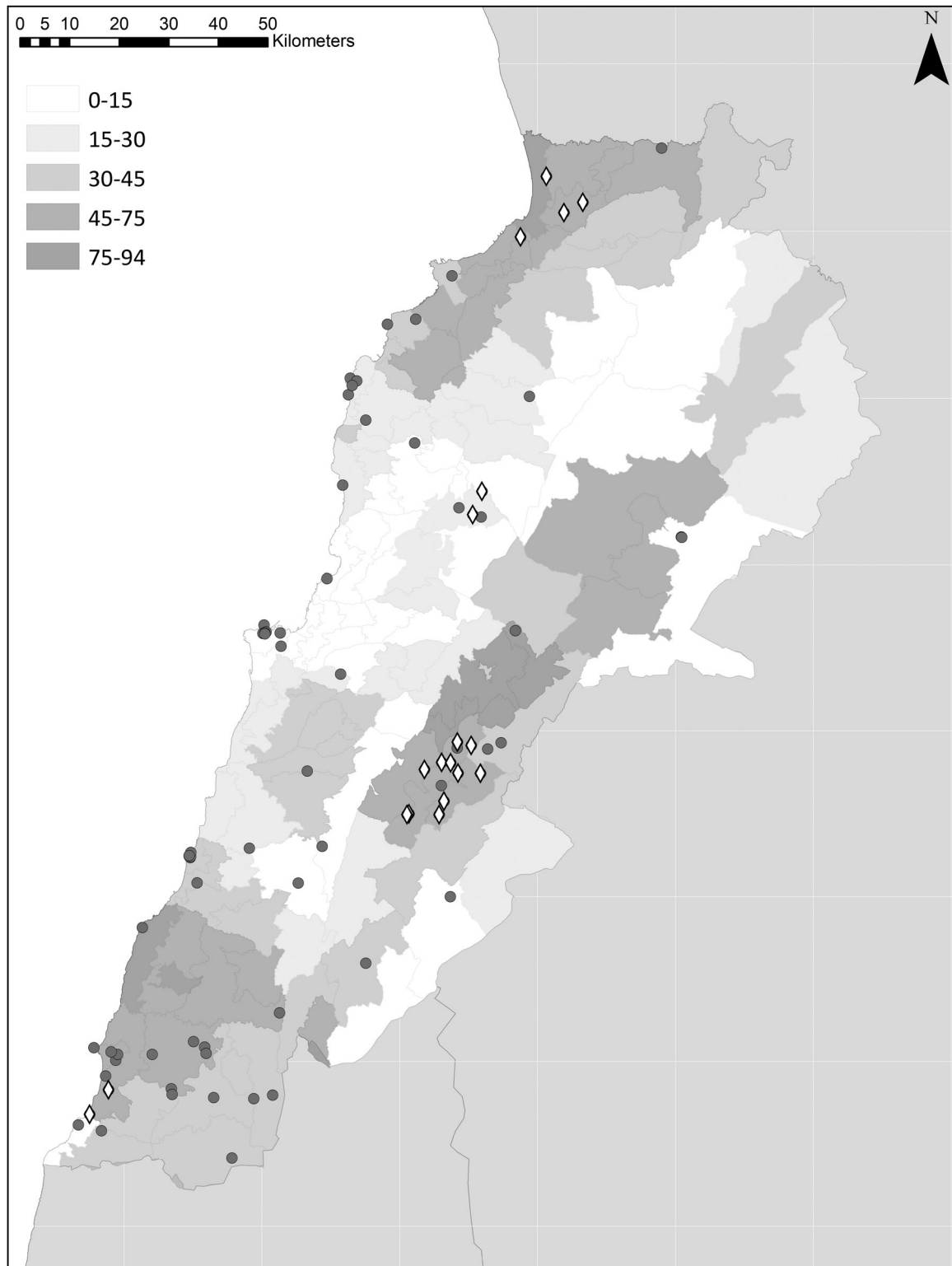


Figure 9 Crusader sites with “agricultural/pastoral” factors as a recorded disturbance type (in white) against all Crusader sites. Background data depict the percentage of each area that is characterized by agricultural land use, based on Verdeil *et al.* 2007. Figure compiled in ArcMap 10.8.

