

Harbours of Byzantium

The Archaeology of Coastal Infrastructures

Edited by

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Cover: Southwestern harbour of Byzantine Kassandreia in Chalkidiki, Greece (A. Ginalis)

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Contents

List of Figures	ii
Editor's Preface	vii
1. Byzantine Imperial Policy Towards Building and Maintaining of Ports in the Eastern Mediterranean in the 6th Century AD and the Technology Involved.....	1
<i>Ruthy Gertwagen</i>	
2. Was Roman Marine Concrete Used in Byzantine Harbour Construction? An Unanswered Question....	34
<i>Robert L. Hohlfelder</i>	
3. Ports, Harbours, and Landings of the Byzantine Terra d'Otranto	46
<i>Paul Arthur</i>	
4. The Late Antique and Byzantine Port of Thessalian Thebes – The Archaeology of its Coastal Infrastructures	65
<i>Alkiviadis Ginalis and Anna Gialouri</i>	
5. The Port Facilities of Thessaloniki up to the Byzantine Era	86
<i>Marina Leivadioti</i>	
6. Remarks on the Urban Transformations of the Harbours of the North Aegean Coastline during the Early Christian Era as well as on their Links with the Road Network	100
<i>Flora Karagianni</i>	
7. An Interdisciplinary Approach to the Study of the Ancient Harbour Site of 'Karon Limen' or 'Portus Caria/Carea', Bulgaria	113
<i>Preslav Peev, Alkiviadis Ginalis, Bogdan Prodanov, Grigori Simeonov</i>	
8. Bathonea (?): A Newly Discovered Ancient Port in the Hinterland of Byzantium/Constantinople	127
<i>Şengül G. Aydingün</i>	
9. A Late Antique and Byzantine Harbour in Constantinople: The Theodosian Harbour at Yenikapı. History, Archaeology, and Architecture	134
<i>Ayşe Ercan-Kydonakis</i>	
10. Between Yavneh-yam and Rhinocorura: The Byzantine Portals of the Southern Levant	149
<i>Gil Gambash</i>	
11. The Harbour Installations of Lake Mariout (Alexandria Region) in the Late Roman Empire (4th–7th Centuries AD)	158
<i>Valérie Pichot</i>	
Appendix 1. Conference Programme International Conference on 'Harbours of Byzantium' (January 11th–13th 2018)	178
Appendix 2. Contributors in Alphabetical Order	179

Editor's Preface

Christianity, Roman tradition and ideology, as well as Greek cultural heritage, have been labelled as the pillars of the Byzantine Empire. In fact, the real crux and enabler of power in an empire that combined the Occident with the Orient was its control over the seas. As such, seafaring constituted the formula of success for dominance of the Mediterranean, playing a key role in communication, military activities, and, especially, economic exchange. But how does one get from land to water? The linking gates are coastal installations, i.e. ports, harbours, and other infrastructures. These function as economic hubs, cultural and social meeting points, as well as gateways for communication and connection.

Even though the study of harbour sites and port networks of the Byzantine Empire constitutes a relatively new research field, it has nevertheless received significant attention over the last few years, as we can see from the instigation of various projects and the staging of conferences. However, attention is rarely paid to analyses of physical harbour remains and their impact on the general development of Late Antique and Medieval architecture, economy, or trade networks.

As such, in 2018, an international conference on the *Harbours of Byzantium* was organised at the Institute for Advanced Study of the Hanse-Wissenschaftskolleg in Delmenhorst, Germany. This event was intended to focus particularly on the archaeology of Byzantine coastal sites, including both harbour infrastructures *per se*, as well as associated facilities and affected landscapes. Leading scholars in the field from twelve different countries presented new material and data with which to understand the development of harbour architecture and coastal activities from Late Antiquity to the Middle Ages. The papers set out to cover sites from all provinces of the Byzantine Empire, stretching from Italy in the West to the Levantine coast in the East, and the Black Sea in the North to Egypt in the South. This allowed a general overview for comparative analyses and discussions on various aspects of Byzantine harbour networks and maritime connectivity.

Accordingly, the current volume provides a series of scientific papers deriving from presentations given at the conference. Beyond general approaches to the study of Byzantine harbour archaeology, the contributions offer a representative picture of harbour activities across the historical and geographical boundaries of the Byzantine Empire. Although it is impossible to reflect a comprehensive picture of the entire sweep of coastal landscapes, this work hopefully provides a basis for future comparative research in Byzantine harbour studies – on a local, regional, and supra-regional level.

The conference programme is included in the Appendices. The differences between the conference programme and the final version of this volume are explained by the fact that some scholars who submitted abstracts were ultimately unable to attend, and some who did attend and gave their papers did not submit them for publication. Fortunately, other colleagues agreed to contribute to this volume and I am most grateful to them for so doing.

I would like to express my deepest gratitude to all participants in the Delmenhorst Conference for presenting papers that provided unique insights, not just into ongoing excavations and investigations related to harbour installations, but also into hitherto understudied aspects of coastal infrastructures. It has been a considerable challenge to assemble this volume, and I am therefore particularly indebted to all authors who contributed and enriched this publication. Bearing in mind the time-consuming work of editing and unifying the papers, etc., as well as the difficulties brought on by the COVID pandemic, I have done my best to ensure as prompt a publication as possible.

Thanks must go here to Dr Susanne Fuchs and her team from the Institute for Advanced Study of the Hanse-Wissenschaftskolleg for their support in organising the conference in Delmenhorst. I am also sincerely grateful to David Davison and Mike Schurer from Archaeopress for agreeing to publish this volume and for guiding this work through to publication, their technical help, and the quick production of the printed version.

Alkiviadis Ginalis

11. The Harbour Installations of Lake Mariout (Alexandria Region) in the Late Roman Empire (4th–7th Centuries AD)

Valérie Pichot

Lake Mariout (Figs 11.1–11.2)

The ancient Lake *Mareotis*, currently known as Mariout, is one of a chain of lakes from the Nile Delta between the Mediterranean coast and its hinterland. It is located within a particular configuration on the northwestern margins of the Delta that is characterised by the presence of very ancient coastal dunes stretching parallel to the coastline. The landscape is made up of a succession of depressions and fossil dunes, running northeast-southwest. Alexandria was established upon one of these, the Abusir ridge or Ridge II, known in Antiquity as the *Taenia*. Of irregular topography, this ridge reaches a height of 35 m above sea level. Further south, the ridge of Gebel Mariout, or Ridge III, rises to more than 40 m altitude (Flaux *et al.* 2010: 113).

The western part of Lake Mariout occupies the depression situated between these two ridges, from Alexandria heading westwards. This sector, known as the valley or arm of Mariout, has many rocky promontories that punctuate the landscape of its shore. The eastern part, known as Mariout basin, was oriented towards northwest-southeast and occupied a large part of the fluvial plain up to the Canopic branch of the Nile.

The ancient Lake *Mareotis* was a true inland sea, stretching westwards along the Mediterranean coast and extending in its eastern section far to the southeast. According to Strabo, the lake was more than 150 stadia wide and slightly less than 300 stadia long, equalling roughly 30 km northwest-southeast (the main body of the lake) and 60 km northeast-southwest (the length of the arm plus the width of the northern part of the main basin) (Fig. 11.3). A number of canals connected the lake basin to the Canopic branch of the Nile, ensuring the maintenance of a sufficient level of water for navigation during a large part of the year and regular sluicing thanks to the annual flood (Strabo, *Geography*, XVII, 1, 7 & 14). A channel allowed traffic to reach the canal of Alexandria. The accounts of Strabo and Pliny mention the existence of a large number of canals coming from the Canopic branch of the Nile, which was a major artery of the western Delta during Antiquity, providing access for shipping heading towards Lake Mariout.

Difficulties in current research

The main problem confronting current research in the region is due to the disappearance of the lake and its environment, which makes it difficult to reconstruct the ancient landscapes of the lake's shoreline. The expansion of Alexandria and land consolidation have almost led to the complete disappearance of the lake to the south of the city (Fig. 11.4). Industrial and residential zones are continuously extending westwards along the banks of the lake. The Mariout arm, currently heavily built-up, is divided into several small basins used for different functions: aquaculture, salt pans, or catchment areas for irrigating water from the western margins of the Nile Delta.

The work conducted by Ismael Awad of the Centre d'Études Alexandrines, who charted the evolution of Lake Mariout as plotted on maps, has provided a precise study of the variations in the level of the lake between 1801 and the present day (Awad 2016; 2010; 2009) (Fig 11.5).

In 1801, the surface of the lake covered 980 km². In 2011, it covered no more than 180 km². Accordingly, the lake had lost 82% of its surface area in 210 years. The greatest loss of water occurred between 1801 and 1866, when 50% of the lake was lost due to draining and backfilling the basin to turn the region into agricultural land. The extent of the lake is currently estimated to be less than 13% of its ancient surface area.

