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FROM THE RIVER TO THE SEA OF THE SETTING SUN: ROUTE NETWORKS BETWEEN THE EUPHRATES AND THE MEDITERRANEAN DURING THE IRON AGE (1200-600 BCE)

1. Introduction

This article aims at analysing evidence of ancient roads connecting the Mediterranean to the Euphrates during the Iron Age. Evidence of goods circulation between the Euphrates and the Mediterranean and between the Euphrates, northern Syria and the western world are attested since prehistory (Broodbank 2015). These contacts intensified during the Iron Age, probably thanks to the expansion of the Neo-Assyrian empire, and to the intense activities of merchants, which facilitated the circulation of goods and people. Furthermore, the strategic position of northern Syria provided easy access to raw materials such as metals and wood, which were lacking in the Mesopotamian area.

The study of ancient roads has been important in understanding political, social, and cultural transformations of ancient trade networks and economies. In the Near East, landscape-oriented research has immensely contributed to the analysis of pre-modern road systems. However, while for Roman and medieval periods this method produced a dataset that implemented the rich corpus of historical information (Turchetto 2018; Matessi 2021), research on pre-Roman connectivity networks strongly relies on the archaeological record, mostly represented by data from surveys. The use of these data allows a long term and chronologically unprecise reconstruction of ancient itineraries. Therefore, gaps in the data are often filled by the transposition of later itineraries (Wilkinson 2014). This transposition risks to reiterate the idea that road networks are static, stable over a very long period. While this approach has the benefit to help in reconstructing road maps based on specific itineraries, it has been proven difficult when dealing with mapping the movements of people and material over these routes. Few attempts have been made to contextualise dynamic of changes in route networks over well-defined chronological spans by considering landscape analysis, textual and material sources (Palmisano 2018; Matessi 2021).

The methodology employed to analyse the connecting networks and the route landscapes from the Mediterranean to the Euphrates will apply the use of multiple datasets, including texts, survey data, and the trajectories of ancient roads. Very few texts dated to the Iron Age refer to connecting systems in use at the time. Some Assyrian texts describe the military campaigns the Assyrian kings were promoting to expand their empire (Yamada 2000; Dalley 2017). These texts do not provide precise data on the itineraries followed by the Assyrian army and, while it is possible to establish the main road trajectories, it is difficult to assess the precise route undertaken.

To reconstruct the main road system employed to connect the Mediterranean to the Euphrates during the Iron Age, this research will take into account different datasets: 1) the analysis of data from surveys conducted in the Orontes, the Tabqa and Sajur and in the upper Euphrates areas; 2) geographic data on potential connectivity systems; 3) geographic information drawn from Roman and medieval itineraries and from 18th and 19th century CE travel accounts. This article will take into account three itineraries: 1) the route connecting the Syrian coast to the Orontes and the Amuq valleys; 2) the route connecting the Euphrates valley to the Orontes valley; 3) the route connecting Aleppo to the Orontes and the Amuq valley.

2. Historical and geographical setting

Northern Syria is characterised by fertile valleys, rough mountains and easy crossings, which facilitated the connection of Mesopotamia with the Mediterranean (Fig. 1). The Iron Age (1200-600 BCE) has been often defined as an age of connectivity (Osborne, Hall 2022). In the 10th and 9th centuries BCE the

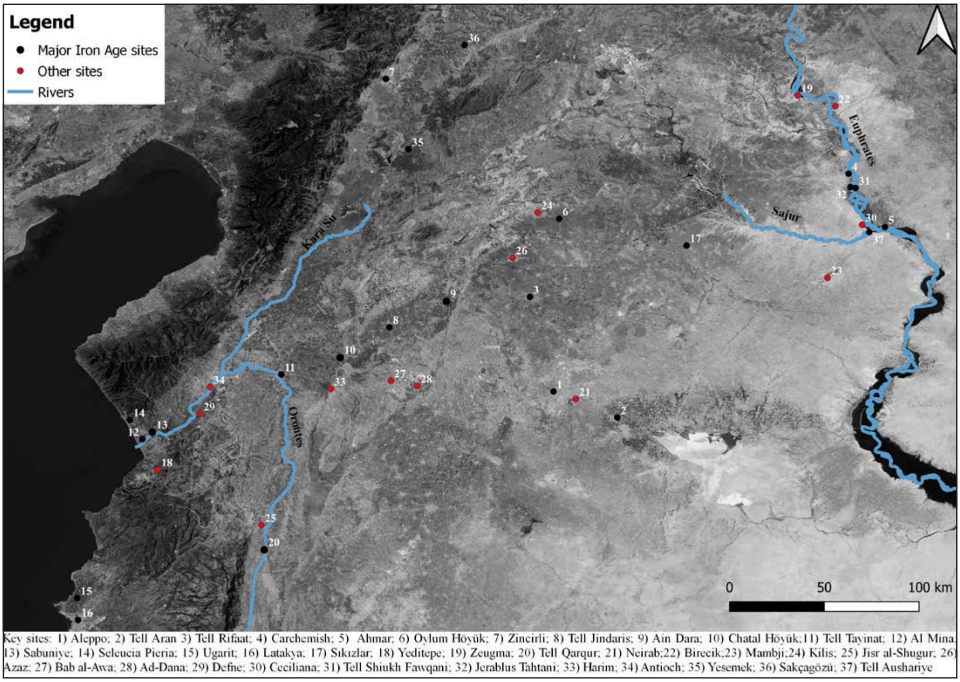


Fig. 1 – General map of the target area.

