Revisiting the Godavaya Mid-Holocene Coastal Hunter-Gatherer-Fisher Camp Site in Southeastern Sri Lanka

Priyantha Karunaratne[1]*, Samanti Kulatilake[2], P. Vidanapathirana[3], Jude Perera[4], Hans Harmsen[1], Nimal Perera[4], Sampath Garusinghe[4], K.M.G. Jinaka[4], D. R. Abeykoon[4], Ratnasiri Pieris[3], Ruwan Dissanayake[3], M. D. Samanthi Ranjanie[3]

[1] The State University of New York (SUNY) at Buffalo, Social Systems GIS Lab, Department of Anthropology, Buffalo, NY 14260. USA
[2] Mount Royal University (MRU), Calgary, Canada
[3] Postgraduate of Archeology (PGIAR), University of Kelaniya, Sri Lanka
[4] Department of Archeology, Colombo, Sri Lanka

*corresponding author email address: prikarunaratne@gmail.com

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Abstract

Archaeological evidence suggests that middle Holocene hunter-gatherer-fisher (HGF) populations set up camps on coastal shell ridges of Sri Lanka. From the middle to late Holocene, coastal areas were subjected to several localized episodes of marine transgression and regression due to sea level oscillation. During highstands the Godavaya hill in southeastern Sri Lanka was a coastal headland jutting into the Indian Ocean between two submerged coastal embayments. We present an analysis of data collected from the rescue excavation conducted in 2014 at the Godavaya mid-Holocene coastal HGF camp site, including supporting information from surveys conducted on the surrounding coastal landscape. Through studying the stratigraphy of the profile walls of the gravel pits adjacent to the Godavaya hill, we summarize the geological process associated with site formation, contextualizing the prehistoric cultural phases. The analysis of the lithic and faunal remains recovered from the Godavaya midden refuse, provide insights to middle Holocene coastal adaptations that suggest the existence of multiple sub-ecosystems abundant in aquatic resources. This abundance may have been a key pull-factor that attracted HGF groups to aggregate along the shorelines during the sea-level highstands allowing a relatively higher density of occupation, as evidenced by numerous encampments along former bay beaches. Based on the presence of previously excavated human burials at Godavaya hill, similar to the burials found at interior shell ridge habitations, and support from ethnographic analogy, we propose that inhumation of the dead may have created an ancestral link to the locality, forming a sense of territorial right and ownership.

Introduction

The Mid-Holocene habitation site at Godavaya (6° 6' 28" N, 81° 3' 4" E) on the left bank of the Walawe River in the Southeastern (SE) coast of Sri Lanka first came to light in 2008 when archaeologists from the Department of Archaeology, Sri Lanka and the *Deutsches Archäologisches Institut*, (DAI), Germany observed patches of lithic debitage on a small hill overlooking the Indian Ocean. The ensuing test excavations unearthed a mid-Holocene human burial containing a skeleton of an adult individual in a flexed posture (*Lankadeepa,* 2008). The site was revisited in the summer of 2013 during the first season of the Bundala Archaeological Survey Project (BASP); an international collaborative research program (comprising of researchers from the UB Social Systems GIS laboratory at the Department of Anthropology, State University of New York (SUNY) at Buffalo, the Postgraduate Institute of Archaeology (PGIAR), University of Kelaniya, and the Department of Archaeology, Sri Lanka) focused on understanding middle to late Holocene Hunter-gatherer Fisher (HGF) adaptive systems along the SE coast of Sri Lanka.

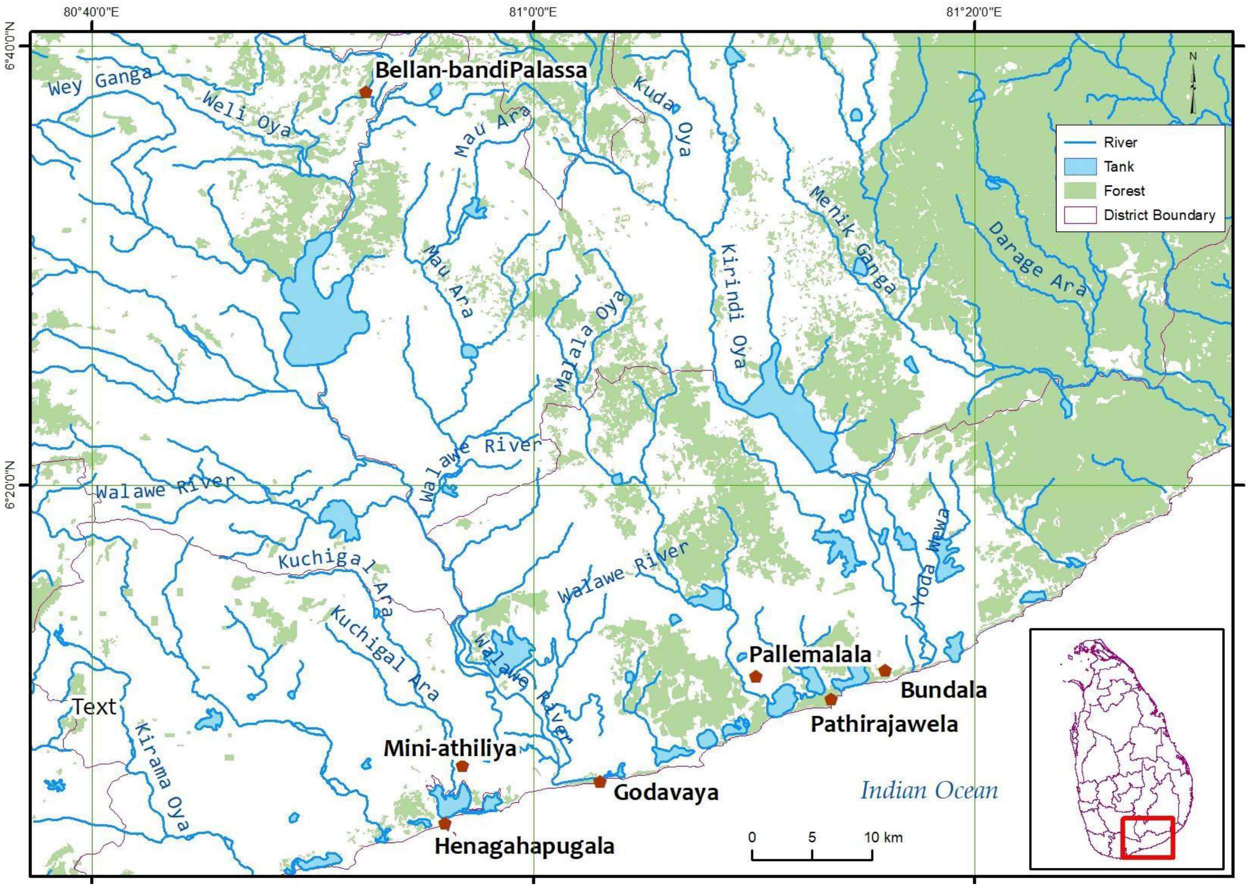

Figure 1. Notable sites occupied during the middle Holocene in southeastern Sri Lanka

Figure 2. Aerial view of the Godavaya site. The rocky peninsula east of the Walawe River mouth is the location of the mid-Holocene habitation and burial site (Google Earth, 2019 Maxar Technologies).

Figure 3. Garusinghe (left) and Karunaratne (right) drawing the site plan at the Godavaya summit (Photo by Hans Harmsen, 2013; from Harmsen, 2017, p. 298)

The goal of BASP was to gain insight into how prehistoric human populations responded to environmental shifts associated with climate change, sea-level fluctuation, and paleotsunami events (Harmsen, 2017; Harmsen & Karunaratne, 2016; Karunaratne *et al*., 2016), by conducting archaeological and paleo-environmental reconstructions of the middle Holocene HGF social landscape along the SE coast.

During the 2013 BASP survey, dense concentrations of lithic debitage were found on the weathering surfaces of Godavaya hill. Additionally, a fragment of human phalange and burnt animal and fish bones were recovered from eroded profile walls of the 2008 test trench. Before the Sri Lanka-German excavations of 2008, gravel mining and granite quarrying had considerably destroyed the site. However, the stratigraphy of the exposed profile walls of large gravel pits provided important insights into late Pleistocene geological processes and prehistoric cultural phases. Similar to the observations made elsewhere along the SE coast by Deraniyagala (1992), the geological formations and cultural material at the Godavaya hill suggested that prehistoric populations inhabited the site at least since the latter stages of the late Pleistocene, and subsequently during the middle Holocene.

Figure 4. Southern wall of 2008 excavation trench; rubble mixed fill right of the scale on the profile is a mid-Holocene pit possibly associated with the flexed burial (Photo: Priyantha Karunaratne 2014).

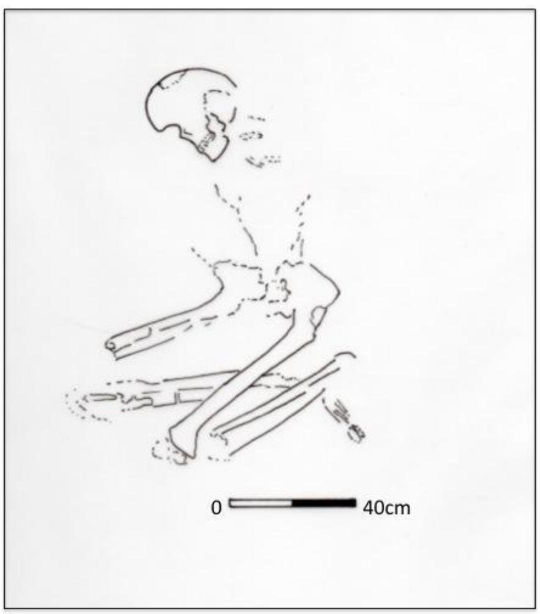

Figure 5. Drawing of a mid-Holocene skeleton unearthed during the 2008 excavation: reproduced from photo published in *Lankadeepa* newspaper (21 August, 2008) Colombo.

During the 2013 BASP field survey, examination of the stratigraphy of the 2008 trench walls (left open after the removal of the human skeleton in 2008) led to the identification of cut marks of a shallow pit (Figure 4). The back-fill of this pit contained a quartz rubble and pebble mixed gravel deposit. Based on the stratigraphic relation to other layers on the profile, it was assumed that this backfill was possibly a part of the mid-Holocene burial pit that contained a human skeleton unearthed during the 2008 excavation (Figure 5). Given that other late “Mesolithic” (microlith-bearing) habitation sites in the SE region of the island such as Pallemalala (6° 11' 18" N, 81° 10' 6" E (Somadeva & Ranasinghe, 2006), Bellan-bandi Palassa (6°310 000N, 80°470 6000E) (P.E.P. Deraniyagala, 1958, 1963; Deraniyagala & Kennedy, 1972; Perera, 2010) and Mini-athiliya (6° 7' 13" N, 80° 56' 48" E) (Kulatilake, 2012; Kulatilake *et al*., 2014, 2018) contained skeletal remains of several individuals and multiple burials in flexed postures, there was a reasonable assumption of finding more disarticulated human remains or even burials at the Godavaya hill. Since the site was heavily impacted by mining and the remaining surfaces of the gravel layers containing prehistoric cultural deposits were exposed to rapid erosion, a rescue excavation to salvage waning archaeological data was planned during the 2014 BASP field season.

The main objectives of the 2014 field season at Godavaya were: 1) to excavate the area beyond the south wall of the 2008 test trench and to explore whether more middle Holocene human burials and/or skeletal remains were present, 2) salvage archaeological data from the deposits that were exposed to heavy erosion for analysis and interpretation, and 3) examine the exposed profile walls in the gravel pits to gain a better understanding of the stratigraphy and prehistoric cultural phases. In 2014, the Godavaya rescue operation was conducted for three weeks, parallel to the archaeological surveys along the shoreline between Kalametiya and Block II of the Yala National Park (Harmsen, 2017; Harmsen & Karunaratne, 2016; Karunaratne *et al*., 2016). The research team of the 2014 field season comprised of researchers from PGIAR of the University of Kelaniya, Department of Archaeology (Sri Lanka), the Social Systems GIS Laboratory at the Department of Anthropology, SUNY at Buffalo (USA), and Mount Royal University (MRU), Calgary (Canada). Funding and logistical support were provided by the Department of Archaeology (Sri Lanka), PGIAR, SUNY at Buffalo, MRU, and The American Institute of Sri Lankan Studies.

The Godavaya Hill Middle Holocene Habitation Site

The prehistoric habitation site at Godavaya is located on the left bank of the Walawe River mouth on a rocky hill overlooking the Indian Ocean (Figure 2). This hillock is composed of large granite boulders partially submerged within thick gravel deposits. Overlying these deposits are patches of dune sand containing scrub vegetation dominated by erect prickly pear (*Opuntia stricta*), an invasive cactus species. On the surface areas that survived the destruction from gravel mining, the vegetation cover was rapidly disappearing, with dune deposits subjected to severe erosion, exposing the few remaining patches of the mid-Holocene habitation areas to the elements of nature. On the southern end of the site, closer to the beach, several large boulders sit on a rocky ridge that extends out into the ocean.

Figure 6. Rock shelter at Godavaya hill overlooking the Indian Ocean (Photo by Priyantha Karunaratne, 2014).

Figure 7. The Walawe River meandering parallel to the dunes in its final stretch near the Godavaya site; the old river mouth on the extreme left of the picture is now completely dammed by a natural sand barrier. On the extreme right, next to the left bank of the river mouth is the high ground where the Godavaya mid-Holocene habitation site is located (Google Earth, 2020 Maxar Technologies).

