

# Binding the spheres – a comparative study of Late Antique trade networks at Berenike and Nea Paphos



**Abstract:** This paper presents a comparative study of the economic and strategic importance of two Late Antique ports: Berenike (on the Eastern Desert coast of the Red Sea, Egypt) and Nea Paphos (on the western coast of Cyprus). Both cities, situated in favorable geographic locations, were dynamic hubs of regional and interregional trade. The aim of this paper is to analyze their mercantile activity between the 4th and early 7th centuries AD, and to assess how they operated within the dense web of economic interdependencies of the Late Antique world. The research, based on the rich assemblage of more than 32000 fragments of transport pottery, sheds light on interregional trade patterns, as well as the consumption and distribution of goods spanning from Iberia to the western coast of India. Comparing these sites provides insights into their differing roles and economic strategies as actors in Eastern Mediterranean and Indian Ocean commerce. While separated by thousands of kilometers, Berenike and Nea Paphos fulfilled remarkably similar roles as intermediary agents, redistributing goods to key actors in their respective regions and linking interregional production centers. This study explores the diverse economic mechanisms that made Berenike and Nea Paphos two of the most important centers integrating the micro-markets of their regions with the macro-markets of the wider Byzantine economy.

**Keywords:** early Byzantine, Cyprus, Nea Paphos, amphorae, Berenike

**Jerzy M. Oleksiak<sup>1</sup>**  
**Urszula Wicenciak<sup>2</sup>**

<sup>1</sup>University of Warsaw,  
Faculty of Archaeology

<sup>2</sup>University of Warsaw, Polish Centre  
of Mediterranean Archaeology

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## AIM OF RESEARCH

The aim of this article is to examine the extent to which the different administrative and economic organization of two Late Antique ports — peripheral Berenike (Eastern Desert, Egypt) and imperial Nea Paphos (western Cyprus)— shaped the networks of goods flow, while identifying stages of the supply chain that remained common despite these differences. We propose that, despite their different administrative frameworks, both ports exhibit convergent mechanisms of amphora distribution at the local, regional, and interregional levels, reflecting universal principles of Late Antique trade logistics. This issue is addressed through a comparative quantification of 32778 fragments of transport vessels dating from the 4th to the 7th century AD.

The selection of Berenike and Nea Paphos is based on three complementary criteria:

1. Contrasting economic models — Berenike functioned as a decentralized, semi-autonomous hub at the junction of the Red Sea and the Indian Ocean, connecting to Mediterranean networks via the Nile Valley. Nea Paphos, in contrast, was an integral part of the imperial Mediterranean system. This contrast in administrative and economic frameworks, although intuitively clear, provides an opportunity to test the center–periphery theory.
2. Complementarity and homogeneity of ceramic material — both ports yielded extensive, methodologically consistent collections of transport vessels documented according to the Solheim refined quantification model (Solheim 1960; Oleksiak 2025: 43–47). This dataset provides a solid foundation for reliable comparative analysis.
3. Identification of common patterns in seemingly contrasting systems — although differences between peripheral and imperial port models may appear predictable *a priori*, our aim is to demonstrate statistically significant similarities in terms of trade, logistics, and supply networks. The analysis considers supply mechanisms at three levels — local, regional, and interregional (from local workshops through regional trading partners to routes extending to the Black Sea and Indian Ocean)— to assess the degree of similarity in trade strategies despite differing administrative structures.

In recent years, research on Late Antique trade has shifted from traditional “center–periphery” models to more nuanced visions of multiscale, resilient trade networks (McCormick 2012). In this context, our analysis of the ports of Nea Paphos and Berenike contributes to the broader debate on how local conditions and global routes intersect to produce heterogeneous yet interdependent distribution mechanisms. By identifying recurring logistical patterns, we aim to move beyond the “center vs. periphery” paradigm and offer a new perspective on adaptive strategies in Late Antique commerce.

## ECONOMIC AND POLITICAL TRANSFORMATIONS IN LATE ANTIQUITY

The vast markets of the past —among which the early Byzantine Empire can be classified— are often described as proto-industrial economies (Bang 2006: 54).

These were characterized by the diversity of produced goods, high competition among small-scale enterprises, state-controlled mass production, and the intensive

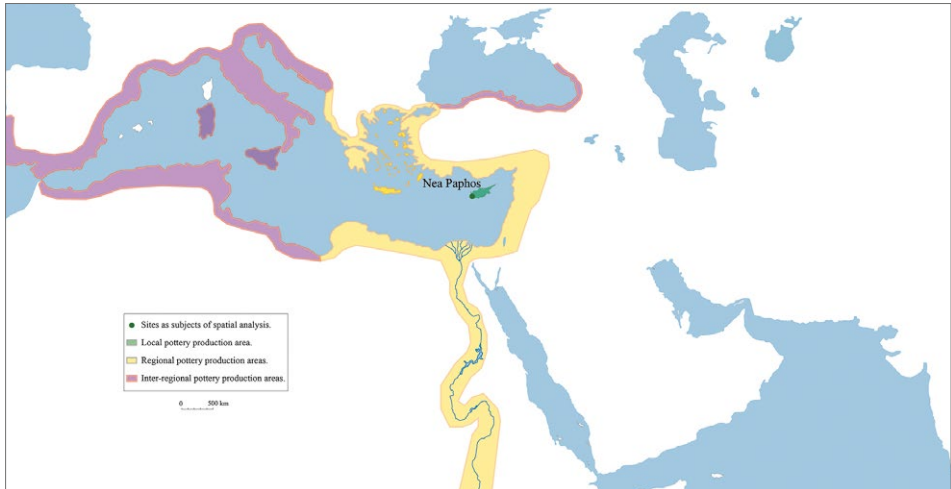


Fig. 1. Map showing local, regional, and interregional pottery importation patterns at Nea Paphos between the 4th and the 7th centuries AD (Drawing J.M. Oleksiak)