Neo-Assyrian empire began to expand outside northern Mesopotamia, while the Syro-Anatolian kingdoms were part of a dynamic city-state system (Osborne 2020). By the 8th century BCE, the Neo-Assyrian empire had conquered almost the entirety of the ancient Near East and it was during this period that the Assyrian capital cities yielded the majority of Syro-Anatolian objects, which have been obtained as tribute or booty. At the same time, objects manufactured in the Near East has been found in sites located in the eastern and central Mediterranean. However, the archaeological evidence for connectivity is reflected by a lack of contemporary documentation. There are no excavated archives of tablets detailing mechanism of trade. While Assyrian royal inscriptions mention Cyprus or the Aegean, they do not analyse economic relations. A way to start and explore the connectiveness existing between the Mediterranean and Mesopotamia is to analyse the possible route networks connecting them.

Northern Syria was famous throughout all the Near East to produce ivory carvings and bronze metalworks (Winter 2010). Evidence coming from Assyrian texts confirms that metal vessels were largely available in the North Syrian states, and they were highly requested as tribute by the Assyrian kings. Literary documentation confirms that at least three states belonging to the North Syrian core, Patina, Carchemish and Sam'al, had access to a quantity of

Fig. 2 – Metal and ivory objects found at Nimrud (© The Trustees of the British Museum).

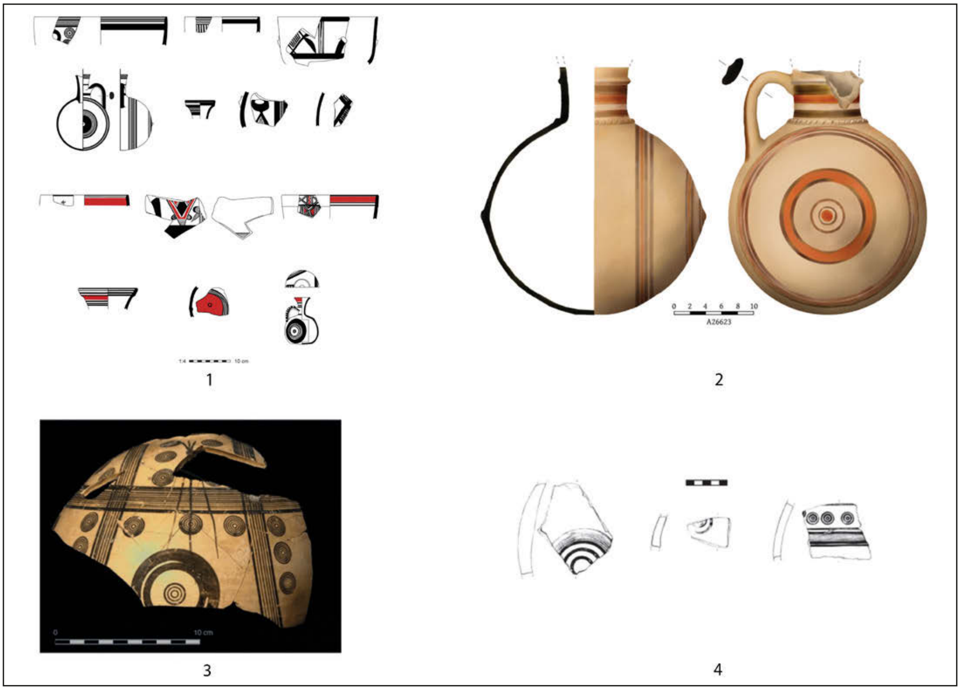


Fig. 3 – Cypriot pottery found at 1) Tell Tayinat (after Karacic, Osborne 2017); 2) Chatal Hoyuk (after Pucci 2019); 3) Tell Ahmar (after Bunnens 2022); 4) Arslantepe (after Manuelli 2010).

raw material to support bronze production (Luckenbill 1926). Although no trace elements analysis has been successfully performed on metalworks from North Syria and Mesopotamia so far, it is undeniable, at least from textual and stylistic evidence, that northern Syria was a production centre for highly valued metal objects (Fig. 2). Similarly, objects produced in the eastern and central Mediterranean world were sought after and circulated in the northern Levant. Cypriot and Euboean pottery have been found as far as across the Euphrates in the sites of Arslantepe (Manuelli 2010) and Carchemish (Woolley 1939). The circulation of such objects would have been supported by a wide system of route networks connecting the core of the Assyrian empire with the seaports located on the Mediterranean coast (Figs. 3, 4).