mentioned gaps in our knowledge, especially if a comprehensive heritage management and research platform like the EAMENA database is used to record and integrate the data. Sites that have a

continuing function in contemporary society — whether as religious buildings or tourist attractions, or indeed for different purposes altogether — tend to be well looked after, emphasizing the

importance of integrating heritage into people's daily lives.

Discussion

This paper has aimed to demonstrate the potential of the EAMENA database for archaeological research and research-driven heritage management, even as it remains a work-in-progress, based on an incomplete and geographically uneven selection of Crusader sites in the Levant. We have demonstrated that broad-brush analyses of the data can help to identify gaps in our knowledge, including areas where, for example, field survey has taken place but more in-depth research could further illuminate the nature of past activities. Perhaps more interestingly, our investigation of site types has brought to light a dominant focus on monumental buildings, such as castles and churches, at the expense of understanding everyday activities. Published scholarship has also acknowledged this bias; it results from a combination of factors that have long drawn public and scholarly attention preferentially towards the issue of religious warfare over other themes such as subsistence strategies and daily life (Pringle 1997a).

Analysis of the condition assessments for these sites has revealed a relationship between current (land) use and the overall condition of a cultural heritage property. Specifically, we have shown that the active, contemporary usage of sites is generally beneficial for their preservation, in most cases despite any additional wear and tear related to modern activity. Examples of this include the continued use of pre-modern religious buildings for modern religious purposes and the use of heritage sites for (well-managed) tourism and visitor activities. In this sense, one could argue that these Heritage Places benefited from having been labelled as Crusader sites, given the relatively high appeal of this cultural period designation to certain tourist demographic groups.

On the other hand, the term 'Crusader' is problematic in that it implies a one-sided understanding of the past, and its use to describe the 'cultural' aspect of heritage buildings is therefore, at best, debatable. As Haber *et al.*'s (2019) analysis of the Sidon mass grave demonstrates, the cultural identities of the dead were often more complex than narrowly described cultural period designations. Moreover, if ancient cultural identities featured significant complexity, applying such cultural categories to heritage sites could be seen as counterproductive. At worst, the use of the term 'Crusader' to denote a period could therefore represent a 'selective

commodification, preservation and presentation of cultural monuments' that 'privileges particular versions of the past' (Perring and Van der Linde 2009: 199). This is an important consideration: archaeology is a powerful source of information for the construction of collective identities, and archaeologists are, therefore, 'political actors with social responsibilities' (Perring and Van der Linde 2009: 199, 210). In the case of Crusader studies, this is particularly pertinent given that older scholarship casts the situation firmly in the light of an Arab v. western conflict. This became firmly embedded in popular perception from a range of perspectives, both positive and extremely negative (Hillenbrand 1999; Qadir 2007: 527–28, 536; also see Hamilakis 2009; Koch 2017).

It is relevant here to briefly consider the June 2019 EAMENA project decision, mentioned above, to simplify the chronological vocabulary as set out in Table 1. Amongst other things, this change subsumed the cultural period "Crusader (Levant/Mesopotamia)" under the broader category "Islamic, Middle (Fatimid/Ayyubid/Crusader) (Levant/Arabia)". When the EAMENA project initially designed its database, it envisaged the platform as a compromise between a means for archaeological research (optimized to record high levels of detail suitable for fine-grained analyses) and a digital inventory for heritage management (more broad-brush, optimized to inform policy-making and protection initiatives through simple and effective data collection and organisation). In published field surveys, which contribute to the data recorded in the EAMENA database, the term 'Crusader' is typically used to indicate imported ceramics or ceramics known to have been produced by 'Frankish'-controlled centres. The EAMENA project initially adopted the term 'Crusader', like many other detailed cultural period values, to avoid having to 'translate' data recorded in publications to database vocabulary, a decision that has now been overturned; future plans to link EAMENA periods to open-data chronological aggregation platforms such as Period0 (Rabinowitz 2014) can help mitigate such terminological issues.