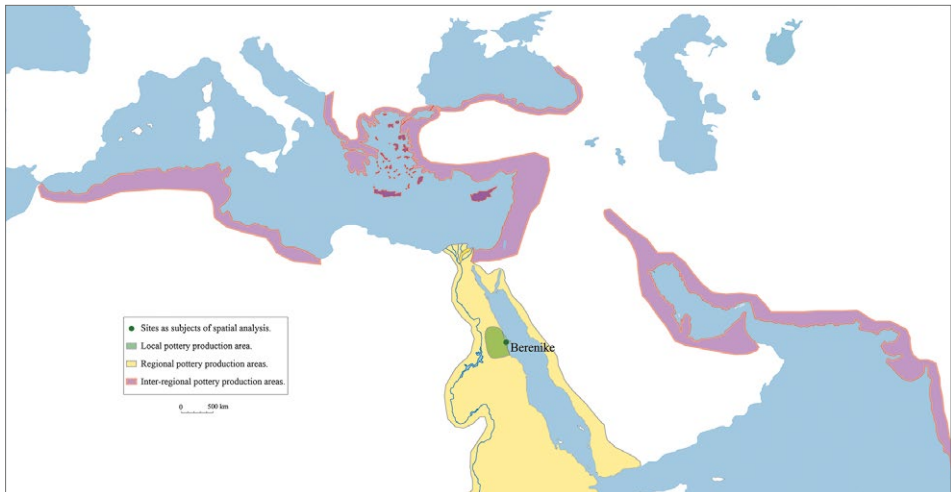


Fig. 2. Map showing local, regional, and interregional pottery importation patterns at Eastern Desert sites between the 4th and the 7th centuries AD (Drawing J.M. Oleksiak)

exploitation of natural resources (Banaji 2015: 1–2). Small markets increasingly became the backbone of the Late Antique economy (Carrié 2012: 15–17). The period under discussion—defined here as spanning from the 4th to the mid-7th century AD—was marked by significant trade intensification and the rapid development of local and regional markets, which evolved into semi-independent, highly active economic entities (Sarris 2013: 172; Whittow 2013: 154–155). This era also witnessed intensified long-distance exchange among ports across the Mediterranean and beyond. The prolonged peace between the Roman and Sassanian empires at the end of the 4th and throughout the 5th century AD stimulated vibrant trade along routes connecting the Red Sea and southern Levant with the West Indian Ocean world (Howard-Johnston 2017: 285–286). Large-scale transportation and the movement of staple goods between small production centers and recipient cities are attested by the immense quantities of pottery found in Late Antique archaeological contexts across both urban and non-urban settlements (McCormick 2001: 29; Costa 2013: 91). This is especially evident in Late Antique Egypt, where remarkable economic growth between the 4th and 6th centuries AD was driven by non-urban production centers. These sites supplied both the internal Egyptian market and the Eastern Mediterranean export economy (Banaji 2015: 18–22). A similar phenomenon occurred in Late Antique Cyprus, where regional-scale production expanded significantly, and the island flourished as a regional and interregional supplier of olive oil, wine, tableware pottery, and copper ore.

The Late Antique period witnessed significant economic and political shifts that reshaped trade networks across the Eastern Mediterranean and the Red Sea. The collapse of the Western Roman Empire and the consolidation of Byzantine control over the eastern provinces led to new commercial patterns, affecting the movement of goods between provincial centers and imperial markets. A key development of this period was the increasing regionalization of production and trade, visible in the distribution patterns of transport amphorae, which provide valuable insight into exchange mechanisms (Reynolds 2017: 355). Unlike the earlier, more centralized Roman economic system in the Eastern Mediterranean, and its structured exchange with the East (Young 2001; Evers 2017), Late Antique commerce became increasingly localized, with production centers specializing in goods tailored to specific regional markets.

By the 4th century AD, distinct production centers dominated the economic landscape of the Eastern Mediterranean, initiating a gradual process of trade and production regionalization. Cilicia emerged as a primary supplier of olive oil, transported in Late Roman Amphora 1 (LRA 1). At the same time, Cyprus also produced LRA 1 amphorae, but archaeological evidence suggests that most of its output was intended for export—primarily to Danubian military supply centers—rather than for local consumption or distribution to Egypt and the Levant (Demesticha 2013). Syria, Phoenicia, and Palestine specialized in wine, producing amphorae types such as Robinson Agora M334, Late Roman Amphora 4

(LRA 4), and Late Roman Amphora 5 (LRA 5). These containers were widely used in regional exchange, but they were also exported to more distant markets, including Egypt, the Black Sea, and even northern Europe (e.g. the Galician coast and Britain) (Reynolds 2017: 355–357; 2021: 308–309). However, in the case of amphorae potentially used for olive oil from Phoenicia, Syria, and Palestine, typological classification and identification of production sites remain problematic, and hypotheses regarding their contents are still under debate. The Black Sea played an important role in the redistribution of Levantine goods. The presence of Levantine amphorae in Pompeiopolis suggests that products from Palestine and northern Phoenicia (modern Lebanon) reached Anatolia via maritime and riverine networks. This trade likely operated through Amastris, a key port on the southern Black Sea coast, where goods were offloaded and transported further inland (Opařt 2021).

Meanwhile, Egypt —particularly the Nile Valley— supplied amphorae mainly for local and regional trade (e.g. Late Roman Amphorae 7, *Amphore Égyptienne* 5/6). However, multiple trade routes coexisted and complemented one another within the Byzantine commercial system (Horden and Purcell 2000; Arnaud 2005). While some goods were transported via Amastris and the Black Sea, others likely followed the Eastern Mediterranean route through Cyprus, which functioned as a key trans-shipment hub.

Beyond regional trade, long-distance exchange intensified during Late Antiquity, particularly along the routes linking the Red Sea to the Indian Ocean and the Eastern Mediterranean. The prolonged peace between the Byzantine and Sassanian empires in the late 4th and 5th centuries AD facilitated the expansion of maritime trade (Howard-Johnston 2017: 285–286). Demand for luxury goods —including spices, textiles, and incense— fueled trade with

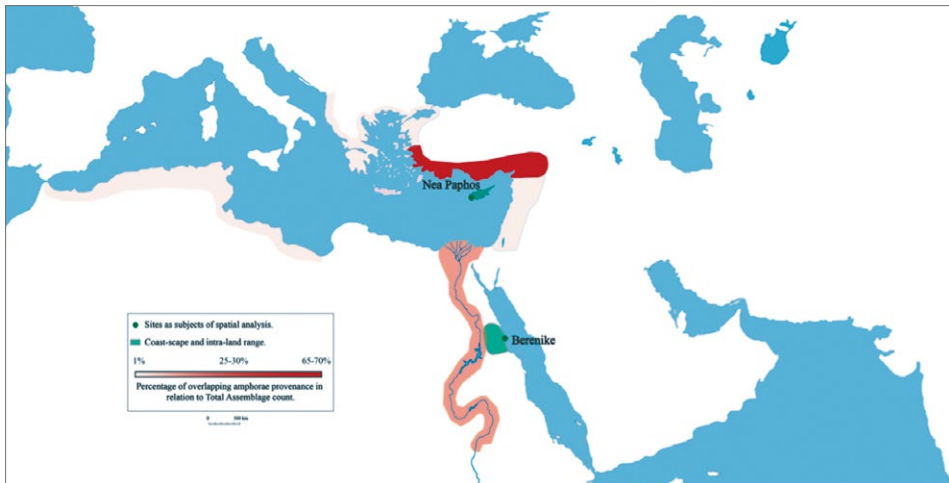


Fig. 3. Map indicating the percentage contribution of imports from overlapping provenances in relation to the total transport container assemblage at Berenike and Nea Paphos (Drawing J.M. Oleksiak)

Arabia, Aksum, the Persian Gulf, and the west coast of India (Tomber 2008: 38–82; Oleksiak 2025: 176). These long-distance trade networks complemented the struc-

tured, often state-regulated markets of the Eastern Mediterranean, creating interconnected systems that linked regional and interregional economies.

