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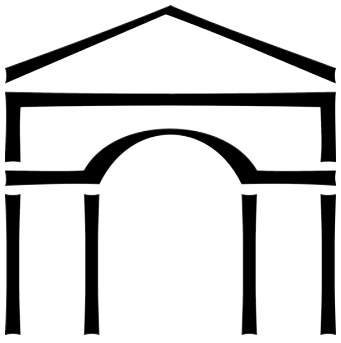


GATEWAYS

Hamburger Beiträge zur Archäologie und
Kulturgeschichte des antiken Mittelmeerraumes

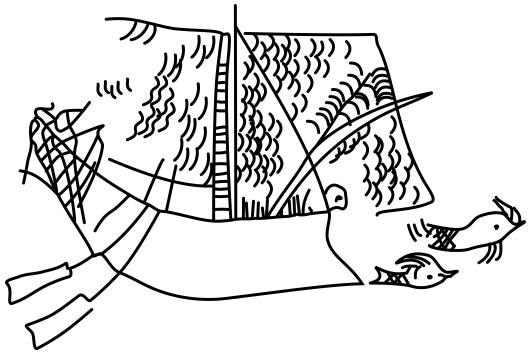
Herausgegeben von
Martina Seifert und Leon Ziemer

North Meets East 3

Aktuelle Forschungen zu antiken Häfen

Ein Workshop veranstaltet von Julia Daum und
Martina Seifert an der Universität Hamburg
vom 15. bis 17. März 2016

Herausgegeben von
Martina Seifert und Leon Ziemer



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Vorwort

Während der Treffen in den Jahren 2014 und 2015 hatte sich der Workshop North meets East vornehmlich mit den antiken und mittelalterlichen Häfen als Schnittstellen der Verkehrswege und des Handelsaustausches zu Lande und zu Wasser beschäftigt. 2016 stand die Tagung, für die zahlreiche Kolleginnen und Kollegen des DFG- Schwerpunktprogrammes 1630 »Häfen von der römischen Kaiserzeit bis zum Mittelalter« sowie einige externe Interessierte begeistert werden konnten, auf Wunsch der vorjährigen Mitdiskutanten im Fokus terminologischer Fragen.

Ausgangspunkt für die eingereichten Beiträge sollte die Frage nach der Entwicklung vergleichbarer Kriterien für eine »Klassifizierung von Häfen und Hafenanlagen in der Antike« bilden. Die fünf thematischen Sektionen sollten sich dieser Fragestellung aus verschiedenen Blickwinkeln nähern: Die erste Sektion zu Fallstudien stand hierbei ganz im Lichte von Feldforschungsprojekten und vor allem von archäologischen Arbeiten unter Wasser. Theoretische und methodische Ansätze der Hafenforschung waren dann Gegenstand der zweiten Sektion – hier sollten auf Grundlage der als Einstieg für die folgende Diskussion gedachten Fallbespiele des ersten Abschnittes terminologische Probleme erörtert werden. Die folgenden beiden Sektionen setzten sich wiederum mit inhaltlichen Fragen, so mit dem Hafen als Wirtschaftsfaktor einerseits und den repräsentativen Funktionen von Häfen andererseits auseinander. Den Abschluss bildete die Vorstellung von vergleichenden Regionalstudien. Für den Abendvortrag konnten schließlich Ewdoksia Papuci-Władyka und Łukasz Miszk mit einem Beitrag über die aktuellen Untersuchungsergebnisse der Jagiellonian University Krakow zu den Häfen von Nea Paphos gewonnen werden.

Nach jedem Vortrag bestand die Möglichkeit zu einer kurzen Aussprache. Im Plenum erfolgte eine Zusammenfassung der Beiträge und es gab genügend Zeit, um mit den Teilnehmerinnen und Teilnehmern intensiv über die eingangs gestellte Frage der Erarbeitung eines Klassifikationssystems von Häfen zu diskutieren. Insbesondere der Aspekt der gemeinsamen Terminologie zur möglichst genauen Charakterisierung von archäologischen Strukturen aus dem Hafenkontext wurde ausführlich besprochen. Es zeigte sich, dass die materiellen Hinterlassenschaften mit ihren regionalen und chronologischen Unterschieden ganz verschiedene Anforderungen an methodische Herangehensweisen und Interpretationen erfordern, um sich einem Verständnis der Befunde vor dem Hintergrund ihrer Einbettung in den historischen Kontext anzunähern.

Hamburg, im März 2017 Martina Seifert

Abstracts

NEA PAPHOS AND ITS HARBOURS. GATES TO THE MEDITERRANEAN IN THE LIGHT OF THE JAGIELLONIAN UNIVERSITY RESEARCH

(page 1–19)

Łukasz Miszk – Ewdoksia Papuci-Władyka

Harbour cities, like Paphos, played the most important role in the history of Cyprus. There existed two Paphos cities: Old (Palaia) Paphos, famous Aphrodite's cult centre and the new, Nea Paphos founded at the end of 4th or beginning of the 3rd c. BC. The second became the capital of Cyprus for a long time. Starting from 2011 the Jagiellonian University in Kraków conducts archaeological excavations in the heart of the Nea Paphos city – the Agora, but also beyond it searching for the economic infrastructure and activity of the city in Hellenistic and Roman times. Harbours constitute one of the most important elements of this infrastructure. The results of previous studies in the main port in the south bay will be presented and the hypothesis of the second harbour (or haven) in the north-western bay will be revisited with rather positive conclusion in the light of our research.

DIE HAFENLANDSCHAFT DER ÖSTLICHEN ADRIAKÜSTE ZWISCHEN SPÄTANTIKE UND MITTELALTER

(page 21–48)

Dominik Heher

The Dalmatian coast and its offshore islands have always been clearly oriented to the sea. Its maritime character was due to its relative isolation from the inner parts of the Balkan peninsula and encoruaged by its strategic position that allowed not only crossings to and from Italy but most of all provided the best way to sail up and down the Adriatic Sea. The sea successively shaped the life of the ancient Liburnians, the Greek colonists and the Roman province of Dalmatia. However, the decline of urbanity that can be traced in virtually all of the Roman Empire's (former) provinces, also hit Dalmatia. The density of anchorages and small scale maritime networks decreased dramatically, caused by the disappearance of Roman villa-based economy. Similar to the Northern Adriatic, some of the ancient centres were almost completely abandoned by 600 AD. Dalmatia's orientation to the sea, however, grew yet stronger as can be seen with the rise of markedly maritime towns like Zadar, Split and Dubrovnik and the establishment of fortresses along the sea routes.

