EARLY METAL AGE POTTERY FROM FATU AKI ANIK KNUA, TIMOR-LESTE AND THE APPEARANCE OF CERAMICS IN THE WALLACEAN ISLANDS

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ABSTRACT

Fatu Aki Anik Knua is an archaeological site in the mountainous interior of Timor-Leste comprising of a limestone cave and hilltop open site locale. Excavations in 2015 yielded an extraordinary quantity of earthenware pottery with over 13,000 potshards recovered, all dating within the last 1800 years. The Faak pottery is described and examined in the context of Timor-Leste and eastern Indonesian assemblages more widely. The intensification of ceramic technology transfers and initial pottery use, which occurred at many sites in the region during the Paleometallic era, is highlighted. The essential features of this hinterland site assemblage show affinities with Early Metal Age pottery occurring extensively throughout eastern Indonesia after 2500 BP.

INTRODUCTION

The Early Metal Age and the corresponding appearance of pottery at several sites across eastern Indonesia and Timor-Leste are relatively understudied and the precise timings and influences by which ceramic technologies and pottery-using communities emerged are largely unknown. The archaeological focus on pottery assemblages in Island Southeast Asia (ISEA) has mostly centered on the arrival of Neolithic innovations and there has been less attention given to the diversification of pottery traditions after this time (see Swete Kelly 2017). The description herein of an Early Metal Age assemblage from the mountainous interior of Timor-Leste provides data from the new site of Fatu Aki Anik Knua (Faak) within a region where more information is required to establish evidence-based comparative frameworks.

Faak was excavated in August 2015 and can be considered among the few inland archaeological sites in Timor-Leste so far investigated. Among the range of archaeological finds almost 19.5kg of ceramics were excavated. The occurrence of such a concentration of ceramics, at a site that is otherwise unknown in terms of its prehistoric past, points to longstanding and persistent human occupation at this highland locale. The pottery assemblage derives from two separate areas within the site locality—a limestone cave and a hilltop open area above the cave (hereafter called the Faak Open Site). The overwhelming majority of the ceramics came from the Faak Open Site where some 13,000 potshards were recovered from a limited 1x1m excavation. This is a substantial pottery assemblage, particularly in relation to previous prehistoric ceramic finds in Timor and ISEA more generally.

BACKGROUND

The archaeological appearance of pottery across ISEA is a phenomenon debated in the context of driving forces for technological, economic and cultural change. The presence of pottery has provided substantiation for pan-regional theories explaining the transition from hunter-gatherer to sedentary, agricultural communities (see Bellwood 1979). In other instances, the emergence of ceramic technologies and perceived similarities between shards found at various locations has been used as the foundation for developing models of prehistoric contact and interaction (see Solheim 1984). Either way, pottery has been the central element and putative evidential basis for paradigms surrounding the Neolithic transition in ISEA and the spread of Austronesian languages (Spriggs 2011).

This base correlation has resulted in two key schools of thought or macro scale models: the first associates ceramics with dispersal and sudden arrival of Austronesian-speaking migrants, as part of a package of introductions throughout the region, expounded by Bellwood (1979, 2007, 2017) as the 'Out-of-Taiwan' (OT) model, also known as the language-farming dispersal hypothesis (Klamer 2019); and Solheim's (1975, 1984, 2006) 'Nusantao Maritime Trade and Communication Network' (NMTCN), which sees the spread of pottery as an outcome of reticulate linkages between long-existing, maritime-orientated communities. In this sense, the OT school fundamentally commits to demic diffusion and settlement of new people as the exogenous cause of technology introductions like ceramics, while the NMTCN theory proposes that sustained and intensifying communication and exchange brings about similarities in internally shared material culture traditions. The influence of these models has been highly significant, effectively providing a template that directs research and interpretation of archaeological pottery data. Although these paradigms primarily address the Neolithic arrival of pottery in ISEA, they have represented valuable conceptual frameworks for the emergence of pottery in various spatial and temporal contexts, both as individual models and in integrated theory, including where pottery appears as an Early Metal Age phenomenon (see Bellwood 2017:312–338).

In the Wallacean islands the appearance of pottery is often sparse, spatially uneven and temporally variable (O'Connor 2015). This may largely be a consequence of the relative paucity of archaeological survey and data from across this region, given its vast insular and remote characteristics, coupled with the fact that much of the excavation effort has focused on cave and shelter sites which would not be expected to be permanent domestic settings where a full range of ceramics would be in use. Nevertheless, the available prehistoric pottery data from eastern Indonesia reviewed by the authors indicates variations in attributes, usage, timeframes, as well as inferred origins and influence. The extant orthodox macro-scale models do not necessarily fit particular circumstances and locations. Neither of the key models satisfactorily explains the patterning of pottery appearance, nor the complex circumstances where Austronesian migrants may have settled in some areas but not others, or where pre-existing island communities rapidly take up technological innovations like pottery, while others are less attracted to the lifeways offered by sedentism, domestication and ceramics (O'Connor *et al*. 2018). Yet in the absence of localized data and synthesis, prevailing models are invariably the default interpretation that fills apparent knowledge gaps. However, models are inherently imprecise and rely on assumptions, and the application of any idealized model across a range of contexts or specific locations is considerably weaker where presupposed circumstances are not present. Consequently, a single hypothesis is likely to represent just one of several possible mechanisms and modes of interaction which might illuminate prehistoric technology transfers (Swete Kelly 2008).

In the context of the dispersal of Austronesian languages across ISEA, Klamer (2019:19) has recently argued that contra to macro-level models such as the farming-language dispersal hypothesis “Many of the histories reflected in the languages, archaeological findings and DNA molecules do not converge”, and moreover that there is no reason why we should expect them to. Macro-level models are unable to capture the complexity of settlement in ISEA, with its thousands of islands, variable geography and ecologies, human networks, and histories of migration. Klamer and others suggest that refocusing on detailed bottom-up investigations will produce results that will reflect this rich ecological and cultural diversity and the different histories of settlement and contact. In this vein, we argue that identifying and acknowledging all the characteristics of a pottery assemblage, outside the confines and expectations set by regional theories or overarching models where archaeological data may be conflated with findings from various disciplines, will bring to light more nuanced narratives accounting for potential multiple causes at a more authentic and focused scale.

Across many sites in the Indonesian islands of Wallacea, the fundamental impetus for technological transfers, including ceramics, seems to occur after 2500 BP, when cuprous and iron artifacts appear in ISEA (Spriggs 1999, 2000; Bulbeck 2008; Calo *et al*. 2015; Ono *et al*. 2018; Oliveira *et al*. 2019). In many ways, the Metal Age in ISEA is even more problematic to define spatially and chronologically than the Neolithic, as metal objects found *in situ* in archaeological contexts are exceedingly rare, and the timing of the appearance of metal is usually inferred from the few widely separated locations where it has been found (see Bellwood 2017). In addition, it is often difficult to separate the Neolithic definitively from the Metal Age as distinct periods in ISEA and the sequence of cultural developments may be regarded as seamless and continuous overall (Bellwood 2017:269). Therefore, the term ISEA Metal Age does not reflect clear chronological integrity but, rather, provides a temporal device to distinguish the period from around 2500–2000 years ago until the arrival of Europeans (Szabó *et al*. 2013) as distinct from the Neolithic. Nevertheless, of 48 excavated sites in eastern Indonesia and Timor-Leste where the initial appearance of pottery is recorded, an ongoing survey of the documented evidence by the authors (in prep.) indicates that the first ceramics distinctly occur in Early Metal Age timeframes more often than Neolithic aged contexts. Over half the sites show initial pottery appearance after 2500 BP, with around 30 percent presenting ceramics in Neolithic contexts circa 3500–2500 BP. Also, at sites where Neolithic pottery is present, there is frequently a second recognizable pottery horizon after 2500 BP, marked by significant quantitative and some stylistic changes in ceramics. Despite this, archaeological narratives concerning Early Metal Age mechanisms of technology transfer and the impact on regional societies at this time are very rare and eclipsed by orthodox Neolithic transition theory.

There remain a number of possible reasons to explain the beginning of the ‘ceramic age’ in eastern Indonesia and Timor-Leste during the Neolithic and Early Metal Age, and several hypotheses around the concepts of independent innovation, trade or exchange, imitation, and human migration might be tested through structured examination and comparison of the specific attributes of localized pottery assemblages. The orthodox OT and NMTCN models of the Neolithic transmission of ceramics do outline broad processes that could also apply where pottery first arrives in Early Metal Age context. However, direct affinities in pottery from the Early Metal Age that may point to demic diffusion or population movements and the introduction of ceramic technology are yet to be established for this region. In contrast, general similarities befitting the influences of trade and exchange, and localized imitation or acculturation are more readily perceived. Ceramic innovation within the region has to date not been a supportable concept given the apparent instantaneous appearance of earthenware as the first pottery observed. Even so, there is evidence from Sulawesi indicating a deep Holocene beginning for clay-based utilitarian technology in the form of fire-pit hearths that also incorporate symbolic decorations (Bulbeck *et al*. 2019), strikingly prior to the Ceramic Age in eastern Indonesia. To this extent, local innovations and adaptations should not be entirely dismissed given the not inconceivable possibility that a transition from baked-clay products to pottery could have occurred independently in the region, as is it did in a number of Eurasian examples (see McKenzie 2010; Hommel 2013).