Lake Mariout, the main traffic route and commercial crossroad of the region

With the foundation of Alexandria Lake Mariout constituted an important traffic route for merchandise coming from all over Egypt. As a link between Alexandria and its close hinterland, the lake was also the endpoint of land routes coming from the province of Cyrenaica, the oases of the Western Desert, and from the Fayum via Wadi Natrun. It was connected to the Nile by numerous canals that linked Alexandria with the Delta, the Nile Valley, and with further-flung regions, such as India via the ports of the Red Sea.

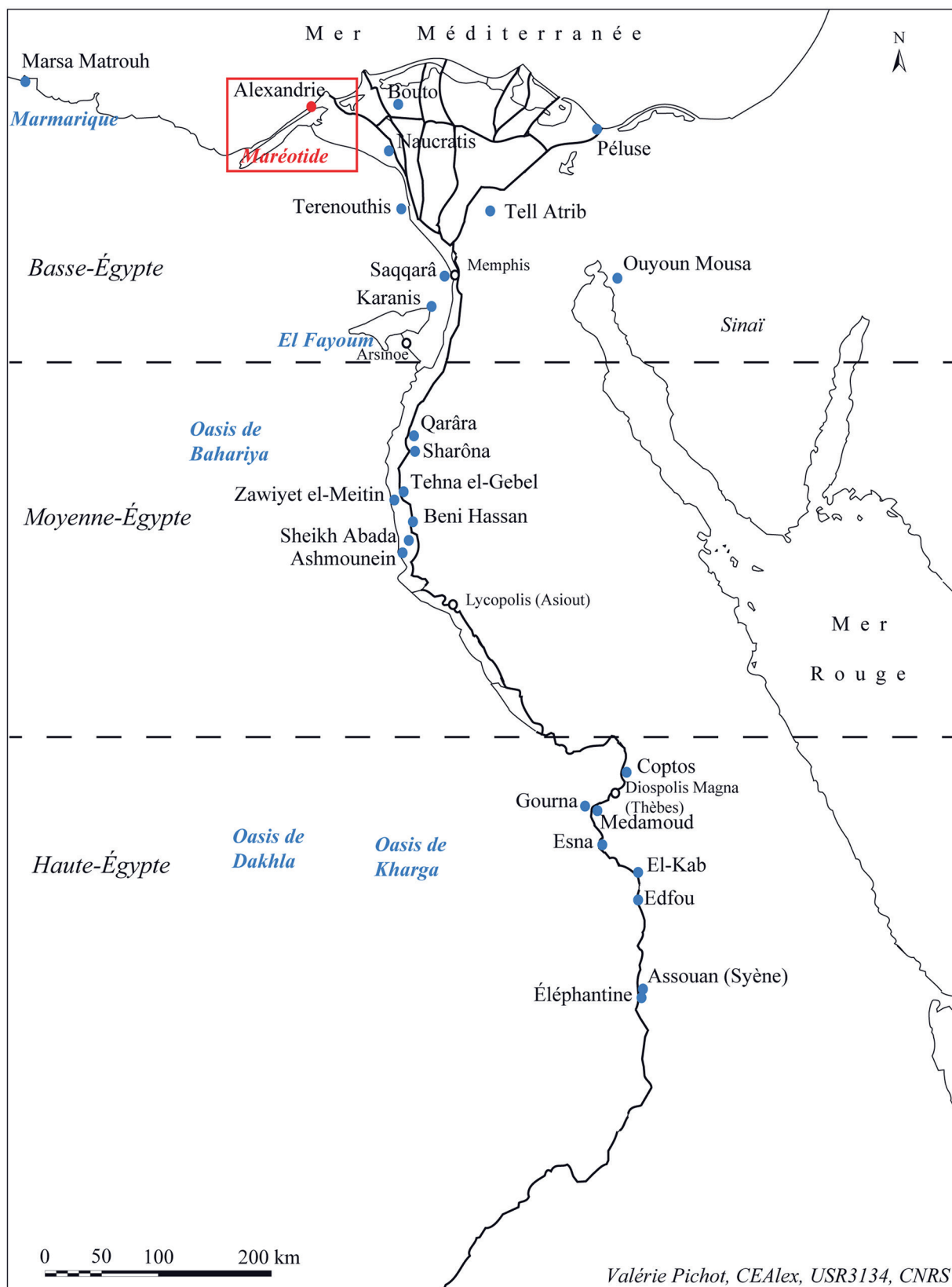


Figure 11.1: Map of Egypt (V. Pichot, CEAlex/CNRS).

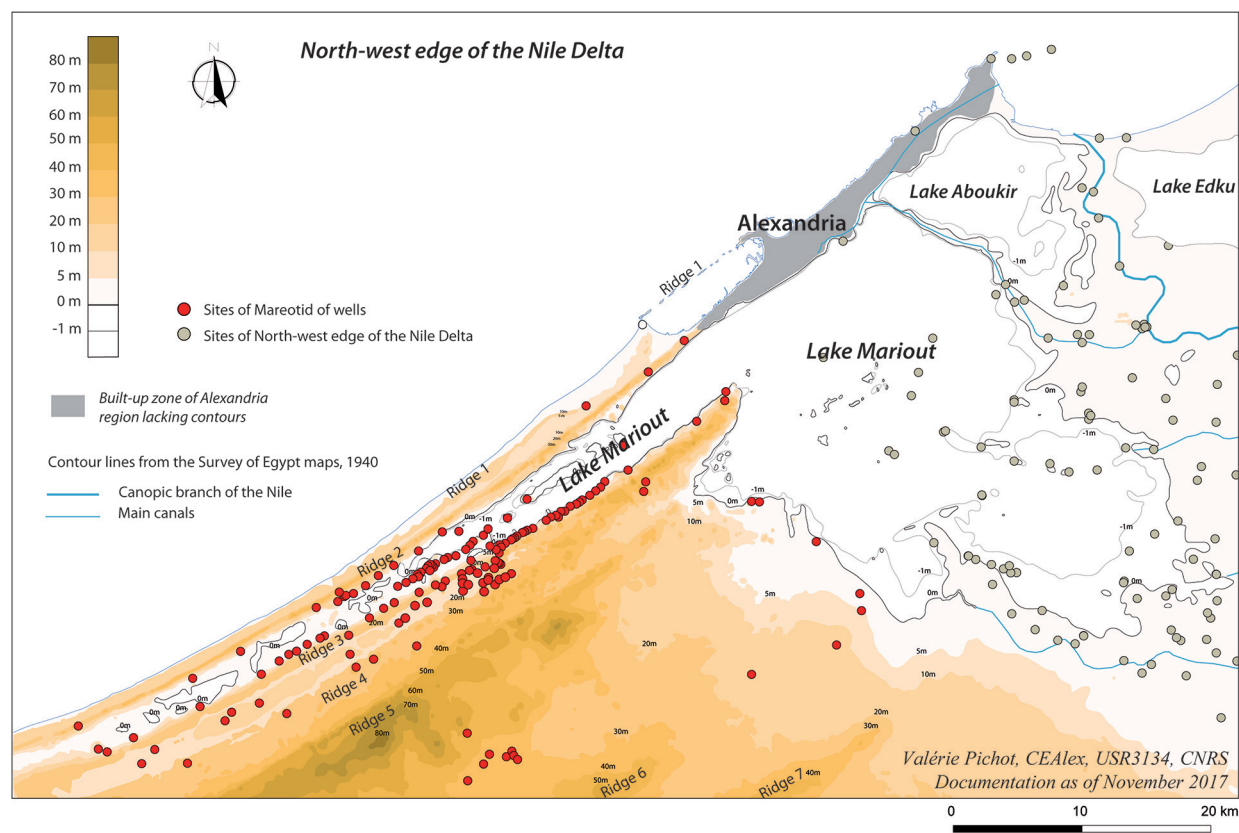


Figure 11.2: North-west edge of the Nile Delta (V. Pichot, CEAlex/CNRS).