(page 49–73)

JENSEITS VON EPHESOS: HAFENANLAGEN AN DER KLEINASIATISCHEN WESTKÜSTE IN SPÄTANTIKER UND BYZANTINISCHER ZEIT

Andreas Külzer

Ephesos was one of the most important settlements in Western Anatolia during antiquity and the Middle Ages. There were considerable changes in the coastal landform due to the alluvial deposits of the river Cayster (Küçük Menderes) in this long period. Therefore, the Ephesians were forced to maintain and to repair the existing harbours, but also to create new anchorages in the urban area and its hinterland. In recent years, the scientific analysis of this situation leads to important new results, due to a combination of archaeological, geoarchaeological and historical methods. – About 110 kilometres airline distance to the north, one can find at the shore of the Çandarlı körfezi near the village of Kazıkbağları the settlement of Elaia, the former harbour of Pergamum. In the last years, a lot of scientific research was dedicated to this harbor place as well. – This paper refers to the harbor situation of both settlements. Furthermore, it presents some of the more important harbor cities situated between the two key points: in this region, one can find almost 30 percent of the early Byzantine bishoprics of the province *Asia*. Such a conspicuous concentration of outstanding *poleis* shows a well-developed communication system, both on land and on sea.

(page 75–84)

UNDERWATER SURVEY IN LAKE IZNIK – 2015

Mustafa Şahin – Ahmet Bilir

An underwater archaeological survey was launched on the basilica remains that were discovered by our team in February 2014 during an aerial photographic survey of the Lake İznik and referred to as one of the top 10 discoveries in 2014 by »Archaeology«, a periodical magazine of the Archaeological Institute of America. The survey was carried out between 16.06. – 07.07.2015 and began by enclosing the area of the basilica by cork floats to make it visible from the surface of Lake İznik.

As a preliminary work for the survey, we established benchmarks based on the national geographic positioning coordinates and divided the entire working area into a grid of 10 m x 10 m squares with denoted letters in the north southern direction and numbers in the east-west direction in order to be able to document the underwater cultural heritage accurately. Among the finds are a partially buried pithos, potsherds, a fragment of an amphora and an abundant number of terra cotta roofing tiles. The most unexpected discovery of the survey was the graves inside and around the basilica. The graves extend until the remains of the temenos wall. Another important finding of the survey was the remains lying to the west of the wall that we called the temenos wall. Another interesting finding inside the lake is the exedra-shaped remains to the northeast of the basilica.

The basilica is located at the centre of the remains. Lying approximately 50 m off from the coast in the east-west direction, are the architectural remains with three naves with an overall length of 41,32 m, and width of 18,61 m. There is a sarcophagus in the section to the south of the apse, presumably a diaconicon. The northern part of the building to the north of the exedra, presumably a prosthesis, measures 3,88 m in length and 4,31 m in width. To the west of the building lies the narthex and the atrium.

The plan and size of the basilica have similarities with the Church of Hagia Sophia (Murat II Mosque) in İznik. Considering the location of the structure, it appears that it was an extramural church on the shore of the lake. Therefore there might be a monastery complex in this location. The remains can be considered to have belonged to a basilica-plan church. Given the fact that it is outside the city walls and located near the lake, and there are many graves it is still likely that it may be martyrdom dedicated to St. Neophytes who became a martyr very young as we claimed earlier. In this regard more detailed information will be acquired after the archaeological excavations.

THE UNDERWATER ARCHAEOLOGICAL RESEARCH ON THE WESTERN BLACK SEA SHORES OF TURKEY

(page 85–95)

Emre Okan – Cenker Atila

The Black Sea is entirely different from the other seas in terms of geology, morphology and biology. Before becoming a sea, it was initially a fresh water lake fed by rivers. Geophysical and geomorphological research which was conducted in the Black Sea, shows that the prehistoric shoreline lies at a depth of 150-155 m. The sea level of the Black Sea has changed many times until recently. The first change occured 130,000 years ago when the salt water flooded into the fresh water lake via Bosphorus. Slowly, this changed the biological fauna of the Black Sea from fresh water to salt water. Especially, mollusc fossils that are found on the Black Sea shores are the proofs of this change. The last rising of the Black Sea had occured after the last Glacial Period and it reached to the present condition. During this stage, many prehistoric settlements remained under the sea bottom. Recently, research conducted on the Southern Bulgarian coasts (especially on the river mouths) put forth this situation. Another event which shows the importance of the Black Sea is colonization movements occuring from about the 7th century BC. In that process, many Aegean cities, like Megara, Boiotia, Miletos etc., had established a lot of colonial cities on Black Sea shores especially in order to gain trade. But the striking point is that all founded colonial cities are on the river mouth. For this reason, all rivers , which flooded into the Black Sea, should be important both for the trade of goods and the transportation of people. In this way, trade penetrates into the Black Sea inland. Many Black Sea countries such as Bulgaria, Romania, Ukraine, Russia etc., have given importance to uncover their underwater cultural

heritages. Unfortunately, Turkey's Black Sea shores have stayed in the shade of Mediterranean and Aegean in terms of cultural research. In 2015, Duzce University, Department of Archaeology begun the archaeological survey along the coast of Western Black Sea. In these studies which are conducted on Karadeniz Ereğli (Herakleia Pontika) coasts, two important breakwaters were detected. The first one is the north breakwater of the commercial port of ancient Herakleia Pontika and only 50 meters of this breakwater have remained today. The second breakwater is located in the south of Modern Ereğli. This structure is better than the former. Its length is about 120 m. The interesting point here is that there is no trace of any settlement in this place. Although uncertain, this breakwater must have been used for protection against storms. Further studies will clarify this situation.

(page 97–120)

»UNTEN AM FLUSS«.
DER HAFEN DER COLONIA ULPIA TRAIANA/XANTEN
Valeria Selke

The *Colonia Ulpia Traiana* and its predecessor were laid out on the bank of an ancient arm of the river Rhine, which is silted up today. Several excavations carried out between 1934 and 1993 outside the northeastern city walls brought to light well preserved remains of a wooden harbour. In front of *insula* 37 a wooden quay was built as early as 46 AD. Dendrochronological analysis of several posts has shown, that repairs or construction works took place in 76, 92 and 137 AD. A connection between some of these works and the elevation of the settlement to a *colonia* seems obvious, because a huge mass of building material had to be imported, especially for the public buildings.
During the first century we find northwest of the quay only small stabilisations of the riverbank. Later the quay is extending further north and it seems, there was an at least 200 m long wooden quayside at the beginning of the second century. The area east of the quay was artificially dried up and in 141 AD a 30 m long wooden footbridge was built. So far there has been no evidence for further construction although the colonia existed at least till 275/76 AD. A possible late antique harbour has not yet been found.

(page 121–145)

DER FRÜHMITTELALTERLICHE HAFEN KÖLNS.
PRODUKTIONSSTÄTTE UND EXPORTHAFEN FÜR GLÄSER
Michael Dodt

The harbour of Cologne was an important factor in the development of the city onto one of the most important cities of Europe between late Antiquity and the Middle Ages. Between former Roman town wall and Rhine sprang up a settlement of merchants and craftsmen, who produced glass and metal and sold them via the harbour in the Early Middle Ages. Close Merovingian and Karolingian

sites of this settlement were excavated along the bank of the Rhine in the years between 1996 and 2012. The products of glass from theses workshops were sold in the Merovingian period via the harbour to Krefeld-Gellep, Duisburg and other places along the Hellweg to the east or upstream the Rhine and Main, in the Karolingian period more via Dorestad to the North and the Baltic Sea, among others to Ribe and Haithabu. These harbours came to more importance as a result of relations to the Karolingian empire.

