An Early Human Settlement Site in Fiji: The First Dates from the 2002 Excavations at Naitabale, Moturiki island

IAS TECHNICAL REPORT NO. 2003/06

INSTITUTE OF APPLIED SCIENCES
THE UNIVERSITY OF THE SOUTH PACIFIC

REPORT

INSTITUTE OF APPLIED SCIENCES

THE UNIVERSITY OF THE SOUTH PACIFIC

An Early Human Settlement Site in Fiji:

The First Dates from the 2002

Excavations at Naitabale, Moturiki island

IAS TECHNICAL REPORT NO. 2003/06

by

Roselyn Kumar
Patrick D. Nunn
Kazumichi Katayama
Hirotaka Oda
Sepeti Mataraba
Tamara Osborn

June, 2003

An early human settlement site in Fiji: the first dates from the 2002 excavations at Naitabale, Moturiki Island

Roselyn Kumar [Corresponding Author – RoselynKumar802@hotmail.com]
Institute of Applied Sciences
The University of the South Pacific
Suva
FIJI

Patrick D. Nunn
Department of Geography
The University of the South Pacific
Suva
FIJI

Kazumichi Katayama
Section of Morphology
Primate Research Institute
Kyoto University
Kanrin, Inuyama, Aichi 484-8506
JAPAN

Hirotaka Oda
Center for Chronological Research
Nagoya University
Furo-cho
Nagoya 464-6602
JAPAN

Sepeti Matararaba
Fiji Museum
Suva
FIJI

Tamara Osborne
Department of Geography
The University of the South Pacific
Suva
FIJI

Contents

	Page
Introduction	1
The study site	2
Excavations at the Naitabale site	4
Radiocarbon dating from the Naitabale excavations	5
Pit P3	7
Pit R2	9
Pit T1	11
Preliminary analysis of the human skeleton (Mana)	12
Conclusions	13
Acknowledgements	14
References	15

List of Figures

Figure 1. The islands of central Fiji and the adjoining coast of Vitilevu Island, showing the known Lapita-age settlement sites.

Figure 2. The island of Moturiki, showing the main settlements and the locations of the two known Lapita sites at Solevu and Naitabale.

Figure 3. Sketch geomorphological map of the Naitabale site, showing the locations of the ten pits excavated.

Figure 4. Summary stratigraphy and radiocarbon dates from Pit P3.

Figure 5. Summary stratigraphy and radiocarbon dates from Pit R2.

Figure 6. Summary stratigraphy and radiocarbon dates from Pit T1.

Executive Summary

Until this study, the earliest-known people to have occupied the islands of Fiji were those who inhabited Matanamuani on Naigani Island as much as 1000 BC. Excavations at the Naitabale site in southern Moturiki Island in June-July 2002 found an older settlement. From the nature of the pottery recovered from Naitabale, it appears to predate the Matanamuani site. Radiocarbon dates on charcoal from within the pits excavated at Naitabale confirm the site's great age. The dates show that the site could have been occupied as much as 1220 BC but this requires confirmation.

A human burial (named "Mana") found within the oldest layers of Pit T1 at Naitabale is that of a female, about 1.60 m tall, of slender build. The first radiocarbon date shows that she lived at least 650 BC. Further tests will determine her other characteristics.

Introduction

The first people thought to have settled in the Fiji Islands (and many other countries in the southwest Pacific[1]) made pottery, some of which they decorated using a unique technique called dentate stamping. Some of the designs they created on pots were more intricate and elaborate than any of those created by later peoples in this region. These first colonists have become known as the Lapita people, after the site in New Caledonia where their intricately decorated dentate stamped pottery was first recovered.

In Fiji, as elsewhere in the region, much remains to be learned about where the Lapita people came from, where they first settled, and what lifestyles they followed. Archaeologists suggest that the Lapita people came from the western Pacific margin. In Fiji, we are fairly certain that the Lapita people arrived slightly less than 3000 years ago and remained as a recognizable cultural group until around 2500 years ago (Anderson and Clark 1999). The earliest-known settlement site to date is the Matanamuani site on Naigani Island in central Fiji where settlement began around 2950 years ago (Professor Roger Green, University of Auckland, personal communication, 2002).

In 1999, a single Lapita sherd was discovered at Solevu (Saulevu) on the northeast coast of Moturiki Island, some 18 km south of Naigani (Nunn 1999; Ramoli and Nunn 2001). This discovery, combined with the presence of an

[1] Namely Vanuatu, New Caledonia Tonga and Samoa

early Lapita site on Naigani, led to a major field survey of Moturiki and northwest Ovalau (Figure 1) being undertaken in 2002 by the University of the South Pacific and the Fiji Museum. In June and July 2002, a seventeen-person team spent 3 weeks in the field, based at Nasauvuki Village on Moturiki. The team discovered a single Lapita sherd at Taviya on Ovalau, but concentrated their attention on the Naitabale area in southern Moturiki, where a large number of intricately-decorated Lapita potsherds were gathered during surface collection. When the surface collection part of the study was over, the team excavated at Naitabale. This paper reports the preliminary results of the radiocarbon dating of various excavated materials from the Naitabale excavations which demonstrate the considerable antiquity of this settlement site. It is anticipated that these results will be of wide interest.

The study site

The island of Moturiki lies east or windward of Vitilevu and southwest of Ovalau island (Figure 1). Its location about 15 km south of Naigani (approximately 1.91km^2 in area) is important for archaeological and geological studies. This is because until the present study the island of Naigani was thought to have had the earliest Lapita site in Fiji. The Lapita site there was excavated in 1981 by Simon Best, and some Lapita sherds were found to exhibit exotic tempers, showing that they had been imported to the island from elsewhere. The same might be expected of Moturiki Lapita sherds, one, because of this island's close proximity to the island of Naigani and two,

because the decorative motifs on the Lapita sherds are believed to be very early in nature, resembling motifs from Solomon Islands and Papua New Guinea. Preliminary assessment of the Lapita decorative styles from the Naitabale, Moturiki, site suggest the exotic sherds here predate those from Naigani (Nunn et al. 2003).

