

Handbook of South American Archaeology

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Late Pre-Hispanic Chiefdoms of Northern Colombia and the Formation of Anthropogenic Landscapes

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INTRODUCTION

The basic framework of Colombia archaeology was established by Gerardo Reichel-Dolmatoff, an Austrian-born Colombian who made immense contributions to knowledge about his adopted land through his fieldwork in many of its regions (Oyuela-Caycedo 1996a, 1998). The most useful synthesis of Colombian archaeology is his book *Colombia* (1965,1997). Reichel-Dolmatoff divided Colombian prehistory into the following periods: Paleo-Indian, Formative, and Regional Developments (the coast and inland; the chiefdoms: San Agustín, Tierradentro, Quimbaya, Calima, Narino, and Sinú; the incipient states: Muisca and Tairona). In terms of territorial space the major regions of Colombia are: the Atlantic or Caribbean Coast (Botiva Contreras 1989), the middle valley of the Magdalena River, the central mountains of Antioquia, the mountains of Santander, the high plateau of Cudinamarca and Boyaca, the mountains and drainage of the Cauca River, the Pacific coast and west cordillera, the upper Magdalena River region, the southern Andean mountains, the oriental grasslands of Colombia, and the Colombian Amazon.

Northern Colombia is a geographical area that needs to be studied intensively. It is known as "El Caribe" or "la Costa" and its people are called "Costeños." It is a territory that is recognized as having a history very different from the Andean altiplano of Cundinamarca-Boyaca. La Costa, composed of the states of Cordoba, Bolivar, Cesar, Magdalena, and Guajira, is the place from which Spanish conquest and colonization expanded into the Andes. Only two regions of this territory are analyzed in this chapter. One corresponds to

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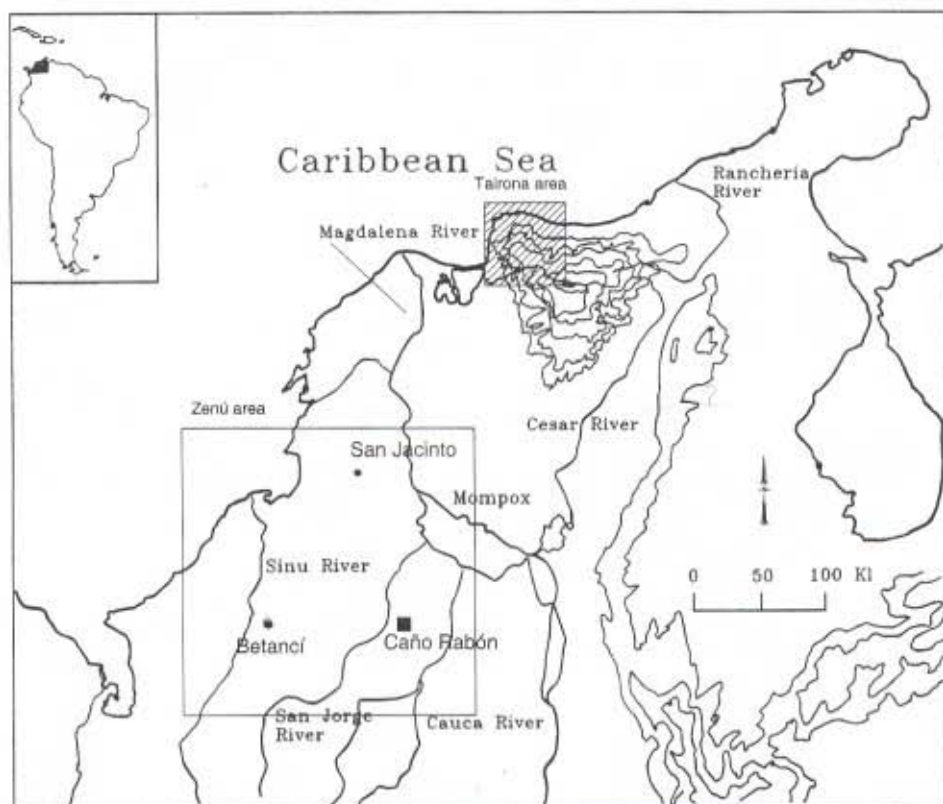