The complexity and diversity of prehistoric material culture across the region points to intricate inter-island interactions prior to the Neolithic (Szabó and O'Connor 2004; Bulbeck 2008; Blench 2010; Barker and Richards 2013; Denham 2014; Reepmeyer *et al*. 2019; Shipton *et al*. 2019), and the role of such networks in subsequent technological transfer and transition is still to be fully realized. This dynamic backdrop of interaction points to cumulative processes between long-established Wallacean communities and the active, ongoing and escalating diffusion of technologies. Rather than being effectively supplanted by external influences or people that directly affected various areas, established communication processes were in place to potentially convey innovations among a range of communities. Significantly, the Early Metal Age does represent a pivotal time of further intensification driven broadly by distant exogenous mercantile expansion, ultimately bringing a range of islands into a nascent globalizing economy and clearly increasing contact and communication with disparate communities. The market demand arising in the Hellenistic and Roman Mediterranean and the chain of trans-Asiatic merchants and traders that it activated is thought to be the proximate cause. Demand for spices and forest produce only available in eastern Indonesia is the probable engine of widespread technology transfers, including the extensive arrival of ceramics in the region, during the Early Metal Age. Transcontinental processes in the centuries around the beginning of the Common Era resulting in intensification of contacts within eastern Indonesia are widely acknowledged, but remain speculative (see Spriggs *et al*. 2006; Bellwood 2019a). Nevertheless, the evidence of metal artifacts dispersed throughout eastern islands suggesting Mainland Southeast Asian (MSEA) sources, along with exotic ceramics from India in similar time-frames, is compelling proof of external contact and new influence occurring from around 2000 BP (Ardika 1991; Calo *et al*. 2015).

The context of initial metal use and production in eastern Indonesia is poorly understood and seldom dated with absolute chronologies. Bronze Dong Son drums, with affinities in southern China and northern Vietnam in the last few centuries BC, have been found in far-flung locations occurring widely from Sumatra and Java, through the Lesser Sunda Islands, the southern Moluccas, and in New Guinea (Bellwood 2017; Oliveira *et al*. 2019). Some 27 distinctive Dong Son drums, constituting the major part of a highly homogenous cluster known as RS3 (Calo 2014:15), have been found in eastern Indonesia to date with a further two belonging to the same cluster being recently identified in Timor-Leste (Oliveira *et a*l. 2019). They are thought to have been produced around the second-third centuries AD (Calo 2014:111), although dating their maritime dispersal into the eastern islands is more difficult as the finds lack coherent dated archaeological contexts. The drums provide clear evidence of the incorporation of the region into extensive exchange networks. However, it is also clear that the transmission of bronze objects from MSEA locations was also accompanied by metal-casting technical knowledge with centers emerging in Bali, for example. Early bronze metallurgy appears to have been inspired by the Dong Son tradition from around 2000 years ago (Ardika 1991) with Pejeng drums, a distinct style characterized by frog forms cast in relief, emerging predominantly in Bali but also Java, and distributed eastward along the Lesser Sundas (Bellwood 2017:318).

The north coast of Bali is also highly significant in terms of the transmission of Early Metal Age ceramics. Excavations at Sembiran and Pacung indicate strong links with India from the late first millennium BC (Ardika 1991; Calo *et al*. 2015). These sites have yielded over 1200 fine and coarse fabric shards of Indian manufacture (Calo *et al*. 2015:384), along with numerous novel artifacts including glass, gold and carnelian that similarly indicate Indian origins, as well as possible transmission from MSEA (Ardika 1991; Calo *et al*. 2015). Fine gray rouletted pottery, unambiguously matched in style and by compositional analysis to locations in Tamil Nadu and Sri Lanka (Ardika 1991:5), provides clear evidence of importation. It is unknown whether Indian pottery was brought directly to Bali from the subcontinent, or by intermediate traders originating from Sumatra, Java or elsewhere given the presence of rouletted ware also in northwest Java (Ardika 1991:71). However, these north coast Bali sites clearly demonstrate the arrival of Indic presence and influence leading reasonably to the inference that such ports acted as *entrepôt* for a developing trade between centers to the west and islands where spices and certain forest products were endemic in the east. In addition, large quantities of locally produced earthenware shards have been excavated dating between 2500–1500 BP with notable concentration in the first and second centuries AD (Ardika 1991:74), which bear wide similarities in vessel form and decoration with contemporary assemblages found in eastern Indonesia, reflecting contact and probable inter-island trade.

Traders engaged in regional inter-island transport and more localized activity conveyed with them a range of influence derived from the external sphere to which they were ultimately connected. Externally-driven contacts with eastern Indonesia beginning around 2000 years ago extended from the Moluccan 'spice islands' in the north, where commodities such as cloves, nutmeg and bird plumes were primarily sought (Swadling 1996; Bellwood 2019), to Nusa Tenggara Timur in the south where aromatic barks and the best sandalwood was sourced from Timor and Sumba (Glover 1986). However, the nature and intensity of contact and its effects on communities at local scales, where decisions about the adoption of technology or other cultural traits fundamentally occur (Lape *et al*. 2016), are yet to be elucidated. Even in circumstances where material culture can be found to be readily related, it is still probable that the manner in which these were adopted, integrated, or innovated varied in particular instances (Swete Kelly 2008). The spread of pottery in the Early Metal Age appears as irregular and any simple single explanation will not be adequate. Several factors from a suite of possible causes may be evoked including the earlier presence of Neolithic ceramic technology through to the appearance of merchants seeking the region's unique commodities. The underpinning of connectivity that characterizes many island groups in eastern Indonesia, from at least the early Holocene, along with connections between coastal areas and interior communities that may have facilitated riverine or other access to hinterland territory where certain commodities were obtained, are all elements that might contribute to explanations of technological transfers in the region.

THE CERAMIC AGE IN EASTERN INDONESIA AND TIMOR-LESTE

The arrival of pottery is considered to begin around 3500 BP based on excavations at some key sites including in northern Maluku (Bellwood 1998, 2019b), southern Maluku (Lape *et al*. 2018), and Sulawesi (Anggraeni *et al*. 2014; Azis *et al*. 2018; Suryatman *et al*. 2018). Neolithic pottery is also present in the more southern Nusa Tenggara Timur archipelagos prompting some scholars to see the emergence of pottery in eastern Indonesia as essentially instantaneous and part of a single process (Mahirta 2006). The period after 2500 BP sees the emergence of a different form of ceramics occurring at many locations that were previously aceramic. This pottery is mostly unslipped, occasionally decorated predominantly with incised lines, and fundamentally utilitarian (Soegondho 2003). Further, at sites where Neolithic pottery is present, it is often the case that relative occurrence is dramatically surpassed by more abundant Early Metal Age pottery. After 2500 BP, regional pottery production and adoption becomes considerably more extensive and widespread (Bellwood 2007; Bulbeck 2008).

ARCHAEOLOGICAL POTTERY IN TIMOR-LESTE

The pioneering fieldwork during 1966–67 by Glover (1972, 1986) still provides the most comprehensive treatment of prehistoric pottery in Timor-Leste. Glover excavated four limestone caves and rockshelters with contrasting coastal and inland locations that yielded some 14,000 potshards in total (Glover 1977). Although this number of shards could be thought sufficient for informative examination, Glover remarked that "…the usefulness of this material for the normal archaeological procedures of typological and metrical analysis is reduced by the degree of breakage of the pots, the restricted range of vessel forms, the extreme rarity of surface decoration, and the conservatism over time in respect of those features which can be measured or recorded" (Glover 1986:35).

Glover suggested that ceramics first appeared in Timor between 5000–4000 years ago as a result of the arrival of immigrant people who also introduced exotic animals and practiced some form of agriculture (Glover 1986:197). However, subsequent review showed that Glover's timeframe had been derived from disturbed deposits resulting in unreliably dated contexts (Spriggs 2003). Testing of a series of aceramic middens, which went out of use immediately before the appearance of pottery, enabled Spriggs (2003:61) to determine a likely *terminus post quem* of 3500 BP for ceramics on Timor.

The pottery assemblages recovered by Glover showed little temporal or spatial variation and he observed "…it is virtually impossible to say whether any one shard or rim form is modern or 4000 years old, whether it comes from the coast or from the mountains" (Glover 1972:91). Glover did record a limited number of incised decorated shards appearing in a second phase between 3500–1500 BP (Glover 1986:36) although, given the uncertainty and reappraisal of the broad timeframes associated with his excavations, it is likely that this pottery more correctly dates from after 2500 BP and is consistent with Paleometallic occurrences of pottery in eastern Indonesia.

Ceramics have frequently been recorded in more recent excavations in Timor-Leste. Neolithic pottery has been found at Lene Hara (O'Connor and Veth 2005). At Bui Ceri Uato Mane, plain earthenware appears in relative abundance in layers dated to 1890–1700 BP (Oliveira 2008:143). Near Manatuto, excavation of several hilltop sites yielded significant quantities of earthenware pottery as well as tradeware ceramics dating within a late prehistoric to historic timeframe of AD 1000–1750 (Chao 2008). Also, a number of fortified hilltop settlements in use after AD 1300 (O'Connor *et al*. 2012) have yielded large assemblages of earthenware pottery along with tradewares (Fenner and Bulbeck 2013; Brockwell *et al*. 2020; O'Connor *et al*. 2020).