The island Moturiki itself is part of the Lomaiviti group geographically and has ten villages in total (Figure 2). It occupies an area of 10.9 km^2. Given its location in the Fiji waters, this island is vulnerable to climate change and long-term sea-level rise and is constantly under the socio-economic threats from the human population, expressed as deforestation of the mangrove ecosystem for example, thereby compounding the island's vulnerability. The first Lapita site on Moturiki was discovered at Solevu (Saulevu) in 1999 (Nunn 1999).

The actual site of our excavation is called Naitabale, which lies on the windward side of the Moturiki island and has no conspicuous offshore reef passages making it difficult for sea-going vessels to maneuver during Lapita (and modern) times. Naitabale only lies a few hundred meters away from the village of Uluibau. The Lapita site at Naitabale is approximately 200 to 300 meters inland of the present coastline and covers an area of 1.5 km^2 (Figure 3). Naitabale is characteristically marked by lush vegetation and abundant supplies of fresh water from the local river called Mataloaloa, which drains from the northwest to the south of the site and out to the sea. A 300-400 meter broad reef flat offshore exists and is still used intensively by shellfish

collectors today from the nearby villages of Daku and Uluibau. The combination of freshwater availability and abundant seafood resources must have made the Naitabale site very attractive to early Lapita settlers.

Cliffs as high as 8 to 10 meters border the western and northern end of the Naitabale site. These exposures are poor and deeply weathered but exposures were seen of porphyritic hornblende andesite and some hornblende-augite andesite. The Lapita site at Naitabale without any doubt appears to be part of a series of palaeo-beach ridges where some 3000 years ago the coastline was some 300-320 metres inland of its present position. Sea level is estimated to have been at least 1 meter higher than today at this time. It is envisaged that many settlements once stood behind some of the palaeo-beach ridges which provided barriers against storms, high seas and strong winds yet were as close as possible to the seafood resources on which the people depended. Such environments have been discussed to be the most favourable habitation sites for the Lapita people (Kirch 1997, Lepofsky 1988).

The excavations at Naitabale

As shown in Figure 3, ten 1-meter square pits were excavated in the Naitabale area. Of these, two (Pits R1 and P3) were extended southwards by another 1 meter square while a third (Pit T1) was extended by 0.5 meter square in both east and west directions in order to expose the entire human

burial we found there. In all, thirteen meters square of the site were excavated, to a typical depth of around 1.5 meters.

In most pits we observed distinct layers, which told us that there had been little significant disturbance of the site. Some disturbed areas were noted however, good examples being Pit P1 where there had evidently been regular reworking of beach-ridge and alluvial sediment sequences by lateral movements of the river channel, particularly we infer during flood stages.

In order to establish a chronology for the history of human occupation found at Naitabale, we took samples of charcoal from selected pits for radiocarbon dating. It is the results of these which are reported in the following section, and which demonstrate the considerable antiquity of this site.

Unexpectedly we also discovered a complete human burial deep within Pit T1. We received permission to excavate it and remove it to Suva for analysis. We also report the results of the preliminary analysis of the skeleton below.

Radiocarbon dating from the Naitabale excavations

The origins of all sedimentary units (layers) found in the Naitabale excavations can be explained by the interaction of marine (shoreline) processes and fluvial processes of both erosion and deposition. The basic form of the Naitabale coastal plain is that of a prograding (seaward-extending)

shoreline during the late Holocene (the last 3000 years of Earth history) under the influence of a slowly falling sea level. Storms from time to time emplaced ridges of coarse-grained sediment which later became covered by finer-grained overwash from the sea and the river system. Alluvial sediments deposited by the Mataloaloa during floods are also found, typically being silt in grain size. Localised deposits of clay are consistent with deposition beneath standing water such as occurs today in immediate back-beach areas.

Since the beach ridges are reasonably continuous, it seems that there has not been significant reworking of the area, at least the older part, by the sea. Fortunately for our purposes, the Mataloaloa is a small stream and reworking associated with high flow stages therein appears to have affected only areas marginal to the river channel.

In summary, we have at Naitabale a well-preserved coastal sequence in which the oldest beach ridge is the farthest inland and appears to be the only one associated with Lapita pottery. We assume that the Lapita settlers occupied the area in the lee of this beach ridge, a location which (as elsewhere in the western tropical Pacific) attracted them because it provided shelter from the sea yet allowed them easy access to nearshore (food) resources. The site was also close to a source of fresh water. It is worth noting that the Lapita sequence here is also quite well preserved because later groups of people occupying the site would have lived farther seaward in the lee of younger beach ridges to allow them easy access to the same marine resources. These younger beach ridges formed only after Lapita times

during times of falling sea level. This explains why the evidence of Lapita occupation is so conspicuous on the ground surface around the oldest beach ridge, and why, when we begin excavating, we often encountered Lapita potsherds in the upper layers of the sediment sequences.

This section of the paper looks in detail at only three of the ten pits we excavated, because it is these where we acquired most samples for radiocarbon dating.

Pit P3

Pit P3 was sited at the back of the oldest beach ridge, 5 metres south of its intersection at the ground surface with what we regard as alluvial sediments and/or reworked beach ridge. The excavation was directed by Patrick Nunn and reached 171 m downward at which point the water table was encountered.

Two clay layers were recognized in the upper 80 centimeters of the sequence (Figure 4). These are interpreted as former backswamp deposits since drained by the downcutting of the Mataloaloa River, perhaps in association with sea-level fall 3000-1200 years ago. The shells found in the upper clay are probably recent, dropped by people who harvested them from nearshore areas but did not occupy this exact site. The pumice in the middle clay layer may have been introduced by humans or deposited and worked into this clay

during a storm, when this beach ridge was closer to the shoreline than it is now.

