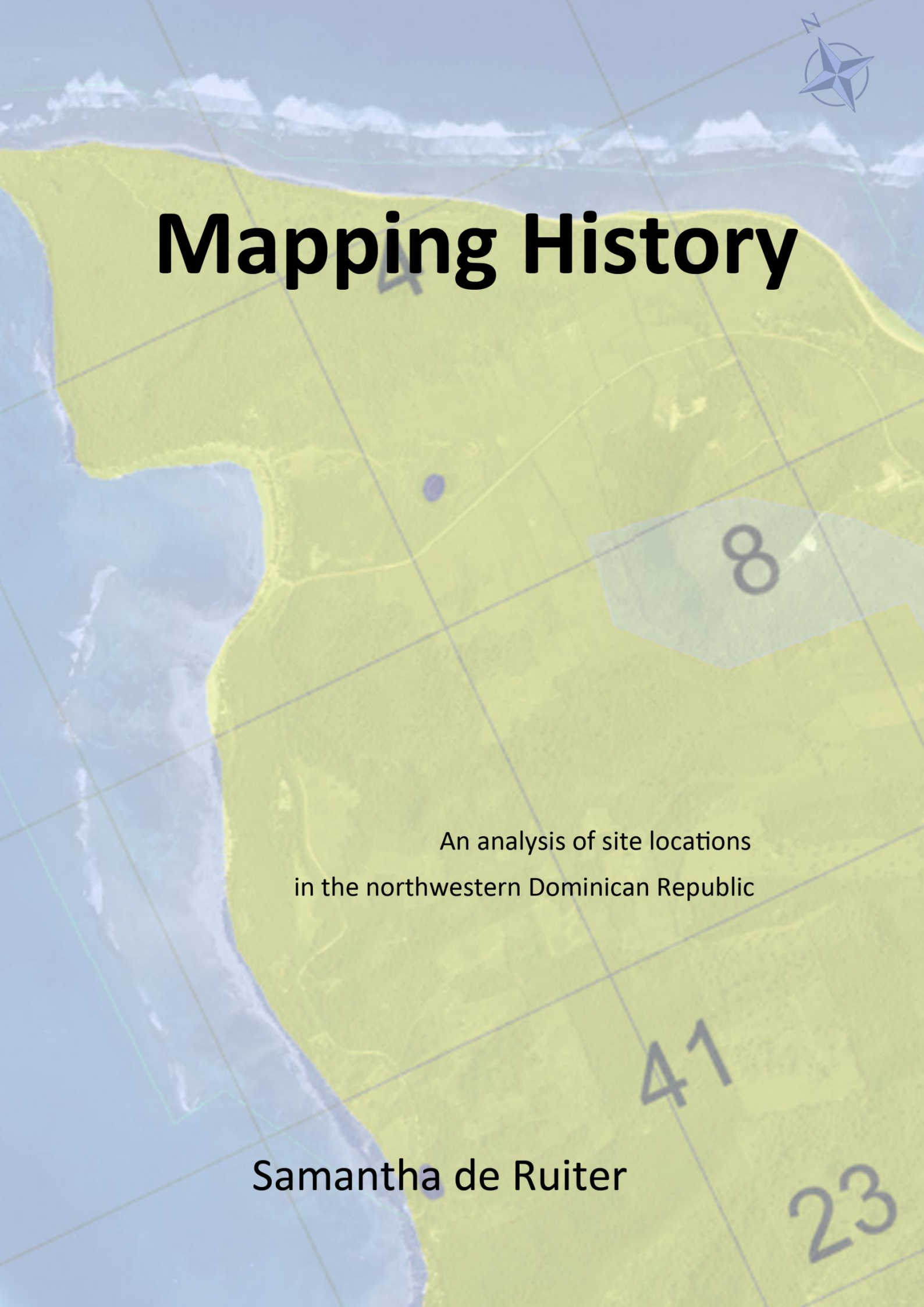

Mapping History

An analysis of site locations
in the northwestern Dominican Republic

Samantha de Ruiter

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Mapping History

An analysis of site locations in the northwestern Dominican Republic

Universiteit Leiden

RMA thesis
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Table of Contents

LIST OF FIGURES

List of Tables

List of Appendices

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1 INTRODUCTION

1.1 INTRODUCTION

The Dominican Republic has been the focus of a great amount of research in the Greater Antilles and the Caribbean area in general. In this study, ambitiously titled *Mapping History*, past social landscapes on the border of the northwestern provinces of the Dominican Republic (Figure 1) - Monte Christi and Puerto Plata - are mapped by using archaeological data, present-day maps combined with GPS data, and ethnohistoric accounts of the sites in the region. This pilot study provides a Geographical Information System (GIS) database containing the known sites in the region, which will be a first set-up for a more widely used database. Such a national database promotes the implementation of Cultural Heritage Management programmes, which is essential for the protection of cultural heritage.

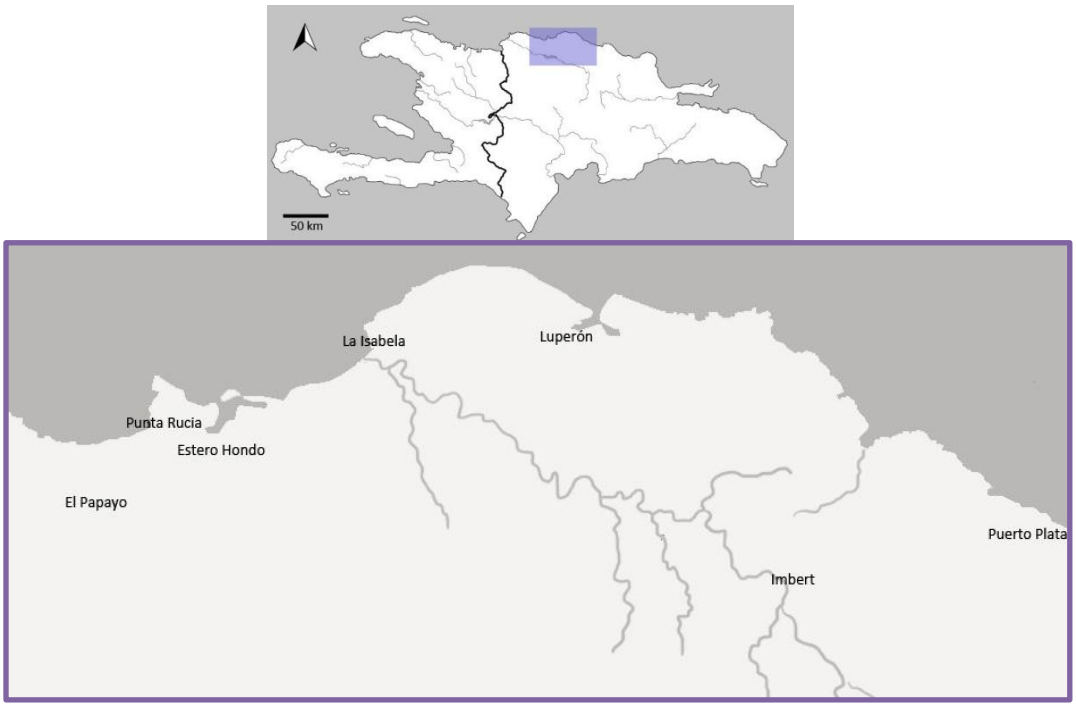


Figure 1. Above a map of Hispaniola with the research area highlighted, and an enlargement of the highlighted area with the location of villages below.

In recent decades, computer applications have increasingly become an essential element in the field of archaeology. Archaeologists have gained access to a whole new range of data analysis with the aid of different types of spatial analyses, viewshed analyses and other forms of geoinformatics. This line of data analysis is arguably suitable for a study of the social landscape though the pitfalls will be addressed and elaborated on in the following chapters. 'Social landscape' is a very broad term, which encompasses the physical as well as the social spaces that people inhabit. The people residing in this social landscape do not necessarily form a homogenous community; in fact, the various social relations existing within a given society allow for differences within and between its members (Torres 2010). Through such an analysis of the studied area a better conception of the past social landscape will emerge. Equally importantly, information will be permanently recorded in a database. This is of major importance in the region, as well as on most of the Caribbean islands.

A study of the past social landscape is fundamental to understanding how sites and in turn the people might have been interrelated. Mapping the social landscape and creating a GIS of the region will clarify the interesting mix of different ceramic styles all over the region and within sites. Archaeological research in the northwest of the Dominican Republic is rather scarce in comparison to the eastern part of the island, but there are several publications on sites in the region. Among others, Marcio Veloz Maggiolo and Elpidio Ortega provide a clear overview of the sites in the region around Puerto Plata, and show the great diversity of types of pottery styles within and between them (Ortega 2005; Veloz Maggiolo *et al*. 1981).

One of the best known sites in the region is La Isabela, commonly considered as the first town in the New World. This site is described in historical sources, and has been the subject of archaeological research (Chiarelli and Luna Calderón 1987; Deagan and Cruxent 2002b). In the past years archaeological research has taken place at several sites in the area, conducted mainly by Jorge Ulloa Hung (Museo del Hombre Dominicano), José Oliver (University College London) and Alfredo Coppa (Università la Sapienza Roma). Coppa's study focused on the site Don Julio located in the northwestern part of the research area, while José Oliver excavated at Edilio Cruz, located in the centre of the research area. Ulloa has excavated at several sites in the area prior to this research (Ulloa Hung 2007), and his preliminary findings have founded the basis of this thesis. The fact that different types of ceramic styles are found on one site point to a much more dynamic body of societies, their economies and material culture, which has been argued before by Veloz Maggiolo (Veloz Maggiolo 1977). An image of a diverse and complex archaeological area emerged, which called for the combination of Ulloa Hung's study on ceramic styles with a study on the archaeological landscape. The social landscape in this

area is set on a diverse ecological landscape, which makes the area suitable for specific analyses by combining archaeological with ecological factors, enabling patterns in human-land relations to emerge.

The collaboration with Jorge Ulloa Hung started in 2009, and was elaborated during a preliminary visit in January 2010. The fieldwork conducted for this study during the summer of 2010 was led by myself and Ulloa Hung, and involved a collaboration with José Oliver and Jaime Pagán Jiménez. The project consisted of surveys, performed by myself, and small excavations at several sites. The relationships built with local people were vital for the completion of the surveys. Adriano Rivera, a retired teacher and amateur archaeologist, was our main local guide offering both a wealth of knowledge about the region and even more importantly, a connection to his many acquaintances in the research area. Rivera's private collection also allowed myself as well as two accompanying BA students to get acquainted with ceramics and other artefact categories typical for the area. An acquaintance of Adriano Rivera who also accompanied us and helped us excavate is José Medina. Besides their knowledge of the area, local connections are often necessary to get permission to survey or excavate on private property. The importance of the fieldwork and especially the surveys needs to be stressed, and will become evident throughout this thesis. Studying the landscape and human interaction with this physical landscape, or in other words the social landscape, cannot simply be done from maps and satellite images. Becoming a part of the local community, as briefly as it might have been, and travelling through the area as we did while surveying has had a profound impact on the nature of this research. As complex as incorporating the human factor might be, it should not be obliterated from landscape studies using GIS analyses. Recent approaches have taken on new types of analyses to overcome this problem. Although this research is a pilot study and therefore only a first step to contribute to our knowledge of the archaeological landscape, the importance of recording and mapping the sites and the types of ceramics uncovered within them is evident as the creation and use of a national database is critical for the protection of cultural heritage.

1.2 RESEARCH QUESTIONS

The following research questions have been formed or reshaped after some initial data collection and an exploratory visit to the area.

The main research question to be addressed is:
"What can site characteristics and certain patterns in site locations reveal about the social landscape in the past?"

The sub questions are:

1) In what kind of environments are the sites located?

-What is the geomorphological setting?

-What is the ecological setting?

-Is there a specific kind of site (ceremonial, settlement etcetera) linked to a specific setting?

2) Is there a pattern visible in the location of (or the combination of) sites with either predominantly Meillacoid or Chicoid ceramics?

-What are the specific site characteristics?

3) Is there an indication that visibility played a role in site location?

What role could this visibility play?

As part of the main research question it is essential to define the term *social landscape*; this will be discussed in the section on theories. Throughout this thesis the research questions are tackled or in some cases be deemed less relevant. An evaluation of the questions and the results is discussed in Chapter 6, while the main research question is addressed in the concluding chapter.

1.3 RESEARCH AIMS

Most research conducted in the Dominican Republic has been in the southern and southwestern provinces of the island. A thorough overview and characterization of sites in the northwestern part of the country was lacking. The aim of both Ulloa Hung and myself has been to fill this gap and to produce a coherent and inclusive regional vision. With the aid of extensive surveys and a widely used database it is possible to address the research questions and to come to such an inclusive regional vision. This results in the unveiling of the social landscape. In all, the source of interest is twofold: a scientific analysis of the archaeological landscape which sheds light on matters of interaction and patterning, and the creation and use of a general database. The archaeological landscape has been the main focus of this research, leaving questions concerning different computer applications in the periphery.

1.4 SCIENTIFIC AND SOCIETAL RELEVANCE

There are important objectives besides the scientific and archaeological value of this research. The creation of a database in collaboration with the Museo del Hombre Dominicano in January 2010 was set up in such a manner that this database can be used nationally, by professional archaeologists as well as by local amateur archaeologists. Information on excavations, specific finds, or literature can be entered into this database. An important aspect of creating a database and map of the sites in the region is the recording and storage of information that might be lost in the near future. Not only hurricanes, erosion, agriculture or urban growth are endangering the maintenance of the archaeological resources in the Caribbean area, but also developments in the tourist industry are a major threat to the archaeological heritage. These threats are some of the reasons why databases are built; the realization that archaeological resources are finite is a catalyst for the creation of these types of recording methods. Once a site is destroyed, it becomes impossible to retrieve contextual information, and it will be a loss for the archaeological record and our knowledge of the human past.

Although many steps must be taken in between, such a widely used database is the first step towards Cultural Resource Management programmes, which are important in order to counter the destruction of the archaeological record in these vulnerable regions. This has been done in the Caribbean with some measure of success (Reid and Lewis 2007). On many Caribbean islands there are certain CRM programmes, laws or

NGO's which may be consulted for advice, but often it is the case that these laws are not enforced (Farmer 2011). Esteban Prieto Vicioso recently published a chapter on the current state of the protection of heritage in the Dominican Republic. Although the chapter consists of an overview of laws and institutions dealing with this subject, Prieto Vicioso concludes that Dominican legislation is as of yet deficient, primarily because of the lack of enforcement of the legislation (Prieto Vicioso 2011). Ulloa Hung has also recently published on the status and the protection of Dominican heritage, but more from a social point of view instead of a legislative one (Ulloa Hung 2010). It is clear that creating a CRM programme based on GIS and predictive modelling is a first step towards the better treatment of the archaeological record.

This research will not only add to our knowledge about the past inhabitants of the region, but will also help to preserve the archaeological record. Eventually, CRM programmes can be developed, but this calls for a rise in local awareness of the importance of the heritage. Education plays a role in this awareness, and is a key factor in developing a sustainable heritage management policy. Although local interest in archaeology is divided between *huaceros* who loot for money and collectors or amateur archaeologists, the efforts of certain local people like Adriano Rivera, who has turned his house and garden into a small archaeological museum as did several other people in the area, enable next generations to continue a local interest in archaeology and in their heritage.

1.5 APPROACH

The approach taken in this study relies on the use of computer applications to address questions about the relationship between the landscape and site patterning. A short introduction on the use and usefulness of these applications, both now and in the past, follows in Chapter 3 with an elaborate discussion on the methods used and the theories behind them. Such methods, including GIS, are widely utilized by archaeologists working in various disciplines, but the application is distinct for each study. The situation in the Americas differs from for example that of ancient Rome, where one might analyse movement through the streets, temples and theatres, as the sites of horticulturalists located on island settings can only be analysed by focusing on the landscape and on site locations. Not only the environmental factors – in the broadest sense of the word – can vary greatly, but the worldview of these past people can as well. While this worldview can hardly be incorporated in any computer model, it is a major aspect that needs to be

taken into account. Both GIS applications and fieldwork observations are utilized to address the research questions. Although this does not address the worldview of past people, with this approach the human perception is partially incorporated in the analyses.

1.6 THESIS OUTLINE

The introductory chapter includes the general aims and questions of this study as well as the scientific and societal relevance. The outline and objectives are discussed and will function as a guideline while reading this thesis. The following chapter will focus on the North-western Dominican Republic, discussing the reasons for the selection as well as for the delimitation of the study area. There are several ethnohistoric sources available from the area which mention the landscape or other relevant aspects. Furthermore, previous studies in the area will be discussed in the second chapter. These include not only studies performed directly in the area, but also refer to the area such as Daniel Koski-Karrell's research in northern Haiti. Lastly, a sketch of the physical and the cultural landscape will be drawn. The physical landscape needs to be described with both facts about for example the different types of vegetation in the area, and with the possible experiences of being there. To find a balance between these two aspects has proven to be difficult. The cultural landscape will be described by the presence of different ceramic styles recently studied by Jorge Ulloa Hung, as well as by the results of previous studies about these styles in the area.

The methods and theories used will be discussed in Chapter 3. The methods of surveying and excavation during our fieldwork are explained, and the resulting database and GIS are thoroughly discussed. The focus in the section on theories of the landscape is mainly on archaeology and settlement patterning. However, during the fieldwork the importance of experiencing the landscape became clear, which led to perception changes of myself. This process is also discussed in Chapter 3. The available and used dataset is covered in Chapter 4. This dataset consists of the different maps used for the creation of the GIS, and of the fieldwork data. Each known and visited site in the area will be described in terms of their setting in the landscape, their size, the distribution of ceramics and other artefacts, and any other specific characteristics.

Chapter 5 deals with the analysis of the data, and the generated results. Sites are analysed in relation to the landscape and in relation to other sites. A brief overview of different types of site plans is given, though not analysed due to the small amount of data on this topic. Chapter 5 concludes with a short elaboration on site patterning and

predictive modelling, followed by a discussion on all analyses and results in Chapter 6. In the final part of Chapter 6 the research questions are reviewed and addressed and the aims are discussed. Lastly, Chapter 7 consists of a short summary of the thesis, followed by the conclusions, and concluding with suggestions for further research.

2 THE NORTHWESTERN DOMINICAN REPUBLIC

2.1 INTRODUCTION

Hispaniola is the second largest island of Caribbean, covering an area of approximately 75 000 km^2, with Haiti on the western part and the Dominican Republic on the eastern part of the island. Consequently, together with Cuba it also has the most complex topography and the greatest habitat diversity, and therefore has the greatest number of taxa among many classes of fresh water fish and mammals (Newsom and Wing 2004). The central and western parts of the island are rather mountainous, while the eastern part of Hispaniola is rather flat. The highest mountain range is the *Cordillera Central* or the Central Mountain range , with the Pico Duarte at 3,087 m above main sea level, and consisting of formations dating back to the Late Cretaceous era. Parallel to the *Cordillera Central* are the larger ranges *Sierra de Neiba* and the *Sierra de Barouco* in the southwest, and the *Cordillera Septentrional* in the north. The *Valle del Cibao* and the *Valle del Yaque* are located in between the latter and the *Cordillera Central.* Names of the geological features are the names used in the Dominican Republic, which differ from those used in Haiti. The geology of Hispaniola is diverse due to the age of formation of the island, although the details of the formation of the Greater Antilles are controversial (Hedges 2001). The most geomorphologically homogenous area is the southern part of the southeastern region, with a low-lying limestone area consisting of coastal reefs. One of the most diverse areas is located in the northwest of the Dominican Republic, enclosed by the sloping hills of the *Cordillera Septentrional.*

Figure 2. A southeast facing view of the valley, from the site Los Mangos.

This area, with a northern view of the Atlantic Ocean, valleys with sloping hills to the east and west, and a southern view of the mountain ranges (Figure 2), was chosen by Christopher Columbus on his second voyage to come to land. Nowadays the area is still largely intact, particularly in comparison with other mainly coastal areas of the country. The region is scattered with small villages or single houses along unpaved roads, used for motorized traffic as well as for horses and cattle. The town Punta Rucia, where the fieldwork group stayed in the summer of 2010, normally houses no more than 250 people, although it is occasionally swamped with tourists on a trip. There is no public transportation going in or out, and the only place with a cell phone signal in the area is on a hill outside of town. Apart from a small shop or *colmado* near the beach, the nearest supermarket is in Estero Hondo, a town 8 km away along the road. Currently tourism has not left its footprints in this area yet, but this is likely to change with the ever growing tourist industry and the development of hotels and golf courses.

This chapter will explore the area described by chroniclers, modern day archaeologists and geologists. The research area and its surroundings will be discussed in terms of its history, both cultural and natural, resulting in the rendition of a lush, vibrant and diverse view of the region which will aid in the *understanding* of the research area and the questions asked. The importance of preservation of such a largely authentic area is stressed, whether this involves actual preservation of the landscape and all that is unique within it or virtual preservation of gathered and recorded data.

2.2 ETHNOHISTORIC ACCOUNTS

The northern coast of Hispaniola is well known for the encounters during the arrival of Europeans in the area. After nearly three months at sea Christopher Columbus and his approximately 1500 men went ashore at the bay of what he named La Isabela, after the Queen of Spain, in December 1493 (Deagan and Cruxent 2002a). It is now known as the first town of the New World, and is located in the vicinity of the research area (Figure 3). Columbus stated that this site was the "best suited spot and better than any other in the land; and this must be believed". However, it is most likely that the bay was chosen rather hastily because the crew was weary and there was illness among the people and animals on the ships (Deagan and Cruxent 2002b, 47).

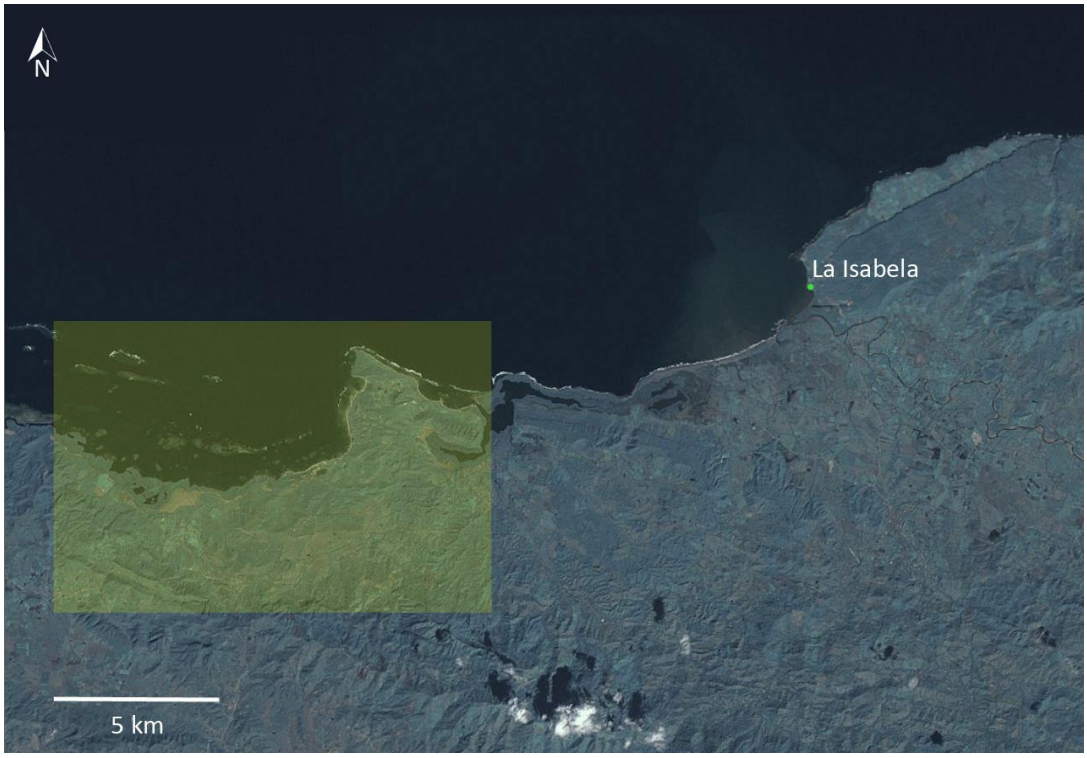


Figure 3. Adapted Landsat7 Imagery with the location of La Isabela and the research area highlighted.

The main ethnohistoric sources on the landscape of the area are those of Pietro Martire d'Anghiera, friar Bartholomé de las Casas, and Gonzales Fernando de Oviedo, which will be discussed below. Pietro Martire, an Italian historian born in the fifteenth century, wrote in his *Decades of the New World* about the first accounts of explorations in the Americas. Using documents and letters he interviewed the European explorers himself. Martire describes a lush landscape with healthy rivers filled with flavorful fish, as well as 'rumors about the master of the house of gold' (Martir 1964, 124). It is also

described how the indigenous people procure things from the forest in a sustainable way, to exchange these with inhabitants of the neighboring islands (Martir 1964,124). On the geopolitical division of northern Hispaniola Martire has written the following (author's translation):

> *"In the province of Huhabo are the regions of Xamaná, Canabacoa, Cuhabo and many others whose names I do not know until today. Those of Cayabo include Maguá and Cocacubana. The inhabitants of this region speak a language very different from the others on Hispaniola, and call it "macoryxes". Other regions are Cubana, the language also being different from the other, Baioháigua, in which occurs the same, Dahaboon and Cybaho and Manabaho. Cotoy is in the middle of the island and across the river Nizao, its hills are called Mahaítin, Hazúa and Neibamáo .."* (Martir 1964, 356).
>
> *"There is in Hispaniola, in the territory of the old chief, a tree called "macorix", which still retains the name of the region, and it has a thick top. At the ends of its branches there is cotton no less useful than the seed, planted each year"* (Martir 1964, 638).

This excerpt reveals a diverse depiction of the region, describing the existence of different languages and regional identity. The accounts of Gonzalo Fernando de Oviedo, a Spanish chronicler born in the fifteenth century, are even more verbose on these topics in his *La Historia general de las Indias* (Oviedo 1988). Oviedo describes where the indigenous people were located (author's translation):

> "*The Indians on the island of Haiti or Hispaniola live on the coast or along rivers, or near the sea,*[…] *, and in high places and in the plains, valleys or forests,* […]. *And along their places they had their crops and* conucos *..., of corn and cassava, and fruit trees"* (Oviedo 1988, 183).

Similar to Martir, Oviedo also describes the rivers of the island. About the Yaque river, located west to southwest of the research area, he has written the following (author's translation):

> *'..of another named Yaque…, which enters and finishes in the sea, in the part of the island that faces the north, …There is a good* salina *near…This river is powerful, and* […] *of great and beautiful grass meadows and farms"* (Oviedo 1988, 199).

Friar Bartolomé de las Casas, now known for his opposition to the treatment of the Indians at the time, was born in the late fifteenth century in Spain and came to live on Hispaniola before he was 20 years old. After years of exploiting the Indians, Las Casas' perception of the indigenous people altered and he started arguing on behalf of the Indians. Among other chronicles, he has written *Apologética Historia de Las Indias*, in which he describes the provinces located in the north of Hispaniola. These descriptions are full of beautiful landscapes, fertile fields, gracious rivers, and landscape features such as salt plains. In his writing on the area of the Yaque river, located west of the research area, Las Casas recounts a *salina* in the vicinity, as did Oviedo.

In his *Historia de Las indias*, Las Casas describes a valley in the north, which is similar to other of his descriptions of valleys (author's translation):

> *"[…] This port is the ridge mentioned above, fertile, which makes the plains by the north, which was all settled, but for the part where they were, there ought to be a deserted road; however it was all within walking distance, because it could not be more than eight or ten leagues to descend in the valley down below, which was so admirably populated"* (Las Casas 1988b, 361).

He further recounts the difficulties encountered while traveling in the northern region and further inland, where the reception of the indigenous people was not always hospitable. Las Casas also mentions the Macorix ethnic group, living in the Vega Real, as well as 'three or four or a few more' languages (Las Casas 1988b, 408). This is described in *Apologética Historia de Las Indias* (author's translation):

> "*There were three different languages on the island, which were not understood by the others: one was from the Macorix de Abajo, another from the Macorix de Arriba… The other was the universal language of all land, and this was more elegant with better words and a sweet sound* […]*."* (Las Casas 1988a, 620).

The described chronicles and translated excerpts depict a diverse population and a beautiful and fertile landscape, populated in different places; on the hills, in the valleys, near the coast and along the rivers. The chronicles are much more elaborated, also on topics such as exchange, but for this study the small translated fragments are sufficient to portray the contents of the accounts relating to the landscape.

2.3 PHYSICAL ENVIRONMENT

According to the current regional division the area in which the recent surveys took place is part of the north-central Cibao region (Santillana 2002, 37). The research area comprises approximately 6 by 13 km, or circa 80 km². In this relatively small area there is a diverse landscape, ranging from sea-level mangroves and swamps to high hilltops several kilometres inland, enclosing lower hills and depressions in the valleys. The area is surrounded by the higher hilltops of the Cordillera Septentrional in the southern and western part. A line of medium-high hills at the coast surrounds the area in the northeast. The Cordillera Septentrional is one of the most important mountain ranges of the Dominican Republic. Located in the north, it extends circa 200 km in the northwest - southeast direction from the area of the city of Montecristi in the west to the town of Nagua in the East. It is separated from the Atlantic Ocean by a narrow coastal plain which forms a corridor, which constituted a significant area for the indigenous habitation and it is indeed one of the main areas of concentration of archaeological sites. The Cordillera Septentrional separates the coastal plain and the region of the Cibao-Vega Real valleys.

