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The Plurality of Harbors at Caesarea: The Southern Anchorage in Late Antiquity

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Abstract The engineering marvel of Sebastos, or Portus Augusti as it was called in Late Antiquity (284–638 CE), dominated Caesarea's harbor center along modern Israel's central coast but it was only one part of a larger maritime complex. The Southern Anchorage provides a case study as one portion of the Caesarea complex, as well as a node within the regional network of anchorages and small harbors. Ceramics recovered from here show a high percentage of locally, and provincially, produced storage jars engaged in maritime trade. The ceramic evidence points towards an intensified regional trade or *cabotage* rather than favouring long distance trade from large port to port. Working out of these small harbors, opportunities arose for greater flexibility in specialization of commodities and materials passing through the network of subsidiary ports, contributing to a more diversified market economy. This analysis provides another example in the growing focus on how these simple and semi-modified anchorages in the Eastern Mediterranean were often the predominant economic networks connecting hinterland and coastal trade.

Keywords Late Roman/Byzantine Amphora · Port · Maritime economy · Trade

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Introduction

The Late Antique Eastern Mediterranean experienced a pronounced upturn of economic expansion and population growth (from the 4th–7th c. CE), however, the nature of its harbors and maritime networks reflect a concentration on the local and regional scale. The massive harbors connected to urban centers seem to typify our perception of maritime trade in the Roman world; however Late Antique small anchorages unaccompanied by port facilities provided a foothold in the regional economy and trade networks. Caesarea's Sebastos (Portus Augusti, in the later Roman period), the great technological endeavor of an artificial harbor along the brutal Levantine coastline, functioned as a primary maritime-node surrounded by a network of secondary harbors. The plurality of these harbors within the harbor complex, now in modern Israel, suggests a more diversified process of administration, catering to a broader commercial market of regional production and consumption (Horden and Purcell 2000: 368–369). Caesarea provides another valuable case-study for evaluating this trend of small harbors and their network as the dominant mode of maritime economy along the Eastern Mediterranean shores (Leidwanger 2013: 1–3).

Within the context of the harbor complex the subsidiary Southern Anchorage has been explored significantly less than Sebastos/Portus Augusti and its immediate secondary harbors. Over the course of more than 21 years, beginning in 1983, the Southern Anchorage was regularly explored through survey under the Israel Antiquities Authority. By contrast intensive exploration of the Inner and Outer harbor at Sebastos/Portus Augusti was undertaken from 1980 to 1985 by the Caesarea Ancient Harbour Excavation Project (CAHEP; under the direction of Drs. Avnar Raban, John Oleson, Robert Hohlfelder, and Lindley Vann). Later seasons were carried out in the harbors by the Combined Caesarea Expeditions (CCE, under the direction of Drs. Avnar Raban, Ken Holum, and later Joseph Patrich) periodically from 1993 to 2004. Survey and excavation have shown that the harbor complex has its origins in the Bronze Age with cargos scattered in shipwrecks along the natural anchorages (Raban et al. 1993: 3). This early occupation is mirrored in the Southern Anchorage. Intensification of the main and northern harbors occurred in the Hellenistic period when the town of Straton's Tower reached its height in the 2nd c. BCE. The main harbor and town continued to develop in the 1st c. BCE when it was freed by Pompey then in 30 BCE added by Octavian to Herod's kingdom of Judaea (Raban 1992: 7). Construction of the harbor at King Herod's newly established Caesarea Maritima (22–10 BCE) became a centerpiece for the capital's port activities. While Herod's city grew as an important cosmopolitan center, and significant early Christian site, the structural integrity of the Herodian harbor began to slip into decline by the beginning of the 2nd c. CE when breakwaters experienced tectonic slumping (Raban and Holum 1996: xxviii). As Herod's Sebastos was unable to retain its original capacity and counter the silting of the Inner Harbor, the engineering marvel continued to decline throughout the Roman period even as the city began to expand in the 4th c. CE. However, by this time the Herodian breakwaters had become submerged reefs and navigation into the harbor a dangerous endeavor. At a time when Portus Augusti is physically in decline, the opposite can be said for the Southern Anchorage which seems to experience an intensification of use based on the ceramic assemblages. The Emperor Anastasius (492–517 CE) undertook extensive renovations to restore provincial harbor, likely contributing in some part to the prosperity of Byzantine Caesarea (5th–7th c. CE). The eventual neglect and decline of Portus Augusti came after Caesarea's fall to the Muslim siege in 640 or 641, followed by the subsequent de-urbanization of the local elites all contributing to the harbor's disrepair (Raban and Holum 1996: xxxi). While Anastasius's renovations helped reestablish the stability of the harbor, coastal

processes of degradation never ceased eating away at the harbor's breakwaters and depositing dunes across the ancient city. While there was not the same scale construction in the Southern Anchorage as Sebastos/Portus Augusti, the periods of occupation are concurrent.

The material culture and minimally modified nature of the Southern Anchorage reflects a common trend along the Levantine coast, in which natural anchorages and small harbors emerged as an important facet in maritime commercial trade. While the use of small anchorages is not a rarity in the Mediterranean world, their exploitation was a default necessity here given the poor geographic topography of the very straight Levantine coast without the benefit of cut coves and protruding peninsulas. The geomorphological factors that characterize favorable conditions for a port are exactly those which the Levantine coast lacks (Veikou 2015: 41–42). From Achziv to Ashkelon, natural anchorages and small harbors were by default the prevalent commercial maritime centers rather than massive built harbors with extensive facilities to support the range of maritime trade activities. If these harbors were not used in the same capacity as those associated with urban centers, then through what agency were they organized and tied to trade networks both maritime and as part of the regional economy? Therefore, by necessity a modified version of *cabotage* was used. *Cabotage* or 'tramping', typically operated individually on a small scale in which destinations, cargoes, and the frequency or length of the voyage varied by what was available in each locality as well as changes in weather and season (Horden and Purcell 2000: 142). In the case of the Central Levantine coast, it seems that natural anchorages and small harbors may have been utilized in a specific predetermined network, playing a much greater role in maritime trade than voyages between major ports. Here, the 'grand cabotage' of international commerce from coast to coast was likely surpassed in frequency or economic impact by this form of regional cabotage along stretches of coastline (Arnaud 2011: 62).

The situation at Caesarea is further compounded with the dominance of Portus Augusti as the main provincial harbor of Palaestina Prima (Roman province 390–636 CE), surrounded by several anchorages all with evidence of use during the Late Roman (132–324 CE) and Byzantine (324–638 CE) periods forming a 'harbor complex'. In this analysis of the ceramic remains and function of the Southern Anchorage it is necessary to set a framework of the plurality of maritime commercial exchange points within the immediate area of Caesarea. During the Late Roman and Byzantine period Caesarea's coastline was supported by Portus Augusti, the South Bay, and the North Bay all functioning contemporaneously within the general area of the Byzantine fortifications; what circumstances necessitated the utilization of additional harbors/anchorages such as the Southern Anchorage beyond the city's main harbor? Economic factors including the increase in wine production during the Byzantine period as well as the region's ability to simultaneously support a growing population and maintain export surplus may have contributed heavily to specialized small harbors sustaining maritime trade (Kingsley 1999: 187). This research aims to examine how small harbors such as the Southern Anchorage in Caesarea were exploited during the Late Roman and Byzantine periods as part of a regionalized network.