The silt layer from 80-156 cm is interpreted as a former alluvial flat, probably elevated as a river terrace relative to the channel of the Mataloaloa. This would have provided an ideal flat surface for Lapita-age occupation in the lee of the beach ridge to the south. And the two charcoal samples we took for radiocarbon dating in this layer both confirm that it was occupied during Lapita times. The two dates (shown in Figure 4) suggest that this area was occupied only in the later part of the Lapita history in Fiji (3000-2500 years ago) but it may simply be that charcoal from this time, the last time when the area was permanently occupied, are better preserved and in larger pieces, than that from earlier times. When calibrated the dates suggest occupation of this alluvial flat included the period 900-510 BC (2850-2460 cal yr BP).

The alluvial flat overlies the beach-ridge sand, which thickens to the south as the silt layer pinches out. There is evidence from potsherds and shell fragments that humans occupied this land surface, presumably slightly earlier than the time they occupied the alluvial flat.

Pit R2

Pit R2 is located close to the northern (inland) boundary of the oldest beach ridge at Naitabale. The excavation was directed by Roselyn Kumar and extended 148 cm downwards until the water table was reached.

The sequence to 127 cm is primarily alluvial material of silt size, mixed with clay in most parts suggesting that the site was not as well drained as P3 and T1 and that it was sometimes waterlogged for prolonged periods (Figure 5). It was still evidently a favoured site for early human settlement, implying that the number of humans in this area at the time was considerable, if even marginal areas like this were occupied.

It is suggested that the upper two silt layers and possibly the third all formed largely only after people first began to occupy and/or farm the interior of Moturiki. Inland forest clearance would have increased sediment loads in the Mataloaloa considerably, causing it to flood more often and leading to rapid sediment build-up in such areas. At the site of R2, the effect of sediment build-up on and above the floodplain would have been exacerbated by the fact that there is a right-angle bend in the stream at this point (see Figure 3). The boundary between the second and third layers is sharp and suggests a change of environmental conditions in the area. A radiocarbon age from the top of the third layer does suggest however that this layer is also recent, although we accept that there may have been sediment reworking within the upper three layers here. It is tempting to suggest that they formed only when

people first moved inland from the Moturiki coast as a result of the crisis associated with the AD-1300 Event (Nunn 2000).

At 102 cm, there is another abrupt boundary and the layer below is distinctly silty compared to those above. This is, we suggest, the same alluvial flat in which evidence for Lapita occupation was found in Pit P3 (above), and indeed the three radiocarbon ages on charcoal from this layer bear this suggestion out. The dates suggest that Lapita people occupied this site between 1220-540 BC (3170-2490 cal yr BP). If the older date is correct as an indicator of human occupation of this site, then this becomes the oldest-known record of humans in Fiji, some 220 years earlier than the oldest-previous date from Matanamuani on Naigani Island. We do however argue for caution in accepting the 1220 BC date because it would be surprising, though not impossible, that if people were in Fiji at this time no other trace of them has ever been found.

Beneath the silt, at 127 cm is found a layer of brown silty sand, interpreted as the base of the ridge which rises to the south of this area. Pottery within this layer may have been introduced from above. It seems unlikely (yet not impossible) that this pottery is *in situ* (in the place where it was originally deposited) if the 1220 BC date of the layer above is correct.

Pit T1

Pit T1 is located on an alluvial terrace (flat) on the right bank of the Mataloaloa. In terms of its elevation, it is as high as the northern flanks of the oldest beach ridge, which it abuts. The excavation of Pit T1 was directed by Tamara Osborne and reached bedrock (fine-grained calcareous beachrock) at 160±8 cm.

The upper two layers of Pit T1 are both silty, interpreted as river deposits (Figure 6). The abundant shell fragments in the lower of the two silt layers may represent silt deposition simultaneous with the reworking of the shell-rich sand layer below, as might happen during a flood event. A radiocarbon age for the lower silt layers suggests it is recent, and may have formed (like the silts in Pit R2, above) as a result of the first inland forest clearance, itself a response to the 'AD-1300 Event'.

The remainder of the sediments in Pit T1 are sands, interpreted as part of the oldest beach ridge in this location. Both sand layers have large shell fragments of species gathered from nearby reef flats by the humans who lived there. Two radiocarbon ages on charcoal in these sand layers (see Figure 6) show that they are both ancient; the younger could conceivably postdate the end of Lapita in Fiji at about 2500 cal yr BP but the abundant Lapita potsherds found in this layer suggest otherwise. The lower layer is securely dated to Lapita times, between 900 and 780 BC (2850-2730 cal yr BP).

A human burial was found within the lowest sand layer.

Preliminary analysis of the human skeleton (Mana)

The human skeleton called Mana, named by its discoverer, a Solomon Island research student (Chris Suri), means "truth" in his dialect. This burial was removed from Pit T1 at a depth of 150 cm. Radiocarbon dates of skeletal fragments proves Mana lived at least 2600 years ago and is therefore Lapita in age. This generally poorly-preserved skeleton is believed to be that of a female with a well-preserved cranium (skull) and mandible (jawbone) thus making it perhaps the most exciting Lapita skeleton ever to be discovered in the South Pacific region.

The probability that the skeleton is that of a female comes from making observations of the greater sciatic notch parts of the pelvic bones, the glabella and orbit-margin parts of frontal bones, the size and shape of the mastoid process, the size of the femoral head, the clavicle, and ankle bones.

Mana lived for more than 0 years, perhaps more than 50 years. Mana's age was estimated by observing her severe dental wear, and the secondary cementum formation of the tooth roots. Other age-determination criteria come from observations made of the nearly-completed fusion of her cranial structures (already fused, even on the outer plate), and the degenerative changes of the sacro-iliac joints of the pelvis.