On the south slope of the hill, there is a spacious rock shelter overlooking the ocean (Figure 6) and it is reasonable to conclude that early inhabitants utilized this natural shelter from time to time. At the foot of the Godavaya hill, waves break on the exposed rocky coast over a narrow sand strip trapped between the rocks. Much wider and longer beaches extend along the coast, west, and eastward of the hill. The west side of the hill borders the left bank of the Walawe River, while the right bank of the river contains wind-blown dune formations peppered with stunted vegetation (Figure 7). Along the coast beyond the right bank of the river, the dunes extend parallel to the beach, forming a long sand barrier obstructing the drainage of the river basin. This dune barrier (along with accumulations of wave generated beach sand) not only blocks the former river-mouth that existed 3 km west of the present location, but also causes the river to meander parallel to the beach in the flat landscape behind the dune cover before reaching the ocean at the foot of the Godavaya hillock. During the dry seasons when the river current is low, the present river-mouth is blocked intermittently with beach sand accumulated through wave action during high tides. This causes flooding of the lowlands behind the dune and threatens low-lying farmlands along the riverbanks.

Immediately to the east of the prehistoric habitation hill is a curved beach strip, which extends below the rocky ridge near the ancient Buddhist temple at Godavaya. The 2nd century AD rock inscription located near the temple premises refers to the ancient harbor at Godavaya as *Godapavatha Patana* (Paranavithana, 1983). Similar to the prehistoric habitation area at Godavaya hill that contains rock shelters, the temple hill possesses numerous boulders that overlook the Indian Ocean. Quartz and chert fragments found on the surface of the coastal bluffs indicate widespread prehistoric occupation along much of the Godavaya coastline.

The Climate of the Southeastern Coast of Sri Lanka

Sri Lanka is located in the Indian Ocean, a few degrees north of the equator between latitudes 5°55′ and 9°50′ N and longitudes 79°41′ and 81°53′ E. The Island comprises an area of approximately 65,610 sq. km, and the total length of the coastline is approximately 1,620 km. There are two main monsoon seasons on the Island, namely the Southwestern and the Northeastern systems. The Southwestern system occurs from May to October when the Indian Ocean winds blow from the southwest. The Northeastern monsoon occurs from November to April (Holmes 1958) when winds originating from the direction of the Bay of Bengal travel southwestwards over the Island. These monsoon wind patterns and the topography of the Island create variable temperatures in different regions ranging from 15°C (60°F) in the central highlands to 38°C (100°F) along the northeastern coast. The area where the mean annual precipitation is above 2500 mm, which has no noticeable dry period (e.g., central hills and southwestern regions), is appropriately named the Wet Zone. The relatively flat area extending from the SE seaboard northwards through the north-central to north and northwestern coastal belt that receive less than 1750 mm annual mean rainfall is named the Dry Zone. Between these two main climatic zones, the area that receives above 1750 mm and less than 2500 mm annual average rainfall is named the Intermediate Zone. The fourth climatic area is named the Semi-Arid Zone, i.e., two relatively small areas in the northwestern and SE coastal belts of the Island that receive less than 1000 mm annual average precipitation.

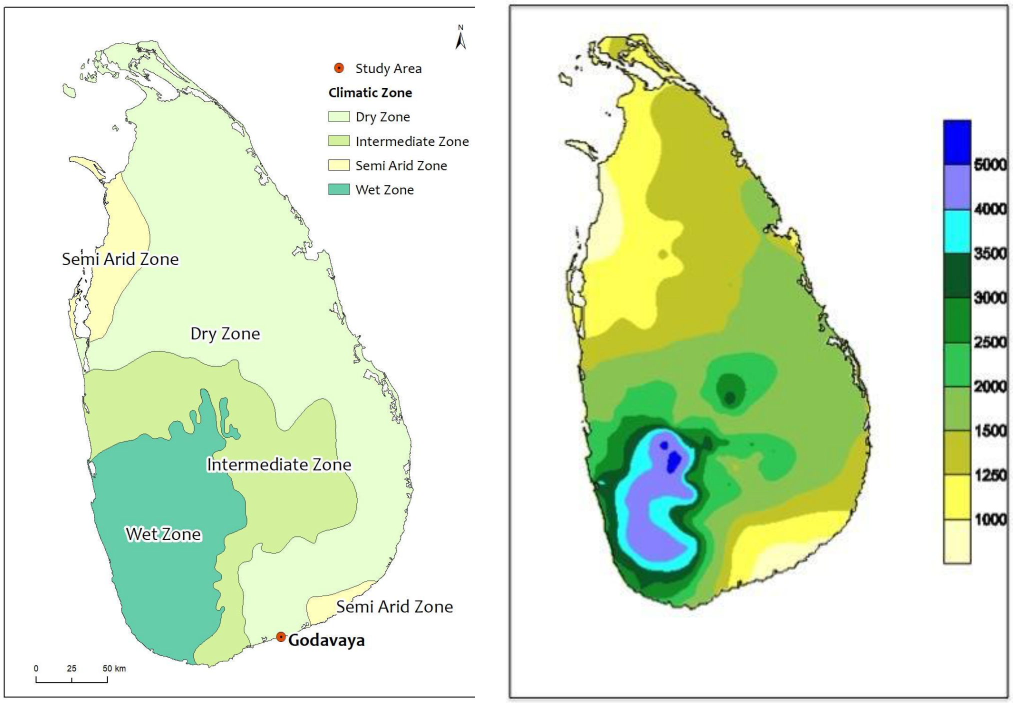

Figure 8. (Left) Climatic Zones of Sri Lanka. Godavaya is located in the Dry Zone and (Right) Annual Rainfall Pattern. Key values depicted in millimeters (Courtesy of Department of Meteorology, Sri Lanka, http://www.meteo.gov.lk/).

Based on the annual rainfall pattern described above, Godavaya is situated within the Dry Zone of the island (Figure 6). Furthermore, in terms of the distribution of the climatic zones, the location of Godavaya is unique because it is situated on a coastal strip that crosscuts all four climatic zones described above, located within 50 km of the site. The closest Wet Zone boundary is located 30 km west of Godavaya, while the Semi-arid Zone is situated approximately 15km east (Figure 8). The Semi-arid Zone, particularly the coastal strip stretching from Bundala to Yala National Park, receives less than 1000mm average annual precipitation. The wet season in the SE coast stretches from October to January (Domrös, 1974), and low precipitation and high evapotranspiration rates create a desiccated environment during the dry season. The average temperature on the SE coast is 27.6 C (82°F). Dry climatic conditions and persistent winds shape the coastal landscape altering dune formations. Some salt concentrated marshes and shallow lakes in the low wetlands of the Semi-arid Zone are prone to seasonal desiccation by high winds (Katupotha, 1995, p. 1043), transforming low-lying areas into saltpans. The presence of variable climatic conditions together with diverse coastal geomorphological settings (constituting lagoonal, estuarine, and marshy landscapes) makes the SE coastal belt a unique environment with several different types of ecosystems.

Geology and Geomorphology of the Southeastern Coast

The geology of the SE coast of Sri Lanka consists of Precambrian, Miocene, and Quaternary deposits (Cooray, 1963). The Quaternary deposits mainly consist of Pleistocene basal gravel and raised beach, and highly compacted dune formations. The Holocene formations comprise estuarine and lagoonal sediment deposits, buried coral reefs, barrier beaches and dunes (Cooray, 1963, 1967, 1968, 1984; Katupotha 1988, 1995; Weerakkodi, 1988, 1992). From Tangalle to Minihagalkanda, Pleistocene basal gravel deposits rest either on crystal-line Precambrian rocks or on Miocene limestone strata (Katupotha, 1994, p. 143). In some areas the Miocene limestone formations overlay the Precambrian base (Cooray & Katupotha, 1991; Katupotha, 2016).

The Pleistocene basal gravel deposits contain coarse sand grains, chert, and pellets of limestone mixed with materials consisting of iron compounds such as limonite. These iron compounds give a reddish-brown color to this formation (Cooray, 1967; Katupotha, 1994 p. 143). It was suggested that these ferruginous basal gravel deposits have formed either by episodes of Pleistocene sea encroachment or by fluvial processes associated with sheet-flood events of an ancient river system (Cooray, 1967; Katupotha, 1994 p. 143, 2016, p. 197).

At Patirajawela (approximately 15 km east of Godavaya) the basal gravel deposits are located 15 meters above the present sea-level (Deraniyagala, 1992, 2007). Deraniyagala (1992) correlates the 25m basal gravel found in the Bundala-Levengoda and +15m at Patirajawela with the 'Eem interglacial' occurring ca. 125,000 - 75,000 years BP. The latosolic dune sands sitting on the basal gravel at Patirajawela are dated to ca. 28,000 years BP and the lower Horizon at ca. 80,000-64,000 years BP (Deraniyagala, 2007, p. 3).

According to recent observations at Patirajawela (Karunaratne *et al*., 2016), the exposed bluffs, containing mid-Holocene shell deposits, Pleistocene red dune sand, and gravel formations are subjected to heavy erosion, with deposits mixed together and re-deposited closer to the beach (Figure 9). Similar events of erosion and re-deposition seemed to have occurred during the latter stages of the late Pleistocene along the southeastern coast. The coastal bluffs containing red sands and gravel deposits buttressed by the rocky shore at Godavaya seemed to have also experienced a similar process of heavy erosion and re-deposition during the latter stages of the late Pleistocene. These re-worked gravel deposits at Godavaya contain bands of lithic debitage. As discussed above in the site description, the re-deposited sand mixed gravel layers at Godavaya hill are sitting on a rocky surface composed of large boulders. Since this reworked sand mixed gravel fills could have originated from the eroding late Pleistocene deposits such as latosolic dune formation (dated to ca. 80,000- 64,000 years BP and 28,000 years BP at Patirajawela) and the ferruginous basal gravel (ca. 125,000-75,000 years BP) found on nearby coastal bluffs, we tentatively suggest that the re-deposition process of lithic debitage embedded sandy gravels at Godavaya occurred during the latter and terminal stages of the late Pleistocene. The mid-Holocene occupational phase occurs 100-50 cm above the late Pleistocene lithic bands on the surface of the reworked sand mixed gravel deposit, indicating that the erosion and re-deposition process of the nearby basal gravel and latosolic sand deposits continued after the late Pleistocene occupation. Subsequently, during the middle to late Holocene times, the surface of the reworked gravels containing the middle Holocene cultural deposits were covered by a thick sand deposit.

Figure 9. Eroding prehistoric gravels, latosolic dune sands, and middle Holocene shell beds at Patirajawela (Photo by Priyantha Karunaratne, 2013).

From the middle to late Holocene time frame, the SE coast was subjected to several localized episodes of marine transgression and regression due to the oscillation of the sea (Katupotha, 1988; Weerakkodi, 1988, 1992). According to Weerakkodi (1992, p. 301), the former bay beaches corresponding to a middle Holocene highstand were situated at heights between one and five meters above present sea level. Katupotha (1992, 1995, 2015) suggests that three sea-level episodes occurred between 6240- and 2270-years BP. The first episode occurred between 6240-5130 years BP, with a highstand 1.5+ m above that of the present mean sea level (msl) (Katupotha, 1994, 1995). The second highstand episode occurred between ca. 4390-3930 years BP and the third occurred between ca. 3280-2270 years BP. These submergence and re-emergence events would have reshaped the morphology of the southeast coast throughout the middle and late Holocene. During times of transgression, the coastal river valleys and lowlands were flooded, creating embayments, estuaries, lagoons and tidal flats (Katupotha, 1988; Weerakkodi, 1992). These coastal embayments and marshy landscapes that were subjected to tidal actions created ideal habitats for colonies of various mollusk species**.** The accumulations of shell materials containing articulated and disarticulated bivalve species such as *Meretrix meretrix, Anadara* sp. and *Cerithidea* sp. (Harmsen, 2017, p. 231) were reworked and transported due to tidal action and settled in extended areas along the shorelines of coastal embayments and lagoon floors. During the times of regression these wavy shell ridges, formed along the rims of coastal embayments and strip beaches, created the unique shell ridge deposits that are now observed buried in many parts of the interior of the southeast coast (Katupotha, 1995; see also Harmsen 2017).

Archaeological evidence strongly supports the notion that middle Holocene hunter-gatherer-fisher (HGF) populations set up their camps on these shell ridges (Harmsen & Karunaratne, 2016) to exploit nearby aquatic resources found abundant in shallow embayments. Such ancient human occupation sites dotted along the middle to late Holocene shoreline(s) created midden deposits containing shell valves and other aquatic and terrestrial fauna, adding a cultural dimension to the already diverse geological processes along the SE coast (Katupotha & Wijayananda, 1989).

During the middle Holocene sea-level highstand(s), when the shoreline pushed up to 2-4 km inland along coastal valleys, the Godavaya hill would have been a headland of a large embayment associated with the Walawe River estuarine. Similarly, the rocky shoreline that sticks into the Indian Ocean at Henagahapugala (6° 4' 34" N, 80° 56' 7" E) would have been another prehistoric headland associated with a larger embayment that over time shrunk to form the present day Kalametiya lagoon. The large middle Holocene embayment associated with the former headland at Henagahapugala seemed to have stretched up to 4 km inland to the Mini-athiliya buried shell ridges where mid-Holocene burials were identified and excavated in 2007-2008 (Kulatilake *et al* 2018) by the Department of Archaeology, Sri Lanka. During regression phases, the coastal landscapes along the southeastern shorelines further evolved. Wind and wave actions resulted in the formation of barrier beaches and dune systems, reshaping the coastal morphology by creating lagoons, lakes, estuaries with mangrove strands, and marshy, vegetated landscapes.