3. Methodology

Research on ancient route networks received a boost thanks to the development and implementation of Geographic Information System (GIS) packages. GIS provides a set of tools to model connectivity based on a digital

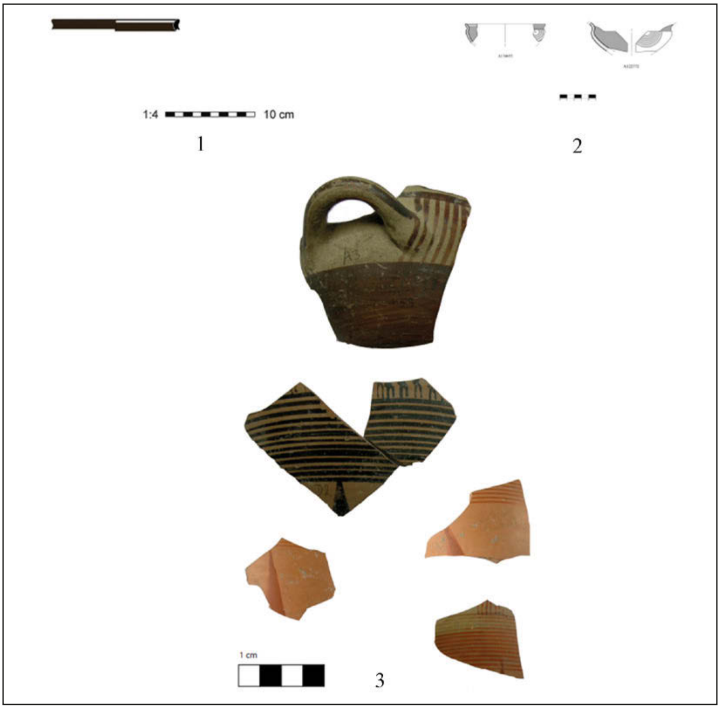


Fig. 4 – Euboean pottery found at 1) Tell Tayinat (after Osborne *et al.* 2019); 2) Chatal Hoyuk (after Pucci 2019); 3) Al Mina (after Vacek 2012).

map data. Least-Cost Pathway (LCP) is a well-known computational method for tracing routes based on topography and landscape features (Bevan 2010; Palmisano 2018). One limitation of this approach is that it can predict only one path, although several paths may exist between two points, thus ignoring the several possibilities of movement that may have existed, imposed by cultural or behavioural choices. One way to avoid generating only one path is to produce a Least-Cost Corridor (LCC) based on friction maps, to create a more comprehensive picture of possible transit areas (Palmisano 2018). The final LCC models represent a wide range of possibilities of movement rather than a single LCP. For this research it has been decided to employ both methods, to provide an extensive picture of connectivity networks in the area.

Data have been processed by using the open source software GRASS GIS 7.8v, the slope friction map has been created through the module r.slope. aspect on a digital elevation module (DEM) generated by the NASA's Shuttle Radar Topography Mission (SRTM), which provides a coverage with a spatial resolution at 30 m. The cost surface upon which the LCC is based upon has been generated by using the GRASS module r.walk.points. The LCP has been calculated by using the DEM generated by the NASA and modelled by using the GIS' least-cost path analysis. The LCCs and the LCPs have been computed based on key Iron Age sites situated in the a) Orontes delta, b) northern Syria, c) Islahiye valley, d) the Euphrates and e) on the Syrian coast:

a) Al Mina
b) Tell Tayinat; Aleppo; Jindaris; Tell Rifaat
c) Oylum Höyük; Zincirli
d) Tell Ahmar; Carchemish
e) Latakya plain

All these sites and regions were main cities or key nodes within networks of interaction during the Iron Age. Al Mina was a seaport, and, according to different studies, it was one of the main ports of entries of goods circulating between the Mediterranean and the Near East (Pamir 2013; Radner, Vacek 2020). Tell Tayinat is located in the Amuq valley, and it has been identified as Kunulua, the capital of the kingdom of Patina, and later as the regional capital of the Assyrian province of Kullania (Harrison 2016). Zincirli was the capital of the kingdom of Sam'al, which became part of the Assyrian empire (Hermann, Schloen 2016). Tell Ahmar/Til Barsip/Kar-Shalmeneser (Bunnens 2022) was one of the crossing points across the Euphrates. Carchemish was a capital city during the Iron Age. Its relevance in the Late Bronze and Iron Ages suggests that it was used as a crossing point, however it likely lost its importance during the Roman, medieval and Islamic period (Marchetti 2014). Tell Rifaat is in the western Afrin valley and has been identified by some scholars as the ancient city of Arpad, capital of the kingdom of Bit-Agusi (Seton Williams 1961). Tell Jindaris is in the Afrin valley. Remains dated to the Iron Age II-III (9^{th}-6^{th} century BC) consist of scarcely preserved domestic buildings (Weiss 1997, 118-119; Sürenhagen 1999).

Ain Dara, located in the Afrin, was a religious centre during the Iron Age (Abu Assaf 1990; Stone, Zimansky 1999). Oylum Höyük is located in the Kilis valley, and it has an uninterrupted stratigraphic sequence dated from the Late Chalcolithic period to the Roman times (Özgen, Helwing 2003). Aleppo, ancient Halab, dominates the plain in the northwest of Syria, on the eastern side of the Orontes river. During the pre-Hellenistic period, Aleppo was an important religious centre (Kohlmeyer 2009). The plain of Latakya was included in the Neo-Assyrian province of Simirra, likely created by Tiglat-Pileser III (Yamada 2005, 67). This province included several cities and trading posts located on the Mediterranean coast and its northern border was the Jebel el-Aqra (Radner, Vacek 2022). Perhaps the most important site during the Iron Age in this area was Ras ibn Hani. Excavations here yielded evidence of contacts with Cyprus and the Mediterranean area (Bordreuil 1981).