THE FAAK EXCAVATIONS

The Faak site locale (S08°42'42.7" E126°00'52.8") is approximately 4km from the upland village of Cribas in Manatuto district (Figure 1). It lies in the upper reaches of the Laleia River system at an elevation of 757m ASL (Louys *et al*. 2017:386) and is the highest altitude prehistoric site to be excavated thus far in Timor-Leste. The Faak locality comprises two areas of archaeological interest—a limestone cave that was the primary focus of excavation during the 2015 field season, as well as a flat hilltop open area above the cave bounded by boulders, and with clayey-silty deposits where a surface exposure of pottery was evident. Surface occurrences of pottery were also noted throughout the cave. At the rear of the cave a karstic chimney or fissure could be seen opening vertically to the surface, and the slope of the deposit in this part of the cave suggested that sediment and some of the surface shards and bone had entered the cave from the open area above (Shimona Kealy pers. comm.). A fragment of human mandible found in this area of the surface lag was dated to ca. 2000 calBP (see Table 1), supporting this interpretation. It was therefore decided to carry out a limited exploratory excavation to test the open site area above the cave for evidence of occupation. Intriguingly, the overwhelming majority of the Faak earthenware pottery assemblage was recovered here. It should be noted that while no plan of the site and excavation areas is included in this paper, it is expected to be published as part of a forthcoming report on the overall Faak archaeology.

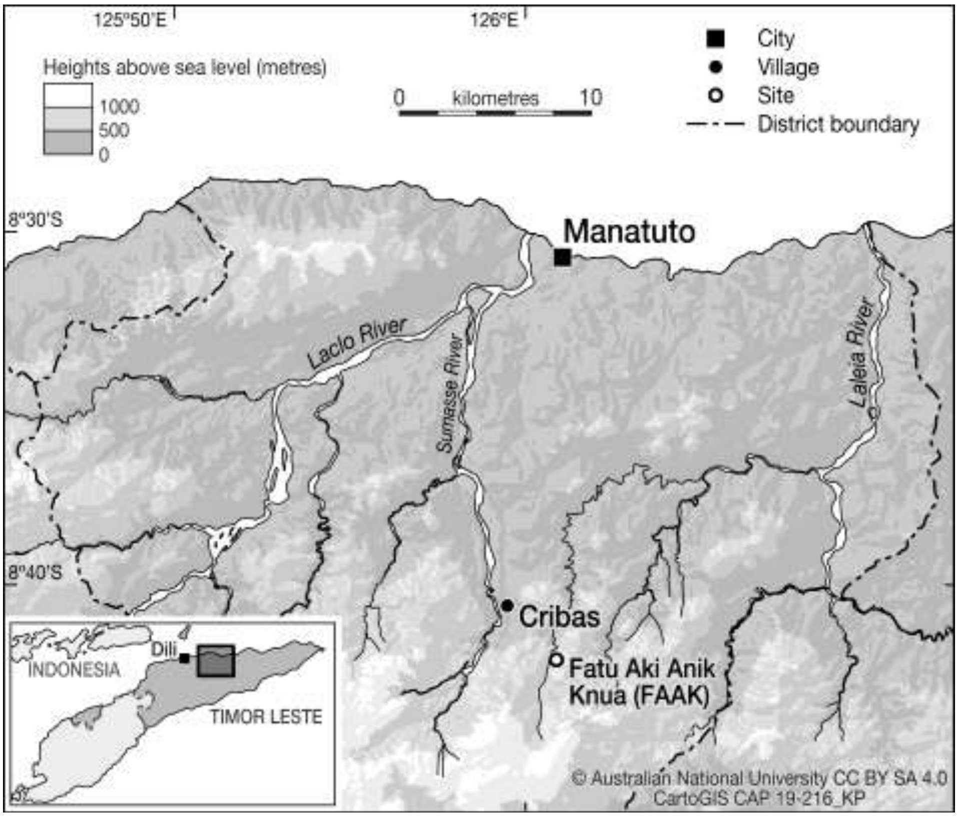


Figure 1: Faak-Cribas location. Credit: Carto GIS Services, Australian National University.

Table 1: Faak site AMS radiocarbon dates (calibrated using OxCal v4.3 (Bronk Ramsey 2017) with IntCal13 used for terrestrial samples (Reimer *et al.* 2013).*

Faak Cave Site					
Square-Spit	**Laboratory code**	**Material**	**Radiocarbon Age**	**±**	**Age calBP (2σ)**
A-16	D-AMS 013032	charcoal	modern	–	–
B-14	D-AMS 013029	charcoal	3459	31	3830–3641
C-1 (wall)	D-AMS 013026	charcoal	188	30	301–32
C-5	S-ANU 58507	charcoal	133	21	273–10
C-13	D-AMS 013028	charcoal	5502	30	6396–6217
C-17	D-AMS 013033	charcoal	3613	30	4061–3840
C-19	D-AMS 013030	charcoal	10,126	34	11,996–11,509
F-4 (wall)	D-AMS 013027	charcoal	315	23	460–305
F-15	D-AMS 013031	charcoal	3750	29	4229–3988
Surface at rear of cave	D-AMS 013023	Fragment of human mandible	2257	30	2345–2157
Faak Open Site					
Spit	**Laboratory code**	**Material**	**Radiocarbon Age**	**±**	**Age calBP (2σ)**
2	S-ANU 58509	charcoal	611	26	654–549
5	S-ANU 58510	charcoal	1837	23	1858–1710

**Samples prepared at the ANU Radiocarbon Laboratory have been analyzed according to the methods detailed in Fallon* et al. *2010.)*

Within the cave, six m^2 test pits were opened near the well-lit entrance to the cave, but inside the drip line. Each excavation removal (spit) was divided into nine 'bucket' sectors and excavated in spits of 5cm depth. Bedrock was generally reached at around 150cm although rocky fissures and flowstones meant that basal depths varied. All recovered material was dry sieved through 1.5mm mesh before 1.5mm wet sieving at a nearby stream. Samples were dried and transported back to Cribas for initial sorting and bagging. All the material in the cave excavation is thought to have accumulated as a result of human living activities in this area of the cave, and there are no fissures or chimneys proximal to the excavation area that could have introduced material from the Faak Open Site above.

A single 1x1m test pit was excavated in 10cm spits in the open site area above the cave. This area was partly enclosed by large limestone boulders with saplings and larger trees growing throughout (Figure 2a). A dense quantity of around 13,000 earthenware potshards was encountered to a depth of 60cm, whereupon a human burial was discovered, and excavation ceased. Local villagers required the excavation be immediately terminated and the test pit refilled so that the burial was left undisturbed. There was little opportunity to make detailed records of stratigraphy or indeed the skeletal remains. However, the remains were readily identifiable and confirmed as human. Although a definitive judgment on the age of the burial was not possible, no items associated with the remains that could have indicated a relatively recent interment were present (Sofia Samper Carro pers. comm.). Furthermore, there was no evidence of a grave cut or disturbance observed during the excavation of the higher levels. Figure 2b shows the wall of the test pit prior to the excavation being backfilled. The stratigraphy displayed horizontally bedded shards that reinforce the assessment that there had been no disturbance. In the view of the lead excavator, the deposit of earthenware pottery probably extended to the areas surrounding the test pit (Tim Maloney pers. comm.). This view was confirmed in 2019 when the site was revisited and testing was conducted using an earth auger, with

Figure 2a: Faak Open Site excavation: Open site test pit and environs within karst. Credit: India Dilkes-Hall.

Figure 2b: Faak Open Site excavation: Wall bearing horizontally layered potshards. Credit: India Dilkes-Hall.

drilling revealing potshards beneath the surface at 1m and 2m horizontal intervals from the original test pit and further at 5m and 6m distance. Our auger testing did not reveal deeper deposits in this area but this may have been due to the presence of limestone clasts in the sediment inhibiting the drilling. The quantity of pottery in this locale supports the local oral history of the Cribas population that refers to this hilltop location as the home of their *ratu* ancestral group (Sue O'Connor field notes). Along with the pottery, other archaeological material recovered from the test pit included marine shells, faunal remains, lithic artifacts, charcoal and seeds.

Radiocarbon Chronology

AMS radiocarbon dates from the Faak Cave obtained soon after excavations were complemented by dates directly targeting ceramic concentrations. The dates associated with pottery-bearing layers are from the Faak Cave C-1, C-5, F-4 and the Faak Open Site Spit 2 and Spit 5 (Table 1).

POTTERY OCCURRENCES AND TEMPORAL RANGE

The occurrence of pottery and relative concentrations by square and spit are presented alongside the dates obtained for the Faak Cave and Open Site (Tables 2 and 3). The cave assemblage (Table 2) is characterized by earthenware pottery with a lesser number of glazed, high-fired ceramics. The distinction between the two types is substantive in several ways, including absolute difference in provenance, probable difference in temporal scope, and the relative clustering of glazed ceramics in a particular square and within surface layers. The occurrence of conspicuously modern, glazed ceramics appears incidental to the overall Faak earthenware assemblage. Nevertheless, it is indicative of the ongoing and continuing usage of caves for many purposes that is characteristic of Timor-Leste (Pannell and O'Connor 2005). It is notable that no glazed ceramics were recovered from the Faak Open Site.