Contextualizing Godavaya Cultural Phases in the Prehistoric Chronology of the Southeastern Coast

The profile walls of large gravel pits at the Godavaya hill indicate the presence of two distinct prehistoric cultural occupations. The stratigraphy suggests that these two occupations occurred possibly several millennia apart. As indicated elsewhere in this article, the first prehistoric occupation is represented by thin bands of lithic debitage and cores sandwiched between reddish-brown gravel deposits devoid of organic cultural material. The second prehistoric occupation phase is located approximately 100-50 cm above the older phase near the surface of the gravel deposit, and subsequently covered by the remnants of eroded dune-sand formations (Figures 10 and 11).

Figure 10. Profile of the large gravel pit located north of the excavation area depicting late Pleistocene gravel deposits filled around granite boulders (Photo by Priyantha Karunaratne, 2013).

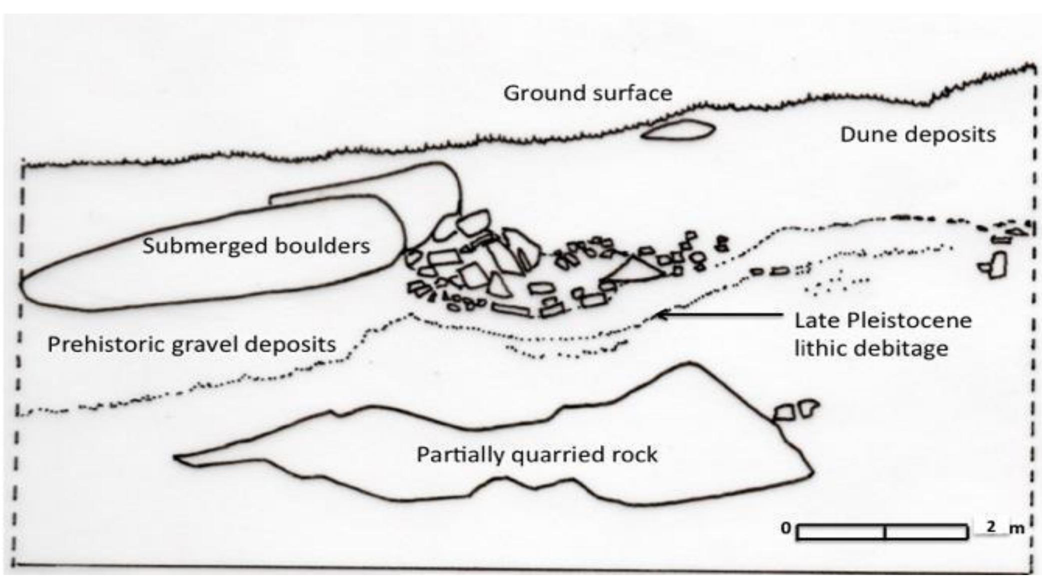

Figure 11. Section drawing of the large gravel pit shown in Figure 10

The human remains, faunal record, and lithic assemblage from the Godavaya hill represent a distinct second phase of occupation. Cultural materials from this phase suggest that the occupation was contemporaneous with the middle Holocene shell ridge habitations found along the former bay beaches in the interior. During the oscillation of the middle Holocene sea-levels, submerged coastal valleys created new habitats abundant with aquatic resources. During sea-level highstands, around 5000 years BP, a new type of human occupation associated with HGF adaptations emerged along the shoreline(s). The patchwork of campsites and activity sites distributed on natural shell ridges (Harmsen, 2017; Karunaratne *et al*., 2016; Kulatilake *et al.,* 2018; Somadeva & Ranasinghe, 2006) indicate the presence of a relatively dense hunter-gatherer-fisher occupation. The recent research on these unique types of prehistoric campsites gives important insights into the late Holocene HGF adaptive systems, resource exploitation, and cultural practices (Harmsen, 2017; Karunaratne *et al.,* 2016; Kulatilake *et al*., 2014, 2018). More importantly, a set of chronometric dates has been obtained for both the cultural deposits and the natural shell beds (Deraniyagala, 1992, pp. 701-702; Harmsen, 2017 p. 202; Katupotha, 1988 p. 305; Katupotha & Wijayananda, 1989; Kulatilake et al., 2014, p. 4; Weerakkodi, 1992).

Among the sites subjected to archaeological investigation in the recent past, Pallemalala and Mini-athiliya are noteworthy, as both of these sites contain human burials discovered as a result of local shell mining activities. The Pallemalala shell-ridge habitation yielded a cluster of burials containing seven individuals (Somadeva and Ranasinghe 2006:19). Based on ^{14}C dates (4050 ± 60 years BP and 4650 ± 70 years BP) obtained from nearby shell beds at Hungama by Katupotha (1988), Somadeva and Ranasinghe (2006) estimated that the Pallemalala site was occupied around 4500 years BP. Charcoal samples obtained from layers 2 and 3 of the midden deposit at Mini-athiliya yielded 2 dates (3610 ± 40 BP and 3680 ± 40 BP). Based on this chronology, Kulatilake *et al*. (2014, p. 4) concluded that this site was occupied around 4000 years BP. Harmsen revisited the sites at Pallemalala, Mini-athiliya, Patirajawela, and Kalametiya in 2014 during the BASP, for his doctoral research and twelve ^{14}C dates were obtained from the shell samples collected from these sites (Harmsen, 2017, p. 202). Based on these dates, Harmsen (2017, p. 221) concluded that human interference with shell deposits occurred during three broad phases: (1) ca. 5200-5000 cal. BP, (2) ca. 4100–3800 cal. BP, and (3) after ca. 3400 cal. BP.

However, the precise timing of the end of the Mesolithic (Sri Lankan microlithic) tradition along the SE coast is still uncertain. Almost all the shell ridge sites along the shoreline were from aceramic cultural horizons. Nevertheless, in many places, on the surfaces of the shell beds or in the deposits directly above the shell beds, Black and Red Ware (BRW) sherds were present, indicating the possibility of some level of cultural overlap between the Mesolithic/microlithic HGF and Early Iron Age (EIA) proto-historic techno-cultural phases. In this chronological context the archaeological record from Godavaya prehistoric habitation phase, which is associated with the flexed burial and other human remains (J. Wahl, personal communication, 2022) can be placed parallel with the middle Holocene shell ridge habitations. Given that the final occupation at

Godavaya depicts aceramic “Mesolithic” techno-cultural traits, the site was most likely occupied before 3000 years BP.

The Geomorphology of Godavaya during the Late Pleistocene Occupation

Bands of lithic debitage seen in the profile of the gravel pit at Godavaya hill, which slope towards the left bank of the Walawe River highlights the shape of the ground surface during latter stages of late Pleistocene. Although this debitage may not be from an *in situ* context and could have been scattered by natural processes, the distribution of lithic scatter depicts the contour(s) of late Pleistocene ground surface(s) linked to nearby prehistoric activity area(s). These land surfaces associated with the lithic bands were located approximately 100-50 cm below the mid-Holocene cultural phase. Based on the stratigraphy of gravel formations that sandwiched the lithic bands, we suggest that the cultural occupation associated with the lithic knapping occurred several millennia before the middle Holocene occupation, during the latter stages of the late Pleistocene. The heights of the lithic band contours suggest that during the time of the late Pleistocene ground (occupational) surface, the bases of some of the large boulders (which are now submerged by late Pleistocene gravels) were considerably exposed.

Overall, the present local topography at the Godavaya hill comprises large boulders partially submerged by natural gravel formations. This submerged rocky landscape indicates that before late Pleistocene re-deposition events, this area was once part of a heavily eroded coastal strip. Subsequently, during late Pleistocene, eroding gravels and sands from nearby high grounds seemed to have re-deposited in this area, submerging the boulder strewn, rocky ground surface. It was probably during this late Pleistocene re-deposition event that the earliest prehistoric populations occupied the site.

The Geomorphology of Godavaya during the Middle Holocene

During the middle Holocene, before late “Mesolithic” populations occupied the area, the summit of the hill had amassed a thick gravel deposit over the earlier late Pleistocene ground surfaces that were strewn with lithic debitage. However, the large boulders on the hill slope facing the ocean remained exposed. Some of these boulders consist of spacious rock shades that are large enough to shelter small groups of people from the elements. The prehistoric people who occupied Godavaya hill would have had a good view of the coastline from their hilltop camps. During the middle to late Holocene highstands, the sea level in this area seemed to have risen up to 5m above the present msl (Katupotha, 1988; Weerakkodi, 1992). There is a natural shell valve deposit (possibly deposited by tidal actions) approximately four meters above the present sea level on the left bank of the Walawe River next to the gravel road at the foot of Godavaya hill. This area was exposed during one of the test trenches excavated by the German research team (DAI) in 2008. If this shell deposit was an indication of a prehistoric highstand (contemporaneous with interior paleo-shorelines containing shell ridge habitations), it is plausible that sometime during the middle Holocene the area surrounding the Godavaya hill comprised a relatively deep rocky shoreline. During high sea level phases, much of the Walawe River delta east of Godavaya would have been submerged, creating a large embayment. The high ground fronted with rocky boulders associated with Godavaya hill was a coastal headland sticking out into the ocean between the two adjoining submerged coastal valleys/embayments to the west and east of the hill.

Previous Research at the Godavaya Hill

In 2008, Sri Lankan and German archaeologists excavated four test trenches at Godavaya hill in search of prehistoric habitation layers (S. Garusinghe, personal communication, 2014). The most significant discovery from these excavations was a human skeleton inhumed in a flexed posture at the summit of the hill. Although some of the research conducted in the Godavaya area by the Sri Lankan and German archaeologists has been published (Krause-Kyora & Weisshaar, 2008, 2010), the available data on the discovery of the flexed burial and other skeletal remains are minimal. A few findings were reported in the news media (*Lankadeepa* 2008), including photographs of the skeleton. However, the unpublished preliminary findings indicate the recovery of the remains of three individuals (including the flexed burial); two adults and one adolescent (J. Wahl, personal communication, April 20, 2022). Although limited, these communications reveal valuable information about the skeletal material and the mortuary practices associated with the burial process.

The 2014 BSAP Excavation at the Summit of the Godavaya Hill

In 2014, upon revisiting the Godavaya site, a portion of the southern part of the Godavaya hillock was tested, the area located within a narrow strip of land between two deep gravel pits. The grid prepared for the Godavaya hill comprised 10x10m squares divided into 100 (1x1m) sub-squares. It was set up based on two perpendicular baselines heading north-south (N-S) and east-west (E-W) directions. The 10x10m square north of the E-W baseline was named A, and the square south of the E-W baseline was named B. The area subjected to excavation was within sub squares A93, A94, B3, and B4 (Figure 12).

The context method (Harris, 2014) was used for the excavation, removing each natural or cultural depositional episode as a separate unit. Each deposit was given a context number. All cultural materials (special finds and bulk samples) were assigned a bag number. These two sample categories and special finds were registered in separate registers with XYZ coordinates along with the respective context numbers.

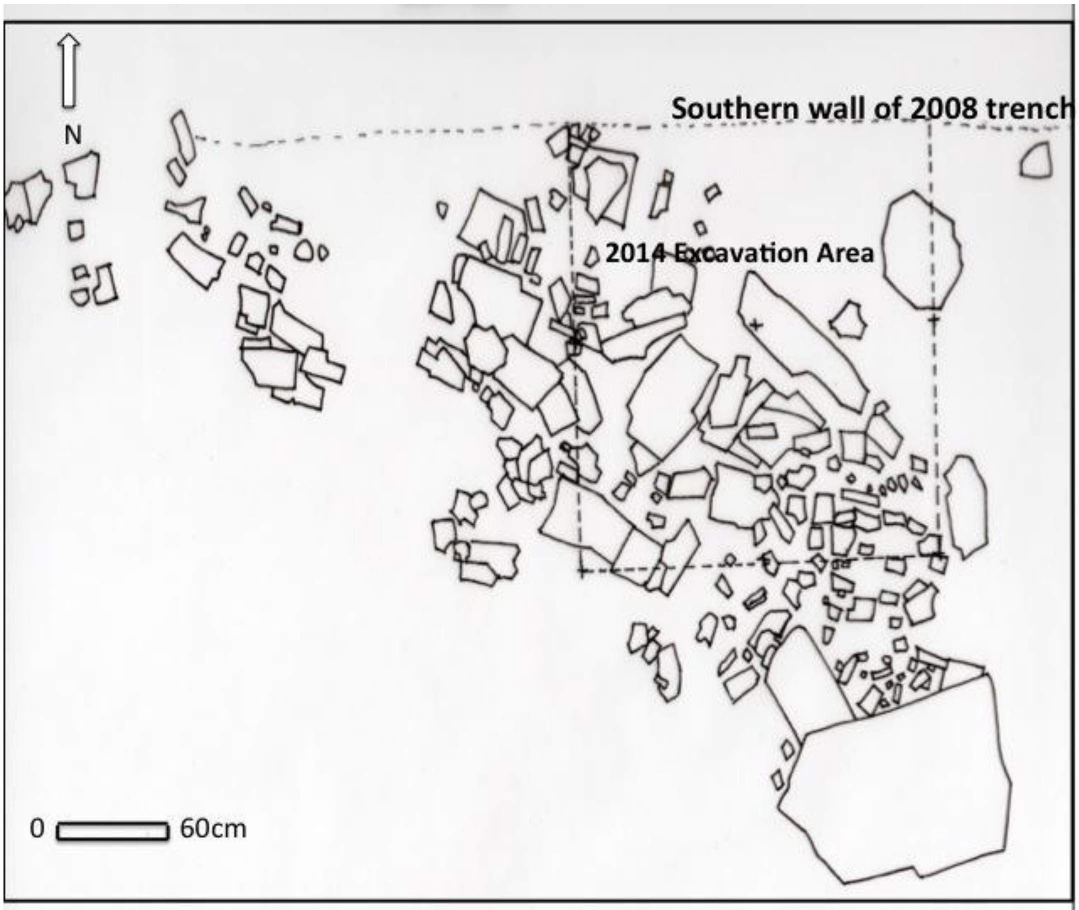

Figure 12. Surface plan showing 2014 excavation area south of the 2008 test trench.

