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Settlement History and Landscape Use in Santo, Vanuatu

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ABSTRACT. Preliminary results of an archaeological investigation of the northwest coast of Santo Island in Vanuatu are presented. They indicate the possibility that wet taro gardening correlated with the use of oven stone cooking technology in some coastal rockshelters extends back some 1,000 years.

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In 1996 I started a research project on the prehistory of Santo, the largest island of Vanuatu, which began with field survey and test excavations in two rock shelters (Malsosoba 1 and 2). This project focused on subsistence strategies on the western, mainly mountainous part, of the island. The settlement chronology of the high northern islands of Vanuatu is very little known apart from the recent work done by Bedford in Malekula (Bedford, 2000). It was anticipated that in a rugged and hardly accessible part of the countryside any evidence of human presence would not only reflect the final expansion of ancient populations, but also indicate the introduction of important activities such as irrigated gardening, pig husbandry or stone oven technology.

Preliminary results showed that an important part of the archaeological material found on surface sites along the coast of Santo (Galipaud & Walter, 1997) was a pottery with stylistic similarities to Sinapupu ware of Tikopia in the Solomon Islands, which is around 2,000 years old (Kirch & Yen, 1982). This pottery, however, could not be dated in Santo. The general survey was completed in 1997 with further excavation in Malsosoba 1 rockshelter at the northern end of Cape Cumberland. This shelter is located at the edge of a large irrigated taro pondfield and the results of the excavation are used to discuss the chronology of irrigated taro gardening in this area.

Location

The rockshelters Malsosoba 1 and 2 are on the north end of Cape Cumberland, the northern-most part of the west Santo coast (Fig. 1). This area, surrounded by open sea, is an old coralline uplifted structure, which was once a reef at the base of the high volcanic chain of west Santo. Several flat terraces reveal the uplift history of the region. The maximum altitude is about 300 m. The only village in this area is Hokua, about 3 km northwest of the shelter. Irrigated gardens extend over several hectares in the vicinity of the two rockshelters and remnant garden systems are witness to irrigated taro gardening which once extended up to a few meters away from the shelters' entrances.

The shelters are close to the coast, about 10 m above the Naturtur River. Fossil terraces near the shelters are now too high for irrigation as a result of recent uplifting. The rate of uplift (determined from the dating of uplifted coral reefs, Jouannic *et al*., 1980; Gaven *et al*., 1980) is between 2.2 and 4.6 mm/year in this area.