## THE ROLE OF CYPRUS AND NEA PAPHOS IN LATE ANTIQUE TRADE

Nea Paphos was a major Hellenistic and Roman administrative center, reaching its peak in the 1st century AD (Papuci-Władyka and Miszczak 2020: 506–510). In AD 342, a catastrophic earthquake led to the transfer of Cyprus's administrative center to Salamis-Konstantia (Davis 2010: 8). Despite losing its status as the provincial capital, Nea Paphos remained a key economic hub and continued to function as a redistribution center within Byzantine commercial networks (Papuci-Władyka and Miszczak 2016: 7; Gordon 2018). Operating within a stable Byzantine trade system, the city benefited from imperial routes connecting the Levant, Anatolia, and the Aegean. Archaeological evidence suggests that its harbor infrastructure remained in use well into Late Antiquity (Papuci-Władyka and Miszczak 2016: 7), supporting its continued economic relevance. Nea Paphos's integration into the broader maritime routes of the Eastern Mediterranean implies its sustained function within Byzantine trade networks.

Cyprus served two primary roles in Late Antique trade:

1. as an exporter of agricultural products, including olive oil, wine, and copper;
2. as a redistribution hub: Cypriot LRA 1 amphorae were distributed across the empire, particularly to the Danubian military supply centers.

Although Cyprus was not a primary contributor to the *annona* system and, unlike Egypt or Africa Proconsularis, lacked formal integration into imperial grain supply networks, its ports—particularly Nea Paphos—may have functioned as auxiliary nodes in long-distance provisioning routes, possibly frequented by ships associated with the *annona* fleet (Gordon 2018: 21, 24).<sup>1</sup> Unlike Syria and Palestine, which were deeply integrated into the Diocese of the East (*Dioecesis Orientis*) and subjected to strict imperial taxation, Cyprus operated with greater economic flexibility (Kazhdan 1991: s.v. *Consularis*; Demesticha 2013, Deligiannakis 2022). This autonomy allowed Cypriot ports such as Nea Paphos to engage in interregional trade without the same level of imperial oversight that structured commerce in neighboring provinces. As a result, the island played a key role in redistributing Levantine goods, which may have been transshipped through Nea Paphos and Salamis before reaching northern markets.

<sup>1</sup> Gordon (2018: 21, 24) notes that Paphos may have had the capacity to accommodate “larger ‘oneraria naves’”, such as the “vessels of the *annona* grain fleet”, and speculates about “the possible route of the *annona* ships” connecting provincial ports.

Epigraphic evidence from Novae and Oescus suggests that high-ranking military officers (*primipilarii*) responsible for provisioning Danubian legions had connections to various regions of the Eastern Mediterranean (Łajtar 2013). Although Cyprus is not mentioned directly in these inscriptions, it is plausible that such affiliations influenced procurement practices, potentially favoring Cypriot amphorae within long-distance supply networks. The simultaneous presence of Levantine amphorae in Pompeiopolis and Cypriot amphorae in Danubian supply centers suggests that multiple interconnected trade routes linked the Levant, Cyprus, Anatolia, and the northern provinces. These observations support two hypotheses:

1. that the Levantine route supplied the Black Sea and Anatolia, and
2. that the Cypriot route funneled goods into the Danubian provinces, functioning as a key intermediary in Byzantine supply chains (Demesticha 2013).<sup>2</sup>

This interpretation finds indirect support in studies of *annona militaris* logistics, which demonstrate the extent of interconnected provisioning networks linking the

Eastern Mediterranean with the Balkans and frontier regions (Rizos 2015). While alternative trade routes through the Adriatic and along river systems such as the Sava and Danube (Łajtar 2013: 106) also played a role in connecting the Eastern Mediterranean with the northern provinces, Cyprus remained a critical node in the Byzantine supply system.

Nea Paphos was deeply embedded in long-distance trade networks, with its trade connections oriented toward the broader Eastern Mediterranean and the Black Sea. The port was strategically positioned along major sea routes circumnavigating Cyprus from the west, which allowed Nea Paphos to facilitate connections with Egypt, the Levant, and the Aegean. Ships sailing between Egypt and Constantinople likely used Cypriot ports as stopovers, further integrating Nea Paphos into imperial supply chains (Demesticha 2013: 176; Zavagno 2017: 174–175). Despite its diminished political status after the 4th century, archaeological evidence—including public and religious buildings—suggests that Nea Paphos remained economically significant well into Late Antiquity (Michaelides 2020; Nocoń, Michalik, and Jellonek 2022: 133–134).

## BERENIKE, TRADE, AND THE IMPACT OF THE BLEMMYES

Berenike, originally established in the Ptolemaic period, gained significance as

a key port on the Red Sea trade route linking Egypt, the Eastern Mediterra-

<sup>2</sup> It has to be noted that the mentioned observations are based on the macroscopic study of pottery specimens what can to some extent be a biased research method. While the amphorae material in Pompeiopolis and the Danube region were studied by very experienced pottery specialists (A. Opařt and P. Dyczek), the Cypriot and Cilician wares are macroscopically very much alike. The geological similarity of raw clay sources in the Cilician and western Cypriot coasts makes it hard to distinguish not only with use of a simple optical tool, but even through petrographic studies (Gillett 2023: 98–99). The origin identification of pottery discussed in this paper also relies on macroscopic observation.

nean, and the Indian Ocean. After experiencing periods of economic fluctuation, the city flourished again between the late 4th and early 6th centuries AD, serving as a major transit hub connecting three major spheres of economic influence:

1. Egypt and the Nile Valley, which provided everyday goods and labor;
2. The Eastern Mediterranean, which supplied amphorae, wine, olive oil, raw materials such as wood and marble, and manufactured goods;
3. The West Indian Ocean, from which demanded luxury commodities such as spices, textiles, incense, and rare food products were imported (Tomber 2008: 63–64; Oleksiak 2025: 184–186).