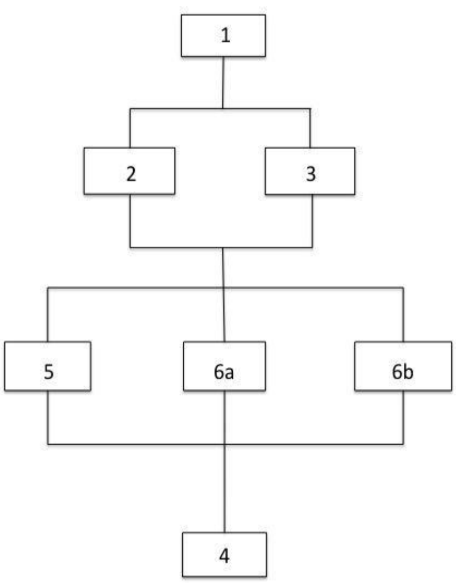

Figure 13. Context Matrix

The Context Description

The area selected for excavation contained a surface previously covered by windblown sand deposits. These dune sands had shifted due to the clearance of vegetation during the granite quarry. During the 2014 field season, remnants of the dune deposits were still visible in some areas of the profiles of the adjacent gravel pits (Figure 10). The area selected for excavation contained a cluster of granite rubble (context 3). A fine sand deposit (Context 1) was filled in the gaps between the granite rock pieces in the rubble pile. In these gaps, fragments of animal bones, fish jaws and vertebrae were found mixed with sand. The granite pile (Context 3) was a result of a prehistoric activity that occurred before the deposition of Context 1.

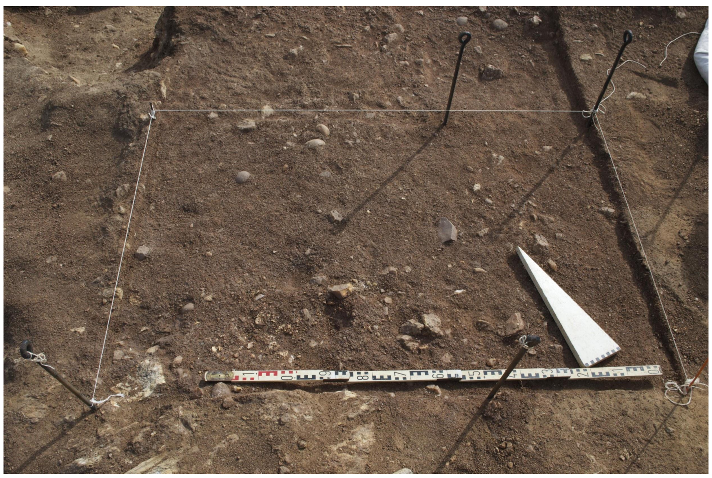

Figure 14. A middle Holocene occupational floor (context 4) containing pebbles and lithic debitage strewn on the surface (Photo by Priyantha Karunaratne, 2014).

Figure 15. Yellow ocher embedded in a fill (context 5) containing lithic fragments and cores (Photo by Priyantha Karunaratne, 2014).

A highly compacted layer containing coarse sand mixed silt (Context 2) lay below Context 1. This layer also contained a few fragments of animal bones, flakes, quartz debitage, and pebble fragments. The surface of Context 2, strewn with lithic scatter, seemed to be an occupational surface where prehistoric cultural activities took place. Context 2 and Context 3 appear to be more or less contemporaneous depositional episodes, as the piling of granite rubble likely occurred during the time when the occupational surface was in use.

A few centimeters below Context 2 and Context 3, another occupational surface associated with a lithic workshop (Context 4) was found (Figure 14). Both chert and quartz were found on the surface of Context 4 along with numerous round pebbles used as hammers (as indicated by strike marks). These pebbles appear to have been brought to the site and utilized for microlith production. Inside squares 93 and 94 (towards the northern end of the 2014 excavation) the back-fill of a pit (Context 5) was observed. Part of this fill was excavated during the 2008 field project. It is plausible that the remaining segment of the backfill (Context 5) seen on the south wall of the 2008 trench was possibly associated with the mid-Holocene burial(s). Context 5 contained a compacted gravel deposit mixed with fragile faunal remains, quartz rocks, pebbles, lithic debitage and yellow ocher (Figure 15). The profile of the southern wall of the 2008 trench indicates that this fill was inserted into a shallow pit with a curvy bottom. The upper end of the cut (although partially eroded close to the 2008 trench wall) suggests that the “burial pit” was initiated from Context 4.

Also, two post hole-like features (Context 6a and 6b) were found on the surface of Context 4. Judging by the prehistoric cut marks on the profile wall of the 2008 trench (and if this cut was in fact a part of the prehistoric burial pit excavated in 2008), it is hypothesized that the most significant cultural activity that had taken place during the deposition of Context 4 was the inhumation of the body belonging to the skeleton unearthed during the 2008 excavation. The evidence of food consumption, lithic knapping, and burial activities indicate that this open area of the summit was utilized not only for day-to-day activities but also for socio-cultural and ritualistic purposes.

The Surface Finds

The surface finds collected at this site were associated with two types of locational contexts: (1) finds associated with exposed prehistoric surfaces due to recent aeolian erosion. These surfaces consisted of patches of prehistoric lithic debitage, tools, and faunal matter, and (2) finds embedded on the "vertical" faces of the exposed profile walls of the gravel pit, which contain discernible bands of lithic debitage visible to the naked eye. The lithic waste material and tools found on the surface at Godavaya hill contained both larger flakes ranging from 5 to 8 cm in length and micro flakes. As pointed out above, the distribution of these bands of lithic debitage not only contained high densities of flake debris but also highlights the contours of buried prehistoric land surface(s). These lithic bands further indicate extensive knapping activities in the nearby habitation areas. However, the bands of lithic debitage found on the gravel profiles are not *in situ*. It seems that the natural movement of lithic waste previously accumulated in prehistoric knapping areas had subsequently dispersed on the late Pleistocene ground surface by overland flow during heavy rains. The subsequent mid-Holocene deposits found on the upper parts of the profile walls of the gravel pits were sandwiched between the surface deposits of late Pleistocene gravel formations and middle to late Holocene dunes. This mid-Holocene occupation phase contained a significant amount of faunal material comprising fish and animal bones mixed with lithic debitage comprised of flakes, pebbles, and cores.

The Lithic Assemblage

We have discussed above that the lithic assemblages were from two distinct occupational phases: (1) the occupational phase tentatively identified as belonging to latter stages of late Pleistocene represented by bands of lithic debitage, and (2) the middle Holocene period cultural phase associated with the human burial, kitchen refuse and microliths. The assemblage from the first phase contained a high frequency of larger flakes and scrapers (ranging from 5 to 8 cm in size) and cores. As highlighted above, these were collected from the bands of lithic waste embedded in the sandy gravel deposits exposed in the profile of the gravel pits. The assemblage from this earlier phase indicates flake-based reduction techniques on relatively large quartz rocks/pebbles in comparison to the pebbles that are smaller in size and flakes found from the middle to late Holocene occupational phase. Both occupational phases contained quartz of various shades, ranging from clear to opaque varieties and a small number of chert pieces. A relatively large piece of creamy-white chert was sampled from the lithic bands embedded in the late Pleistocene gravels. Two types of chert, i.e., brown color and creamy-white color pieces, were recovered from the middle Holocene occupational phase.

The material unearthed from the middle Holocene occupational phase, i.e. the assemblage from Context 1, 2, 4 and 5, contained dense concentrations of lithic waste. This area on the summit of the hill was likely used as a lithic workshop; the assemblage contained a few scrapers, bifaces, points, cores and quartz pebbles used as hammers and raw material for lithic implements. Most of the pebbles were found within Contexts 4 and 5 and mixed with other tools and lithic debitage (Figure 14). The sizes of the pebbles varied but the largest ones do not exceed the size of a tennis ball. It is plausible that these were collected from nearby riverbeds or basal gravels and brought to the workshop on the hill summit. Some of the pebbles contained percussion use-wear traces, indicating they may have been utilized as hammers. These pebbles may also have been utilized as pounding tools, as well as convenient instruments to chip lithic implements. Similar to the earlier late Pleistocene occupation phase's knapping techniques, middle Holocene populations used flake-based reduction. However, the middle Holocene assemblage differs from the late Pleistocene collection due to a higher frequency of retouched flakes, scrapers, points, and blades. A geometric microlith belonging to this phase was collected from the surface next to the excavation area during the 2014 excavation. The lithic assemblage collected from Godavaya is being analyzed within the context of larger collections from other prehistoric sites in Sri Lanka (N. Perera, personal communication, 2016).

The Faunal Material

The faunal remains collected for analysis were sampled (hand collected and screened) from three stratigraphic contexts and the eroding mid-Holocene surfaces near the excavation area. The majority of the faunal material consisted of small fragments that were burnt/charred that can be typically categorized as kitchen refuse. Both terrestrial and aquatic fauna were collected from Context 1 in the soils and dune sands filled between the gaps of the rocks in the rubble pile. A few bone point tools and small fragmented fish bones were found in Contexts 4 and 5. These fish bones were extremely fragile and disintegrated upon removal, preventing proper identification. More samples were collected from the gravel surfaces exposed by eroding sand deposits, and in thin sand patches (remnants of dune sand formations) overlying the gravel layers. Although this last category of samples was recorded as surface finds, the stratigraphic relations (as indicated by exposed profile walls of the gravel pits) suggest that these faunal materials were associated with the middle Holocene aceramic cultural context, lying below the dune sands in the upper levels of the gravel deposit.

The analysis of faunal material was conducted at the zooarchaeological laboratory of the Department of Archaeology, Sri Lanka. Identification was done by comparing samples with specimens in the reference collection repository at the Archaeological Department Laboratory, Sri Lanka. Some of the fish and shell species were identified using the fish and mollusk collection deposited in the zoology section of the National Museum of Sri Lanka and the National Aquatic Resources Research and Development Agency. Specimens were examined for taphonomic (biostratinomic and diagenetic) information such as the features depicting burn, butchery, cut, scrape, and gnaw marks. Specimens were also examined for mechanical alteration and fragmentation or comminution. Criteria for aging and sexing were simultaneously applied based on the samples in the reference collection. A total of 40 species (excluding a fragmented human bone) were identified (Tables 1-5).

The faunal record comprised of thirteen mammal, six reptile, eleven fish, nine mollusk, and one avian species, indicating the presence of relatively high faunal biomass and exploitation of a variety of habitats associated with terrestrial, marine, estuarine, and freshwater ecosystems. In analyzing the faunal data from Godavaya, special attention was given to the aquatic fauna to gain a better understanding of middle Holocene coastal adaptive strategies. Particularly, the analysis of mollusk and fish species sheds light on environmental variability, ecosystem diversity (Table 6), diet, procurement techniques, equipment, patterning of settlements, and seasonal movements within this coastal landscape.

Mammals

Despite being surrounded by marine, brackish, and freshwater bodies within a narrow peninsular landscape protruding into the Indian Ocean, the Godavaya hill during the middle Holocene contained a considerable amount of terrestrial fauna representing both mammal and reptile species. In Table 1 and Figures 16-18 the mammalian remains recovered are depicted. Among the mammalian species, water buffalo (*Bubalus bubalis*) was the largest animal consumed, while spotted deer (*Axis axis*) and wild boar (*Sus scrofa*) were also hunted. *Axis axis* seems to have been abundant in this area and hunted and consumed more frequently. Also, bone fragments of a variety of small mammals such as toque macaques (*Macaca sinica*), mouse deer (*Moschiola meminna*), palm civet (*Paradoxurus* sp.), Indian flying fox (*Pteropus giganteus*), porcupine (*Hystrix indica*), ring-tailed civet (*Viverricula indica*), black-naped hare (*Lepus nigricollis*), rat (*Ratus sp*.) and grizzled giant squirrel (*Ratufa macroura*) were present in the sample. Among small mammals, the remains of *Moschiola mimenna*, (the smallest ungulate) showed the highest representation in the sample, indicating the abundance of this particular species in this area during the middle Holocene. These mammals could have been procured using various trapping methods. Ethnographic records from central Sri Lanka (Myrdhal-Runebjer & Yasapala, 1994) suggest that these types of small mammals were hunted with stone-bows (*gal dunna*), bow and arrow, numerous types of snares and traps. Some of these methods were specifically designed to catch certain species.