Figure 22.1. General location of the Sinú (within the outlined square box) and Tairona chiefdoms (hachured area) in Colombia. (Augusto Oyuela-Caycedo)

the region of the Sinú chiefdoms and the other to the Tairona chiefdoms (Figure 22.1). The two are very different in terms of their geography and pre-Hispanic complexity. However, they share a common feature: the massive transformation of the landscape through human use, leaving the ecology of the regions profoundly transformed.

Northern Colombia is characterized by a mosaic of micro-environments with an archaeological past that is still far from adequately understood for any time period or framework, chronological or spatio-cultural. The landscape is characterized by rolling hills of grasslands that cover 70% of the landscape, some of which are subject to seasonal flooding. Forest is restricted to the last fingers of the Andes with an isolated pyramid-shaped mountain with permanent glaciers located only a short distance from the Caribbean Sea. The coastal environment is diverse with deep-sea bays enriched by upwelling currents and large lagoons whose salty seawaters are replaced seasonally by river runoff, according to rainy-dry cycles. Alluvial fans and large flood plains that are underwater on a seasonal basis dissect the northern coast. It is also a region with large estuarine conditions found in the deltas of the Sinú and Magdalena rivers. In contrast to these areas of humid environments, at the northeastern tip of Colombia is the Guajira, a dry desert peninsula with sand dunes and xerophytic conditions. It is in this mosaic of ecological variations that several

chiefdoms developed complex relationships with the environment, transforming it in significant ways that continue to affect present-day occupants of the region.

Our knowledge of humans in northern Colombia begins at least 11,000 years ago in the Paleoindian period. A few serendipitous archaeological findings indicate the easiest route taken by the first populations as they entered and colonized eastern South America. For instance, we have learned about the seasonal use of the high terraces of the Magdalena River for hunting with projectile point technologies (López Castaño 1998, 1999).

The next time periods, known as the Archaic and Formative (marked by the introduction of pottery), saw restricted seasonal movements of populations that depended heavily on the use of diverse micro-environments, and efficient use of resources as they became available seasonally. More is known about these Archaic/Formative times than the Paleoindian Period, but our view of lifeways is mostly limited to the coastal areas where sites such as Monsu, Puerto Hormiga, Barlovento, Canapote, Crespo and Puerto Chacho have been studied. Only one interior site, known as San Jacinto 1, has been excavated and analyzed (Oyuela-Caycedo 1996; Oyuela-Caycedo and Bonzani 2005).

Around 4000 BC, pottery was invented, as demonstrated by the excavations of San Jacinto 1, a site located in the rolling hills of the anthropogenic savannas of Bolívar. Pottery was invented in a grasslands environmental context, and it consists of well-decorated vessels with zoomorphic lugs that do not seem to repeat the same motifs. However, the pottery displays a high diversity in decorative technology that is found later in neighboring ceramic complexes, but with simpler designs. Examples include lower Central America (such as, the Monagrillo ceramics) and northwestern South America (such as pottery with Barrancoide style decorations). Initially, pottery was used primarily for serving purposes, and possibly for the fermentation of beverages. Cooking was done in roasting pits for steaming foods that included wild meat and possibly tamales (a steamed or boiled mass of flour wrapped in large leaves) made with flour processed from the grass seed plants (Oyuela-Caycedo 1995a). Ground stone technology included metates and grinding tools, while nutcrackers appear that are similar to examples from Spanish Conquest times.

We can speculate that reduction in people's mobility and increased dependency on domesticated plants favored the rise of decentralized forms of power in the lowlands of Colombia. This decentralized power appears to be associated with chiefdom societies and was probably tied to population density and expansion of the diet, including the use of domesticated plants. The first secure evidence of the formation of chiefdom societies in northern Colombia (see Chapter 21 in this volume for discussion of central and southern Colombia) occurs in two areas, pertaining to the Sinú and the Tairona chiefdoms (Figure 22.1), although the internal variability in both is high and still needs to be defined into local and regional variations.