Unlike Cypriot ports, which operated within a structured Byzantine economic system, Berenike functioned in a semi-autonomous economic sphere on the fringes of imperial control, yet remained an active and important actor within the same system. The city's economic strength lay in its ability to mediate between different trade networks while maintaining a degree of independence. Its strategic location facilitated interregional exchange and allowed it to sustain a profitable role as a middleman. However, Berenike's peripheral position made it difficult to control by the withdrawing imperial administration already during the reign of Diocletian (Updegraff 1988; Brun 2018: 34). The current academic

consensus holds that, as a consequence, the Blemmyes gradually took control of Berenike and its productive hinterland around the turn of the 4th century AD, maintaining power there at least until the mid-5th century AD (Barnard 2008: 26; Oleksiak 2025: 205). This phenomenon is well demonstrated by the correlation between shifts in well-stratified pottery assemblages and the coinciding historical events of the 5th century AD (Török 1985: 42; Eide et al. 1998: 1158–1165; Oleksiak 2026: 88, 97–98).

Recent excavations in Berenike have provided valuable insights into its mercantile function, revealing a huge assemblage of transport amphorae, predominantly from Cilicia, the Ephesus region, and the Nile Valley. Warehouses and storage facilities—indicating long-term storage and redistribution of goods—are well attested archaeologically. Fieldwork in sacred and monumental structures has produced evidence of a high level of consumption of foreign products, supported by the presence of imported ceramics and luxury goods (Popławski et al. 2021; Bajtler and Popławski 2022; Oller Guzmán, Fernández Abella et al. 2022: 586). Berenike's prosperity was further supported by satellite settlements in the Eastern Desert, which, since Early Roman times, ensured access to resources such as water, food supplies, export goods, and logistical support for long-distance caravans (Faucher 2018; Sidebotham and Gates-Foster 2019; Oller Guzmán et al. 2021; Crépy and Redon 2022; Oller Guzmán, Trevín Pita et al. 2022).

## BYZANTINE ADMINISTRATION AND ECONOMIC NETWORKS – BERENIKE AND NEA PAPHOS

Cyprus, though part of the Byzantine Empire, maintained a distinct administrative status. It was not included in the Diocese of the East (*Diocesis Orientis*) and was governed independently by a *Consularis* appointed directly by the emperor (Kazhdan 2005; Filipczak 2015: 13–14). Byzantine lead seals dated to the late 7th or early 8th century from Nea Paphos, Salamis, Amathous, and Kourion confirm that fiscal officials continued to oversee taxation and trade regulation on the island (Zavagno 2017: 157).

Nea Paphos played an essential role in regional economic activity, supported by an agricultural surplus (notably wine and olive oil), which was exported to Syria (Demesticha 2015: 69) and the Danubian provinces (Demesticha 2000: 549; Opař 2010: 1015). Furthermore, the island was actively involved in mining and ceramic production, including the extraction of copper ore and the manufacture of tableware (Bes 2015: 125–128; Kassianidou 2022: 216–218).

The precise administrative status of Berenike during Late Antiquity is much harder to define. By the late 4th century AD, Berenike was no longer under direct Byzantine rule. The inscription of the king's "interpreter" Mochosak (Ast and Rądkowska 2020) clearly states that the Blemmyes had their own tribal war chiefs (*pylarchoi*) governing the city at that time. Additional literary sources confirm Blemmyan jurisdiction extending as far north as the island of Gebelen in the *Dodekaschoinos* (e.g. the letter of King Phonen, Gebelen parchments), at

least until the mid-5th century AD (Eide et al. 1998: 1132, 1158–1163). Moreover, Berenike does not appear in Late Antique sources listing cities of the Thebaid, suggesting that the entire territory of the Southeastern Desert was likely under Blemmyan control at least by the mid-5th century AD. This is further supported by a 4th/5th century AD account by Olympiodorus of Thebes, who reportedly required special permission from Blemmyan oracles or priests to enter the Smaragdus region (modern Wadi Gemal) (Olympiodorus, *Histories*, 35:2; Epiphanius, *De Gemmis*, 21). We may therefore assume that land trade routes—as well as the frontier between the Thebaid and the Eastern Desert—were to some extent controlled by the Blemmyes. This interpretation is supported by the 4th- to 6th-century AD ceramic assemblages from various hinterland sites, including Geli, Nugrus, Sikait, Middle Sikait, Ka'ab Marfua, and Shenshef.

It is now evident that, after a series of military or political disruptions in the mid-5th century AD, Berenike came back under Byzantine sphere of influence. The latest historical texts referring to Berenike describes it as an entity incorporated into Byzantine foreign military policy (*Martyrium Sancti Arethae*, 747; Cosmas, *Topographia Christiana* [Winstedt 1909: 11–14]). A shift in the composition of the ceramic assemblage between the mid-5th and early 6th centuries AD indicates intensified trade relations with the Nile Valley (Oleksiak 2026: 89–91).

## MATERIALS AND METHODS

### POTTERY ASSEMBLAGE AND SAMPLING

This study is based on two comparable, large, and fully quantified amphora assemblages, each originating from well-controlled archaeological contexts:

1. Berenike ( $n_{BE}=30050$  sherds): excavated from variety of urban contexts including streets, storage magazines, sacral structures/temple offerings, and refuse deposits. All contexts are securely dated to the late 4th through early 6th centuries AD;
2. Nea Paphos ( $n_{NP}=2728$  sherds): derived from the 16 test trenches within the Agora and Maloutena quarters. Although stratigraphically mixed, these layers span the 4th to 7th centuries AD and —precisely because of their random mixing— provide an unbiased, representative sample of the site’s container spectrum.

### QUANTIFICATION PROCEDURE

A robust comparative analysis rests on transparent data collection methods. This study is based on two fully quantified amphora assemblages totaling 32306 fragments (Berenike  $n_{BE}=30050$ ; Nea Paphos  $n_{NP}=2256$ ). Each fragment count was compiled by context and weighted accordingly, following the refined version of Solheim’s quantification method (Solheim 1960; Oleksiak 2025: 43–47).