Mana acquired a height of about 160 cm during her lifetime. She had a very flat face and a rather gracile (slender) body shape, especially her legs and shoulders. She might be right-handed. Preliminary pathological analysis reveals no traces of bone fracture or any diseases except severe gum disease with advanced caries on several teeth. On the distal joint surface of the left humerus, there are degenerative bone changes recognisable.

Without any doubt, the first date on the skeleton fragments (2600 years Before Present or 650 BC) places Mana within the Lapita period of Fiji history, as recently determined by Anderson and Clark (1999). Further analysis of Mana, such as three-dimensional osteometric measurements, bone mass measurements, and dietary patterns will be conducted within the next few months. These analysis are vital in determining the facial features, build, and diet of the Lapita people about which little is definitively known.

Conclusion

We present in this paper our initial dates from our research at the Naitabale site, Moturiki Island, central Fiji. The decorative style on the Lapita pottery places it among the very oldest found in Fiji, and many archaeologists to whom we have shown it believe that the occupation at Naitabale predates any other Lapita-age settlement yet found in Fiji. The radiocarbon dates confirm the antiquity of the site, and at least one date suggests that the site may be

more than 3000 years old, although this should be regarded as only a possibility, to be confirmed or denied by the next series of dates. We hope to have all our analyses completed by mid-2004.

Acknowledgements

The research on Moturiki Island was funded by the University of the South Pacific and was carried out with the endorsement of the Fiji Museum and the chiefs and people of Moturiki. In this regard we wish especially to thank the *Ratu mai Moturiki*, Ratu Alifereti Draunidalo, and the chief of Uluibau, Ratu Tevita Bukasoqo. The radiocarbon dates on the charcoal were all funded by the University of the South Pacific and determined at the University of Waikato Radiocarbon Dating Laboratory. For assistance in the field, we are grateful to Francis Areki, Taati Eria, Michael Foon, James Leo, Alifereti Nasila, Tufoua Panapa, Tui Raicebe, Lisa-Marie Shillito, Preetika Singh, Chris Suri, Esther Tegu, Nunia Thomas. Thanks are also due to the people of Nasauvuki for their hospitality. A first version of this paper was issued as an Environmental Studies Report from the Institute of Pacific Studies at the University of the South Pacific.

References

Anderson, A. and Clark, G. 1999. The age of Lapita settlement in Fiji. *Archaeology in Oceania*, **34**, 31-39.

Best, S. 1981. Excavations at Site VL 21/5 Naigani Island, Fiji: a preliminary report. Department of Anthropology, University of Auckland.

Kirch, P.V. 1997. *The Lapita Peoples*. Oxford: Blackwell.

Lepofsky, D. 1988. The environmental context of Lapita settlement locations. In: Kirch, P.V. and Hunt, T.L. (eds). *Archaeology of the Lapita Cultural Complex: a critical review*. Seattle: Burke Museum, 33-47.

Nunn, P.D. 2000. Environmental catastrophe in the Pacific Islands about AD 1300. *Geoarchaeology*, **15**, 715-740.

Nunn, P.D., Matararaba, S. and Kumar, R. 2003. An early Lapita site on Moturiki Island, central Fiji: preliminary report. In: Sand, C. (ed). *Pacific Archaeology: Assessments and Prospects*. Proceedings of the 2002 New Caledonia Conference, submitted.

Ramoli, A. and Nunn, P.D. 2001. Naigani Island and its historical connections with Ovalau and Moturiki Islands: convergences between legend and fact. *Domodomo*, **13**, 19-28.