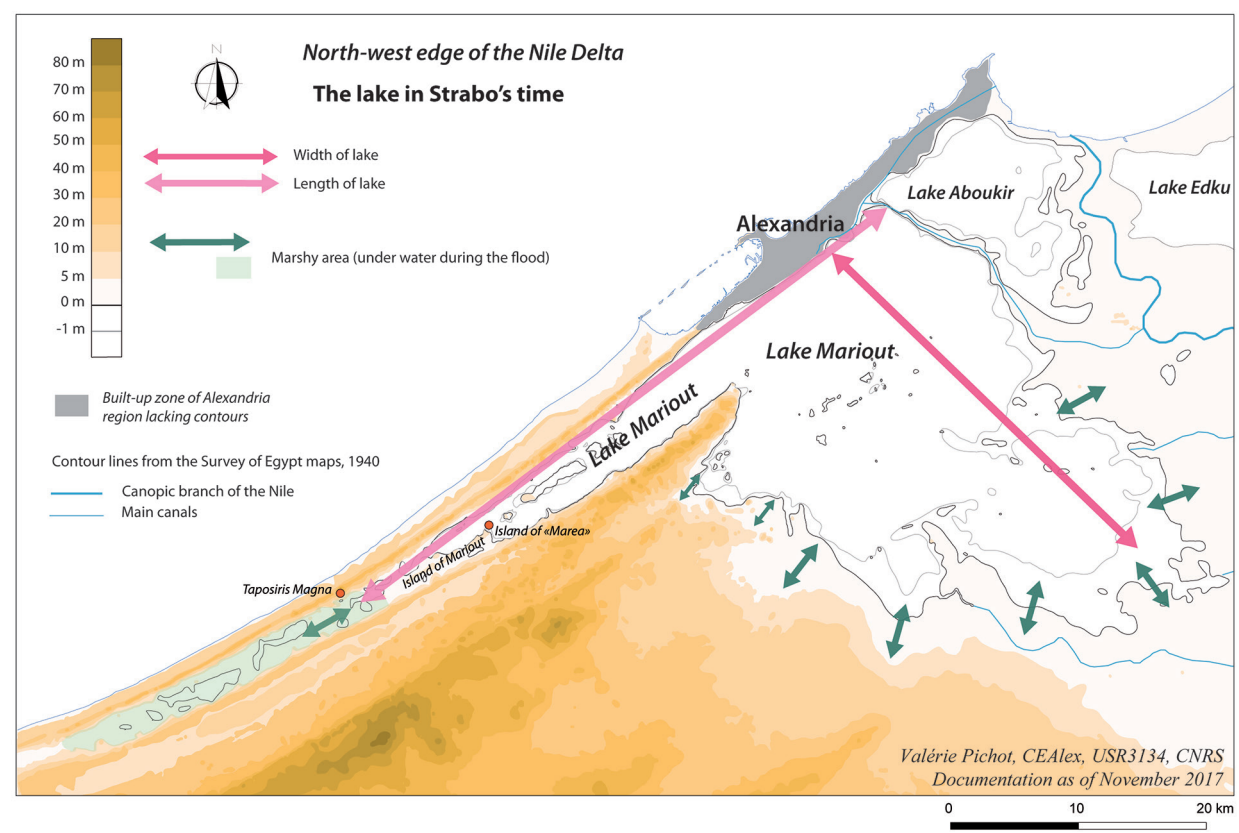


Figure 11.3: Map of Lake Mariout showing Strabo's measurements (V. Pichot, CEAlex/CNRS).

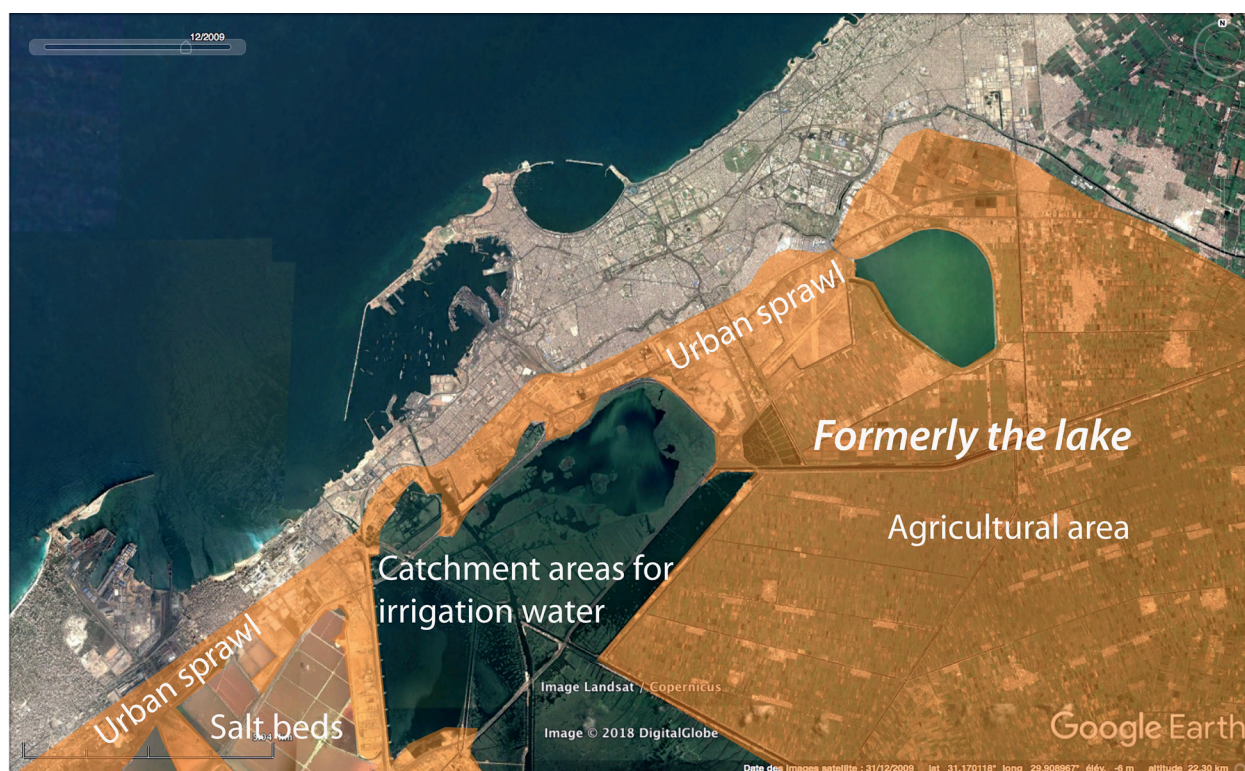


Figure 11.4: Shrinkage of the lake to the south of Alexandria (based on Google Earth, V. Pichot, CEAlex/CNRS).

The research conducted by the Centre d'Etudes Alexandrines has focused particularly on the southwestern part of the region and the western sector of the lake, and my work within this framework examines the changing occupation and exploitation of the region (Pichot and Simony 2023; Pichot 2017).

This region, Alexandria's hinterland, represented a vast frontier zone that had to be carefully controlled: agricultural development began as early as the Hellenistic era. After the Roman conquest, the area experienced significant growth. The development of the town of Taposiris Magna (Boussac 2009a; Empereur 1998: 220-222), which by the 1st century AD became the western customs post of Alexandria, and the expansion of occupation on the southern shore of Mariout are proof of the increased traffic in the lake at this period. The wide-scale development of agricultural land as part of villages, or more often by large *villae rusticae*, demonstrates a clear desire to intensify production and maximise profits from the land in the Imperial period. The majority of the archaeological sites that have been located date to this period and functioned throughout the entire Late Roman era. The harbour installations that dot the shores of Lake Mariout in the Late Roman period result from this process of expansion in the region (Fig. 11.6).

My work on the sites of Marea Island, Akademia and Amreya 1 has revealed evidence of a relatively large and

long-lasting rise in the level of Lake Mariout around the 3rd century AD (Pichot and Flaux 2015; Pichot and Şenol 2015; Pichot and Şenol 2014). This rise was characterised by a slow beginning – from the start of the Roman period – followed by a less manageable and sudden increase, and it would appear to have been an environmental response to human activities related to the intensive irrigation that had developed throughout the western edges of the Delta, starting in the Ptolemaic era.

The lake was a catchment basin for irrigation waters from all over the region and, once cut off from its connection to the sea by the presence of the Alexandria canal,¹ it would have been filled with no means of overflow. This rise in the lake's level caused, on the one hand the abandonment of the lower stretches of the lake's shore and a concentration of occupation on the rocky promontories, and on the other an extension to the west of the navigable surface of the lake, allowing for new and more sustainable harbour installations in zones that were previously far too marshy (Pichot and Simony 2023; Pichot 2017).

¹ The canal of Alexandria was dug during the reign of Ptolemy I at the end of the 4th/beginning of the 3rd century BC to connect Alexandria to the Canopic branch of the Nile (Hairi and Sennoune 2009; 2006). The canal supplied Alexandria with fresh water and was also open for navigation during some part of the year. It connected with Alexandria's western maritime harbour (*kibotos*) and also with a lakeside harbour (*portus mareoticus*) (Flaux et al. 2017).