4. Route analysis and results

Most research has been based on the identification on ancient road networks between south-eastern Turkey, northern Syria and Iraq. A typical example of this research is the map of Mesopotamia proposed by H. Kiepert (1903), which represents an overlay on Ottoman Turkey of the road networks produced by the *Tabula Peutingeriana* (Fig. 5). Furthermore, research on road networks between Turkey, Syria and Iraq is summarised by the work of A. Comfort (2009, 2023), which proposed a gazetteer of cities and elements of the road networks preserved in this area. The analysis of ancient texts and itineraries and the evidence collected from modern travellers, maps, the location of roman bridges and satellite imagery pointed to the existence of several main roads connecting the Mediterranean to northern Syria and the Euphrates valley and then continuing towards Mesopotamia.

4.1 *Analysis of survey data*

Surveys conducted in the Amuq valley, the Aleppo region and the Upper Euphrates identified, through the analysis of a series of sites alignments, evidence

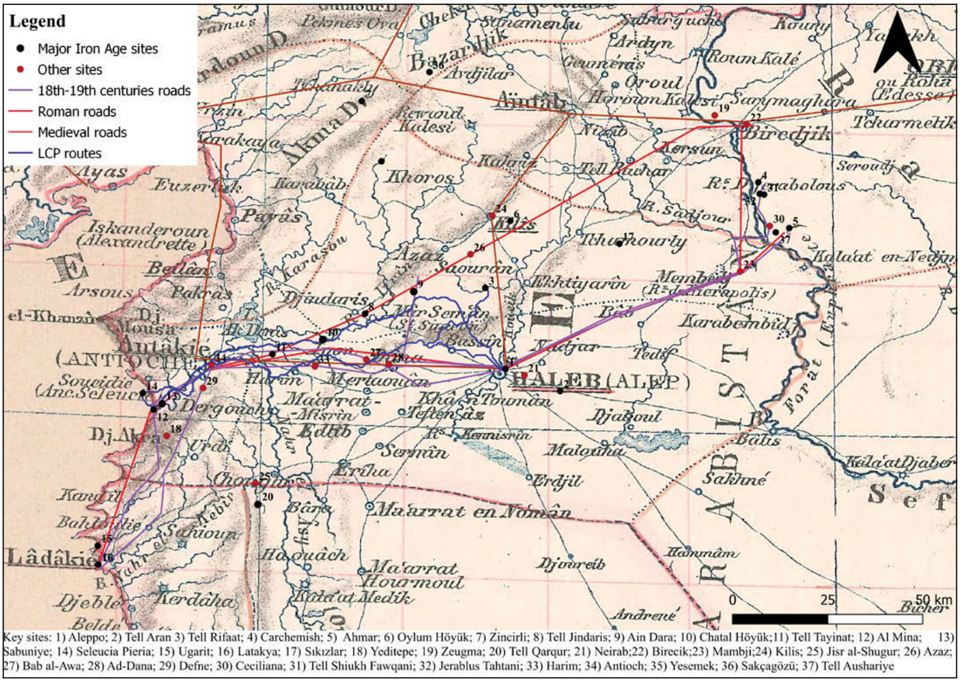


Fig. 5 – Map drawn by Kiepert (1903) with Roman, medieval and modern roads and LCPs results.

from texts, and physical traces of routes, the alignment of sites along presumed routes connecting Carchemish and the Euphrates with the rest of the Assyrian world and the Mediterranean (Wilkinson, Wilkinson 2016) and a series of roads leading to Aleppo (Del Fabbro 2012). Research conducted by analysing survey data from the Amuq valley (Braidwood 1937) and from various locations in Syria (Maxwell Hyslop *et al.* 1942; Tchalenko 1953-1958; de Maigret 1978; Matthers 1981; Schwartz *et al.* 2000; Del Fabbro 2012) identified a series of roads connecting Aleppo to the Amuq valley and to Mesopotamia. Two roads are evident: one departing from Aleppo to Carchemish via Tell Ahmar, and a second road connecting Aleppo to the Amuq valley via the valleys located at the fringe of the limestone massif. The road connecting Aleppo to Carchemish via Tell Ahmar may be the same road identified by the analysis of data coming from the survey conducted by the Land of Carchemish Project, departing from Carchemish, passing by the quarry at Sıkızlar, through Al Qana and directed towards Tell Rifaat and onwards towards the Amuq valley (Wilkinson, Wilkinson 2016, 224). The road connecting Aleppo to the Amuq valley was likely passing close to the sites of Ain Dara and Tell Jindaris, following the Afrin river to enter the Amuq valley.

In addition to this, the analysis of settlement patterns from survey data collected between the Mediterranean and the Euphrates (Amuq valley, Aleppo region, Upper Euphrates valley, Sajur valley) highlighted a significant growth in the number of occupied sites during the Iron Age (Morandi Bonacossi 2000). In parallel, with the exception of the main cities, the average site size is smaller than the one recorded for the previous periods. This means that the archaeological landscape was mainly characterised by rural villages dispersed in the countryside and dependent on the provincial capital or by fortresses or stronghold protecting routes or river crossings.