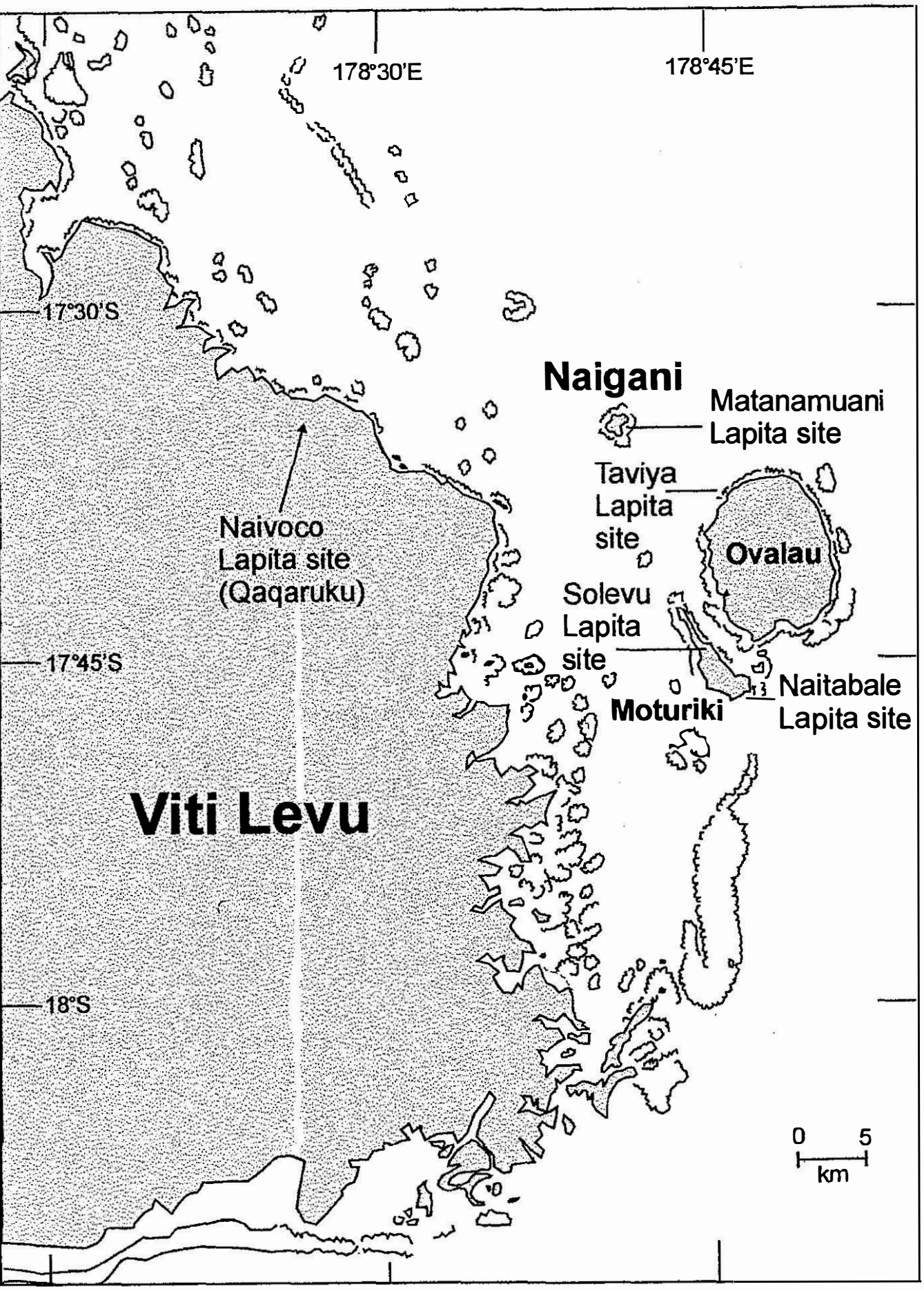
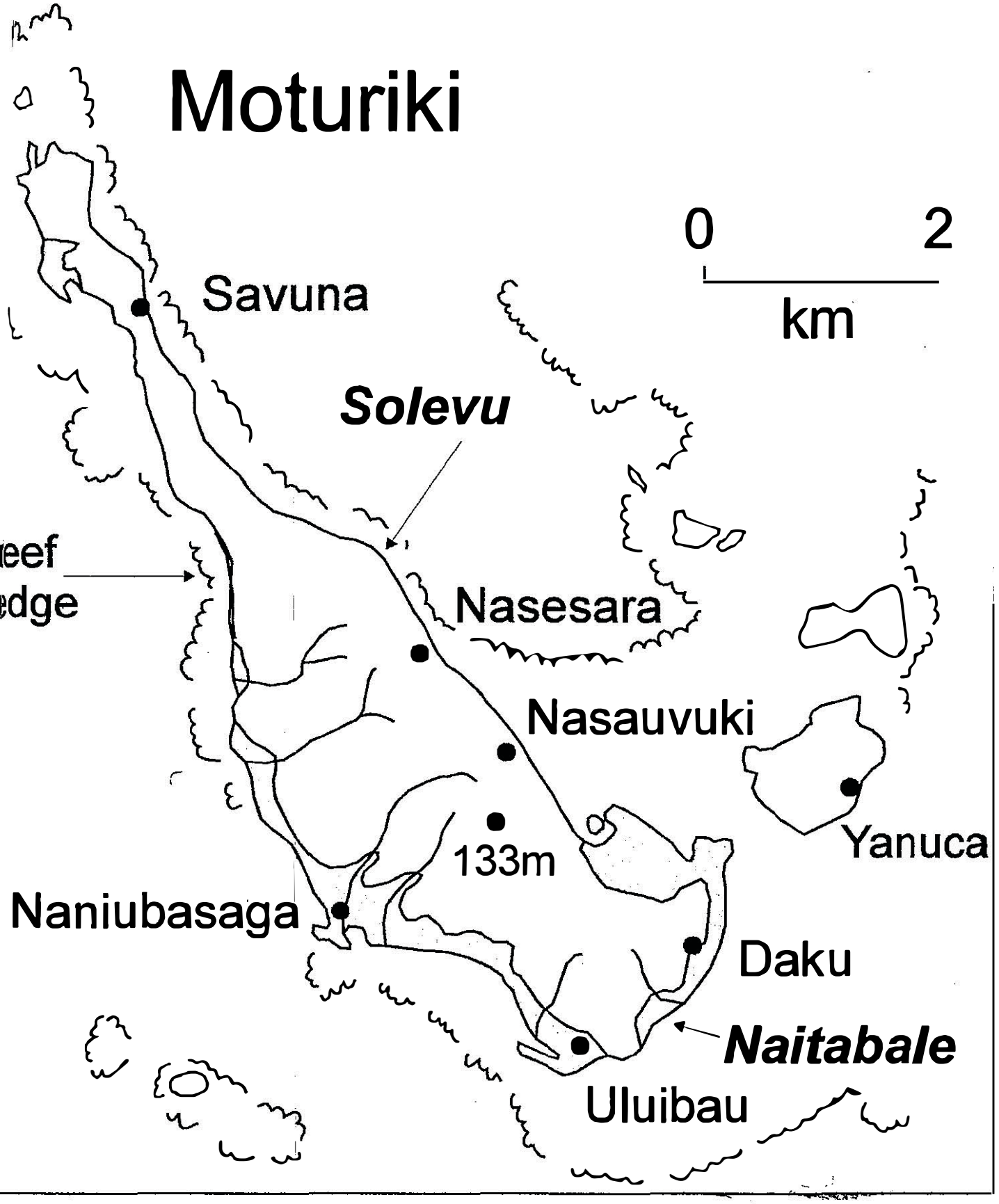

178°30'E
178°45'E
17°30'S
17°45'S
18°S
Naigani
Matanamuani
Lapita site
Taviya
Lapita
site
Ovalau
Naivoco
Lapita site
(Qaqaruku)
Solevu
Lapita
site
Naitabale
Lapita site
Moturiki
Viti Levu
0
5
km