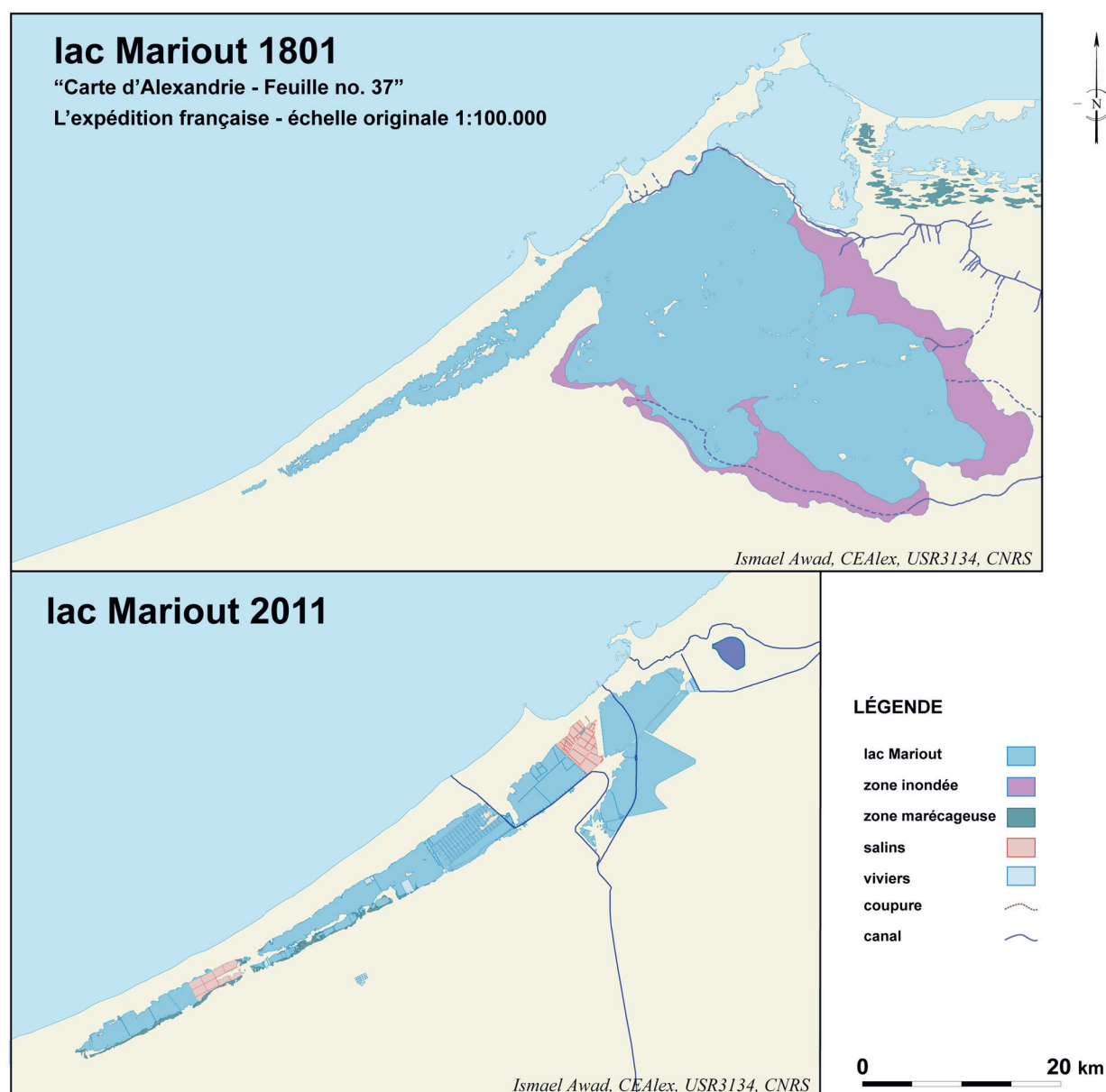


Figure 11.5: Evolution of Lake Mariout between 1801 and 2011 (I. Awad, CEAlex/CNRS).

Along with villages and large *villae rusticae*, the Alexandrian hinterland also witnessed the early development of the first Christian monastic communities, which were places of teaching, artisanal production and trade, thus filling an important space in the economic life of the region. Numerous texts refer to the communities settled on the Taenia close to milestones, which marked stages on the route to the monastery of Saint Menas (Abu Mina), from which they took their names (Gasco 2003; 1991a; 1991b; 1991c; 1991d). As with Enaton, some of these monasteries had a seafront and a lakeside harbour. In the hinterland to the south of the lake, the monastery of Saint Menas is one of the oldest and best known. Founded in the 4th

century AD, one century later it had become one of the most important pilgrimage sites of Antiquity. The land around this great religious centre was occupied by farm villages under the control of the monastery and a part of the agricultural production was transported by road to the ports of Mariout – certainly to Philoxenite – to supply the markets.

The quantity of remains of developments on the shores of the arm of Mariout, which one could still see just a few years ago, confirms the existence of a large number of small harbours during Late Antiquity – evidence of the extraordinary vitality of the region up until the Arab conquest.



Figure 11.6: Map of Late Roman era occupation of the Mareotid region as understood in Nov. 2017 (V. Pichot, CEAlex/CNRS).

Harbour installations around Lake Mariout

The port structures of Lake Mariout are very varied from both the morphological and functional point of view. The now disappeared eastern part of the lake provides little information about ancient port installations. Nonetheless, recent investigations conducted by different teams in the region underline the existence of transshipment activities on numerous sites as well as checkpoints around the lake (Kenawi 2014; Trampier 2014; Trampier *et al.* 2013; Kenawi 2011; Wilson 2010; Kenawi 2010a; 2010b; Wilson and Grigoropoulos 2009).

This region is characterised by the presence of many canals navigable during part of the year and thus it was equipped with ports as transshipment points along these canals as well as with lakeside harbours at the estuaries of the canals that linked the lake with the Canopic branch of the Nile. It was not, however, an

easy sailing space. The lake basin lay parallel to the prevailing winds, which blow from the northwest, with boats heading for Alexandria often finding themselves sailing into the wind. Moreover, the secondary arms of the Nile and the canals that opened into it carried large amounts of silt during the Nile flood. The lake basin was shallow and surrounded by marshland and therefore had a very mobile shoreline and sandbanks that were sensitive to the effects of the Nile flood, making it a difficult waterway to control.

The configuration of the western part of Lake Mariout played an important role in the development of this sector of the Mareotid. Unlike the eastern basin, the orientation of the western arm of the lake, the presence of many rocky banks, and the thinness of the valley allowed for better navigability and an increase in harbour facilities along the shore. Indeed, the arm of the lake possessed all the qualities of a navigable canal

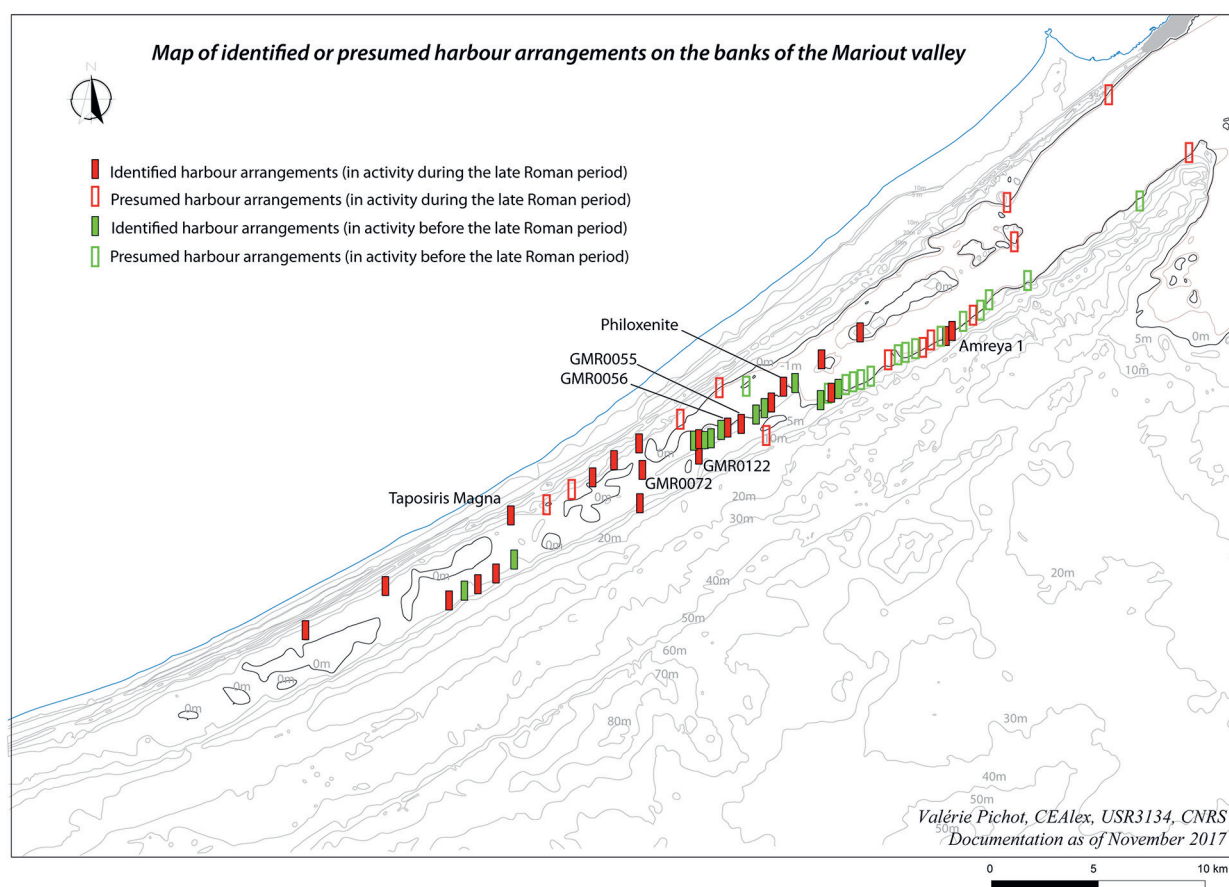


Figure 11.7: Map of identified or presumed harbour arrangements on the banks of the Mariout valley (V. Pichot, CEALex/CNRS).