Common to both the Sinú and Tairona cultural areas are elaborate transformations of the landscape. The Sinú region is formed by a complex ecological system of river drainages and interfluvial savannas. Part is an area of seasonal flooding produced by the Sinú River and its delta, which disperses waters into the Atlantic Ocean. In contrast to this, the San Jorge River drains its waters through the Cauca River into internal deltas that form the lower depression of Mompox where they join the Magdalena River. Between these active flood plains there is a rolling landscape known as the savannas of Bolívar with low extensions of the Andes mountains, including the Serranias de Ayapel, San Jacinto and San Jeronimo.

The second region with complex chiefdoms is the Sierra Nevada de Santa Marta (SNSM), the Tairona heartland. Here a great mountain rises 5,775 masl in front of the

Caribbean Sea, with deep bays and a large lagoon named Ciénaga Grande de Santa Marta, which constitutes part of the delta of the Magdalena River.

The two regions have different histories. Sinú is linked to flood management and grassland populations that were able to exploit a rich environment. The Tairona populations lived in a rough mountainous landscape with slopes of more than 45 degrees and poor soils, but with rich coastal fishing and natural areas that facilitated salt production.

The main objective of this paper is to discuss what we have learned of the relationships of these chiefdom societies with their environments and the transformations of the landscape as case studies in historical ecology. In both complexes of chiefdoms, Sinú and Tairona, the human populations shaped the landscape to such a degree that they are best understood as anthropogenic—two great archaeological landscapes transformed by human activities involving intensive selection and modification (Denevan 1992: 375). The impact of these chiefdoms on the landscape is apparent even in the present, defining the ecology of the regions. Only recently have they become more “natural” after the depopulation created by the Spanish conquest that decimated the native population to a fraction of its pre-Hispanic size.

The old Sinú and Tairona culture areas are not the only ones in northern coastal Colombia with significant pre-Hispanic developments in landscape transformations and political complexity. There are other areas but little research has been conducted in insecure regions controlled by guerrilla or paramilitary groups. For example, the Serranía de San Lucas, which is the mountainous ridge of the Central Cordillera that separates the Cauca and Magdalena drainage systems from one another is a region rich in gold. There is anecdotal information about large settlements, ancient roads, and pre-Hispanic terraces, but the area is totally unknown in terms of professional research because this territory is avoided by state agencies and has been under the control of guerrilla organizations (ELN) for decades. Other regions also present problems of access and security due to their marginalization from the modern Colombian state.

This chapter considers how and why these pre-Hispanic societies developed a degree of complexity that places them in the chiefdom category. All of them had a strong impact on their landscapes, to the point that the modern environments can be characterized as archaeological artifacts still in use today. Descendants of the original inhabitants still live in both regions. Linguistically, the descendants of the Sinú have lost their language, making it impossible to classify them in terms of known linguistic families (Adelaar and Muysken 2004). However, taking toponyms into consideration the area seems to have been occupied by Chibchan speakers. In the case of the SNSM, the various groups that still exist also belong to the Chibchan language family.

SINÚ CHIEFDOMS OF THE SAVANNA AND FLOODPLAIN

The first ethnohistoric descriptions of the Sinú [Note 1] come from the Spanish chronicles of the conquest. In the compilation by Fray Pedro Simon, which is based on reports from field expeditions, the earliest known encounters took place in 1534. In their pursuit of gold the Spanish learned that there were three provinces in the realm, each with a chief, and that one of the provinces had a village dedicated to serving as a burial ground for all the elite chiefs. This was the village of the Finzenú, in what is today the lower and middle Sinú River Valley. The other provinces were Panzenú in the lower San Jorge River Valley, and Zenúfana (the chief had the same name) located in the Serranía de San Lucas and

the middle Cauca River Valley up to the Aburra valley (Simon 1981: 97). The Finzenú chief was the sister of the Zenúfana chief, and her name or title was "Tota." According to Simon's sources, the Zenúfana had ordered that all principal "señores" (chiefs) be buried in the cemetery of the sanctuary of his sister, the "bohío del Diablo" (Devil's house) in Finzenú. According to these same sources, if a chief did not want to be buried in the necropolis half of his gold had to be interred in the place assigned to elites of the group within the cemetery. Simon (1981: 98–99) stresses that Tota was the most respected of the three chiefs.