Square A has the greatest concentration of pottery in the Faak Cave. However, consistent with the date obtained for spit 16, this excavation area is dominated by modern glazed ceramics with relatively few earthenware shards. Of 133 shards found, 118 are glazed. Furthermore, this number represents 85 percent of the total number of 139 glazed pieces recovered from the cave overall, with spit A-1 alone accounting for 73 percent. Although small numbers are found in other excavation units, glazed ceramics are concentrated in the upper two spits of Square A.

The cave assemblage consists of 325 earthenware shards with a total weight of 636g. Earthenware pieces are relatively evenly spread across squares and appear mostly in the upper spits. The dates obtained from charcoal samples in Squares C and F and coming from layers closely underlying relative concentrations of pottery, indicate a deposition range from around 400 years ago until the recent past. Some squares present mid-Holocene ages but these are not stratigraphically associated with pottery. The anomalous find at Square F Spit 19 underlies a mid-Holocene date obtained from F-15. However, this rim shard matches two other rim segments found at F-1 (see Supplementary file 1: Faak Cave – F:1-02; F:1-04; F:19-01). The rim shard F:19-01 is thought to be vertically displaced and strongly indicates some disturbance within this excavation unit.

The amount of earthenware pottery recovered from the Faak Open Site test pit is considered extraordinary (Table 3). Relative to the earthenware from the six Faak Cave squares, the open site assemblage consists of over 40 times more pottery. It occurs consistently throughout the stratigraphy with fewer shards appearing in spit 1 indicating that deposition ceased some time ago and silt and other materials have accumulated overlying the archaeological deposit. The smaller number of shards at spit 6 is due to partial recovery at this level given the abrupt termination of the excavation.

Table 2: Faak Cave pottery occurrence and temporal ranges.

Square	Spit	Pottery N	Pottery W(g)	Age calBP (2σ)
A	1	104	315.3	
	2	19	82.1	
	3	5	9.0	
	6	1	0.5	
	8	1	2.9	
	12	2	1.0	
	16	–	–	modern
	28	1	1.8	
	Total	*133*	*412.6*	
B	1	22	78.0	
	2	20	28.0	
	3	17	17.7	
	4	7	20.3	
	5	2	4.4	
	6	4	4.6	
	7	1	1.4	
	10	1	0.6	
	14	–	–	3830–3641
	Total	*74*	*155.0*	
C	1	28	61.0	301–32
	2	10	13.4	
	3	22	51.9	
	4	9	14.4	
	5	8	20.4	273–10
	10	1	1.9	
	11	1	0.5	
	13	–	–	6396–6217
	17	–	–	4061–3840
	19	–	–	11,996–11,509
	Total	*79*	*163.5*	
D	1	11	16.2	
	2	26	45.5	
	3	4	2.5	
	4	8	19.7	
	5	11	18.6	
	6	11	25.2	
	7	3	8.1	
	9	1	4.9	
	11	1	10.4	
	Total	*76*	*151.1*	

Table 2 (continued): Faak Cave pottery occurrence and temporal ranges.

Square	Spit	Pottery N	Pottery W(g)	Age calBP (2σ)
E	1	18	42.5	
	2	25	55.7	
	3	5	16.5	
	4	1	4.0	
	5	1	0.5	
	Total	*50*	*119.2*	
F	1	34	50.6	
	2	11	20.4	
	3	1	0.6	
	4	3	3.8	460–305
	5	2	6.2	
	15	_	_	4229–3988
	19	1	4.0	
	Total	*52*	*85.6*	
Overall total		*464*	*1087.0*	

Table 3: Faak Open Site pottery frequency and dates.

Spit	Pottery N	Pottery W(g)	Age calBP (2σ)
Spit 1	886	1096.9	
Spit 2	2796	3211.8	654–549
Spit 3	4555	5712.3	
Spit 4	2397	4554.5	
Spit 5	2198	3074.0	1858–1710
Spit 6	283	681.4	
Total	*13,115*	*18,330.9*	

Table 4: Faak Open Site shard types.

Spit	Body	Rim	Neck/shoulder/carination/base	Decorated	Surface color
1	847	16	23	8	177
2	2653	49	94	22	710
3	4351	47	157	49	763
4	2228	38	131	34	339
5	2070	31	97	25	199
6	254	8	21	7	145
Total	*12,403*	*189*	*523*	*145*	*2333*

EARTHENWARE SURVEY—DIAGNOSTIC SHARDS

The survey identifies and describes diagnostic shards that provide information on vessel forms and stylistic attributes (rim and decorated shards). Shards with colored surfaces are also recognized. Full data on each diagnostic shard are provided in Supplementary files: 1. Faak Cave; 2. Faak Open Site – Rims; 3. Faak Open Site – Decorated Rims; 4. Faak Open Site – Decorated Body Shards.

Among the 325 earthenware shards recovered from the Faak Cave, there are 14 rims (three of which appear modern and exhibit striation markings at the lip) and two body pieces bearing single line decoration (see Supplementary file 1 for details and photographs of the Faak Cave diagnostic shards). Of the small number of rims, direct and outcurving directions are the most numerous. The most common lip profile is round and there are seven combinations of rim-direction and lip-profile indicating that no particular style characterizes this small collection. In addition, 46 shards are identified as bearing surface color.

Of the total 13,115 shards in the Faak Open Site assemblage, 1.4 percent are rims with 1.1 percent decorated shards. The various shard types are detailed in Table 4.

The number of diagnostic shards identified within the open site assemblage is 321, comprising 189 rims and 128 decorated body shards (and four additional pieces that exhibited particularly distinctive forms—two bases, one attachment, one neck). There are 17 decorated rims making up the total of 145 decorated shards. The diagnostic shards appear in relatively consistent numbers in all excavation levels with no apparent concentrations or change over time.

Open Site Rims

Everted rims dominate every spit (see Supplementary files 2 and 3 for description and photographs of the Faak Open Site rims). Along with outcurving rims, everted rims account for over 81 percent of the rim forms. Everted and outcurving rims are virtually exclusively coupled with round, round-pointed, or pointed lips. Direct, incurving and inverted rims are mostly paired with flat-type lips and this combination comprises approximately 15 percent of the assemblage (Table 5).

Table 5: Faak Open Site rim direction and lip profile totals.

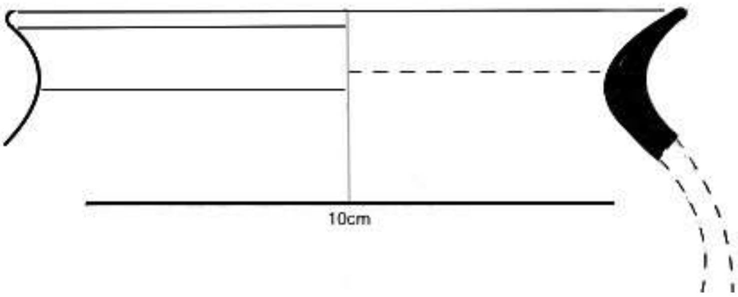
Rim direction	N	Lip profile	N
Direct	12	Round	66
Incurving	11	Round-pointed	40
Outcurving	24	Pointed	56
Inverted	6	Flat	22
Everted	130	Flat-horizontal	5
Unknown	6		

Although there is no striking difference between rims from various spits, there is slightly more diversity of forms in upper spits (1–3), while the everted rim is heavily prevalent in lower spits (4–6). Some variation also occurs in the length of rims and angles. At around spit 3–4, everted flange-like rims with sharper and more acute angles are evident. Overall, however, the study indicates continuity of a conventional tradition.

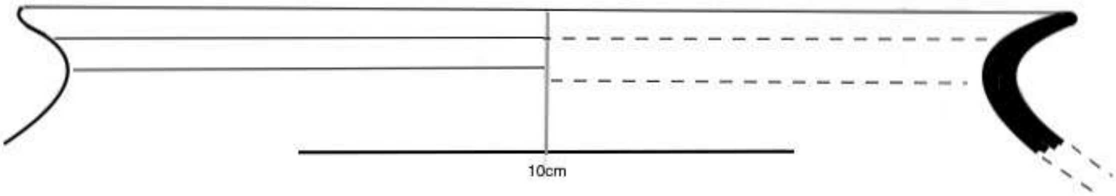
The distinction between the two primary rim-lip combinations suggests at least two different types of vessels. The everted rim forms represent restricted vessels, which may be globular. The direct or incurving rim with flat lip represents an open vessel like a bowl, dish or platter. Vessel projections based on several everted forms with the typically accompanying round-pointed lips, along with one incurving rim, are featured in Figure 3.

Open Site Decorations

Seventeen decorated rims (see Supplementary file 3) and 128 decorated body shards (see Supplementary file 4) were recovered from the open site test pit. The most prevalent decorative technique in all spits is incised line (Table 6). However, it is noted that appliqué (segments applied to vessel surface creating raised features) is the second most frequent technique and is especially common in spits 4 and 6. Impressed decorations are generally the third most prevalent technique, although punctation appears more significant in spits 1 and 2. Just two shards feature notching in combination with appliqué.