Underwater surveys were conducted in the Southern Anchorage of Caesarea in the years 1983–2004, under the auspices of the Israel Antiquities Authority (directed by Dr. Ehud Galili) and the University of Haifa, they provide an insight into the function of a Late Antique anchorage on the Levantine coast. The surveys yielded 15 archaeological assemblages ranging from the Middle Bronze Age to Umayyad Period (from 2000 BCE to 750 CE) (Galili et al. 1993). The chronological termini of these assemblages represent true outliers as the majority of the ceramic finds date to the Roman and Byzantine periods (37

BCE–638 CE). Analysis of the material culture recovered from the bay suggests that its use as a commercial trading center begins in the Iron Age (1200–586 BCE) and flourished alongside Sebastos during the Roman Imperial Period (37 BCE–132 CE).¹ Unlike Portus Augusti, its use bourgeoned in the Late Roman Period (132–324 CE) and reached its zenith during the Byzantine Period (324–638 CE), when the highest concentrations of ceramics were passing through the Southern Anchorage. Throughout its commercial peak the assemblages reveal a homogeneous Eastern Mediterranean origin confined to almost entirely transport amphorae.

The Survey Area of the Southern Anchorage

Surrounding the well-known ancient harbor of Caesarea, in the central region of the Levantine coast, there are several natural features some of which served as fair-weather anchorages to the north and south (Fig. 1). Within this complex is the Southern Anchorage, located ca. 1000 m south of the main ancient harbor. Immediately to the south of Portus Augusti is the large unprotected South Bay, directly to the south is a smaller bay, the so-called White Bay, and south of it is the elongated Southern Anchorage, the subject of this article. Likewise, to the north of the former Sebastos, the North Bay offered another large fair-weather anchorage for maritime activities. Geographically, the Southern Anchorage is the most protected natural feature of Caesarea's harbor complex. A ridge of partly submerged kurkar stone runs parallel to the beach providing minimal break from the direct exposure of the sea.

The only formal man-made structure in the bay is a small jetty, dated to the 4th–5th c. CE, extending from the eastern side of the kurkar ridge to the shoreline (Fig. 2). In Galili's survey of the bay two parallel lines (5 m wide) of stones (measuring 50 × 60 × 130 cm) pierced by round holes at their center were identified extending across an area of roughly 75 m (Galili et al. 1993: 67). The pierced stones and variety of ashlar formed bases for wooden columns that supported the jetty's super-structure (Galili et al. 1993: 67). High concentrations of Roman and Byzantine artifacts south of the proposed jetty suggest that boats may have moored here. However, given the small size of the natural anchorage from the shore to the kurkar ridge, use of the jetty would have been limited to only a few smaller ships at a time during fair weather.

The Archaeological Assemblages in the Southern Anchorage

The high concentration of amphorae recovered from the Southern Anchorage may be in direct correlation to the thriving wine industry of Late Antique Palestine.² While wine production may have initially been a means of supplying the provincial *annona*, for taxes paid in kind, surpluses produced regularly were sold in the overseas markets to consumers in harbors such as Rome, Marseille, and Carthage (Kingsley 1999: 187). Agricultural stability during this period was not limited to viticulture but extended to olive oil

¹ Analysis of the Iron Age material recovered from Caesarea's Southern Anchorage will appear in a future article focused on the functionality of the anchorage in the Bronze and Iron Ages.

² Palestine in this case will generally refer to the broad region that included the area of the Roman province of Syria Palaestina and the later Byzantine provinces of Palaestina Prima, Palaestina Secunda, and Palaestina Tertia.



Fig. 1 Map of Caesarea Harbor Complex (*inset* Caesarea in the Eastern Mediterranean)



Fig. 2 Remains of jetty: cut blocks pierced for timber columns (E. Galili)

production and even diversified foodstuffs such as wheat. The function of these subsidiary anchorages such as the Southern Anchorage may have served commercial vessels not connected to the cargoes tied to the state but those circulating in regional trade. In this respect, Portus Augusti may have been the primary state harbor associated with goods being exported with ties to the provincial administration during the 4th–6th c. CE; alternatively, the Southern Anchorage may have specialized in regional, smaller markets.

Building materials such as large (1 × 2 m) cut stone blocks, raw glass, and marble slabs were also found alongside ceramics from wrecks within the bay. Our inability to date these deposits of raw materials restricts how accurately they can be included in our understanding of the nature of the anchorage. The volume of such building and raw materials seems to reflect both cases of importation or coastal trade of the stone blocks and marble as well as export in the case of the raw glass (found in along the Levantine coast). Taken together, the building and raw materials, with the ceramics, on the whole seem to represent a greater tendency towards export than import.

The Ceramic Assemblages

The surveys yielded ceramics from three key areas: B/D, H, and A/I/J (Fig. 3). No complete vessels were retrieved in these expeditions, however preservation was considerably better in Area B/D, where several partial vessels were recovered with the upper one-third of the vessels intact. Favorable preservation here may be attributed to shifting underwater sand dunes that protected the assemblages in this area (Table 1).

Area B/D

Located in the center of the Southern Anchorage over an area of roughly 100 m² and at a depth of between 1 to 4 m, Area B/D represents the main concentration of ceramic and artifactual remains from Late Antiquity. Within this area, six separate sub-assemblages



Fig. 3 Plan of Caesarea-Southern Anchorage with survey areas (based on Galili et al. 1993: Fig. 6)

were identified, totaling 37 partial vessels and sherds, ranging in date from the 3rd to 7th c. CE. The majority of ceramics from this area date to the Byzantine Period (5th–7th c. CE). Gaza Jars (LRA 4) and Palestinian Bag Jars (LRA 5) represent the largest group of vessels, however, there is only marginal variation within in each group. While transport amphorae were the most common vessel type within this area's assemblage, three rims and five handles belonging to dolia were found also recovered. Two triangular rims are similar to other examples found at Caesarea from Byzantine levels in Area CC and another with affinities to a flattened triangular dolium rim found in Area KK (Johnson 2008: 54, nos. 555 and 556). Two handles are plain with incised channels on their outer edges, both likely coming from the same vessel. Three other handles are of the incised variety; two with six vertical lines incised the length of the handles and one example with three deep incisions. Dolia recovered from Yavne Yam and at the nearby Palmahim Beach are of both of these types and exhibit similar triangular rims, dating to the Byzantine Period (5th–7th c. CE) (Ayash and Ganor 2009).