The climate in the study area is predominantly humid, except at its western end at the border between the province of Montecristi and Puerto Plata, where it is semiarid. Corresponding to the climate, the predominant type of vegetation is subtropical rainforest, tempered by mountain areas where it reaches the category of mountain wet forest (Santillana 2002, 40). It is a fairly 'open' landscape, the vegetation is not too dense, on most locations, and intervisibility is high because of the lightly sloping character of the area. Currently the land is mostly used by the local people to let their cattle graze, and to a lesser extent for agricultural purposes.

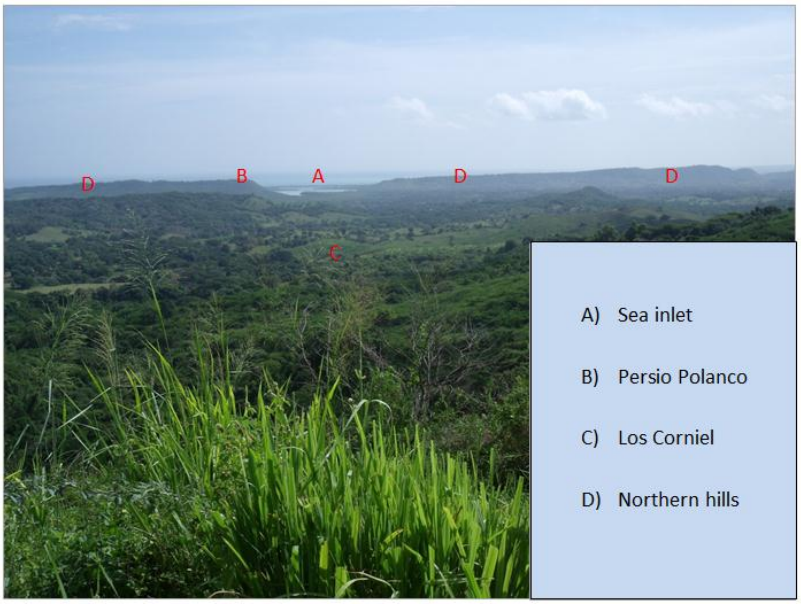


Figure 4. Northeastern view from Los Muertos.

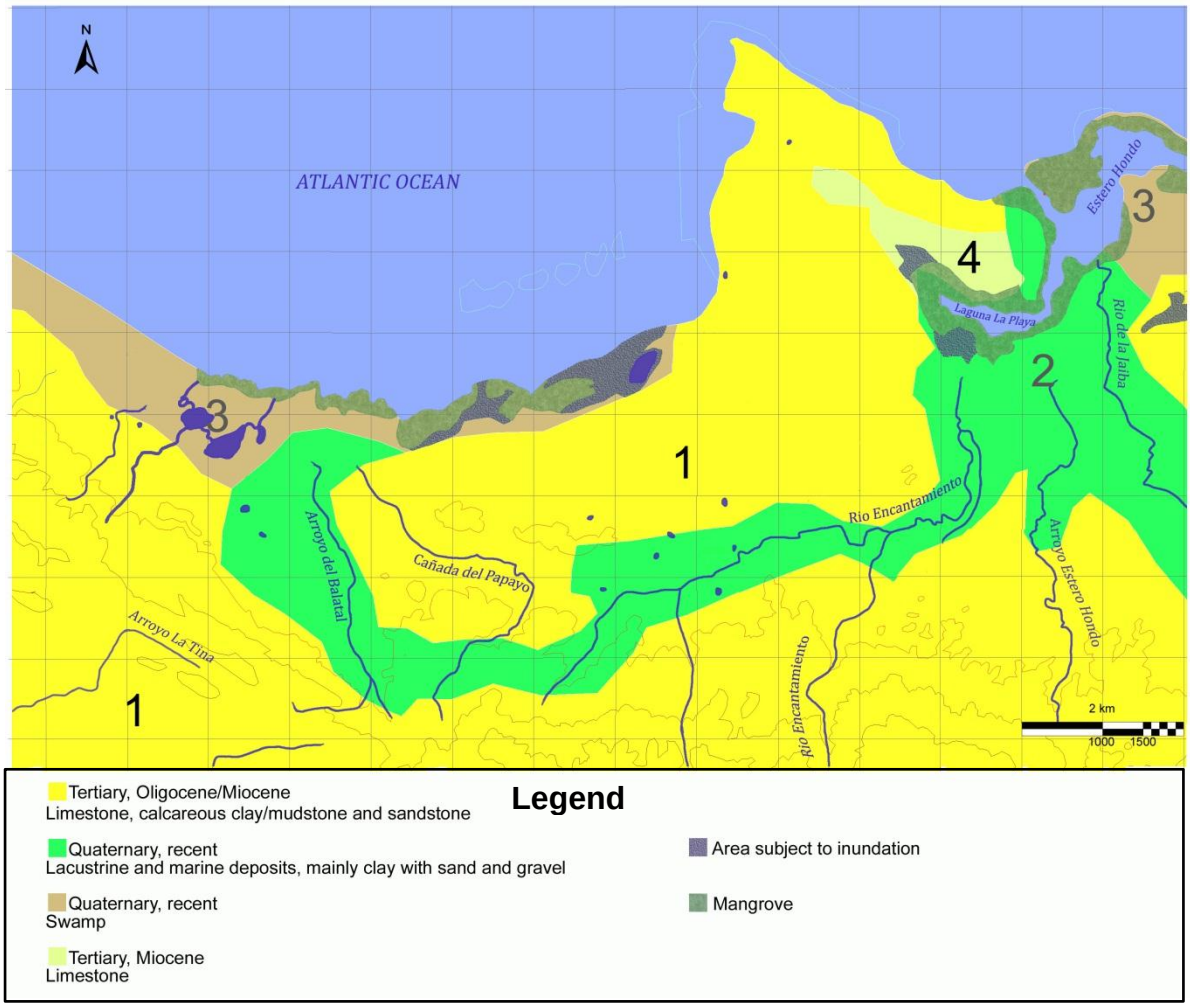


Figure 5. Map of geomorpohological profiles in the area.

The geology of the research area dates from the Tertiary and Quaternary period, and consists predominantly of limestone, lacustrine and marine deposits. The study area comprises three major regions, the plains of Puerto Plata, the Bajabonico Plain and the Cordillera Septentrional. The first two coastal plains are irrigated by two key streams and their tributaries, the Bajabonico river and the Camú river, which flow into the Atlantic Ocean.

The soil on the narrow strip that runs along the northern slope of the Cordillera Septentrional consists of different types. In figure 5 the four different geomorphological profiles in the research area are indicated by the numbers and different colours. Dating further back, area three (9% of the area) is formed in the Quaternary period and consists of swamps. These coastal marshes extend from the town El Cacao to Punta Rucia. The soils are associated with permanently flooded areas subject to tidal influence. Its texture is clay loam with predominantly halophytic vegetation (Tirado 2003). Area 2 (24% of the area) consisting of lacustrine and marine deposits also dates to the Quaternary period.

These consist mainly of clay with sand and gravel. Area number 4 (3% of the area) represents a Miocene deposit of limestone, and area one (64% of the area) represents an Oligocene mix of limestone, calcareous clay and sandstone; both dating from the Tertiary period. The yellow residual soils occur both deep and shallow in the area, and are formed by the deposition of calcareous materials. These clay soils have a brown or reddish colour and are of certain importance to agriculture (Tirado 2003). In areas closer to the shoreline soils are usually red and consist of hard limestone, while in the inland areas they are grey and formed by non-hardened calcareous material. The soils in the area are fit for agriculture, although the possibilities are limited. However, the presence of mangroves and swamp areas make the area perfectly fit for the collections of shells for dietary or utilitarian purposes.

As depicted in figure 4 from the top of Los Muertos, the above list of facts about vegetation, geomorphology and soil is not sufficient for a thorough description of the landscape. The physical landscape can both be measured and experienced. Due to the fairly 'open' landscape there is a high level of visibility on a large amount of sites, which was observed during the extensive surveys. Surveying two to five sites a day, it became facile to navigate through the area as the days passed. Within one week it was possible to recognize numerous other sites while standing on one of the 44 sites in the area. The view in figure 4 is rather restricted because it is looking to the northeast from Los Muertos, a site located in the eastern part of the southern hills. On the right side of the image, partly covered, the slope of the adjoining hill restricts the view. This image, together with figure 3 from Los Mangos, demonstrates how open as well as secluded the landscape in this area is. Concerning altitudes the landscape is averagely divided into four sections: the coast, the lower northern hills, the valley, and the higher southern hills. Broadly, these four sections come with their own specific views, although there is some variation within the sections as well as similarities between them. The four sections are also characterised by the accessibility of the sites. Sites located on the sloping hills in the valley covered in only grass and some trees and bushes are a walk up the hill. Sites in the southern hills are very different; the higher altitude and the steeper slopes of the hills combined with dense vegetation demands an intensive hike up the hill. The landscape of the area, visible in its entirety from most of the sites located on the southern hills, is diverse in several ways.

2.4 CULTURAL ENVIRONMENT

The existence of stylistic diversity at the intra-regional level was perceived early on by Rouse and Rainey during their studies at Fort-Liberté. The stone and shell artefacts and ceramics were different from those compared to the southeast (Ulloa and De Ruiter 2011). Discussions about this diversity are part of current research. A brief overview of the cultural landscape follows.

Focusing on the ceramic period, the cultural landscape will for the larger part be described using ceramic styles. Ostionoid ceramics appear in eastern Hispaniola at around 600 CE. These ceramics are characterized by polished or smoothed surfaces, surfaces painted with reddish slip, handles in the shape of looped straps, modelled or applied zoomorphic heads and limbs, and simple stylized decoration. Ostionoid ceramics are diagnostic of Ostionan culture (Koski-Karrell 2002), dating roughly from 600 to 1200 CE (Rouse 1992).The settlement sites are characterized by the presence of redware pottery and griddles. As noted by Veloz Maggiolo, Ortega and Caba Fuentes in *Modos de Vida Meillacoides*, the Ostionan components in northern Hispaniola are ephemeral and contemporaneous with or succeeded by Meillacoid components (Veloz Maggiolo, *et al.* 1981).

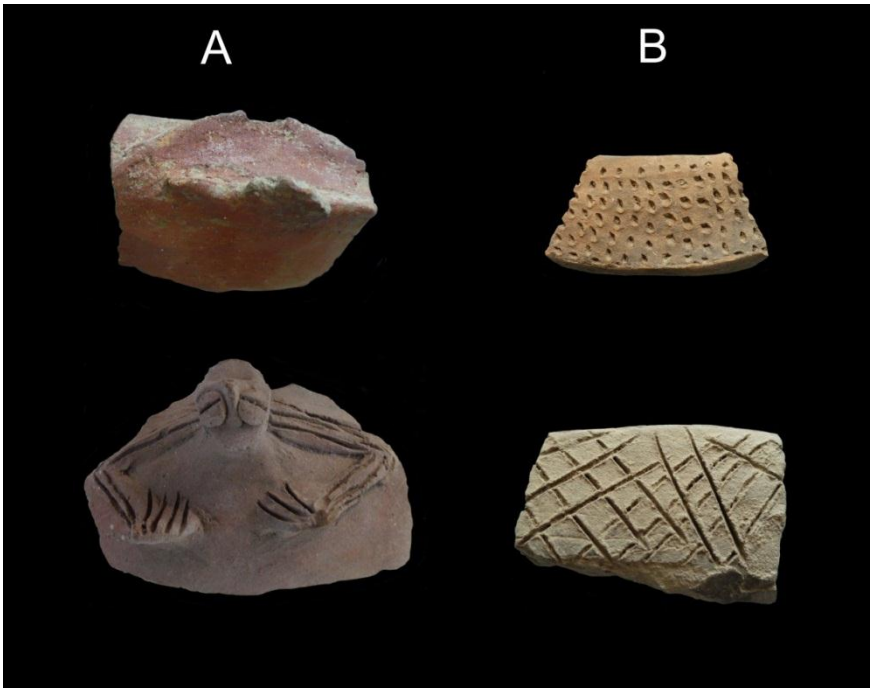


Figure 6. Ostionoid ceramics on the left and Meillacoid ceramics on the right. Adapted and enhanced image, photographs taken by Jorge Ulloa Hung.

The aforementioned authors also suggest that the Meillacoid cultural expressions seem to originate in northern Hispaniola. This will be discussed further in the paragraph below. Meillacoid style ceramics are usually hard, have thin walls, are not polished but smoothed, with a greyish-brown paste. One of the most distinct features of Meillacoid pottery is the cross-hatch pattern, either incised or applied (Figure 6). Zoomorphic features are also common in Meillacoid pottery, and consists of heads, limbs, and other body features. Although many things are unclear about the Meillacoid series, there are indications that the socio-political organization resembles an egalitarian village-based system where the subsistence in based on agriculture. Settlement sites are characterized by the presence of marine shells, suggesting that the collection of shellfish was an important subsistence practice. Calibrated radiocarbon dates on sites with predominantly Meillacoid style ceramics in the research area were between 1019 and 1394 CE.

Chicoid style ceramics, named after the Boca Chica site in southeastern Hispaniola where the style was first reported, emerge at around 900 CE, although the spread to the northwest occurs later. It was argued by Rouse that the Chicoid culture occupied a vast territory spanning from eastern Cuba up to the Virgin Islands, and covering nearly all of Hispaniola (Rouse 1992). Archaeological studies indicated that Meillacoid and Chicoid series were contemporaneously in certain places, among which the research area (Moore 1997). As discussed in paragraph 2, the chroniclers also recount what could be called a melting pot. The idea that Chicoid groups simply replaced Meillacoid groups is clearly oversimplified.

The earliest date of a site with predominantly Chicoid style ceramics in the research area is 1160 CE, while the latest dates to 1632 CE. The Classic Taíno or Chicoid culture is well known for its hierarchical chiefdom system (Rouse 1992, 9). However, the subsistence patterns are similar to those of the Meillacoid. Although there is a wealth of finely crafted and unique Chicoid style artefacts coming from the southern regions of the island, it is rather scarce in the northern part. Chicoid style ceramics are often reddish-brown, and have typical wide incisions and punctuations, both of which are visible on the right side of figure 7. The pottery also appears as more refined than Meillacoid pottery. As Classic Taíno culture, our knowledge of the Chicoid series is larger than of most other cultures in the area. In the discussion of Ulloa Hung's research below, the extent of the complexity and the 'melting pot' will become clear.

Figure 7. Meillacoid ceramics (A) and typical Chicoid ceramics (B).
Adapted and enhanced image, photographs taken by Jorge Ulloa Hung.

2.5 STUDIES IN THE PUNTA RUCIA AREA

There have been several archaeological studies in the research area, or the in the vicinity of it. From over a century ago up to the present the area has proven to contain large amounts of archaeological material, covering both pre-Columbian and colonial times. As an archaeologically relatively intact region, archaeology in the northern area of Hispaniola will undoubtedly yield much more in the coming decades.

2.5.1 PREVIOUS STUDIES

The northern region of Hispaniola has been a focus for pioneering archaeological research in the Caribbean by De Booy, Shomburg, Fewkes, and Krieger. In these early descriptions, archaeological approaches were combined with other scientific interests (Ulloa and De Ruiter 2011). This led to an initial characterization of the region from different points of view. After this the studies focused particularly on archaeology in northern Haiti, especially in the region of Fort Liberté (Rainey 1941; Rouse 1939, 1941), located on the western side of the border between Haiti and the Dominican Republic. These studies served as a base for the methodological and conceptual model by Rouse in which he characterized West Indian ceramics and the developed theoretical framework defining the indigenous cultures of the region.

Because of its colonial history the north of Hispaniola has also provided valuable data for the study of early interactions between Indians and Europeans (Cusick 1991; Deagan and Cruxent 2002; Guerrero and Veloz Maggiolo 1988; Oliver 2008; Ortega

1988; Rothschild, Luna Calderon, Coppa and Rothschild, 2000; VanderVeen 2006; Vega 1990; Veloz Maggiolo 2002; Wilson 1992). The main focus of these studies is on the first European colonial enclaves in the West Indies, in particular La Isabela, En Bas Saline, and Puerto Real, with general archaeological references to its surroundings in an attempt to contextualize the social and cultural space in which the first Spanish villas were located (Cusick 1991; Deagan 1995; Deagan and Cruxent, 2002).

Another approach often taken in the region is to try to link archaeological data with ethnohistoric accounts, which was conducted by for example Elpidio Ortega. Ortega´s study is an archaeological exploration along the route of Christopher Columbus (Figure 8), this trail runs from La Isabela to the Cibao Valley (Ortega 1988).

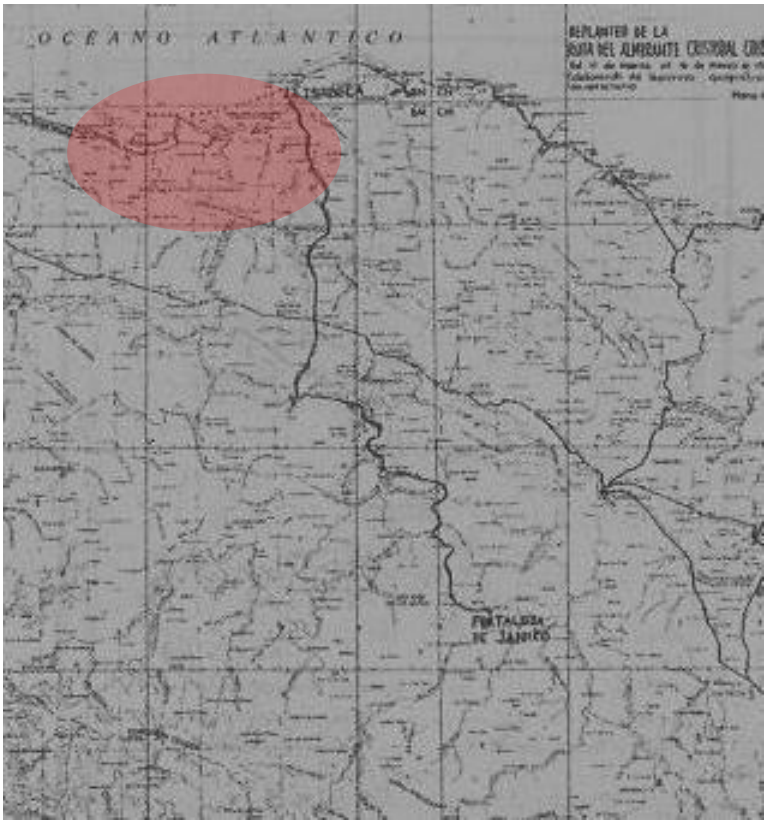


Figure 8. Part of the map on which Ortega marked the route by Columbus, with the location of the research area highlighted (after Ortega 1988).

Guerrero and Veloz Maggiolo have attempted to attribute the Meillacoid ceramic style to the aforementioned Macorix group described in the Chronicles (Guerrero and Veloz Maggiolo 1988). In Wilson's 1992 publication *Hispaniola: Caribbean Chiefdoms in the Age of Columbus* the complexity and integration of chiefdoms are studied using historical sources from the early colonial times. More recently archaeometric methods were applied for studies on the diet, in order to reveal interactions between indigenous people and Europeans (VanderVeen 2006). Most archaeological studies in the north of Hispaniola have been primarily focused on isolated sites (De Grossi *et al.* 2008; Luna Calderón 1973; Olsen 2000; Ortega 1981, 1988; Ortega and Veloz Maggiolo 1972; Ortega *et al*. 1990; Veloz Maggiolo 1972a, 2002; Veloz *et al*. 1981), which has created the absence of a coherent and inclusive regional vision.

2.5.2 RECENT STUDIES

Already performed and perceived by Veloz Maggiolo in the 1970's, the study of identities as dynamic and diverse phenomena focused on material culture differences is one of the latest archaeological approaches in the region (Oliver 2009; Veloz Maggiolo 1971). These differences have been interpreted as a sign of diversity within so-called Taíno cultural expressions. The area studied in this research elucidates the complexity and depth of this diversity. Recently, other researchers have mapped the northern coast of Hispaniola as well; Clark Moore mapped all archaeological sites in Haiti (Moore 1991b, 1997; Rouse and Moore 1983), while Daniel Koski-Karell focused on settlement patterns in northern Haiti (Koski-Karrell 2002). Koski-Karell distinguished different types of settlement based on their size, starting with the household as the smallest and the large villages as the largest. The landscape was categorized into different terrain relief zones: waterland, shoreline, coastal plain, river valley, piedmont, highland and montane zones. Koski-Karell analysed the combinations of these variables for Ostionoid, Chicoid, and Meillacoid sites. Although the categorizations are somewhat different, the research is comparable to this study. This will be further discussed in Chapter 6.

As previously discussed, this study is conducted in collaboration with Jorge Ulloa Hung's study. Ulloa Hung has studied the ceramics of the area, focussing on the processes behind stylistic diversity. The chronological analysis of Hispaniolan ceramic styles reveal significant levels of stylistic coexistence in various parts of the island. This coexistence marks the presence of a particular cultural landscape in which different types of interaction can be perceived through ceramics, at different scales in the region under study (Ulloa Hung and De Ruiter 2011). In these combined studies placed in the northern region a combination of ceramic attributes have been observed. These two different ceramic expressions are found both separately and combined in the same archaeological

context. The differences are observed not only at the decorative attribute level but also in other technological and formal aspects (Figure 9).

This gradual combination of the two ceramic styles in the area is retraceable through a consistent combination of attributes through time, and was thus a graded continuum. The fully combined expressions are what most consider Hispaniolan Meillacoid, which presents differences as well as similarities to the Meillacoid style ceramics in for example Jamaica or Cuba (Ulloa Hung, in press). Hispaniolan Meillacoid is marked by the presence of the Ostionoid technological expressions of appliqués, which can be very characteristic. This reflects the different historical processes for each island or island region. The gradual process of the merging of the two ceramic traditions is expressed in different phases at various sites in the northeast of Hispaniola (Ulloa Hung, in press). However, in the study area we only see the result of the final process, at the Meillacoid sites Don Julio, Puerto Juanita, Los Perez, Popi and Humilde Lopez.

Figure 9. The merge of Ostionoid and Meillacoid traits.
Adapted and enhanced image, photographs taken by Jorge Ulloa Hung.

Another process of interaction is visible in the Meillacoid and Chicoid style ceramics. There is no harmonious integration between the two expressions, rather these remain separate within the same site or specific elements are adopted on the vessels. This kind of interaction is present in sites such as Don Julio, Humilde Lopez, Puerto Juanita, El Coronel, Los Muertos and Edilio Cruz. In Ulloa Hung's opinion this interaction was not

part of a legitimizing or homogenizing discourse or a ritual grammar, but that the evidence suggests constant negotiation and renegotiation at the intra-regional level.

3 THEORIES & METHODS

3.1 INTRODUCTION

Two factors play a central role in this research: the fieldwork data and experiences, and the computer-analyses. In this chapter applicable theories are described, followed by the choices of the used methods. This extensive explanation is important because the focus of this research, and therefore the methods as well as the theoretical approach, has changed during the process of writing this thesis.

Theories on landscape archaeology have always varied widely: from one end of the spectrum, analysis of the hard data on the landscape comprising particularly ecological variables, to the other, analysis of 'experiencing the landscape' or a more phenomenological approach. There are many approaches to the landscape, the main difference lies in the focus of these approaches (Anschuetz *et al*. 2001; Cooper 2007; De Waal 2006; Fitzjohn 2007, Ingold 1993; Johnston1998; Reid 2008; Witcher 1999). A broad approach, encompassing the entire aforementioned spectrum, is necessary for a study of the social landscape. The intention was to adopt a hard-data analysis approach, which is evident from the initial plan to rely on computer applications in order to address the research questions. However, after several days in the field it became clear that this would not be sufficient to come to conclusions. The focus of research has somewhat shifted in order to combine these two different approaches. This process, and this shift, will be explained in the Theories section below.

After a brief introduction on preparatory work the methods of survey will be discussed. The fieldwork in the summer of 2010 is the main source of information and has provided the data necessary to address the research questions. All data recorded in the field was completed according to a standardized form, in order to be able to record it into a Microsoft Access-database designed for this project. The contents of the form were defined in collaboration with the Museo del Hombre Dominicano, during a preparatory visit. The form and the database set-up have been sent digitally. This enables other archaeologists active in the Dominican Republic to record their data to this standardized form. The contents and use of the database will be explained in paragraph 3.4.3. A GIS

was created with the fieldwork data and the collected maps. Different GIS-programs were used for different purposes. The methods section concludes with the description of the computer applications used.

3.2 THEORIES ON LANDSCAPE ARCHAEOLOGY

A short overview of the developments and the current state of affairs in landscape archaeology and settlement patterning is discussed, focusing on specific studies and methods used. The following section will focus on the current state of affairs of these topics in the research area.

3.2.1 LANDSCAPE ARCHAEOLOGY AND SETTLEMENT PATTERNING

Starting with New Archaeology in the 1960s, the landscape was viewed as one of the factors in a system, with a focus on ecology. Movement, settlement and other human activity was explained with empirical evidence on different scales, from the artefact, to the site, to the landscape. Instead of the mere descriptive documentation of a site or a region, interpretation of multivariate dynamics underlying certain observed patterns became the way to conduct archaeological research. According to Clarke (Clarke 1968) and Johnson (Johnson 1977) among others, the interaction of different factors on different scales would allow for a more comprehensive understanding of patterns of change. A well-known proponent of New Archaeology, Lewis Binford stated that the landscape, not the site, is the arena for all human activities. He argues for a multiscalar approach, within and between sites, to come to a systemization of settlement pattern studies (Binford 1982). Binford's views on the importance of context have had profound effect on landscape archaeology and archaeology in general. However, these systems approaches could only the *how*, and not the *why.*

These views changed gradually through the 1970s and 1980s. The socio-symbolic aspect now came into focus, and more interpretive methods were used. By the time of the 1990s the re-creation of the socio-cultural landscape had become the main focus in landscape archaeology. Ian Hodder's work is one of the most well-known of this approach, as are Timothy Ingold's *taskscapes* and the *dwelling perspective*. *The temporality of the landscape* (Ingold 1993) is one of the key publications in landscape archaeology. In this article Ingold describes how much the landscape can change within a years' time, how human action changes within that, and how every person perceives this differently – in the present as well as in the past. According to the dwelling perspective

the landscape is constituted as an enduring record of the lives and actions that have taken place of the past people who have dwelt within it. Through their lives and their actions, these people have left something of themselves there. The landscape does not just tell a story, it *is* a story (Ingold 1993). This recent approach towards the human experience in the past has made landscape archaeology all the more complex. The historical and economic component of the landscape have been replaced by a human socio-symbolic component. More recent research by Joshua Torres on the landscape surrounding Tibes, Puerto Rico (Torres 2010) attempts to approach the social landscape methodologically, focussing on the relations between sites and areas. Although the socio-symbolic factors are mentioned, the study results in a categorization of sites in the landscape.

Although landscape archaeology and settlement patterning studies are not as widely applied in the New World as they are in the Old World, there have been some major studies since the 1940's. Gordon R. Willey's 1953 publication on prehistoric settlement patterns in the Virú valley in Peru was one of these which was conducted on a regional scale and focussed on the description of a set of specific site characteristics (Willey 1953), in line with the archaeological theory in that period. Studies on a regional scale in the 1950's and 1960's generally adopted the cultural-historical descriptive approach. An important and exemplary study from the next theoretical era, known as processualism or New Archaeology, is Kent Flannery's 1976 *The Early Mesoamerican Village.* Flannery's goal was not only to create a model of Early Formative society based on substantive data, but also to produce "analytic procedures for sampling and studying Formative cultures" on different levels (Flannery 2009). Processualist studies focus on systematically acquiring hard data which led to the postprocessualist critique of the obliteration of the human factor in developing our understandings of the past. However, this more interpretive approach does not necessarily exclude the ecological factor. Current studies on landscape and settlement patterning often apply computer applications for analysis, which is why they tend to focus more on ecological factors.

One of the most prolific studies in the circum-Caribbean has been conducted by Irving Rouse. Throughout his career Rouse's descriptive studies have produced an all-encompassing overview of the area. However, due to this large scale detail is lacking, and notions of landscape and settlements are rather broad-stroked. A more explanatory approach has been taken on by Marcio Veloz Maggiolo from the 1970's onward, with his *modos de vida* (Veloz Maggiolo *et al.* 1981). Veloz Maggiolo has been the most influential Dominican archaeologist and opted for a new approach - a specifically Antillean vision, as a reaction against North American hegemony. He focused on the social relationships between people as part of a production system, the hybridity and diversity of aboriginal cultures, and on the importance of ecology (Samson 2010). His

approach resulted in a more dynamic and diverse view of the Caribbean, in contrast to that of Rouse. One of the more recent large scale study on landscape and settlement patterning, albeit across the border, was conducted by Daniel Koski-Karrell, in which sites were mapped along the northern coast of Haiti. Koski-Karrell used similar categorizations as were used in this study, which make them quite comparable. Koski-Karrell's work will be further addressed throughout this thesis. Maaike de Waal's study on social interaction and settlement patterns on La Désirade and on Guadeloupe (De Waal 2006) and Alistair Bright's dissertation on inter- and intra- insular relationships in the Windward islands (Bright 2011) are some of the most recent studies (at least partly) on settlement patterning in the Caribbean.

Current research on landscape archaeology and settlement patterning shows a diversity of approaches, both processual and postprocessual, often using GIS for analyses. Jago Coopers' review of pre-Columbian Cuban archaeology included an analysis of settlement patterning with the aid of a GIS. Although the overview was very thorough, interpretations were feeble due to the biased information incorporated in the GIS (Cooper 2010). Difficulties concerning the limitations of these analyses can be overcome with creative new approaches such as Fitzjohn's study on the perception of space in the mountains of Sicily (Fitzjohn 2007). In this study he explores the use and value of methods of analysis widely used by archaeologists by incorporating perception and experience of local farmers into his research. Approaches such as these will bring landscape archaeology, settlement patterning and the use of GIS to the next level.