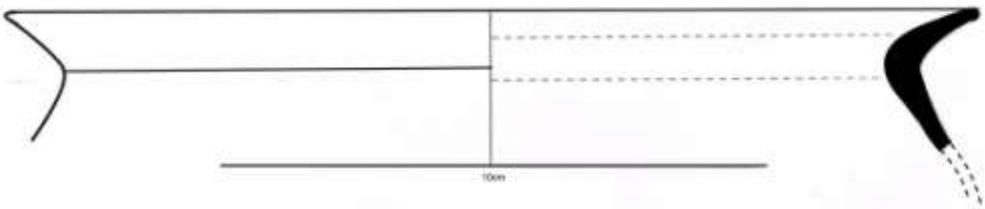


OS:2-02 everted, pointed lip. Restricted vessel – likely globular cooking pot. Estimated 13cm diameter, 10% rim present.

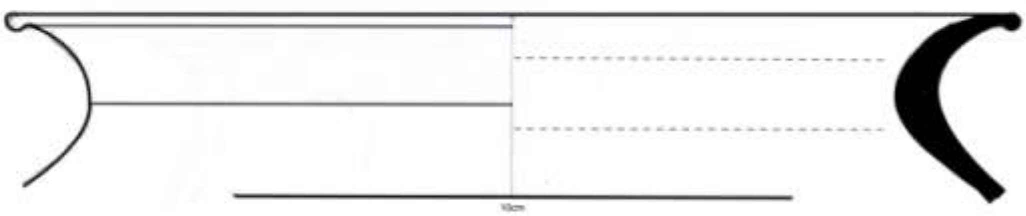


OS:3-80 everted, round lip. Restricted vessel – likely globular cooking pot. Estimated 22cm diameter, 7.5% rim present

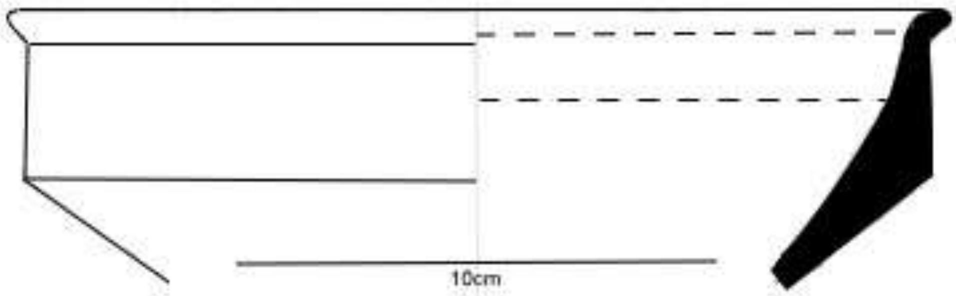
OS:4-01 everted, flat-horizontal lip. Restricted vessel – likely globular cooking pot. Estimated 16cm diameter, 7.5% rim present



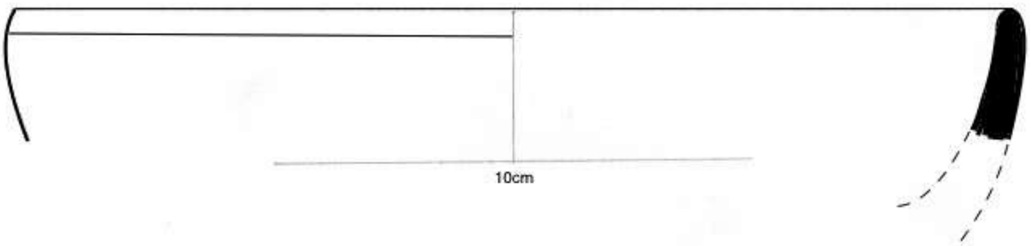
OS:4-15 everted, round-pointed lip. Restricted vessel – probably globular cooking pot. Estimated 18cm diameter, 10% rim present



OS:5-30 everted, round lip. Restricted vessel – globular cooking pot. Estimated 19cm diameter, 10% rim present



OS:4-65 decorated shard, outcurving round lip. Relatively thin lip to very thick at carination and then tapering wall. Open vessel – dish, platter. Estimated 18cm rim diameter, 17% of rim present.



OS:5-37 incurving, round-pointed lip. Open vessel – unknown form. Estimated 21cm diameter, 7% rim present

Figure 3: Faak Open Site vessel projections: restricted vessels (above) and open vessels below. Credit: Phillip Beaumont.

Table 6: Faak Open Site key decorative techniques

Spit	Incised	Appliqué	Impressed	Punctation
1	50%	20%	–	30%
2	39%	26%	13%	22%
3	41%	30%	27%	2%
4	44%	44%	10%	2%
5	50%	36%	7%	7%
6	43%	43%	–	14%
Total	*44%*	*34%*	*14%*	*8%*

Sixty-eight shards exhibit incised lines as the most common decorative feature (Figure 4). However, the characteristics of the incision and the patterns produced are variable. Seven incised line pattern types are identified: single straight; single curved; paired parallel; several parallel; converging parallel; v-shaped/zigzag; curvilinear. It may be noted that although a number of the patterns feature aligned incisions, creating a parallel line effect, these patterns are not strictly parallel and therefore are unlikely to have been made with a tined tool or other multi-point implement.

Over 70 percent of the 54 shards with raised features or appliqué express a curvilinear pattern. Several shards have straight appliqué and some of these are impressed, indented, or notched. There are also some closed forms in rectangular or circular shapes and two occurrences of nubbins (Figure 5).

There are 19 shards exhibiting impressed decorations. Eight are linear shapes and effectively resemble incised decorations. Others are rounded indents or gouges. There are 11 shards exhibiting circular punctation decorations. One shard shows a series of dots in curvilinear pattern, six shards present a linear and symmetrical set of punctations, while four pieces have irregular punctations.

The assemblage is dominated by incised lines that vary from basic and singular markings to zigzag geometric motifs. Appliqué is also strongly featured mostly in curvilinear designs. Although not recorded in high numbers, all techniques appear in combinations and lead to more complex patterns, as well as composite patterns generally (Figure 6).

	
OS:4-21 paired parallel	OS:5-47 several parallel
	
OS:2-36 converging	OS:4-69 curvilinear

Figure 4: Faak Open Site incised line decorations. Credit: Phillip Beaumont.

	
OS:5-08 curvilinear	OS:3-76 straight, impressed
	
OS:5-42 closed form	OS:6-07 nubbins

Figure 5: Faak Open Site appliqué decorations. Credit: Phillip Beaumont.

	
OS:3-90 incised zig-zag pattern and impressed appliqué	OS:4-05 appliqué parallel lines and curvilinear

Figure 6: Faak Open Site combination decorations. Credit: Phillip Beaumont.

Surface Treatment

An immediate distinction between the Faak Cave and Faak Open Site shards is preservation state. Over 80 percent of cave shards are fresh or average, while 75 percent of the open site collection is conversely worn to very worn. This observation is not surprising given the evident temporal differences and the protected environment of the cave, particularly from heavy wet-season rain, which is undoubtedly the main agent accounting for the worn and rounded quality of the vast majority of the open site shards. Almost 18 percent of the Faak Open Site shards display apparent surface color, which occurs consistently throughout the assemblage (Table 4 above). However, the presence of an applied surface color or treatment is often ambiguous, especially where shards are worn or highly eroded. In addition, there may be a number of factors that produce surface color other than applied slips, paints or other finishes, including the essential nature of the fabrics concerned and differing outcomes resulting from variable firing conditions. There are no clear examples of red-slipped pottery or any other readily identifiable and consistent surface quality within this collection.

EARTHENWARE SURVEY— FABRICS

Macroscopic assessment of the diagnostic shards identified a range of variation in fabric types, firing, and color (see Supplementary files 1-4). Most of the cave and open site shards are a medium to fine fabric and evenly fired. Of the open site shards, very pale brown (15 percent) and reddish yellow (14 percent) are the most numerous colors. However, when taken together as groups, various ‘brown’ shards account for around 38 percent of the assemblage, gray 29 percent, with red at 19 percent.

THIN SECTION ANALYSIS

A preliminary petrographic examination was conducted on a selection of non-diagnostic shards (see Supplementary file 5 for photomicrographs and key observations). The outcomes were compared with a petrographic report by Dickinson (2011), who assessed thin section samples from five north coast archaeological sites in the east of Timor-Leste (see Supplementary file 5 for the report). Dickinson found the tempers from these sites were exclusively local, although he identified a calcareous-forminiferal type as resembling tempers from Maluku. Dickinson described several main inclusions that he associated with particular sites. However, it was also apparent there were several mixed versions that combined temper types, as well as including other lithics. In effect, he described two temper spectrums based on calcareous sands and terrigenous lithic fragments, which serve as a basic framework for distinguishing between broad locations: coastal tempers, which are more likely to contain reef detritus; and tempers derived from inland sources.