The Gaza Jars (Riley's Late Roman Amphora 4, Peacock and Williams Class 49) found in Area B/D are predominantly of the later form from the 6th–7th c. CE, with a few exceptions belonging to the earlier 3rd–4th c. form (Fig. 4). Majcherek divides the type into four forms chronologically and typologically; Forms 2 and 4 are present in Area B/D where Form 4 is the dominant type. Form 4 Gaza jars are tall characteristically more canonical than the earlier forms, particularly from the shoulder to the rim. Other main features of this later version of the Gaza jar include a flattened rim (11–12 diam. average) only minimally thickened with uneven accretions below the rim and rough ear-shaped handles that attach at the base of a gently sloping shoulder with combed bands beneath the handles (Majcherek 1995: 169). Fabrics of the Gaza jar Form 4 vessels in Area B/D range from red/yellowish-red to grey. Typically, this form is found in contexts that date to the 6th–7th c. CE. Examples of Form 4 have been found in other maritime excavations including the Yassi Ada wreck dated to 625/626 CE (Bass and Doorninck 1982: Pl. 8–19). The vessels are known to have an eastern origin in southern Palestine, in the region of Gaza (Riley 1975: 30–31; Peacock and Williams 1986: 198), and in the Negev, where they may have been manufactured at several of the large Byzantine cities (Blakely 1987:112). Among Byzantine amphorae, this form traveled well throughout the empire as far as Marseilles in late 6th–early 7th c. deposits (Bonifay 1986: 292, pl. 13). In addition to its

Table 1 Caesarea Southern Anchorage Ceramic Assemblage Samples in Figs. 4, 5, 6, 7, 8, and 9

Pl.	Area	Type	Date range	Reg. no.	Description
1	B/D	LRA 4—Form 2	4th–mid 5th c. CE	21/94-33/ 3	Exterior pink (5YR 7/5); fabric reddish brown (5YR 5/3) sparse white inclusions with white and black grit
1	B/D	LRA4—Form 4	6th–7th c. CE	16/37-75/ 18	Exterior light brown (7.5YR 6/3); fabric yellowish red (5YR 5/6) white inclusions and grey grit
1	B/D	LRA4—Form 4	6th–7th c. CE	16/37-75/ 15	Exterior pinkish grey (5YR 6/2); fabric red (2.5YR 4/8) quartz inclusions with white grit
1	B/D	LRA4—Form 4	6th–7th c. CE	16/37-75/ 17	Exterior grey (5YR 6/1); fabric grey (7.5YR 5/1) dense with white and quartz inclusions and black grit
1	B/D	LRA4—Form 4	6th–7th c. CE	15/91-7/ 11	Exterior pinkish grey (5YR 6/2); fabric grey (7.5YR 5/1) surrounded by reddish yellow layer (7.5YR 6/8), black inclusions and cream grit
1	B/D	LRA4—Form 4	6th–7th c. CE	15/91-79/ 2	Exterior light reddish brown (5YR 6/4); fabric core (7.5YR 6/2) surrounded by yellowish red layer (5YR 5/6)
2	B/D	LRA5—Pteri Type 2a	5th–7th c. CE	32/90-63/ 1	Deep ribbing below neck, exterior and fabric pink (5YR 7/4), white inclusions
2	B/D	LRA5—Pteri Type 2b	Late 6th–7th c. CE	15/91-79/ 5	Exterior pink (7.5 YR 7/4); fabric reddish yellow (5YR 7/6), sparse white inclusions and grey grit
2	B/D	LRA5—Riley Type 1b	6th–7th c. CE	16/37-75/ 3	Deep ribbing on shoulder, exterior light brown (7.5YR 6/4); fabric reddish brown (5YR 5/4) high concentrations of black and grey grit
2	B/D	LRA5—Pteri Type 2a	5th–7th c. CE	16/37-75/ 14	Exterior and fabric light reddish brown (5YR 6/4), white and black inclusions with grey grit
2	B/D	LRA5—Riley Type 1b	6th–7th c. CE	15/91-79/ 1	Exterior light reddish brown (5YR 6/4); fabric yellowish red (5YR 5/8) sparse white inclusions and grey grit
2	B/D	LRA5—Riley Type 1b	6th c. CE	21/94-33/ 2	Exterior pale red (2.5YR 6/2); fabric light reddish brown (5YR 6/3), large and medium white and black inclusions, hard metallic. No painted motifs preserved
3	B/D	Agora M334 (Variant)	Early 6th–7th c. CE	16/37-75/ 19	Exterior reddish brown (2.5YR 5/6); fabric red (2.5YR 5/8), white and quartz inclusions with grey grit
3	B/D	Agora M334 (Variant)	Early 6th–7th c. CE	16/37-75/ 21	Exterior light reddish brown (5YR 6/4); fabric yellowish red (5YR 5/6), white and quartz inclusions with grey grit
3	B/D	Agora M334 (Variant)	Early 6th–7th c. CE	(16/37)- 163	Exterior red (2.5YR 5/6); fabric red (2.5YR 4/6), white and quartz inclusions with grey grit
3	B/D	Agora M334 (Variant)	Early 6th–7th c. CE	(16/37)-1/ 22	Exterior light reddish brown (5YR 6/4); fabric yellowish red (5YR 5/6), white and quartz inclusions with grey grit

Table 1 continued

Pl. Area	Type	Date range	Reg. no.	Description	
4	B/D	LRA 2	6th–7th c. CE	16/37-75/ 27	Exterior light reddish brown (5YR 6/4); fabric strong brown (7.5YR 5/6) black grit
4	B/D	LRA 2	Late 7th —early 8th c. CE	16/37-75/ 28	Exterior pink (7.5YR 7/4); fabric reddish brown (5YR 5/4) small percentage of white inclusions and black grit
4	B/D	LRA 2	7th–8th c. CE	16/37-75/ 30	Exterior pink (7.5 YR 7/4); fabric light brown (7.5YR 6.4) black grit.
5	H	LRA 2—Kellia Type	mid 7th–8th c. CE	15/ 91–121/ 1	Exterior light reddish brown (2.5YR 7/3); fabric dark brown (7.5YR 3/2), high concentration of yellow flecks, metallic
5	H	LRA 4—Form 2	3rd–mid-5th c. CE	15/91-90/ 98	Exterior reddish brown (5YR 5/4); fabric yellowish red (5YR 4/6) large white inclusions and black grit
6	A//J	LRA 4—Form 2	3rd–mid-5th c. CE	15/91-37/ 6	Exterior reddish yellow (7.5YR 6/6); fabric yellowish red (5YR 4/6) quartz inclusions with white and grey grit
6	A//J	LRA 4—Form 4	6th–7th c. CE	30/93-4/1	Exterior pinkish grey (7.5YR 6/2); fabric reddish brown (5YR 4/1) white inclusions and black grit
6	A//J	LRA 1	4th–7th c. CE	20/92-12/ 11	Exterior reddish brown (5YR 4/4); fabric red (2.5YR 4/6) white flecks and black grit