This account promoted the hypothesis that the Sinú chiefdoms were matriarchal, an interpretation reinforced by the abundant representation of females in pottery figurines and vessels (Figure 22.2) (Cristiaa Granda 1996). The settlement of the Tota had twenty main houses for the principals (perhaps secondary chiefs) of the province. Around each there were four smaller dwellings for their granary, servants and others from their land to reside (Simon 1981:103). The descriptions stress that the cemetery located close to the town was the main burial ground for this land. Its mounds were so large that they could be seen from afar. However, the main mound was dedicated to an idol or god ("sepultura de Diablo," or devil's burial). It was so large that you could see it from a league away (Simon 1981: 103–104). Around it were located twelve other mounds, all being thirty paces in diameter and the same in height (Simon 1981: 109).



Figure 22.2. Pottery with female representation (C12857B), Betancé style. (Courtesy: Museo del Oro)

The Spanish were impressed with the town and burial mounds they encountered. When they entered one of the houses located in a corner of the main plaza they found 24 gigantic statues laminated with gold. Some of them had gold clothes; half were males and the other half females, looking at each other. In front of each sculpture there was a hammock containing offerings. This main house was able to hold up to 2,000 people (Simon 1981: 105). The Spanish were surprised by the low density of population, and the reason given to them was that most of the people had already died of diseases after an encounter with a Spanish conquistador in 1515 (possibly an expedition by Captain Francisco Becerra with 150 soldiers, none of whom returned except for one Indian who was part of the expedition and escaped to tell about the event, see Herrera 1936: 36; Simon 1981: 111). In the natives' houses they found the weapons of the previous expedition, which had apparently introduced European diseases, and dramatically lowered population densities (see Denevan 1976; Cook 1998). There is also mention of another important sanctuary in the hills named Faraquiel, where the natives hid some of the gold from the burials.

In an explanation given by a young indigenous informant, each of the mounds represented the burial of a chief. The size of the mound corresponded with wealth of the chief, in the amount of labor and number of days of drinking "chicha" (a fermented maize beverage). Another interesting piece of information given is that the earth of the mounds is red (bermeja) and is extracted from some location at a distance. On top they planted a tree, preferably of hobos or ceibas variety (Simon 1981: 107). Simon's account also refers to other burials that did not have mounds. They were easy to spot after the savanna grass was burned, because they were marked with a covering of dark soil two fingers deep, followed by two fingers of white sand.

Fray Pedro Simon's descriptions have been published by others, who probably consulted the same documents from early Spanish expeditions (see Parsons 1952: 71–72 for a literature review with similar interpretations of the chronicles, using other sources). What is extraordinary about the Spanish descriptions is that archaeological evidence supports information about the monumentality of Finzenú. The main mound (in what is today called the region of Betancf) still exists and can be seen from a long distance away (as Parsons indicates), even though it has been heavily looted. The main mound is still 60×40 m in diameter east to west and stands 8 m high (Figure 22.3a, b; Gerardo and Alicia Reichel-Dolmatoff [1958: 59] surveyed the site). The Spanish observation about construction using different soils was confirmed. A larger circular earthwork encloses this mound, and additional, smaller mounds were also recognized.

Monumentality was not limited to mounds and pyramids found all over the region and described by the conquistadors. Indeed, it may be that the Spanish never noticed the most extraordinary of the constructions. These include massive earth works of ridged fields and drainage channels covering half a million hectares in this region (Plazas and Falchetti 1990; Plazas et al. 1993; Figure 22.4). This extensive infrastructure of agricultural earth works was recognized on the ground for the first time by Reichel-Dolmatoff (1953, 1965) and later verified by Parsons and Bowen (1966), thanks to aerial archaeology.