WHERE TO GO? – EIN AUSBLICK *(page 147–157)*

Martina Seifert – Leon Ziemer

Working on ports and harbour structures and comparing them with other trading facilities the modern archaeology requires commonly used terms and definitions, which intend the same meaning between these different structures. To take them in a GIS-database similar used words and descriptions are needed. During the workshop the wish of a multilingual thesaurus was often expressed. The final discussion of this workshop tried to answer the question on the intention to classify port structures in different languages. The requirements seemed to vary between North and South Europe and also between Greek, Roman and Late Antique periods. The participants offered different suggestions to classify harbour structures, intended to try first with a minimal definition of requirements for a trading point with a water connection.

Nea Paphos and its harbours. *Gates to the Mediterranean in the light of the Jagiellonian University research*

We would like to express our gratitude to Professor Martina Seifert who invited us to participate in the workshop »North Meets East. Aktuelle Forschungen zu antiken Häfen III« and to all organizers. It was our great pleasure and honour to participate in this event and to present our investigations in Paphos and their main results, especially those concerning the harbours. We also would like to underline that the collaboration between Jagiellonian and Hamburg Universities begun only in September 2015, when Martina Seifert and her two colleagues, Michaelis Antonakis and Nikola Babucic, came to Paphos and joined us conducting non-invasive research in Agora and beyond. We stated that we would like to continue, so we hope, and we are deeply convinced that we will have long, fruitful and friendly collaboration.

Harbour cities, like Paphos, played the most important role in the history of Cyprus. Before Paphos with its harbour was erected, there existed another one city – the Palea (Palaia) Paphos that means Old Paphos. It was the well known centre of Aphrodite's cult and today it is the Kouklia village. It is situated close to the mythical birthplace of Aphrodite the so-called Petra tou Romiou. The history of the site goes back to the 16th century BC and in 12th c. BC the famous sanctuary of Aphrodite was erected, although today only scanty remains are visible. Shortly after the abolishment of the Persian Empire by Alexander the Great, Cyprus became part of the Ptolemaic kingdom. The Ptolemies abolished local Cypriot kingdoms (which existed here from the beginning of the Iron Age), and Paphos seems to have acquired a special importance for the new conquerors.
At the end of the 4th century BC, Nikokles, the last king of Old Paphos, decided for not obvious reasons to found a new city: Nea Paphos, situated about 14 km to the west at the promontory with good bay for harbour[1]. Another theory says that the city was founded in 294 BC already by Ptolemy I Soter[2]. The ancient town of Nea (New) Paphos after some time took on significance. It replaced the Old Paphos (Palaepaphos) in its economic and administrative functions. However, Old Paphos remained the main centre of the Aphrodite's cult on the island. Two centres have been connected by the sacred gardens of the Aphrodite-Ieroskepos (today Yeroskipou village).
The new city had been the capital of Cyprus (from ca. 200 BC to ca. AD 350) as the seat firstly of strategos who governed the island in the name of the Egyptian dynasty of Ptolemies and later, of the Roman governor.
Nowadays Paphos is one of the most important archaeological sites in Cyprus. The monuments of Nea Paphos uncovered, starting from the 60s of the 20th century by Cypriot archaeologists and numerous foreign missions, have been inscribed in the UNESCO World Heritage Sites in 1980. The ruins are located about 3km south from the modern centre of the Paphos city (old name Ktima), at the modern touristic region of Kato Paphos (Fig. 1).

1 Daszewski 1987; Młynarczyk 1990, 67–70.

2 Bekker-Nielsen 2000.

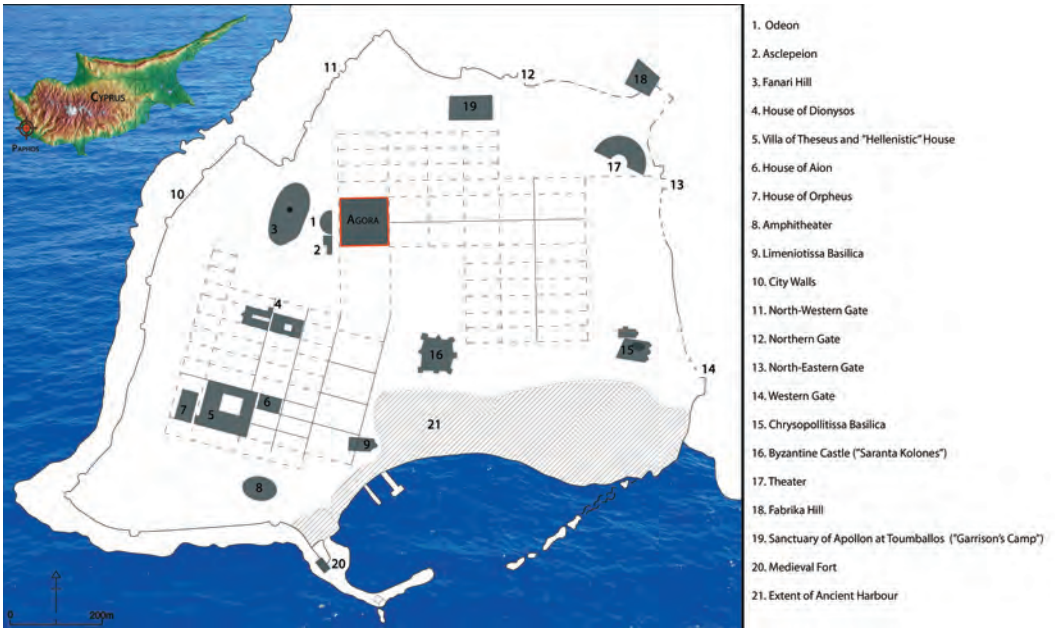


Figure 1: Location of Paphos on Cyprus map and the plan of the Nea Paphos ancient city (based on Młynarczyk 1990 and Medeksza 1992 with modifications by Paphos Agora Project)

THE PAPHOS AGORA PROJECT: INTRODUCTION

Nea Paphos was a modern city for its time. As established by Jolanta Młynarczyk[3], it was founded on a regular Hippodamian grid of streets intersecting at right angles. Though such organization existed in Classical Greek cities (e.g. Miletus and Piraeus), it was a first in Cyprus. The city's area had ca. 95 ha and was surrounded by walls with many gates. The harbour was organized in a natural, quite large, bay existing in the south (see below). In the eastern part, the theatre was created at the very beginning of the town's history (around 300 BC)[4] and many temples embellished the city. Other buildings (e.g. the gymnasium) had been known from the written sources but have not been localized yet. In the western part of the city, the residential quarter developed, known as Maloutena and Ktisto and in the central area, the low hill known as Faros (from the modern lighthouse built here) probably served as an Acropolis. On the east slope of this hill, the Odeon was erected (likely used as a bouleuterion too). Opposite it, the Agora is located (the main city square) – the primary focus of our work (Fig. 1).