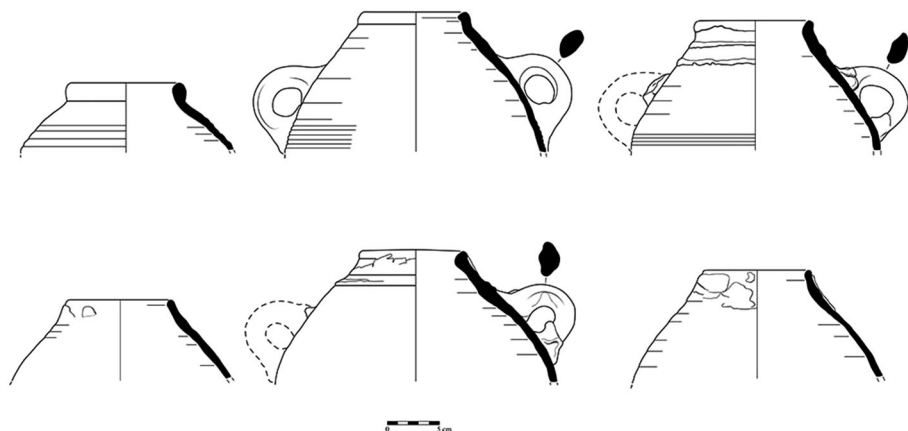


Fig. 4 Area B/D assemblage sample—LRA 4, Gaza Jars (*top row: left to right*): 21/94-33/3, 16/37-75/18, 16/37-75/15; (*bottom row: left to right*) 15/91-7/11, 16/37-75/17, 15/91-79/2 (Drawing by S. Head)

popularity as a vessel used in the export of goods, the late form Gaza Jar can be found at many sites within the Palaestina provinces including Scythopolis, Sepphoris, Jerusalem, Caesarea, Avdat, Haluza, Shivta, and as well as in Egypt (at Kellia and Kom el-Dikka) to only name a few (Egloff 1977: 116–117; Majcherek 1995: 169). Originally, this jar may have been manufactured for shipping the regionally produced white wine of Gaza, however evidence for their use in the transport of a variety of edible and inedible commodities suggests that their production and function was more widespread (Levine and Netzer 1986: 99; Oleson 1994: 19; Blakely 1987: 113; Galili and Sharvit 2001: 31).

One example of the early LRA4 Form 2 (Zemer 52–53, Peacock and Williams 48) was recovered in Southern Anchorage assemblage. This form is characteristically different from the later Form 4 with a thicker rim and heavy loop handles attached to a more pronounced sloping shoulder; around the neck and shoulder there are bands of deep vertical grooves (Majcherek 1995: Pl. 5, nos. 1,3,5). Fabrics from the examples of this form (and Form 4) found in the Southern Anchorage are reddish brown with small concentrations of white inclusions with white and black grit. Examples of Form 2 appear earlier in the Eastern empire, where in Egypt examples can be found from Antinopolis and Kom el-Dikka belonging to the 3rd c. CE, however their appearance in the Western empire at sites such as Tarragona, Marseilles, and Rome ranges from the 4th–5th c. (Riley 1975: Pl. 121, 12; Bonifay 1986:281).

Bag-Shaped Jars (LRA 5, Riley's Caesarea Amphora Type 1, Peacock and Williams Class 46/62) make up the second most prominent type of vessel recovered from Area B/D (Fig. 5). Produced at numerous sites throughout Palestine, with concentrations in the north bordering Phoenicia, the popularity of this form extended throughout the Eastern Mediterranean in Late Antiquity, and as such it seems only natural to find this vessel type in the Southern Anchorage. Examples of this form recovered from Caesarea's Southern Anchorage are characterized by their bag-shaped bodies, short vertical rims, and ring handles. Partial vessels and fragments from this group fall into several forms: Riley's Caesarea Type 1B—mostly in a Gritty Orange fabric, Pieri Type 2A, and Pieri Type 2B. The Riley Type 1b ('Aiyadiya amphora) are the most common type found in the assemblage. These are a distinct form found along the Palestinian coast, defined by their fabric as much as their typological form. In Riley's excavation of the Caesarea Hippodrome he

noted the large quantities of this vessel type in the Byzantine levels, to the extent that he suggests a local origin for this type (Riley 1975: 26–27). Typologically, the lip is much shorter, only 2.5–3 cm and plain but in some cases flattened or rounded to a certain extent and there is no ridge at the base of the rim. When Riley first classified this variant, they had only been identified at Ashdod, Nessana in the Negev, Atlit, Jerusalem, however, more examples have been identified throughout province. Beyond Palestine, they are found in Cyprus (at Tocra) and in late 6th c. contexts in Istanbul (Riley 1975: 26–27). Under Pieri's typology, this form fits as his Type 1A, and reaffirms a fairly limited distribution across the Mediterranean, found primarily in 6th c. contexts at Argos, Athens, Ravenna, Tel 'Arqa (Lebanon), Marseille, and the LaPalud shipwreck off the coast of southern France.

The other variety of this form in the B/D assemblage is the Pieri Type 2A type, specifically the later forms. Within this form the variety present at Caesarea has a fabric similar to Pieri's Type 1B that is orange or light brown in color, with sandy, calcareous, and quartzite inclusions (Pieri 2005: 118–119). The form follows many of the same characteristics of a typical baggy jar but with ear handles on a more spherical body, a collar neck and a rim with a small triangular lip and a protruding ridge at the bottom of the neck. Regionally, it may have been produced with other LRA 5 at Horbat 'Uza and other sites in the region of the Akko plain (Getzov et al. 2009: 52–60). This type was dispersed throughout the Eastern Mediterranean between the 5th–8th c., where Pieri notes that it is found in contexts in Greece (Athens, Argos & Thasos), Turkey (Istanbul-Sarachane), as well as Byzantine and Ummayed sites throughout Syria, Lebanon, Israel, and Jordan (2005: 119). However, it appears with much less frequency in the West, where this type has been identified in Rome and Marseille from the wreck Saint-Gervais, Golf of Fos, and Port-Vendres in the 5th–7th c. CE (Pieri 2005: 117–119).

Among the Area B/D assemblage there are six partial vessels of Robinson's Agora M334 type (Fig. 6). However, these are a regional variant of the form found in Byzantine contexts in the Agora. This selection of amphora type is distinguished by a wheel-ridged body, folded everted rim with distinctive over-hanging lip and a conical neck; the ridged handles dip slightly at the connect point midway on the neck. No bases or the lower portions of vessels were recovered making it difficult to classify the specific shape of this form, although examples from the Agora adhere to a carrot-shaped body (Robinson and Wilson 2011: 115, Pl. 33, M334). Variation from Robinson's original type is found in the connecting point of the handles below the rim near the middle of the neck in contrast to a connection at the rim. Despite this morphological diversity, the Southern Anchorage Agora M334 has close affinity to examples from Beirut's Chhim Necropolis and unprovenanced examples in the American University of Beirut Museum (Reynolds 2005: Pl. 16, Figs. 115, 116, 117, 118, 120). At least two examples (Figs. 115 and 118) diverge from Robinson's carrot-shape, with a wide base and a reduction in size. The Beirut rims (Figs. 115, 116, 117, 118) are the closest parallel in size and morphology to the Southern Anchorage examples. Reynolds proposes that the Chimm and two unprovenanced AUB Museum examples are 6th c. forms of the Agora 334 (Reynolds 2005: 572). Robinson's original form roughly dates to the early 14th c., also from Beirut, extending until the late 7th c. Variants of this form (usually with disparities in the rim) have been identified at Carthage, where a complete example is datable to the late 6th c. (Riley 1981: 108, Fig. 8.65). Reynolds provides a comparison to a single example from Sarachane (Istanbul), in which the handles attach below the rim similar to the Southern Anchorage variant but with a greater reduction in size despite dating to the 6th c. corpus (Hayes 1992: Fig. 22.6: Type 15; Reynolds 2005: Pl. 16, Fig. 121). One of the later examples is from the late 7th c. at Crypta Balbi, Rome, but in the more traditional carrot-shape (identified as 'Crypta Balbi