This approach, merging weight and sherd count, provides the least biased estimate of overall assemblage size and enables direct comparison between sites. Unlike metrics such as EVEs (Orton 1993: 179–182) or the Minimal Number of Vessels

(Voss and Allen 2010), full quantification includes every fragment, thereby avoiding “cherry-picking”. Moreover, it streamlines stratigraphic comparisons and strengthens the chronological framework for our subsequent discussion. To ensure transparency and consistency, all pottery processing and quantification were carried out personally by the authors. By handling every fragment in both assemblages, we eliminate selective reporting and minimize bias, ensuring that our comparative study rests on a fully uniform and open dataset.

### CHRONOLOGICAL AND CONTEXTUAL CONTROL

1. Nea Paphos: All amphora fragments from Nea Paphos are dated between the 4th and 7th centuries AD. The material comes from 16 sondage trenches opened in two main districts of the ancient city: the Agora and Maloutena. Since these trenches were cut across the ancient street grid, their ceramic deposits are highly fragmentary and stratigraphically mixed;
2. Berenike: Material from Berenike comes from securely dated layers spanning the end of 4th to the beginning of the 6th centuries AD. Importantly, a variety of archaeological contexts —including street pavements, sacral structures, trash dumps, and magazines— help to mitigate biases caused by the homogenous character of specific excavated areas. Depending on the original use of the excavated space, the composition, fragmentation,

and erosion of the deposited pottery may vary significantly.

Far from being a drawback, this contextual diversity meets the criteria for an unbiased sample: the assemblages are neither limited to a single architectural feature

nor tied to a narrow occupational phase.

Crucially, both the Nea Paphos and Berenike collections exhibit similar average fragmentation rates, ensuring that subsequent comparisons are not skewed by differential preservation or recovery biases.

## COMPARATIVE PERSPECTIVE: TRADE SCOPES

We analyze amphora distribution across three scales—local, regional, and interregional—to demonstrate how Nea Paphos and Berenike, despite their differing ad-

ministrative and economic frameworks [Table 1], reflect both distinctive characteristics and shared logistical patterns of Late Antique trade.

Table 1. Differences in the geopolitical and economic setup between Berenike and Nea Paphos

Aspect	Nea Paphos	Berenike
Economic role	Regional redistribution hub (Levant, Anatolia, Black Sea)	Intermediary in Indian Ocean–Mediterranean trade
Political status	Part of the Byzantine Empire, administratively distinct from the Diocese of the East ( <i>Dioecesis Orientis</i> )	On the fringes of imperial control, potentially vulnerable to external threats
Key trade partners	Levant, Anatolia, Aegean, Black Sea	Egypt, eastern Aegean, West Indian Ocean
Main commodities	Agricultural products (wine, olive oil), copper, ceramics	Eastern Mediterranean and northern Red Sea products, Egyptian agricultural and mining products, rare commodities from Aksum, Arabia, Persian Gulf, and India
Threats to trade	Earthquakes, shifting administrative focus to Salamis	Disruptions in Red Sea trade, indirect impact of Byzantine-Sassanian rivalry, seasonality of West Indian Ocean trade

Apart from differences in administrative affiliation and primary spheres of influence, both ports exhibit significant similarities in their choice of regional

suppliers—particularly the dominance of LRA 1 and LRA 3—and in their three-tiered distribution structure [Table 2].

Table 2. Comparison of amphora type presence between Berenike and Nea Paphos

BERENIKE			NEA PAPHOS		
VESSEL GROUP ORIGIN	FRG. COUNT	%	VESSEL GROUP ORIGIN	FRG. COUNT	%
			Cypriot		11.84%
			LRA 1	263	11.66%
			Other Cypriot containers	2	0.09%

## BERENIKE

VESSEL GROUP ORIGIN	FRG. COUNT	%
<b>Eastern Mediterranean</b>	<b>68.82%</b>	
LRA 1	11660	38.81%
LRA 3	8980	29.89%
LRA 4	27	0.09%
Amrit	11	0.05%
LRA 5	3	0.01%
Agora M334	2	0.01%
Eastern Mediterranean undifferentiated	5	0.02%

**Egyptian 28.67%**

LRA 7	7262	24.16%
Aswan region	1344	4.49%
Other Egyptian	11	0.02%

**Red Sea and Indian Ocean 1.29%**

Ayla-Aksum	302	1%
Persian Gulf imports	11	0.02%
Organic South Arabian Jars	80	0.27%

**Central Mediterranean 0.14%**

North African imports	47	0.14%
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**Other 1.02%**

Unidentified	305	1.02%
<b>TOTAL:</b>	<b>30050</b>	<b>100%</b>

## NEA PAPHOS

VESSEL GROUP ORIGIN	FRG. COUNT	%
<b>Eastern Mediterranean</b>	<b>55.41%</b>	
LRA 1	456	20.21%
LRA 3	259	11.48%
LRA 4	222	9.84%
Agora M334	147	6.52%
LRA 5	69	3.06%
LRA 2	36	1.60%
Other Eastern Mediterranean imports	26	1.15%
Amrit	17	0.75%
Kapitän 2 (late forms)	10	0.44%
LRA 6	8	0.35%

**Egyptian 12.06%**

LRA 7	269	11.92%
Other Egyptian imports	3	0.13%

**Black Sea 9.22%**

Kuzmanov 9	160	7.00%
Sinopean	42	1.86%
Heraclea Pontica	6	0.27%

**Central Mediterranean 4.29%**

Other North African imports	47	2.08%
Spatheion 1	47	2.08%
Spatheion 2	3	0.13%

**Western Mediterranean 0.18%**

Almagro 50	4	0.18%
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**Other 7.00%**

Unidentified	160	7.00%
<b>TOTAL:</b>	<b>2256</b>	<b>100%</b>

Following Dawson and van Rensburg (2024), this study classifies distribution patterns into four categories: coast-scape (restricted to the site's adjacent coastal areas), local (within the same province or economically self-contained micro-region), regional (spanning multiple provinces), and interregional (long-distance exchange networks exceeding 1000 km).

Both cities functioned as significant Byzantine trade nodes — Nea Paphos within the Mediterranean–Black Sea routes, and Berenike within a decentralized Red Sea–Nile network. Nea Paphos

relied almost exclusively on Mediterranean and Black Sea trade, whereas Berenike was more closely tied to Eastern Mediterranean and Red Sea circulation. Both ports were heavily susceptible to external factors: imperial administration in the case of Nea Paphos, and Byzantine–Egyptian political and military dynamics for Berenike.

Based on 32778 fully quantified amphora sherds [see *Table 2* details], this section traces the parallel and divergent distribution patterns observed at the two sites.