A long introduction on the development of theories in computer applications is not needed, as these are methods which have only been in use in the past decades. However, as with general archaeological theory, there has been a shift in the attitudes towards the use of these models. The naiveté about the possibilities of these applications that existed at the rise of it was soon met with more pessimistic and critical views; the above mentioned study by Fitzjohn is an example of this. The incorporation of the human factor demanded new types of analysis, such as space syntax analysis; a graph-based theory normally used by architects to examine how the spatial layout of buildings and cities influences the economic, social, and environmental outcomes of human movement and social interaction. Furthermore, it can be argued that the sustainability or permanence of the digital information is not guaranteed. With new software and upgraded versions developing faster than the average time it takes to excavate a small site it is very well possible that data stored in a specific format cannot be accessed in a few years' time, or at least not without expertise. Besides this factor there is also the possibility of losing digital data in many other ways, from a simple virus to a crashing server.

3.3 Theoretical Approach: Experiences and Perception Changes

In the process of writing this thesis it was striking to realize that the four-decade spanning journey from processualism toward post-processualism was unintentionally also undertaken in my own approach. Commencing with the notion that hard data and computer-models will unveil the social landscape of this small area, this was revealed to be insufficient. There are many variables which cannot be included in a computer model, and the most relevant one is *experiencing* the landscape. Certain patterns might emerge from the data collected, all based on these measurable variables. These variables play a certain role, but it has to be made clear that many other factors such as animism, which is believed to have been a key factor of life in the pre-Columbian Caribbean, have played an important part in for example site location.

While computer models are useful for the characterization of a region or area, the use for analyses must be questioned. When computer models are used for analysis it has to be made clear *why* these analyses are performed. What would it actually mean that route X is the shortest or fastest route from point A to point B? It is merely a computer model which does not necessarily reflect routes taken by people in the past. In fact, what is available in archaeological data is point A and point B. How these are connected or what the relation is between these two cannot be concluded from computer models based on location, distances and slopes. At the very least other variables must be included, such as indications of mobility and/or exchange between the two. It has become increasingly clear that mobility and exchange have played an important role in the life of Amerindians, whether this was on a day-to-day basis or as part of a larger network (e.g. Hofman *et al.* 2007; Hofman and Hoogland 2011).

In this thesis only the points are analysed, not the relation or connectedness between them. These points are analysed in terms of location in the landscape and each other. The argument for the inclusion of visibility in the analysis comes from experiences during the fieldwork. During the surveys it appeared that the visibility might have played a role in site location. While navigating through the area it was striking how many landscape features and other sites could be seen from one point. While some sites were located in on such a slope in a specific location that there was a 360° view even from a relatively low altitude, like Los Mangos (Figure 3), other sites located in for example the high southern hills have a rather restricted view (Figure 6). In both cases there are other possibilities for site location within a 500 m range, which would have similar characteristics (altitude, slope, surface). Examples such as these indicated the possibility of visibility as a factor in site location. Because current vegetation often restricted (part

of) the views, a 3D computer model was necessary to reconstruct what is visible from which site. This is further explored and explained in chapters 5 and 6.

The experience of navigating through the landscape has changed my views on many aspects of this thesis. The focus is shifted from GIS analyses towards *experiencing* the landscape. However, this can only be described and cannot be analysed. Answering the research questions is possible by analysing the characterizations made while taking the site descriptions into account. To retrieve the experiences of the past people archaeologically is impossible. However, some variables and patterns emerging from analyses can generate possible priorities and preferences of specific peoples.

3.4 METHODS

As preparatory work a study of the available literature on archaeological sites in the area is essential in the first phase of this research. With the aid of the Museo del Hombre Dominicano a list of known sites was compiled from archaeological as well as from ethnohistoric sources. This provides the information that is necessary to determine the possibilities for fieldwork in the area, and has helped to estimate possibilities of the extent of the research area. Several different maps had to be retrieved, many of them only available in the Dominican Republic, and some of them on the internet or at the Leiden University Library. A preparatory visit was made by myself in January 2010. The aim of this visit was to retrieve maps, get acquainted with the research area, and to meet local archaeologists who would work on this combined project. The next step in the preparatory work was to digitize the collected maps, in order have a properly working GIS of the area when the fieldwork commenced. Due to difficulties with the digitizing tablets and with importing the map from AutoCAD into MapInfo, this was partially completed in advance.

3.4.1 SURVEY

The surveys that took place were based on the knowledge of local people. The research area comprises such a small scale that local people have reliable knowledge on where certain archaeological material was and still could be found. The collaboration with Adriano Rivera was very valuable during the course of the fieldwork. His knowledge of the area, his connections to landowners, and above all his interest in archaeology have made this project possible. Most of the land surveyed is currently used as a grazing area for cattle, although not on a large scale, and some of the land is used for small scale

agriculture. People in the area generally live off their own land with a few animals, crops and fruit trees to sustain them. Local inhabitants know their lands well, and archaeological material hardly goes unnoticed: this has proven to be a lucrative way of earning money. *Huaceros* or looters are very active in the area. Every single one of the sites visited had been visited by looters as well (Figure 10), with distinctively dug pits at strategic points on a site left behind as evidence for these activities. Local knowledge of the presence of archaeological material is reliable; during our great many hikes to a site we have never encountered archaeological material of which the local people had no knowledge.

Figure 10. A typical *huacero* pit located on the slope of the Humilde Lopez site.

The surveys of the sites were usually conducted by a team of two local men, Adriano Rivera and José Medina, two BA-students from Leiden University, Daniëlle Meuleman and Marlieke Ernst, archaeologist Jorge Ulloa Hung, and myself. The tasks varied from site to site; depending on whether or not shovel-tests or test-pits would be made. All sites were surveyed on the surface, and as many useful points as possible were mapped with a handheld GPS by me. Where possible the general area of the site was mapped, as well as mounds and specific finds. The location of pits, dug by archaeologists as well as by looters, were also mapped by recording the coordinates of at least one

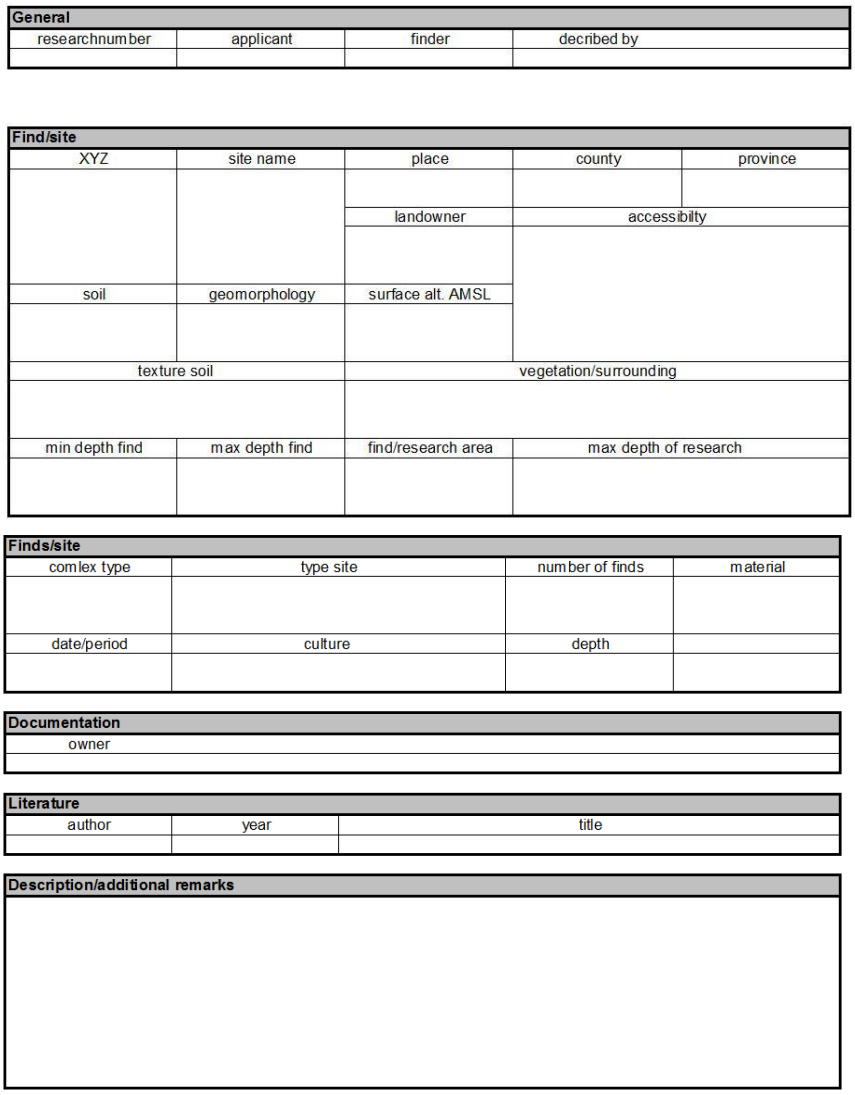
corner. The surface surveys took place in a random manner due the irregular vegetation, fences, and slope of the landscape which made a systematic survey impossible.

The standardized A4 form (Figure 11) has been used in the field and during literature studies. It is made in such a general manner that it is suitable to record the observed information on the paper form into the digital database.

In the field the following information was noted when possible:

-Site name	-Minimum depth of finds
-UTM Coordinates	-Maximum depth of finds
-Place	-Find/research area
-Landowner	-Maximum depth of research
-Accessibility	-Complex type
-Soil	-Site type
-Geomorphology	-Number of finds
-Altitude AMSL	-Material
-Vegetation/Surrounding	-Date/Period
-Current land-use	-Remarks (about the view or experiences)

These variables were not only noted to be used for this study, but also to record information to incorporate in the general database. Variables used for this research are mainly the UTM coordinates, the accessibility, geomorphology, altitude, vegetation, current land-use, complex type, period, and site type. The latter is often a rough estimate based on presumed function and general archaeological character, such as resource extraction sites, settlements, workshops, individual finds, and ritual sites. Observations on the field as well as the material assemblage of the site aid in assigning site types (De Waal 2006). In this section observations on the visibility and specific views were noted. The aforementioned variables are all either environmental factors or influence the human experience of the landscape. For instance, the accessibility, vegetation and visibility might make a site location either beneficial or disadvantageous. Other variables noted, such as depth of finds and number of finds, are in order to preserve information for future research, easily accessible with the database and recorded in a standardized manner.



General			
researchnumber	applicant	finder	decribed by

Find/site				
XYZ	site name	place	county	province
		landowner	accessibilty	
soil	geomorphology	surface alt. AMSL		
texture soil		vegetation/surrounding		
min depth find	max depth find	find/research area	max depth of research	

Finds/site			
comlex type	type site	number of finds	material
date/period	culture	depth	

Documentation
owner

Literature		
author	year	title

Description/additional remarks

Figure 11. Standardized form used in the field.

It was rarely ever possible to record information on all these variables due to different circumstances on each site. When one of the variables could not be observed and recorded the cause was explained on the form. Both Ulloa Hung and I used a handheld GPS in the field. The recorded coordinates were compared and reliability was checked on the maps. Due to the type of GPS device which displays the UTM coordinates without the ability to name or record them, the displayed coordinates were copied in a field notebook and on the standardized A4 form, accompanied by a short description.

Shovel-tests and test-pits were dug at several sites. The shovel-tests consist of a shallow, irregular dig, usually with a pick-axe. These tests were not only made to collect material, but also to assess the general area of the site and the best option to dig a 1x1 meter test-pit. Test-pits were 1x1 or 1x2 meters, set out with a measuring tape, and were not aligned to a specific grid; however the coordinates of at least one corner were recorded. The test-pits were divided in layers of 10 cm and finds were bagged accordingly, categorized by material. The contents of the test-pits were sieved in order to retrieve smaller pieces of archaeological material. Excavation ended when the pit-depth had come to the sterile layer. Ulloa Hung made profile drawings and recorded photographs of the profiles. Lastly, soil colour was noted according to the Munsell color chart, and the characterization of the soil texture was recorded. All finds were washed in the Punta Rucia field laboratory with tap water, different sized brushes, and sticks.

3.4.2 DATABASE

Relational databases are the main choice in storing data, especially in archaeology. It is a relational database when relations are assigned between different attributes of several tables. However, these relations and tables are not in a particular order. Geographic Information Systems are map-based databases, systems designed to store, manipulate and analyze all types of geographically referenced data. It is a combination of cartography, statistical analysis and database technology. Computer applications have become an indispensable aspect of archaeological research. Even in for example literature and historical studies a digital database is created and used, thus resulting in mainly digital data storage. Fieldwork carried out with a mere measuring tape and a shovel will eventually be digitized in a text document and a data spreadsheet, before it could ever be published.

Creating a (relational) database requires clarity on what it will be used for, and which questions it might need to help answer. A detailed plan must be written down or preferably sketched to ensure that the structure is solid and that all variables are covered. Efficiency is one of the key aspects in the use of a database; therefore the database has to be easy to use, clear, and should take the least amount of bytes possible. Data entry is less

complicated, time-consuming, and more reliable through the use of forms and within them so-called drop-down menu's to ensure that all entries in that box will be comparable. For example, for the analysis database the relative approximate altitudes have been categorized into plain, low hill, medium high hill, and high hill. Broad analyses can be made through the use of created queries, of which simple graphs can be made.

The database created for this project was not only built to be used for this research, but also had to be capable to contain research information from other parts of the Dominican Republic, conducted by other researchers. The variables included in the main database are therefore quite general. Although the titles and data-fields are in English, the descriptions of the fields are also in Spanish to enable Spanish-speakers to use the database. An additional database with data fields more specific for the analyses planned for this research was created as well, related to the general database. All recordings on the form were entered into a Microsoft Access 2003 database. It should be noted that this database is mainly used as a recording device, not as a tool to enable comparisons and analyses. The variables are too complex and most of them cannot be converted into a simple drop-down menu, which would enable analyses. However, factors such as geomorphology, relative altitude, slope, the presence of mounds, percentage of visibility, view (direction), and distance to the sea are categorized and can therefore be analysed using the database.

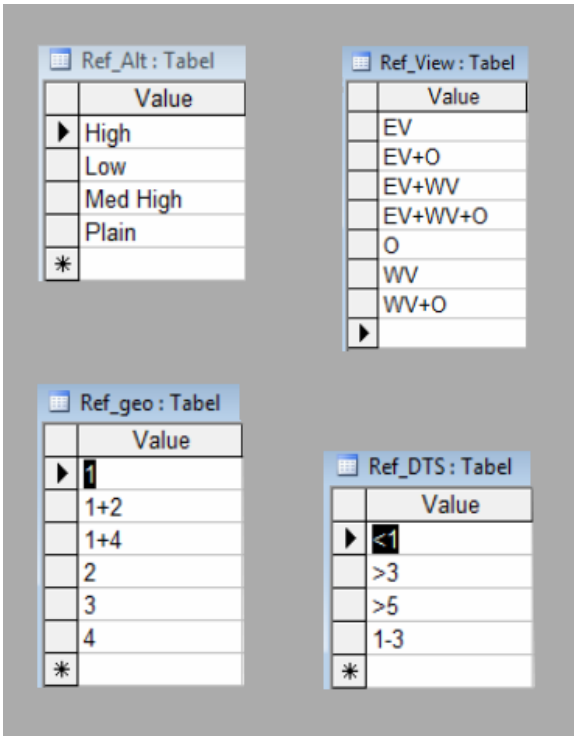


Figure 12. Overview of the pull-down menu's used in the analysis-database.

As is visible in the database image in figure 12, which is simplified and enhanced, the analytical database contains information on the aforementioned variables, categorized into comparable units of measurement or terms. In the reference table for view on the upper right the E stands for east, the W stands for West, the V for valley, and the O for ocean. The lower right depicts the ranges in the distance to sea, in kilometres. The lower left represents the different categories of geomorphology, in which the number corresponds to the numbers and a specific colour on the maps used in following chapters. The presence of anthropogenic mounds on sites is answered with a simple yes/no.

3.4.3 GEOGRAPHICAL INFORMATION SYSTEM

Geographical Information Systems have become a key aspect in archaeological research. Programmes such as ArcGIS, MapInfo/Pitney Bowes, Surfer, and Idrisi are constantly being developed and updated. Each GIS computer programme has its own specialty; 3D models are best made with Surfer and Idrisi, while Autodesk also allows for digitizing maps through AutoCAD. Currently there are several open source GIS programmes available on the internet, these are for example GRASS, Quantum GIS and MapWindow GIS. The well-known Google Earth is also a GIS programme. Over the last years the interface of these open source programmes has become more user-friendly, which enables utility by a larger group of people. Geographical Information Systems are also used for predictive modelling, a method of which the usability and value is much debated (Verhagen and Whitley 2011; Kamermans 2007; Kvamme 1997).

Predictive modelling and the use of GIS have played a central role in several studies in the Caribbean as well, for example on St. Eustatius and Trinidad among other islands (Reid 2008). Recently Cooper and Boothroyd have published on their extensive computer analysis on the sea-level changes in the pan-Caribbean (Cooper and Boothroyd 2011). In this study the combination of digital elevation models and data on sea level changes from the last 8000 years is used in order to provide models of changing *islandscapes* through time. Another recent study was conducted by Rodriguez Ramos and Torres, in which the intervisibility of the islands was explored. They argue for an island interconnectivity based on visibility, and suggest it might have provided a sense of continuity and continentality. The study gives an indication of possible interaction spheres (Torres and Rodriguez Ramos 2008).

Figure 13 . Moore and Tremmel's map of archaeological sites in Haiti (after Moore 1997).

On Hispaniola Clark Moore's online available archaeological database of sites in Haiti is a fine example of an easily accessible and clear national database (Figure 13). Specific characteristics of all sites are recorded, such as the type, culture and area, so there is a short overview of each site in the database. Harold Olsen Bogaert is one of the archaeologists working in the Dominican Republic who has done walkover surveys in several areas ahead of builder development and has recorded the site locations with a GPS, starting a database with site locations used by the Museo del Hombre (pers. comm.). While in Olsen's and this research several sites located in an area are mapped, Erlend Johnson has mapped specific features in the surrounding area of one site; El Cabo. The site is located on the east coast of the Dominican Republic and has been extensively researched in the past decade by a team from Leiden University under the direction of Dr. Menno Hoogland, producing a complex image of house trajectories (Samson and Hoogland 2007, Samson 2010). Johnson's study placed the site in the context of its surroundings by surveying with a GPS (Johnson 2009).

Overall it can be stated that GIS and relational databases have become a large part of archaeological research. Although the use of these computer applications is very efficient, the aforementioned caveats should be taken into account.

For this research the collected military and soil maps were digitized with AutoCAD 2007 to create a basic map to import into GIS programmes. The data was imported into MapInfo to make a clear and understandable map to use as a basis for images. Aerial photographs were available for only a part of the area and did not provide any significant information, which is why these were not incorporated. 3D Grid data, obtained from the United Stated Geological Survey, was imported into Golden Software Surfer 9.0 (Figure 14) and Global Mapper 10. The interpolation method *kriging* was used to create the most useful grid-file from which the 3D image below was produced. Such a 3D model enables the execution of viewshed analyses.

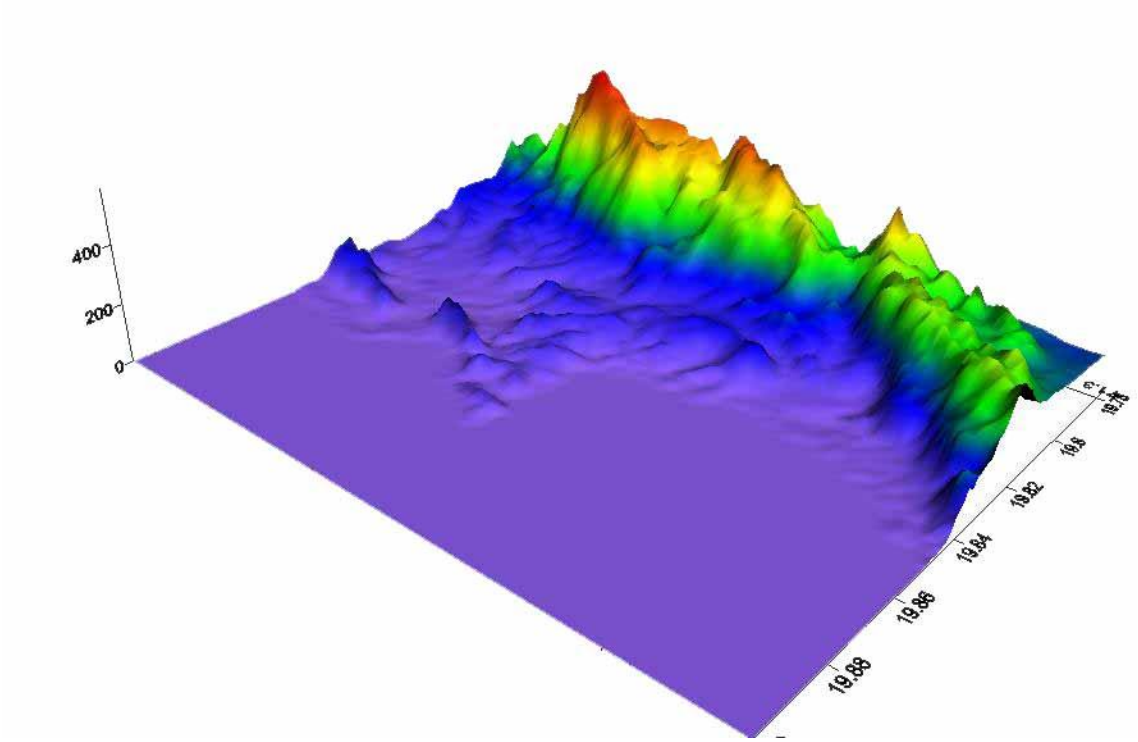


Figure 14. 3D model of the research area created in Surfer, viewed from the northwest.

3D Models as depicted in figure 14 can also be used for for example least-cost path analysis. Given that this research area is very small and that basing such an analysis on only a few variables would be insufficient, these kinds of analyses were not undertaken. To address the research questions concerning patterning and visibility, the location in combination with information of specific features is sufficient.

3.5 THE SOCIAL LANDSCAPE

After this thorough discussion of the theories and methods used, the *social landscape* needs to be addressed. The term *social landscape* is as broad as it is vague, with different definitions used by different researchers, and often the term is simply used without discussing the definition first. This leaves their readers to guess what the social landscape actually encompasses – even though it is the focus of their study (Adler 1996; Varian 1999). My definition is a rather practical and all-encompassing one: the social landscape is the combination of the physical landscape and the human presence and actions which take place in it. It is viewed truly as a merger of the cultural and the physical aspect. This entails that both empirical data and humanistic or more phenomenological data have to be used and combined where possible. The data used in this research allows merely for a broad-stroked image of the social landscape of a small area in the northwest of the Dominican Republic. On this 'middle scale', with small comprising one site and large the whole region, it is hard to place the area as well as specific sites into interaction spheres. Detailed information is lacking on a large majority of the sites, which makes it impossible to look at site-to-site relations. The amount of located sites in the surroundings of the research area is low in comparison with the site density of the area, which makes placing the study area in a larger settlement-patterning context difficult. However, the study area itself is a rather secluded one, encompassed by lines of hills and the ocean. Detailed studies and dense surveys of the surrounding area could shed more light on the actual level of seclusion of the research area.

By mapping the sites within a small area, recording their specific characteristics, and combining this information with ecological data as well as with fieldwork notes on the experience of certain factors such as strong winds or visibility, this study attempts to discern patterns and perceive the social landscape in such a small area. The social landscape that emerges from this study is what in this study is called a *patchwork of diversity*, with many sites located close together, exhibiting many different combinations of specific features, and a merge of ceramic styles. In this thesis I argue for the vision of a dynamic and diverse social landscape of the area, in which the combination of similarities and differences are the common denominator.

4 SITES & THE SURVEYS

4.1 INTRODUCTION

Three fieldwork campaigns with different purposes were carried out in the northwest of the Dominican Republic, around the border of the provinces Monte Christi and Puerto Plata. A total of 49 archaeological sites were visited of which 44 are new recordings for this area of the island. Archaeological material was also studied in two existing local collections, the ceramic material was restudied and site reports from the Museo del Hombre from the 1970s and 1980s from the Cibao valley and the province of Montecristi were reviewed.

Eleven sites were surveyed with excavation units of different sizes and seven sites with different cultural components were dated. In the remainder of the sites archaeological material from the surface was collected and all information was recorded on the standardized form in order to be able to analyse the interaction of human groups with the landscape. Thirty sources of clay in the north of the Dominican Republic were located contributing to research on ceramic interactions and mobility (Ulloa Hung, in press). These, along with samples of potsherds from several settlements are under analysis in the Ceramic Laboratory in the Faculty of Archaeology, Leiden University.

All sites visited or used in the analysis are discussed below, after a brief introduction on the map data used for this research. The sites are divided into Archaic Age sites, sites with predominantly Meillacoid style ceramics, sites with predominantly Chicoid style ceramics, and other sites. The latter includes one Ostionoid site which could not be visited, sites in an adjacent area to the east, and sites where no diagnostic pieces of ceramics could be found. The order in which they are discussed within the subdivisions is random.

4.2 MAP DATA

A very brief overview of the used maps and aerial photographs is described below. The maps used for this research are military maps and geomorphological maps. These maps were retrieved in the library of the Museo del Hombre in January 2010, or via digital source.

4.2.1 MILITARY MAPS

The maps used for the GIS were military maps in Universal Transverse Mercator (UTM) coordinates with a scale of 1:50 000. These military maps, created in 1984 and 1988 are very detailed and reveal a large amount of basic information. Roads, contour lines with 20 meter intervals, buildings, vegetation and other features are indicated on these maps. Although lines on the map, as pictured in figure 15, are at least 2.5 m wide, these maps still form a solid basis to create a GIS. The maps were digitized into AutoCAD 2007, and later imported into other GIS software. The simplified coloured maps, such as figure 18, are all created from the CAD drawing based in these military maps. A composed image of the area is placed in Appendix 1.

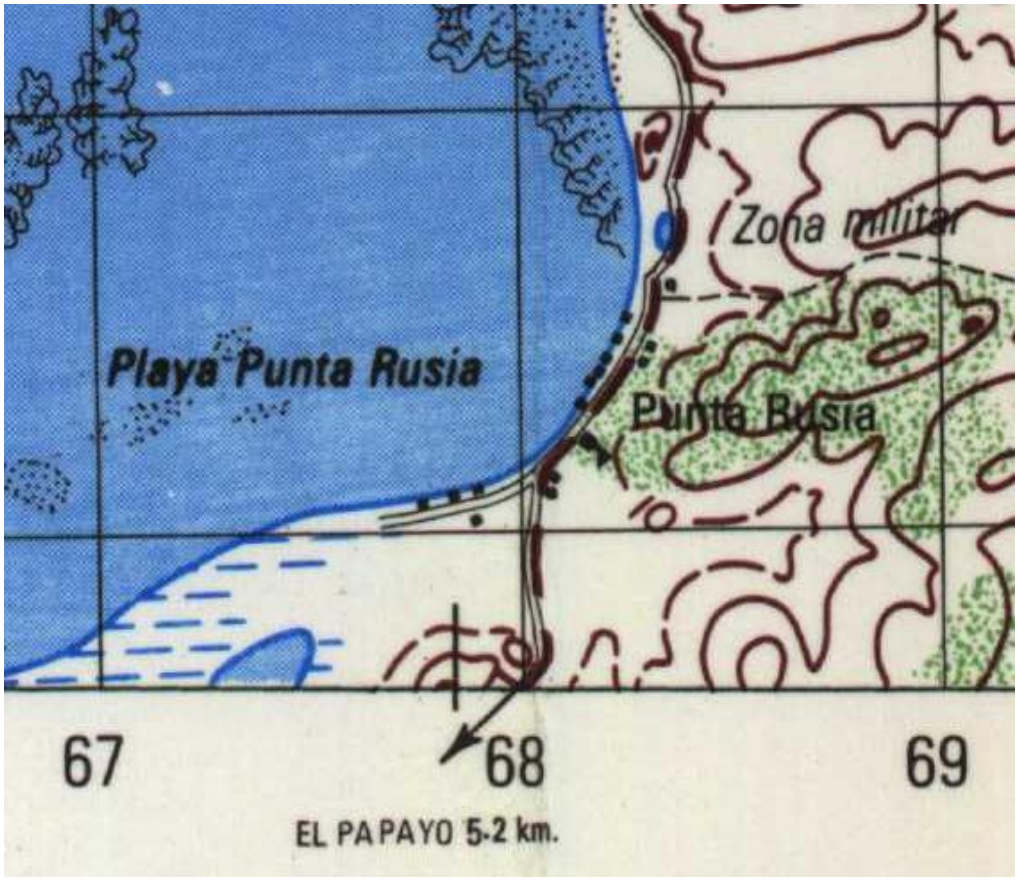


Figure 15. Snippet of the military map in the area of Punta Rucia.

4.2.2 SOIL MAPS, GEOMORPHOLOGICAL MAPS, AND VEGETATION MAPS

The geomorphological maps incorporated in the GIS are on a scale of 1:250 000, which is rather large and causes a lack of detail. However, for this research and the study area it is acceptable. Sites near the border of two profiles are characterized as profile X+Y in the analyses in Chapter 5. Information on the soils is given in the map legend. This, in combination with Tirado's publication *Los suelos de la Republica Dominicana* (Tirado 2003), gives an indication of the soil types in the area.