1'); it was found in context with examples of LRA5, a possible companion import from Palestine (Saguì 2002: 36, Fig. 6:6). Although first identified in Athens, the vessel type is known to have originated in southern quarter of the Roman province of Phoenicia where several kiln sites have been identified in the area north of Akko/Ptolemais, at Horvat Masref, Achziv, Horvat 'Eitayim, 'Evron, and Horvat 'Uza (Avshalon-Gomi 2006: Fig. 2). Reynolds has noted the correlation of the production of Agora 334 with LRA 5 (Palestinian Bag Jars) at sites such as Horvat 'Uza (2005: 573) and excavation has shown both jars being produced at Horvat Masref (Frankel and Getzov 1997: Fig. 5.14.2:1, 5).

Petrographic Results of Agora M334 Vessels

Three amphorae were selected for analysis since their form suggested they are a variant of a regional type not prevalently identified at Caesarea in previous excavations; additionally, the fabric was different from the closest possible parallel found in Beirut. According to the original typology for Robinson's Agora M334 the fabric is described as "soft, gritty, orange-buff clay with a self-slip" for vessels produced at the kiln sites within the region of Akko/Ptolemais (Robinson and Wilson 2011: 115). Initial visual inspection of the Southern Anchorage variant of Agora M334 suggested that a different fabric was in use and warranted testing.

Methodology and Method of Presentation

Optical Mineralogy (OM) analysis, also called petrography implements traditional laboratory techniques borrowed from the field of geology, where the ceramic samples are cut to 30 micrometers (μm) to create a thin section which is then analyzed under a petrographic microscope using polarizing light (Day 1989; Quinn 2013; Tite 2008).

The visual presentation of two selected vessels includes a photograph of the vessel, a picture of the fresh break and three photomicrographs of each thin section in three magnifications: X40, X100 and X200 (Fig. 7). This allows a clear presentation of the information, in which the text serves to illustrate and interpret the visual data and not vice versa, which is the more common practice.

Petrographic Results

All three samples are of the same petro-fabric group: Petro-fabric Group C, Sharon Plain: Iron-Rich Red Loamy Soils; Hamra rich in large Coastal Quartz. The matrix consists of iron-rich clay with silty quartz; the clay is non-carbonate, dark red in PPL (Plain polarized light) with some iron oxides. The silt is mostly quartz but also contains some feldspars. The inclusions consist mainly of well-sorted sub-angular quartz sand ($\sim 30\%$, up to 300 μm) often fractured. Other inclusions are occasional fragments of tuff, chert, chalk, coralline algae, seashells, and other micro-fauna. The dark color of the matrix, the disappearance of most of the carbonate components from the petro-fabric and the fractions in the quartz suggest firing temperature, over 850 °C.

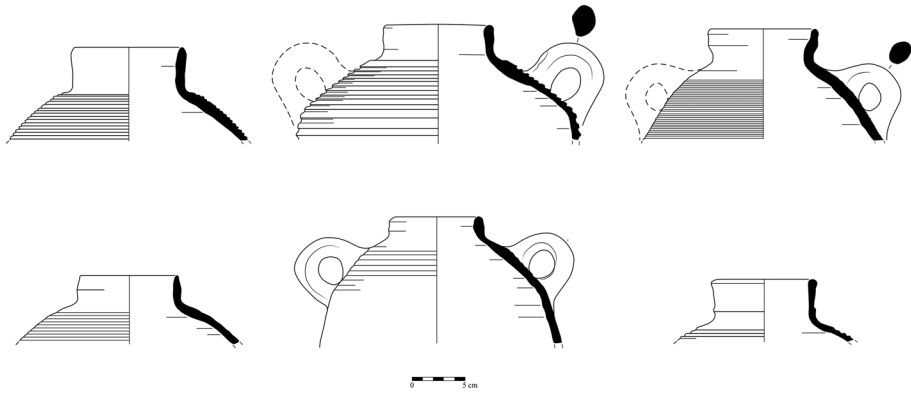


Fig. 5 Area B/D assemblage sample—LRA5, Palestinian Bag Jars (*top row: left to right*): 32/90-63/1, 16/37-75/3, 15/91-79/5; (*bottom row: left to right*) 21/94-33/2, 15/91-79/1, 16/37-75/14 (Drawing by S. Head)

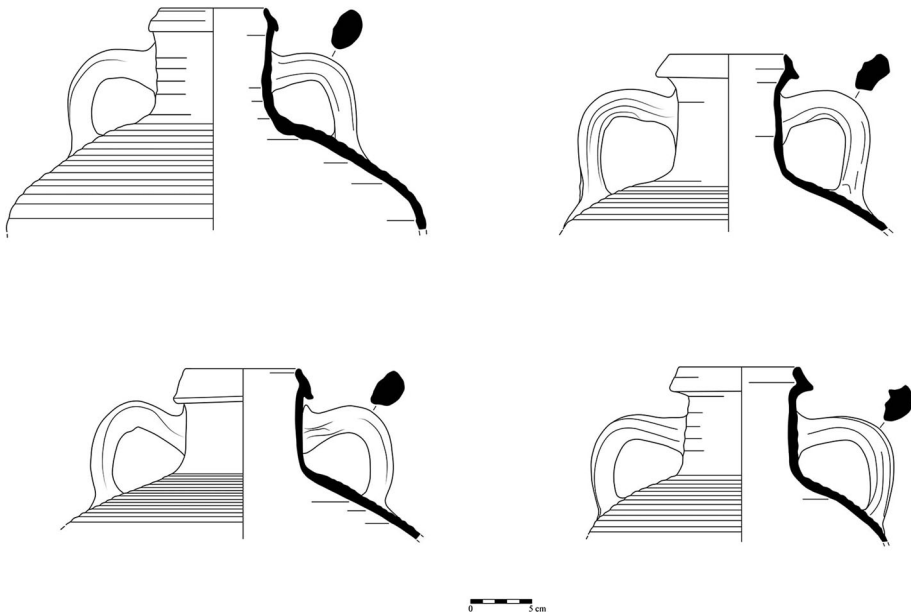


Fig. 6 Area B/D assemblage sample—Agora M334, (*top row: left to right*) 16/37-75/19, 16/37-75/21; (*bottom row: left to right*): 16/37-163, 16/37-1/22 (Drawing by S. Head)