(Flaux and Pichot 2014: 40; Khalil 2010a: 142-143; 2010b: 40-41).

While the harbours on the banks of the Mariout basin were installed near the mouths of the canal, the harbours in the western part of the lake were more often developed along the rocky promontory.

Research conducted in the western region by the CEALex and the University of Southampton indicates that each settlement near the lake possessed a harbour (Blue and Khalil 2011). The size and type of the harbours were related to the activities connected to the site and thus their function (Fig. 11.7).

Two large ports are known in this sector of Mariout and are currently still visible. The port of Taposiris Magna, the western customs post of Alexandria in the Roman period, was an important control post and transshipment point of merchandise as well as a reception centre for pilgrims heading for the monastery of Saint Menas. This was a large, closed harbour with a narrow entrance connected by a channel (Fig. 11.8). The work of the Taposiris Magna mission led by M.-F. Boussac has shown that the harbour system was an artificial

creation of the Imperial period, forming a vast basin-channel of 80,000 m², with a huge earthen levee serving as a 1600 m long and 50 m wide jetty, a bridge marking the western access to the basin, and a 230 m long by 5 m wide stone jetty marking the eastern access to the harbour (Boussac and El-Amouri 2010; Boussac 2009a: 450-460; 2009b).² The entrance between the southern levee and the eastern jetty is 100 m wide.

On the southern shore of the lake stood the port of Philoxenite, a town constructed in the 5th century AD to receive pilgrims en route for the monastery of Saint Menas. It was also a large commercial harbour and the site of much transshipment of the region's goods in the Late Roman era (Haggag 2010; Szymanska and Babraj 2010; Empereur 1998: 229-239) (Fig. 11.9).³ The harbour is very open, stretching 1.5 km in length, and features wide, paved streets, houses, storehouses, an oil press, hotels, public baths, and a large church. The jetties and quays of Philoxenite harbour form several basins set along a rocky promontory. The main harbour is equipped with three long jetties extending up to 64

² For information on the baths of the Late Roman era of Taposiris Magna, see Le Bomin 2016.

³ See also reports in PAM Vol. 12 and *Materialy Archeologiczne*.

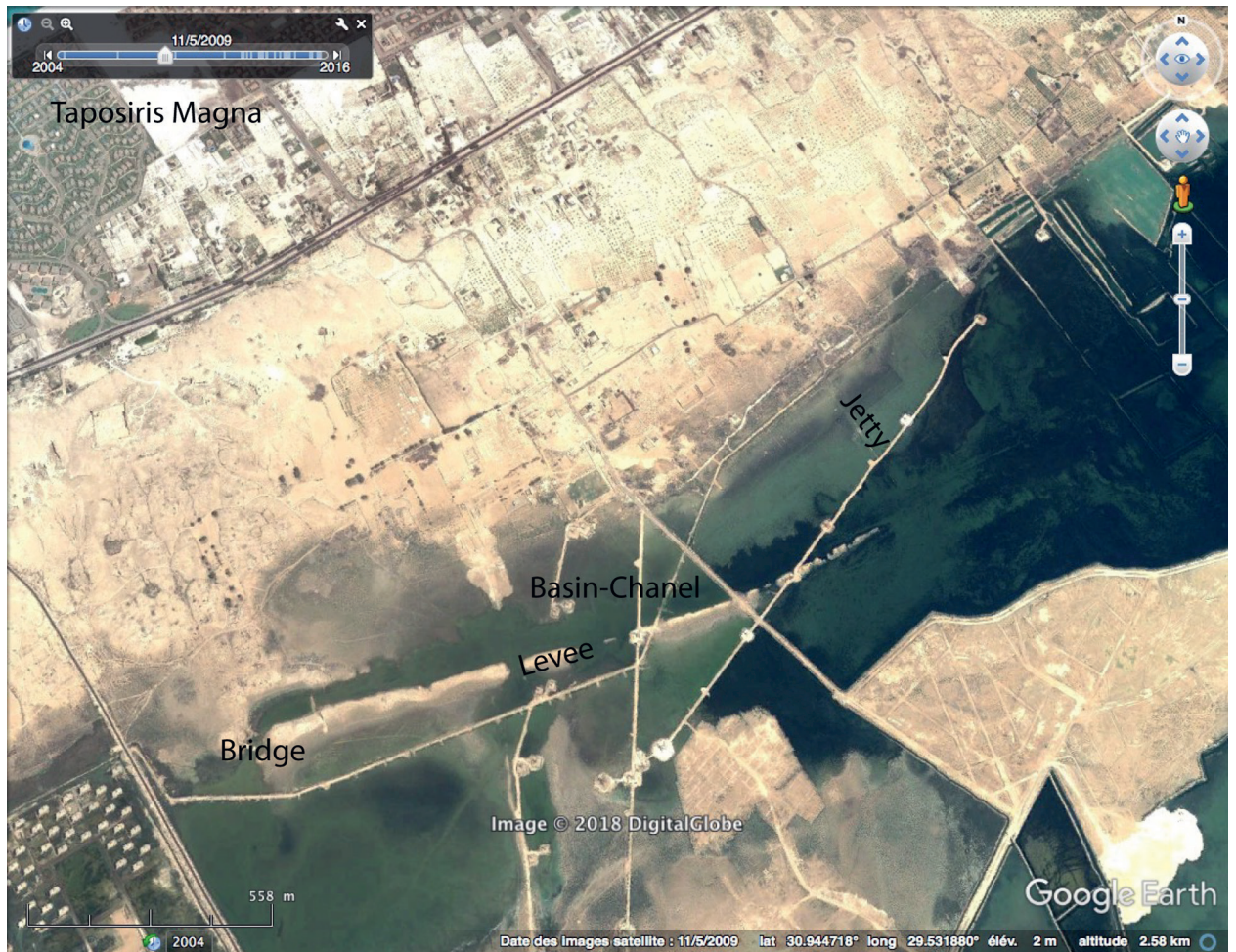


Figure 11.8: The large, closed harbour of Taposiris Magna (based on Google Earth, I. Awad, CEALex/CNRS).



Figure 11.9: The large open harbour of Philoxenite (based on Google Earth, V. Pichot, CEAlex/CNRS).



Figure 11.10: Enclosed harbour located near the eastern side of Mariout Island, Site GMR0055 (based on Google Earth, V. Pichot, CEALex/CNRS).

m, 109 m, and 150 m into the lake.⁴ The length of these jetties ensured that loading and unloading at the far ends was possible even when the water level of the lake

was low. Stairways with no lateral wall allowed access to the western port area whatever the season and the height of the lake.

⁴ Exploratory trenches and surveying were conducted on the jetties of Philoxenite by an Anglo-Egyptian team in 2001 and 2002. The results were presented by N. Lianos during the Alexandria International Conference on Maritime and Underwater Archaeology, held in 2016 (https://www.researchgate.net/publication/322235868_The_ancient_port_of_Marea-Philoxenite_at_Lake_Mareotis_in_Alexandria).

Besides the large ports of Taposiris Magna and Philoxenite that are still visible, smaller port structures linked to *villae rusticae* and villages have been found. These lakeside harbours, which were still clearly visible some thirty years ago, were central components in an efficient and economical transport system for persons

and for local products, in particular agricultural products (wine, olives, reeds, etc.). These still supplied Alexandrian markets and others further afield in the Late Roman period via the city's own lakefront harbour.

Several types of harbour installations have been revealed on the shores of the Mariout arm. Small, enclosed ports either built or carved out of the rock are illustrated by three sites on the southern shore of the lake. The first is located near the eastern side of Mariout Island (Pichot 2017, Corpus 054, GMR0055; Blue and Khalil 2011, Site 09: 123). It features a rectangular harbour basin of c. 70 m x 30 m and is constructed into the extension of a rocky promontory (Fig. 11.10). The second is in the southern part of the eastern end of Mariout Island. It features a natural depression in the terrain that was developed into a small harbour during the Late Roman period, around which a residential and artisanal district sprung up (Pichot 2017, Corpus 075, GMR0122; Blue and Khalil 2011, Site 035-036-014: 228-232) (Fig. 11.11). The third is located on the site of Amreya 1, c. 10 km further east. This is a former quarry, c. 20 m x 20 m that was certainly re-used in the Late Roman era as a sheltered mooring area due to the substantial rise in the level of the lake (Pichot 2017, Corpus 023, GMR0005; El-Fakharany 2003: 205; 1991: 26; Empereur and Picon 1998: 86) (Fig. 11.12).