The research in the Agora is conducted by the Department of Classical Archaeology of the Institute of Archaeology from 2011[5]. The Jagiellonian University cooperates with other institutions including: the AGH University of Science

3 Młynarczyk 1990.

4 Green et al. 2015.

and Technology in Krakow, the Jan Kochanowski University of Kielce, the Warsaw University of Technology, and starting from 2015 with the University of Hamburg in Germany, represented by the team led by professor Martina Seifert. Recently we also started the collaboration with the Intercollegiate Institute of Conservation of the Warsaw and Krakow Academies of Fine Arts.

An agora was an extremely important place in ancient cities: there the administrative, economic, cultural and social functions of the community were focused. The Paphos inhabitants handled the official matters here, discussed about matters of state, filled various cult activities, but also shopped and gossiped.

Excavation of the Paphos Agora were first conducted by the Cypriot archaeologist, Kyriakos Nikolaou, in the 70s. He established that the Agora was square shaped (each side being ca. 97 m long) and likely to have been surrounded by porticos. He dated the market place to Roman times, from the 2nd to 4th century AD. His results were never fully published, and consisted of short, preliminary reports[6].

Our investigations of the Paphos Agora during the first phase of the project (2011–2014), which were financed from the OPUS grant of the National Science Centre (NSC)[7], aimed to answer many questions. The main question was whether the Hellenistic Agora was situated in the same place, under the Roman one. Other questions related to when the excavated area had started to be the Agora; what it had looked like at the beginning and later on, during the changes and rebuilding caused by, among others, the frequent earthquakes in Cyprus; how it had functioned as a public space[8].

The second phase of our research began in 2015 and is financed by the new NSC grant MAESTRO[9] entitled: »Paphos Agora and beyond: material remains of economic infrastructure and activity of the Hellenistic and Roman Cyprus capital based on interdisciplinary research«[10]. It aims to continue research in the Agora itself and to search for the remains of other material infrastructure related to the economy and trade, e.g. other market places, harbours, warehouses, workshops etc., outside the Agora, based on non-destructive investigations.

5 The fifth anniversary of the project was celebrated by conference and photographs exhibition in Kraków in January 2016, see Papuci-Wladyka – Dobosz 2016.

6 E.g. Nicolaou 1977, 41. 1978, 36 f.; 1979, 37.

7 No. 2011/01/B/HS 3/01282.

8 Papuci-Władyka – Machowski 2016; Papuci-Władyka et al. forthcoming.

9 No. 2014/14/A/HS 3/00283.

10 Papuci-Władyka – Słaboński 2015.

Figure 2: Paphos Agora, works in Trench I with Building A (temple?) remains, 2015, photograph by R. Słaboński

METHODOLOGY AND METHODS

The methodology applied include economic models and contextual archaeology. The Paphos Agora Project is an interdisciplinary research effort with expertise in specialized areas of archaeology, architecture, geodesy, geophysics, 3D laser scanning, photogrammetry, aerial photography and preservation. A variety of research, prospection, and documentation techniques were applied. Our researchers created a Digital Terrain Model (DTM), which is the representation of land surface point elevations of the investigated area. All processed data have been stored in a GIS environment (on-going process). Consequently, it will be possible to depict the excavated site virtually on a computer screen. This modern system, named by us The Archaeological and Archaeometric Information System for PAP (AAISforPAP), a database specifically for documenting excavations, is slowly being implemented since 2013.

MAIN RESULTS

The uncovered on the Agora architectural structures can be preliminary dated to the Hellenistic and Early Roman periods in two phases, but at the present stage of research we are unable to say whether we are also dealing with the structures from the Late Roman period – although we are in possession of movable material from that time. The most important find is the discovery of two large fragmentarily preserved buildings of possibly public nature, labeled as Building A in Trench I (a temple?, Fig. 2) and Building B in Trench III (a warehouse?). At the present stage of research, it is not known when Building A was constructed, but it functioned at the end of the 2nd century/beginning 1st century BC (or was rebuilt then), and its next phase may have come from

the Early Roman period (at least in its eastern part). Building B was probably erected in the early stages of the founding of the city, i.e. at the beginning of the 3rd century BC, and operated for some time but, currently, it cannot be stated for how long. Another fact is also of key importance: moving the dating of the foundation of the portico of the Agora, i.e. the first phase of its operation both from the eastern and southern sides, to the Hellenistic times. Both of these discoveries, i.e. exposing the public buildings dating back to the Hellenistic period and shifting the beginning of the porticoes to an earlier period, suggest that we are dealing with a Hellenistic Agora. It should be noted that on Cyprus, only one other agora of Hellenistic date has been excavated – at Amathus, a city on the south coast of the island, east of Paphos.
However, it should be strongly emphasised that the analysis of the discovered movable material, especially pottery and coins, which are crucial for the dating, has not yet been completed and it could change the preliminary findings and hypotheses concerning the Agora development put forward until now.

NON INVASIVE RESEARCH

As stated above, the second stage of PAP research was expanded to investigate the economy and commerce in ancient Nea Paphos. Non-destructive methods will be applied, especially magnetic and geo-radar prospection and aerial photography will be used for the entire Archaeological Park (ca. 75 ha i.e. most of ancient Paphos area).
In 2014 the first geoarcheological studies were also carried out as part of the Paphos Agora Project by the Kielce University team. The exploration included geomorphological prospecting of the Paphos region and geophysical surveys of the Agora, which consisted of a pilot prospection with a Ground Penetrating Radar (GPR)[11].
In 2015 the cooperation with the Hamburg University started and initial surveys were performed for the Agora and the areas directly south of it. The results are promising and suggest the existence of buildings and other features[12]. This research will be continued in the next years in three stages 2016-2018.
The results of geoarchaeological research and analysis of Digital Terrain Model have been very promising in the context of the subject of Hamburg workshop - the harbours.

HARBOUR OR HARBOURS (?) OF PAPHOS: INTRODUCTION

Cyprus is *Mare Nostrum's* third largest island, whose geographical location made it a natural base for many sea travelers seeking a passage in the Eastern Mediterranean. In order to attempt enable a journey, proper infrastructure had to be in place, i.e. ports, harbours and anchorages, which provided a safe haven and were a gateway to the world, ensuring a constant flow of imports and exports.