A way to avoid privileging certain interpretations of the past in earlier versions of the EAMENA database was to record a number of temporarily overlapping cultural period designations (for example, "Crusader (Levant/Mesopotamia)" and "Fatimid (Arabia/Levant/Mesopotamia)" and "Seljuq Sultanate (Levant/Mesopotamia/Iran)" (Table 1)). As speed and efficiency of data entry are also important considerations for heritage management databases, however, the danger here is that users would cut

corners and only record what they perceive as the dominant or most important period designation. Indeed, from among the 92 Lebanese Crusader sites with “definite” or “probable” certainty values, nine (approximately 10%) are listed as having *no* additional cultural period values, which is particularly illustrative given that this is a dataset recorded in relatively high detail.

Restructuring the way in which EAMENA staff record fine-grained cultural periods also reduces the risk of creating one-sided narratives, or indeed narratives that serve to reinforce rigorously dichotomous views of past societies; however, this was never the main objective of the periodization-data restructuring process. As a positive collateral effect, though, it can lead to a more holistic understanding and appreciation of the Crusader era, separate from culturally divided perspectives on the past and the predominant military and religious ‘image’ of Crusader heritage. This is particularly important for a database with heritage management functionalities, as it implies having the power to influence decisions about the survival and protection of site types and, ultimately, public understanding of the past. We have to acknowledge, of course, that the umbrella term “Islamic, Middle (Fatimid/Ayyubid/Crusader) (Levant/Arabia)”, with a broad date range of *c.* 1070–1300 CE, is also not ideal. However, in the context of the EAMENA database, the use of ‘Islamic’ is explicitly defined as chronological, without cultural or religious connotations.

Although periodization terminology is deeply ingrained within archaeological discourse and is difficult to avoid altogether, there are potential technical solutions that can help mitigate this issue. For example, the Arches v5 search interface now includes a ‘time wheel’, enabling users to visualize and select chronological timespans with which to constrain their queries. The EAMENA v3.0 database capitalizes on this by recording absolute dates for site occupations and by appending absolute chronological ranges to cultural period values as thesauri ‘scope notes’. Furthermore, as mentioned above, taking a Linked Open Data approach to periodization by linking cultural period values to URIs (Uniform Resource Identifiers) will in the future enable researchers to explore specific periods independent of terminological or interpretive schemata (see e.g. Rabinowitz 2014).

The EAMENA v3.0 database has additional new functionalities providing possible solutions to other issues that preliminary research has identified (also see Mubaideen *et al.* 2021). In some areas, the

EAMENA project has actively driven the development of new functionality for the Arches platform. For instance, acknowledging the advantage of exporting both geospatial and informational data about archaeological sites, EAMENA and Farallon Geographics, Ltd developed a GeoJSON API endpoint for Arches v5.2 in order to improve inter-operability with GIS and overcome some limitations of the shapefile format. Where the act of exporting and importing files cuts analysis off from edits and additions to the dataset happening live in the Arches database, the GeoJSON endpoint enables a direct connection between GIS programs and the backend database filtered through the Elasticsearch indices. This creates a semi-live link to search results that will update in the GIS with any new changes in the database upon refreshing the data frame or layer. It will, furthermore, eliminate the truncation of characters that occurs when exporting to the shapefile format, preserving data across applications.