Thin section petrography is often used to determine provenance following the principle that ceramic mineralogical composition reflects the geology of the area where raw materials were collected (Quinn 2013:117). Many ethnographic examples show that raw materials for pottery are most commonly obtained within a 1km distance (Rice 1987; Tite 1999; Arnold 2000), with a threshold of no further than 4–7km (Bishop *et al*. 1982). Therefore, effective petrographic analysis is dependent on complementary studies of local raw materials (Peterson 2009) given it is probable that pottery manufacture sites will be close by source materials. The geology of Timor is very complex and, in the locale of Faak, the Cribas Formation is characterized by numerous lithologies, including shale, silty shales and siltstones, calcareous and clay-ironstone nodules, calcarenites, calcilutites and occasional limestones, as well as a notable detrital element comprising quartz forms with some plagioclase and mica (Audley-Charles 1965; ESCAP 2003; Monteiro and Pinto 2003; Tate *et al*. 2015). The physical geography of the Cribas area with steep slopes leading to erosion and high sediment loading in rivers has created extensive alluvial fans and floodplains (Thompson 2011).

The preliminary petrographic examination was made on a series of 21 body shards from the Faak Cave and Faak Open Site (see Supplementary file 5 for complete observations and descriptions), which represented common fabric types observed macroscopically. Shards were also selected from excavation units affording the best temporal details where contrasts over time could be tested. In addition, shards appearing to bear a distinct surface color were also included with the supposition that an applied surface treatment will appear as a distinguishable layer on the edge of a thin section sample (Quinn 2013:182). The preliminary analysis identified four broad inclusion types with two types tending to predominate. The key inclusions common across a number of samples are: polycrystalline quartz, sedimentary rock fragments, calcareous grains, and rock fragments with plagioclase (Table 7). It is noted that the key inclusions all occur in combination with other inclusions of various types and proportions.

Table 7: Faak key inclusions in thin section samples.

Faak Cave Site						
Slide-Sample	**Square-Spit**	**Shard type***	**Polycrystalline quartz**	**Sedimentary fragments**	**Calcareous type**	**Fragment & plagioclase**
1-A	C-4	SC				X
1-B	C-5	SC				X
2-A	C-1	Plain	X			
2-B	C-5	Plain			X	
2-C	C-5	Plain	X			
3-A	F-1	SC			X	
3-B	F-1	SC	X			
3-C	F-4	SC	X			
4-A	F-1	Plain	X			
4-B	F-1	Plain	X			
4-C	F-4	Plain		X		
Faak Open Site						
Slide-Sample	**Spit**	**Shard type**	**Polycrystalline quartz**	**Sedimentary fragments**	**Calcareous type**	**Fragment & plagioclase**
5-A	2	SC	X			
5-B	2	SC		X		
6-A	2	Plain		X		
6-B	2	Plain		X		
6-C	2	Plain		X		
7-A	5	SC	X			
7-B	5	SC	X			
7-C	5	SC		X		
8-A	5	Plain	X			
8-B	5	Plain		X		

* SC: Surface color layer (see Supplementary file 5)

Polycrystalline quartz inclusions appear in 48 percent of the samples overall. Sedimentary rock fragments account for 33 percent. Fabrics with polycrystalline quartz are common among the cave samples but also a number of open site shards. Fabrics with sedimentary rock fragments are mainly clustered among the open site samples and more frequent in spit 2. Two other inclusion types are found in the cave samples but are probably best regarded as unique rather than indicative of any prevalent type. Samples 1-A and1-B exhibit a pairing of volcanic/granitic rock fragments and plagioclase inclusions, which are not apparent elsewhere. However, they show different characteristics in other ways. Sample 1-A has a very dense red matrix, which is free from sand inclusions, with unimodal rock fragments and plagioclase dominant. In addition to rock fragments and plagioclase, Sample 1-B has a heavy occurrence of medium-fine calcareous grains, which results in a clear bimodal distribution (Figure 7). Both samples have apparent red surface coloring macroscopically. However, neither has discernible layers on the surface of the shard in thin section.

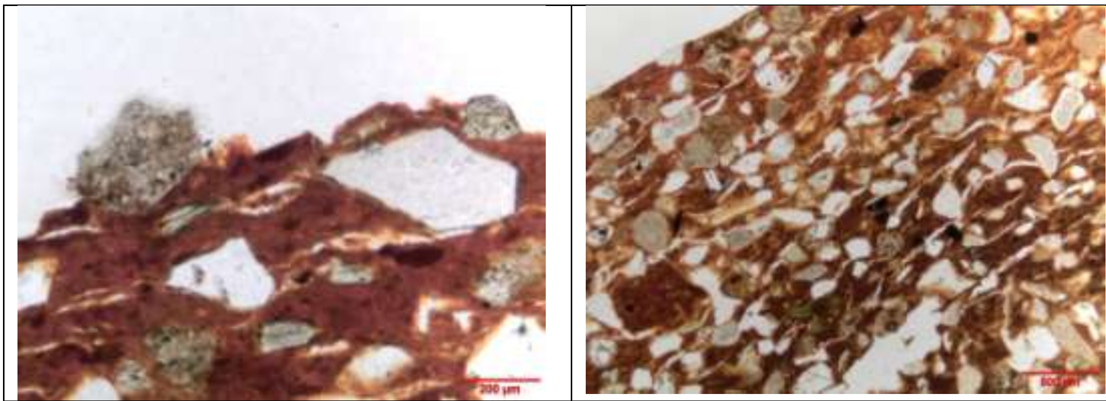
Samples 2-B and 3-A exhibit the other unique cave inclusion type. 2-B features large white-gray plates, suggesting calcareous limeclasts. 3-A appears to be the only example of a marine, forminiferal calcareous inclusion (Figure 8).

As one of the most abundant rock-forming minerals, quartz is not a highly reliable indicator of particular source or origin in the region. However, within the Faak assemblage, it does appear in a number of shards and is absent in others. Figure 9 highlights examples of polycrystalline quartz inclusions from the cave and open site excavations, and the diagnostic characteristic of showing gray or white interference colors in XPL (MacKenzie *et al*. 2017:44). Along with prominent polycrystalline quartz fragments, sample 3-B and 7-B, as well as 2-C and 5-A, share a similar light brown-brown clay matrix with less than 30 percent sand inclusions. This contrasts with most other polycrystalline quartz samples that have various dark clays (3-C), which are also densely packed with medium-fine sand inclusions (2-A, 4-A, 4-B, 7-A). Although the identification of polycrystalline quartz is a means of separating some samples from others, it does not constitute a highly coherent fabric group.

The samples characterized by rounded sedimentary rock fragments of mostly shale or siltstones present a more consistent and unified fabric appearance. These fragments are seen to contain their own inclusions with clay matrices tending to be light brown with silty-clay naturally occurring inclusions. Voids and channels are more abundant relative to the polycrystalline quartz fabrics (Figure 10).

Sample 7-C also exhibits the broad sedimentary rock fragment fabric type. Additionally, it clearly shows a red-colored surface layer, which is seen to be laminating or separating with an elongate void evident (Figure 11, 7-C-02).

Ten samples were macroscopically identified as bearing a distinct surface color and were explicitly examined for evidence of any applied layer (Table 7 above). Results were mixed with just three samples deemed to clearly show a colored surface layer (5-A, 5-B and 7-C). Three were equivocal (3-A, 3-C, 7-B). Four were considered as not convincingly having an applied surface layer (1-A, 1-B, 3-B, 7-A). The case for



1-A-02	1-B-02

Figure 7: Faak Cave volcanic/granitic rock fragment and plagioclase inclusion fabric type. Credit: Phillip Beaumont and Mathieu Leclerc.

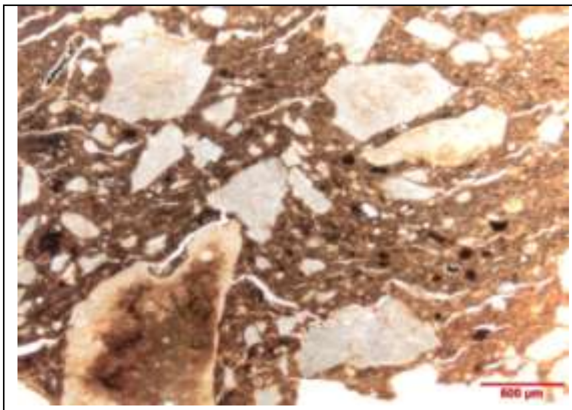
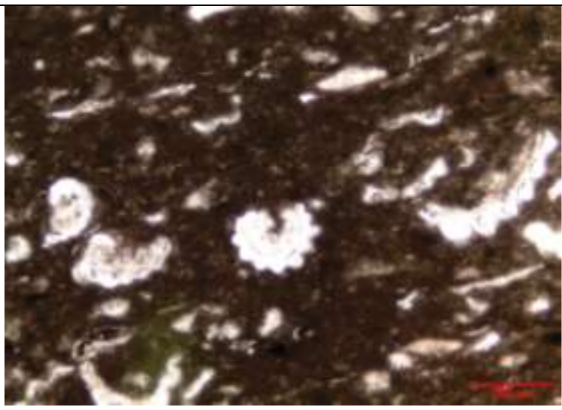
	
2-B-01	3-A-03

Figure 8: Faak Cave calcareous inclusions fabric type. Credit: Phillip Beaumont and Mathieu Leclerc.