FIG-2


Moturiki
0
2
km
Savuna
Solevu
eef
edge
Nasesara
Nasauvuki
133m
Yanuca
Naniubasaga
Daku
Naitabale
Uluibau

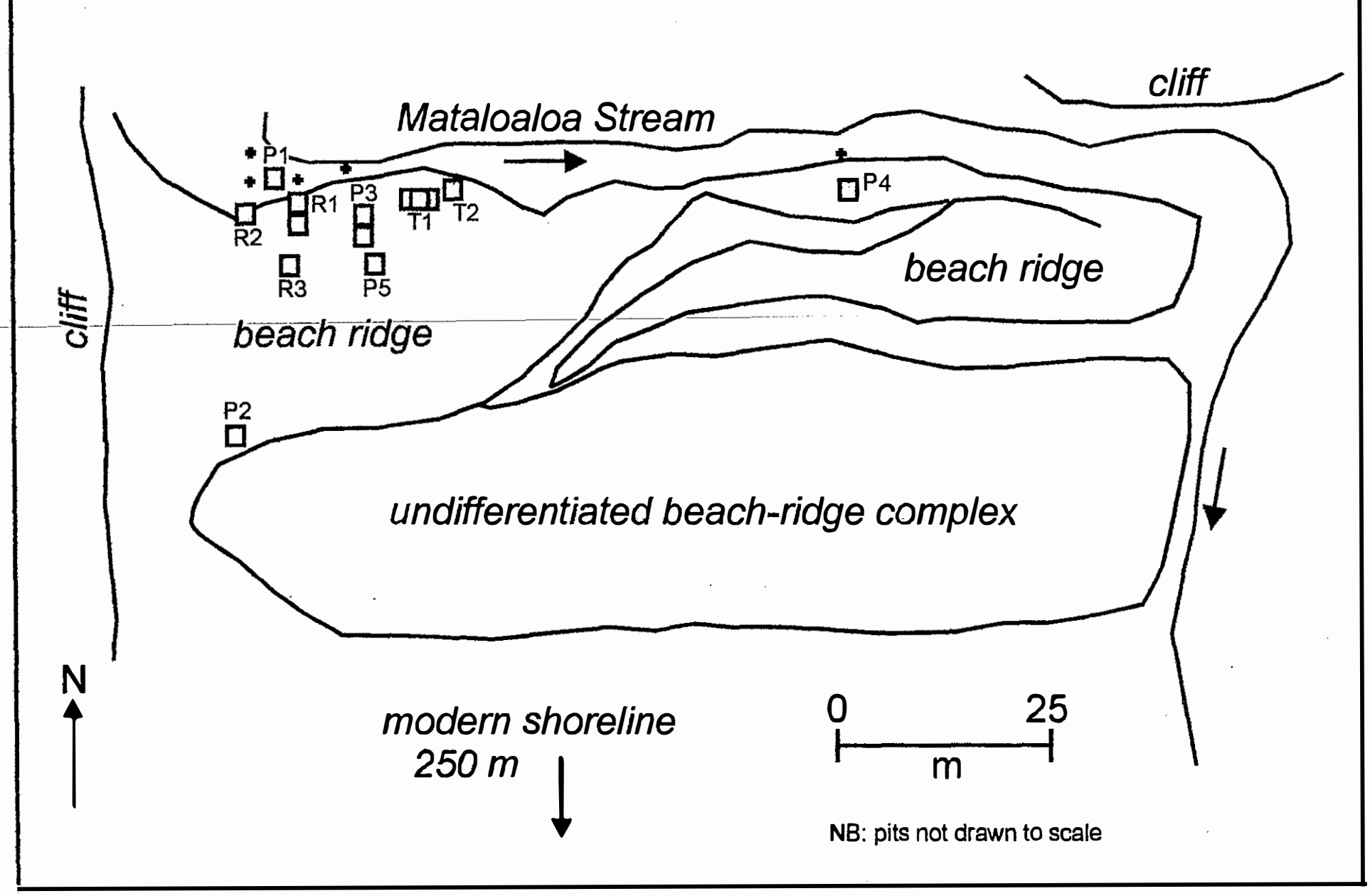

cliff
Mataloaloa Stream
P1
P3
R1
T1
T2
P4
R2
R3
P5
beach ridge
cliff
beach ridge
P2
undifferentiated beach-ridge complex
N
modern shoreline
250 m
0
25
m
NB: pits not drawn to scale