4.2 *Assyrian texts*

Textual evidence mentioning itineraries and dated to the Iron Age are the annals recording the military campaigns of Ashurnarsirpal II (883-859 BCE), Shalmeneser III (858-824 BCE) and Sargon II (721-205 BCE). Texts dated to the ninth and tenth campaigns of Ashurnarsipal II depict a general overview of the main roads system in Syria. Although the information is only marginally mentioned, it is possible to reconstruct two axes followed by the Assyrian army: one road connecting Carchemish to Tell Tayinat and following the piedmont road beyond the Euphrates (Churchill Semple 1919; Liverani 1992, 143) and the second one following a N-S axis linking Aleppo to Hama to Damascus (Liverani 1992, 143). The itinerary connecting Carchemish to Tell Tayinat was passing through the Afrin valley to reach Tell Tayinat and then continuing S by passing through the Jebel Quseir to cross the Orontes at Jisr esh-Shugur, located near the site of Tell Qarqur (Dornermann, Casana

2008). The presence of Neo-Assyrian reliefs (Taşyürek 1975; Harmansah 2014) in the Yayladağ mountains and records of a road connecting Jisr esh-Shugur with the mountains surrounding the Amuq valley, suggest that this itinerary has been used by the Assyrians.

Shalmeneser III records a similar route. He crossed the Euphrates at Tell Ahmar and passed through Tell Shiukh Fawqani. He then moved to Zincirli, touching the city of Lutibu, identified with Sakçagözü or with Yesemek (Kraeling 1918). The king reached the source of the Kara Su river, arrived in the Amuq valley and crossed the Orontes river to reach the Mediterranean (Yamada 2000, 100). The precise location of the seacoast reached by Shalmeneser III is not mentioned. However, he probably reached the coast either at the base of the Jebel el-Aqra, or somewhere in the plain of Latakya, probably using the road passing through the Yayladağ and Tell Qarqur (Yamada 2000, 101). Shalmeneser III reached Carchemish from Tell Ahmar by following the Sajur river. In the sixth-year campaign, he reached Aleppo from Tell Ahmar, passing through the territory of Bit Agusi (either through Tell Rifaat or Tell Arane) and he then proceeded towards Hama following the river Qoqueiq to the S and then westwards to reach the Orontes river close to Jisr esh-Shughur. From here he followed the road towards Latakya to reach the Mediterranean.

Sargon II mentions two itineraries: a southern route connecting the Euphrates to Hama following the Orontes river by approaching Tell Qarqur and Tell Acharneh and a northern route passing from Til Barsip to Neirab to Tell Tayinat (Melville 2016, 69). The most mentioned crossing point by the Assyrian annals is the one from Tell Ahmar to Tell Aushrariye. Additional crossing points mentioned by Assyrian kings include Tell Shiukh Fawqani (Fales 2005; Wilkinon, Wilkinson 2016, 218).

4.3 *Travellers' accounts*

The area was crossed by a number of routes, connecting the Mediterranean to Mesopotamia and beyond, recorded at least from the Roman period to modern times. The *Tabula Peutingeriana* mentions many roads connecting the modern region of Hatay, through Aleppo, to the Euphrates and the same road was likely part of the caravan routes connecting Antioch to Mesopotamia and eastern Asia during the medieval periods. The analysis of stations and routes mentioned in the *Tabula Peutingeriana*, of medieval caravanserai, and of medieval and modern travel accounts allowed to identify two routes connecting the Mediterranean to the Euphrates. These are starting from the Orontes Delta, passing through Antioch and diverging, going through the Afrin valley to Aleppo and through the Islahiye valley towards Zeugma. From Aleppo, the road would have followed the river Sajur, towards Mambji, with a crossing on the Euphrates at Ceciliana. Previous research conducted by C. Tavernari (2009) collected and georeferenced the caravanserai located in medieval Syria.

The analysis of these data allowed to reconstruct part of the road linking the Amuq valley to the Euphrates and passing through Aleppo and Mambji.

During the medieval period, travel across western Asia was facilitated by the presence of caravanserai distributed on the roads between major cities. While there are several research projects based on the study of caravanserai, the publication of results and datasets, with few exceptions, is limited (Tavernari 2009; Wilkinson 2014, 69-70). T.M. Ciolek's OWTRAD project (http://www.ciolek.com/owtrad.html) published a database with over 700 georeferenced caravanserais and routes nodes. Although this database is a work in progress, it is very useful in identifying itineraries during the medieval and Ottoman periods.

The analysis of ancient travel accounts (Pococke 1745; Garovaglio 1896; Baedeker 1898, 1906; Uboldi 2010) allowed the reconstruction of the roads connecting Aleppo to the Mediterranean and to the Euphrates used by travellers during the 18th and 19th century CE. While information on the location of medieval caravanserai is limited, the travel accounts are often accompanied by a brief description of the villages and sites located along the routes. These accounts mention four sets of routes connecting the Mediterranean to the Euphrates, sometimes joining different itineraries: one connecting Aleppo to Antioch and on towards the Mediterranean, another one connecting Aleppo to Urfa, one connecting Latakya to Aleppo, and Latakya to Antioch.

The analysis of ancient caravanserai roads and of modern itineraries allowed to notice that these networks were mostly following the itineraries recorded in the *Tabula Peutingeriana* and the *Itinerarium Antonini*, with some variations probably due to the abandonment of ancient sites and the settlement of new cities and villages. Travellers accounts mention two roads connecting Aleppo with the Euphrates: one passing close to Mambji with a crossing point at Tell Ahmar; the second one follows Mambji and reaches the Sajur river towards the city of Gaziantep to cross the Euphrates at Birecik. The preferred route to reach the Amuq valley from Aleppo passed through the valleys of Sarmada and Harim. Travellers accounts dated to the 19th century CE (Baedeker 1906) mention the road from Latakya to Antakya. This road reached the pass at Yayladağ and moved towards the eastern slope of the Jebel el-Aqra through Yeditepe. From here, the road reached the Orontes Delta at Seleucia and proceeded through Dephne towards Antakya. Roman sources cite this same route as an itinerary to reach Seleucia from Laodicea (De Giorgi 2016, 147-148). There are at least two options mentioned in 18th and 19th centuries travellers' logs (Pococke 1745; Baedeker 1898) to go from Aleppo to Carchemish: one road passed through Azaaz and Kilis and proceeded towards Gaziantep; the second road passed through Mambji and proceeded N towards Jerablus and Carchemish. The first road passed close to Tell Rifaat and Oylum Höyük before reaching Carchemish. The second road passed close to the quarry site of Sıkızlar, before reaching the Sajur river and proceeding N towards Jerablus and Carchemish.