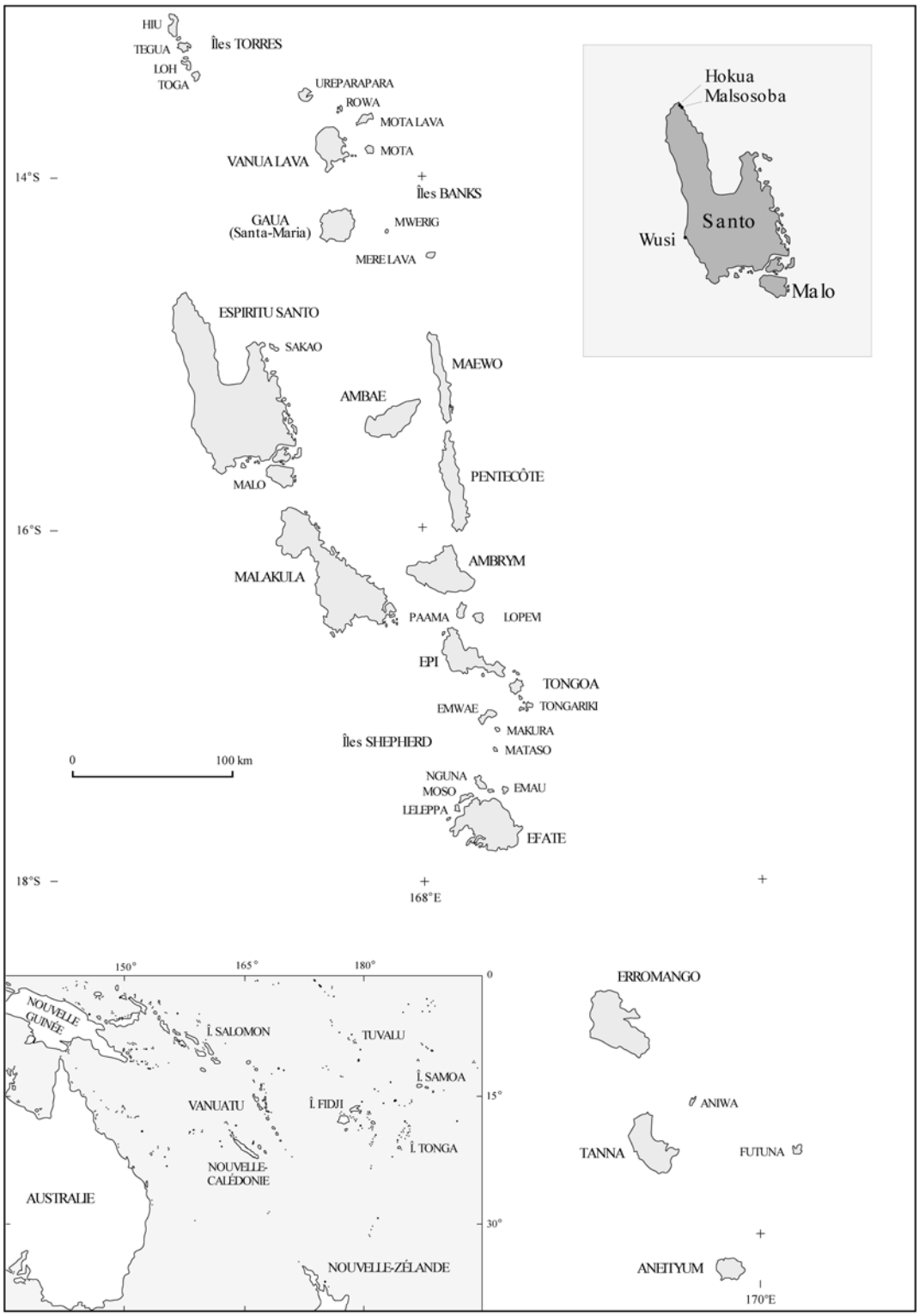

Fig. 1. Location of archaeological sites on Santo, Vanuatu.

The main shelter (Malsosoba 1) is formed by an overhanging large coral block that broke loose from the main uplifted coral terrace. It provides a sheltered area, open to the west, about 20 m long by not more than 2 to 4 m wide, of which two-thirds is high enough for human habitation. The shelter floor is a flat, black, sandy soil that shows evidence of a casual use in the form of ashes from fireplaces, piles of cooking stones, and scatters of coconut palms (Fig. 2).

Another small shelter, Malsosoba 2 (about 30 m to the south of Malsosoba 1) is a round cavity about 6 m in diameter. The shelter floor is a dark rich humic deposit which has been levelled and is retained by a surrounding stone wall. The area immediately beneath the entrance is covered with fossil irrigated gardening terraces and the nature of the sediment inside the shelter suggests that terraces once extended inside it. The stone wall surrounding the shelter is of the same type as the retaining stone terrace