Table 1. Mammals: percentages of species representation based on the number of specimens identified

Species	**Common Name**	**Habitat**	**# of specimens identified**	**Fraction**	**Cumulative Weight**	**young**	**Adult**	**% of Mammal specimens**
Pteropus giganteus.	Flying fox	Arboreal	1	39/1	0.97g	_	1	2.56%
Bubalus bubalis	Water buffalo	Terrestrial	8	39/8	42.35g	_	8	20.51%
Sus scrofa	Wild boar	Terrestrial	1	39/1	-	-	1	2.56%
Viverricula indica	Ring tailed civet	Arboreal/Terrestrial	1	39/1	-	-	1	2.56%
Paradoxurus sp.	Palm cat	Arboreal	2	39/2	4.10g	1	1	5.12%
Moschiola meminna	Mouse deer	Terrestrial	9	39/9	7.32g	2	7	23.07%
Lepus nigricollis sinhala	Black-naped hare	Terrestrial	1	39/1	1.42g	_	1	2.56%
Axis axis zeylonensis	Spotted deer	Terrestrial	12	39/12	15.95g	2	10	30.76%
Hystrix indica	Porcupine	Terrestrial	1	39/1	1.18g	_	1	2.56%
Macaca sinica	Toque macaques	Arboreal/Terrestrial	1	39/1	0.54g	1	_	2.56%
Ratufa macroura	*Grizzled giant squirrel*	Arboreal	1	39/1	1.27g	_	1	2.56%
Rattus sp.	Rat	Arboreal/Terrestrial	1	39/1	0.16g	_	1	2.56%
Total	12		39	39/39	79.59g	6	33	100%

Figure 16. (Left to Right): *Sus scrofa*, premolar; *Axis axis,* incisor; *Paradoxurus* sp., mandible with teeth.

Figure 17. (Left to Right): *Moschiola meminna*, lower 2nd molar; *Moschiola meminna*, portion of mandible with 2nd and 3rd premolar, and 1st molar; *Macaca sinica*, lower molar crown; *Viverricula indica*, fragment of mandible with premolar.

Figure 18. (Left to Right): *Bubalus bubalis*, fragmented molar (crown); *Lepus nigricollis*, complete calcaneus; *Ratufa macroura*, distal part of humerus; *Pteropus giganteus*, proximal humerus.

Aves

In Table 2 and Figures 19 the single avian bone, i.e., a fragment of a jungle fowl (*Gallus lafayetti*) identified from the sample is depicted. At present, the coastal wetlands in the SE coast comprise various aquatic habitats rich with flocks of diverse species of aquatic avifauna. Given the presence of high faunal biodiversity and diverse aquatic ecosystems that harbor a plethora of prey species (fish and mollusk) in the archaeological record at Godavaya, the existence of large flocks of waterfowl (similar to today) during the middle Holocene cannot be ruled out. However, the shortage of avian remains in the sample from Godavaya is not an unusual phenomenon. Analogous patterns have been observed at shell ridge habitations at Mini-athiliya where (among a plethora of terrestrial and aquatic fauna) the only identified avian species was *Gallus lafayetti* (Kulatilake *et al*., 2018). Similarly, in numerous analyses of faunal data collections from various prehistoric sites in Sri Lanka, the representation of avian species is less than 10% (Deraniyagala, 1992; Manamendra-Arachchi *et al*., 2009; Menike *et al*., 2009). However, it does not mean that prehistoric populations did not prefer hunting avian species relative to their dependence on terrestrial and aquatic fauna. The ethnographic record (Seligman & Seligman, 1911; Myrdhal-Runebger & Yasapala, 1994) suggests that both indigenous hunter-gatherer populations and early farmers hunted and consumed numerous types of bird species. Possibly as indicated elsewhere by Premaratne (2019), the dearth of the remains of avian species could be a result of the consumption of meat along with bones. However, it should be pointed out that among many indigenous communities in the world the consumption of certain types of flesh including avian species are tabooed (Hill & Hurtado 1989). Such taboos can impact the frequency of hunting and the procurement of certain types of fauna. For example, the Onge of Little Andaman Island (a HGF community), do not eat birds, lizards, and snakes due to a belief that these animals harbor the spirits of dead people (Singh, 2015). Therefore, the lack of avian species in the archaeological record could occur due to varying cultural reasons such as taboos and ideological beliefs.

Table 2. Avian percentages of species representation based on the number of specimens identified

Species	Common Name	Habitat	# of specimens identified	Fraction	Cumulative weight	young	Adult	Percentage of Avian specimens
Gallus lafayettii	Jungle Fowl	terrestrial	1	1/1	0.51g	_	1	100%

Figure 19. *Gallus* sp., metatarsus – distal extremity of the tarsometatarsus.

Reptiles

The remains of various reptile species including a few fragmented carapaces of sea turtle were present in the sample (Table 3 and Figures 20-21). The elevated location of the prehistoric habitation site on a hill overlooking the Godavaya shoreline must have been advantageous for the inhabitants to monitor beaches and scout for prey. The sea turtles would have been hunted easily when they came ashore for nesting. Before the 2001 Tsunami, the highest number of leatherback (*Dermochelys coriacea*) nesting sites in Sri Lanka was recorded from the Godavaya shoreline (Ekanayake *et al*., 2002). According to regionally comparative ethnographic records, sea turtle meat was a highly valued food source for the HGF populations in the Andaman Islands. These populations hunted turtles with harpoons in inner reef areas on canoes (Portman, 1899, p. 580). In addition to sea turtle species, freshwater turtle species such as hard-shelled pond terrapin (*Melanochelys trijuga*) and flap-shelled terrapin (*Lissemys punctata*) were also present in the Godavaya sample. Particularly, one-third of all the reptile specimens identified in the sample were Indian flapshell turtles (*Lissemys punctata*). Both freshwater species live in shallow slow-moving water bodies, swamps, and ponds. Flapshell turtles can be easily collected from drying ponds during the summer months. Among other reptile species, *Varanus bengalensis*, *Python molurus* and unidentified snake species were also represented in the sample.

Table 3. Reptiles: percentages of species representation based on the number of specimens identified

Species	**Common Name**	**Habitat**	**# of specimens identified**	**Fraction**	**Cumulative weight**	**Young**	**Adult**	**Percentage of reptile specimens**
Serpentes sp.	Snake sp.	Terrestrial	5	33/5	4.25g	_	5	15.15%
Python molurus	Asian Rock Python	Terrestrial/ arboreal	7	33/7	9.33g	3	4	21.21%
Varanus Bengalensis	Monitor - Land	Terrestrial	5	33/5	2.33g	5	_	15.15%
Melanochelys trijuga	Terrapin - Hard Shelled	Freshwater	4	33/4	2.27g	1	3	12.12%
Lissemys punctata	Terrapin - Soft Shelled	Freshwater	12	33/12	4.64g	12	_	36.36%
Sea turtle sp.	Sea Turtle	Marine	2	33/2	6.27g	_	2	6.06%
Total	6		33		29.09g	21	14	100%

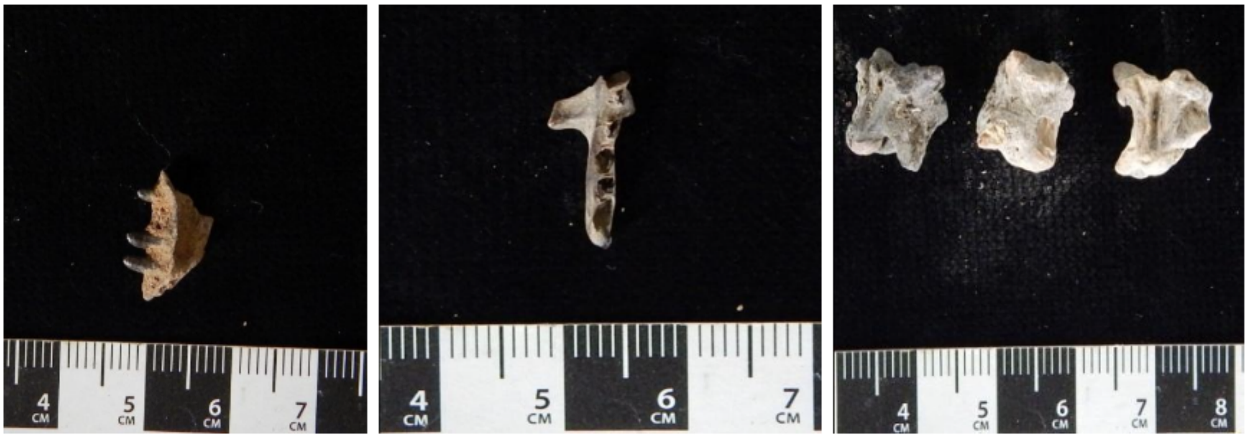

Figure 20. (Left to Right): *Varanus bengalensis*, fragment of dentary with teeth; *Python molurus*, pterygoid without teeth; *Serpentis* sp., vertebrae.

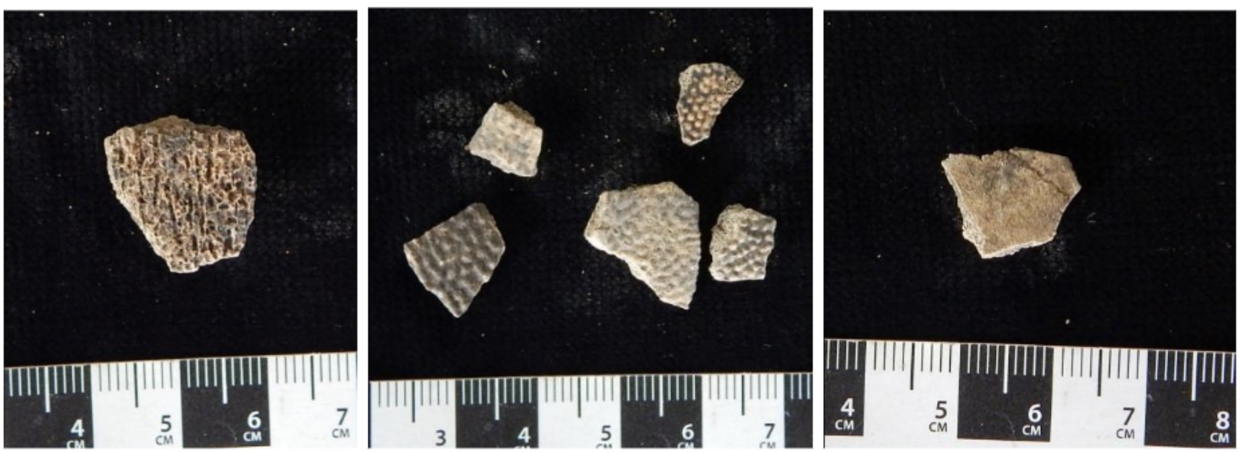

Figure 21. (Left to Right): Sea turtle sp., carapace or plastron; *Lissemys punctata*, carapace and plastron fragments; *Melanochelys trijuga*, carapace or plastron fragment.

Mollusks

Nine mollusk species were identified from the sample, depicted in Table 4 and Figures 22-24. One was an arboreal species (*Acavus* sp.) and eight species, namely *Pila globosa, Paludomus* sp., *Melanoides* sp., *Meretrix casta*, *Cerithidea cingulata*, *Trochus radiates, Thais bufo, and Neverita* sp., were from aquatic habitats (i.e., fresh, brackish, and saltwater ecosystems). Out of the eight aquatic mollusk species, *Pila globosa* and *Paludomus* species are found exclusively in freshwater bodies (Amarasinghe & Krishnarajah, 2009). A third freshwater variety, the *Melanoides* species, usually found in streams, lakes and swap habitats (e.g., *Melanoides tuberculata*), can also be found occasionally in marine environments and brackish habitats such as estuaries and mangrove swamps (Roessler *et al*., 1977; Wingard *et al*., 2007; Barroso & Matthews-Cascon, 2009). While these tiny gastropods may not have been collected as a food source, they may have been brought to the site along with other resources collected from nearby habitats where these types of snails were abundant. The other two varieties (*Pila globosa*, and *Paludomus* sp.) could also have been brought to the site for consumption. *Pila globosa* is one of the largest freshwater snails native to Sri Lanka and found in slow-moving waterways and stagnant ponds, pools, marshes, and lakes (Gimhani *et al*., 2017). Unlike *Pila globosa*, most *Paludomus* species in Sri Lanka (except *Paludomus palustris* that inhabit stagnant waters in the north-central province) are found in slow to fast-moving streams and rivers (Starmühlner, 1974, 1984). Out of the twelve *Paludomus* species that occur on the Island, ten species are endemic (de Silva, 1994). Several *Paludomus* species inhabit the streams of the Sabaragamuwa province, the same province where some of the streams and tributaries of the Walawe River are located. Populations of *Paludomus* species could have been absent in the vicinity during the middle Holocene as they tend to inhabit slow to fast-moving streams in hilly terrains. Therefore, it is plausible that this species washed down-river during the monsoon floods from their habitat, originating a few dozen miles upstream.

The bivalve clam *Meretrix casta* in the family *Veneridae* is the commonest of the mollusk species utilized for consumption at Godavaya. Out of all identified mollusk species in the sample, 65% were shell valves of *Meretrix casta.* These mollusks that rely on phytoplankton and decomposing organic matter for nutrition are usually found in subtidal zones in estuaries and slow-moving brackish water bodies on the sand at a depth range of 0 - 6 m (Rao, 1988; Seshappa, 1967). Thirty-six shell valves collected from a 2x2 m area indicate the high value of this species to the prehistoric inhabitants as a food source, in comparison to the other shell species. However, in comparison to the large numbers of shell remains found in the deposits of interior shell ridge habitations that had direct access to tidal flats, the consumption of bivalve shell species at Godavaya seems to be extremely limited.

Another mollusk species present in the sample was *Cerithidea cingulata* that lives in brackish muddy substrates of mangrove forests or sheltered and shallow high-salt content ponds. These mollusks are usually found clustered in large numbers and occupy upper-bottom layers of almost liquefied mud. Similar to the *Melanoides* species, this minute gastropod has a slender conical shaped shell and may have been collected with other resources, such as salt that occurs in natural saltpans.