11 Kalicki et al. 2015.

12 Antonakis et al. 2016.

The development of infrastructure began with the intensification of interregional trade, of which Cyprus had been a key actor since the Bronze Age, when it became an important supplier of copper ore and wood. The Island's early network of connections spanned across the Eastern Mediterranean to later cover the whole Basin in the Roman Era[13]. Specialisation increased gradually, in terms of both marine infrastructure and the portfolio of traded goods, e.g. in the Roman Times, besides copper ore and wood, Cyprus exported manufactured and agricultural products such as ships, medicines, cosmetics, pottery, olive oil, wheat and wine[14]. Ancient Cyprus' economic life largely depended on its port cities, which were »a window to the world« for local manufacturers and also served as transport nodes linking the cities of Cyprus with other centres. Therefore, in order to be able to fully study and understand the economy of Nea Paphos – one of the most important cities of Cyprus and its Hellenistic and Roman capital – it is absolutely crucial to make an attempt to describe its port infrastructure.

A SHORT HISTORY OF RESEARCH INTO CYPRIOT PORTS

The earliest evidence of interest in Cypriot ports comes from the accounts of travellers who visited the Island and often described the landmarks of its most important urban centres. The most interesting descriptions were written at the turn of the 20th century by, inter alia, D. G. Hogarth, K. Lehmann-Hartleben, J. du Plat-Taylor and G. Jeffery. Their accounts are especially valuable since they relate the appearance of the relics of ancient ports as they still lay largely uncovered by modern buildings[15]. The first archaeologist known to have been interested in ancient Cypriot marine infrastructure was K. Nicolaou[16], a native who carried out the first prospection of archaeological sites from the maritime perspective. More detailed underwater research was initiated by W. A. Daszewski, who in the 1960s undertook a half-amateur prospection of the remains of the main Nea Paphos port[17]. The next decade saw research by H. Frost in Hala Sultan Tekke and Kition and by N. Flemming in Salamina, the second most important urban centre of ancient Cyprus[18]. The number and intensity of research projects increased in the 1980s and 90s, when J. Y. Empereur prospected the port in Amathus and M. Yon continued research in Kition, while C. Giangrande became the first one to study a larger area, including port sites on the whole west coast of Cyprus[19]. Finally in the 1990s, J. R. Leonard conducted his research as part of the Coastal Cyprus Survey, focusing on recording and probing sites on the south coast of the Island. Together with R. L. Hohlfelder, he spent a few seasons carrying out the Paphos Ancient Harbour Exploration

13 Hohlfelder 1995, 192; Leonard 2005, 15, 264.
14 Michaelides 1996; Leonard 2005, XVII.
15 Leonard 1995, 229.
16 Nicolaou 1966a.
17 Daszewski 1981.
18 Flemming 1974, Frost 1985.
19 Empereur 1985. 1987; Giangrande et al. 1987; Yon 1993; Leonard 2005.

Project, which included an underwater component[20]. Archaeological survey projects, e.g. Danish Akamas Project[21] or Canadian Palaipaphos Survey Project[22], played also an important role by yielding new information about littoral sites, in particular those less significant (e.g. anchorages).

NEA PAPHOS PORT(S) – STATE-OF-THE-ART

Any study regarding the subject-matter should definitely start with the examination of ancient sources mentioning the Nea Paphos port(s). The most important accounts were written in the Roman Era, including Strabo's *Geography* and *Stadiasmus sive Periplus Maris Magni*, an anonymous Roman Period work (although written in Greek). The former, which is probably the earlier one, was created at the turn of the 1st c. AD or, perhaps, in AD 18–24. The Roman Geographer describes a number of port cities on Cyprus, including Nea Paphos, which he calls λιμήν (lat. portus)[23]. In Strabo's »typology« this is a word probably used to refer to the largest kind of a port centre, with infrastructure well developed and more complex than that of similar but smaller sites, e.g. Ὅρμους, ὑφορμους or Ἀνάποος[24]. A more curious description, however, comes from *Stadiasmus*, where the Nea Paphos port is referred to as a triple port which can protect from all kinds of winds[25]. The ambiguity of this excerpt, reinforced in translation, is one of the factors that have led some to propose a hypothesis that Nea Paphos had more than one port. It must also be remembered that *Stadiasmus* itself is still studied with the aim of determining its chronology, which does not facilitate interpretation. Currently, the received view is that the work was created between the 3rd and 4th century AD. Less important accounts can be found in the works of Pliny the Elder, Ptolemy, Ammianus Marcellinus or Zosimus[26].

The existence of the »main« port in Nea Paphos has never been questioned. The remains of its breakwaters are still visible, and their presence has been noted by many travellers. In fact, the bay located south of the City has been in continuous use since the Antiquity (e.g. by local fishermen). Unfortunately, a decision by the British Administration of Cyprus to remove rubble from the bay's bottom in the mid 20th century had a detrimental impact on the surviving ancient port infrastructure. Only those elements that formed a continuous line of original structures were left in place[27]. As a result, interpretation and reconstruction options have been significantly limited.

20 Leonard – Hohlfelder 1993; Leonard 1995. 2005; Leonard et al. 1995. 1998; Hohlfelder 1995; Hohlfeder – Leonard 1994.
21 Fejfer 1995.
22 Sørensen – Rupp 1993.
23 Strab. 14, 6, 3 cf. Leonard 2005, 583.
24 Strab. A, B, C cf. Leonard 2005, 105.
25 Stadiasmus 297 cf. Młynarczyk 1990, 187.
26 cf. Leonard 2005, 102–111.
27 Daszewski 1981, 328; Leonard 2005, 588.

The Paphos port has itself been a subject of a few research initiatives. The first one was an attempt by British Army divers to conduct an underwater prospection during a drill code-named »Aphrodite«. The results of that amateur endeavor have never been published, but it is worth noting that in scholarly literature one can encounter references to a prospection report which is available at the Department of Antiquities' Archive. The findings, never confirmed later, were sensational: the surviving breakwater was reported to join the city bay with the Moulia Rocks, a natural landmark and fresh water source located 4 km southeast of the city. That would make the breakwater the longest ancient structure of its kind known as of today, but as has already been mentioned, later research did not confirm the divers' findings[28].

The first archaeologist who described the relics of the Paphos port was the already mentioned K. Nicolaou[29]. However, he did not undertake any research and only described the condition of the surviving antiquities. He noticed that the southern bay was partly covered with canes, algae and sand, which turned it into a swampy environment[30]. W. A. Daszewski, who conducted the first half-amateur research into the Paphos port (probably working with a Cypriot colleague) confirmed that observation. His research consisted in underwater prospection and took place in 1965, but its results were not published until 1981, unfortunately without any drawings or photographs. In the meantime, a Frenchman collaborating with the University of Warsaw mission, H. Lebrun, conducted a survey of the site, focusing on the remains of the port. He never published the results of his work, but his findings are referred to by J. Młynarczyk[31], whose book lists and examines all known data and research results regarding the Paphos ports. Her analysis laid a foundation for further studies by American archaeologists in the 1990s. R. L. Hohlfelder and R. J. Leonard, collaborating with the architect S. L. Tuck and the geoarchaeologist R. K. Dunn undertook a few year long underwater and geoarchaelological research project in the port bay area. Its results, however, were only published in reports and a couple of single problem-oriented articles[32]. The most important findings are repeated and listed in R. J. Leonard's monumental, though unfortunately never published, 2005 Ph.D. dissertation entitled »Roman Cyprus: Harbours, hinterlands, and hidden powers«, which partially establishes the spatial organization and chronology of the Port and makes a tentative attempt at its visualization, including the Hellenistic and Roman era shoreline and sea level[33]. The Port was enclosed by two breakwaters erected as extensions of the city walls (Fig 3). The western