The open harbours are composed of one or more jetties stretching into the lake. There are many small harbours of this sort in the region. Good examples of this are provided by the site on the western part of Mariout Island, with a very long jetty extending c. 300 m into the lake associated with a large Late Roman residential quarter (Pichot 2017, Corpus 082, GMR0072; Blue and Khalil 2011, Site 040: 271) (Fig. 11.13), as well as by the installations between this isle and Philoxenite (Pichot 2017, Corpus 055, GMR0056; Blue and Khalil 2011, Site 10-11: 126) (Fig. 11.14).

Archaeological discoveries on the shores of the Mariout arm confirm the conclusions reached by M. Rodziewicz regarding the representations of the mosaics of Palestrina⁵ and of Kenchreai, the eastern harbour of Corinth (Rodziewicz 2002).⁶ The views on these Nilotic mosaics are of sometimes marshy lake landscapes with extraordinarily rich flora and fauna and many luxurious

free-standing buildings, tower-houses, vineyards, and often small harbours. There are a few representations of landing stages for the little boats sailing on the lake, and steps on the front of a building giving direct access to the water, which was a necessary structure on the lake where the water level varied throughout the year as a function of the Nile flood.

The lakeside harbour of Alexandria, *Portus Mareoticus*

Set between sea and lake, Alexandria was also at the junction of the arm and basin of Lake Mariout. The city benefitted from this geographic situation that gave it access to the sea to the north and a long lakefront to the south, the two being connected by the canal of Alexandria that crossed the town and supplied it with water. Alexandria's prosperous trade was linked to a complex port system that involved not merely the sea but also the shores of Lake Mariout.

Strabo testifies that traffic on the lake was busy, stating that more goods arrived at Alexandria via the lake than the sea. Alexandria's lakeside harbour 'was in fact richer than that on the sea' (Strabo, *Geography*, XVII, I, 7). Thus, one should imagine a port area equipped with the necessary infrastructure, such as jetties, quays, docks, dry docks, sea walls, and landing stages, as well as warehouses, offices, shops, markets, and lodging houses. The lakeside harbour of Alexandria centralised a large part of the imported merchandise coming from the maritime port, and all the products transited through the many ports installed around the lake, which was destined for the Alexandrian market or Mediterranean trade.

The ancient sources refer to the *Portus Mareoticus*, which stretched along the lakeshore south of Alexandria, as the largest and wealthiest of Alexandria's harbours. It has now completely disappeared, smothered by urban sprawl throughout the 19th and 20th centuries, and so it is a buried port that has not been the object of any excavation to date. We know from Strabo that the canal of Alexandria opened into Lake Mareotis,⁷ which was itself connected by a canal to the maritime port to the north-west. Alexandria's lakeside harbour must therefore be somewhere between these two waterways (Flaux and Pichot 2014: 40-41).

Old maps are especially important documents for our understanding of this harbour complex. On the overall map of the coasts, bays, harbours, town and surroundings of Alexandria (*Carte générale des côtes, rades, ports, ville et environs d'Alexandrie*) from the *Description de l'Égypte* the area of the lakeside port appears as a curved shoreline with distinct promontories

⁵ The Barberini mosaic of Palestrina was discovered between AD 1588 and 1607. It covered the floor of a nymphaeum within the apse of a sanctuary dedicated to Fortuna Primigenia to the north of the forum of Praeneste (present-day Palestrina). Recent studies have dated the mosaic to the last quarter of the 2nd century BC. It is considered to be the work of an Alexandrian artist, deriving from an Alexandrian prototype. For studies of this mosaic, see Pomey 2015; Burkhalter 1999; Meyboom 1995; Coarelli 1990; Whitehouse 1976.

⁶ In the 1960s, c. 100 panels of glass *opus sectile* mosaics were found still in their packing at the ancient harbour of Kenchreai. These have been attributed to an Alexandrian workshop and dated to the third quarter of the 4th century AD (Ibrahim *et al.* 1976).

⁷ It seems that this junction was located close to *Schedia*, the eastern customs post of Alexandria in Antiquity.



Figure 11.11: Enclosed harbour in the southern part of the eastern end of Mariout Island, Site GMR0122 (based on Google Earth, V. Pichot, CEALex/CNRS).



Figure 11.12: The ancient quarry of Amreya 1 reused in the Late Roman period as a sheltered mooring (based on Google Earth, S. Gondet, CEAlex/CNRS).



Figure 11.13: Open harbour in the western sector of Mariout Island, Site GMR0072 (based on Google Earth, I. Awad, CEALex/CNRS).

(*Description de l'Égypte, Antiquité*, Vol. 5, 1822: Pl. 31) (Fig. 11.15). Two sectors bear the presence of ancient jetties that were still visible at that time: the first sector is located to the west of the town and presents the vestiges of three jetties lying perpendicular to the shore; the second is located to the south of the town and presents the remains of one single jetty.

Recent corings taken by C. Flaux in this sector to the south of the town have revealed a part of the ancient port infrastructure, identifying three ancient jetties of several hundred metres in length running

perpendicular to the shoreline (Fig. 11.16). While the central jetty corresponds neatly to the one represented on the map of the *Description de l'Égypte*, the two others appear to be shown on the map of E. Napier dated to 1841⁸ in the form of small alignments perpendicular to the shore of the lake at the south of the town (Fig. 11.17). According to a study and analysis of core samples, these port installations were in use at least from the end of

⁸ 'Plan of Alexandria and its Neighbourhood' in 1841 by E. Napier Lt. Colonel 46th Regt., published by James Wyld, Geographer to the Queen and H.R.H. Prince Albert, Charing Cross, East London, June 13th, 1842.



Figure 11.14: Open harbour located between Mariout Island and Philoxenite, Site GMR0056 (based on Google Earth, I. Awad, CEAlex/CNRS).



Figure 11.15: Extract from the *Carte générale des côtes, rades, ports, ville et environs d'Alexandrie* (*Description de l'Égypte, Antiquité*, Vol. 5, 1822: Pl. 31, CEALex/CNRS Archives).

the 1st century BC until the end of the 7th century (Flaux *et al.* 2017).

The end of harbour activity

All the lakeside harbours of the Mariout arm ceased to function in the 7th–8th century AD. Indeed, the Arab conquest marked a turning point in the history of the region, which was to experience profound changes. The hegemony of the monasteries on the administration and economy of the Mariotid was gradually challenged. Pilgrims became rarer, depriving the religious communities of their main source of revenue. Bedouin populations gradually colonised the land. The province moved from an economy relying

upon intensive agricultural exploitation of the land to an economy based upon transhumant livestock farming and the cultivation of small parcels. Hence, most of the infrastructures established to receive pilgrims or linked to agricultural production were gradually abandoned.

Alexandria lost its role as the capital to Fustat and that of the principal port of the country to Rashid. Traffic on the lake shrank and the lakeside harbours lost their importance. The navigable canals, which fed the lake with water, were no longer maintained and the lake began gradually to dry up. Once prosperous, the shores of the lake, as well as the higher ground lauded for its high-quality wine, slowly turned to desert.