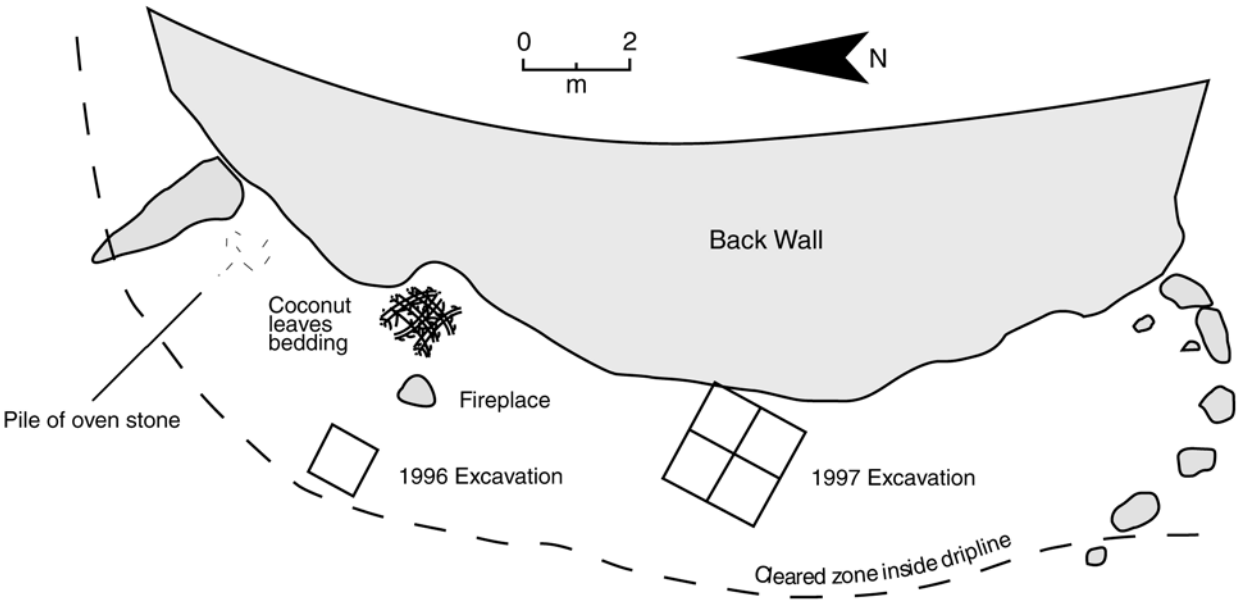

Fig. 2. Plan of Malsosoba 1 showing surface organization with location of excavated areas.

walls in the pondfields. A heap of volcanic stones from a stone oven as well as coconut palm bedding indicates that this place has been used recently. The ground in front of both shelters slopes down rapidly towards the mouth of the Naturtur River 10 m below. The entire slope is terraced.

Vegetation is typical of a low coralline environment (*Pandanus* sp., *Ficus* sp.) with an important component of introduced coconut, orange and mango trees, as well as breadfruit trees.

Excavation methods and results

In 1996, one square meter test-pits were excavated in Malsosoba 1 and nearby Malsosoba 2. The stratigraphy in Malsosoba shelters 1 and 2 revealed about 0.6 m of archaeological deposits, mainly burned stones and ash lenses from oven activity with a few faunal and plant remains and pottery.

Radiocarbon ages for the basal layers in the 1996 test-pits (Table 1) show that Malsosoba 1 was first occupied at the end of the first millennium A.D., probably at a time when the shelter had not yet uplifted to its present altitude. The recent date associated with the basal layer in Malsosoba 2 probably provides an indication of the cessation of gardening activity in this area of terraced gardens due to uplift and the consequent difficulty of re-establishing a water source.

In April 1997, a 2 by 2 m area was excavated in the eastern end of Malsosoba 1, close to the back wall (Fig. 2). This area was chosen because there was no evidence of recent use on the surface and because the ceiling height allowed for comfortable habitation. Excavation of the deposit followed as much as possible the natural strata and the eight spits were later grouped into three layers reflecting the depositional history. All sediments were dry sieved using a fine mesh screen (2 mm). All cultural remains were retained (apart from large stones which were drawn on plan), sorted, identified, measured and counted.

Table 1. Radiocarbon ages.

site name	sample ID	^{14}C age B.P.	$^{13}C/^{12}C$ ‰	conventional age B.P.
Malsosoba 1	Beta-98570	1,150±80	–27.4	1,110±80
Malsosoba 2	Beta-97558	350±60	–25.3	340±60

Stratigraphy of Malsosoba 1. The stratigraphy of Malsosoba 1 (Fig. 3) has been largely influenced by past human activity in the shelter, mainly cooking.

The surface (layer 1) is a brown loose organic deposit a few centimetres thick due to recent deposition of organic matter in the shelter. Some pottery sherds, a pig tusk, and a few bones were found on or in this layer.

Beneath layer 1 are several grey to white compact ashy lenses (layer 2) which appear thicker and better preserved towards the back wall. The lenses might be associated with the scattered heap of cooking stones in the eastern end of the shelter.

A grey-brown humic sandy layer (layer 3), 20 to 40 cm thick, is the main deposit. This humic sediment is linked with a strong human gardening activity in the nearby surroundings or with a more important vegetation cover near the shelter. Large stone oven features were found in this layer. A radiocarbon age of 1,110±80 B.P. (Beta 98570) for the base of layer 3 was obtained from large charcoal chunks associated with a small oven in test pit 1 (Table 1).

Grey and white sandy natural deposits with rounded volcanic and coral pebbles attest to the time when this shelter was at sea level and adjacent to the river. These natural alluvial sediments do not contain any cultural remains, with the exception of a few pottery sherds which might have migrated from the upper layers (see below for discussion).