28 Daszewski 1981, 332; Młynarczyk 1990, 59; Hohlfelder 1995, 196.
29 Nicolaou 1966a. 1966b.
30 Nicolaou 1966a, 578.
31 Młynarczyk 1990, 177. 1991.
32 Leonard 1995. 2005; Leonard et al. 1995. 1998; Hohlfelder 1995; Leonard – Hohlfelder 1993; Hohlfelder – Leonard 1994.
33 Printed microfilm is available at the Blegen Library of the American Classical School at Athens. Brief summary of the results of the studies about Paphos harbour is also available on the NA-

breakwater was ca. 270 m long and 10-15 m wide. Today it unfortunately is not visible as a result of the redevelopment of the Port in the 1980s. The surviving structure was converted into foundations for a new breakwater and a marina, where modern yachts and tourist ships moor. However, thanks to historical photographs, including aerial ones, the condition of the breakwater before the redevelopment is known. The eastern breakwater may have been 400 m long and 5-10 m wide[34], and its remains are still visible[35]. Different estimates were suggested by J. Młynarczyk[36], who thought that the eastern breakwater must have been used as a pier too and could have been even 15 m wide, and by R. L. Hohlfelder, who believed that it had been 600 m long. Though it is difficult to verify any reconstruction efforts regarding the original form of the breakwater, its length can be more easily assessed thanks to the latest research tools. Satellite photographs show that the latter researcher's estimates were more accurate: the length could be ca. 596 m (Fig. 4). A parallel breakwater arm, 195 m long, was erected south of the described structure. Its lower parts are still visible underwater, but its purpose remains unclear. Chronologically, it is later than the breakwater[37]. The entrance to the port used to be located a bit further west of where the entrance is today. On the western end, it was flanked by a small additional structure, which could have been a defensive tower, a lighthouse, or another breakwater running off the western arm[38]. In the middle of the port bay was a natural elevation, still partly visible today, which separated the port into at least two basins and provided support for the pier. It is a received view that the port was divided into at least three basins in accordance with one of the interpretations of the *Stadiasmus* description. This hypothesis lacks, however, decisive proof, and, what is more, there are serious disagreements regarding the purpose of each basin[39]. Geoarchaeological research has confirmed earlier suggestions that today the port bay covers a smaller area than in the antiquity. R. K. Dunn's work enabled a more precise reconstruction of the shoreline[40] as compared to that suggested by Megaw in the 1980s on the basis of small-scale rescue excavations[41]. Both W. A. Daszewski's and the American expedition's research revealed that the Nea Paphos port had struggled with the problem of gradual siltation. Two factors may have contributed to that. First, a stream that flowed into the port at its eastern border, may have transported deposits that

VIS 2 project's website, created by T. Theodoulou, The harbour of the kingdom of Paphos. <http://www2.rgzm.de/Navis2/Home/HarbourFullTextOutput.cfm?HarbourNR=Paphos> – access 13.07.2016.

34 Daszewski 1981, 330.

35 Daszewski 1981, 331.

36 Młynarczyk 1990, 181.

37 Hohlfelder 1995, 203 f.

38 Daszewski 1981, 331; Młynarczyk 1990, 178; Leonard – Hohlfelder 1993, 58; Hohlfelder – Leonard 1994, 375; Leonard et al. 1995, 237 – 247.

39 Daszewski 1981, 332 – 333; Młynarczyk 1990, 177 – 178; Leonard – Hohlfelder 1993, 375.

40 Leonard et al. 1998, 152 – 153.

41 Megaw 1988, 142; Leonard et al. 1998, 154.

Figure 3: Satellite image of the modern harbour (2014) of Paphos. Visible ancient remains of the two lines of the eastern breakwaters, possibly remains of the pier and modern western breakwater covering the ancient one. Created by Ł. Miszk. Image Courtesy of the DigitalGlobe Foundation.

made the bay more and more shallow, leading to gradual siltation. Second, tides may have transported sand through the port entrance in parallel to the process observed in the port of Amathus, causing gradual siltation of the area[42]. The two phenomena were quite typical of many Mediterranean port cities[43]. The ancient port seems, however, to have been operating without much hindrance. Siltation intensified with the gradual decline of harbour life and with the destruction of the infrastructure by earthquakes. The aforementioned second breakwater arm, erected parallel to the eastern arm, may have been intended to regulate the siltation process, but this has not been entirely confirmed[44]. The chronology of the whole construction has been established indirectly, on the basis of correlation with known events from the city's history. As has been mentioned above, the two main breakwaters were erected as extensions of the city walls, which may suggest their synchronicity. Until recently the received view was that the walls were erected at the time of the foundation of the city[45], i.e. at the turn of the 3rd century BC or in the early 3rd century BC. The latest research by C. Balandier has, however, shifted the chronology of their construction to the early 2nd century BC in connection with the relocation of the capital from Salamis to Paphos[46]. Furthermore, the American researchers have pointed out that the

42 Daszewski 1981, 329; Leonard et al. 1998, 154.
43 Morhange et al. 2016, 93–95.
44 Leonard et al. 1998, 154.
45 Młynarczyk 1990, 98.
46 Balandier 2011, 376.

Figure 4: Length of the main ancient breakwater measured on the GoogleEarth satellite image. Created by Ł. Miszk.

breakwater structure must have been repaired and redeveloped as is evident from the use of hydraulic-setting cement, which had not been introduced until the Roman era[47]. R. L. Hohlfelder put forward a hypothesis that the Paphos port had been rebuilt after the 17 BC earthquake by the same engineers that had been in charge of rebuilding the Caesarea Maritima port, a suggestion supported by the presence of the Roman cement[48].

Unfortunately, many questions remain to be answered. Despite the conducted geoarchaeological research, the exact shape of the ancient shoreline as well the progress and impact of siltation are unclear. The spatial organization of the bay has not been unanimously determined either. There is no decisive evidence of the port having been divided into three basins, which is a recurrent hypothesis. The discussion regarding the purpose of each basin has been highly speculative as it can only rely on parallels. Excavations of the silted area of the ancient harbour could definitely shed more light on the issue, but since the whole site is covered by modern developments (a parking lot and a bus station), such a project seems rather unfeasible. As much as possible, a geophysical survey could be attempted in accessible spots, but its success would largely depend on local

47 Hohlfelder 1996; Morhange et al. 2016, 89–91.

48 Hohlfelder 1996.

conditions, i.e. type of eventual building or features, etc. The issue of the purpose of the breakwater erected parallel to the eastern arm of the port has not been resolved either, and so is the case with the question whether there existed a lighthouse or an alternative structure on the southern arm of the western breakwater, at the entrance to the port. As of today, possible answers to those questions are unfortunately few, which is due to the condition of the surviving constructions and of the older archaeological records.