## LOCAL TRADE

Local trade encompasses the immediate hinterland of each port: for Nea Paphos, this would be western Cyprus; for Berenike, the Eastern Desert region.

### NEA PAPHOS

To fully understand the role of Nea Paphos in Late Antique trade networks, it is essential to examine its amphora imports using a structured classification of trade distribution. The evidence highlights the complexity of its supply mechanisms, ranging from short-distance exchange along the Cypriot coast to interregional trade linking Cyprus with the Aegean, the Levant, and the Nile Valley.

Although Nea Paphos produced its own pottery containers, local products constitute only a small fraction of the total amphora assemblage (11.84%). Among these, LRA 1 is the most frequently represented type (11.66%), while the remaining Cypriot containers are largely non-diagnostic sherds, making

precise typological classification difficult. While Nea Paphos was a significant trading hub, its role in short-distance coastal trade was limited compared to its participation in regional and interregional networks. Amphorae of Cypriot origin — primarily LRA 1 — were likely involved in redistribution along the island's coastline. Their circulation between sites such as Kourion, Amathous, and Constantia-Salamis suggests an internal supply system for agricultural goods, particularly wine and olive oil. However, in contrast to these sites, Nea Paphos exhibits a much higher proportion of imported amphorae, reinforcing its status as an external trade hub rather than a self-sufficient production center.

### BERENIKE

The Late Antique amphora assemblage from Berenike is overwhelmingly dominated by imports from the Eastern Mediterranean, particularly Cilicia, Asia Minor, and Egypt. The amphorae

found at the site reflect the city's role as a crucial redistribution hub, facilitating long-distance trade across the Red Sea and beyond. Unlike Nea Paphos, which had a small but notable proportion of locally produced Cypriot amphorae (11.84%, see above), Berenike's assemblage consists entirely of imported containers, underscoring its complete dependence on external supply networks. No pottery production centers have yet been identified within the Eastern Desert region, and there is no evidence for local amphora production at Berenike itself. This confirms that the city functioned exclusively as an import center, reliant on supplies from distant production zones.

#### **LOCAL SUMMARY**

The modest share of locally produced amphorae in Nea Paphos (11.84% of the assemblage) complemented its primary function as a redistribution center for island-wide consumption. In contrast, Berenike's total reliance on imports underscores its role as a pure transshipment hub, channeling goods from

distant producers in the Red Sea and Eastern Mediterranean without a substantial local supply base. Nevertheless, in both ports, short-distance (coast-scape) trade remained strictly supplementary: it served local consumption needs within the macroregion, while the bulk of amphorae arrived via wider regional and interregional networks. The evidence from Kourion provides an important comparative perspective on the function of transport amphorae in Late Antiquity. Unlike Nea Paphos, where amphorae were primarily used for large-scale importation and distribution, Kourion presents a significantly smaller but distinct assemblage, with a high prevalence of Cilician LRA 1 amphorae. Recovered from funerary contexts, these vessels suggest a ritual role beyond their economic function as transport containers (Wicenciak 2024: Table 5:1). This contrast highlights the differing roles of these sites: while Kourion served as a localized consumption and ritual center, Nea Paphos functioned as a key redistribution node within the broader economic landscape of Cyprus.

## **REGIONAL TRADE**

The regional scope refers to exchange within a broader geographical area, linking several provinces or sub-regions typically associated with major production centers. For Nea Paphos, this includes the Eastern Mediterranean basin (Levant, Cilicia, Aegean, Egypt), while for Berenike it covers the Nile Valley where the main Egyptian amphora workshops were concentrated, and Red Sea regions.

#### **NEA PAPHOS**

The majority of amphorae at Nea Paphos—55.41% of the total assemblage—were imported from regional production centers across the Eastern Mediterranean. Imports from Cilicia, represented predominantly by LRA 1 (29 distinct macroscopically identified fabrics), account for 20.21%, while amphorae from Ephesus and other Asia Minor workshops (LRA 3 and Ephesus Type 54)

together make up 11.48%. Additionally, Nile Valley containers (LRA 7, Egloff 172, and Aswan amphorae K704) contribute 12.06% of the assemblage, underscoring the deep economic ties between Cyprus and Egypt and their integration into broader Eastern Mediterranean provisioning networks — some possibly linked to the *annona* system.

Nea Paphos also shows a high proportion of Phoenician and Palestinian amphorae, particularly LRA 4 (9.84%), ranking as the second most common amphora type in the assemblage and confirming its role as a major recipient of Gazan wine. Phoenician Robinson Agora M334 amphorae account for 6.52%, while LRA 5 amphorae, primarily from Caesarea Maritima and northern Palestine, constitute 3.06%. These figures highlight the central role of Nea Paphos in facilitating regional trade with the Levant.

Findings from Majcherek's study (1995) on Gazan amphorae show that LRA 4 production increased significantly in the 5th and 6th centuries, matching the distribution pattern observed at Nea Paphos. A comparison with Kourion reveals similar trends: both sites exhibit high proportions of Gazan LRA 4 and Phoenician Robinson Agora M334 amphorae, indicating that southern Levantine wines and goods reached multiple Cypriot urban centers. However, Nea Paphos, as a major port, likely functioned as a primary entry point, while smaller settlements like Kourion served as redistribution nodes.

Earlier evidence from the Hellenistic period points to direct contact with Tyre, particularly through the importa-

tion of torpedo-shaped amphorae and unguentaria. Additionally, material from the Early Roman period confirms the presence of imported cooking wares and plain wares from Berytus, further supporting the notion that Cyprus — and Nea Paphos in particular — maintained direct exchange links with key Levantine production centers. More recent Late Antique imports from Beirut (BEY 020) also confirm direct trade between Nea Paphos and the Levant. Beirut 4 and Beirut 8 amphorae, both key types between the 5th and 7th centuries AD, were widely distributed across the Eastern Mediterranean, including Nea Paphos (Wicenciak forthcoming). The presence of these amphorae at Paphos suggests direct mercantile exchange between the two ports, rather than their arrival via secondary distribution networks. This reinforces the view that Nea Paphos functioned as a primary hub for Levantine imports into Cyprus, rather than merely receiving goods through intermediary routes.