A single complete shell of a red stripe trochus snail (*Trochus radiates*) was present in the sample. This edible conical-shaped gastropod relies on detritus and algae for nutrition and inhabits marine environments such as intertidal rock boulders and mangroves (Ray, 1948). Another edible marine gastropod present in the collection was toad purpura (*Thais bufo*). This species inhabits rocks and dead corals and preys upon oysters and barnacles (Poutiers, 1988) and can be gathered at low tide. A complete shell of a moon snail (*Neverita* sp.) was also identified in the sample. Similar to *Thais bufo*, moon snails are also a predatory species found at varying depths below sea level (from zero to several dozen meters) depending on the species. Some species such as *Neverita duplicata* are found on sandy substrates near the intertidal zones below the low tide level (Welch, 2010) where they can be gathered at low tide.

Despite the presence of a variety of mollusk species in the kitchen refuse, the quantities of shellfish consumed at the Godavaya hill in comparison to the middens at the shell ridge habitations on interior bay beaches were limited. The percentage of shell refuse found at the Godavaya hill was a small fraction of the total faunal sample collection, highlighting the limitations of access to shell colonies in shallow areas and mangrove strands closer to the interior bay beaches and estuaries where shell ridge campsites were located. However, the variety of species present in the sample indicates relatively easy access to diverse ecosystems around the Godavaya hill and the population's ability to reach and exploit these species from various aquatic habitats.

Table 4. Mollusks: percentages of species representation based on the number of specimens identified

Species	**Common Name**	**Habitat**	**#of specimens identified**	**Fraction**	**Cumulative weight**	**young**	**Adult**	**Percentage of mollusk specimens**
Acavus sp.	Tree snail	Arboreal	3	55/3	1.98g	_	3	5.45%
Cerithidea cingulata	Mudflat Shell	Brackish mangrove & saltwater ponds	4	55/4	_	_	4	7.27%
Neverita sp.	Moon Shell	Inshore	1	55/1	3.18g	_	1	1.81%
Thais bufo	Murex Shell	Inshore	1	55/1	5.18g	_	1	1.81%
Melanoides		Fresh water	2	55/2	0.17g	_	2	3.63%
Pila globosa	Apple Snail	Fresh water	1	55/1	1.42g	_	1	1.81%
Paludomus sp.	Bella	Fresh water	6	55/6	1.12g	_	6	10.90%
Trochus radiatus	radiate top shell	inshore and estuarine	1	55/1	2.18g	_	1	1.81%
Meretrix casta	Backwater Clam	Sub-tidal zone Estuarine/brackish	36	55/36	16.25g	9	27	65.75%
Total	9		55	_	31.48g	9	46	_

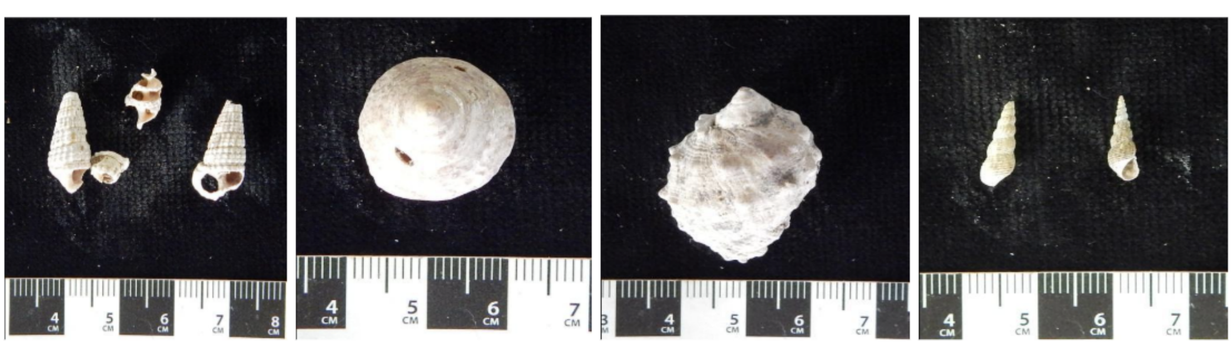

Figure 22. (Left to Right): *Cerithidea cingulata*, body whorl; *Trochus radiatus*; *Thais bufo*; *Melanoides* sp.

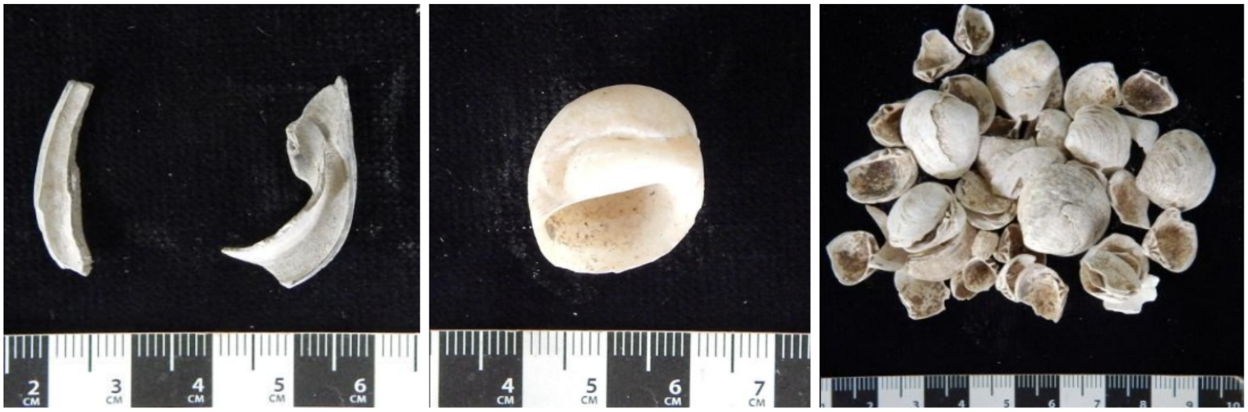

Figure 23. (Left to Right): *Acavus* sp., fragments of body whorls; *Neverita* sp.; *Meretrix casta*.

Figure 24. (Left) *Pila globosa*, fragment of a body whorl; (Right) *Paludomus* sp., fragments of body whorls.

Fish species and aquatic habitats exploited

Fish are an excellent gauge of the biodiversity of aquatic ecosystems due to the vast variety of species found in a wide array of environmental settings (Moyle & Leidy, 1992). Numerous fish species from various aquatic habitats such as riverine, lagoonal, estuarine, and inshore or near-shore and offshore areas were present in the Godavaya sample (Table 5 and Figures 25-26), highlighting the diversity in the local aquatic ecosystems exploited by early HGF groups. This, in turn, sheds light on the ability of the Godavaya population to reach and exploit resources across a spectrum of different habitats, which would have required specialized knowledge, skills, techniques, and equipment for successful procurement. Similarly, the presence of numerous offshore fish species in the collection indicates that the Godavaya population had access to open sea habitats (Karunaratne *et al*., 2016). However, further research into seasonal movement and migration patterns of different fish species, habitat variability and change through different growth stages indicates that some of the offshore/deep sea species can be found in inshore sublittoral areas. Furthermore, nearshore habitats such as estuaries and lagoons, coral reefs, mangroves, seagrass beds, and salt marshes (offshore and inshore sub-littoral zone) are used by many species of fish, crustaceans, and mollusks as breeding and/or nursery grounds. Thus, the presence of offshore species in the faunal record alone cannot be considered as solid evidence for deep-sea fishing. It should be noted however, that almost all the fish species that sometimes inhabit offshore habitats identified from the Godavaya sample such as shark sp., jack (*Carnax* sp.), cutlass (*Trichiurida*e sp.) and emperor (*Lethrinus* sp.) are also found in inshore sub-littoral zone and estuarine environments at different seasons or at different stages of growth. For example, juveniles of *Lethrinus* sp. and *Carnax* sp. recruit to estuarine nursery habitats before they move into rocky reefs and seagrass beds. Another species that can be found in multiple habitats in the sample was barracuda (*Sphyraena* sp.), which is primarily a marine fish. However, a few varieties of this fish species are found in brackish water at times and inhabit mangroves, bays and turbid inner lagoons. They can also be found in near-shore seagrass beds and coral reefs looking for schools of prey such as jacks (*Carnax* sp.), groupers (*Epinephelinae* sp.) and snappers (*Lutjanidae* sp.).

Data from midden deposits on shell ridge habitation along the mid-Holocene shorelines at Pallemalala and Mini-athiliya some 2-4 km within the interior, indicate that these HGF populations had access to deep-sea fish species. Somadeva and Ranasinghe (2006, p. 22) report the presence of mackerel (*Euthynnus affinis*) and skipjack tuna (*Katsuwonus pelamis*) remains in the Pallemalala midden deposits on the shell ridges 2 km interior from the present shoreline. However, although these two species can generally be found in the open ocean, they sometimes enter inshore continental shelf areas in multi-species schools (Ahmed *et al*., 2014). Thus, these fish species could have been caught with hooks and lines while paddling in small canoes/rafts in the inshore sublittoral habitats. It is also possible that offshore species entered the middle Holocene embayments looking for prey species, particularly near estuaries where nurseries are abundant.

Among all marine fish species, the emperor fish (*Lethrinus* sp.) was likely the most abundant in the inshore reef habitats around the Godavaya hill during the middle Holocene. Out of all the fish species identified in the sample, one-third comprised *Lethrinus* sp. remains. Out of this one third, over 80% of the *Lethrinus* sp. found in the sample were young fish, indicating the presence of large schools along nearby reefs (Tables 5 and 6). *Lethrinus* sp. is a non-migratory fish species found in both inshore and offshore environments. Usually, *Lethrinus* sp. can be found on sandy bottoms near coral and rocky reefs. Juveniles of this species can be found in large schools.

Similar to *Lethrinus* sp., *Caranx* sp. (which belong to the jack family) inhabit multiple aquatic habitats, including both inshore and offshore regions. They are also present in estuaries, bay areas and reefs. A complete maxilla of a parrotfish (*Scaridae* sp.) in the sample was another indication that middle Holocene HGF groups frequented inshore reef habitats for fishing. Although parrotfish usually inhabit offshore reef habitats, they can also be found in sublittoral rocky habitats and seagrass beds.

Also found in the sample were groupers (*Epinephelinae* sp.), usually found in inshore marine ecosystems containing irregular rocky bottoms and reefs. Another interesting fish species identified was the Barramundi (*Lates calcarifer*), a catadromous fish, which can live in both freshwater and saltwater. Barramundi fish in Sri Lanka can grow up to 5 kg and live in coastal waters that include river mouths. These fish are also known to move into estuaries for breeding.

Table 5. Fish: percentages of species representation based on the number of specimens identified

Species	Common Name	Habitat	# of specimens identified	Fraction	Cumulative weight	Young	Adult	Percentage of Fish specimens
	Shark	Offshore/inshore /some sp. estuarine	3	33/3	1.78g	_	3	9.09%
Caranx sp.	Trevally	Coral, sandstone, and rock reef offshore/inshore/ estuarine	5	33/5	3.45g	2	3	15.15%
Lethrinus sp.	Emperor	Inshore: corals, sand stones, sandy areas near reefs & sea-grass meadows, juveniles of some sp. in estuarine	11	33/11	4.21g	9 (81%)	2 (19%)	33.33%
Epinephelinae sp.	Rock-cod Grouper	Coral sandstone and rocky reef: inshore and offshore	1	33/1	0.8g	_	1	3.03%
Sphyraena jello	Barracuda	Offshore, inshore & estuarine (salt, brackish)	2	33/2	1.39g	_	2	6.06%
Lates calcarifer	Barramundi	riverine/estuarine/ marine (Fresh, brackish, & salt)	1	33/1	1.12g	_	1	3.03%
Scaridae sp.	Parrot fish	Coral rubble areas, seagrass beds and inshore rock reefs	1	33/1	1.20g	_	1	3.03%
Mystus gulio	Long whiskered catfish	Estuarine and riverine: demersal (brackish & Fresh)	1	33/1	0.17g	_	1	3.03%
Trichiurus sp.	Belt fish	Inshore/offshore Benthopelagic	2	33/2	0.10g	_	2	6.06%
Arius sp.	Sea catfish	Inshore and estuarine (Salt & brackish)	4	33/4	2.09g	1	3	12.12%
Tor khudree	Mahseer	Fast moving rivers, streams & lakes	3	33/3	1.24g	1	1	9.09%
Total	11		33	_	17.55g	13	20	100%

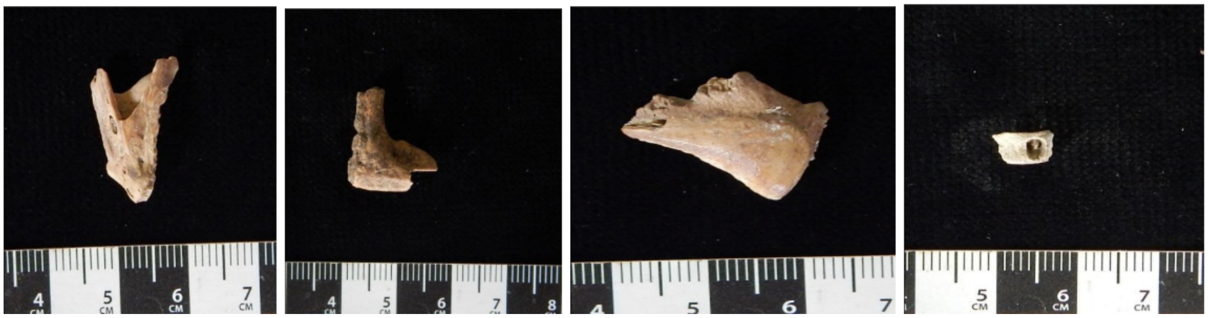

Figure 25. (Left to Right): Tor khudree, fragment of pharyngeal tooth; Trichiuridae, two complete canine-like teeth; Sphyraena jello, canine-like dentary; Lates calcarifer, anterior portion of premaxilla.