The EAMENA project’s latest graph designs deploy the Arches v5 resource-instance node in order to partially address the database’s inability to tie chronology to site feature form values (a problem that was also highlighted by Mubaideen *et al.* 2021). For data recorded on the EAMENA v3.0 system, users will be able to create a hierarchy of archaeological sites, site features such as mounds or monumental buildings, and built components of site features such as annexes, each with their own site function and cultural period values. Users can take this approach to disambiguate otherwise entangled periodization and site function data, as well as to more accurately represent site complexity. Taking further advantage of Arches v5’s resource-instance node and its hierarchical data-structuring capabilities, the current version of the EAMENA database allows for a succession of multiple detailed condition assessments, each with their own overall condition, that users can link to the general condition assessment like a series of reports through time. This alleviates the necessity to envision the condition of each site as a static state.

Moving beyond ‘sites’ to thinking on the level of ‘landscape’, the EAMENA team collaborated with the MarEA project (see Andreou *et al.* 2020) to incorporate palaeolandscapes as a unit of recording and an analytical methodology. As instances of the geoarchaeology resource model, palaeolandscape records mainly feature environmental data, but also allow for the documentation of processes that occurred between, or independently of, high-visibility archaeological sites. We hope that future research efforts can utilize this development in EAMENA data modelling

to help balance the presently necessary over-reliance on well-defined ‘sites’ relative to broad-scale interactions and processes.

Finally, for Arches v6.0, the EAMENA project and Farallon Geographics Ltd have developed improved export functionality that preserves hierarchical data structures across applications. This will enable users to deploy Bayesian analytical techniques to nested high-cardinality data such as, for the EAMENA v3.0 database, certainty values in relation to disturbance type values. The advanced export capabilities will also improve the sustainability of Arches data, preserving node values within their original graph structure independent of software or database platform type. Since most means of storing and using data are not hierarchical, this should represent a big step forward in terms of both sustainability and interoperability.

When designing any archaeological database, one must strike a balance between its geographical coverage and the level of detail contained within it, both affecting the speed with which users can populate it and the questions that it can help answer. The EAMENA database is for the MENA region unparalleled in its geographical scope. To allow for cross-regional comparisons, the use of broad-brush terms that ensure a degree of consistency across large areas is also a distinct advantage. Through ongoing work to achieve interconnectivity with external datasets using Linked Open Data methodologies, the EAMENA project is currently discovering ways to operate at both trans-regional and highly granular scales. With plans to integrate more detailed, regional, or field databases, as well as specialized Linked Open Datasets, the EAMENA database is becoming a more generally useful and multi-functional tool. Users of all types will be able to leverage its broad scope to add further value to the manifold smaller data inventories that exist across the region, and vice versa. This should help foster the power to synthesize and compare Middle Eastern and North African societies of the past on a larger scale than has ever previously been possible.