5. LCC and LCP analysis and discussion

Least-cost analysis has been widely used in archaeology to model movement across past landscapes. Despite its widely use, this analysis has been often criticized due to the lack of validation of the modelling results. This is partly due to the lack of sufficiently detailed archaeological data to assess the realism of the model outcomes (Seifried, Gardner 2019). In order to get around some of the limitations of least-cost analysis, this research decided to use two different methods to model movements: LCPs and LCCs.

The basis for LCP algorithms is accumulated cost surfaces that draw from a friction map to compute the cost of movement from and to the selected points. However, these algorithms do not consider the human factor and the complexity of human movement that does not necessarily follows one path. In addition to this, the algorithm does not allow for cultural factors involved in the choice for a path, such as the presence of settlements and political boundaries among others. LCC provides a more comprehensive picture of transit areas (Matessi 2021; Palmisano 2018). The algorithm indicates the area of the least common costs between two points by combining the cumulative cost surfaces obtained for a source and a destination. The results of the LCC are a raster grid representing a wider range of possibilities for movement if compared to the single least-cost path. The main aim of this research is to provide a preliminary pattern of expected movement connectivity, to be tested against archaeological and historical data. For this reason, only friction costs determined by the topography, i.e. slope, have been considered as a base for the LCPs and LCCs analyses.

While previous research made use of satellite imagery (Wilkinson, Wilkinson 2016), least-cost analysis and archaeological data (Del Fabbro 2012; Matessi 2021) to identify route networks, this article aims at assessing the realism of the modelling outcomes provided by the LCPs and LCCs analysis. Therefore, the results have been compared to the location of settlements and to the presence of pre-modern routes. In particular, the analysis focused on comparing the LCPs and LCCs results against a) the location of settlements dated to the Iron Age extrapolated from published excavations and surveys conducted in northern Syria and southern Turkey; b) the routes used by the Assyrian army to move between the Assyrian capital, located in northern Mesopotamia, and the Mediterranean sea; c) Roman itineraries recorded in the *Tabula Peutingeriana*; d) the location of caravanserai used by travellers during medieval and modern periods; e) the routes used by 17th and 18th centuries travellers, with mentions of the travel time between one place and another by horse.

The roads extracted by these datasets have been compared to the analysis of the LCP and LCC. The cumulative results of the computational analysis sometimes show a different connectivity network from the one recorded on Roman and modern itineraries. The LCP model connecting Aleppo to Tell

Tayinat and Al Mina passes through Bab el-Awa, while accounts of travellers visiting the area during the 18th and 19th century CE were using the road passing through Harim.

1) The results of the LCC connecting the Syrian coast to the Orontes Delta and the Amuq valley follow the course of the Orontes river, crossing it at Jisr esh-Shugur and following one of its many tributaries to cross the Yayladağ and reach the Amuq valley. While the 18th and 19th centuries travellers' guides suggest a different route to reach the Orontes Delta and the Amuq valley, the analysis of Ashurbanipal II itineraries follows the same route suggested by the LCC analysis (Fig. 6).
2) The LCP analysis shows two roads connecting the Mediterranean to the Euphrates: one passed through the Amuq valley and Aleppo to reach the Sajur river and the Euphrates (Fig. 6); the other passed through the Islahiye valley passing by Zincirli and Sakçegözü to reach Birecik or Zeugma (Fig. 7).
3) The cumulative LCC models identify a series of corridors leading from Aleppo to the Mediterranean. Several passages connect Aleppo to the Amuq valley and the Orontes Delta. Nowadays the main axis of communication is represented by the Aleppo-Antakya Road, roughly copying the routes