Figure 26. (Left) Mystus sp., pectoral fin spines; (Right) Grouper sp., Premaxilla – anterior part of the maxillary diaphysis (posterior portion is missing).

Among the few freshwater fish in the sample, a significant find were three pharyngeal teeth of a carp-family fish, locally known as *Lehella* (*Tor khudree*). This species does not live in estuarine environments. However, if habitat conditions are right, this freshwater species can grow up to a meter in length. In rivers in the Indian peninsula *Tor khudree* weighing about 45 kg have been recorded (Menon, 1999). The *Tor khudree* prefer fast-flowing, rocky rivers, but can also be found in main rivers and lakes and can move to the upper reaches of small streams to spawn (Raghavan, 2011). According to the ethnographic record, *Tor khudree* fish weighing up to 10-20 kg were caught by shocking them with toxic plant material such as *Derris uliginosa*, locally known as *kalawel* (Deraniyagala, 1952). The method of fishing by contaminating water with toxic plants is a practice still observed today in Sri Lanka (Epa *et al*., 2016, p. 1130). This method is used frequently during the dry season when fish congregate in waterholes in drying riverbeds (Welianga, 2010). In addition to the use of toxic plants, large species such as *Tor khudree* would have been speared/harpooned when they came to shallow areas near riverbanks, while other small to medium-sized fish species found in the sample such as catfish (*Mystus gulio*) could have been caught using fish traps, baskets, hooks, and nets. Thirty-six unidentified fish vertebrae, ranging from 5 mm to 2 cm in diameter, were among the sample collection.

Disarticulated and Commingled Human Bones: Post-mortem Deformation or Mortuary Rituals?

A small fragment of a human anterior mandible (Figure 27) was present in the faunal sample collection of 2014. It represents only a portion of a mental protuberance and incisive fossa buccal root of a middle-aged individual. The fact that the bone was burned, fragmented and found among kitchen refuse raises the questions whether it was due to cannibalism/ritualistic cannibalism or taphonomic processes and commingling due to later disturbance to the site or whether it reflects mortuary ritual behaviors that involve disarticulation and reburial (Bello et al., 2016). We contend however, that more evidence is needed to reach conclusions because burnt human bone fragments can reach the archaeological record through several means. Certain HGF tribes in Andaman Islands are known to possess mortuary behaviors that can be ethnographically analogous to mortuary rituals reflected in the archaeological record of past HGF people. These Andaman Island groups were known to dismember the bodies of slain enemies or strangers and burn them on a fire to avoid any negative impact from the dead on the community (Brown, 1922, p. 110). While such activities do not involve cannibalism, they can produce an archaeological record that could be mistakenly interpreted as the cooking and consumption of human flesh. It has been noted based on skeletal and molecular evidence however, that early human populations may have widely practiced cannibalism (Stoneking, 2003).

Figure 27. fragment of human anterior mandible

Furthermore, the mortuary record of the SE coast HGF populations in Sri Lanka indicates differential mortuary treatments and utility of skeletal material for other ritual purposes. During the 2008 excavation at Godavaya hill, in addition to the discovery of a complete skeleton in flexed posture, the remains of two other individuals (an adult and an adolescent) were recovered (Wahl, Pers. Comm, 2022). Katupotha (1995, pp. 1052-1054) reports the finding of disarticulated human remains together with stone implements and animal bones embedded in shell layers tested at Hatagala (Hungama). Somadeva and Ranasinghe (2006) report the presence of the remains of 14 different individuals (seven individuals unearthed during a rescue operation in addition to the remains of seven individuals dug up by local shell miners) at Pallemalala. Among the skeletons unearthed at Pallemalala during the rescue operation, some were complete skeletons in flexed posture, while others lacked certain skeletal parts. A similar pattern was observed at Mini-athiliya where a complete skeleton was recovered along with the commingled remains of five other individuals (Kulatilake *et al*., 2014, 2018). Although some of the disarticulation of human remains (e.g., Mini-athiliya) was due to recent shell mining activities (Kulatilake et al., 2018), the skeletons unearthed at Pallemalala midden burials (Somadeva & Ranasinghe, 2006, pp. 19-22) indicate that certain skeletal parts (e.g., skulls) have been removed from burials during prehistoric times. Thus, the presence of disarticulated human remains at prehistoric campsites along the southeast coast suggests that skeletal materials of the dead were exhumed and kept, manipulated and possibly transported to other locations for ritualistic purposes.

Ethnographic comparisons can also be drawn from certain Andaman Island tribes where bones of individuals are exhumed at the end of the mourning period (Deraniyagala, 1992, 2007). These tribes kept exhumed skulls and jawbones as mementos (Man, 1883, p. 86) and sometimes were worn around the neck (Brown, 1922, p.112), while bone remains of children were utilized to make necklaces (Man, 1885). Furthermore, in the Andaman Islands, the dead were buried in communal huts (Brown, 1922) and subsequently the remains were mixed with other discarded material. These ethnographic data suggest that a midden in an HGF encampment was much more than piles of discarded refuse. According to Cooper (1997, p. 227), for the Andaman Islanders a midden was a repository of the remains of ancestors. Such ethnographic records from similar HGF adaptive systems provide important insights into how disarticulated human remains of multiple individuals could end up in the archaeological record of the middle Holocene HGF groups along the southeast coast of Sri Lanka.

The Significance of the Presence of *Acavus* sp. at Godavaya

The presence of three small body whorl fragments of *Acavus* sp. shells at Godavaya in the Dry Zone are highly significant, as these air-breathing arboreal gastropods are strictly a Wet Zone adapted species. In Sri Lanka, three species of genus *Acavus*, i.e., *A. haemastoma, A. superbus* and *A. phoenix* and two other subspecies, *A. phoenix phoenix* and *A. phoenix castaneus* have been identified (Hausdorf & Perera, 2000, pp. 217-218). The earlier records of the *Acavus* sp. habitat distribution on the island are found in the works of Linnaeus (1758) and Pfeiffer (1850). According to Linnaeus (1758), *A. haemastoma* was present in the lower basin of the Nilwala River, south of Matara, approximately 55 km west of the Godavaya prehistoric habitation. Pfeiffer's (1850) map, which depicts the distribution of *A. superbus,* indicates that this species was present somewhere in the vicinity of Puhulwella (about 8-10 miles north of the Talalla coast), approximately 25 km west of Godavaya. Today *A. haemastoma*, particularly the 'red-lip form' dominates the southwestern region of the Island, its range extending from Galle to Matara (Hausdorf & Perera 2000, p. 221). The restriction in the distribution of the *Acavus* sp. to the Wet Zone indicates a strict adaptation to more moist climatic conditions. However, today Godavaya is located within the Dry Zone of the Island in an area that receives 1250-1000 mm annual precipitation, which is approximately 50% less than the average rainfall of the Wet Zone habitat, where the *A. haemastoma* population is found. This raises the question of whether the climate in the southwestern region during the middle Holocene was more humid, in contrast to the present day dry climate. Alternatively, prehistoric populations could have traveled to the interior Wet Zone areas to obtain resources (Kulatilake *et al*., 2018, p. 70). If territorial boundaries were strictly established between middle Holocene bands, then a third possible scenario could be that there were exchange systems between the interior Wet Zone and coastal Dry Zone populations.

According to Kulatilake *et al.* (2018), the three main *Acavus* sp. found in Sri Lanka, *A. haemastoma, A. superbus,* and *A. phoenix,* were present in the Mini-athiliya assemblage. What is significant about the presence of *Acavus* sp. at Mini-athiliya is the utility of the shells of this species in the manufacture of fishhooks (Perera, 2016). According to Perera (2016), middle Holocene middens dated to 4600 years BP yielded six fishhooks. Out of these, four were made out of *Acavus* shells (three from *A. haemastoma* and one from *A. superbus*). Perera (2016, p. 161) suggests that smaller sized shells of *A. haemastoma* were desirable and specifically selected to make fishhooks. At Mini-athiliya, in an environment where many marine and estuarine shells are readily available, the preference for shells of a Wet Zone tree snail species as a raw material may be an indication of the superior performance of fishhooks manufactured with *Acavus* sp. shells. The curved shape of the *Acavus* shell lip may also have been an important factor in selecting these types of shells as the shape of the shell lip may have helped to achieve the desired form of the fishhook. Thus, properties such as relative hardness, desired shape and ease to stylistically fashion the fishhooks would have been key factors in choosing *Acavus* sp. shells over other locally available mollusk shells for fishhooks.

In comparison to the higher quantities of *Acavus* shells found in the interior prehistoric habitation sites, where this arboreal gastropods were an important food source, at sites such as Aligala (Karunaratne & Adikari 1994), Pothana (Adikari, 1994), Kitulgala Beli Lena, Batadomba Lena (Deraniyagala, 1992), Fa Hien Lena, and Bellan-bandi Palassa (Perera, 2010), the presence of this shell species in the assemblages at Godavaya and Mini-athiliya are minimal. At Godavaya only three fragments of *Acavus* sp. shells were present, suggesting that this snail species was not readily available in the immediate vicinity. This gives credence to the assumption that local climatic conditions during the middle Holocene occupation in the Godavaya area were dry, and more or less comparable to the present climate.

Referring to accounts from the colonial era on *Acavu*s populations (Linnaeus, 1758; Pfieffer, 1850), if the climatic conditions were similar to the present day, middle Holocene populations along the southeast coast could have reached *Acavus* habitats within a day of travel. If traveling west from Mini-athiliya, the distance to the nearest recorded population in the vicinity of Puhulwella would have been approximately 25 km. Therefore, the presence of relatively fewer shells at Godavaya and Mini-athiliya could be an indication of restriction of access across tribal territorial boundaries, rather than the distance to the *Acavus* habitats in the Wet Zone.

Among HGF coastal populations in the Andaman Islands, tribal boundaries are strictly enforced by violence (Man, 1983) and territorial boundaries between two tribes sometimes do not exceed 10 miles (Brown, 1922). Although it is difficult to infer middle Holocene groups' territorial boundaries through the archaeological record, the existence of prehistoric interactions, trade and exchange networks between coastal and interior groups cannot be ruled out. The presence of a shark tooth at Bellan-bandi Palassa (Perera, 2010) and bivalve shells such as *Meretrix casta* and *Gafrarium tumidum* along with small marine shells and remains of green crab claws at Kuragala (Perera, 2016, p. 166) strongly suggests the flow of coastal resources to interior habitation sites along with other materials such as salt and chert found in the coastal regions. The *Acavus* shells could be one such interior trade item (Deraniyagala, 1992) exchanged between the coastal and interior populations.

Table 6. Distribution of species across Habitats
FW=Fresh Water; BW=Brackish Water; IS=Inshore; OS=Offshore

Habitat	Fish	Mollusk	Avian	Mammal	Reptile	Total
FW only *Riverine/lakes/ponds	1	2			2	5
BW only *Estuarine		2				2
FW and BW	1					1
IS only	1	3				4
OS only						0
IS and OS	2				1	3
IS and estuarine BW	2					2
IS/OS/estuarine	3					3
IS (salt) /BW/FW	1	1				2
Terrestrial			1	8	2	11
Arboreal		1		2		3
Terrestrial and Arboreal				2	1	3
Total	11	9	1	12	6	39

Figure 28. Unidentified faunal remains

Synthesis

There were multiple objectives for the BSAP research at Godavaya during the 2014 field season. One of the key goals was to excavate beyond the south wall of the 2008 test-trench to identify if more middle Holocene human burials/skeletal remains were left undiscovered. If such data were to be found, the objective was to utilize them to study mortuary behaviors and bio-archaeological aspects of the middle Holocene HGF populations. The second goal was to analyze the lithic data and faunal remains collected from the kitchen refuse to understand the diversity of middle Holocene coastal adaptations. The third objective was to understand the geological process associated with site formation, contextualizing prehistoric cultural phases through studying the stratigraphy of the profile walls of the gravel pits. Below we offer our synthesis focusing on this third objective summarizing the geologic process that shaped the topography associated with the two prehistoric occupational phases (discussed above) in their respective geo-stratigraphic contexts.

The stratigraphy observed on the profile walls of the gravel pits indicates that the terrain at Godavaya was subjected to heavy erosion during the latter part of the late Pleistocene, leading to a significant transformation in the geomorphology of the area. The cultural material embedded in the re-worked gravel formations indicates that two distinct occupational phases existed many millennia apart. The sources of the reworked sand mixed gravels that contained the bands of lithic debitage could be basal Ferruginous gravel beds (ca. 125,000 years BP and 80,000 years BP) and the red color aeolian deposits (dated at 64,300 - 74,200 cal. years BP). Therefore, the bands of lithic debitage embedded in these reworked gravel layers possibly belonged to a human occupation that existed during the latter part of the late Pleistocene, which postdates Ferruginous gravel beds and red color aeolian deposits. The lithic debitage found from this late Pleistocene occupation phase contained relatively larger flakes in comparison to microliths, such as scrapers, bifaces, and flakes found from the middle to the late Holocene occupational phase.