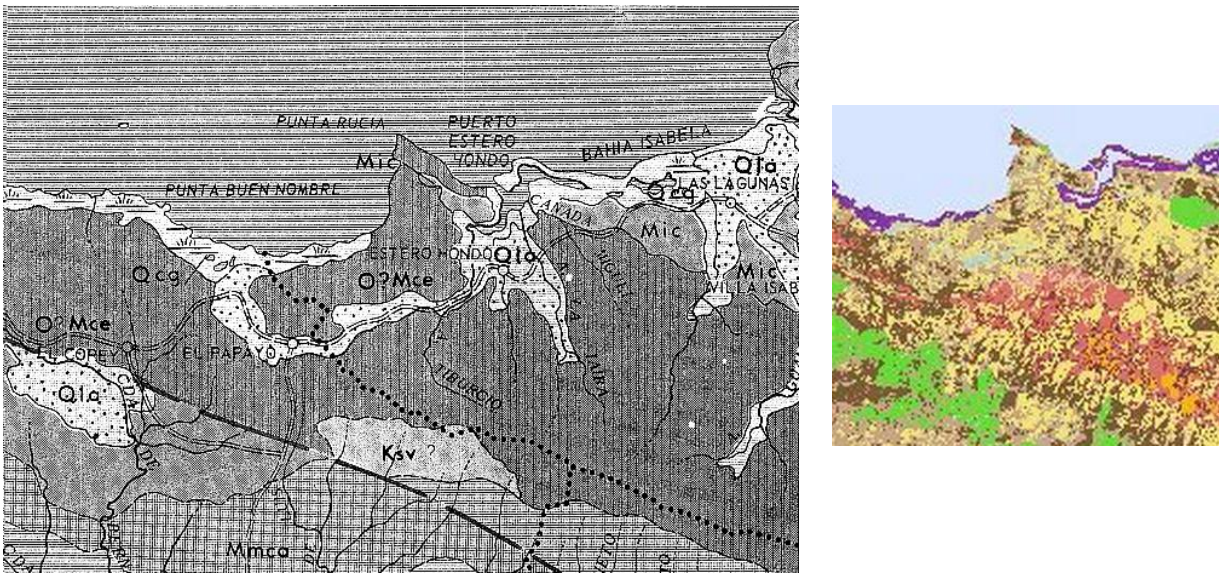


Figure 16. Examples of a geomorphological map on the left, and vegetation map on the right.

Vegetation maps could not be obtained on a scale smaller than 1:500 000. This is one of the reasons vegetation is not taken into account in detail. The best vegetation map that could be obtained is shown in figure 16, which is impossible to incorporate into the created GIS. However, the most relevant argument not to take vegetation into account during analyses is because the vegetation can change within a year in the area. Both myself and Ulloa Hung have mistaken their location on different accounts based on vegetation. This was simply because where once was a densely overgrown area with large trees, there was now a completely cut field with young fruit trees planted on it, or in my case, where an easily accessible agricultural field was encountered in January and a completely overgrown, impossible to survey area was encountered in July.

4.2.3 AERIAL PHOTOGRAPHS

Aerial photographs on a scale of 1:20 000 are available in digital form of the complete research area, with the exception of a small part of a several hundred square meters. These photos are geo-referenced and can therefore be incorporated into a GIS. The aerial photographs were mainly used to identify a site in the area, or to function as the background of an image. As visible on the bottom picture of figure 17, the zoom level is very high, up to the point where it is possible to distinguish small features such as bushes.

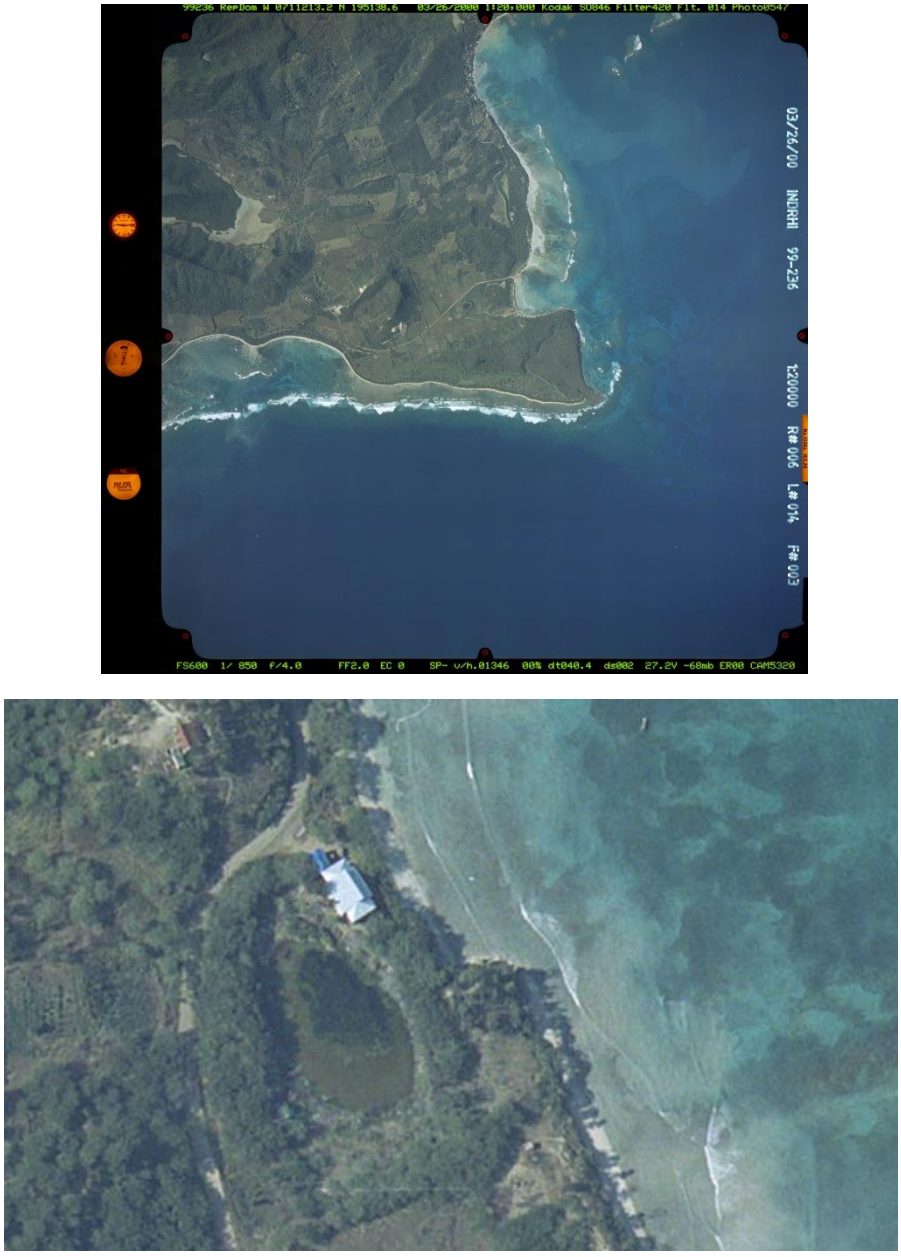


Figure 17. Aerial photograph of Punta Rucia in the top image, and a 100% zoom level in the bottom picture (adapted image from Instituto Nacional de Recursos Hidráulicos; 2000)

4.3 FIELDWORK DATA

Prior to the fieldwork which took place in the summer of 2010, the area has been visited in order to estimate research possibilities in terms of surveying and the extent of the area which would be covered. Maps, site reports and articles on the area were also collected in the library of the Museo del Hombre Dominicano.

After an initial week of preparatory studies, the surveys in the research area were carried out. The first 17 days of surveying took place in the vicinity of Punta Rucia, while the last four days these were in a larger area around Imbert located further east. Although data have been collected on the sites in the vicinity of Imbert, they are not included in the analyses. Sites located in a different area would not be comparable in factors such as viewshed analyses, distance to the sea, vegetation etcetera. Sites included in the analyses are located in the area of Punta Rucia, 36 of them recorded by myself, while five were recorded by Jorge Ulloa Hung. The latter have not been visited by myself due to both time restraints and in some cases the inability to find the sites again. Visited sites will be discussed below, divided into Archaic Age sites and Ceramic Age sites. The latter are subdivided into sites with predominantly Chicoid style ceramics or with predominantly Meillacoid style ceramics. Accessibility and steepness of the slopes are described as experienced while on foot. All variables described per site contain information on either the ecological setting of the sites, or on the human experience of travelling and residing there. Although archaeological material from each site is briefly discussed, more detailed information about the results from the test pits and ceramics is recounted in Ulloa Hung's

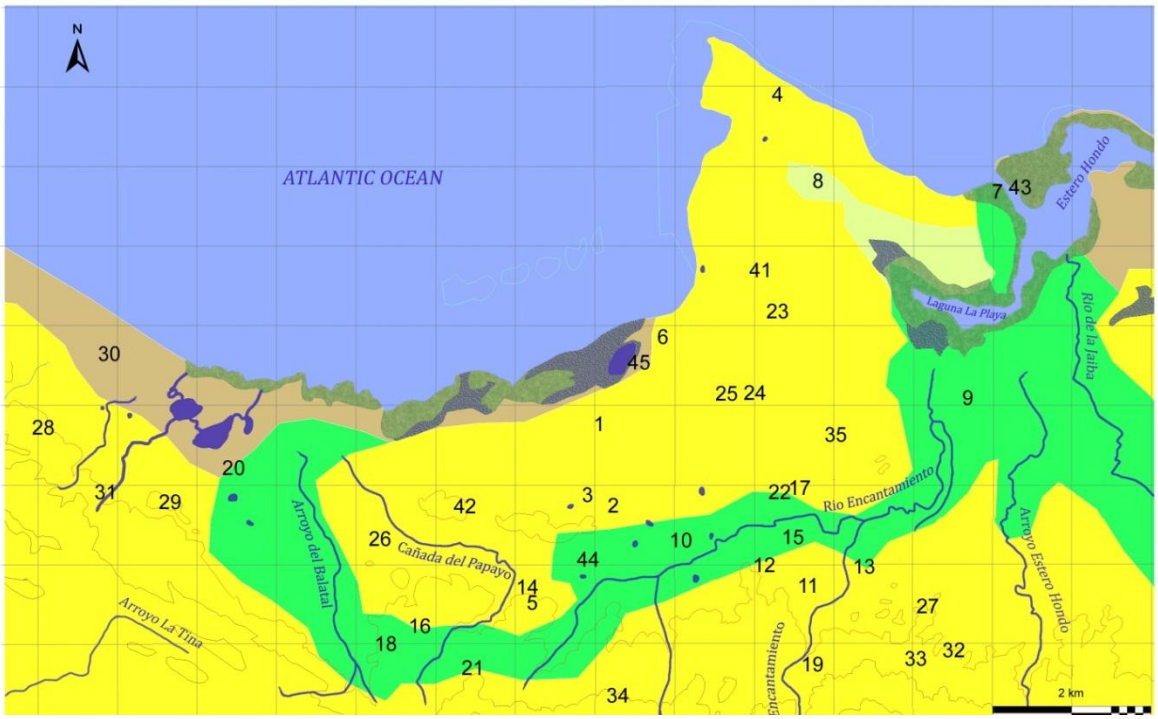


Figure 18. Overview map of all sites, numbered.

dissertation (Ulloa Hung, in press.). Each site has a number which corresponds to the numbers on figure 18 and table 1 below, and on the fold-out map in Appendix 4.

SITE NUMBER	SITES	ALTITUDE (M)	UTM 19Q N coordinates	UTM 19Q W coordinates
1	Los Perez	40-60	267383	2193348
2	La Tierra Blanca	60-80	267216	2192699
3	Maria Rosa	60-80	266908	2192848
4	El Burén/Las Paredes	<20	269293	2197916
5	Jacinto Aracena	100-120	266208	2191502
6	Los Bros	<20	267903	2194935
7	Los Manatis	<20	272065	2196745
8	Persio Polanco	60-80	269807	2196804
9	El Solar de Sepelin	<20	271679	2194110
10	Edilio Cruz	40-60	268073	2192263
11	La Mara	40-60	269688	2191708
12	La Muchacha	60-80	269111	2191983
13	Los Corniel	60-80	270391	2191952
14	La Mina de Adolfo	-	266135	2191704
15	Cristobal Gomez	20-40	269593	2192331
16	José E. Quiñones	100-120	264800	2191227
17	Los Mangos	40-60	269524	2192970
18	Rafael Quiñones	120-140	264422	2191052
19	Los Muertos	120-140	269637	2190783
20	Puerto Juanita	20-40	262484	2193239
21	Humilde Lopez	180-200	265465	2190694
22	Elida	40-60	269362	2192931
23	Popi	20-40	269279	2195199
24	La Cota	40-60	268977	2194162
25	Nino Acosta	40-60	268638	2194150
26	Papolo	40-60	264287	2192340
27	El Rastrillo	80-100	271194	2191454
28	Don Julio	120-140	260071	2193739
29	Las Cuevas de Rafo	80-100	261666	2192784
30	La Tina	<20	260885	2194650
31	Rafo	120-140	260811	2192886
32	El Lucio	100-120	271521	2190889
33	Los Piñones	140-160	271043	2190796
34	El Coronel	220-240	267266	2190319
35	Los Pachecos	60-80	270017	2193660
41	Elto	40-60	269060	2195672
42	Tiburcio	80-100	265361	2192697
43	Los Patos	<20	272278	2196705
44	Gregorio	80-100	266922	2192074
45	Juan Antonio	<20	267538	2194556

Table 1. Overview of sites, site numbers, altitudes and coordinates.

4.3.1 ARCHAIC AGE SITES

The site **El Burén** (Number 4 on the map, UTM 19Q 269293 2197916) is also known as Los Farallones, Estero Hondo or Las Paredes. The site consists of a habitation area near several caves and rock shelters located near the coast (Figure 19). According to Ulloa Hung the plain in front of the caves was a habitation area. Archaeological evidence has been found in front of the caves as well as inside. A large amount of subsistence remains was found, among this different kinds of shells and hearths. There were also human burials at the site (Ulloa Hung, in press). El Burén is the only site in the study area which is known as an Archaic site, and its coastal setting is unique because of the location near a (albeit small) limestone cliff; other coastal sites in the area are located in the mangroves or on flat plains. Current vegetation consists of small trees. The view is basically limited to the ocean and the sea inlet on the eastern side because of the setting in front of a cliff on the southern side.

Figure 19. Aerial photograph of the site area of El Burén, with the limestone cliffs indicated.

4.3.2 CERAMIC AGE SITES

With the exception of El Burén, all the sites in the research area date from the Ceramic period. Below the fieldwork at the sites is discussed, categorized into either sites with predominantly Meillacoid style ceramics or Chicoid style ceramics, and undetermined

sites. The site numbers in figure 18 correspond to the numbers used in the text. Sites with Meillacoid ceramics are highlighted in figure 20, and with Chicoid ceramics in figure 23.

4.3.2.1 SITES WITH PREDOMINANTLY MEILLACOID CERAMICS

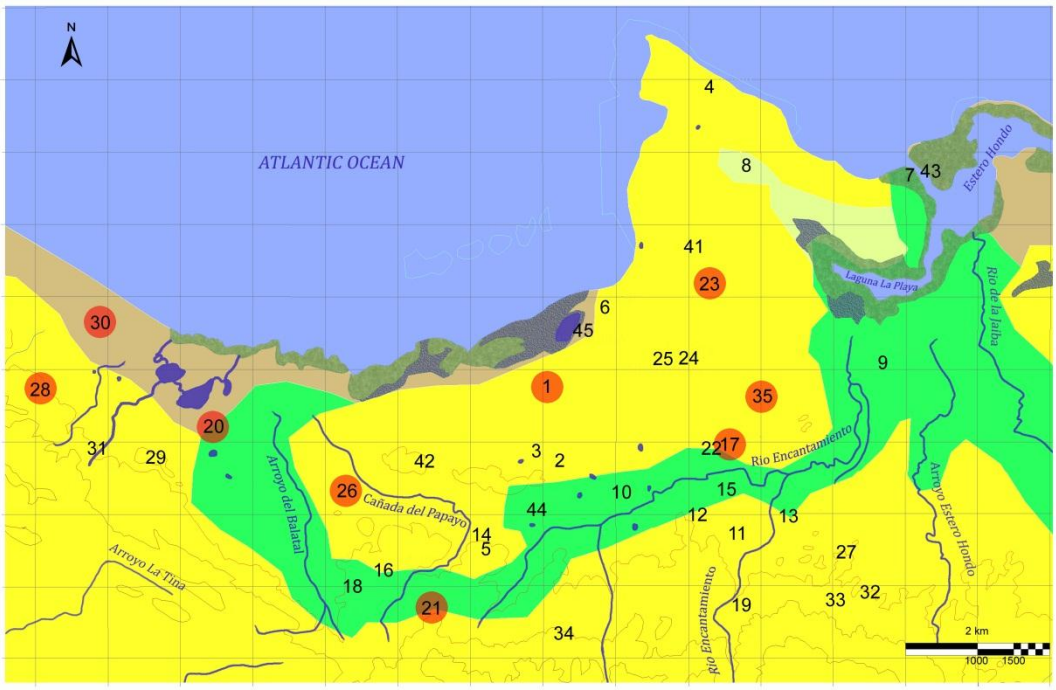


Figure 20. Overview map with Meillacoid sites highlighted.

Los Perez (Number 1, UTM 19Q 267383 2193348) is located approximately 300 m from one of the few roads in the area. The site is located circa 2 km west-south-west of Punta Rucia, and the distance to the ocean is approximately 1 km. Los Perez is placed on top of one of the smaller hills in the north. The altitude of the site is between 60 and 80 m above sea level. It is fairly accessible; the slope is not very steep and the vegetation is not too dense. The site is overgrown with mountainous rainforest which consists of many small trees and bushes, with open patches where tall grasses grow. The ocean is visible from the northern side, despite the current vegetation. The site covers an area of approximately 300 m east-west, and between 20 and 30 m north-south. The level of disturbance at Los Perez is low, and a substantial amount of ceramic sherds, shells and pieces of coral are visible at the surface. A total of 13 mounds was visible, all placed in an east-west oriented line along the 'spine' of the hill. The radii of the mounds range between 8 and 10 m, and are not higher than 1.5 m above the current surface. Several of the mounds were covered with a stone pavement on the northern side; this was best visible on mounds 7 and 8, located more or less in the centre of the site and hill.

Figure 21. Stone slabs on the slope of mound 7, Los Perez.

The exact function of this pavement is still unknown and several different theories exist on this topic. In the area this practice of paving the (mounted) soil on which the house is placed is common among contemporary local inhabitants. It serves as a firm basis for the house which will be less prone to erosion and slope wash. This might have been the function in the past as well. Another possibility is that it was used to cover the side of the hill to keep that from washing away. The occurrence of limestone slabs is also found at the Meillacoid site Puerto Juanita (Ulloa Hung, in press). This phenomenon does not only occur in the study area, but is also reported in other areas of Hispaniola (Véloz Maggiolo *et al*. 1981) and on Meillacoid sites in Jamaica (De Booy 1913). However, in these cases this occurrence was believed to be related to agricultural purposes, for which there is no indication in this research area.

The fieldwork on this site has taken place in 2009 and 2010. Two test-pits were dug in the summer of 2009 by a team from Leiden University, with the aim of establishing a site stratigraphy and collecting material for radiocarbon dating. The test-pits were dug in areas in which traces of ash and food waste were present. In the 1x1 m test-pit there was little archaeological material; only very fragmented shell and some pieces of ceramics. The other test-pit was 0.50x0.50 m and was placed next to a looters pit. Many pieces of *Codakia* sp. were found in a layer of grey ash (Ulloa Hung, in press).

The site had been visited by the myself in January 2010. As noted, during these previous visits several mounds were spotted, some of which were covered with a stone pavement. This was confirmed during the summer 2010 excavation that has taken place. Material was collected from the surface and all visible mounds were recorded with the GPS device. The site boundaries were also recorded. Three test pits were excavated and,

with the aid of Dr. José Oliver (University College London), a contour map of the hill was created with his GPS device. The 2010 fieldwork was primarily focused on the partially paved mounds, and started with the cleaning of the surfaces of these paved slopes. This enabled an overview of the surfaces, all on the northern side, and accurate measuring of these. The northern side of mound 7 is nearly completely paved with flat stones which appeared to have been worked to fit together; examined stones showed clear traces of flaking. The location of several large trees made it impossible to excavate the total extent of the pavement. The northern slope of mound 8 was also paved, although this was only partially or possibly not preserved as well as the pavement on mound 7.

The excavations first focused on mound number 7, located in the centre of the site, where a 1x2 m test pit was dug in arbitrary layers of 10 cm on the eastern slope, oriented east-west. Ceramics, shells, coral and stone were retrieved only in the first ten of the excavated 30 cm. The ceramics found were mostly Meillacoid, but there was also one Chicoid sherd. Overall there was very little archaeological material in this test pit. The soil of the mound is yellowish white which is different from what is usually found in the area. There is no presence of stone slabs in the pit. The stratigraphy was recorded by Ulloa Hung. Mound 7 is approximately 7x7.50 m with a maximum height of 95 cm from the surface. The pavement, as seen in figure 21, was 1.20 m in height by 4.60 m in length. The northern side of this mound is the steepest; the incline of the paved area is 35%.

A second test pit of 1x1 m was opened on mound 3, but after 15 cm of clean soil this was closed again. Another 1x1 m test pit was excavated on the northern side of mound 2. In the layer 0-10 cm there was a large amount of shell, some ceramics among which a piece of a griddle, and pieces of stone. It contained mainly ashy soil. In the layer 10-20 cm deep there was a lot of charcoal, fish bones, shell, and ash. A charcoal sample was taken from this layer for radiocarbon dating. This is similar in the 20-30 cm layer, which in addition also contained some ceramics, one of which was decorated in Meillacoid style. A charcoal sample was also taken from this layer. The next layer consisted of clean soil from 32 cm to 38 cm deep. The stratigraphy of the test pit was drawn by Ulloa Hung. His study of the ceramics from Los Perez revealed that 22,2% of the ceramics contain Chicoid elements. Radiocarbon dates of samples from Los Perez revealed dates (2σ range) from1056 to 1255 CE and from 1296 to 1394 CE.

Popi (Number 23, UTM 19Q 269279 2195199) is a rather large site located on a low hilltop and is covered in grass and several trees. Maize is cultivated on the far southwestern area of the hill which runs in a southwest-northeast direction, although it winds a bit. The ocean is visible in the north, part of the valley is visible in the southeast, and the site Persio Polanco is visible in the northwest. Southeast of the site is a stream

which runs in the rain season. Popi is easily accessible because of its rather flat slopes (Figure 22) and low altitude. The latter also causes the experience and views on the site to be locked '*in the valley'*. Medium high hills in the surrounding constrict the views from the site.

There are 17 mounds on the site, on the eastern part these are aligned in a linear fashion, while on the western part the mounds seem to be aligned in a horseshoe-pattern, then again flowing into a linear pattern further west. There are a lot of stones on the surface of the slopes of the eastern part of the hill. The mounds have a diameter between 5 and 10 meters and they are usually located within 15 meters from each other, although there are a few larger gaps between the mounds. A human burial was found at the foot of one of the mounds which is part of the horseshoe-shape. At the first visit shovel-tests were made, which produced Meillacoid style ceramics, shell, and bone. Ulloa Hung, Oliver and Pagán Jiménez later returned to make a 1x2 m test pit in a north-south orientation on the mound where the human remains were found earlier. The first 10 cm contained a lot of archaeological material, bivalves, ceramics and a polishing stone. A small fish bone and some charcoal were found as well. Most of the archaeological material was retrieved on the north side of the trench (Ulloa Hung, in press). In the 10 to 20 cm layer there was charcoal, bird bones, bivalves, fish bones, pottery with Meillacoid decorations, coral, *hutía* bones (a small mammal), and mangrove shell species. A large cluster of mangrove shells was present, associated with the charcoal. Furthermore a piece of pottery with Chicoid characteristics was unearthed, executed with Meillacoid technique. Mangroves shells and bivalves are the most prevalent in this layer. The 20 to 30 cm layer was again full of bivalves, mangrove shells, charcoal, fish, turtle, *hutía* and bird bones, and ceramics. A large piece of pottery was excavated, with typically Meillacoid decoration on it. In the southeastern part of the trench some flat stones and a concentration of archaeological material were encountered. The deepest layer which contained archaeological material is from 30 to 40 cm, mainly concentrated in the southern part of the trench. Pottery with classic Meillacoid decoration was excavated from this layer, in what is called the Transitional style in Dominican archaeology. Ulloa Hung's study of the ceramics form Popi reveal that 4,8% of the ceramics contain Chicoid elements (Ulloa Hung, in press). Radiocarbon dating of the site indicated calibrated (2σ range) dates between 1019 and 1150 CE.

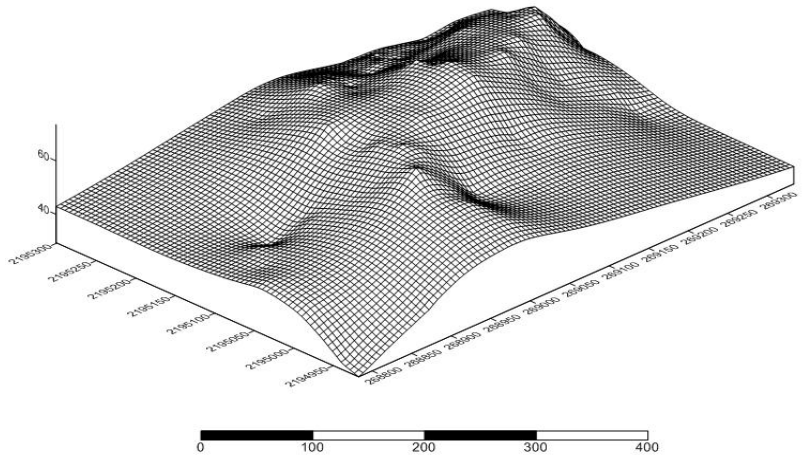


Figure 22. Contour map of Popi (Ulloa Hung, in press).

Papolo (Number 26, UTM 19Q 264287 2192340) is located on a hilltop approximately 2 km from the coast. Sites in the vicinity are Puerto Juanita and Tiburcio, the former is well visible from Papolo. There is a small stream southeast and northwest of Papolo. The site was covered in tall grass during the summer visit. It is easily accessible and located near a possible clay source. Despite the tall grass it was possible to collect shell and ceramics during a surface survey. The ceramics were decorated with typically Meillacoid motifs. As is the case for practically all sites, this hill is used for cattle to graze.

Los Mangos (Number 17, UTM 19Q 269524 2192970) is one of the most unique sites in the area, particularly because of its location on a medium high hilltop with extremely steep slopes. The Rio Encantamiento flows along the southwestern slope of the site. Los Mangos is located near one of the main roads in the area, at the fringes of the northern line of hills. The top is only about 50 square meters, and due to strong winds it was impossible to thoroughly survey this area. There was one tree at the top and the hill was covered in grass. The view from Los Mangos was 360°, over the valley to the east and west, and to the ocean in the northwest. Shell fragments were visible on the surface. Due to an upcoming storm, visible in figure 3, the site was left without conducting an extensive survey. However, four mounds were identified during a previous survey, and seashells, Meillacoid ceramics, fish bones, mangrove species, a burin and hammer stones were retrieved (Ulloa Hung, in press).

Puerto Juanita (Number 20, UTM 19Q 262484 2193239) is located on a medium high hilltop, in an east-west orientation. The site is located near the ocean and overlooks the mangroves and lagoons on the northeastern side, and part of the valley on the southeastern side. The Puerto Juanita lagoon with brackish water lies less than 500 m from the site. This lagoon with its mangroves provide rich source for the extraction of

dietary and utilitarian resources. The site is approximately 260 meter in from east to west, and 70 meter in width, which forms a rather linear shape.

With a cover of several trees the site is easily accessible and surveying was very well possible because of the large amount of ceramics, pieces of coral, and shells are visible at the surface. Local people have reported burials in the northwestern part of the site, which were also unearthed by them. These burials would have been an adult and a child. During previous excavations colonial material has been found; this did not only consist of colonial ceramics but also of parts of glass bottles and flat bricks. Whether these bricks are *in situ* is unknown. A large amount of ash, charcoal, Meillacoid style pottery and food remains were excavated from a 1x1 meter pit on the southern slope of the hill. A 2x2 meter pit in the vicinity yielded very little archaeological material, after which it was decided to open a 1x2m pit on the northern side which contained slightly more material, mainly marine molluscs. Several other pits contained more material, among which small mammal bones, a celt, a human molar, a human skull, shells and pieces of pottery. Most of the pits contain primarily dietary remains, although evidence of fishing is scarce. Ulloa Hung's study of the ceramics from Puerto Juanita shows that 12% of the ceramics contain Chicoid elements (Ulloa Hung, in press). Radiocarbon dates range from 1010 ± 15 BP to 1075 ± 15 BP.

La Tina (Number 30, UTM 19Q 260885 2194650) is a resource extraction site at the coast of approximately 5000 m^2. The site is flat and covered in small trees. The area is associated with an area of mangrove swamp nearby, in the vicinity of Puerto Juanita. La Tina is located at the northeastern base of the hill on which the site Don Julio is placed. A large amount of shell material was encountered during the surface survey. Small pieces of ceramics, some of them with Meillacoid decoration, were found as well. The view is limited to the ocean to the north and to Puerto Juanita to the west. Because of the wide dispersal of surface material it is assumed that this was an area where for example shellfish were collected. At the time of the visit the area was swamped with land crabs. During the survey a large amount of material, such as pieces of *Strombus* shells, a lot of coral files, and pieces of pottery with typical Meillacoid decoration were collected. Because this area was most likely used to extract marine resources, there is a possibility that it has served the people inhabiting several different sites in the area.