Petrographic Interpretation

Caesarea is built on the kurkar (calcarenite) ridges of the northern Sharon plain in Israel, south of Mt. Carmel (Table 2). Chalks of the upper cretaceous Gharab formation as well as tuffs from Shfeya formation are exposed on the southern slopes of the Carmel adjacent to Caesarea. The region of Caesarea is covered with red loamy soil known locally as Hamra. Hamra developed on sea sand and kurkar ridges and is abundant along the coastal plain of

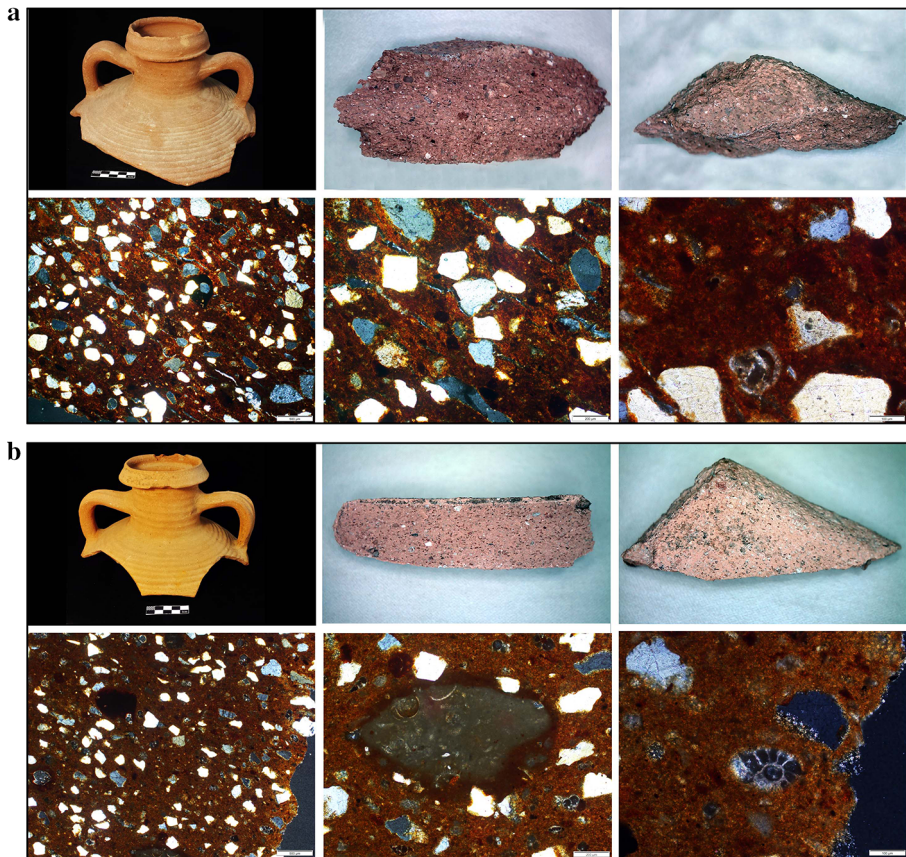


Fig. 7 Samples a (163-2/6) and b (1–22): photograph of the vessel, a picture of the fresh break and three photomicrographs of each thin section in three magnifications: X40, X100 and X200 (Photos and results by P. Waiman-Barak)

Table 2 Samples of Agora M334 selected within this paper and suggested provenance

DB no.	Reg. number	Vessel type	Area	Relative chronology	Petro-fabric group	Suggested provenance	Figure
1	1-22	Amphora	B/D	Byzantine	C	Local/regional	b
2	163-2-6	Amphora	B/D	Byzantine	C	Local/regional	a
3	16/37-75-/ 1	Amphora	B/D	Byzantine	C	Local/regional	

Israel (e.g. Dan et al. 1969; Goren et al. 2004; Sivan and Porat 2004; for its formation, see Dan and Yaalon 1990; Wieder et al. 2008; Crouvi et al. 2009).

This petro-fabric group is well known and has been previously identified in Bronze and Iron Ages ceramics (Goren 2013: Fig. 2, blue; Gilboa et al. 2015: group C). Comparative petro-fabrics have been also identified at sites in the coastal Sharon plain, mainly at Tel

Zeror (unpublished), Tel Ifshar (E. Marcus, pers. comm.), and also in tablets from Gezer and Aphek in the eastern Sharon (Goren et al. 2004; Yasur Landau and Goren 2004).

Area H

Southeast of Area B/D along the shoreline, another area was designated as Area H, consisting of several small assemblages found in water only 1–2 m deep (Fig. 8). Preservation of the ceramics recovered from this area was exceptionally poor. Only two vessels could be identified of the nine (diagnostic remains) found within this assemblage. Portions of five other storage jars were recovered as well as the rim of a mortarium and a fragment of a small bowl. Two vessels were preserved well enough to establish a typology. A single Gaza Jar of Majcherek's Late Roman Amphora 4—Form 2, as described above. The other preserved vessel is an example of Riley's Late Roman Amphora 2, with a close parallel found on the Tantura shipwreck where it is identified as Tantura Amphora Type 1. This form is distinguished by a long cylindrical neck and a thickened, rounded rim, however our example has a slightly shorter neck but similar to the Tantura vessel there is a sharper angle where the neck meets the shoulder (Barkai et al. 2010: 91, Fig. 4:1). Other parallels can be found in Egypt at Kellia where deposits date the vessel to the mid-7th to early 8th c. (Egloff 1997: 113, Fig. 57:7) and Marea where a similar longer-necked vessel may be an Egyptian version of the this late LRA2 form (Majcherek 2001: 62–63, Fig. 2: 4, 6).

Area A/I/J

The third area considered in this study is located at the southern end of the bay, along the eastern side of the kurkar ridge and extending toward the center of the bay in slightly more shallow water (Fig. 9). Designated as “J” and “A” this part of the area is approximately 4–5 m deep while “I” is shallower at 3–4 m. The majority of deposits from this area are later, primarily belonging to the Umayyad Period, however a small portion of the assemblage is representative of the Late Roman and Byzantine Periods. A well-preserved Majcherek Late Roman Amphora 4—Form 4 (6th–7th c. CE) was recovered with a cargo of rectangular cut stone building blocks. Also from this area, a short Gaza jar, Majcherek's Late Roman Amphora 4—Form 1. In addition to the storage vessels the assemblage included a pithos base and basin rim incised with wavy lines (Johnson 2008: 65, no. 736).