The 600,000 ha of ridged fields located in the Sinú and San Jorge River flood plains act as a drainage system, both allowing and restricting the flow of waters to a complex system of channels (Figure 22.4; for descriptions of similar agriculture systems see Denevan 2001: 213–288 and Chapters 11 and 13 in this volume). The entire region is flooded for seven months of the year (April to November [Note 2]) but thanks to the ridged mounds standing above the flood waters, agriculture is possible throughout the period. Furthermore, flood waters are channeled so that large schools of fish (called locally Bocachico, *Prochilodus*

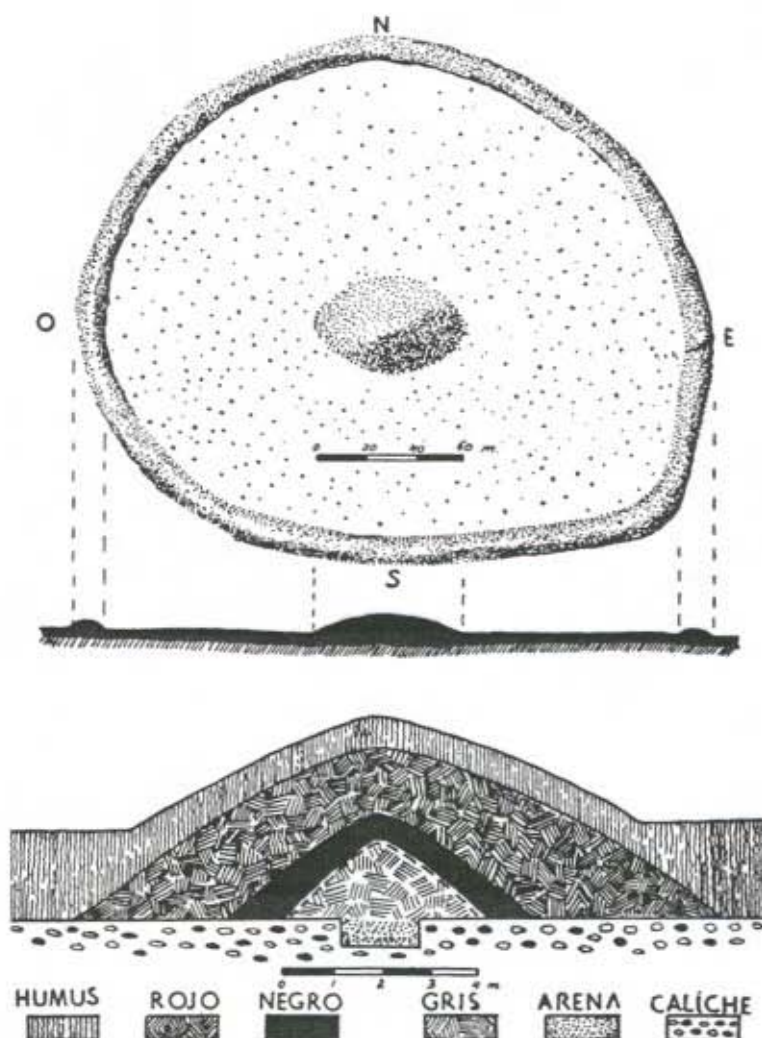


Figure 22.3. a. Mound of Maracayo. b. Mound A of Junquillo, Lagoon of Betanci (After Reichel-Dolmatoff 1957: 150).

reticulatus) can migrate upstream into the region, at the end of March and April (Dahl 1971: 108), an event known today as the "Subienda." The subsequent abundance of fish enabled the mound builders to catch and process vast quantities by smoking, and by making a fish flour that was possible to store and trade. In the area iguanas also were consumed, as well as their eggs, which are collected at the beginning of flood season today.