Only a brief visit was paid to **Los Pachecos** (Number 35, UTM 19Q 270017 2193660) due to time constraints. This site is set on a medium high hilltop in the eastern valley in the vicinity of Los Mangos and Elida. The slopes are rather steep which makes the site less accessible. The ocean is visible in the northwest, and parts of the valley are visible to

the south and east. Los Pachecos is approximately100 m in length and 20 m in width, oriented east-west. The vegetation was very dense; large trees and bushes covered the site. A small scatter of shells was visible on an open patch of soil. During previous research seven mounds with diameters of circa 20 m could be distinguished. Shell, turtle and crab remains were found, as well as Meillacoid style ceramics.

Located on a high southern hilltop quite like Los Muertos, **Humilde Lopez** (Number 21, UTM 19Q 265465 2190694) is not easily accessible. Although the entrance is on the roadside, from that point on it becomes a steep and often slippery climb up the hill. The site is completely overgrown with trees, without these the view would encompass the valleys all the way to the ocean. The site is placed on different 'plateaus' around and on the hilltop, which is rather unique in the area. The orientation of the site is roughly east-west, containing several lines of mounds. Although there is a total of 13 mounds on two different plateaus, distinguished during previous visits, only four mounds could be discerned in 2010, and two of them were measured. One of the largest mounds had a 23to 29 meter diameter. A 1x1 meter test pit was dug on the western slope of the hill near a pit created by looters, while the surface of the site was surveyed. Shell, ceramics, coral, stone, fishbones, charcoal and ash were retrieved from the 70 cm deep test pit. Distinctive Meillacoid style ceramics were found in the test-pit as well as during the survey. In the first 10 cm there were mainly bivalves, mostly *Codakia orbicularis* and *Arca Zebra*. A charcoal sample was taken from this layer for radiocarbon dating. The next layer, from 10 to 20 cm revealed a lot of shell and ash, as well as charcoal. At the top of the 20 to 30 cm later there was a large amount of *Cittarium pica* shells as well as a substantial amount of bivalves and pottery fragments. Similar to the previous layer, a lot of ash and charcoal was encountered. The next layer revealed more diverse archaeological material, and contained several large pieces of pottery, some with typically Meillacoid decoration. Furthermore there were fish bones, small mammal bones, bivalves, land snails, crab shells, mangrove species, and other shells. A large amount of ash and charcoal were also present in this layer. The 40 to 50 cm layer contained a concentration of charcoal and ash, which indicates the possible presence of a fire. The archaeological material in this layer is very similar to the previous one, although there were more fish and small mammal bones in this layer. The next layer, 50 to 60 cm contained similar finds, though with less ash and charcoal. The last layer, up to 70 cm deep also contained typically Meillacoid style ceramics, as well as turtle bones, marine shells, and land snails. A loop handle common in Ostionoid style ceramics was excavated from this layer. At approximately 70 cm natural soil was reached. The wall profile was drawn and photographed by Ulloa Hung,

and his study of the ceramics from Humilde Lopez revealed that 4,4% of the ceramics contain Chicoid elements.

Don Julio (Number 28, UTM 19Q 260071 2193739) is a high hilltop site approximately one km from the coast and was only briefly visited to note coordinates. It lies in the vicinity of Puerto Juanita and La Tina and is not easily accessible, mainly because of the steep slopes. The vegetation is not very dense, with little more than trees. The ocean is visible in the north, and to the east the valley and the southern hills are visible. The site is oriented east-west and there are a large number of mounds observed at the site. Shells, coral and ceramics in Meillacoid style are visible at the surface. According to Ulloa Hung there are at least 16 rows of at least 10 mounds in the north-south direction. Researchers from Leiden University visited the site in 2009 and dug two 1x1 m test pits in order to obtain more diagnostic material from the site, and to take a sample for radiocarbon dating. These pits yielded bivalves, land snails, pieces of *Strombus*, charcoal, animal bones, fish, shellfish and contained a mostly ashy soil. The remains of mangrove species are very scarce in contrast to what we find in food remains on other sites (Ulloa Hung, in press).

4.3.2.2 SITES WITH PREDOMINANTLY CHICOID CERAMICS

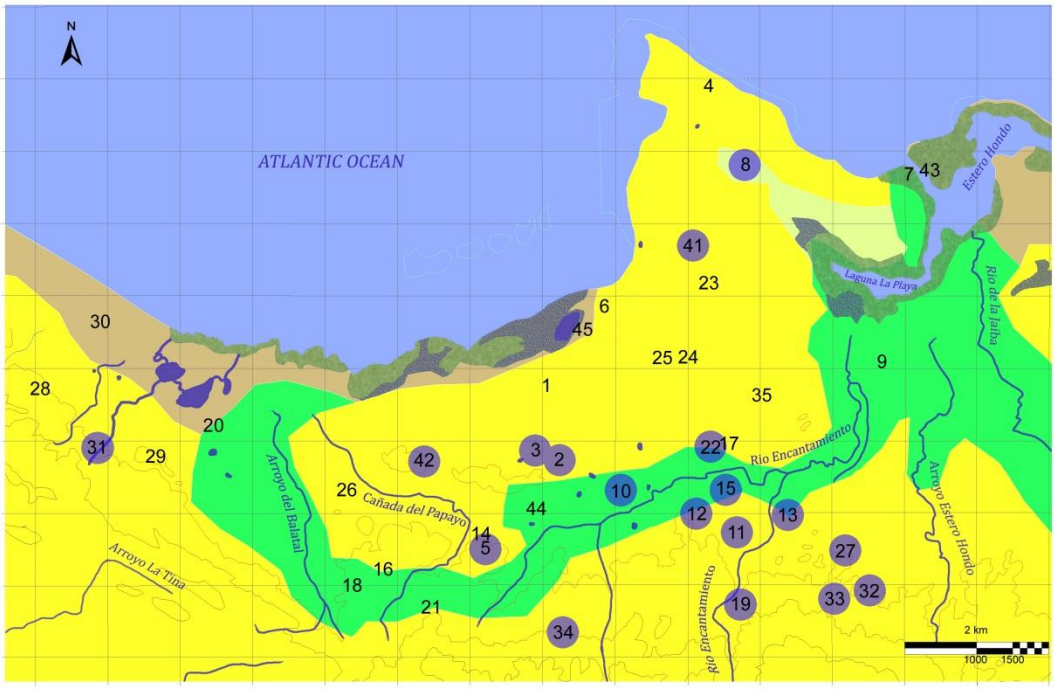


Figure 23. Overview map with Chicoid sites highlighted.

La Tierra Blanca (Number 2, UTM 19Q 267216 2192699) covers a large elongated area and is stretched out over more than 400 meters in an east-west fashion. The site is located

on a medium-high hill covered in grass and several trees, surrounded by other medium high hills and by a depression on the southern side. It is exemplary of one of the sites embedded in the valley, surrounded by many low hilltops in the vicinity. The ocean is visible from the site, as well as large parts of the valley. La Tierra Blanca is easily accessible as it is right next to a main road. The site is cross-cut by a small unpaved road. During previous research a total of nine mounds were recorded.

Starting on the eastern side of the hill, nine shovel tests were made in the western direction on the southern side of this small road, three of which contained shell, ceramics and coral while the remainder was marked as 'negative'. Another 18 shovel tests were dug on the northern side of the road, eight of which contained shell, ceramics and stone. One sherd was in typically Chicoid style. The seven most western pits were all negative. These shovel tests functioned as a means to establish the general area of the site, and to observe if La Tierra Blanca and Maria Rosa were part of one and the same site. It was concluded that these were in fact two different sites because of the absence of archaeological remains for in a large area between the sites. A 1x1 m test pit was dug at shovel test 4. In the first layer, 0-10 cm, shell, Chicoid ceramics, bone, and stone was found. A piece of pottery with an anthropomorphic decoration on it was also excavated. The bivalves in this layer are rather large. In the 10-20 cm layer there were similar finds, although less than the in the first layer, eventually ending in the natural soil. The profile of the pit was recorded with a photograph.

Maria Rosa (Number 3, UTM 19Q 266908 2192848) is located 200 m from La Tierra Blanca, also easily accessible from the main road. It is placed somewhat higher than La Tierra Blanca on a hilltop, covered in trees and tall grass. Possible mounds are hard to discern because of the high degree of surface and soil disturbance. There 9 or 10 small elevations on the site, but these are not necessarily anthropogenic mounds. The ocean is visible from the northern side, and although Maria Rosa and La Tierra Blanca are located very near to each other, both sites seem to have a very different character in terms of the *setting* of the sites. While the latter has a very elongated and sloping character, Maria Rosa is a bit higher up, on a steeper hill, and a bit more circular and flat in shape. However, it was impossible to map the site area accurately because of tall grass, the restriction of a fence, and the high degree of looter pits. These factors also made it difficult to select the location for a test-pit. Shovel tests were made to explore the possibilities for a test pit. Three of six shovel tests were positive. Surface material consisted of bivalves and some Chicoid style ceramics. A 1x1 m test pit was opened at the location of shovel test 2. Shell and ceramics were found in both the 0-10 cm and the

10-20 cm layer, although there was less in the lower layer. No clearly decorated ceramics were encountered in the pit.

Jacinto Aracena (Number 5, UTM 19Q 266208 2191502) is located on a steep, high hilltop in the southern part of the valley, and is not too easily accessible because of its steep slopes overgrown with tall grass and bushes. The ocean and part of the valley are visible from the site. Low-growing vegetation is dense on the larger part of the slope, which is now used for cattle to graze. This, and the fence on top of the hill, made it impossible to map the site exact area accurately. The length is approximately 160 m and the width is circa 70 m, in an east-west orientation. Shovel tests were dug from west to east in order to approximate the site area. Ten out of 15 shovel tests were negative, only two contained ceramics out of a total of five pits which also contained shell. There were decorated ceramics in Chicoid style as well as undecorated ceramics.

Persio Polanco (Number 8, UTM 19Q 269807 2196804), also known as Don Persio, is located on a high hilltop with steep slopes in the north of the area, encompassed by the ocean on three sides. Approximately half the site has been bulldozed about two meters deep (Figure 24), the intact half is densely vegetated with small trees and bushes. Not only the ocean, but also the sea inlet to the west is visible from Persio Polanco, as well as the valley to the south. The site Los Manatís lies at the banks of the sea inlet, and is named after the presence of manatees in the national park in which it is located. During the summer 2010 visit 10 mounds could be distinguished and their coordinates were recorded. During previous surveys ceramic material was collected, and the site is designated as a Chicoid site, although some Meillacoid ceramics have been retrieved.

Figure 24. Aerial photograph of Persio Polanco, where the bulldozed area is clearly visible on the western side (INDHRI 2000).

La Mara (Number 11, UTM 19Q 269688 2191708) is one of the two non-hilltop sites which is not located at the coast. La Mara consists of a flat area located near the Rio Encantamiento, at the foothill of the site Los Muertos. There is a small artificial lake created to provide water for livestock; unfortunately this construction destroyed most of the site. Now the site is very sparsely scattered with shells and ceramics, which made it impossible to map it accurately. Currently it is used as a grazing area for cattle. Earlier surface collections have recovered shells, ceramics, mortars and hammerstones. The site was labeled as a Chicoid site.

Cristobal Gomez (Number 15, UTM 19Q 269593 2192331) is the other site located on a large, flat plain. The location near a road makes it easily accessible. The site has a very limited view of only the surrounding hills. Cristobal Gomez is covered in low grass and several trees, and is used as land for cattle to graze. There are stone slabs visible on the surface, and the landowner explained that when he tried to use this land to grow some crops it failed because of the difficulty to plough with such a large amount of stones in the soil. A small stream runs by the site, and there are natural bodies of water in the vicinity. The general area of the site was identified and recorded, but no archaeological material was collected. The site is approximately 140 m east to west by 150 m north to south. Ceramics collected during earlier surveys are in Chicoid style. Other finds include shells (mainly bivalves), pestles, and fragments of ochre. A shovel test produced a large number of marine shells and mangrove species. According to the landowner there were human burials present at the site. Cristobal Gomez is different from the surrounding Chicoid sites in the sense that is located on a low, flat plain.

Elida (Number 22, UTM 19Q 269362 2192931) is located on the slope of a low hill in the vicinity of Los Mangos, at the northern side of the main road. It is an easily accessible, medium high site with three small mounds scattered in a circular fashion between several trees. Eilda is different from other sites in the area because it is located on the slope of a hill, not on a flat plain or a hilltop. Only a small portion of the western valley and a larger area of the eastern valley to the south are visible from this site. Besides shell, coral and stone, Chicoid style ceramics were also collected during the surface survey.

El Rastrillo (Number 27, UTM 19Q 271194 2191454) is a medium high-hilltop site surrounded by higher hills and is difficult to access. The site lies in the vicinity of Los Muertos, Los Corniel, Los Pinones and El Lucio. The hilltop is a circular flat plain and is

covered in some trees and bushes. Nine mounds were recorded aligned in a more or less circular pattern, covering approximately 2000 m², and with a depression in the centre. The surface survey produced Chicoid ceramics as well as shell material. A natural body of water which collects water from the surrounding hills is located at the base of the hill on the southwestern side.

El Lucio (Number 32, UTM 19Q 271521 2190889) was the most difficult site to access, and was completely overgrown with trees, bushes, and plants. Ravines with large, loose rocks and slippery, muddy walls are part of the slopes on several sides of the hill. After following the guide climbing these with the help of lianas we were under the impression that there was finally a site in the area which was truly hard to get to. However, we were both unpleasantly surprised and relieved when the route back, via the northern slope, was an easy walk down a smooth, grass covered slope. El Rastrillo is located down this slope. Although the site is at a relatively high altitude, the view is limited to the eastern valley. Two small test-pits were excavated in order to retrieve some archaeological material from the site. Bivalves, mangrove oysters, a retouched flake, a fragment of the lip of a *Strombus* shell and ceramics were collected from the shovel tests with a maximum depth of 35 cm, but a surface survey was impossible because of the extremely dense vegetation. Some of the ceramics had typical Chicoid style decorations.

Los Corniel (Number 13, UTM 19Q 270391 2191952) is located near La Muchacha, and the two sites have a clear view of each other. Los Corniel is a medium-high hilltop site, oriented northwest-southeast, near the Rio Encantamiento, which runs between the two sites. The site is accessed from the road after crossing a few fields and the river. The view is mainly restricted to medium high hilltops in the vicinity, the southern hills, and small part of the ocean to the northeast. At the time of the visit the site was densely overgrown with thorned bushes which made any kind of survey impossible. However, this site was also visited in January 2010 at which time Los Corniel was only covered low grass and recently planted crops. It was clear that the whole hilltop, at rather flat area of least 150 m in length, was covered in shell and ceramics. During previous research by Ulloa Hung 18 mounds were observed. A 1x2 m trench was excavated on a mound located on the southern side of the site. The amount of archaeological material increases as the depth increases first 20 cm, with mainly dietary remains. In the 20 to 40 cm layer the archaeological material is more abundant. Mangrove shells and bivalves are the most prevalent. A sample of charcoal was taken for radiocarbon dating. Archaeological material was very scarce below 40 cm. Ulloa Hung's study of the ceramics from Los Corniel revealed that 11,1% of the ceramics contains Meillacoid elements.

There is abundant evidence of looters activities on the site, with *huacero*-pits particularly at the base of the mounds. Remains of at least two human burials on the western slope, one of which was a juvenile were reported by local people. According to local accounts the burials excavated at the foot of a mound were associated with archaeological material, suggesting the existence of burial offerings consisting of pottery. Further excavations on Los Corniel might reveal more information on the burial practices in the area.

Edilio Cruz (Number 10, UTM 19Q 268073 2192263) has been partially excavated by José Oliver (UCL) and his team of Puerto Rican and US archaeologists. Located on a medium high-hill in the valley, the site is sparsely covered in large trees and is approximately 500 m in length. The view is limited to the southern part of the valley. The top of the hill is flattened, this is possibly artificial. There are at least 10 mounds on the site. Circular depressions might indicate the location of houses, where waste was swept outside. According to looters, there were human burials near or under the possible housing. There is a high level of site preservation which is one of the reasons why it was selected to excavate. Furthermore it is located next to one of the main roads in the area, which makes it easily accessible. The Rio Encantamiento runs 200 m from the site and is a seasonal river which runs dry outside of the rain season. Excavations revealed similar finds as elsewhere in the area, with a lot of dietary remains and ceramics. The ceramics found are in a simple Chicoid style, although 16% of the ceramics contained Meillacoid elements (Ulloa Hung, in press).

From **El Coronel** (Number 34, UTM 19Q 267266 2190319), on the northern slope of the southern hills, and at an altitude of approximately 250 m, the entire research area is visible. In the west the view is restricted by the southern hills, where the far northwestern end of the Cordillera Septentrional flows into the ocean. El Coronel lies south of the road from Punta Rucia to Rancho Manuel. The surface of the hilltop is irregular, which makes it difficult to distinguish mounds, and is oriented north-south. The surface appears as one with a depression in the middle. The looters pit was located on the fringe of this depression. As suggested at Edilio Cruz, this circular depression might indicate a sweeping area. The site was covered in trees and tall grass. A looters pit revealed that archaeological material is present until a depth of 75 cm. Mostly shell and some Chicoid style ceramics were collected from the surface; 28% of the ceramics contained Meillacoid elements (Ulloa Hung, in press).

La Muchacha (Number 12, UTM 19Q 269111 2191983) is a high hilltop-site, with quite steep slopes. Since it lies next to the main road it is easily accessible. It is partially covered in trees, but the larger part is covered in low grass. The eastern side of the hill views over the valley and the two ranges of hills in the north and the south (Figure 25) and over the ocean in the northeast. The orientation is roughly north-south, but the extent of the site could not be mapped in all directions due to a fence in the western part and dense vegetation at another part. There are numerous traces of looter activity on the site. Surface material was collected, and a 1x1 m test pit was dug on top of the hill on the eastern side. This pit contained a wealth of archaeological material up until 90 cm deep, consisting of ceramics, shell, fish bones, crab, manatee bone, stones, charcoal, and coral. Specific finds from La Muchacha include very typically Chicoid ceramics, a possible hearth, and a specimen of *Strombus* which showed traces of being in the middle of the process of getting cut. Many shells were mangrove species. The archaeological material retrieved from the pit consists wholly of dietary material, except for one piece of flint which was found. At several points samples were taken for radiocarbon dating, which resulted in calibrated dates (2σ) ranging from 1300 to 1445, and from 1439 to 1632. In the 70-80 cm layer a cluster of stones and charcoal was encountered, which was possibly a fireplace. The ceramics, among which some *adornos*, were mainly in Chicoid style. The wall profile was drawn, and soil samples were taken from each layer by Ulloa Hung. His study of the ceramics from La Muchacha revealed that 28% of the ceramics contained Meillacoid elements.

Figure 25. Western view from La Muchacha.

Los Muertos (Number 19, UTM 19Q 269637 2190783) has earned its name from the amount of burials which were present on this high hilltop, none of which have been preserved. Los Muertos is quite hard to access, a one hour hike starting at La Mara, then following a creek to the foothill, on through dense vegetation and patches of burned trees is necessary to get to the top of this hill. The dimensions of the site are approximately 190 m north-south and 90 m east-west. This site has a view to the north over the western as well as the eastern valley, up to the ocean. Currently it is overgrown with tall grass, and cattle grazes at the top despite the steepness and the high altitude. In the recent past this area has been used as a tobacco plantation, and the site has been looted almost completely. According to locals' accounts human burials, associated with well-crafted Chicoid ceramics, often in zoomorphic or anthropomorphic shapes, were present at the site. Some of these objects have made their way to the collection of local amateur archaeologists, like complete ceramic vessels and a skull with what appear to be pathological lesions. The pottery collected from Los Muertos in these local collections is sometimes produced in a very crude manner which suggests the presence of possible Meillacoid elements. Furthermore stone tools, beads, celts, hematite and ochre were found at the site. Shell material yielded dietary remains as well as scrapers and burins. Survey was impossible because of the dense vegetation, the tremendous amount of cow dung, and due to the fact that most of the site was already looted. A survey was conducted in search for petroglyphs at the Rio Encantamiento running around the foothill, but none were found. The water level in the rivers changes a lot over the year and was low at the time of the survey, exposing large rocks on the banks.

Rafo (Number 31, UTM 19Q 260811 2192886) is located on Mr. Rafael Sánchez's property on a rather flat plain on high hilltop near the ocean, at the far northwestern end of the Cordillera Septentrional. The view from Rafo encompasses the ocean as well as the valleys to the east. Within 500 m of the site is an area with caves, which the I have named Las Cuevas de Rafo because these are also located on Rafael Sánchez's land. The site is relatively easily accessible. A surface survey produced several large coral slabs, as well as Chicoid style ceramics and shells. The mounds present on this site are aligned in a circular fashion and have a flat surface or depression in the centre, similar to what has been observed at the Edilio Cruz site. Due to time restraints only one coordinate was noted, although other coordinates were used in the field to calculate the width of one of the mounds.

Similar to Humilde Lopez, **Los Piñones** (Number 33, UTM 19Q 271043 2190796) is placed on three plateaus surrounding a high hilltop, although this is more in step-by-step

way rather than in a circular way. The site is located in the vicinity of Los Corniel, Los Muertos, El Lucio and El Rastrillo. One of the looters pits indicates the presence of archaeological material up to a depth of 70 cm. There are five mounds spread over these plateaus on different altitudes, with a total altitude difference of about 20 m. Set on the northeastern slope of the southern hills, the view of Los Piñones is limited to the eastern valley. Surface survey produced a large amount of shell, undecorated and Chicoid ceramics, and a stone axe.

4.3.2.3 UNDETERMINED SITES

Los Bros (Number 6, UTM 19Q 267903 2194935) is one of the few coastal sites in the area, located at the beach of Punta Rucia. The site is located approximately 200 m from a possible resource extraction area. Los Bros was briefly visited and could not be mapped accurately, only a general GPS location for the site could be recorded. The site was completely overgrown with very dense thorny bushes which made any kind of survey or an approximation of the site dimensions difficult. Maize, papaya and sweet potatoes are currently cultivated at the site, and surface material is very scarce. Food remains and some pieces of pottery were found, but there were no diagnostic sherds. There were also hammer stones and pieces of coral found at the site, and it is suggested that Los Bros was a settlement site associated to the resource extraction area mentioned above (Ulloa Hung, in press).

Los Manatis (Number 7, UTM 19Q 272065 2196745) is another coastal or rather a riverbank site; and it is easily accessible. The site is located in a national park, which is designated due to the presence of manatees in the nearby sea inlet and mangroves. Los Manatis consists of a large area of scattered shell material on the western bank of *Estero Hondo* (the Hondo Estuary). There are no recordings of ceramic material at this site, which has never been excavated or thoroughly surveyed. However, Ostionoid ceramics have been found at the site of Los Patos located on the eastern bank of the estuary. Los Manatis appears to have functioned mainly as a resource extraction area.

El Solar de Sepelin (Number 9, UTM 19Q 271679 2194110) is located right next to a road, and would be easily accessible if not for a house and garden which are lay on top of the site. The location and altitude of the site restricts the view to surrounding hills. During a previous visit it was estimated that at least five mounds were present in an east to west orientation. Archaeological material is very scarce, and there was no diagnostic pottery obtained from the site.

The situation at **La Mina de Adolfo** (Number 14, UTM 19Q 266135 2191704) is similar. As the name of the site states, the area where this site was located is used for mining, or more specifically the extraction of limestone for the construction of the road to Punta Rucia. Only very small fragments of ceramics could be found – not just at the location of the site but also along many parts of the aforementioned road. Only the location could be recorded.

Local landowners pointed us to the location of **José Enrique Quiñones** (Number 16, UTM 19Q 264800 2191227) where several years ago a stone in the shape of an iguana was found. This location was on a low hill near a flat plain, causing a limited visibility. There was no archaeological material visible on the surface at this location, which is why only one coordinate was taken to indicate the general location.

Located on a medium high hilltop near José Enrique Quiñones, **Rafael Quiñones** (Number 18, UTM 19Q 264422 2191052) has a broad view over the valley to the northwest, in the direction of Puerto Juanita. With the exception of a few trees the site was only covered in grass. The site is easily accessible from a nearby road. There were five low mounds on the site of Rafael Quiñones. Some pieces of shell and ceramics could be collected. Unfortunately none of the ceramics were clearly decorated.

La Cota (Number 24, UTM 19Q 268977 2194162) is located on top of a relatively high hill with a broad view over the ocean and a partial view of the valley to the south. The site is easily accessible and is covered in grass. The general area of the site was recorded with the GPS, while a 1x1 meter test pit was dug on the northern side of the site after an earlier attempt on the eastern side which revealed no finds. Test pit number 2 contained shell, ceramics, stone, bone and coral. Sterile soil was reached at 30 cm depth. No diagnostic ceramics were found. During a visit in 2008 14 mounds were identified. However, these could not be distinguished during the last visit in 2010.

Nino Acosta (Number 25, UTM 19Q 268638 2194150) is located on a very steep and relatively high hill only 200 m away from La Cota, and is oriented east-west. The site is less than 2 km away from the ocean. Due to very dense vegetation Nino Acosta was only briefly visited. The ocean is very well visible from the site, but only part from the valley in the south is visible. The hilltop is covered in pieces of shell and some ceramics, but no diagnostic sherds could be found. There are 6 mounds on the site, but possible damage due to bulldozing made it impossible to observe them during the 2010 visit.

The caves of Rafo (Number 29, UTM 19Q 261666 2192784) are located at the foothills near Rafo and Don Julio. These caves have unfortunately collapsed. However, the landowner stated that he had found archaeological material in these caves in the past. One coordinate was recorded for the general location of these interconnecting caves, to indicate the area where these were placed.

Guzmancito (36), **Los Judios** (37), **Paradero** (38), and **Arturo Payero** (39) were all visited during the summer of 2010. However, the sites lie outside of the research area in a different landscape setting and are geographically segregated from the Punta Rucia area. The aforementioned sites are therefore not included in analyses in this thesis. The sites of **Elto** (Number 41, UTM 19Q 269060 2195672), **Tiburcio** (Number 42, UTM 19Q 265361 2192697), **Los Patos** (Number 43, UTM 19 Q 272278 2196705), **Gregorio** (Number 44, UTM 19Q 266922 2192074), and **Juan Antonio** (Number 45, UTM 19Q 267538 2194556) are included although they were not visited because these are located in the research area. Only coordinates are known from these sites.

5 Analysis & Results

5.1 Introduction

The extensive dataset discussed in Chapter 3 allows for many different analyses, covering a broad spectrum. 'Social landscape' is in itself a broad term, encompassing and being the sum of numerous factors concerning both people and the environment. The former is a complex aspect when dealing with any type of analysis; only measurable variables can be analysed. This is one of the causes of the obliteration of people from computer models. Analyses such as least-cost-paths attempt to approach human (inter)action, but are in fact an image of different paths which would have been the most efficient to travel between for example several sites. This only becomes relevant when these are combined with variables concerning human choice, for example with the placement of settlements or ceremonial sites. However, there are still countless variables concerning human agency which cannot be reconstructed and therefore not be incorporated into a computer model. For example, interaction with specific other people while on route to the coast might make one take an 'inefficient' route. Assuming that interaction with other people has played was rather substantial in the area in pre-Columbian times, this might have happened more often than not. This could be on a regular as well as on an irregular basis. However if it is on a regular basis one might argue that it actually comprises two paths, from point A to B, and from B to point C. Furthermore, in this area most sites are located on low hilltops, which would make the least-cost-path analysis becomes useless to approach human action.

The 40 sites located in the research area all have their own characteristics and set of ceramics. In which way or how frequent people actually interacted is not traceable. In other words, there are dots on the map but these cannot be connected with any substantial arguments. The data produced by the analyses performed, in which the sites are always placed in a larger context; either site-to-site or site-to landscape, culminates in a broad-stroked image of the social landscape in the discussion. This chapter commences with the analysis of the placement of sites in the landscape by analysing the locations of types of sites, occurrence of mounds, geomorphology, altitude, and the proximity to the sea. On a

site-to-site basis analysis has been performed on the proximity of other sites and on viewsheds and intervisibility. Detailed site plans are only characterized because few are available which are not fit for analysis. Results are briefly discussed in terms of site patterning, and the possibility of making a predictive model for the area.

5.2 SITES & THE LANDSCAPE

The landscape is the main focus in this research, and in the following paragraph the possible roles of specific settings of the sites are explored. Site types in combination with geomorphology and soil and the proximity to the ocean and fresh water are analysed in order to conclude whether patterns can be discerned. An overview of analysed variables is presented in table 5. A column containing information on the presence of different ceramic styles, as discussed at specific site descriptions in the previous chapter, is also included in the table due to the indication of subsistence strategies carried out in the study area. This will be further examined in Chapter 6.

5.2.1 SITE TYPES

As site patterning is part of the main research question, the occurrence of different types of sites is a relevant variable. However, during the fieldwork it has become clear that the only distinction which could be made was that between a resource extraction site and a settlement site. There are no evident ceremonial sites in the area. Although two of the sites are located in or near a set of caves, El Búren on the northeast coast and Las Cuevas de Rafo located inland in the southwest of the area, only the former has been thoroughly researched. Moreover, El Búren is a settlement site located on the small strip of land between the caves or rock shelters and the ocean. Due to the lack of different types in this sense, conclusions about site pattering concerning such site types are not possible in the study area. However, it is noted by Moore (1991a) that Archaic Age sites in several areas of Haiti also tend to be located close to the coast, while ceramic sites in that same area are located further inland on higher hilltops. Settlement size, as used by Koski-Karrell (Koski-Karrell 2002), is also a variable which cannot be included due to the lack of detail and data on this.