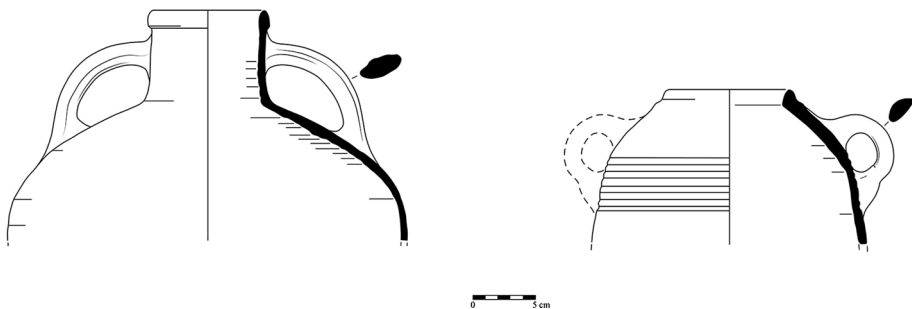


Fig. 8 Area H assemblage sample (left to right): 15/91-121/1, 15/91-90/98 (Drawing by S. Head)

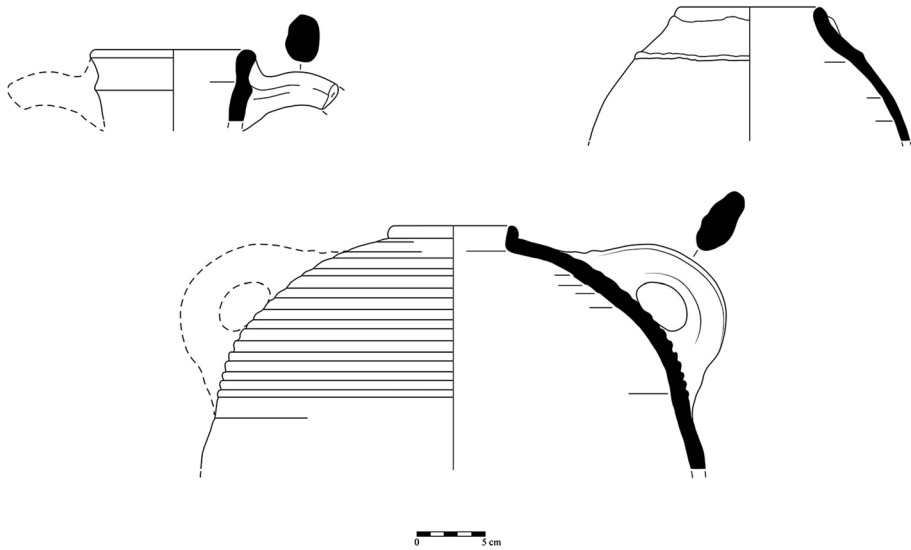


Fig. 9 Area A/I/J assemblage sample (clockwise *top left*): [26/92-12/11], [30/93-4/1], [15/91-37/6] (Drawing by S. Head)

Ceramics Discussion

Evidence from underwater survey of the Southern Anchorage has established its use contemporary to the duration of Sebastos but also provides evidence for thriving activity in this secondary bay during the Late Roman and Byzantine periods. Unfortunately, the small sample size of the assemblage makes it difficult to draw definitive conclusions; however, the results yielded do offer new insights when considered in the broad context of information known about Caesarea and its environs over many years of survey and excavation. Numismatic finds, and to a lesser degree ceramics, from shipwreck deposits in the northern end of the Southern Anchorage date to 1st c. CE, when nearby Sebastos was the provincial maritime epicenter (Galili et al. 1993: 67–8). The relative absence of mid 2nd to mid 3rd c. CE ceramics and coins in the Southern Anchorage coincides with a period of economic downturn and decline at Caesarea. This period, particularly the 2nd c. CE, is also the poorest represented in the CAHEP excavations in Caesarea's main harbor and secondary anchorages directly to the north and south (Oleson 1994: 5). The later 4th c. CE marks an increase in vessels and coins deposited in the Southern Anchorage. This noticeable increase in the deposition of material beginning again in the 4th c. is mirrored in the Outer Harbor and even more so in the South Bay (Oleson 1994: 6, 155). The greatest concentration of material culture in the Southern Anchorage belongs to the Byzantine Period; however, the date range of nearly all the ceramics from this period straddle more than a single century, extending between the 4th/5th, 5th/6th, 6th/7th c. As a result of these overlapping ranges it is difficult to provide more than an estimate of the late 5th–6th c. as the period of peak activity in the Southern Anchorage.

The ceramic assemblages from each area consist of multiple amphorae of the same type including variation among a single vessel form. However, these seem to represent mixed cargoes not homogenous groups of amphorae transported together. Individual ceramic forms found over several centuries tended to be the result of multiple production centers,

sometimes across a disparate geographical area. Caution should also be exercised when analyzing these assemblages as cargo units without any defined shipwreck to associate them with. Given the accessibility of the bay to those living at nearby Kibbutz Sdot-Yam and tourists scouring Caesarea's coast, compounded by shifting sand and silting, the ceramic assemblages recovered are only a fraction of a representative sample from original deposits in the bay. Further distinction should also be made to the fact that this material is recognized as assemblages not clearly defined cargoes from specific shipwrecks. While their origins are overwhelmingly likely to be from shipwreck deposits, archaeologically they can only be analyzed as grouped assemblages from salvage survey and excavation. There are then implied limitations as to what can be derived from their deposition, beyond examining which ceramics and other artifacts were found in obvious association with each other as an assemblage within the bay's general areas of exploration.

Production centers for the majority of vessels recovered in the Southern Anchorage can be traced to regions of the Aegean, Egypt, and the Levant, specifically in the case of Gaza Jars and Palestinian Bag Jars. Egypt's proximity to Syria-Palaestina/Palaestina Prima and its location as a stop prior to the Levant, along the south to north trade route around the Eastern Mediterranean makes for a logical inclusion in the assemblage. Likewise, material from the Gaza region represents an intermediate stop between Egypt and Caesarea along this same route. Historical sources mention only a few harbors and anchorages in use during the Byzantine Period, primarily in the context of ships embarking on trips carrying notable individuals, not necessarily detailing cargo. Harbors mentioned include Gaza (*Maiuma*), Ashkelon, and Caesarea in the late 4th/early 5th c. (*Mark the Deacon: Life of Porphyry, Bishop of Gaza* T6, T24, T34; trans. Hill 1913: 57, 6, 34), Iamnia [*Peter the Iberian* (Vitto and D-Yamnin 1998: 126)] in the 5th c. and 6th c. (*Johannes Rufus*), and Ioppe also in the 5th c. (*Lives of the Monks of Palestine*, 63.4, 213.10). Similar to the Southern Anchorage as a small harbor, other such sites underwent only minimal construction for use as maritime commercial centers. Beyond the bays surrounding Caesarea, archaeological evidence for minor Byzantine structures in association with natural anchorages functioning as maritime commercial centers can also be found at Achziv, Dor, and Apollonia.³

The Southern Anchorage in Late Antiquity

Under Hadrian's reorganization of the provinces and the merger of Judaea and Syria to form Syria-Palaestina (135–390 CE), the provincial capital was no longer Caesarea but remained in Antioch. The shift in provincial administration and by extension economic interests associated with the governmental seat contributed to the decline in maritime activity that had previously been thriving in Caesarea's harbor and anchorages during the 1st c. CE. Contrary to the decline witnessed in Caesarea's harbors and anchorages, archaeological evidence from throughout the empire reflects a period of economic prosperity in the 2nd c. CE. The deterioration of Sebastos' breakwaters only helps to explain the waning use of Caesarea's main harbor after the 2nd c. CE but does not account for the