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References

- Abu-Sitta, S. H. 2010. *Atlas of Palestine: 1917–1966*. London: Palestine Land Society.
- Andreou, G., Blue, L., Breen, C., El Safadi, C., Huigens, H., Nikolaus, J., Ortiz-Vazquez, R. and Westley, K. 2020. Maritime endangered archaeology of the Middle East and North Africa: the MarEA project. *Antiquity* [e-journal] 94(378). Available at: <<https://doi.org/10.15184/aqy.2020.196>> [Accessed March 2021].
- Barton, C., Cox, A., Delgadillo Cruz, S. and Hansen, J. 2017. Cultural-heritage inventory implementations: the versatility of the Arches system. *APT Bulletin: The Journal of Preservation Technology* 48 (4): 19–28.
- Bewley, R., Wilson, A. I., Kennedy, D., Mattingly, D., Banks, R., Bishop, M., Bradbury, J., Cunliffe, E., Fradley, M., Jennings, R., Mason, R., Rayne, L., Sterry, M., Sheldrick, N. and Zerbin, A. 2016. Endangered Archaeology in the Middle East and North Africa: introducing the EAMENA project. In, Campana, S., Scopigno, R., Carpentiero, G. and Cirillo, M. (eds), *CAA2015. Keep the Revolution Going: Proceedings of the 43rd Annual Conference on Computer Applications and Quantitative Methods in Archaeology*: 919–32. Oxford: Archaeopress.
- Boas, A. J. 1998. Archaeological sources for the history of Palestine: the Frankish period: a unique medieval society emerges. *Near Eastern Archaeology* 61(3): 138–73.
- 1999. *Crusader Archaeology: The Material Culture of the Latin East*. London: Routledge.
- Boas, A. 2012. Crusader archaeology. In, Silberman, N. A. (ed.), *The Oxford Companion to Archaeology*. 2nd edition [e-book]. Oxford: Oxford University Press. Available through: Bodleian Libraries <<https://www.bodleian.ox.ac.uk/>> [Accessed 10 April 2020].
- 2016. Domestic life in the Latin East. In, Boas, A. J. (ed.), *The Crusader World*: 544–67. London: Routledge.
- Bozzi, R., Bianchini, R. L. and Coccia, S. 2016. The case study of Saidia Land Castle: cultural heritage conservation in Lebanon. *Assorestauro: associazione italiana per il restauro architettonico, artistico, urbano*, [e-journal] Available at: <<https://www.assorestauro.org/en/projects/lebanon-2016/from-qa-012016/the-case-study-of-saida-land-castle.html>> [Accessed 20 April 2020].
- Bradbury, J., Sader, H., McPhillips, S., Kennedy, M., Banks, R., Hoffman, D., Mardini, M., Vafadari, A. and Wannessian, B. in press. Kūbbā Coastal Survey: first season report. *Bulletin d'archéologie et d'architecture Libanaises*.
- Bradbury, J., Davies, D., Jay, M., Philip, G., Roberts, C. and Scarre, C. 2016. Making the dead visible: problems and solutions for ‘big’ picture approaches to the past, and dealing with large ‘mortuary’ datasets. *Journal of Archaeological Method and Theory* 22(2): 561–91.
- Clark, V. A., Koucky, F. L. and Parker, S. T. 2006. The regional survey. In, Parker, S. T. (ed.), *The Roman Frontier in Central Jordan: Final Report on the Limes Arabicus Project, 1980–1989*: 25–116. Washington, DC: Dumbarton Oaks Research Library and Collection.
- Crowley, H. 2016. *The impact of the Franks on the Latin Kingdom of Jerusalem: Landscape, Seigneurial Obligations, and Rural Communities in the Frankish East*. PhD. University of Cardiff.
- DAAHL [online]. Available through: <<https://daahl.ucsd.edu/DAAHL>> [Accessed 1 May 2019].
- Faulkner, N., Saunders, N. J. and Winterburn, J. 2008. The Great Arab Revolt Project 2006–2007 field seasons. *Annual of the Department of Antiquities of Jordan*: 73–80.
- 2011. The Great Arab Revolt Project 2008–2009 field seasons. *Annual of the Department of Antiquities of Jordan*: 73–80.