5.2.2 GEOMORPHOLOGY AND SOIL

The placement of sites in the landscape is the key factor in this study. As visible in figure 26, the sites are rather equally dispersed over the landscape. The red squares represent

sites indicated as sites with predominantly Meillacoid style ceramics and the blue triangles represent sites indicated as Chicoid, based on the ceramics analysis performed by Jorge Ulloa Hung (Ulloa Hung, in press). The diamonds represent sites where only undecorated pottery was found.

The nine Meillacoid sites are generally aligned in a curve following the coastline, with three sites forming a second line located slightly further inland. There is great diversity in altitude, ranging from a sea level site like La Tina to a high hilltop site such as Humilde Lopez with an altitude of between 180 and 200 meters. The altitude indications are divided in ranges of twenty meters because of the general differences in altitude within a site, as well as the level of detail of the DEM and contour maps used. The majority of the Meillacoid style sites are located on the lower hills. The larger part of these sites occurs in the limestone, clay and sandstone area, and several sites are located on the border between two types of soils.

Chicoid style sites are located on higher hilltops further inland, and most of them are rather clustered in the southeastern part of the research area. The sites are aligned following the Cordillera Septentrional instead of the coastline, which causes these sites to be more frequently located at higher altitudes. The Chicoid style sites demonstrate the same patterns as the Meillacoid in terms of geomorphology (Table 2), with the majority in the limestone and sandstone area, and several on the borders of two different types of soils. However, there are no sites in the marshy areas.

	T	GM1 64%	GM2 24%	GM3 9%	GM4 3%	GM 1+2	GM 1+3	ALT
Archaic	1	1 (100)	X	X	X	X	X	1
Ostionoid	1	X	X	1 (100)	X	X	X	1
Mellacoid	9	6 (66.7)	X	1 (11.1)	X	1 (11.1)	1 (11.1)	10-199
Chicoid	18	12 (66.7)	1 (5.6)	X	1 (5.6)	4(22.2)	X	40-257
Unknown	11	5 (45.4)	4 (36.4)	1 (9.1)	X	1 (9.1)	X	10-120

Table 2. Number of sites present in different geomorphological profiles.

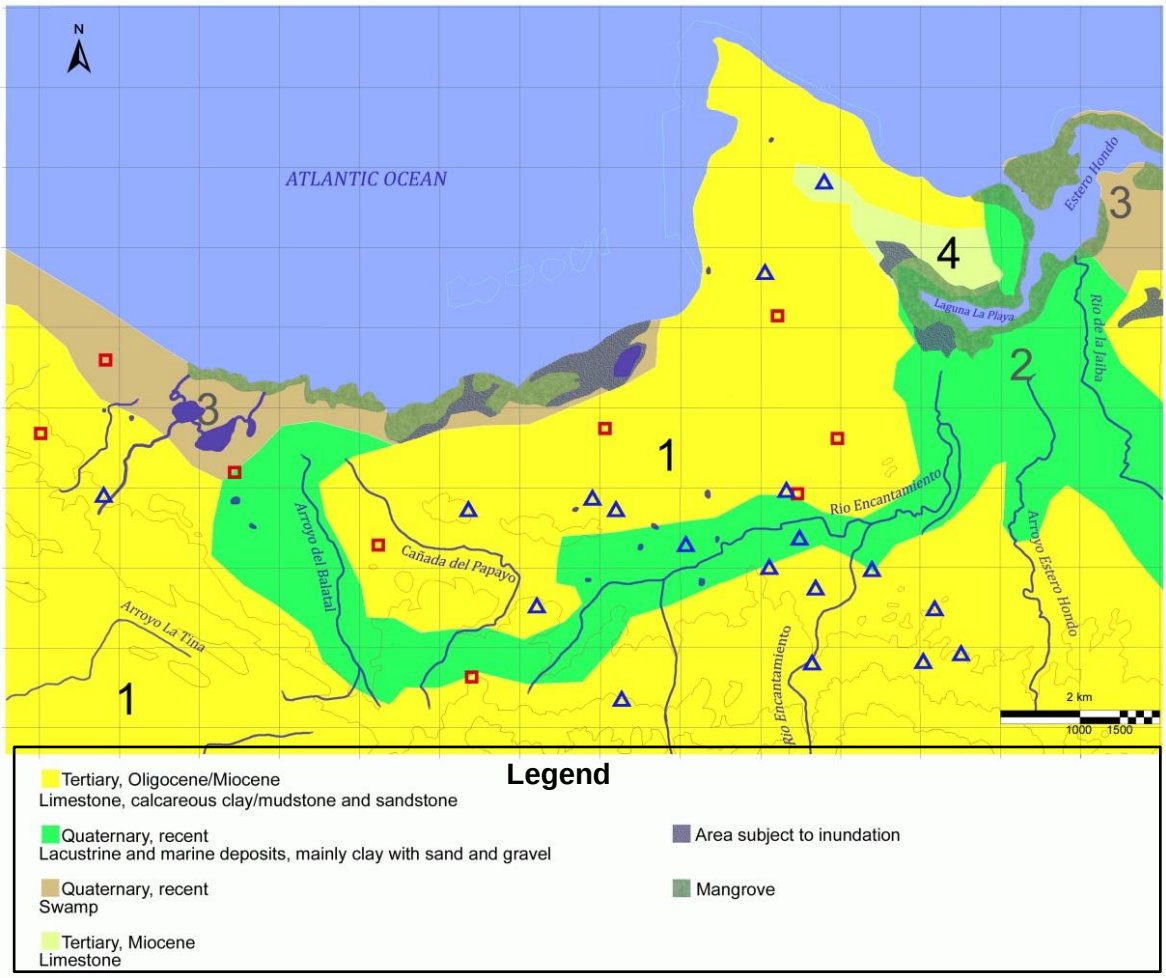


Figure 26. Map with locations of Meillacoid (red) and Chicoid sites (blue).

5.2.3 PROXIMITY TO THE OCEAN AND FRESH WATER

The amount of rivers and other bodies of water is rather high in the area due to the location at the foothills of the Cordillera Septentrional, combined with the sloping character of the hills. Without exception, all sites are located within 1.5 km from a river or another body of water besides the ocean. On average, this would take approximately 20 minutes to walk. The majority of the sites, 19, are within 500 m or approximately a six-minute walk from a fresh water source. When the distinction between Meillacoid and Chicoid sites is made, the following tables (Table 3 and 4) demonstrate the differences. The number indicates in what radius, in steps of 500 m, a body of water is located.

SITES	DISTANCE TO OCEAN (KM)	DISTANCE TO WATER (KM)
Don Julio	2	1
Humilde Lopez	3,5	0,5
La Tina	<0,5	0,5
Los Mangos	2,5	0,25
Los Pachecos	2,5	1,5
Los Perez	1	1
Papolo	1,5	0,5
Popi	1	1
Puerto Juanita	1	0,25

Table 3. Distance to ocean and fresh water for Meillacoid sites.

For sites with predominantly Meillacoid ceramics the average distance to the ocean is approximately 1.9 km, while the average distance to fresh water is circa 0.7 km. Both averages are possibly conducted on a day-to-day basis, and even the largest distance of 3.5 km takes less than one hour.

For Chicoid sites the average distance to the ocean is approximately 3.3 km, while the average distance to sweet water is circa 0.5 km. This is a distinct difference from the Meillacoid sites; the latter are located closer to the ocean and further from other bodies of water in comparison with the Chicoid sites. This might indicate less reliance on the ocean in the case of the Chicoid sites, or a vertical economy. Finds of different specific shell species can elucidate this aspect. A dietary study of stable nitrogen and carbon isotopes could also shed more light on this possibility. This will be discussed further in Chapter 6.

SITES	DISTANCE TO OCEAN (KM)	DISTANCE TO WATER (KM)
Cristobal Gomez	2,5	0,25
Edilio Cruz	2,5	0,25
El Coronel	5,5	0,5
El Lucio	6	1
El Rastrillo	5	0,5
Elida	2,5	0,5
Elto	1	1
Jacinto Aracena	3	0,25
La Mara	4	0,25
La Muchacha	3,5	0,5
La Tierra Blanca	2	0,5
Los Corniel	4	0,25
Los Muertos	4,5	0,25
Los Piñones	5,5	1
Maria Rosa	2	0,5
Persio Polanco	1	1
Rafo	2	0,25
Tiburcio	1,5	0,5

Table 4. Distance to ocean and fresh water of Chicoid sites.

5.2.4 OCCURRENCE OF MOUNDS

Although the exact function and shaping of the mounds are as of yet unknown or at least much debated, the occurrence of these mounds on many sites in the area is a variable which needs to be taken into account for site patterning. As highlighted in figure 27, the mounds occur in the limestone, calcareous clay and sandstone area as well as in the lacustrine and marine deposits area. Covering all four geomorphological areas, with locations close to the sea as well as on high hilltops in the south, these ecological factors are unlikely to have been a reason for the presence of mounds on a site. Mounds are present on six out of nine Meillacoid sites, and on nine out of 18 Chicoid sites, as well as on three sites with undecorated pottery. Furthermore, mounds are present on both sites with a flat, circular plan and an elongated, linear plan.

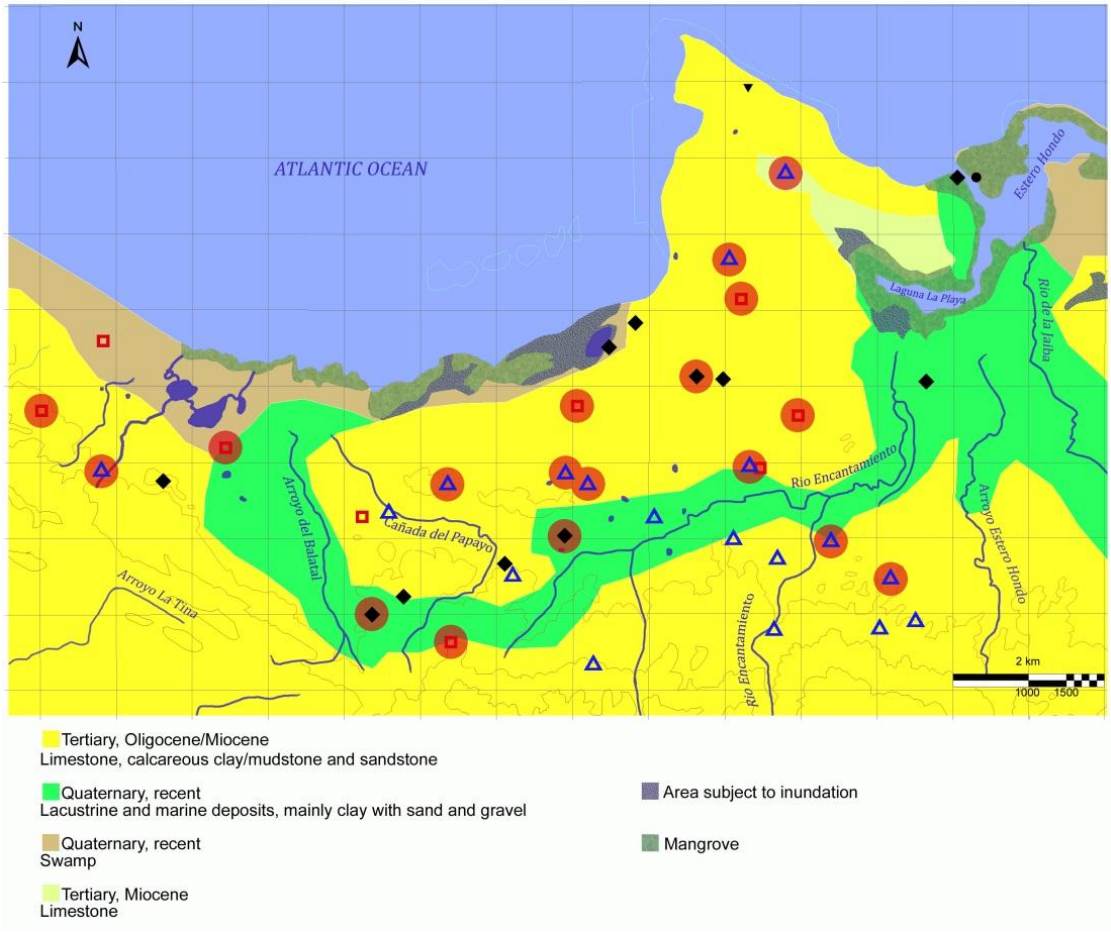


Figure 27. Presence of mounds on the sites highlighted in red.

SITES	CERAMICS	RADIOCARBON DATES (2σ range)	PERCENTAGE OF DIFFERENT STYLE OF CERAMICS	GEOMORPHOLOGY	ALTITUDE (M)	DISTANCE TO SEA (KM)	DISTANCE TO WATER (KM)
Cristobal Gomez	C	-	-	1	20-40	2,5	0,25
Edilio Cruz	C	1160-1420 CE	16%	2	40-60	2,5	0,25
El Coronel	C	-	28,6%	1	220-240	5,5	0,5
El Lucio	C	-	-	1	100-120	6	1
El Rastrillo	C	-	-	1	80-100	5	0,5
Elida	C	-	-	2+1	40-60	2,5	0,5
Elto	C	-	-	1	40-60	1	1
Jacinto Aracena	C	-	-	1	100-120	3	0,25
La Mara	C	-	-	1	40-60	4	0,25
La Muchacha	C	1300-1445 CE	28,8%	2+1	60-80	3,5	0,5
La Tierra Blanca	C	-	-	1	60-80	2	0,5
Los Corniel	C	-	11,1%	2+1	60-80	4	0,25
Los Muertos	C	-	22,3%	1	120-140	4,5	0,25
Los Piñones	C	-	-	1	140-160	5,5	1
Maria Rosa	C	-	-	1	60-80	2	0,5
Persio Polanco	C	-	-	4	60-80	1	1
Rafo	C	-	-	1	120-140	2	0,25
Tiburcio	C	-	-	1	80-100	1,5	0,5
Don Julio	M	1227-1278 CE	4%	1	120-140	2	1
Humilde Lopez	M	1031-1206 CE	4,4%	2+1	180-200	3,5	0,5
La Tina	M	-	-	3	<20	<0,5	0,5
Los Mangos	M	-	-	1	40-60	2,5	0,25
Los Pachecos	M	-	-	1	60-80	2,5	1,5
Los Perez	M	1296-1428 CE	22,2%	1	40-60	1	1
Papolo	M	-	-	1	40-60	1,5	0,5
Popi	M	1019-1150 CE	4,8%	1	20-40	1	1
Puerto Juanita	M	1267-1402 CE	12%	2+3	20-40	1	0,25
El Burén/Las Paredes	A	-	-	1	<20	<0,5	1
Los Patos	O	-	-	3	<20	<0,5	1
El Solar de Sepelin	U	-	-	2	<20	2,5	0,5
Gregorio	U	-	-	2	80-100	2,5	0,25
José Enrique Quiñones	U	-	-	2+1	100-120	3	0,5
Juan Antonio	U	-	-	3	<20	0,5	0,25
La Cota	U	-	-	1	40-60	1,5	1,5
La Mina de Adolfo	U	-	-	1	-	2,5	0,25
Las Cuevas de Rafo	U	-	-	1	80-100	2	1
Los Bros	U	-	-	1	<20	<0,5	0,25
Los Manatis	U	-	-	2	<20	<0,5	1
Nino Acosta	U	-	-	1	40-60	1,5	1,5
Rafael Quiñones	U	-	-	2	120-140	3	0,5

Table 5. Overview of all sites, with radiocarbon dates, percentages of ceramics from a different style than the predominant one at the site (after Ulloa Hung, in press), and locational factors. C=Chicoid, M=Meillacoid, A=Archaic, O=Ostionoid U=Unknown.

5.3 Sites in Relation to Other Sites

The location as well as the view of other sites might play a role in the choice of site location. During the fieldwork it has increasingly become clear how different these views are while two sites might be located quite near each other. The importance of these factors is explored below.

5.3.1 Proximity to Other Sites

The proximity to other sites places the site into an archaeological context. As with all other factors it needs to be taken into account that many of these sites might not be contemporaneous. However, as extensive and detailed dating is lacking at the moment, it is useful to examine this particular context: it reveals whether certain sites are located near each other either synchronically or diachronically. It is known from radiocarbon dates of several sites that both Meillacoid and Chicoid sites occur contemporaneously. In figure 28 an example of a Chicoid site, La Muchacha, is indicated as a triangle at the centre of a 2.5 km radius. Within this area 11 other Chicoid sites are located. This at least indicates a preference for the location, either through time or simultaneously.

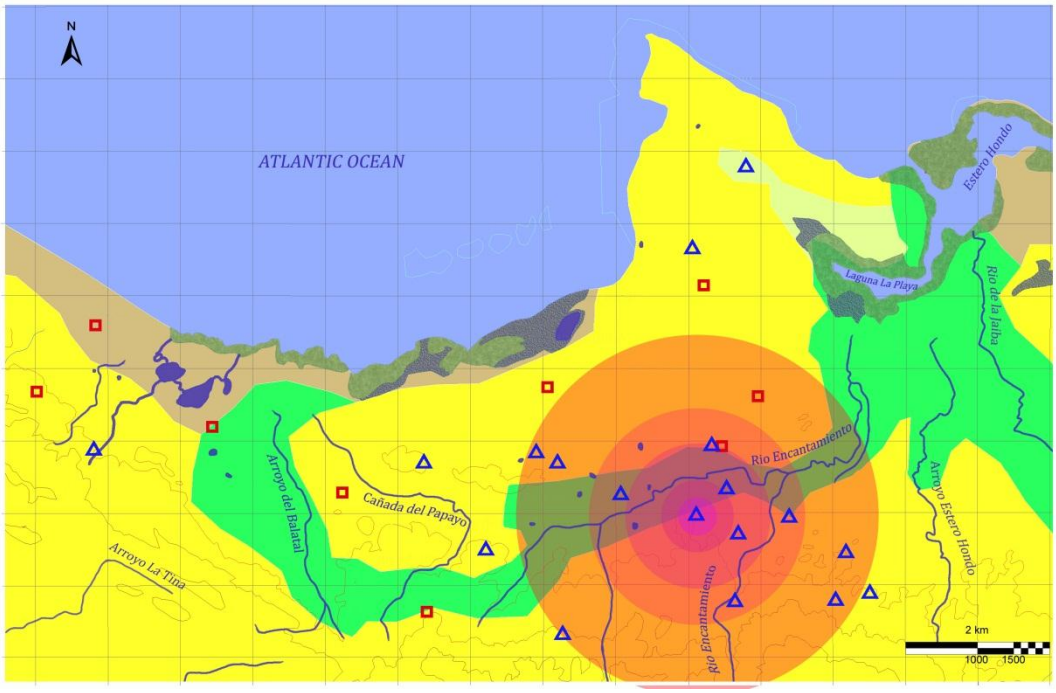


Figure 28. Example of a 2.5 km radius.

What becomes clear after analysis is that Chicoid sites are located in the vicinity of on average six other Chicoid sites (33% of all Chicoid sites) in a 2.5 km radius, and of only two Meillacoid sites (22% of all Meillacoid sites) in that same radius. However, Meillacoid sites are located in the vicinity of four Chicoid sites (22%) and two Meillacoid sites (22%) in the 2.5 km radius; in this case the percentages are the same (Table 6). In absolute as well as in relative numbers there is a stronger relation between the location of Chicoid sites than there is between Meillacoid sites.

	Chicoid av.		Meillacoid av.	
	<2,5km	<1,5km	<2,5km	<1,5km
Chicoid	6	3	2	1
Meillacoid	4	2	2	1

Table 6. Average amount of sites within 2,5 and 1,5 km radii.

5.3.2 VISIBILITY

Another possibly relevant factor is the visibility and intervisibility of the sites. Because the landscape is fairly 'open' there is a high level of visibility on most sites, as noted during the fieldwork. Concerning altitudes the landscape is roughly divided into four sections: the coast, the lower northern hills, the valley, and the higher southern hills. Broadly, these four sections come with their own specific views, although there is some variation within the sections as well as similarities between them. A Digital Elevation Model or DEM is necessary in order to render a viewshed analysis. For each site several coordinates across the site, all at an eye altitude of 150 cm, were used. Many sites are located on and around hilltops which would give each point a different view. The analyses show that on average about forty per cent (Table 7) of the area is visible from a site.

Whether there is a difference in this average between Meillacoid and Chicoid sites, and what is visible from which sites is examined below. In the following comparisons percentages are used because the number of Chicoid sites and Meillacoid sites is different. With the higher altitudes of most Chicoid sites it would be expected that these will also have wider views, and therefore more sites would be visible from these Chicoid sites. However, looking at the overall percentages Chicoid sites have an average visibility of 37% while the Meillacoid sites have an average visibility of 48% of the area. This corresponds roughly with the number of sites that can be seen; Chicoid sites cover on average 43 per cent of all sites, while for Meillacoid sites the average is 53 per cent.

	Percio Polanco	Cristobal Gomez	El Coronel	El Lucio	El Rastrillo	Elto	Jacinto Aracena	La Mara	La Tierra Blanca	Los Muertos	Los Piñones	Maria Rosa	Rafo	Tiburcio	Edilio Cruz	Elida	La Muchacha	Los Corniel	Don Julio	Los Mangos	Los Pachecos	Los Perez	Papolo	Popi	La Tina	Humilde Lopez	Puerto Juanita	El Búren	Los Manatis	Los Bros	Juan Antonio	Nino Acosta	La Cota	El Solar de Sepelin	Gregorio	La Mina de Adolfo	Jose E Quinones	Rafael Quinones	Las Cuevas de Rafo	PERCENTAGE	N/C	N/M	N/U (inc EB)	N/T
Percio Polanco	x	x	v	v	v	v	v	x	v	v	v	v	v	v	x	x	v	x	v	x	v	v	x	v	v	v	v	x	v	x	x	v	x	x	v	x	x	x	v	73	12	7	5	24
Cristobal Gomez	x	x	v	x	v	x	x	v	x	v	v	x	x	x	x	v	v	v	x	v	v	x	x	x	x	x	x	x	x	x	x	x	v	x	x	x	x	x	x	7	8	2	1	11
El Coronel	v	v	x	x	v	v	v	x	v	v	x	v	v	v	v	v	v	x	v	v	v	v	x	v	v	v	v	v	x	v	v	v	v	x	v	v	x	v	v	72	13	8	9	30
El Lucio	v	x	x	x	v	v	v	x	x	x	v	x	x	x	x	v	x	x	x	v	v	v	x	v	x	x	x	x	x	x	x	v	v	v	x	x	x	x	x	41	5	4	2	11
El Rastrillo	v	v	v	v	x	x	x	x	v	x	v	v	v	x	x	v	v	x	v	v	v	v	x	v	x	x	x	x	x	x	x	v	v	x	x	x	x	x	x	32	10	5	2	17
Elto	v	x	v	v	x	x	v	x	x	v	v	x	v	x	x	x	v	x	v	x	v	x	x	v	x	v	x	x	x	x	x	v	x	x	x	x	x	x	x	36	8	4	1	13
Jacinto Aracena	v	x	v	x	x	v	x	x	v	x	x	v	x	v	v	v	v	x	v	v	v	x	x	v	v	v	v	x	x	x	x	v	x	v	x	v	x	v	x	51	9	7	4	20
La Mara	x	v	x	x	x	x	x	x	x	v	x	x	x	x	x	v	x	v	x	v	v	x	x	x	x	x	x	x	x	x	x	v	x	x	x	x	x	x	x	4	4	2	1	7
La Tierra Blanca	v	x	v	x	v	x	v	x	x	x	v	x	x	x	v	v	v	v	x	v	v	x	x	v	x	v	x	x	x	v	x	v	v	x	v	v	x	x	x	28	9	4	5	18
Los Muertos	v	v	v	x	x	v	x	v	x	x	x	x	v	v	x	v	x	v	v	v	v	x	x	v	x	x	v	x	x	x	x	v	v	x	x	x	x	x	v	58	9	5	4	18
Los Piñones	v	v	x	v	v	v	x	x	v	x	x	x	x	x	x	v	v	v	x	v	v	v	x	v	x	x	x	v	x	x	x	v	v	x	x	x	x	x	x	46	9	4	3	16
Maria Rosa	v	x	v	x	v	x	v	x	x	x	x	x	v	v	x	v	v	v	v	v	v	v	x	v	x	v	x	v	v	v	v	v	v	x	x	x	x	x	v	54	9	6	5	20
Rafo	v	x	v	x	v	v	x	x	x	v	x	v	x	v	v	v	v	x	v	v	v	v	v	v	v	v	x	x	x	v	v	v	v	x	v	v	v	v	v	61	10	8	9	27
Tiburcio	v	x	v	x	x	x	v	x	x	x	x	v	v	x	x	x	v	x	v	x	v	v	v	v	x	v	v	x	x	v	x	v	v	x	x	v	x	x	v	24	6	7	5	18
Edilio Cruz	x	x	v	x	x	x	v	x	v	x	x	x	v	x	x	v	v	x	v	v	x	x	x	x	v	x	x	x	x	x	x	x	x	x	x	v	x	x	x	7	6	3	1	10
Elida	x	v	v	v	v	x	v	v	v	v	v	v	v	x	v	x	v	v	v	v	x	x	x	x	v	x	x	x	x	x	x	x	x	x	x	v	x	x	x	12	14	3	1	18
La Muchacha	v	v	v	x	v	v	v	x	v	x	x	v	v	v	v	v	x	v	v	v	v	v	v	x	v	x	v	x	x	x	x	v	x	v	v	v	v	v	v	45	13	7	6	26
Los Corniel	x	v	x	x	x	x	x	v	v	v	v	v	x	x	x	v	v	x	x	v	v	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	9	8	2	0	10
Don Julio	v	x	v	x	v	v	v	x	x	v	x	v	v	v	x	v	v	x	x	v	v	v	v	v	v	v	v	x	x	v	v	v	v	x	v	v	v	v	v	66	11	8	9	28
Los Mangos	x	v	v	v	v	x	v	v	v	v	v	v	v	x	v	v	v	v	v	x	v	x	x	x	x	v	x	x	x	x	x	v	x	x	x	v	x	x	x	14	15	3	2	20
Los Pachecos	v	v	v	v	v	v	v	v	v	v	v	v	v	v	x	v	v	v	v	x	x	x	v	v	v	x	x	x	x	x	x	x	v	v	v	v	x	v	v	52	17	5	5	27
Los Perez	v	x	v	v	v	x	x	x	x	x	v	v	v	x	x	v	x	x	v	x	x	x	x	v	v	v	x	x	x	x	x	v	v	v	x	x	x	x	x	48	9	4	4	17
Papolo	x	x	x	x	x	x	x	x	x	x	x	v	v	x	x	v	x	x	v	x	x	x	x	x	v	v	v	x	x	x	x	x	x	x	x	x	x	v	v	40	3	4	2	9
Popi	v	x	v	v	v	v	v	x	v	v	v	v	v	x	x	v	x	x	v	x	v	v	x	x	v	v	v	x	x	v	x	x	v	v	v	x	x	x	v	54	13	6	6	25
La Tina	v	x	v	x	x	x	v	x	x	v	x	x	v	x	x	x	x	x	v	x	v	v	v	v	x	v	v	x	x	v	x	x	v	v	v	x	x	v	v	47	5	7	7	19
Humilde Lopez	v	x	v	x	x	v	v	x	v	x	x	v	v	v	v	v	v	x	v	v	v	v	v	v	x	v	v	x	x	v	v	v	v	x	v	v	x	x	v	61	11	8	8	27
Puerto Juanita	v	x	v	x	x	x	v	x	x	x	x	x	x	v	x	x	x	x	v	x	x	x	v	v	v	v	x	x	x	v	v	v	v	x	x	x	x	v	v	46	4	5	6	15
El Búren	x	x	v	x	x	x	x	x	x	v	v	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	v	x	x	x	x	x	x	x	x	x	x	28	3	0	1	4
Los Manatis	v	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	v	x	x	x	x	x	x	x	x	x	x	x	25	1	0	0	2
Los Bros	x	x	v	x	x	x	x	x	v	x	x	v	v	v	x	x	x	x	v	x	x	x	x	v	v	v	v	x	x	x	x	x	v	x	x	x	x	x	v	39	5	5	3	13
Juan Antonio	x	x	v	x	x	x	x	x	x	x	x	v	v	x	x	x	x	x	v	x	x	v	x	v	v	v	v	x	x	x	x	x	v	x	x	x	x	x	v	44	3	6	3	12
Nino Acosta	x	x	v	x	x	x	x	x	v	x	x	v	v	v	x	x	x	x	v	x	x	v	x	v	v	v	v	x	x	v	v	x	v	x	x	x	x	x	v	43	5	6	4	15
La Cota	v	v	v	v	v	v	v	v	v	v	v	v	v	v	x	x	v	x	v	v	x	v	x	v	v	v	v	x	x	v	v	x	v	x	x	v	x	x	v	54	15	7	5	27
El Solar de Sepelin	v	x	x	v	v	x	x	x	x	v	v	x	x	x	x	x	x	x	x	x	v	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	13	5	1	0	6
Gregorio	x	x	v	x	x	x	v	x	v	x	x	x	v	v	x	x	v	x	v	x	v	x	x	x	v	x	x	x	x	x	x	x	x	x	x	v	x	x	x	6	6	3	1	10
La Mina de Adolfo	v	x	v	x	x	x	x	x	v	x	x	x	v	v	v	v	v	x	v	v	v	x	x	v	v	v	x	x	x	x	x	v	x	v	x	x	v	x	x	43	8	6	3	17
Jose E Quinones	x	x	x	x	x	x	v	x	x	x	x	x	v	x	x	x	v	x	v	x	v	x	x	x	x	v	x	x	x	x	x	x	x	x	x	v	x	x	x	4	3	3	1	7
Rafael Quinones	x	x	v	x	x	v	v	x	v	x	x	v	v	v	v	v	v	x	v	v	v	v	x	v	v	v	x	x	x	v	v	v	x	v	v	v	x	x	v	70	10	9	8	27
Las Cuevas de Rafo	v	x	v	x	x	x	x	x	x	v	x	v	v	v	x	x	v	x	v	x	v	x	v	v	v	v	x	x	x	v	v	v	x	x	x	x	v	x	x	57	7	8	5	20

	% view	av% CH	av% ME	av% UN	av % TOT
Chicoid	36,67	50	54	3	43
Meillacoid	47,56	54	62	45	53
Unidentified	32,36	31	45	18	31

Table 7. Overview of visibility ranges and sites visible, with a summary of the results below.