The stratigraphic sequence suggests that the initially marine and fluvial environment of the shelter was, following uplift, affected by intermittent human activity, the latter evidenced by ashy lenses and scatters of burnt stones and stone fragments within the shelter.

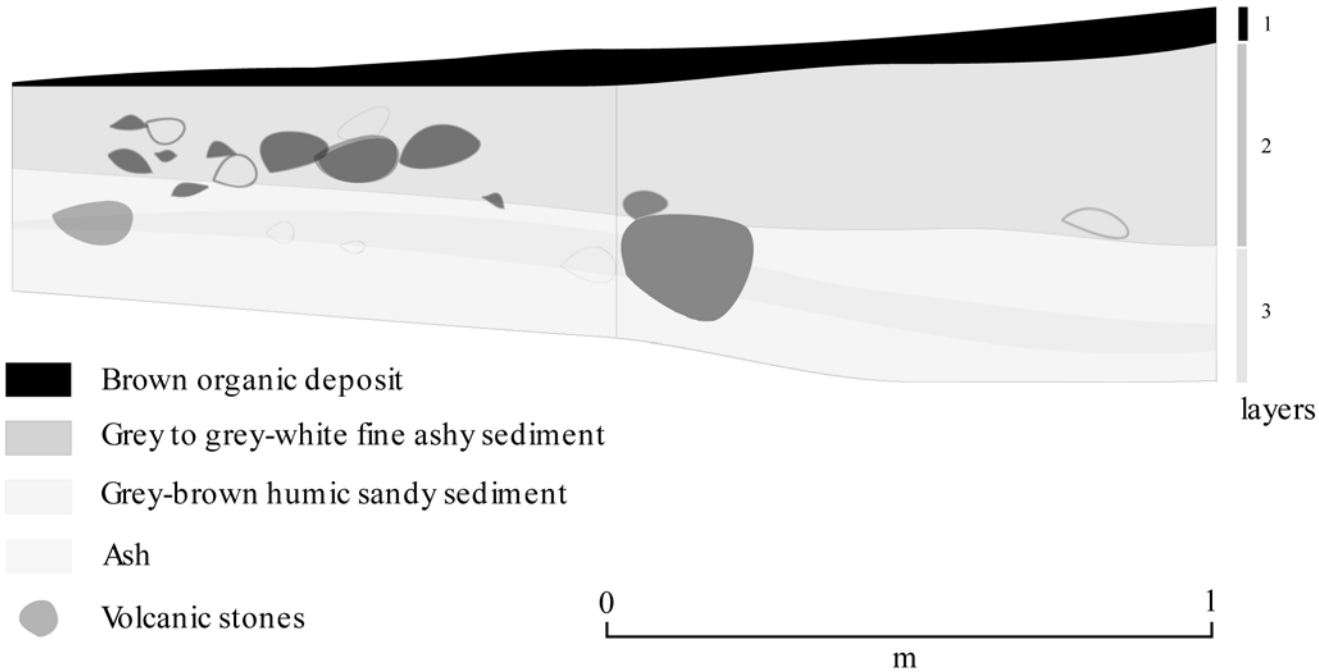

Fig. 3. Stratigraphy of west section of Squares L1 and L2 in Malsosoba 1.

Material from Malsosoba 1. Less than five pottery sherds were collected together with some shell beads which are probably from a necklace. The sherds are small and of a type made in a few villages along the coast up to the beginning of this century. Bone is also rare, and part of the collection may be of natural origin rather than brought into the shelter by humans (D. Steadman, pers. comm.). This is especially true for the rat bones and crab exoskeleton; the amount of fish bone and its recovery from all layers might be a result of the very fine mesh used for screening. The distribution of archaeological material in the excavated layers is shown in Table 2 (as most of the recovered bones weighs less than one gram, relative abundance in each square has been indicated by asterisks: one asterisk means present in one square only, four asterisks means present in all squares).

Plant remains are dominated by about nine woody species, four of which are common throughout the collection. The more common include mangrove (*Rhizophora, Bruguiera*) and among the less common species are *Pemphis acidula* and *Tespesia*. Non-woody species include one palm tree (*Metroxillon*?), a few endocarps which are probably from *Canarium* and *Barringtonia* and burnt food remains which include *Cordyline* or *Araceae* (taro) (Eric Pearthree, pers. comm.).