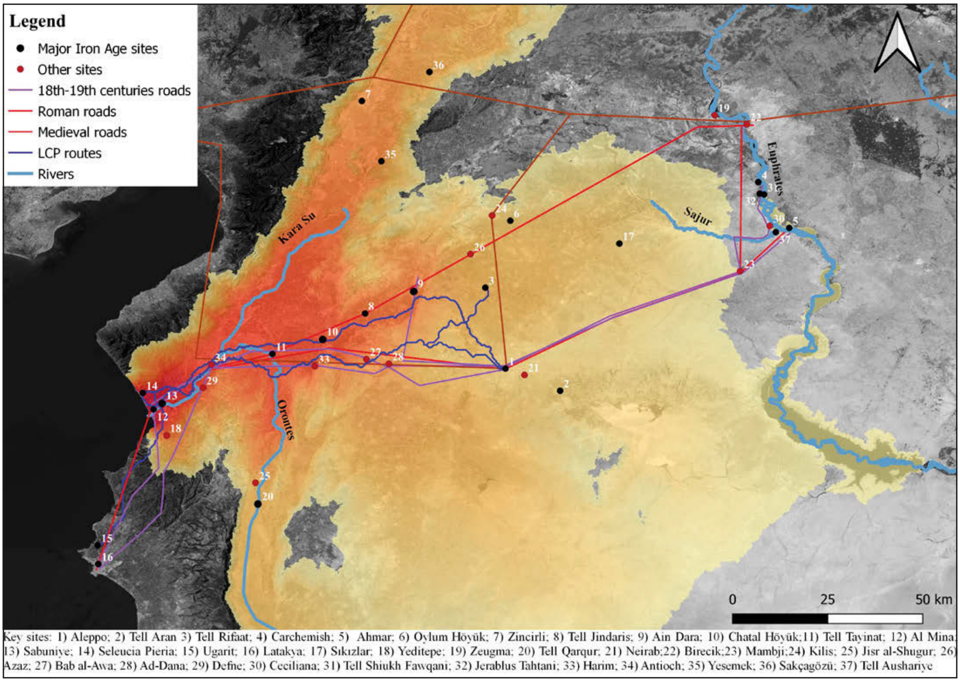
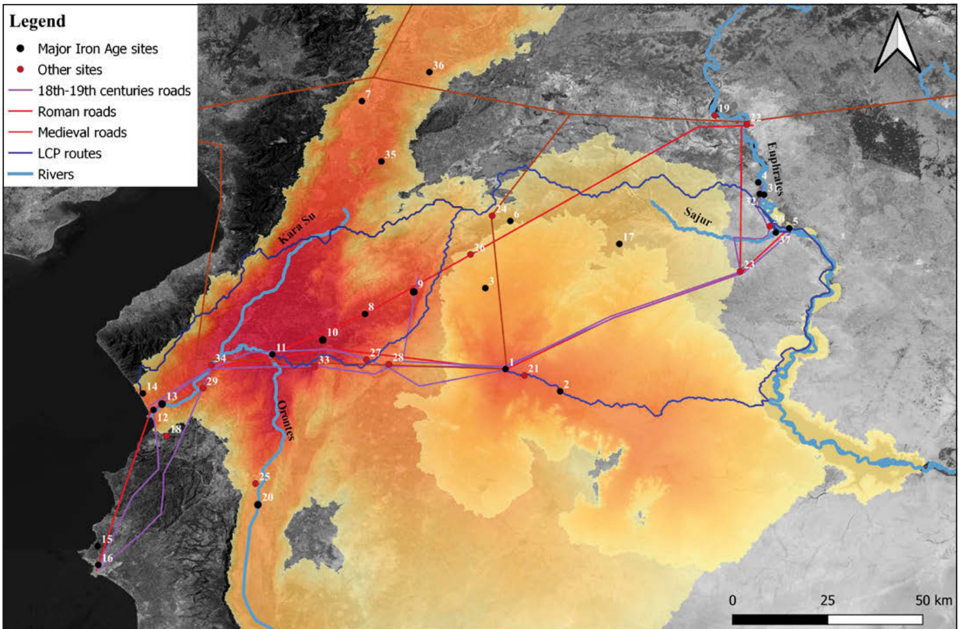


Fig. 6 – LCP and LCC analysis of the Syrian coast and the Orontes Delta.

predicted by the LCP model. However, the LCC splits, suggesting a different corridor between Aleppo and the Mediterranean. The second corridor is passing through the Ad-Dana and Harim valleys to enter the Amuq valley and then continuing towards the Mediterranean (Fig. 8).

The comparison between historical data and LCC analysis shows some discrepancies. Although there is a risk in assuming that major routes remained the same through long periods of time, the result of the computerised method shows the need to contextualise the conclusions obtained by employing the two different methods. For example, while it is true that Assyrian and Roman itineraries and the LCP from Aleppo to the Amuq valley passed through Bab el-Awa, following the modern road, the geographical layout of the landscape exposed this route to robbers, thus making preferable to use the route passing through Harim. In this case, the analysis of archaeological data and of ancient itineraries helps us contextualising the route. The location of archaeological sites dated to the Iron Age and the analysis of Roman remains and itineraries imply that the route through Bab el-Awa was in use at least until the Roman period and it probably fell in disuse sometime between the medieval period and modern times, as travellers' guides discourage its use during the 19th century CE



Key sites: 1) Aleppo; 2) Tell Aran 3) Tell Rifaat; 4) Carchemish; 5) Ahmar; 6) Oylum Höyük; 7) Zincirli; 8) Tell Jindaris; 9) Ain Dara; 10) Chatal Höyük;11) Tell Tayinat; 12) Al Mina; 13) Sabuniye; 14) Seleucia Pieria; 15) Ugarit; 16) Latakya; 17) Sıkızlar; 18) Yeditepe; 19) Zeugma; 20) Tell Qarqur; 21) Neirab;22) Birecik;23) Mambji;24) Kilis; 25) Jisr al-Shugur; 26) Azaz; 27) Bab al-Awa; 28) Ad-Dana; 29) Defne; 30) Ceciliana; 31) Tell Shiukh Fawqani; 32) Jerablus Tahtani; 33) Harim; 34) Antioch; 35) Yesemek; 36) Sakçagözü; 37) Tell Aushariye

Fig. 7 – LCP and LCC analysis of the Mediterranean and the Euphrates.