This data on intervisibility of each site can be visualized with Visone (version 2.6.5), a computer programme used for the visual presentation of network data, or for analysis and transformation of such data. Each site is represented by a node, while the lines or links represent a visible connection between sites. The nodes in the image represent Chicoid sites in blue, Meillacoid sites in red, and the pink nodes are undetermined sites as well as an Ostionoid and an Archaic Age site.

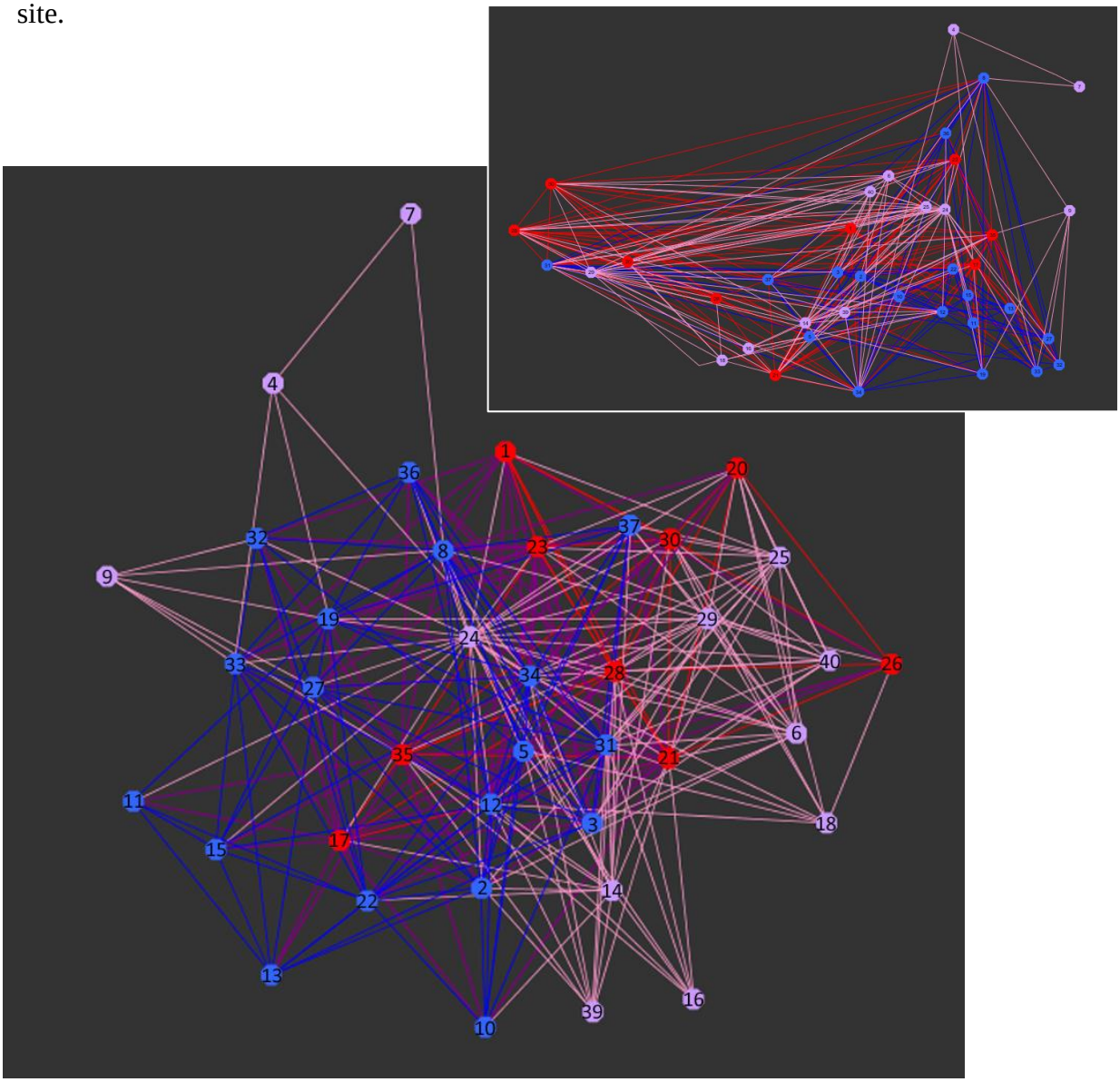


Figure 29. Visualizations of the links between sites, created with Visone 2.6.5. Chicoid sites and links in blue, Meillacoid sites and links in red, Chicoid-Meillacoid links in purple, and unknown sites and links in pink.

The study area is presented in a geographical lay-out in the upper image, and in the enlarged lower image the nodes and links are organized according to

their ‘degree’, or the numbers of links attached. In other words, the most visually connected site is placed near the centre of the image, while the least connected sites are placed on the fringes. With the different colour indications it becomes clear in the lower image that although several Chicoid sites are well-connected, or located near the centre, most Meillacoid sites are in general located rather near the centre.

5.4 SITE PLANS

Sites where mounds have been recorded were thoroughly mapped with the handheld GPS, although this was not always possible due to vegetation or other restrictions. In some cases the visibility of the mounds has changed over time, which is the reason why several sites have more mounds listed than were eventually recorded in 2010. The result is a detailed site plan of six sites, one of them incomplete due to destruction of a large part of the site. The site plans will only be described and characterized because only six could be mapped in some detail. The mounds are indicated with same-sized half-circular symbols, and the dark grey areas are rough indications of the general site-area, identified by the scatter of archaeological material such as shells and ceramics. These images are all a top view of the site, generating a 2D overview of the general area and mound locations. All images are depicted on the same scale and are oriented according to figure 30, the top being the north quarter of the compass. The figures were created by adapting the rather

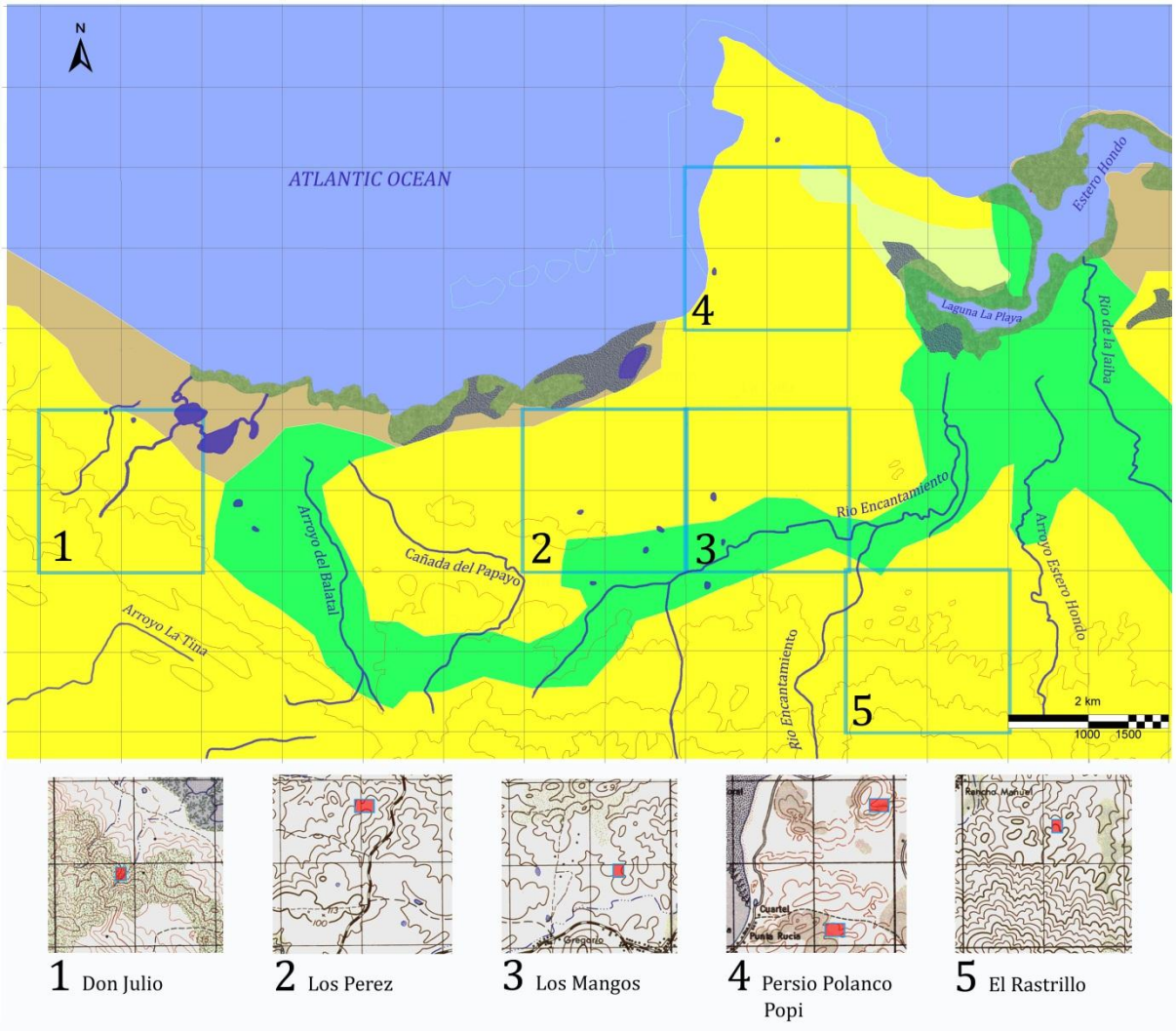


Figure 30. Overview of the locations of the site-plan images indicated in red on cut outs of the military map.

basic AutoCad 2007 map and the Global Mapper map with Adobe Photoshop CS5 Extended. These maps were incorporated as different layers on which the simplified figures were drawn.

5.4.1 CHICOID SITES

The sites Rafo, El Rastrillo and Elida were mapped thoroughly with the GPS. Persio Polanco was mapped, but the resulting image is incomplete because there is a clear cut-off of the site where it has been bulldozed (Figure 24 and 32). Another site, Los Piñones, was also mapped, but the exact location or presence of mounds was difficult to identify because of the location on the slope of a hill. The sites covered three different ´levels´, each 2 to 4 m higher than the other. The exact altitude differences and contours of the hill have not been mapped with a handheld GPS. A detailed 3D-model, which is necessary to map the site and exact mound locations accurately, could therefore not be created. Without such an accurate 3D model the image would not accurately represent the site plan on a 2D image.

Rafo, Elida and El Rastrillo have several characteristics in common. All three are located on a rather flat area, whether on the top of a hill at the foothill. The surface scatter, usually consisting of shell material and small pieces of ceramics, is in a rather circular shape. However, Persio Polanco reveals different characteristics. It is located along a hilltop and both the mounds and the surface scatter follow the 'spine' of the hill. It is noted to have 22 mounds, but only 9 could be mapped. The straight cut-off in the darkened area on the image in figures 31 and 32 depicts the line from which the site has been completely destroyed. According to the local guide Adriano Rivera, the site used to continue westward for at least 30 metres.

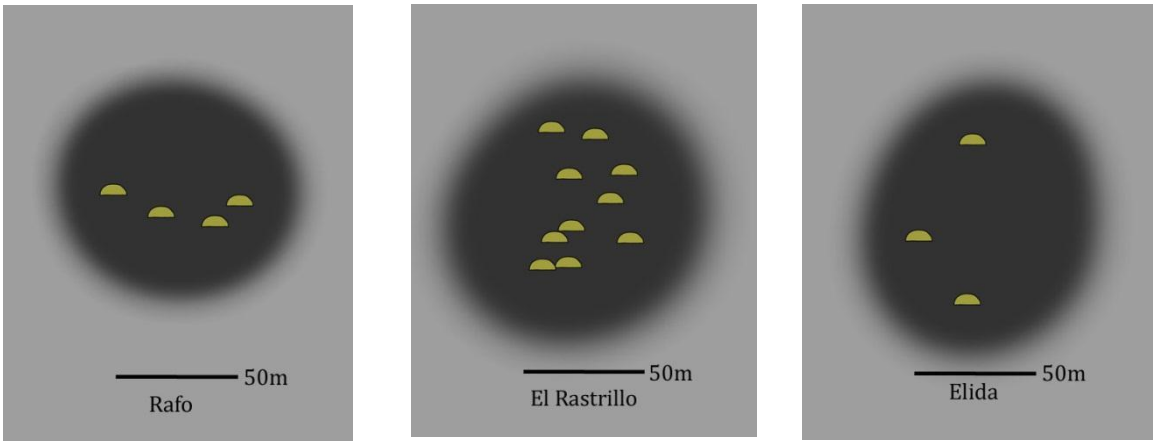


Figure 31. Site plans of Chicoid sites Rafo, El Rastrillo and Elida.

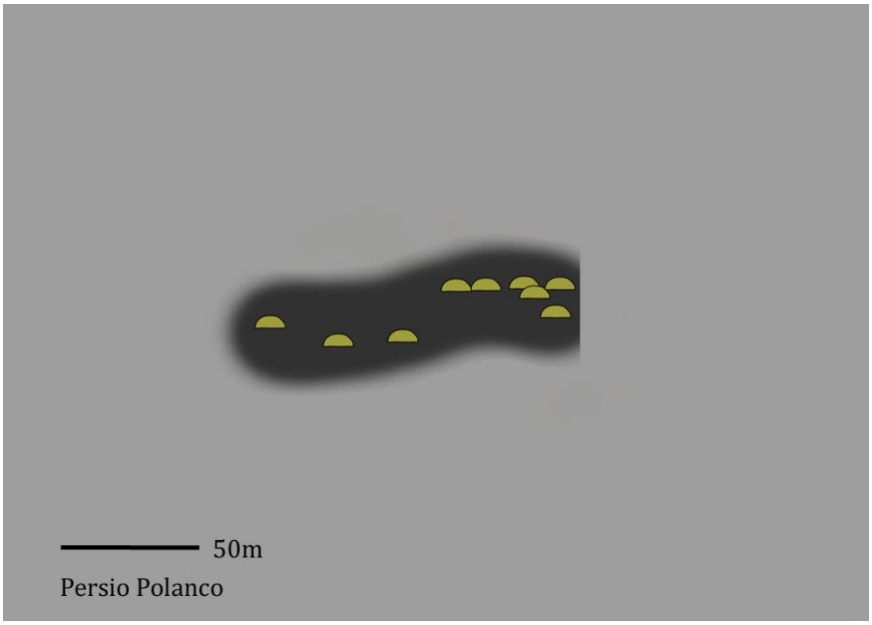


Figure 32. Site plan of Chicoid site Persio Polanco.

5.4.2 MEILLACOID SITES

Two of the nine Meillacoid sites were mapped in detail. Although there is a high number of mounds on Don Julio, it was decided not to map this site because it has been extensively mapped and researched by Alfredo Coppa over the past years (unpublished). Another Meillacoid site which is not included in the figures below is Humilde Lopez. The site is similar to Los Piñones in the sense that it is also a site located on different levels on a hill, which makes a fine grained 3D model necessary in order to make an accurate image of the site. Overall, the site would be characterized as having a circular shape, though divided into different 'terraces'.

Popi (Figure 34) and Los Perez (Figure 33) are both sites which could be mapped thoroughly. Both sites have similar characteristics which they share with the Chicoid site Persio Polanco; they are located on hilltops and the mounds as well as the surface scatter follow the spine of the hill. However, Popi is different because this site flows east to west from a hill spine-site into a flat circular-surface with a depression in the centre, and then again into a more linear shape. Whether this might be due to different phases of occupation is unclear, and further research on Popi could prove crucial for understanding site occupation processes. The preservation of the site is rather well; during the summer of 2010 at least one human burial was exposed. Most of the burials in the area have been looted in the past, which makes this burial an excellent opportunity for research.

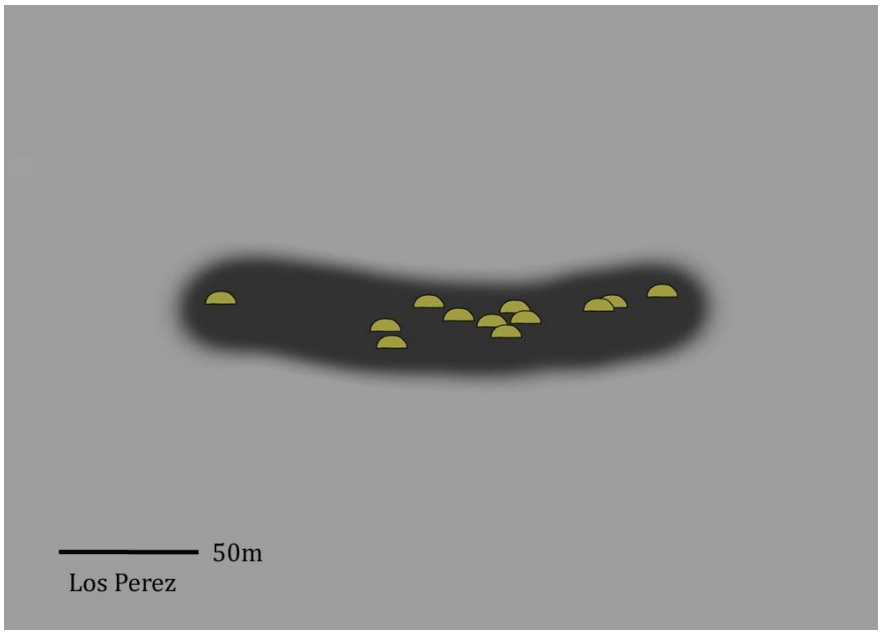


Figure 33. Site plan of Los Perez.

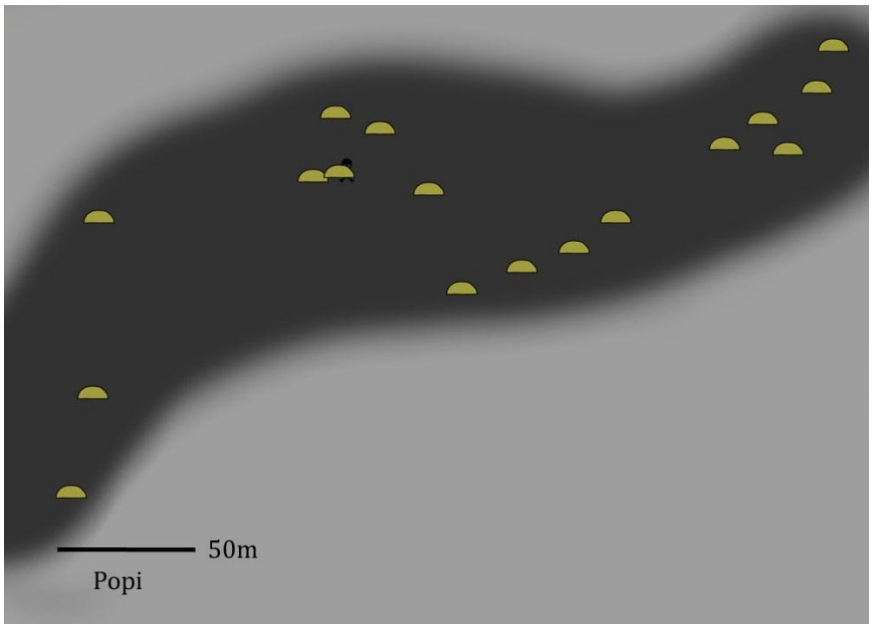


Figure 34. Site plan of Popi.

5.5 PATTERNING AND THE SOCIAL LANDSCAPE

Most of the factors discussed reveal a difference in Meillacoid and Chicoid preferences, these are mainly evident in site location and in visibility. Overall, it can be stated that in this particular area Meillacoid sites are usually located within 2.5 km (with one exception) from the ocean and within 1 km (one exception) from a water source. However, Chicoid sites are usually located within 5.5 km (one exception) from the ocean, and not more than 1 km from a water source. Chicoid sites are for the larger part located on the higher hilltops, either in the same area through time or in the vicinity of on average six other Chicoid sites. Despite the high altitude and the proximity of other sites, Chicoid sites have a smaller visibility range than Meillacoid sites. Many Chicoid sites are located on rather flat hilltops, while the location along the 'spine' of a hill is more typically Meillacoid. However, there is a great variety among site plans of both.

Despite these differences in specific characteristics, it needs to be made clear that there are many similarities between the Meillacoid and Chicoid sites as well. Not unlike the island of Hispaniola itself or even the pan-Caribbean, the whole area is simply a patchwork of different sites, pottery styles and people where diversity and interaction have most likely been the common denominators.

5.6 PREDICTIVE MODELLING

Besides setting up a database one of the aims of this thesis was to explore the possibilities of predictive modelling. This has become a less important research question while doing analyses and while writing this thesis. First of all, the geographical study area is very small. Due to the lack of detail in soil and precipitation maps it would only be possible to create a very coarse grained predictive model. Secondly, sites are scattered all across the area, both on hilltops and in the valley, as well as at the coast and deep inland, which would make the whole area one of high archaeological interest. Without a higher degree of detail in both the aforementioned maps as well as in information and cover of surveys it would not be useful to create an accurate predictive model for this area. Such pitfalls and difficulties using predictive modelling are not unknown in other larger projects (Kamermans 2007). However, there are definitely possibilities when looking at a larger scale; for example (large parts of) Hispaniola. Predictive modelling might prove a useful exercise either through expanding the scale or acquiring more detailed information on a smaller area. Suggestions for further research are discussed in the concluding chapter.

6 DISCUSSION

6.1 INTRODUCTION

Results presented in the previous chapter will be put into context in the discussion below. The different results will be examined in terms of what these entail, and what their significance is. How these compare to previous research, and whether they produced different or similar patterns to this research will be explored in this paragraph. An evaluation of the research questions follows, concluding with an evaluation of how these have been addressed.

6.2 RESULTS

In the introductory chapter it was explained that there were two main goals for this thesis: a scientific analysis of the social landscape which sheds light on matters of interaction and patterning, and the creation and use of a general database. Combined with Ulloa Hung's study on the ceramic styles this would produce a coherent and inclusive regional vision. The design and utilization of the database has proven to be of great advantage, which in turn was one of the other aims. The analyses performed enable us to address most of the research questions, while fieldwork has also played a key role.

6.2.1 THE LOCATION OF SITES IN THE LANDSCAPE

The main distinction that could be made was between sites with predominantly Meillacoid or with predominantly Chicoid ceramics. The analysis of these two types in combination with the geomorphology resulted in a rather homogenous image, without significant differences in the choice of for example the clay grounds of the river deposits or the older areas with limestone. However, the most significant difference between Meillacoid and Chicoid sites is the location in the landscape. While Meillacoid sites are located more or less aligned with the coastline, the Chicoid sites are located mostly on the hills of the Cordillera Septentrional, roughly in a line from the west-northwest to the east-

southeast. This automatically caused the difference in the distance to the ocean, with a 1.4 km higher average for Chicoid sites. As suggested in Chapter 5 there could be different reasons for this. All sites located in the high southern hills contained large amounts of marine shells, and often also mangrove oysters. This indicates that the ocean played an important part in the subsistence strategy of the inhabitants of Chicoid sites as well. The largest distance to the ocean is from the Chicoid site Los Piñones at 5.5 km. This means a walk of a little over an hour, or a total of 3 hours counting the collection of shells and the way back, which is easily performed on a day to day basis, and therefore does not indicate a vertical economy; however it does not refute the idea of a vertical economy either.

If one would argue that all sites in the area are coastal sites because all but one are within a mere 5 km from the coast, the main difference is that of the altitude. Even the Chicoid sites closer to the coast tend to be placed at higher altitudes. This will be put further into context below, in the section of comparability with related research. The difference in the proximity to fresh water is a mere 200 m, with averages of 700 m for Meillacoid sites and 500 m for Chicoid sites. The area nowadays has at least 80 mm of rainfall in the dry months, and 230 mm in the wet season. This in combination with the sloping character of the hills produces natural water basins. Furthermore, the area is full of rivers of different sizes. It needs to be stressed that these are mere ecological and environmental factors, and that there could be numerous other factors playing a role in preference of site location which cannot be obtained archaeologically.

6.2.2 Sites and their Relations to Other Sites

The relation of sites to other sites was studied through both intervisibility and the proximity to other sites. Chicoid sites tend to be located more in the vicinity of other Chicoid sites than Meillacoid sites. This is most evident in the southeastern part of the research area. Since only one site in this area has been dated, it cannot be concluded whether these sites were located in each other's vicinity contemporaneously or if this area was the location of choice over a longer period of time. This factor makes the results in general hard to interpret. The possibility of the importance of visibility became more and more evident during the surveys. These observations were recorded during the fieldwork, and when this was impossible due to dense vegetation the DEM was used to create a viewshed analysis. Observations and the reliability of the DEM were cross-checked with each other. The use and significance of these analyses is debated. One of the problems is the *spurious* correlation between visibility and height. Sites might be located on a higher altitude for a different reason such as simply catching a bit more wind. However, higher locations tend to have a greater visibility, and are therefore statistically more likely to

have a larger amount of sites visible (Wheatly and Gillings 2002). As discussed in the previous chapter, the Chicoid sites are generally located at a higher altitude, but have less visibility. Even more so, Chicoid sites and Meillacoid sites within a few hundred metres from each other even have visibility range differences of 20 per cent. This was also experienced in the field: one hilltop has a restricted view caused by surrounding hills which are only a bit higher, and the other has a very wide view because of its exact location between lower surrounding hills. The differences between Meillacoid and Chicoid sites in visibility ranges and the amount of sites visible are an indication that visibility did play a role in site location, and that it was not a 'side effect' of ecological factors. Another issue is the purpose of the high visibility rate. In the last decades studies have increasingly focused on this aspect. For instance, in a study on the relationship between cognition, perception and visibility on rock art sites in southwestern Scotland, cumulative viewsheds were used to identify areas of 'increased monument awareness', with the level of this viewed as a direct correlate of socio-symbolic importance (Gaffney *et al.* 1995). This is a gross oversimplification of the complex man-land relationship; computer analyses are in this case even used to generate the human variable. Experiences during the fieldwork have been the most important influence in incorporating the human variable in this research. They revealed that there were three beneficial aspects for sites with a high visibility range. First of all, the sites catch more wind; this is desirable because it can get very hot and damp in the area. Secondly, it is possible to predict the weather hours in advance from specific points in the landscape, and thirdly it is very important to keep track of everything happening around the site and possibly interact with people. Communication is possible from a large distance as long as the individuals can see each other. The relevance of visibility will be examined further below.

It has become increasingly clear through Ulloa Hung's study of the ceramics that specifically Meillacoid sites near the coast and Chicoid sites further inland show a higher percentage of each other's ceramic traits in their ceramic assemblage. This does indicate connections between ocean-based Meillacoid sites and Chicoid inland sites. Overall, the Meillacoid sites in the area date further back than Chicoid sites in the area. This is similar to the rest of the Dominican Republic; although the calibrated radiocarbon dates of Meillacoid and Chicoid sites do overlap based on 150 calibrated radiocarbon dates, the latter are generally more recent (Ulloa Hung, in press). It could be suggested that the coastal Meillacoid sites were already 'in use' when groups using Chicoid style ceramics came into the region, where they settled on higher hilltops in the south. These higher hilltops often have a view over the most important resource extraction sites: de Laguna la Playa mangroves, where Los Manatis and Los Patos are located, and the Puerto Juanita lagoon where Puerto Juanita and La Tina are located. The Meillacoid site Los Perez is

located in the vicinity of a smaller mangrove area. Both Los Muertos and El Coronel, the Chicoid sites with the highest degrees of 'mixed ceramics' (Chicoid ceramics with Meillacoid traits or elements or vice versa), have a clear view of at least two of the mangrove areas. In turn, the aforementioned Los Perez and Puerto Juanita are the Meillacoid sites with the highest degree of mixed ceramics. Two lines of evidence - the presence of marine shells and the presence of the mixed ceramics - point to specific connections between hilltop sites and marine resource extraction sites. This northern line of Meillacoid sites might have had control of the coastal sites, but their visibility is generally poor. However, the southern line of Meillacoid sites, located only slightly further inland, has great visibility. Both lines are quite strategically placed, with sites scattered throughout the valley.