Table 2. Distribution of archaeological remains in Malsosoba 1. Increasing numbers of * indicate increasing levels of abundance.

archaeological remains	Spit 1 Layer 1	Spit 2	Spit 3 Layer 2	Spit 4	Spit 5 Layer 3	Spit 6
land fauna						
Sus sp.	**	*			*	
Pteropus sp.	*	***	**	*		
Rattus sp.	***	**	****	***	**	**
marine fauna						
fish	****	****	***	****	***	****
crab	***	****	****	****	****	***
oursin					*	*
birds						
land	**		**	****	*	
reptiles						
lizards	**	*	*	**	**	**
snakes		*	*	*	**	**
unidentified fauna				*		
artefacts						
pottery	**		**	*		
beads	*	**	****	***	*	*

Discussion

The initial date of the basal cultural layer in Malsosoba 1, the known rate of uplift, and present altitude of the shelter suggest a rapid human use of the area once it was beyond the influence of the Naturtur River. The numerous stone features, the appearance of burnt remains of *Cordyline* or *Araceae* (taro) together with the scarcity of other cultural material, suggest that Malsosoba 1 was occasionally used as a kitchen to cook tuberous foods in a stone oven, a practice that is still in use today in some nearby shelters close to taro gardens.

The most prominent features within the excavated area are the large numbers of burnt stones. The size of the stones (between 2 and 10 cm but occasionally up to 15 cm) and their distribution, as well as the occurrence of ash and charcoal, allow tentative identification of several large clusters and some smaller scatters (Fig. 4). Three large clusters of stones are located in squares K2 (feature 6), L2 (feature 7) and L1 (feature 1). One round depression without stones but with an abundance of charcoal and ash in the southern corner of square L1 (feature 5).

The stone structures identified during the excavation are either ovens or features associated with stone oven cooking.

In the four excavated squares, there are at least two stone ovens. One is composed of features 1, 2 and 5, which are features generally recognized as being associated with stone ovens (Green, 1979). This layout suggests that this oven was left with the intention of further use. The second structure consists of a well-arranged stone heap (feature 7) and probably a hollowed out area with stones and charcoal (feature 6). However, it is not possible in this case to be sure that both features belong to the same oven. Feature 6 has all the characteristics of a complete uncleaned oven, including the number of stones found in and around it. There is no direct evidence of a chronological sequence, and at the moment we could assume that these ovens were used during the same period. This may have been about one thousand years ago as indicated by the radiocarbon date from charcoal in another small oven in nearby Test Pit 1.

Today, there is a strong correlation between stone ovens found on the surface of several rockshelters and adjacent currently worked taro gardens in the vicinity of Malsosoba 1, but on the other side of the Naturtur River. These shelters are still used occasionally as places in which to rest and cook tubers while working in the taro pondfields and, as in Malsosoba 1, do not contain any other human traces than those occasioned by use of stone ovens. The presence of buried oven stones as well as burnt food remains in Malsosoba 1 thus suggests that irrigated taro gardening was already practised in the area a thousand years ago. It does not however preclude an earlier use of this practice further inland along the same river, where several ancient taro terrace systems have been located. They are, however, difficult to date. The dating of charcoal in a stone oven in Malsosoba 2 further indicates that irrigated taro gardening was still in use about 300 years ago when uplifting damaged the water channel.

The pottery found in Malsosoba 1 is of the type known ethnographically in the area. Several pottery production centres are known along this coast and pottery was probably made in the northwest area up to the beginning of this century. It is still made on the southwest coast in a village named Wusi (Speiser, 1990[1923]: 232).

Sherds of another pottery style were collected on the surface in many coastal and some inland areas during the initial survey (Galipaud & Walter, 1997). This pottery is characterized by a smooth red slip applied over the whole exterior of the pot with the exception of the incised-decorated surfaces. The incised decorated area thus comes out as a lighter spot on a darker background (the slip being applied like paint rather than a traditional slip). A similar type of decoration is described from Tikopia during the Sinapupu phase and has also been found in the Banks Islands and Ambae (Galipaud, 1996). This pottery is found in large quantities on the northwestern coastal area of Santo and, in a very few instances, on higher locations up to 1000 m a.s.l. on the main ridges of the west Santo volcanic chain. It has not been possible to date its appearance in Santo as no stratified site has been discovered yet. The only chronological evidence, from Tikopia, places the Sinapupu ware at the beginning of the first millennium A.D., that is, almost 2,000 years ago (Kirch & Yen, 1982). This could be an acceptable estimation for Vanuatu as this very specific red-slipped and incised pottery is not present in recent or traditional sites, but such an hypothesis will need to be confirmed by securely stratified finds in datable contexts.