NORTH-WEST PORT (?)

Nea Paphos is located on a promontory with a bay on each side. The southern one has remained a perfect place for organizing marine activities since the Antiquity, when the large, aforementioned port was established and thrived. It still must be ascertained if and how the other one, on the north-west end of the city, was used. In the light of the fact that our understanding of the economy of ancient cities is considerably influenced by the existence of ports, the reconstruction of the history of the discussed area has become one of the objectives of the Paphos Agora Project as part of the above mentioned second stage of the Jagiellonian University's project, which aims to search for material infrastructure related to the economy and trade, e.g. ports.

As has been noted above, the hypothesis that Nea Paphos had more than one port is founded on the description of the city in *Stadiasmus sive Periplus Maris Magni*, which claims that the Island's capital »ἔχει λιμήνα τριπούν παντί ἀνέμώ«[49]. This excerpt is usually interpreted to mean either a triple port or three ports[50]. Without examining further this purely linguistic dispute, one cannot help but notice that Paphos may actually be distinguished from other Cypriot ports mentioned in Stadiasmus for a good reason. No other port city in Cyprus is described in the same way. What is more, the account that Paphos had a port or ports protecting ships from winds blowing from all the directions brings to mind the Delos port, where such conditions were ensured by three separate havens[51]. On the other hand, Strabo, who may have visited Paphos in person, does not mention a greater number of ports, describing the one in the city as λιμήν or an enclosed port[52]. It can be debated whether the wording employed by Strabo corresponds to that in *Stadiasmus*, but reaching a definite answer seems unattainable.

The first one to put forth the three-port hypothesis was W. A. Daszewski, who in the 1960s apparently saw some architectural remains on the shore, at the NW end of the city[53]. It is likely that H. Lebrun, whose observations are cited by J. Młynarczyk, saw the same structures[54]. According to Daszewski those were

49 Stadiasmus 297 cf. Młynarczyk 1990, 187.
50 Daszewski 1981; Młynarczyk 1990; Leonard – Hohlfelder 1993.
51 Młynarczyk 1990, 187.
52 Młynarczyk 1990, 187; Leonard 2005, 102.
53 Daszewski 1981, 332 f.
54 Młynarczyk 1990, 177.

elements of an ancient subsidiary port. Polish archaeologist also suggested that a shipyard may have been located there, a theory corroborated by the evenly descending land relief in this part of the city. In W. A. Daszewski's concept, not only did Nea Paphos use to have three ports (with the third one located east of the south port), but also its main port was divided into three basins (domestic, international and military basins)[55]. Unfortunately, it remains unknown what exactly the head of the University of Warsaw's archaeological mission saw, since no relevant drawings or photographs exist. 1960s' aerial photographs do not reveal any larger architectural remains on land, but their definition is too poor to allow them to be considered decisive proof. W. A. Daszewski's concept was re-examined by J. Młynarczyk[56], who believed that there might have existed a port in this area. She points out that it would have been very unusual for a city gate to be located there (Fig. 1 no. 11), directly facing the sea, without a corresponding wharf, in particular since the reshaping of the rock shore and the erection of a special ramp, a gatehouse and defensive towers must have consumed a lot of effort. The American researchers Hohlfelder and Leonard do not agree with that line of argumentation[57]. They did not, however, look deep into the question of existence of the NW port as is evident from Leonard's description of its possible remains, which he believed were located directly at the north end of the city, close to the site excavated by Italian archaeologists and known as »Garrison's Camp« (Fig. 1 nos 12 and 19)[58]. In view of the long distance to the shore, such a localization seems highly unlikely and implies that the American archaeologist was not very familiar with the area's topography.

Above the state of research as of 2014 is presented. With the commencement of a new stage of research in 2015, our expedition has decided to once again analyse the existing evidence and to obtain new, especially remote sensing, data, and also to try to broaden the context of the researched site. It is worthwhile to examine the account of the traveller G. Jeffery, who left a thorough description of the area: »*On the west side the city (Nea Paphos) wall may be traced by actual remains or by cuttings in the rock levels nearly its whole length. On the face towards the north-west bay of the sea are traces of gateways with rock-cut steps supposed to have formed sally ports into the water-if, as must also be supposed, the present marshy ground of the coast was once below the water level.*«[59] It is particularity interesting to note that the area outside the city's NW gate appeared swampy to the British voyager. This could suggest its progressive siltation as a result of the deposition of algae by tides. This process can be still observed today, though most vegetation is regularly removed by the municipal services. The Jan Kochanowski University experts conducting the Paphos Agora Project geoarchaeological research have been the first ones to bring to light the geomorphological processes taking place in the

55 Daszewski 1981, 332 f.
56 Młynarczyk 1990, 178 f.
57 Leonard – Hohlfelder 1993, 375.
58 Leonard 2005, 591.
59 Jeffery 1918, 401.