6.2.3 SITE PLANS

Two main categories of site plans could be distinguished: sites in circular patterns and sites in linear patterns. These mostly follow the contours of the hill, although not necessarily, but they are naturally bounded by them. Hills come in all shapes, altitudes and sizes in the area, and it is possible that the 'right hill' was chosen to fit the preferred site lay-out as well as the other way around. However, both categories occur in Meillacoid sites as well as in Chicoid sites. The one exception of Popi, on which both types of site plan occurs, possibly consists of different phases as it is also quite large in comparison to other sites. Further research would be necessary to confirm or refute this claim. Although the function or production of the mounds is still debated, they were also counted as a variable in site characterization. Mounds are present on Meillacoid as well as on Chicoid sites, in different patterns, elevations, shapes and dimensions. The presence of mounds was also analyzed in combination with the present soil. There was no significant difference in the occurrence of these factors. Due to the lack of knowledge of the mounds and their debated function it would not be expedient to come to further interpretations of the site plans. Furthermore, the amount of research from the Dominican Republic on house plans, household patterns and village site plans is insufficient to aid interpretation, especially in the northern area of the island. One of the studies which does include mounds is Veloz Maggiolo's research on Atajadizo, located in the far southeastern province of the Dominican Republic, where two phases were distinguished: an early phase dating from 540 CE (Ostionoid) in which there were large, seasonally occupied extended family houses, and a later Chicoid phase dating from the tenth century until colonial times with small nuclear family houses on top of anthropogenic mounds, arranged concentrically around a plaza (Veloz Maggiolo *et al.* 1976). In this later phase the houses were located near their 'agricultural mounds' and people were buried in

cemeteries. Such changes or differences in site lay-out are often assumed to coincide with a difference or change in social complexity or even in culture. Social complexity, site plans and site hierarchy are a common topic in Caribbean archaeology. For instance, in their article on the Anguilla Bank Crock and Petersen (2004) argue that Anguilla's settlement hierarchy reflected an independent chiefdom polity covering multiple islands. This idea was based on the presence of high-status objects at certain places and the important role of Anguillan settlements in exchange networks. The settlements in Anguilla are assumed to be at the highest level on the inter-island settlement hierarchy based on their dimensions, which were far greater than those of other Lesser Antillean settlements. However, Maggiolo's descriptions do not match what was observed at the Chicoid sites in the area, and much more extensive research is elementary to distinguish possible site hierarchies. For now, the available data consists of descriptions of the site plans. These are linear as well as circular, and according to accounts of local people there were human burials below or near mounds which are interpreted as having a domestic function.

6.2.4 PATTERNING

The combination of all aforementioned analyzed factors culminates into patterning of the sites. As stated above, there are differences in the preference of site location for Meillacoid sites and for Chicoid sites. Meillacoid sites are usually located within 2,5 km from the ocean with five sites (55% of all Meillacoid sites) within the first 1.5 km, while Chicoid sites are located within 6 km from the ocean, with only four sites in the first 1,5 km (22% of all Chicoid sites). Lastly, predictive modelling was discussed in Chapter 5. The use and reliability of these models is highly debatable. Predictive models tend to rely too much on ecological or environmental factors, and assume that these would have been the same in the past. Furthermore, data on the research area is too crude to make a useful predictive model. Even with more detailed data, a thorough consideration of methods and theories applied must precede the creation of a predictive model in order for it to be feasible (Verhagen and Whitley 2011).

Surveys truly played a key role in this thesis, and the information and experiences obtained by it proved to be the most valuable. A study on landscape and the human presence within it cannot be done by analyzing dots on a map, soil information, and aerial photographs. The landscape needs to be navigated by the researcher, because nothing will reveal more about possible variables in site location preference than walking through the valley and over the hills yourself. Ethnographic data might also be a fruitful source, but is lacking for this area. There are ethnohistoric accounts, as described in Chapter 2, but these mainly tell of the experiences of the past Europeans. Although the experience of the

researcher might not even resemble that of the past inhabitants, it does hint at which variables to analyze in order to conclude if a specific aspect did in fact seem to play a role.

6.3 Comparability and Compatibility with Related Research

Jorge Ulloa Hung's research on ceramics and processes of fusion and assimilation is complementary to this research and vice versa. These two studies are completely compatible as they were written rather simultaneously and in collaboration. Different presentations (at the International Association for Caribbean Archaeology conference at Martinique in 2011, and at Leiden in the Caribbean V at Leiden University) as well as articles written by both (Ulloa Hung and De Ruiter 2011) have also produced a composed and corresponding view of the area.

As noted before Koski-Karell's research is similar to this study. Situated on the northern coast of Haiti, the landscape resembles the landscape in the research area, located on the other side of the border between Haiti and the Dominican Republic. The approach Koski-Karell developed identifies and compares habitation types and distribution on a regional-scale area and is called *settlement-type distribution analysis* method. Different types of settlement were categorized based on their size, starting with the household as the smallest and the large villages as the largest. Koski-Karell also categorized the landscape into different terrain relief zones: waterland, shoreline, coastal plain, river valley, piedmont, highland and montane. The combinations of these variables were analysed for Ostionoid, Chicoid, and Meillacoid sites. The main difference is that Koski-Karell applies an ecological approach, while this study also includes other variables. Furthermore, he also includes data obtained from underwater site surveys, which has not been done in this study. Although his categorizations are somewhat different, his research is comparable to this study. The distribution of sites is rather similar to the research area, although there is a higher percentage (37.7 %) of Meillacoid sites located on the piedmonts and in the highlands than is the case in the area of Punta Rucia, and there are more Chicoid sites located in the coastal areas (55.1 %). A major difference between the two studies is that Koski-Karell concludes, among other things, that the Chicoid expansion westward into northern Haiti may relate to apparent hostility between Chicoid and Meillacoid groups. The picture emerging from the research area around Punta Rucia is very different: there were Meillacoid and Chicoid groups inhabiting the same area, and even adopting traits of the other's ceramics. The processes

of ‘ceramic interaction’ are discussed in Ulloa Hung’s study. Because of the lack of cultural factors in Koski-Karell’s study this factor is not explored in northern Haiti. However, several researchers have noted the occurrence of different ceramic styles in present in one site in Haiti (Moore 1999a). Site locations on the whole island of Hispaniola show similar patterns as to what is observed in the research area. For instance, Chicoid sites tend to cluster and are more often located further inland on higher altitudes, while Archaic and Meillacoid sites are locates closer to the coast (Koski-Karell 2002; Moore 1991a; 1991b; 1997; Rouse and Moore 1983). However, these are general similarities in which local detail is lost. These studies mainly presented overviews of site locations and survey results. Based on the data from Haiti it is suggested that there was not only a lot of diversity within the area, but also between areas.

7 CONCLUSIONS

7.1 INTRODUCTION: AN OVERVIEW

Throughout this thesis the landscape has played the lead role. After an introduction into the aims and central questions in this thesis and an explanation of the approach taken, the reader is introduced to the northwestern Dominican Republic. This is done through ethnohistoric accounts, descriptions of the physical as well as the cultural landscape, and previous studies. The ethnohistoric accounts often speak of a lush and fertile area, which is exactly how it would be experienced nowadays: the hills covered in grass, bushes and trees, cultivated areas with fruit trees, maize and other crops, interspersed with small seasonal streams and larger rivers, all surrounded by high, densely vegetated hills in the south and limited by the ocean in the north. Buildings are sparsely scattered throughout the landscape and are often easy to overlook; they are usually located on lower grounds near the roads.

Following the description of the methods and theories used, and a discussion on perception changes, the available dataset was discussed. As a study using a map related-database it is important to discuss which maps are used. Unfortunately there were very few and often crude maps available. Military maps at a scale of 1:50 000 were used as the basis for the GIS, on which all data recorded during the fieldwork could be placed. Aerial photographs sometimes aided in locating a site, or in characterizing it.

The fieldwork took place in the summer of 2010 and mainly consisted of surveys and digging test pits on several sites. Sites were discussed in detail in terms of their setting and the results form surface surveys and excavations. The sites are subdivided into ceramic style categories, such as sites with predominantly Meillacoid ceramics. The data acquired during the fieldwork was analyzed by combining map data and information on the sites in order to establish preferences and patterns in the location of sites. Not only ecological factors were counted, but intervisibility was also one the major factors in analysis and the results. The possibility of the importance of this factor was noted during the surveys in the area, and the results indicate that this was a correct assumption. All results of the analyses were then discussed and put into context. The research questions

were briefly addressed with referrals to the chapters dealing with these questions for more in depth information. Lastly, the success of the research aims was reviewed.

7.2 CONCLUSIONS: THE SOCIAL LANDSCAPE OF THE PUNTA RUCIA AREA

The main research question on what patterns in site location can tell us about the social landscape has been gradually addressed throughout the last chapters. The social landscape was defined as the combination of the physical landscape and the human presence and actions which take place on it. Although conclusions on direct human *actions* were not drawn, the presence of people in the landscape has been characterized and analyzed. This was done by analyzing many aspects of sites, both in relation to the landscape and in relation to each other. The focus in analyses lies on Meillacoid and Chicoid sites, to determine if there are patterns in their site locations. This focus is mainly because there is only one Archaic and one Ostionoid site in the area. The 9 Meillacoid and 18 Chicoid sites in the area were all surveyed in a similar way, in order to enable comparison. What emerged was a diverse image, with as many similarities as differences among and between Meillacoid and Chicoid sites. Although patterns can be discerned, the characteristics they comprise are not exclusive for one or the other. While Chicoid sites are generally located at higher altitudes it does not mean that Meillacoid sites are not, and vice versa. The location on hill-spines as well as on more circular areas area also present on both Meillacoid and Chicoid sites, although one tends to be more prevalent at the Meillacoid sites and the other at the Chicoid sites. This overlap of characteristics makes it impossible to simply make a list of aspects typical for either site type. Sites without diagnostic ceramics can therefore not be identified using typical characteristics, although it can be suggested that there is a higher probability to be either a Meillacoid or a Chicoid site. Still, the image of a diverse area makes for a complex picture. Of course there is always the question what ceramic styles actually mean in terms of culture, which is the reason why the sites were described as *containing* Meillacoid and Chicoid ceramics. Such is a topic itself worthy of a doctoral dissertation. Furthermore, as discussed in the thesis, there are other differences in between the site types as well. Specific traits of coastal and inland sites have been interpreted as the rendition of connections between coastal Meillacoid en inland Chicoid sites. It is postulated that earlier Meillacoid groups might have had control over marine resource extraction sites, which ensued the interaction between Meillacoid and Chicoid groups.

Overall it can be concluded that the social landscape that comes forward from this study is what I call a *patchwork of diversity*, with many sites located close together, exhibiting many different combinations of specific features, and with even a merge of ceramic styles. The diversity of landscape features in a small area might play a factor in this, because it allows for different preferences and strategic choices in site location. In this thesis the image of a dynamic and diverse social landscape of the area comes forth, in which the combination of similarities and differences are the common denominator.

7.3 Suggestions for Further Research

As has become clear over the course of writing this thesis, further research in the area will highly likely prove to be very fruitful. On a smaller scale the area is rather intact and still has a lot to reveal about processes change in ceramic styles. Furthermore, extensive research on the function or genesis of the mounds might add to the ongoing debate on this topic. However, the function of the mounds need not be uniform, but may comprise a set of functions. It is also needed in the Punta Rucia Area to enable better interpretations of settlement types.

On a larger scale the topic of diversity in the landscape combined with diversity in cultural groups can be explored on an island-scale. It is my view, based on some years of studying Caribbean archaeology, that in the past this entire area would have been a very diverse and dynamic whole, in which mobility and exchange played an important role. A thorough overview and review of current knowledge of settlement patterning on Hispaniola will be a promising start of such an endeavor. Research tends to stay on either side of the border, which is a loss for especially landscape archaeology and settlement patterning. The database created by me will be advantageous for such an extensive study, and vice versa. Furthermore, it can be argued that in regions such as the Punta Rucia area, where local knowledge is great and the area is not too affected by modern construction, the use of an accessible database would be of great significance for the management of cultural heritage. However, there has to be a well-established heritage management programme in place in order for it to have any effect in the preservation of sites.

ABSTRACTS

SUMMARY

In this thesis titled *Mapping History* archaeological sites within a small region in the northwestern Dominican Republic are mapped, in order to distinguish patterns in site locations and to explore the social landscape in the past. The landscape in the research area consists of beaches, swamps, mangroves, valleys, and hills up to 300 metres in height. It is known from research by Jorge Ulloa Hung, an archaeologist currently writing his dissertation on ceramics in the area, that there were different ceramic styles present contemporaneously in the north of the Dominican Republic. While Ulloa Hung focuses on the ceramics from the sites in the area, in this research the surrounding area (circa 80 km²) is mapped to provide a context for Ulloa Hung's research. In this thesis the study on the social landscape is the central focus. Observations and results of the fieldwork conducted in the area were used for this study, and recorded into a map-related database or Geographical Information System (GIS). The relation between site locations and surroundings were analysed with the use of the created GIS. The focus of the analyses is mainly on differences between sites with Meillacoid style ceramics and sites with Chicoid style ceramics. The goal was to bring forth different patterns in the site locations of Meillacoid and Chicoid sites. The diverse landscape in the area combined with the diverse cultural landscape makes this area very suitable for such analyses. Although there are similarities between several aspects of the sites, the area also differences. Meillacoid sites tend to be located closer to the coast, while Chicoid sites are located further inland. Furthermore, Meillacoid sites have a better visibility range, and are therefore better visible themselves. There are evidently different patterns of site locations of both kinds of sites in the area, but there is one common denominator: diversity.

SAMENVATTING

In het onderzoek *Mapping History* worden archeologische sites in een kleine regio in het noordwesten van de Dominicaanse Republiek in kaart gebracht, om zo patronen te achterhalen in site locaties en meer te weten te komen over het sociale landschap van het verleden. Het landschap in het onderzoeksgebied bestaat uit stranden,

moerassen, mangroven, valleien, en heuvels tot 300 meter hoogte. Het is onder andere uit lopend onderzoek van Jorge Ulloa Hung, een archeoloog die zijn dissertatie schrijft over aardewerk in het gebied, bekend dat er in het noorden van de Dominicaanse Republiek meerdere aardewerkstijlen tegelijkertijd voorkwamen. Waar Ulloa Hung gedetailleerder onderzoek doet naar het aardewerk van de vindplaatsen in de regio, is in deze studie het omliggende gebied (circa 80 km²) in kaart gebracht om het eerder genoemde onderzoek meer context te geven. In deze scriptie staat onderzoek naar het sociale landschap centraal. Voor dit onderzoek zijn de observaties en resultaten van veldwerk in de regio gebruikt, en verwerkt in een kaartgerelateerde database of een Geografisch Informatie Systeem (GIS) . De relatie tussen de site locaties en de omgeving van de vindplaatsen en het landschap zijn geanalyseerd met behulp van de gecreëerde GIS. De focus van de analyses ligt voornamelijk op het verschillen tussen sites met Meillacoid-stijl aardewerk, en sites met Chicoid-stijl aardewerk. Er is gezocht naar verschillende patronen in de locaties van de Meillacoid en Chicoid vindplaatsen. Het diverse fysieke landschap in de regio in combinatie met het diverse culturele landschap maakt het gebied uiterst geschikt voor zulke analyses. Hoewel er veel overeenkomsten zijn tussen meerdere aspecten van de vindplaatsen, zijn er ook verschillen. Meillacoid sites bevinden zich meer langs de kust, terwijl Chicoid sites zich meer op de hogere heuvels bevinden. Ook zijn de Meillacoid vindplaatsen beter zichtbaar, en hebben dus ook een groter gezichtsveld. Er zijn duidelijk verschillende patronen in vindplaats locaties van beide soorten sites in het gebied, maar er is één gemene deler voor alle sites: diversiteit.

RESUMEN

En la investigación *Maping History*, se realizan mapas de los sitios arqueológicos que se encuentran en una región pequeña del noroeste de la República Dominicanacon el fin de descubrir patrones en sitios y a su vez para comprender el paisaje social del pasado.

El paisaje en el área de estudio esta compuesto por playas, pantanos, manglares, valles y cerros que van hasta los 300 metros de altura. Se conoce por la investigación proveniente de Jorge Ulloa Hung, un arqueólogo que escribió su disertación sobre la cerámica de la zona, que en el norte de la Republica Dominicanallegaron diferentes estilos de cerámica al mismo tiempo. En esta investigación se ha mapeado la zona adyacente (aproximadamente 80 km²) a la región donde Ulloa Hung ha realizado la investigación, con el fin de otorgarle más contexto a dicha investigación. En esta tesis se encuentra la investigación sobre el paisaje social central. Para este estudio se han utilizado y procesado las observaciones y resultados del estudio de campo en una base de

datos o en unSistema de Información Geográfica (SIG). La relación entre los sitios y el entorno de los yacimientos en el paisaje han sido analizados con la ayuda del SIG creado. El foco del análisis se centra principalmente en las diferencias entre los sitios con cerámica del estilo Meillacoid y sitios con cerámica del estilo Chicoid. Se han buscado diferentes patrones en los lugares de los yacimientos Meillacoid y Chicoid. La diversidad del paisaje físico en la región en combinación con la diversidad del paisaje cultural hacen que la zona sea ideal para este tipo de análisis. Aunque hay muchas similitudes entre los múltiples aspectos de los yacimientos, también hay diferencias. Los sitios Meillaicoid se encuentran a lo largo de la costa, mientras que los sitios Chicoid estan en los cerros altos. Además, los yacimientos Meillaciod se los encuentra mejor visibles y poseen a su vez un panorama más amplio. Existen claramente patrones diferentes en los yacimientos lugares de los dos tipos de sitios en la zona, pero hay un denominardor común para todos los sitios: la diversidad.

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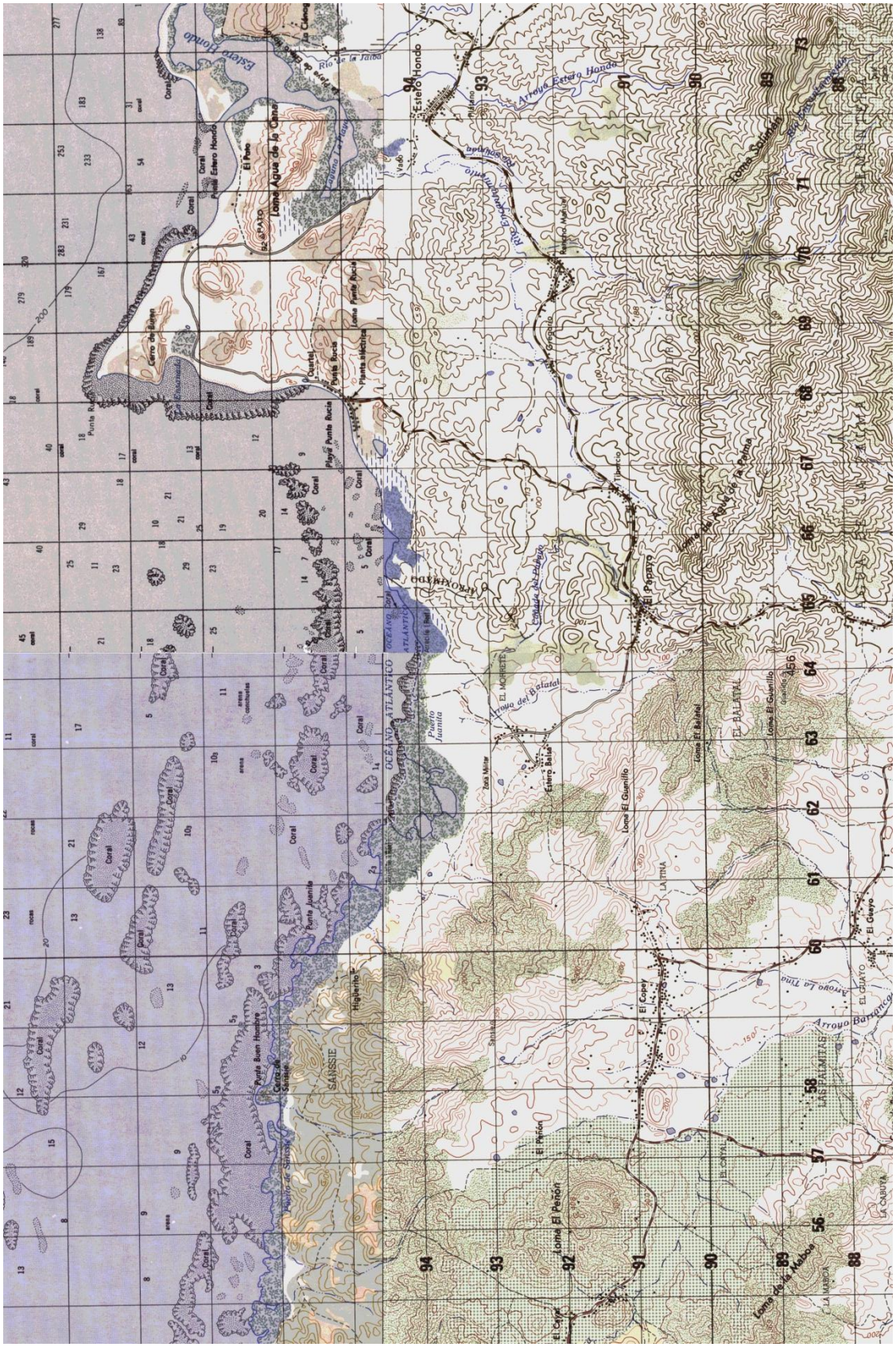
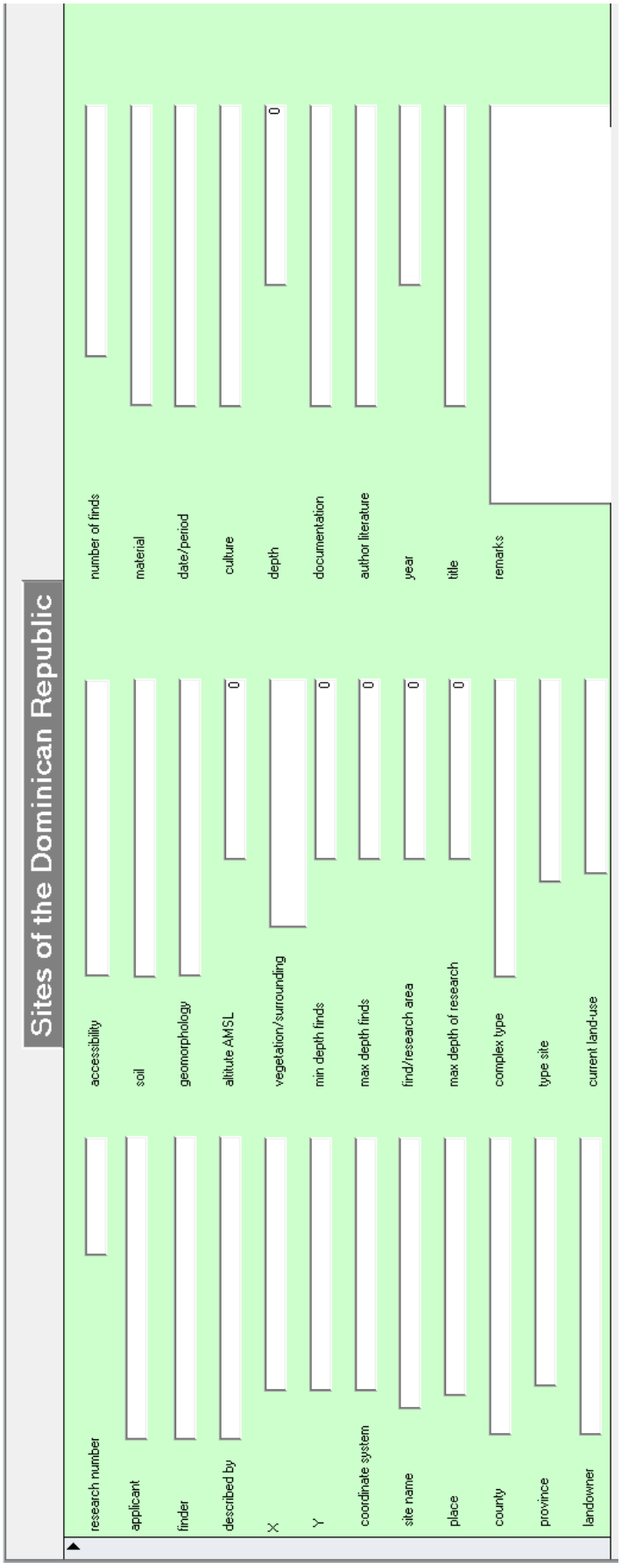
APPENDICES

APPENDIX 1 Composed image of military maps



APPENDIX 2 Microsoft Access 2003 database entry form



APPENDIX 3 Overview table of sites

SITE NUMBER	SITE	UTM 19Q N COORDINATES	UTM 19Q W COORDINATES	DATE VISITED (2010)	CERAMIC STYLE	GEOMORPHOLOGY	DISTANCE TO OCEAN (KM)	DISTANCE TO FRESH WATER (KM)	ALTITUDE (M)
1	Los Perez	267383	2193348	10-7	M	1	1	1	40-60
2	La Tierra Blanca	267216	2192699	12-7	C	1	2	0,5	60-80
3	Maria Rosa	266908	2192848	12-7	C	1	4,5	0,5	60-80
4	El Burén/Las Paredes	269293	2197916	13-7	A	1	<0,5	1	<20
5	Jacinto Aracena	266208	2191502	13-7	C	1	3	0,25	100-120
6	Los Bros	267903	2194935	13-7	U	1	<0,5	0,25	<20
7	Los Manatis	272065	2196745	13-7	U	2	<0,5	1	<20
8	Persio Polanco	269807	2196804	13-7	C	4	4	1	60-80
9	El Solar de Sepelin	271679	2194110	14-7	U	2	2,5	0,5	<20
10	Edilio Cruz	268073	2192263	15-7	C	2	2,5	0,25	40-60
11	La Mara	269688	2191708	15-7	C	1	4	0,25	40-60
12	La Muchacha	269111	2191983	15-7	C	2+1	3,5	0,5	60-80
13	Los Corniel	270391	2191952	15-7	C	2+1	4	0,25	60-80
14	La Mina de Adolfo	266135	2191704	15-7	U	1	2,5	0,25	-
15	Cristobal Gomez	269593	2192331	16-7	C	1	2,5	0,25	20-40
16	José E. Quiñones	264800	2191227	16-7	U	2+1	3	0,5	100-120
17	Los Mangos	269524	2192970	16-7	M	1	2,5	0,25	40-60
18	Rafael Quiñones	264422	2191052	16-7	U	2	3	0,5	120-140
19	Los Muertos	269637	2190783	17-7	C	1	4,5	0,25	120-140
20	Puerto Juanita	262484	2193239	18-7	M	2+3	1	0,25	20-40
21	Humilde Lopez	265465	2190694	19-7	M	2+1	3,5	0,5	180-200
22	Elida	269362	2192931	20-7	C	2+1	2,5	0,5	40-60
23	Popi	269279	2195199	20-7	M	1	1	1	20-40
24	La Cota	268977	2194162	21-7	U	1	1,5	1,5	40-60
25	Nino Acosta	268638	2194150	21-7	U	1	1,5	1,5	40-60
26	Papolo	264287	2192340	21-7	M	1	1,5	0,5	40-60
27	El Rastrillo	271194	2191454	22-7	C	1	5	0,5	80-100
28	Don Julio	260071	2193739	23-7	M	1	2	1	120-140
29	Las Cuevas de Rafo	261666	2192784	23-7	U	1	2	1	80-100
30	La Tina	260885	2194650	23-7	M	3	<0,5	0,5	<20
31	Rafo	260811	2192886	23-7	C	1	2	0,25	120-140
32	El Lucio	271521	2190889	24-7	C	1	6	1	100-120
33	Los Piñones	271043	2190796	24-7	C	1	5,5	1	140-160
34	El Coronel	267266	2190319	26-7	C	1	5,5	0,5	220-240
35	Los Pachecos	270017	2193660	26-7	M	1	2,5	1,5	60-80
41	Elto	269060	2195672	PV	C	1	1	1	40-60
42	Tiburcio	265361	2192697	PV	C	1	1,5	0,5	80-100
43	Los Patos	272278	2196705	PV	O	3	<0,5	1	<20
44	Gregorio	266922	2192074	PV	U	2	2,5	0,25	80-100
45	Juan Antonio	267538	2194556	PV	U	3	0,5	0,25	<20

APPENDIX 4 Fold-out overview map with site numbers

SITE NUMBER	SITES	UTM 19Q N coordinates	UTM 19Q W coordinates
15	Cristobal Gomez	269593	2192331
10	Edilio Cruz	268073	2192263
34	El Coronel	267266	2190319
32	El Lucio	271521	2190889
27	El Rastrillo	271194	2191454
22	Elida	269362	2192931
41	Elto	269060	2195672
5	Jacinto Aracena	266208	2191502
11	La Mara	269688	2191708
12	La Muchacha	269111	2191983
2	La Tierra Blanca	267216	2192699
13	Los Corniel	270391	2191952
19	Los Muertos	269637	2190783
33	Los Piñones	271043	2190796
3	Maria Rosa	266908	2192848
8	Persio Polanco	269807	2196804
31	Rafo	260811	2192886
42	Tiburcio	265361	2192697
28	Don Julio	260071	2193739
21	Humilde Lopez	265465	2190694
30	La Tina	260885	2194650
17	Los Mangos	269524	2192970
35	Los Pachecos	270017	2193660
1	Los Perez	267383	2193348
26	Papolo	264287	2192340
23	Popi	269279	2195199
20	Puerto Juanita	262484	2193239
4	El Burén/Las Paredes	269293	2197916
43	Los Patos	272278	2196705
9	El Solar de Sepelin	271679	2194110
44	Gregorio	266922	2192074
16	José E. Quiñones	264800	2191227
45	Juan Antonio	267538	2194556
24	La Cota	268977	2194162
14	La Mina de Adolfo	266135	2191704
29	Las Cuevas de Rafo	261666	2192784
6	Los Bros	267903	2194935
7	Los Manatis	272065	2196745
25	Nino Acosta	268638	2194150
18	Rafael Quiñones	264422	2191052