Due to sea-level fluctuations during the middle to late Holocene, the topography surrounding the Godavaya hill transformed significantly. During sea-level highstands, the ocean encroached through the shallow valleys to the west and to the east of the hill creating a rocky headland. The embayment to the west of Godavaya hill was associated with the Walawe River estuarine environment. The oceanfront and this embayment along with the Walawe River estuarine locales seem to have been composed of diverse aquatic habitats rich with aquatic resources. The location of the Godavaya prehistoric encampment, on the narrow headland, was perhaps advantageous to gain access to several nearby coastal ecosystems. The fully articulated human skeleton in a flexed posture and disarticulated skeletal remains from a few other individuals indicate that the residential community of this area revisited the site regularly and may have performed various rituals, with some such performances requiring the utility of human remains as ritual paraphernalia. Additionally, the presence of disarticulated human bone fragments belonging to multiple individuals may suggest a differential mortuary treatment such as inhumation, exhumation, fragmentation and burning.

The presence of yellow ocher (in Context 5) in association with one of the two mid-Holocene occupation phases (i.e., Context 4) highlights the fact that the population at Godavaya used ocher based paint for decorations. Kennedy (2000, p. 183) and Deraniyagala (2007, p. 57) report yellow ocher coated human vertebra (ca. 36000 years BP) from Batadomba-Lena, ocher coated teeth (ca. 7700 years BP) and red ocher coated bones (ca. 5500 years BP) from Fa-Hien cave in the southwestern region of the Island and from Ravana-ella in the central hills of Sri Lanka. Analogous behaviors are also documented by ethnographers and colonial officers among indigenous communities spanning Asia and Oceania. For example, the Ngāpuhi in the Bay of Islands in New Zealand (Ballantyne, 2018, p. 124) and Australian aborigines (Warner, 1959), and the tribes of the Andaman Islands (Brown, 1922; Man, 1983, 1932; Portman, 1899) are known to paint their bodies with intricate designs and apply color to skeletal remains for ritual purposes.

According to Man (1983), HGF communities in the Andaman Islands conducted ceremonial gatherings, communal dancing and feasting in a common area of an encampment surrounded by a few huts. These common areas were also utilized for daily household activities such as fixing hunting and fishing equipment, stitching and knitting, and for preparing and consuming daily communal meals. The two middle Holocene occupational surfaces, i.e., Context 2 and 4, and the backfill of Context 5 at Godavaya contained pebbles, pebble fragments, flakes, cores, microlithic tools, lithic debitage, bone points, and yellow ocher, indicating that the summit of the hill was a communal space where daily activities such as tool knapping, preparation and consumption of meals was common. In addition to these materials, the presence of burnt faunal remains indicates that the open area was utilized for cooking. Based on these observations, we suggest that the middle Holocene groups at Godavaya hill used the location as a semi-permanent encampment and sometimes the dead were inhumated in the common area of the encampment where communal ceremonies and daily activities were performed.

The flexed burial tradition at the Godavaya hill reflects the same mortuary practices observed at the shell ridge occupations at Mini-athiliya (Kulatilake *et al*., 2014) and Pallemalala (Somadeva & Ranasinghe 2006). Additionally, the high degree of skeletal robusticity shared among the middle Holocene people of Mini-athiliya (Kulatilake *et al*., 2014), Pallemalala (Ranaweera, 2002) and Godavaya (J. Wahl, personal communication, 2022) suggest shared biological links between these people. Extensive dental attrition observed among individuals belonging to this cultural complex (Kulatilake *et al*. 2014; J. Wahl, personal communication, 2022) suggests an abrasive diet typical of people consuming largely unprocessed food with grit from marine and estuarine environments. Nevertheless, it should be noted that unlike in the shell ridge habitations on the interior bay beaches, the cultural deposits at Godavaya headland encampment contained little evidence for intensive exploitation of mollusk species. This suggests limited access to shell species at relatively deeper rocky beaches protruding into the open sea compared to the shallow tidal flats containing large shell colonies along the interior bay beaches. Such evidence of variable access to different ecosystems reflected in the faunal record at Godavaya headland indicate that the occupation at the summit was possibly during a middle Holocene sea-level highstand.

There were 312 unidentifiable bone fragments belonging to avian, fish, mammal, and reptile species in the sample collection. Therefore, a considerable amount of data could not be utilized for an in-depth analysis. Although some fish were well represented in the sample, the number of species identified seems to be only a small fraction of what was actually consumed. Naturally, the small fish could have been consumed along with bones. Further, fish bones are prone to rapid decay, relative to skeletal elements of terrestrial fauna, especially in open-air sites that are exposed to the elements. Such problems in preservation hinder our ability to understand the degree to which certain habitats were exploited as opposed to others. Thus, important questions such as how often a population ventured into inshore and offshore fishing grounds and to what extent they depended on terrestrial, estuarine, and marine resources cannot be answered with accuracy. Furthermore, since marine fish that frequent offshore habitats are found in the sample, the question arises whether the mid-Holocene inhabitants at Godavaya needed to venture into offshore fishing grounds at all.

Table 6 highlights the presence of 18 different species that overlap estuarine and inshore aquatic habitats in the sample. This is a clear indication that the Godavaya's middle Holocene population frequented both inshore reefs and estuarine habitats in search of fish, and other aquatic fauna. However, the majority of the fish species in the faunal sample are from coastal reef habitats, suggesting that the prehistoric groups at Godavaya frequented the coastal reefs foraging for fish, turtles, and mollusks. The Sentinelese and Onge in the Andaman Islands are known to utilize canoes with a long pole in lagoons (Pandya, 2009) and in inner reef areas where they fish (Singh, 2015). Although the evidence of such devices is not preserved in the archaeological record, it is possible that the Godavaya's inhabitants used rudimentary rafts or dugout canoes to reach rocky reefs, and to navigate the estuarine environments, since numerous species that lived in these two habitats were caught and consumed.

The fishhooks recovered from Mini-athiliya (Perera, 2016) site are a clear indication that the mid-Holocene population along the southeast coast knew the techniques associated with line and hook fishing. They possibly employed rod angling when fishing for smaller fish among reefs along rocky shorelines. They may also have perfected bow fishing, harpooning and spearfishing in the inshore reefs as the majority of the relatively larger fish species in the collection (such as trevally and grouper) frequented inshore rocky reef areas for prey fish. Many ethnographically described communities like the "negrito people" of the Philippines, Australian aborigines, Sentinelese of the Andaman Islands and tribes in the Nicobar Islands are known to use such techniques and implements for fishing in inshore reef areas.

Overall, the data from the southeast coast of Sri Lanka suggest that inhabitants of shell ridge habitations and headland encampments relied heavily on both the aquatic and terrestrial resources. However, the locational pattern of these two campsite types suggests that the middle Holocene coastal populations placed a higher emphasis on aquatic foraging. It is reasonable to assume that abundant aquatic resources along submerged coastal valleys and the relative ease of their procurement led to the development of novel adaptive strategies conducive for marine and coastal aquatic resource exploitation. This required specialized skills and techniques, and knowledge in the behavior of marine/aquatic prey species, seasonality and coastal ecosystem diversity. Furthermore, having simultaneous access to both aquatic and terrestrial resources, the carrying capacity in the coastal embayment areas seemed to have been relatively high as opposed to the interior terrestrial ecosystem zones. Perhaps this coastal advantage allowed a relatively higher density of occupation as seen in the distribution of late Mesolithic encampments and worksites along the middle Holocene bay beaches and estuarine shores along the Southeast coast (Figure 29).

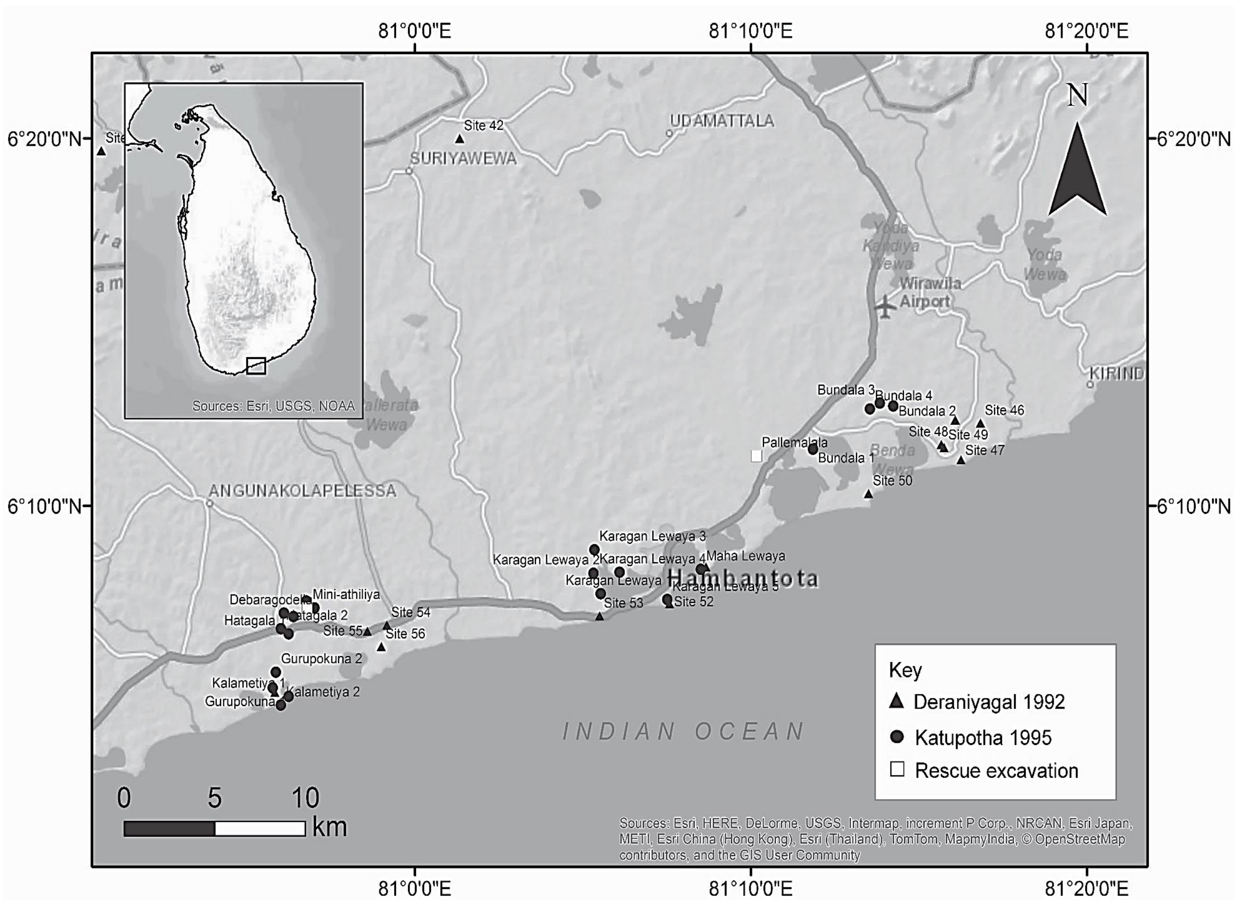

Figure 29. Prehistoric sites clustered around middle Holocene bay beaches and headlands between Kirinda and Kalamatiya. Locations include sites reported by Deraniyagala (1992) and Katupotha (1995). Two rescue excavations are also identified; Pallemalala excavated in 1997 (Somadeva & Ranasinghe, 2006) and Mini-athiliya excavated in 2008 (Kulatilake et al., 2014), (From Harmsen 2017, p. 113, Figure. 38)

Conclusion

This research suggests that the HGF encampment on Godavaya hill was part of the same middle Holocene settlement system observed along the paleo-shorelines of interior embayments stretching along the southeastern coast. During middle Holocene sea-level highstands, the southeast coast comprised numerous embayments with multiple headlands jutting into the Indian Ocean (Katupotha, 1988; Weerakkodi, 1992). Based on the elevation and surrounding topography we can identify Godavaya hillock as one such mid-Holocene headland. The embayments that spread 2-4 km inland through shallow coastal valleys thrived with large colonies of bivalve mollusk species. The middle Holocene shell beds and ridges (shell valve accumulations of dead mollusks) are concentrated around the lagoons of Kalametiya, Hungama, Lunama, Mahasittrakala Lewaya, Karagan Lewaya, Embilikala, and Bundala Lewaya. In these shell deposits, shell valves of *Meretrix, Anadara*, and *Cerithidea* sp. are dominant (Katupotha, 1995). The presence of these large shell valve accumulations indicates that the shallow embayment areas comprised ample nutrients to sustain large shellfish colonies. The presence of these shell colonies and abundance of diverse resources in distinct coastal sub ecosystems seemed to be the key pull-factor that attracted HGF populations to aggregate along the shorelines of embayments during the sea-level highstands. Thus, it is apparent that a new type of coastal habitation pattern had occurred.

It is plausible that shell ridge inhabitants of the interior embayment shorelines migrated into coastal headland encampments during seasonal migration cycles. Given that HGF societies, such as the tribes in the Andaman Islands are known to be highly territorial (Brown, 1922, p. 26; Man, 1883, p. 114), we can suggest that access to campsites, hunting and fishing grounds among southeast coastal groups could have been territorially restrictive. The fact that certain ancient encampments along the southeast coast were treated as ancestral burial grounds (and revisited from time to time as indicated by the mortuary record) is further proof that the middle Holocene populations were highly territorial. Inhumation of the dead within an encampment creates an ancestral link (Cooper, 1997, p. 229), which ties descendants to that locality, forming a sense of territorial right and ownership. Through such mortuary practices, these HGF populations seemed to have symbolically emphasized their hunting, fishing, and dwelling rights in the vicinity. With this analysis we conclude that the inhumation of the flexed individual on the summit of the Godavaya hill overlooking the Indian Ocean and surrounding coastline is a testament to the symbolism that emphasized territorial rights.

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