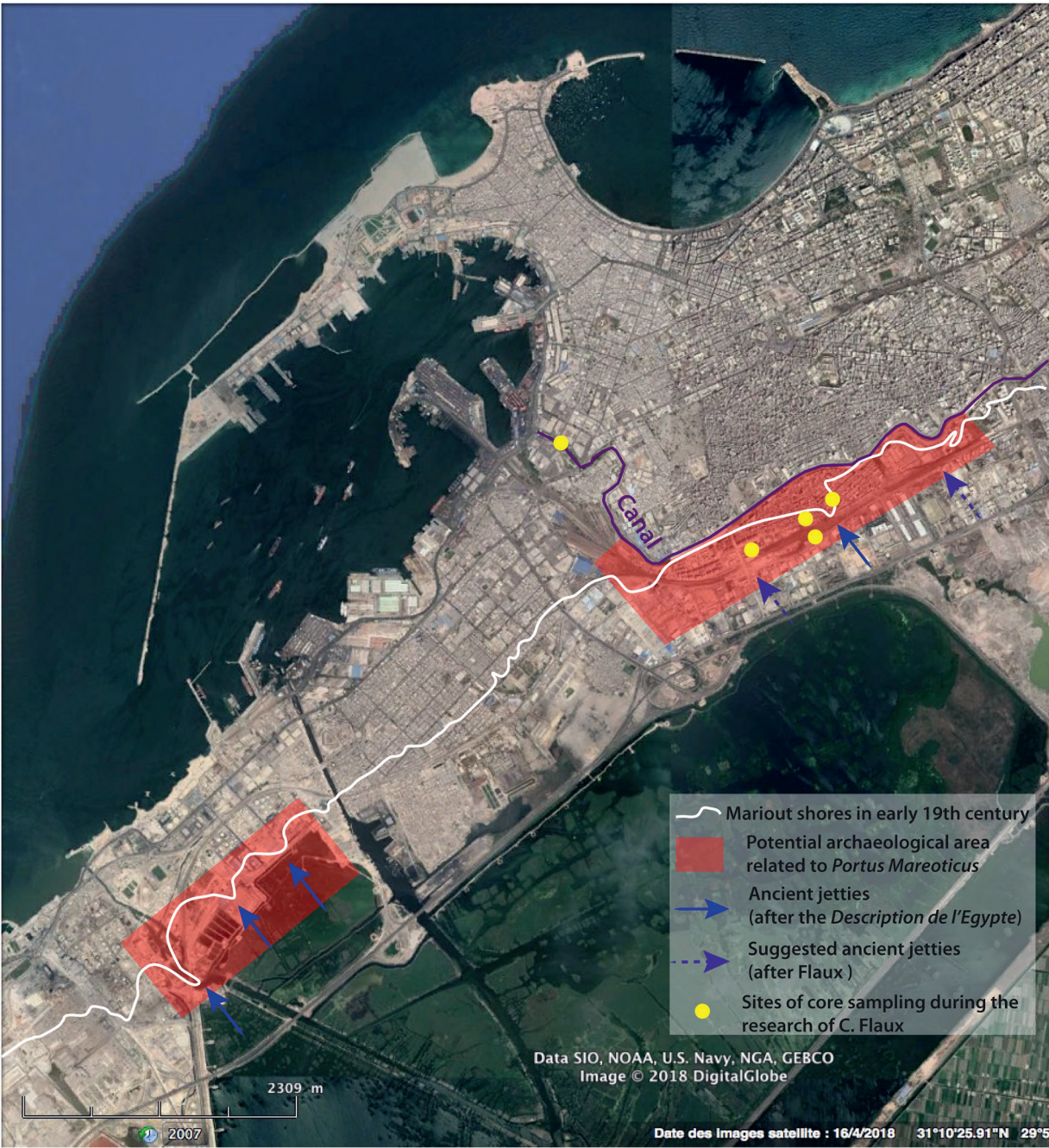


Figure 11.16: Portus Mareoticus (based on Google Earth, after Flaux *et al.* 2017: Figs 2, 8).

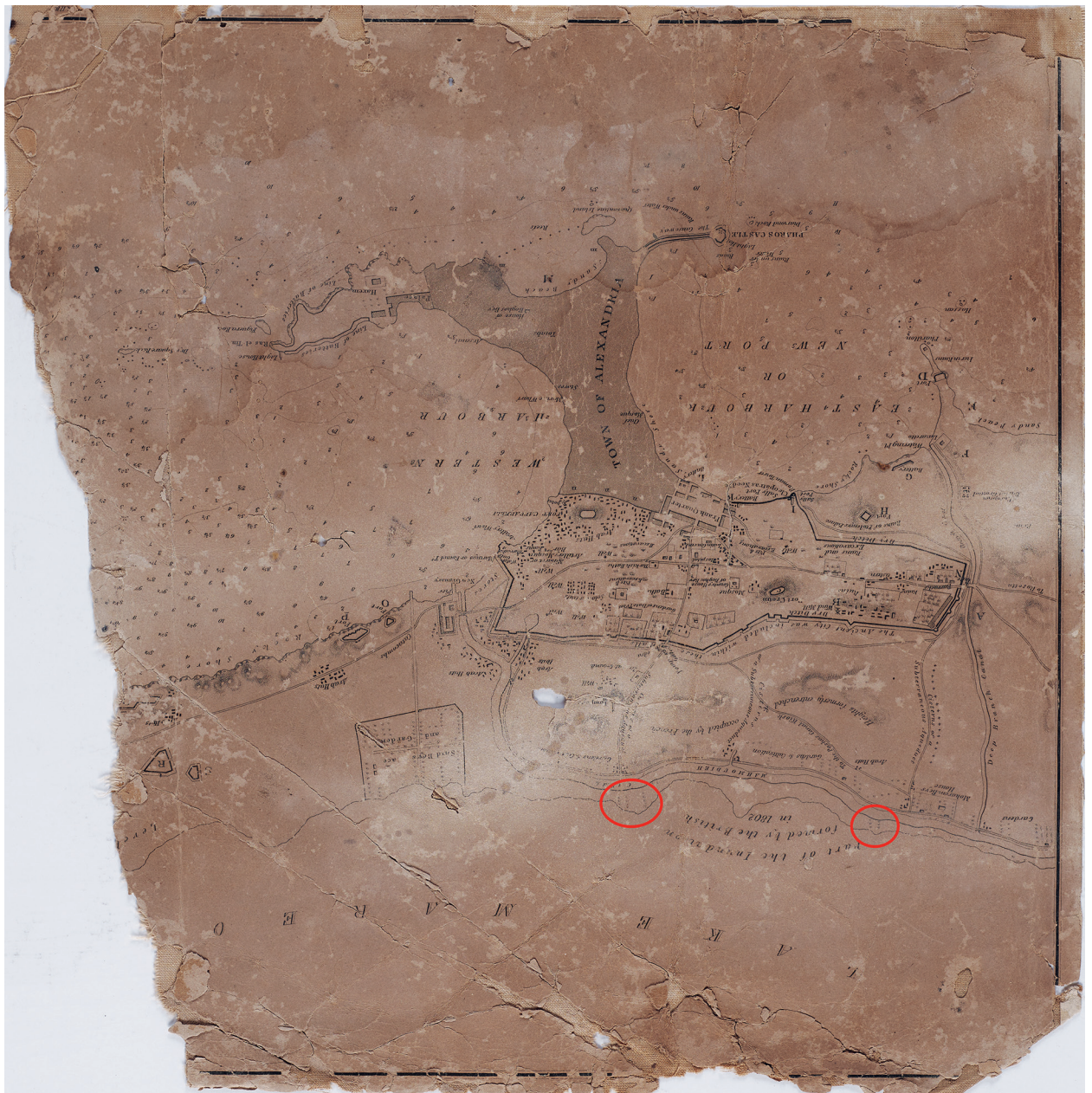


Figure 11.17: Plan of Alexandria and its neighbourhood in 1841 by E. Napier (J. Wyld 1842, CEAlex/CNRS Archives).

Bibliography

- Awad, I. 2016. L'évolution de la frange occidentale du delta du Nil (Maréotide) à travers la cartographie. *CIRILI. City, River, Littoral*, 24 January 2016 (<http://cirili.hypotheses.org/352>).
- Awad, I. 2010. A study of the evolution of the Maryut Lake through maps, in L. Blue and E. Khalil (eds) *Lake Mareotis: Reconstructing the Past. Proceedings of the International Conference on the Archaeology of the Mareotic Region held at Alexandria University, Egypt, 5th-6th November 2009*. British Archaeological Reports International Series 2285. Oxford: Archaeopress.
- Awad, I. 2009. Le lac Mariout, l'eau dans tous ses états cartographiques, in I. Hairy (ed.) *Du Nil à Alexandrie, Histoire d'eaux, catalogue de l'exposition au Laténium de Neuchâtel, 2009*: 190-205. Alexandria: Editions Harpocrates.
- Blue, L. and E. Khalil (eds) 2011. *Multidisciplinary Approach to Alexandria's Economic Past: The Lake Mareotis Research Project*. British Archaeological Reports International Series 2285. Oxford: Archaeopress.