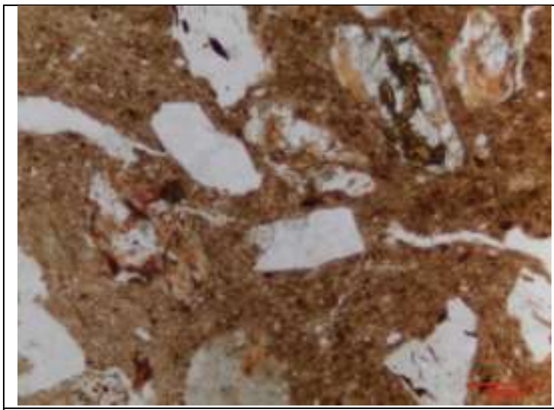
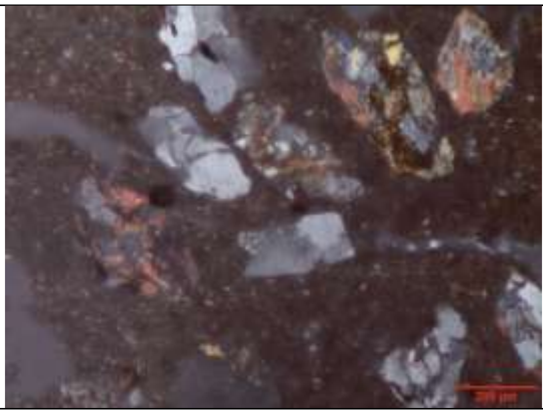
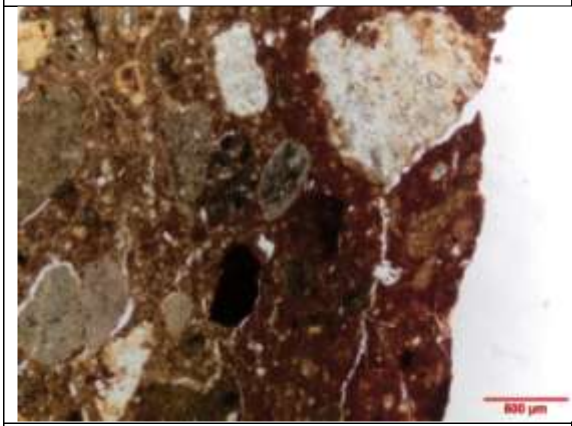
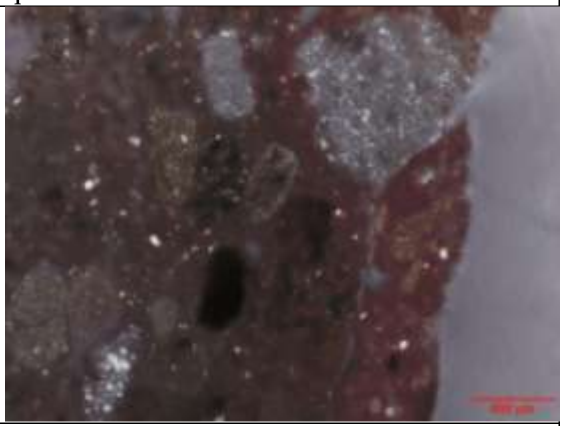
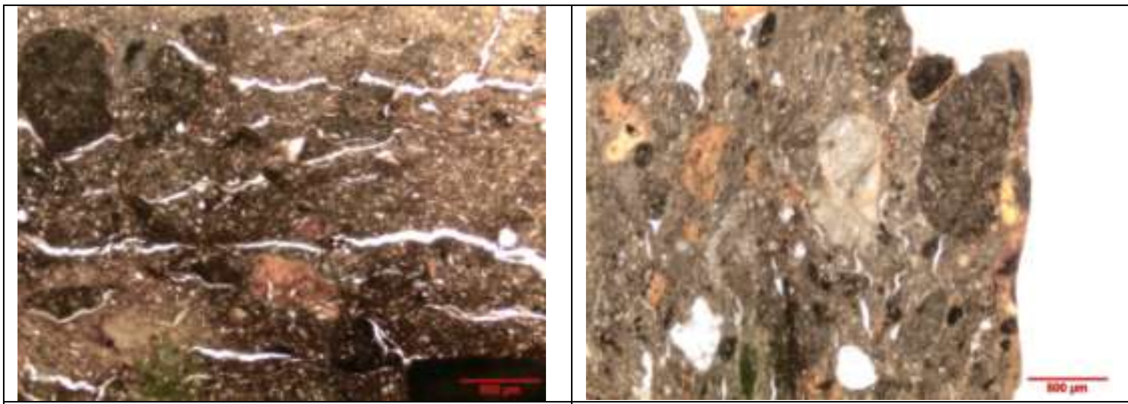
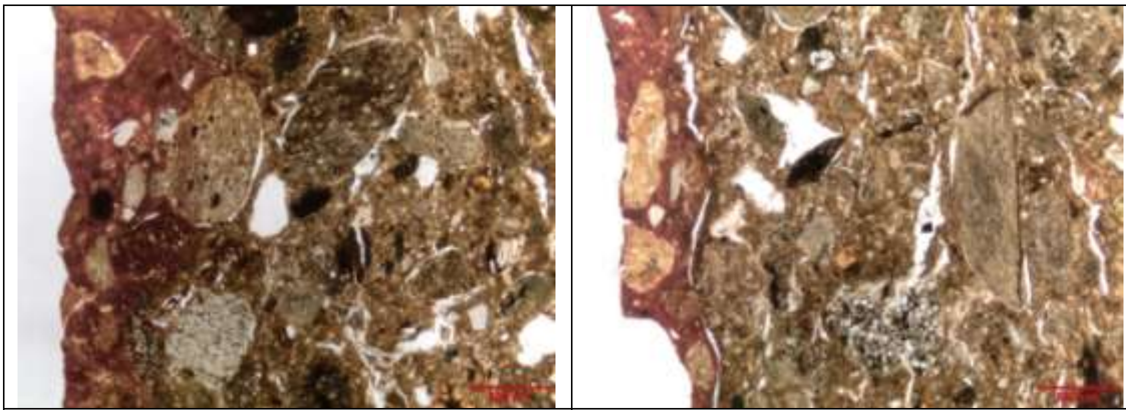
	
3-B-02 PPL	3-B-02 XPL. The inclusions showing multiple colors may be metamorphosed quartz
	
7-B-02 PPL	7-B-02 XPL

Figure 9: Faak Cave and Open Site polycrystalline quartz inclusions at PPL and XPL. Credit: Phillip Beaumont and Mathieu Leclerc.



4-C-01 | 6-B-03

Figure 10: Faak Cave and Open Site sedimentary rock fragment inclusions fabrics. Credit: Phillip Beaumont and Mathieu Leclerc.



7-C-01 | 7-C-02

Figure 11: Faak Open Site colored surface layer. Credit: Phillip Beaumont and Mathieu Leclerc.

the existence of any applied surface color layer appears stronger for the Faak Open Site, based on this limited sample, with a 60 percent positive result. General macroscopic observation indicates that surface color features on around 14 percent cave and 18 percent open site shards (Table 4 above). However, the analysis has shown that the presence of color does not indicate an applied surface layer in most cases.

The results of the preliminary analysis show more affinity with Dickinson's terrigenous lithic fragment spectrum. In broad terms, the Faak Open Site assemblage presents a more homogenous fabric, with more variation evident from the Faak Cave. These observations suggest that the open site pottery is more likely to originate from a single or limited range of sources, while the cave ceramics may be the output of a number of manufacture locales, with the possibility that some pottery was imported and of a coastal origin. In summary, the majority of the Faak earthenware and especially the open site assemblage show inclusions consistent with source materials derived from local river sands and rocky fragments.

DISCUSSION AND COMPARISONS

Although the Faak Cave and Open Site excavations are spatially adjacent, the earthenware assemblages suggest differences in the way the two areas were used. The Faak Cave has a long history of use extending to the Pleistocene-Holocene transition ca. 12,000 years ago (Table 1 above). However, the dates associated with its earthenware assemblage indicate that pottery deposition is a relatively recent phenomenon, no earlier than 400 years ago and mostly more recent. The date ranges obtained from the Faak Open Site are in chronological sequence and indicate that pottery was deposited here from at least 1800 BP until around 500–600 years ago. The open site has yielded a significant quantity of pottery with deposits containing earthenware found to extend beyond the test pit.

There is minimal morphological change in the Faak assemblage overall and it portrays a limited number of standard forms. Standardization of pottery is typically associated with increasing specialization and organized production, and potshards found in large quantities are often the key to identifying ceramic industry sites (Orton and Hughes 2013). However, consistency in form and a limited number of types does not necessarily indicate large-scale manufacturing and there are other modes of productions that might still result in substantial deposits of archaeological pottery over time. The Faak pottery is likely to be part of a craft specialization practiced continually by individuals or households within village communities. The degree of variation in rim-angles and lengths or lip profiles in what is otherwise an essentially standard form, most likely reflects the preferences and skills of individuals practicing their craft within an established, continuing tradition. The homogeneity of tempers and clay pastes is also another key indicator of standardization (Tite 1999). However, village craft potters will usually work with similar paste recipes dictated largely by the local materials available and any conventions in accessing them.