What we know of the history of this kind of flood plain agricultural management comes mainly from research in the lower and middle San Jorge River. Construction of agricultural ridged fields was a continual and gradual process going back to the second century AD, and reaching its peak close to the sixth century, when a dry climatic period ushered in a linear settlement pattern along the branches of the rivers. By the tenth century



Figure 22.4. Ridge fields, lower San Jorge. (Courtesy: Museo del Oro)

the wetlands agricultural system expanded into the middle San Jorge River, while the lower San Jorge River was gradually abandoned. However, some scholars argue that it was the arrival of new people, the Malibu, who took over the lower Magdalena and displaced old populations toward the middle-upper San Jorge River, which prompted the abandonment of the extensive wetlands agricultural facilities (Fals Borda 1980; Reichel-Dolmatoff and Dussan 1991; Plazas et al. 1993).

How did this dynamic wetlands agricultural system develop and what are its roots? It is now clear that by about 200 BC there were large permanent settlements such as Momil, which confirm high population concentrations. The problem with our knowledge of the Sinú is that most current archaeological data relates to ceramic sequences, with very limited information about the use of flora and fauna and other resources. However, based on remains from early Archaic sites it is likely that intensive exploitation of river fish and amphibian resources had begun. Settlement survey by Plazas et al. (1993) revealed a dense population concentrated on high ground, including artificial platforms and cluster-like villages dispersed throughout the landscape.

A settlement named Colomboy has been identified in the rolling landscape region, close to floodplains between the San Jorge and Sinú Rivers. A modified terrace surrounded by depressions extends over 2 km² and includes evidence of dense human occupation dated to AD 980 ± 120. This documents a large village in the interfluvial environment that probably participated in intensive exchange with the two neighboring river systems (Botiva Contreras 1994: 100–101; Kurela 1993).

While, we are still far from a clear understanding of the dynamics of human occupation by the ancestors of the Sinú, it is clear that human activities transformed the environment. They certainly favored the expansion of the grassland in interfluvial regions (LeRoy 1957; Parsons 1980: 283–284; Bonzani 1998). This expansion is implied at sites like San Jacinto 1, dating to 4000–3100 BC, where the consumption of wild grasses involved ground

stone technology in the form of metates and manos. With sites such as Momil we know that around AD 200 people were dependent on roots crops, probably manioc, as well as maize (Reichel-Dolmatoff 1956, 1957). We can hypothesize that massive wetland agricultural development of the flood plains was a consequence of seasonal management strategies in seasonally wet-dry regions. Early populations probably abandoned these areas during the height of flooding, limiting exploitation to optimum conditions for fishing agriculture. When the waters were receding cultivars such as corn and manioc were planted, to be harvested in the dry period, along with the fish that were trapped as the region dried. In fact, the fish could have been conserved live in ponds, and consumed as needed in the complex seasonal environmental cycles.

In some areas, such as the lower San Jorge River, populations lived year round in the floodplains as excavated residential mounds testify. Risk management on seasonal floodplains in the tropics promotes three alternative patterns of landscape occupation. In one, sites of residentially and logistically mobile populations are located preferentially on unstable terrain such as point bars or active stream terraces during the dry season, when there is no risk to occupation and the payoff of the locations is very high. During the rainy season, a preference for stable areas such as river terraces, hill-tops, or ridges is predicted. In the second alternative sedentary populations tend to select more stable landscapes during both seasons in order to avoid seasonal flooding and constant destruction of settlements. This seems to be what was going on at sites such as Momil, Colomboy, and Betanci, all located above the active floodplain but with access to it. The third option of landscape occupation in active floodplains depends on massive landscape modification with earthworks and channels that demand intensive labor but allow year round occupation of the area (see Bonzani 1997, 1998; Oyuela-Caycedo 1998b). This was the case in the construction of residential mounds associated with ridged fields and water channels for transportation as well as the management of fish. Settlements described by Plazas et al. (1993:48–60) for Caño Rabón in the San Jorge River drainage fit this type (Figure 22.5). This third lifestyle was probably the consequence of population pressure in more stable environments, obliging people to occupy high risk areas such as the lower Sinú and San Jorge rivers and subsequently insuring survival with complex strategies of earth moving and seasonal management. This three-part model helps explain the development of the Sinú culture. Most likely, population pressure in the rolling savannas promoted demographic growth in floodplain seasonal wetlands, where intensification was through earth moving made possible by a hierarchical social and political organization, like the Panzenú, Fincenú and Zenufana chiefdoms observed in the Sinú area at the times of the conquest.