- . 2012. The Great Arab Revolt Project 2010–2011 field seasons. *Annual of the Department of Antiquities of Jordan*: 71–77.
- Fiema, Z. T., Frösen, J. and Comte, M.-C. 2008. *Petra, the Mountain of Aaron: the Finnish Archaeological Project in Jordan*. Helsinki: Societas Scientiarum Fennica.
- Fisher, M., Fradley, M., Flohr, P., Rouhani, B. and Simi, F. 2021. Ethical considerations for remote sensing and open data in relation to the Endangered Archaeology in the Middle East and North Africa project. *Archaeological Prospection* [e-journal] 2021: 1–4. Available at: <<https://doi.org/10.1002/arp.1816>> [Accessed March 2021].
- Flohr, P., Bradbury, J. and Ten Harkel, L. 2021. Tracing the patterns: fields, villages, and burial places in Lebanon. *Levant* 53(3). Available at <<https://doi.org/10.1080/00758914.2021.1968114>>
- Fradley, M., Izzo, P. and Zerbin, A. 2021. Snapshots from the past: discoveries and destruction in the Jericho Oasis. *Levant* 53(3). Available at <<https://doi.org/10.1080/00758914.2021.1992879>>
- Gatier, P.-L., Charpentier, G. and Harfouche, R. 2001. Mission de Yanouh et de la haute vallée du Nahr Ibrahim. Rapport préliminaire 1999–2001. *Bulletin d'Archeologie et d'Architecture Libanaise* 5: 93–152.
- Goepf, M. n.d. *Fortresses d'Orient* [online] Available at: <<http://www.orient-latin.com/>> [Accessed 18 March 2020].
- Green, C., Gosden, C., Cooper, A., Franconi, T., Ten Harkel, L., Kamash, Z. and Lowerre, A. 2016. Understanding the spatial patterning on English Archaeology: modelling mass data, 1500 BC to AD 1086. *Archaeological Journal* 174(1): 244–80.
- Greenberg, R. and Keinan, A. 2009. *Israeli Archaeological Activity in The West Bank 1967–2007. A Sourcebook*. Jerusalem: Rahas Press.
- Gupta, N., Blair, S. and Nicholas, R. 2020. What we see, what we don't see: data governance, archaeological spatial databases and the rights of indigenous peoples in an age of big data. *Journal of Field Archaeology* 45(sup1): S39–S50. Available at: <https://doi.org/10.1080/00934690.2020.1713969> [Accessed March 2021].
- Haber, M., Doumet-Serhal, C., Scheib, C. L., Xue, Y., Mikulski, R., Martiniano, R., Fischer-Genz, B., Schutkowski, H., Kivisild, T. and Tyler-Smith, C. 2019. A transient pulse of genetic admixture from the Crusaders in the Near East identified from ancient genome sequences. *American Journal of Human Genetics* 104: 1–8.
- Hamilakis, Y. 2009. The 'War on Terror' and the military-archaeology complex: Iraq, ethics, and neo-colonialism. *Archaeologies: Journal of the World Archaeological Congress* 5(1): 39–65.
- Hillenbrand, C. 1999. *The Crusades: Islamic Perspectives* [online]. New York: Routledge. Available through: Bodleian Libraries <<http://solo.bodleian.ox.ac.uk/permalink/f/n28kah/oxfaeph021334772>> [Accessed 13 February 2020].
- Howard, A. J., Knight, D., Coulthard, T., Hudson-Edwards, K., Kossof, D. and Malone, S. 2016. Assessing riverine threats to heritage assets posed by future climate change through a geomorphological approach and predictive modelling in the Derwent Valley Mills WHS, UK. *Journal of Cultural Heritage* 19: 387–94.
- Koch, A. 2017. The New Crusaders: contemporary extreme right symbolism and rhetoric. *Perspectives on Terrorism* [e-journal] 11.5. Available at: <<http://www.terrorismanalysts.com/pt/index.php/pot/article/view/641/html>> [Accessed 27 February 2020].
- Lederman, Z., Bunimovitz, S. and Finkelstein, I. 1997. *Highlands of Many Cultures: The Southern Samaria Survey. The Sites*. 2 Vols. Tel Aviv: Monograph Series of the Institute of Archaeology.
- Lehmann, G. 2002. *Bibliographie der Archäologischen Fundstellen und Surveys in Syrien und Libanon*. Rahden: Verlag Marie Leidorf GmbH.