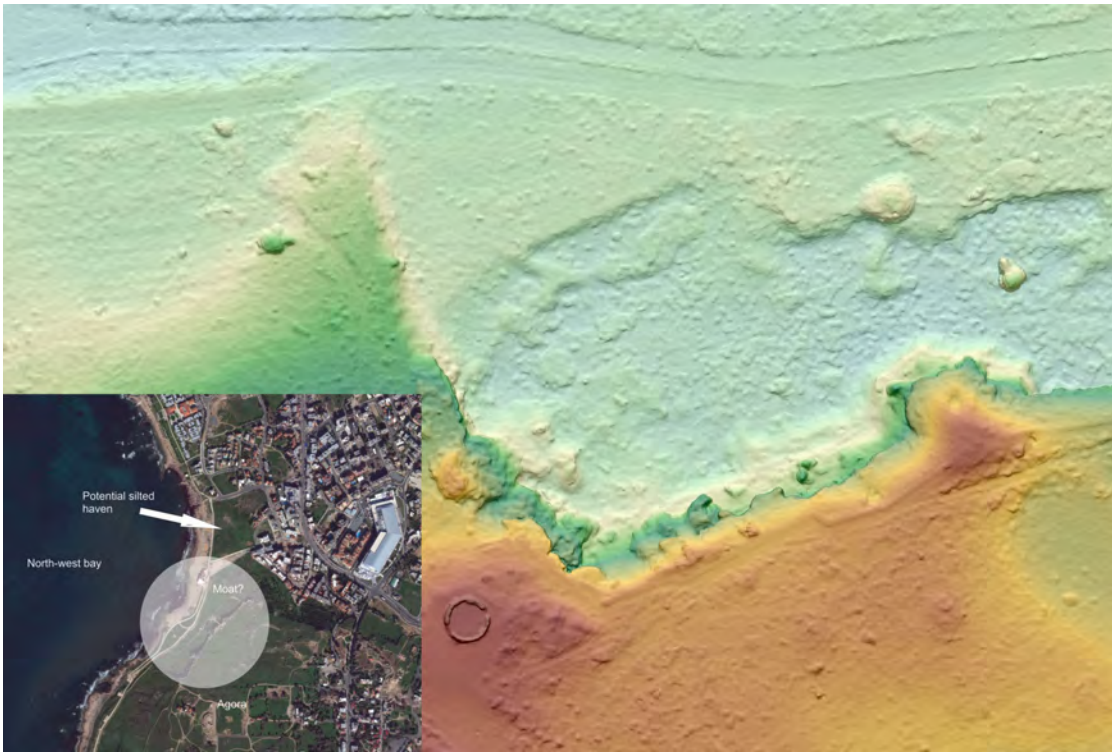


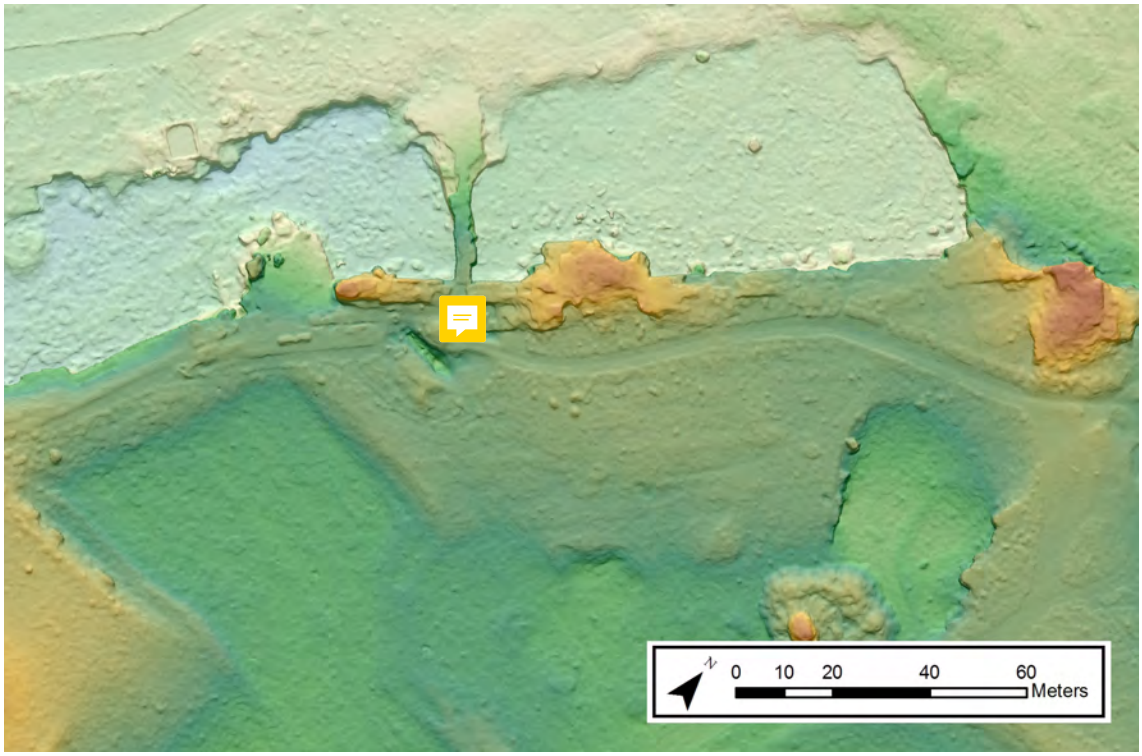
Figure 5: Satellite image of the area of the North-West bay of the Paphos and Digital Terrain Model of the so-called moat – created by Ł. Miszk and W. Ostrowski. Image Courtesy of the DigitalGlobe Foundation.

area. They have established that the siltation of the bay is likely to have been caused not only by the aforementioned algae, but also by sediments transported by a river flowing north of the city. The southward direction of the local tides contributed to the accumulation of deposits in the bay[60]. The whole process may have intensified with the increasing deforestation of the western Troodos Mountains, which were a source of one of the most important exports that the ancient Cypriot economy relied on – wood, sold in the form of raw material and of processed goods. It is, thus, not unlikely that G. Jeffery witnessed the final stage of the process in question (entirely impeded by later river engineering), which might have caused the complete covering of all of the architectural remains in the area and largely reduced the size of the bay itself[61]. Of course, new data allows the NW port hypothesis only to be revived and reconsidered. More research is needed to decisively falsify it (fig. 5).

In this context, the question of the purpose of a large depression running south

60 Leonard 2005, 352; Kalicki et al. 2015, 236 f.

61 Kalicki et al. 2015, 236 f.



from the hypothetical bay along the W city wall till its middle part should be revisited. The entry ramp built across this feature influenced its interpretation as a moat[62]. However, a Digital Terrain Model developed by our team revealed that it gently slopes down from the NW city gate till the sea-facing »mouth« on the south end and forms a reverse L-shaped corridor. Unfortunately during works undertaken in this area all architectural remains were interpreted as rubble from collapsed fortifications and removed[63]. Therefore, it is difficult to establish if the »rubble« contained any structural elements of the feature, which itself is without a doubt man-made. Currently, there is no evidence allowing the connection of this »corridor« with the hypothetical port, but the moat interpretation should be rethought.

62 Karageorghis 1983, 937; Młynarczyk 1990, 99.

63 Karageorghis 1984, 43.

FUTURE RESEARCH

The Kraków team's project should lead to the ultimate falsification of the NW port hypothesis. In order to attain that, the aforementioned geoarchaeological research will be continued with the aim of discovering and exploring the processes affecting the formation of the local shoreline. Boreholes will be drilled to establish the chronology of the area's siltation, and geophysical survey will be undertaken to trace any possible architectural remains. If non-invasive prospection yields positive results, selected spots will be probed to determine the type of the detected structures. If the port hypothesis is confirmed, our idea of the city's spatial organization will have to be revisited with emphasis laid on the Agora, which has been excavated by the Jagiellonian University expedition, as the main reference point for our picture of the ancient city's life.

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After the submission of this text one very important article has appeared concerning inter alia the north-western port: J.-C. Bessac, Les aspects techniques des aménagements rupestres de Paphos, in: C. Balandier (ed.), Nea Paphos, Fondation et développement urbain d'une ville chypriote de l'antiquité à nos jours. Études archéologiques, historiques et patrimoniales, Actes du Ier colloque international sur Paphos, Avignon, 30, 31 octobre et 1er novembre 2012, organisé par Université d'Avignon et des Pays de Vaucluse & Department of Antiquities of Cyprus, Ausonius Editions, Mémoires 43 (Bordeaux 2016) 105–120, and esp. 117–119, figs. 14–18, which could not been taken into consideration by the present authors.