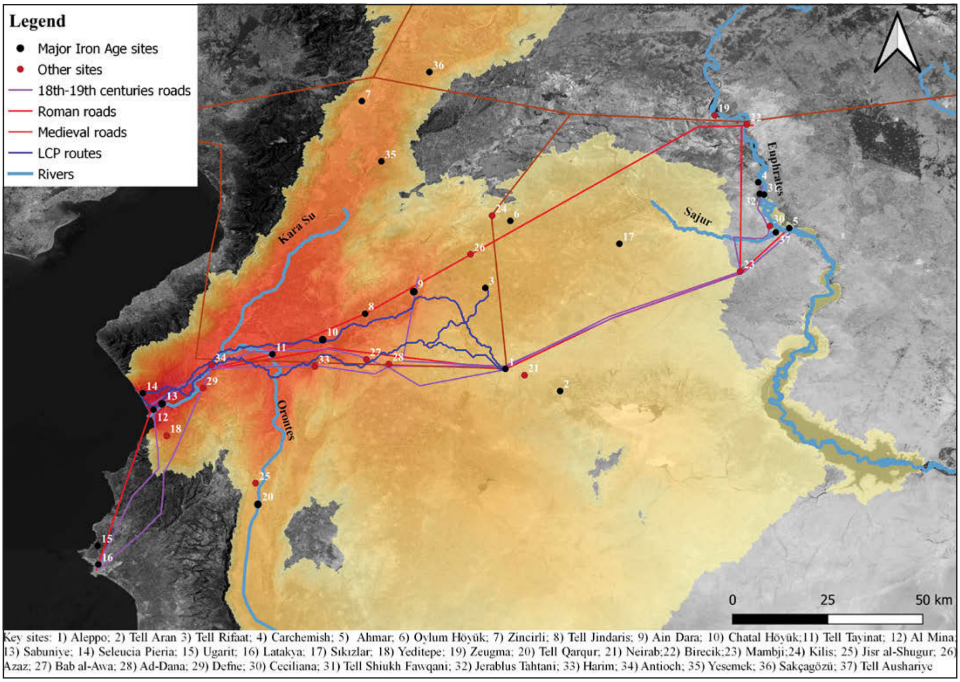


Fig. 8 – LCP and LCC analysis the routes between Aleppo and the Mediterranean.

(Baedeker 1906). However, the best way to reach the Euphrates from Aleppo according to the LCC analysis is to go southward to Raqqa and then to follow the river northwards to cross it at the confluence between the Sajur river and the Euphrates (Fig. 8), although the results of the LCP and evidence coming from Assyrian and modern texts, and from the analysis of archaeological data from the area, suggest that the route used to connect Aleppo to the Euphrates followed the Sajur river to the confluence with the Euphrates river.

6. Conclusion

Computational approaches to the study of past movement and of its related patterns have proven essential in the analysis of any archaeological context. The aim of this study was the reconstruction of ancient route networks located in northern Syria and connecting the Mediterranean to the Euphrates by combining historical and archaeological sources with modern computer aided LCC analysis. While direct evidence of individual categories of archaeological sources are rarely dense enough to be able to recover a detailed movement or to reconstruct route networks, there are different methods that can be used to help reconstructing ancient routes: the traditional method assumes that roads remained the same through long periods of time and that data from better documented periods can be projected on the period of interest. The computational method is based on the principle of landscape continuity, in which routes are modelled on cost-surface GIS techniques (LCC) in association with relevant settlement data. It is important to remark that the proposed approach is not aimed at providing a significant new knowledge on the routes under analysis. It must be also considered that the approach used in this research is at a very general scale and therefore highlighting the main route networks and missing out on the itineraries connecting smaller settlements.

The combination of different data, integrating historical and archaeological approaches to route landscapes offers a better understanding of ancient route networks. Within this framework, the emergence of digital methods has changed the way we conduct archaeological research, sometimes improving or offering a different point of view to the research (Katsianis *et al.* 2022). However, the results of the study on ancient routes performed in this article highlighted the necessity to contextualise the results obtained with the computational method and to interpret them by using archaeological data. Although it has been argued that relying on the transposition of better-known routes in past landscapes risks to obliterate the dynamism of ancient networks, the use of an integrated approach, taking into account data coming from ancient routes, location of Iron Age sites, Assyrian texts, 18th and 19th century CE travellers' log and LCC analysis offers a critical interpretation of the Iron Age route network connecting the Mediterranean to the Euphrates.

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ABSTRACT

The study of ancient roads has been important in understanding political, social, and cultural transformations of ancient trade networks and economies. In the Near East, landscape-oriented research has immensely contributed to the analysis of pre-modern road systems. However, while for Roman and Medieval periods this method produced a dataset that implemented the rich corpus of historical information, research on pre-Roman connectivity networks strongly relies on the archaeological record, mostly represented by data from surveys. The use of these data allows a long term and chronologically unprecise reconstruction of ancient itineraries. Therefore, gaps in the data are often filled by the transposition of later itineraries, risking reiterating the idea that road networks are static, stable over a very long period. This article aims to contextualise connecting networks and route landscapes from the Euphrates river to the Mediterranean sea during the Iron Age (1200-600 BCE). The study will make use of an integrated approach by using multiple datasets. The research will argue that by considering different data, it is possible to offer a critical interpretation of the main route network employed during the Iron Age to connect the Euphrates area with the sea.