- Lombardo, L., Tanyas, H. and Nicu, I. C. 2020. Spatial modeling of multi-hazard threat to cultural heritage sites. *Engineering Geology* 277: 1–15. Available at: <<https://doi.org/10.1016/j.enggeo.2020.105776>> [Accessed March 2021].
- MacDonald, B. 1988. *The Wadi el Hasa Archaeological Survey 1979–1983, West-Central Jordan*. Waterloo: Wilfrid Laurier University Press.
- Marfoe, L. 1978. *Between Qadesh and Kumidi: a History of Frontier Settlement and Land use in the Bika', Lebanon*. PhD. University of Chicago.
- Meens, R. 2015. Een Christelijke tijd? Kerk en religie in de Middeleeuwen. In: Meens, R. and Van Rhijn, C. (eds.), *Cultuureschiedenis van de Middeleeuwen: beeldvorming en perspectieven*: 71–91. Zwolle: Open Universiteit WBooks.
- Miller, J. M. 1991. *Archaeological Survey of the Kerak Plateau*. Atlanta: Scholars Press.
- Molin, K. 1997. The non-military functions of crusader fortifications, 1187–circa 1380. *Journal of Medieval History* 23(4): 367–88.
- Mubaideen, S., Salameen, D. and Momani, R. 2021. Using the EAMENA database to document modern heritage: The Amman Heritage Houses, Jordan, case study. *Levant* 53(3).
- Myers, D., Dalgity, A., Avramides, I. and Wuthrich, D. 2012. Arches: an open source GIS for the inventory and management of immovable cultural heritage. In: Ioannides, M., Fritsch, D., Leissner, J., Davies, R., Remondino, F. and Caffo, R. (eds.), *Progress in Cultural Heritage Preservation: 4th International Conference, EuroMed 2012, Lemessos, Cyprus, October 29–November 3, 2012, Proceedings*: 817–24. Berlin, Heidelberg: Springer-Verlag.
- PADIS [online]. Available through: <<http://www.lasapienazgojericho.it/padis/project>> [Accessed 15 January 2020].
- Perring, D. and Van der Linde, S. 2009. The politics and practice of archaeology in conflict. *Conservation and Management of Archaeological Sites* 11(3–4): 197–213.
- Pringle, D. 1993–2009. *The Churches of the Crusader Kingdom of Jerusalem: A Corpus*. 4 Vols. Cambridge: Cambridge University Press.
- . 1997a. The archaeology of the Crusader Kingdom of Jerusalem: a review of work 1947–97. *Journal of Medieval History* 23(4): 389–408.
- . 1997b. *Secular Buildings in the Crusader Kingdom of Jerusalem: An Archaeological Gazetteer*. Cambridge: Cambridge University Press.
- Qadir, K. 2007. Modern historiography: the relevance of the Crusades. *Islamic Studies* 46(4): 527–58.
- Rabinowitz, A. 2014. It's about time: historical periodization and Linked Ancient World Data. *ISAW Papers* 7(22): 1–12.
- ten Harkel, L., Fradley, M., Flohr, P., Vafadari, A., and Neogi, S. forthcoming. Introduction: tracing the patterns. *Levant* 53(3).
- Theron, J. and Oliver, E. 2018. Changing perspectives on the Crusades. *HTS Theological Studies/Theological Studies* [e-journal] 74(1). Available at: <<https://doi.org/10.4102/hts.v74i1.4691>> [Accessed 12 December 2019].
- The West Bank and East Jerusalem Searchable Map. n.d. [online] Available at: <<http://digitallibrary.usc.edu/cdm/landingpage/collection/p15799coll74>> [Accessed 30 June 2019].
- Thompson, J. A. 2006. *Death and Burial in the Latin East: A Study of the Crusader Cemetery at Atlit, Israel*. PhD. Cardiff University.
- Verdeil, E., Faour, G. and Velut, S. 2007. *Atlas du Liban: territoires et société*. [online] Beirut: Presses de l'Ifpo, CNRS Liban. Available at: <<https://books.openedition.org/ifpo/402>> [Accessed July 2020].
- Zerbin, A. 2018. Developing a heritage database for the Middle East and North Africa. *Journal of Field Archaeology* 43(sup1), S9–S18. Available at: <<https://doi.org/10.1080/00934690.2018.1514722>> [Accessed March 2021].