- Boussac, M.-Fr. and M. El-Amouri 2010. The lake structures at Taposiris, in L. Blue and E. Khalil (eds) *Lake Mareotis: Reconstructing the Past. Proceedings of the International Conference on the Archaeology of the Mareotic Region held at Alexandria University, Egypt, 5th-6th April 2008*: 87-105. British Archaeological Reports International Series 2113. Oxford: Archaeopress.
- Boussac, M.-Fr. 2009a. Recherches récentes à Taposiris Magna et Plinthine, Égypte (1998-2006). *Comptes rendus des Séances de l'Académie des Inscriptions et Belles-Lettres, Année 2007* 151/1: 445-479.
- Boussac, M.-Fr. 2009b. Taposiris Magna: la création du port fermé, in Fr. Dumasy and Fr. Queyrel (eds) *Archéologie et environnement dans la Méditerranée Antique. Hautes études du monde gréco-romain 42*: 123-142. Geneva: Librairie Droz.
- Burkhalter, F. 1999. La mosaïque nilotique de Palestrina et les pharaonica d'Alexandrie. *Topoi* 9/1: 229-256.
- Coarelli, F. 1990. La *pompé* di Tolomeo Filadelfo e il mosaico nilotico di Palestrina. *Ktema* 15: 225-251.
- El-Fakharani, F. 2003. The Pharaonic Port on the Mediterranean: its Shape, Developments, and Importance, in Z. Hawass (ed.) *Egyptology at the Dawn of the Twenty-First Century, Vol. 2: History and Religion, Proceedings of the Eighth International Congress of Egyptologists, Cairo 2000*: 203-208. Cairo: The American University in Cairo Press.
- El-Fakharani, F. 1991. The Kibotos of Alexandria, in S. Stucchi and M. Aravantinos (eds) *Giornate di studio in onore di Achille Adriani (Rome, 1984), Studi Miscellanei* 28: 23-28. Rome: L'Erma di Bretschneider.
- Empereur, J.-Y. 1998. *Alexandrie redécouverte*. Paris: Fayard.
- Empereur, J.-Y. and M. Picon 1998. Les ateliers d'amphores du lac Mariout, in J.-Y. Empereur (ed.) *Commerce et artisanat dans l'Alexandrie hellénistique et romaine, Actes du Colloque d'Athènes 1988*: 75-91. *Bulletin de Correspondence Hellénique Suppl.* 33. Athens: École Française d'Athènes.
- Flaux, Cl., M. El-Assal, C. Shaalan, N. Marriner, Chr. Morhange, M. Torab, J.-P. Goiran and J.-Y. Empereur 2017. Geoarchaeology of Portus Mareoticus: Ancient Alexandria's lake harbour (Nile Delta, Egypt). *Journal of Archaeological Science Reports* 13: 669-681.
- Flaux, Cl. and V. Pichot 2014. Géoarchéologie portuaire dans le lac Maréotis, delta du Nil, Égypte. *Géochronique* 130: 38-42.
- Flaux, Cl., C. Morhange, M. Torab and M. El-Assal 2010. Alexandrie un cordon entre deux mers: une lecture géomorphologique, in I. Hairy (ed.) *Du Nil à Alexandrie, Histoire d'eaux, catalogue de l'exposition au Laténium de Neuchâtel, 2009*: 110-129. Alexandria: Harpocrates.
- Gascou, J. 2003. L'Enaton, <https://halshs.archives-ouvertes.fr/halshs-00000746> (submitted on 16 October 2003).
- Gascou, J. 1991a. Eikoston. *Claremont Coptic Encyclopedia*, Vol. 2: 951b.
- Gascou, J. 1991b. The Enaton. *Claremont Coptic Encyclopedia*, Vol. 3: 954b-958b.
- Gascou, J. 1991c. Oktokaidekaton. *Claremont Coptic Encyclopedia*, Vol. 6: 1826b-1827b.
- Gascou, J. 1991d. Pempton, *Claremont Coptic Encyclopedia*, Vol. 6: 1931a-1931b.
- Haggag, M. 2010. The City of Marea/Philoxenité. Reflections on the Alexandria University Excavations 1977-1981, in L. Blue and E. Khalil (eds) *Lake Mareotis: Reconstructing the Past. Proceedings of the International Conference on the Archaeology of the Mareotic Region held at Alexandria University, Egypt, 5th-6th April 2008*: 47-56. British Archaeological Reports International Series 2113. Oxford: Archaeopress.
- Hairy, I. and O. Sennoune 2009. Le canal d'Alexandrie: la course au Nil, in I. Hairy (ed.) *Du Nil à Alexandrie, Histoire d'eaux, catalogue de l'exposition au Laténium de Neuchâtel, 2009*: 136-157. Alexandria: Editions Harpocrates.
- Hairy, I. and O. Sennoune 2006. Géographie historique du canal d'Alexandrie. *Annales Islamologiques* 40: 247-276.
- Ibrahim, L., R.L. Scranton and R.H. Brill 1976. *Kenchreai, Eastern Port of Corinth. 2: The panels of opus sectile in glass*. Leiden: Brill.
- Kenawi, M. 2014. *Alexandria's Hinterland, Archaeology of the Western Nile Delta, Egypt*. Oxford: Archaeopress.
- Kenawi, M. 2011. Beheira Survey: Rapporto preliminare sulle missioni 2008-2010, in R. Pirelli (ed.) *Richerche Italiane e scavi in Egitto, V*: 187-205. Cairo: Istituto Italiano di Cultura.
- Khalil, E. 2010a. Waterfront Installations and Maritime Activities in the Mareotic Region, in L. Blue and E. Khalil (eds) *Lake Mareotis: Reconstructing the Past. Proceedings of the International Conference on the Archaeology of the Mareotic Region held at Alexandria University, Egypt, 5th-6th April 2008*: 135-145. British Archaeological Reports International Series 2113. Oxford: Archaeopress.
- Khalil, E. 2010b. The Sea, the River, and the Lake: All the Waterways Lead to Alexandria. *Bolletino di Archeologia online*: 33-48.
- Le Bomin, J. 2016. Les thermes byzantins de Taporis Magna. La céramique d'un dépotoir de la fin du VI^e et du début du VII^e s. apr. J.-C. *Bulletin de liaison de la Céramique Égyptienne* 26: 39-71.
- Meyboom, P.G.P. 1995. *The Nile Mosaic of Palestrina. Early Evidence of Egyptian Religion in Italy*. Religions in the Graeco-Roman World 121. Leiden: Brill.
- Pichot, V. and A. Simony 2023. An Archaeological Map of the Mareotid: Initial Results Regarding the Evolution of Occupation in the Region, in M.-Fr. Boussac, S. Dhennin, B. Redon, C. Somaglino and G. Tallet (eds) *Frontières et marges occidentales de*

- l'Égypte de l'Antiquité au Moyen Âge, Actes du Colloque international du Caire, 2nd-3rd Dec. 2017*: 83-102. Bibliothèque d'Étude 181. Cairo: Institut Français d'Archéologie Orientale.
- Pichot, V. 2017. *Aux portes d'Alexandrie. Le développement de la Maréotide hellénistique et romaine*. Unpublished PhD dissertation, University of Lyon 2.
- Pichot, V. and Cl. Flaux 2015. Les fours à amphores du Haut-Empire du site d'Akadémia (Maréotide): campagne de fouille et carottages 2014. *Bulletin de la Céramique Égyptienne* 25: 259-276.
- Pichot, V. and K. Şenol 2015. Amphores de Gaza et résine sur le site de production d'amphores du Haut-Empire d'Akadémia (Maréotide). *Bulletin de la Céramique Égyptienne* 25: 277-289.
- Pichot, V. and K. Şenol 2014. The Site of Akademia: The Amphora Workshop of Apol(l)ônios. First Excavation Campaign (July-August 2012). *Bulletin de liaison de la céramique égyptienne* 24: 225-240.
- Pomey, P. 2015. La batellerie nilotique gréco-romaine d'après la mosaïque de Palestrina, in P. Pomey (ed.) *La batellerie égyptienne. Archéologie, histoire, ethnographie*: 151-173. *Études Alexandrines* 34. Alexandria: Centre d'Études Alexandrines.
- Rodziewicz, M. 2002. Mareotic Harbours, in Chr. Décobert (ed.) *Alexandrie Médiévale* 2: 1-22. *Études Alexandrines* 8. Cairo: Institut Français d'Archéologie Orientale.
- Szymanska, H. and Kr. Babraj 2010. A Preliminary Report from the excavations in Marea in Egypt. August-September 2009. *Materialy Archeologiczne* 38: 157-173.
- Trampier, J.R. 2014. *Landscape Archaeology of the Western Nile Delta*. Wilbour Studies in Egypt and Ancient Western Asia 2. Atlanta: Lockwood Press.
- Trampier, J., W. Toonen, A. Simony and J. Starbird 2013. Missing Koms and Abandoned Channels: The Potential of Regional Survey in the Western Nile Delta Landscape. *Journal of Egyptian Archaeology* 99: 217-240.
- Whitehouse, H. 1976. *The Dal Pozzo copies of the Palestrina mosaic*. British Archaeological Reports Suppl. Series 12. Oxford: British Archaeological Reports.
- Wilson, P. 2010. Recent Survey work in the Southern Mareotis Area, in L. Blue and E. Khalil (eds) *Lake Mareotis: Reconstructing the Past. Proceedings of the International Conference on the Archaeology of the Mareotic Region held at Alexandria University, Egypt, 5th-6th April 2008*: 119-125. British Archaeological Reports International Series 2113. Oxford: Archaeopress.
- Wilson, P. and D. Grigoropoulos 2009. *The West Nile Delta Regional Survey, Beheira and Kafr es-Sheik Provinces*. Excavations Memoirs 86. London: Egypt Exploration Society.