³ Archaeological evidence for a modified anchorage at Achziv is supported by the identification of quarrying of the kurkar ridge in the bay of Minet ez-Zev, mooring-posts and possible dry-docks (Galili and Rosen 200: 1931; Frankel and Getzov 1997: 65-67). Evidence from Dor has tentatively been identified in the North Bay where mooring stones have been found as well other Byzantine installations with an abundance of ceramic material to support the use of the bay as a harbor (Arkin 2015 (unpublished MA Thesis, University of Haifa, Department of Maritime Civilizations; Raban 1995: 295).

corresponding decline in the surrounding harbors and anchorages (Oleson 1994: 160–161). Rather one would expect a proportional increase in their use as an alternative to Sebastos (Portus Augusti); however, the evidence suggests otherwise.

It was not until another provincial reorganization at the end of the 4th c. (390 CE) that activity in the Southern Anchorage and the rest of Caesarea's harbor complex is once again significantly renewed. As the provincial capital of Palaestina Prima (390–636 CE), the city experienced a rejuvenation of its former prosperity as well as an increase in population parallel to the economic expansion. Construction of the lower level aqueduct in c. 385 CE suggests that the population had already grown considerably by the end of the 4th c. to necessitate additional water being brought into the city. Evidence of economic upturn can be found within the city, in Portus Augusti, as well as the material from the Southern Anchorage. As Hohlfelder points out, significant investment was made in Palaestina Prima during the 4th c. with the Christianizing of the Roman Empire, so it would not have made sense for the state to then neglect the harbor installations of a favored province's metropolis and major port (2000: 42–43). Archaeological evidence from excavation of the Outer Harbor's (Portus Augusti) breakwaters show evidence for repair in the 3rd or 4th c. CE, corroborating the investment in the city's economy through harbor maintenance (Oleson 1996: 376). Unfortunately, religious unrest and conflict among the Christian and Samaritan populations created civil disorder within the coastal community (Di Segni 1996: 577). Problems were further compounded by two earthquakes and an outbreak of famine in the 5th c., all of these issues contributed to Caesarea's eventual inability to maintain its harbor (Hohlfelder 2000: 44). City building projects and renovations later instituted by Anastasius I (491–518 CE) and Justinian I (527–565 CE) helped booster the economic base, requiring an increase in the raw materials being imported such as the marble and other stone used in the octagonal church, baths, and colonnades throughout the city. These renovations fortunately extended to the harbor, where Anastasius I investment in Portus Augusti once again rejuvenated the city. Procopius offers some insight into the condition of the Outer Harbor before restoration efforts, noting the debris and rubble that littered the harbor where shipwrecks frequently occurred in both favorable as well as stormy conditions (Oleson et al. 1984, no. 20; Hohlfelder 2000: 45). In the intervening years between Portus Augusti's renovations, particularly in the 5th c., the dire circumstances here may have opened a window of opportunity for commercial traffic in the Southern Anchorage. Obviously some of these conditions would have also affected the secondary harbor but because of its simple nature the Southern Anchorage may have made it a less dangerous alternative to the main harbor.

Large artificial harbors represent an anomaly among the smaller harbors and natural anchorages where maritime commerce took place (Marriner et al. 2014: 9). The type of trade facilitated by such sites seems much more likely to support a form of regional *cabotage* than direct long distance exchange (Leidwanger et al. 2015). The mixed cargoes and highly regional nature of the ceramics represent more small-scale redistribution of locally produced commodities into the Mediterranean market system, undergoing a point-by-point sale and reassessment of goods (Horden and Purcell 2000: 369–370). Within this framework, specialization is the key strategy for the occupants of a micro-region to optimize their resources (Horden and Purcell 2000: 366). Situated south of Caesarea but along the north-south coastal highway, merchants using the Southern Anchorage could have easily transported their goods overland via the highway to and from points along the coast as well as to the inland network.

Conclusions

The Levantine coast offered few well-protected anchorages that could be easily transformed into suitable harbors in antiquity. No single factor can be attributed for the flourishing use of small natural anchorages such as in the case of the Southern Anchorage at Portus Augusti. However, demographic and economic increases during the Byzantine Period undoubtedly impacted the use of these sites. The increased production and trade in the wine industry in the Levant (*Palestina Prima, Secunda, and Tertia*) during the Byzantine Period, produced a surplus that could be entered into the commercial markets of Mediterranean maritime trade. As Kingsley points out, Palestine was agriculturally fertile enough to support the relatively small size of its cities as compared to the metropolises of Alexandria, Antioch, and Carthage, among others (Kingsley 2001: 187). The remaining surplus may have thrived as exports at smaller harbors such as the Southern Anchorage where it could be added as mixed cargo into the regional network.

The Southern Anchorage and the material culture recovered from it further demonstrate the reliance of maritime commerce along the Levantine coast on subsidiary harbors of the Byzantine period as opposed to what we have become familiar with as the built harbors of the Roman Imperial Period. Leidwanger has provided similar case studies that demonstrate the centrality of what he terms “opportunistic ports” in Cyprus, where these simple anchorages played a key role in the socio-economic development between urban centers and hinterlands (Leidwanger 2013: 1–2). Beyond Caesarea, current research being conducted in association with this project has found numerous instances of natural anchorages used as commercial points during Late Antiquity, the Southern Anchorage presents an interesting case as part of a larger harbor complex but with possible ties to a regional network. Instead of focusing on the harbor as the variable, it may have also been the case that goods traded through these subsidiary harbors were exchanged at periodic markets associated with the smaller harbors. Increased specialization at such markets may have driven the demand in commodities traded in the harbor tied to it. The raw materials found in the Southern Anchorage and diversity of vessels reflects an amalgamation of regional types from along the Levantine coast but lacking in pan-Mediterranean imports. Vessels such as the LRA 5 and Agora M334 are often mentioned as produced together in southern Phoenicia/northern Palestine, as were LRA 4 and LRA 5 in the region of Gaza. The imitation of the Agora M334 produced locally at Caesarea and LRA 5 also known to have been made in the city’s environs could represent a ‘regional package’ being exported out of the Caesarea, specifically from the Southern Anchorage. Curiously, we do not find assemblages of the Agora M334 in contexts from the city itself or Caesarea’s other harbors and may be seen as an example of preference between the available harbor networks within the complex. Specialization may have then focused on the regionality of the cargo in which the Southern Anchorage was a designated stop on the coastal *cabotage* route, separate from the long-distance import trade operating out of Portus Augusti. As we continue to survey the small anchorages along the central Levantine coast and assess their material culture more information will come together to help understand how small harbors such as Caesarea’s Southern Anchorage functioned in relation to larger maritime complexes as well as serving small-scale rural regional markets.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

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