#### BERENIKE

Egyptian amphorae form a major component of the Berenike assemblage, representing 28.67% of the total recorded transport containers. These include LRA 7 amphorae made of Nile alluvial clay (24.16%), the most dominant Egyptian product. Aswan amphorae of Gempeler types K704 and K705 (Gempeler 1992: Pl. 124, Fig. 2) account for 4.49%; they were produced in Upper Egypt and likely used for transporting wine. Rare AE 5/6 amphorae from the Mareotis region near Alexandria (0.02%) suggest a minimal contribution from northern Egyptian

production centers. The prominence of Nile Valley amphorae reflects Berenike's logistical role in redistributing Egyptian goods into the Red Sea and Indian Ocean networks. However, in contrast to Mediterranean ports, Egyptian amphorae do not dominate the assemblage, indicating that Berenike's economy relied more on long-distance imports than on regional, Nile-based trade.

A minor addition to the regional trade range includes amphorae produced in the northern Red Sea region—particularly from Ayla/Aqaba—which appear in the assemblage (1.00%). These containers, mainly types 1 and 1a and

dated to the early 5th century AD, suggest that local Red Sea trade, while limited, was present and likely involved goods such as olive oil and salted fish (Oleksiak 2024: 387).

### REGIONAL SUMMARY

Both ports relied heavily on regional producers, though Nea Paphos favors Cilician and Levantine types, underscoring its integration into Mediterranean networks. In contrast, Berenike emphasized Nile Valley ceramics, with minor supplementary importation from the northern Red Sea, reflecting its pivotal role in east–west Red Sea exchange.

## INTERREGIONAL TRADE

The interregional scope refers to long-distance trade links beyond each basin: for Nea Paphos, this extends to the Central and Western Mediterranean and the Black Sea basin; for Berenike, to the Mediterranean circuit and the Indian Ocean networks.

### NEA PAPHOS

Analyzing the distribution patterns of amphorae at Nea Paphos within this structured framework clarifies its economic role in Late Antiquity. While the city engaged in coast-scape and local trade with other Cypriot settlements, its primary function lay in regional and interregional exchange, particularly with the Levant, Cilicia, and the Nile Valley.

Nea Paphos exhibits clear connections with Black Sea production centers. Kassab carrot-shaped amphorae of type C Snp III.1-2, as well as non-diagnostic sherds attributed to Sinope and Hera-

clea Pontica, constitute 9.22% of the total assemblage. This figure underscores the importance of Cypriot–Black Sea trade networks, which likely involved the exchange of agricultural surplus (particularly wine and olive oil) for northern products such as grain and metals.

Other interregional imports include containers from Africa Proconsularis, represented by a wide range of forms—Africana 2B, Africana 3A, Africana 3B, Africana 3C, and Keay 50—together accounting for 2.08% of the total amphora assemblage. Tunisian Byzacena products, including Spatheion 1 and 2 types, make up 2.21%, while Western Mediterranean imports are represented by a marginal presence of Spanish Haltern 70 amphorae (four recorded fragments). Unlike Nea Paphos, Berenike had minimal trade connections with the Black Sea or Western Mediterranean (see below).

**BERENIKE**

The bulk of Berenike's amphorae originated from major Eastern Mediterranean production centers, constituting over 68% of the assemblage. The primary supplier was Cilicia (LRA 1 — 38.81%), the most significant contributor to Berenike's ceramic imports. Cilician amphorae were used primarily for transporting olive oil and wine, reaching peak representation in the late 4th and early 5th centuries AD, when they constituted nearly 50% of the assemblage. The second most active exporter was the Ephesus region (LRA 3 — 29.89%), which also exported wine. These vessels are heavily concentrated in mid–5th century deposits, where they make up nearly 70% of the assemblage from that phase. Aegean wine and oil exports are marginal but attested (LRA 2 — 0.9%) (Oleksiak 2026: 90).

Phoenician and Levantine products (0.9%) include Robinson Agora M334 amphorae from southern Phoenicia and Amrit amphorae from the northern Levant, although they are present in smaller numbers compared to Nea Paphos. Finally Palestinian/Caesarean LRA 5 amphorae, though rare, provide evidence of limited —and most likely indirect— trade links between Palestine and the Red Sea via Ayla/Aqaba or Clysma/Arsinoë.

Unlike at Nea Paphos, the presence of Levantine imports such as LRA 4 in Berenike is negligible. This aligns with Majcherek's (1995) findings that Gazan amphorae were primarily exported within the Mediterranean and were not distributed to Red Sea sites. The limited presence of Levantine products in Be-

renike stands in stark contrast to Nea Paphos, where Gazan LRA 4 amphorae are the second most common type. This suggests that the Levantine market was not a primary supplier for Berenike, which relied more heavily on Cilician and Ephesian products. This contrast underscores the divergence in trade networks between the two ports, with Nea Paphos acting as a hub for Levantine wine, while Berenike was more closely integrated with Anatolian and Egyptian producers [Table 3].

Table 3. Provenance spread of amphorae material from Berenike

Distance of Provenance	Frg. Count	%
Local	0	0%
Regional	8999	29.90%
Long-distance	20746	68.98%
Unknown	305	1.02%
<b>TOTAL</b>	<b>30050</b>	<b>100%</b>

Berenike's southeastern long-distance exchange networks set it apart from Nea Paphos and, more broadly, from the Mediterranean-integrated sphere of influence. Indian Ocean transport amphorae account for 0.29% of the assemblage, with typological diversity reflecting sustained trade with South Arabia, the Persian Gulf, and the Indian subcontinent. These imports include South Arabian Storage Jars (SAOJ class) —likely used for transporting incense, resins, and aromatic goods— Torpedo jars (TORP-S class), associated with long-distance storage of liquid commodities, Dark Lime Transport Containers (DALI class), rare vessels suggesting Persian Gulf involvement in Red Sea trade, and Large Indian Storage Vessels

(LINVES class) produced on the west coast of the Indian subcontinent and likely used for transporting foodstuffs or spices. This stable but marginal presence of Indian Ocean transport containers reinforces Berenike's role as a key node in transregional and transcontinental exchange, linking the Eastern Mediterranean to the broader Indian Ocean economy. Overall, Berenike's economy was more dependent on decentralized, long-distance trade networks.

### INTERREGIONAL SUMMARY

Nea Paphos combined strong Black Sea and modest Western Mediterranean connections, functioning as a bridge between northern grain and metals and

Aegean wine and oil. By contrast, Berenike relied almost entirely on Eastern Mediterranean producers—with over two-thirds of its assemblage originating from Cilicia and Ephesus—and maintained a small but vital Indian Ocean circuit, underscoring its role as a transoceanic redistribution hub. While Berenike's long-distance trade was dominated by Eastern Mediterranean and Indian Ocean connections, Nea Paphos maintained only secondary ties to Western Mediterranean markets. In effect, Nea Paphos served as a gateway to the Black Sea and Levantine networks, whereas Berenike operated as the pivotal link between Red Sea commerce and the broader Indian Ocean economy.