Fig. 3

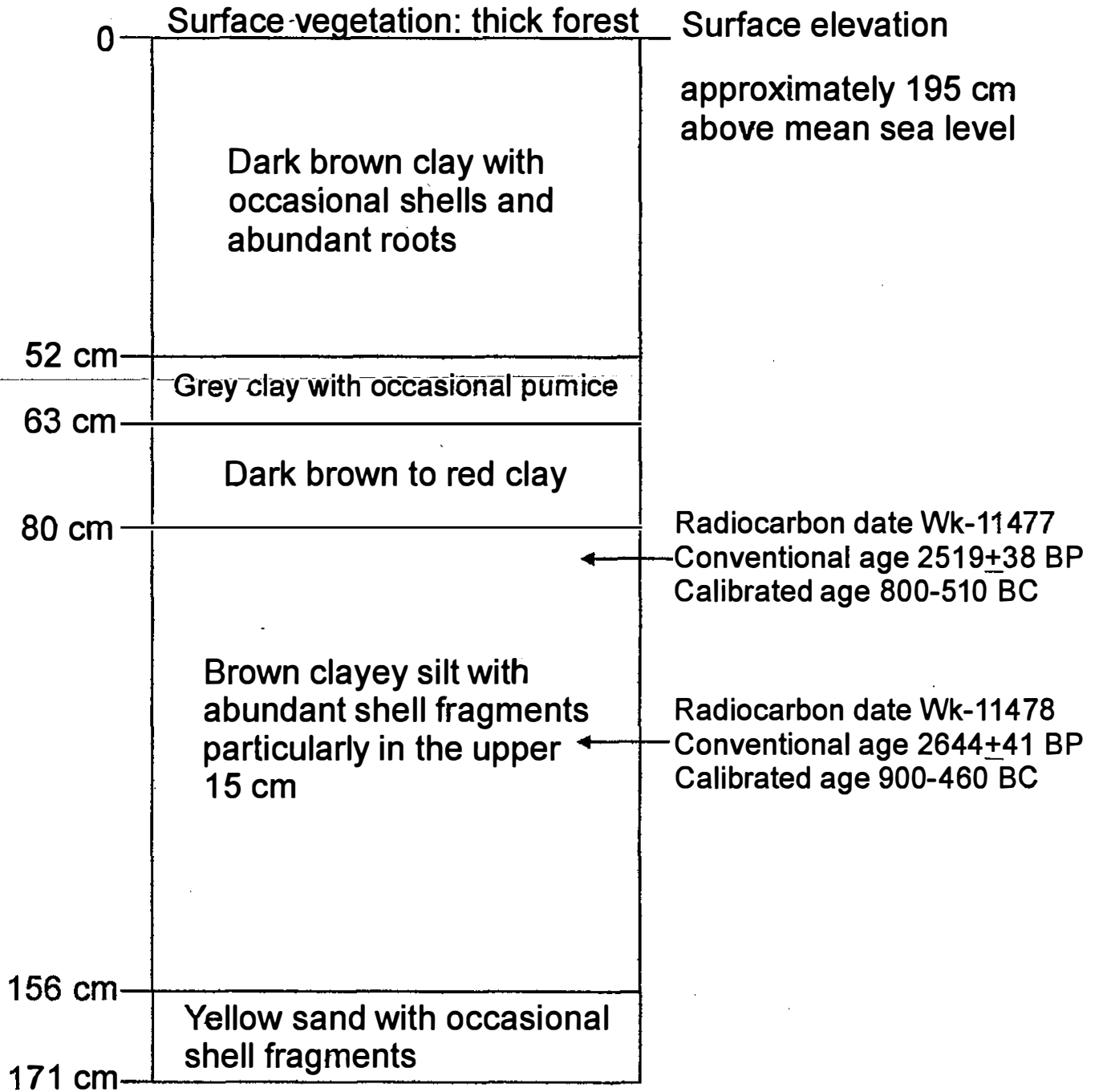
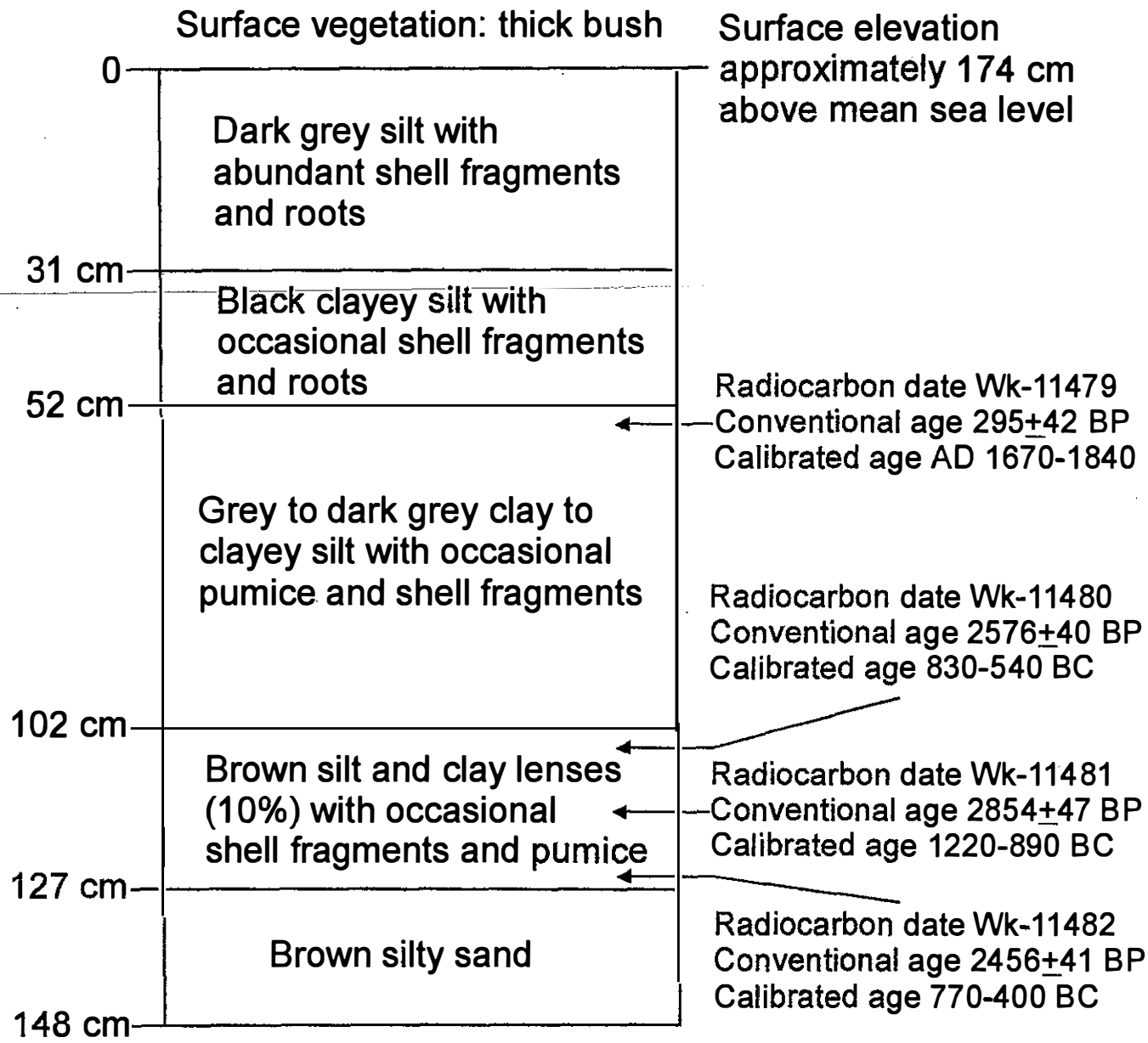