The earthenware survey has indicated the typical vessel from Faak at any time is a globular cooking pot with a sharply everted rim and rounded-pointed lip. It is unlikely to have any decoration but if it does, it will probably be a simple incised line pattern or curvilinear appliqué motif. It is also unlikely to be colored in any way but if it is, it may be painted, perhaps with an ochreous pigment varying in hue from red, yellow to brown. The analysis of the Faak earthenware corresponds closely with the attributes identified by Glover (1986). However, temporal range is the major discrepancy between his sites and the Faak assemblage. Although the chronological integrity of the sites excavated by Glover has been reappraised, it seems clear that his earliest pottery is significantly older than any found at Faak and probably Neolithic. Nevertheless, it is also clear that his ceramic assemblages overlap in time with the Faak Open Site pottery. Given the reassessment of the associated dates, Glover's (1986:210–212) 'second phase' pottery may be reasonably assumed to align closely with the Early Metal Age from 2500 BP and therefore coincide in time with the Faak collection. While it may be incidental, Glover's second phase assemblage does share some similarities in terms of form and incised decoration with the Faak Open Site assemblage. Aside from the transition from Neolithic-age pottery to the occasionally decorated ceramics found in the second phase, Glover noted little change over time. This essential conservatism and continuity is the most striking similarity between the Faak earthenware and the foundational assemblages recorded by Glover (1972, 1986).

The preliminary thin section analysis indicates some broad difference between the Faak Cave and Open Site. The identification of polycrystalline quartz as a key inclusion is not a powerful indicator of distinction, but as a feature of the Faak sample it provides a qualitative contrast. However, among the samples where polycrystalline quartz is seen, there are clear differences in fabrics, which diminish the coherence of the quartz inclusions as any integral fabric group. The rounded sedimentary rock fragments found in the open site samples appears to be a more uniform inclusion group, and lithic fragments like shale or siltstone are likely to be plentiful in the local river sands and gravel beds. These open-site samples also exhibit a similar matrix with characteristic channels and planer voids that suggest low intensity, hand-forming techniques. Nevertheless, the cave samples present more diversity in fabrics, which at first seems at odds given the limited number of shards relative to the extensive open site assemblage. However, a greater degree of homogeneity among the open site pottery is indicative of an enduring pottery tradition and ongoing, localized production. The more diverse cave pottery could be the outcome of differing pottery origins and productions, which provided procurement choice as they became more accessible in comparatively recent times.

The size of pottery assemblages excavated on Timor-Leste varies considerably. The four sites excavated by Glover yielded 14,000 shards (Glover 1972:88), just a thousand more than from the single Faak Open Site test pit. Around 1475 shards were recovered from four excavation squares at the Bui Ceri Uato Mane rockshelter (Oliveira 2008). In contrast, the hilltop forts, which are common to the period prior to and after direct European contact, have pottery shards in abundance. At Macapainara, almost 32kg of earthenware was excavated (Fenner and Bulbeck 2013), a quantity approaching twice the amount from Faak although derived from a much more extensive excavation (O'Connor *et al*. 2020). In the sense of the quantum of pottery available, the excavation of the Faak Open Site has at least a similar density of pottery as that found in the historic-era hilltop village sites, also reinforcing the impression that Faak was the locale of an open settlement.

The generic nature of ceramic styles and decorative forms throughout eastern Indonesia at Early Metal Age sites does facilitate some comparisons. However, these overall similarities tend to flatten the recognition of variations that may be more insightful in inferring closer associations. Even in more complex forms, variations may be overlooked in favor of claiming similarity, which can be readily made; e.g., appliqué and impressed decoration from Halmahera dating to 2300–2100 BP (Ono *et al*. 2017:116) does broadly match some examples from Faak (OS:3-90, OS:3-76, OS:5-44). Yet making speculative linkages based on such similarities may be superficial without further data. Directly associating shards that show affinities in ways like decoration, or conversely demonstrating connection when there appears to be no relation in style, may be achievable through rigorous petrographic examination. However, the effectiveness of petrography as an analytical approach depends on the availability of comparative material, either other samples and appropriate analysis or definitive references. In this sense, more comprehensive petrographic data from the region to facilitate inferences about likeness and association is ideally needed to build upon the available authoritative work, especially of the late William Dickinson. In circumstances where pottery manufacture is often based on locally available raw materials, explanations for any regional Early Metal Age pottery tradition needs a combination of analytical approaches and frameworks that currently remain underdeveloped.

There are at least two broad and regionally identified phases and processes at play that provide some interpretative framework for the Faak ceramics. Evidence from Wallacea points to the arrival of Neolithic pottery from around 3500 BP prompting Spriggs (2007, 2011) to see a north to south connection involving the Philippines, northeast Borneo, Sulawesi, Timor, and then Maluku. Although currently accepted dates for the arrival of pottery in Timor fit well with this timeframe, it remains an open question as to whether an early Austronesian introduction is the major influence on ceramic technology there. It is questionable whether the Neolithic was ever a homogenous social or cultural phenomenon in the region and different mechanisms may have actuated the subsequent uptake, adoption or adaptation of Neolithic technologies in different locations and at different times (Swete Kelly 2008; Lape *et al*. 2016). It appears significant that following the initial introduction of Neolithic ceramic technology in discrete areas of eastern Indonesia, ongoing technology transfers between communities carried pottery production along webs of movement in many directions over sea and land. The appearance of metal in eastern Indonesia after 2500 years ago has been hypothesized to relate to the spice trade driven by demand from China and India (Spriggs *et al*. 2006; Hung and Chao 2016; Ono *et al*. 2017), along with trade in forest produce (Swadling 1996). Against a background of active inter-island communication throughout the Holocene, the Early Metal Age and the subsequent increase in human mobility triggered the widespread introduction of pottery across eastern Indonesia. In many cases, this pottery was distinct from the earlier Neolithic forms in that it was mostly unslipped, occasionally decorated with incised lines, or to a lesser degree other techniques, and fundamentally utilitarian (Soegondho 2003). The Faak ceramics therefore have a general affinity with the Early Metal Age ceramics described elsewhere in Timor and more broadly in eastern Indonesia. The intensification of innovative influences and contacts, which occurred during the Early Metal Age, undoubtedly affected the region, including Timor, in what was largely a maritime process. However, the extent of influence within island interiors and hinterlands is less clear and the pottery found at Faak provides an example of the production of Early Metal Age ceramics in an inland location.

The prolific pottery excavated from the Faak Open Site points to longstanding and regular use of this specific location for domestic purposes. Furthermore, the unexcavated burial within the pottery deposit can justifiably be assumed to relate to the period indicated by the lowest radiocarbon age of 1858–1710 calBP, or before, which is close to the age of the direct date on the fragment of human mandible from the surface context found below the cave fissure in the Faak Cave (Table 1 above). It would appear likely that the pottery deposit is part of a generalized domestic 'midden' associated with village dwellings, accumulated over many generations by particular households. While the Faak Open Site burial may have been interred in the context of this same domestic setting, there is no indication that any of the Faak pottery was placed as grave goods, rather it appears to have been incidentally incorporated into the overlying deposit.

The Faak Open Site is interpreted as part of an overall archaeological landscape that served as a small hilltop settlement complex. If this preliminary assessment is valid, then the large accumulation of earthenware becomes more readily explainable. Indeed, the Faak locale may be an example of a small and comparatively remote habitation site, which may occur widely in locations near permanent water in Timor-Leste but are as yet unexplored archaeologically. Caves in Timor-Leste often have ideological, metaphysical and/or sacred significance, but even today are used in utilitarian and prosaic ways as temporary abodes when overnighting in areas distant from the primary village where gardens are being planted, and during hunting trips, depending on local circumstances of occupation and site suitability (Pannell and O'Connor 2005). There is little doubt that the pottery represented by the Faak Cave assemblage was utilitarian and virtually exclusively for cooking and food preparation. The overall paucity of pottery and its late appearance in the Faak Cave may merely reflect the rarity of cave use for general domestic activities, such as food preparation, particularly in view of its proximity to a village settlement.

CONCLUSIONS

The two excavation areas that make up the Faak site show marked differences in prehistoric ceramic usage. While there is only limited and relatively recent evidence of earthenware in the Faak Cave, pottery is uncommonly abundant at the Faak Open Site where it is dated from around 2000 BP. Although it is certain that pottery extends *in situ* outside the excavated area, the Faak Open Site assemblage is large as it stands and exhibits the key features of everted rim, globular cooking pots, with occasional incised line decorations, which are the common characteristics of Early Metal Age pottery in eastern Indonesia.

The pattern of pottery emergence across eastern Indonesia sees Neolithic ceramics, typified by red slip and particular forms, appearing in small quantities at widely spread locations from about 3500 BP. However, it is not until ca. 2500 BP, that pottery, which largely lacks red slip but sometimes features incised decoration, becomes widespread throughout the region. The Faak Open Site assemblage has forms and decoration consistent with this broad Early Metal Age expression of earthenware traditions. However, rather than fall into the same circular reasoning as besets the Neolithic macro-level models, we would join with Klamer (2019) in advocating a bottom-up approach; one that involves collecting more data at the level of regional language groups and communities, and examining assemblages within the more holistic context of the contact histories of these populations.

The density of ceramic finds at the Faak Open Site strongly indicates that this hilltop locale within close proximity to reliable freshwater was the setting of a habitation complex from around 2000 years ago, and thus a rare example of an inland open settlement, which today occurs throughout Timor-Leste and other islands, but is as yet archaeologically elusive.

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