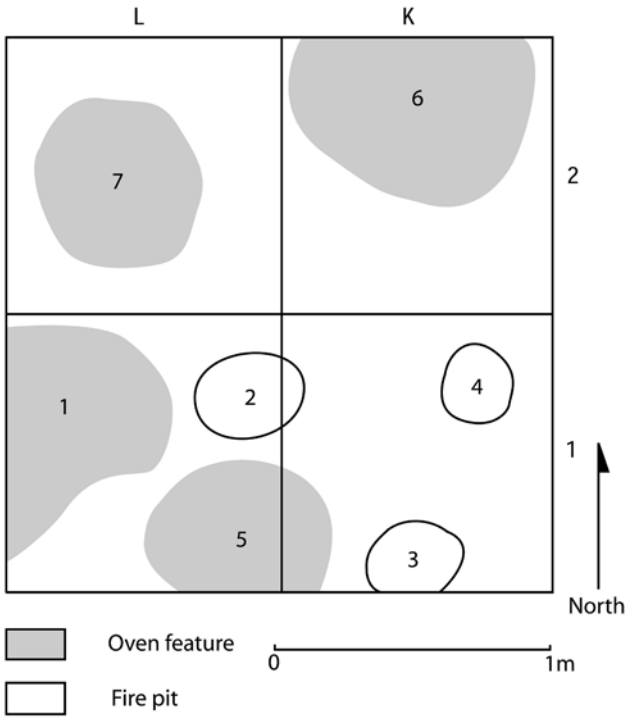

Fig. 4. Drawing of excavated stone features Squares L1 and L2 in Malsosoba 1.

There are very few archaeological sites dating from the first millennium A.D. in the high northern islands of Vanuatu and it is difficult to accept such an antiquity for predominantly surface deposits. The mineralogical composition of the Sinapupu ware from Tikopia points to its origin being a volcanic island in the Vanuatu chain (Dickinson, in Kirch & Yen, 1982). However a recent analysis of the mineralogy of the Santo red-slipped pottery demonstrates the local origin of this pottery (Dickinson, 1997, 2001) and rules out an identical origin for the Sinapupu ware from Tikopia which could have been imported from Vanikoro or the Banks Islands (Dickinson, 1995).

Conclusions

Remains of an early occupation along the west coast of Santo are very scarce probably because of the rugged and steep environment. The succession of tectonic uplifting in this area provides landmarks for understanding human adaptation and use of this coast.

Excavations in the Malsosoba rockshelters show that from the end of the first millennium A.D., i.e., just over one thousand years ago, large irrigated taro gardens may have been in use near the coast and most probably along the permanent water streams. There is no evidence at the moment for earlier pondfield gardening in the area. There is a strong correlation in present-day Santo between irrigated taro gardening and stone oven technology which may be in evidence archaeologically at Malsosoba. Our knowledge of ancient cooking practices in Vanuatu is still very limited, and the antiquity of the stone oven technology used today is hypothetical. Future study will try to date the appearance of stone ovens, discuss the possible evolution of the technology, and test the hypothesis of a correlation of its use with irrigated taro gardening activities.

Several years of surveys and recent excavations in the Hokua region on Santo have enhanced our understanding of the prehistory of the high islands of north Vanuatu. It is now established that initial settlement occurred early during the first millennium B.C. in most coral islands of Vanuatu. However, there is no evidence of permanent settlements on high volcanic islands prior to the beginning of the first millenium A.D. (Bedford, 2000; Bedford *et al*., 1998; Galipaud, 1996; Ward, 1975).

On stylistic grounds, the incised and partly red-slipped pottery of the west and northwest Santo area is similar to the Sinapupu pottery from Tikopia but this is not sufficient to infer that the Santo "Sinapupu" is as old as Tikopia Sinapupu seems to be. If the Santo ware is more recent there is no archaeological evidence for a settlement of the west coast prior to the first millennium A.D. when pottery production and irrigated taro gardening developed rapidly wherever the local environment allowed.

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