Surface vegetation: thick forest
Surface elevation
approximately 195 cm
above mean sea level
0
Dark brown clay with
occasional shells and
abundant roots
52 cm
Grey clay with occasional pumice
63 cm
Dark brown to red clay
80 cm
Radiocarbon date Wk-11477
Conventional age 2519±38 BP
Calibrated age 800-510 BC
Brown clayey silt with
abundant shell fragments
particularly in the upper
15 cm
Radiocarbon date Wk-11478
Conventional age 2644±41 BP
Calibrated age 900-460 BC
156 cm
Yellow sand with occasional
shell fragments
171 cm

FIG 4

Naitabale, Moturiki Island: Pit R2



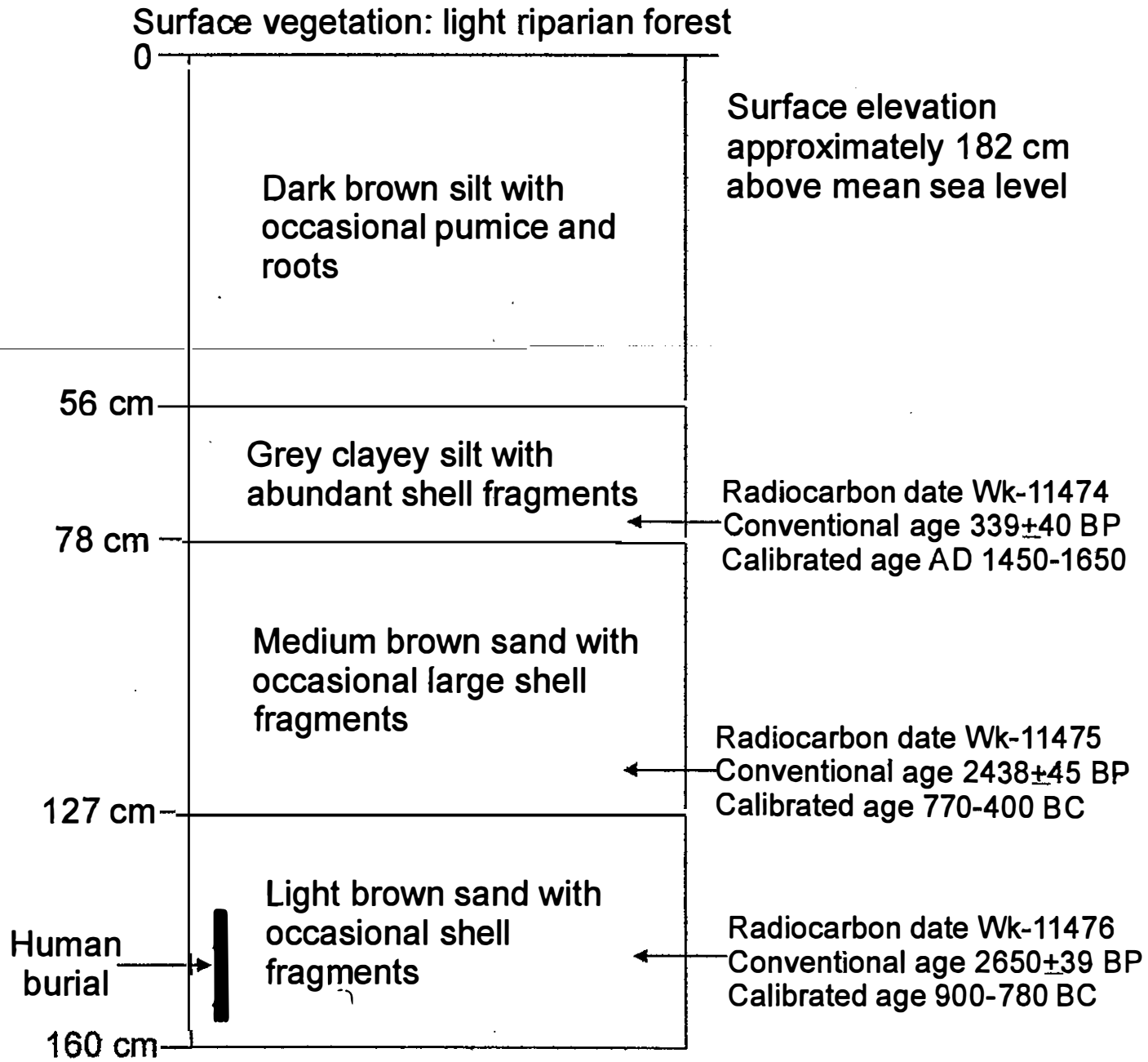

Surface vegetation: light riparian forest
0
Surface elevation approximately 182 cm above mean sea level
Dark brown silt with occasional pumice and roots
56 cm
Grey clayey silt with abundant shell fragments
Radiocarbon date Wk-11474
Conventional age 339±40 BP
Calibrated age AD 1450-1650
78 cm
Medium brown sand with occasional large shell fragments
Radiocarbon date Wk-11475
Conventional age 2438±45 BP
Calibrated age 770-400 BC
127 cm
Light brown sand with occasional shell fragments
Human burial
Radiocarbon date Wk-11476
Conventional age 2650±39 BP
Calibrated age 900-780 BC
160 cm

Fig 4