## CONCLUSIONS

Across all scales, Nea Paphos and Berenike combine local specificity with shared regional and interregional networks, once

again challenging simplistic center–periphery models by revealing common logistical strategies [Tables 4, 5].

Table 4. Comparison of the presence/absence of transport amphora types at Berenike and Nea Paphos

BERENIKE			NEA PAPHOS		
DISTANCE OF PROVENANCE	FRG. COUNT	%	DISTANCE OF PROVENANCE	FRG. COUNT	%
Local	0	0.0%	Local	265	11.8%
Regional	8999	29.9%	Regional	1529	67.8%
Interregional	20746	68.98%	Interregional	310	13.7%
Unknown	305	1.02%	Unknown	152	6.7%
<b>TOTAL</b>	<b>30050</b>	<b>100.0%</b>	<b>TOTAL</b>	<b>2256</b>	<b>100.0%</b>

Table 5. Comparison of transport ware types presence between Berenike and Nea Paphos

AMPHORA TYPE	BERENIKE	NEA PAPHOS
<b>Eastern Mediterranean</b>		
LRA 1 (Cypriot)	✗	✓
LRA 1 (Cilician)	✓	✓
LRA 3	✓	✓
LRA 4	✓	✓
Agora M334	✓	✓
LRA 2	✓	✓
LRA 5	✓	✓
LRA 6	✓	✓
Amrit	✓	✓
Kapitän 2 (late forms)	✓	✓
Other Eastern Mediterranean amphorae	✓	✓
<b>Egyptian</b>		
LRA 7	✓	✓
Aswan amphorae	✓	✓
AE 5/6	✓	✓
Western Desert amphorae	✓	✗
<b>Central Mediterranean</b>		
Spatheion 1	✓	✓
Spatheion 2	✓	✓
Africana Grande IIIC	✓	✓
Other North African amphorae	✓	✓
<b>Western Mediterranean</b>		
Almagro 50	✗	✓
<b>Black Sea</b>		
C SNP III.1–3	✗	✓
Other Sinopean	✗	✓
Heraclea Pontica	✗	✓
<b>Indian Ocean</b>		
'Aqaba amphorae	✓	✗
Indian transport vessels	✓	✗
Persian Gulf transport vessels	✓	✗

Although they belonged to different administrative and economic spheres, both ports relied on the same three levels of distribution—ranging from the immediate coastal local hinterland, through regional production centers, to interregional networks—and made use of the same key workshops (predominantly LRA 1 and LRA 3 amphorae). This shared logistical

framework emphasizes the complexity of Late Antique trade [Figs 1, 2].

At the **local level**, however, the two ports diverge sharply. Berenike had no indigenous amphora production and was entirely dependent on external suppliers; Cypriot LRA 1 jars are absent from its assemblage, confirming that the Red Sea hinterland was never targeted by Cypriot

workshops. Nea Paphos, by contrast, recycled a modest local output (LRA 1 at 11.66%), supplementing it with imports.

At the regional level, both ports drew heavily on Eastern Mediterranean producers, albeit in different proportions. Berenike's assemblage is dominated by Cilicia and Ephesus (LRA 1 at 38.8% and LRA 3 at 29.9%), with a peak in Ephesus in the mid-5th century, likely linked to Byzantine wine demand. Nea Paphos also shows a predominance of Cilician amphorae, but with a significantly higher proportion of Levantine types — especially Gazan LRA 4 (9.84%) and Robinson Agora M334 (6.52%)— reflecting its role as a hub for South Levantine wine and oil. Berenike, by contrast, has negligible quantities of Levantine imports including LRA 4 and Robinson Agora M334.

Within the broader **Aegean and Levantine trade patterns**, Majcherek's work (2007) suggests that LRA 3 jars may have transported not only olive oil but also aromatics. These amphorae occur abundantly at Berenike but only sparingly at Nea Paphos, indicating differing consumption and redistribution strategies. The presence of LRA 4 at Nea Paphos (compared with its negligible presence at Berenike) further underlines Nea Paphos's integration into Mediterranean-Levantine markets.

In terms of **imperial** supply networks, Nile Valley amphorae (LRA 7, Egloff 172, K704) form over 12% of the assemblage at Nea Paphos, underscoring its direct ties to Egyptian workshop networks and the *annona* grain-supply system. This reinforces Nea Paphos's status as a redistribution nexus in Byzantine supply chains, channeling Cilician, Anatolian, and Egyptian containers across Cyprus.

At the **interregional level**, the two ports again diverge. Berenike maintained a modest yet strategically important Indian Ocean circuit (0.29% of its assemblage: SAOJ, TORPS, DALI, LINVES classes), affirming its role as a transoceanic redistribution hub linking South Arabia, the Persian Gulf, and India. Nea Paphos, while maintaining a small Western Mediterranean connection (Africa Proconsularis, Byzacena, and Haltern 70 at around 4%), relied more heavily on Black Sea exchanges of grain and metals (9.22%), positioning it as a gateway between northern production zones and Levantine-Aegean wine and oil circuits.

Together, these patterns reveal two distinct modes of Late Antique economic integration:

1. **Nea Paphos** functioned within Byzantine imperial trade systems — bridging the Black Sea, Levant, and Mediterranean circuits;
2. **Berenike** operated on the fringes of imperial control — serving as a vital conduit for Red Sea-Indian Ocean commerce.

These complementary yet contrasting networks illustrate how regionalization and long-distance linkages coexisted, supporting the persistence of intercontinental exchange well into the 6th century AD [Fig. 3].

In summary, although Berenike and Nea Paphos operated within different administrative contexts, their commodity flow networks were partially synchronized. The roles of intermediaries in regional and interregional amphora flows proved to be convergent. At the same time, the two ports maintained distinct geographical orientations, confirming that they functioned as distinct but coexisting economic zones of Late Antique trade.

**Dr. Jerzy M. Oleksiak**

<https://orcid.org/0000-0002-9631-2097>

University of Warsaw  
Faculty of Archaeology  
j.oleksiak@uw.edu.pl

**Dr. Urszula Wicenciak**

<https://orcid.org/0000-0001-6475-5523>

University of Warsaw  
Polish Centre of Mediterranean Archaeology  
u.wicenciak@uw.edu.pl

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