THE TAIRONA-KOGI CHIEFDOMS OF THE CARIBBEAN COAST AND SIERRA NEVADA DE SANTA MARTA MOUNTAIN

The Sierra Nevada de Santa Marta (SNSM) is the northern geological outlier of the Andean Mountain Chain and one of the most complex ecosystems in the world. It is a massive mountain of pyramidal shape facing the tropical Caribbean Sea. Reaching 5,775 masl, it is the highest mountain in the world so close to an ocean—only 48 km from the modern shoreline. It is Colombia's highest mountain with permanent glaciers. And due to its isolation from other highlands, and its great vertical climatic variability, it is characterized by extreme biological endemism. Consequently, it has attracted scientific studies since

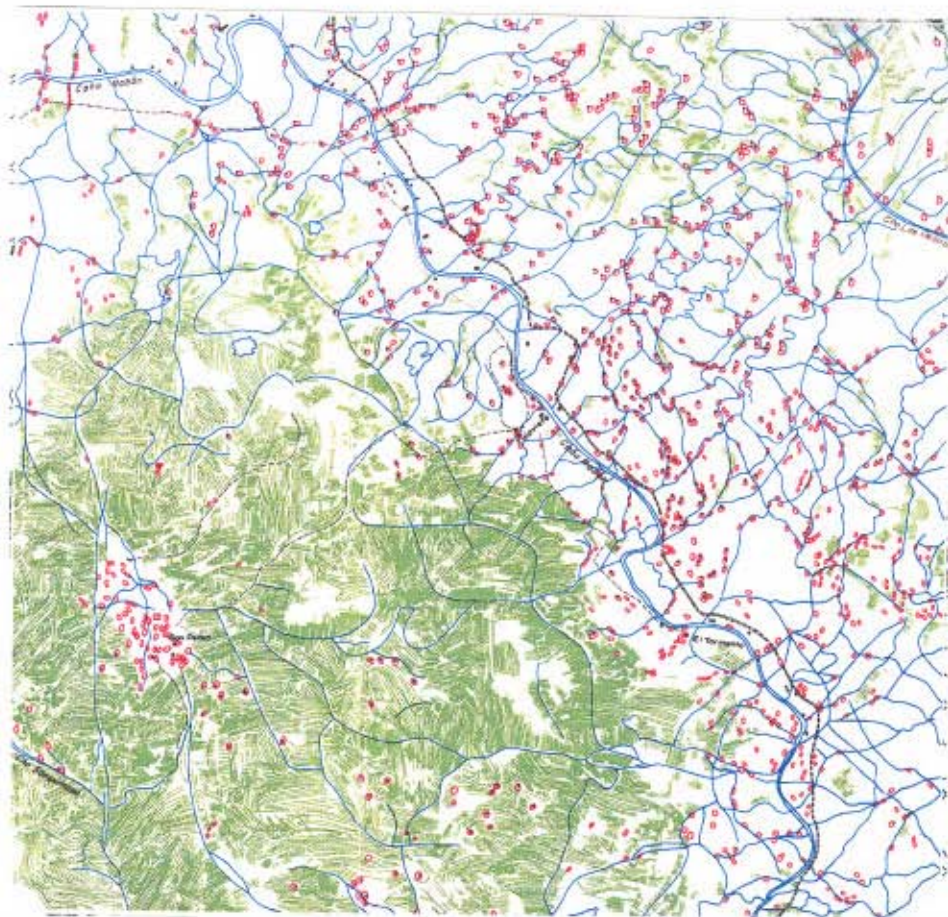


Figure 22.5. Map of the agricultural ridge fields (green) and platforms (red) in the middle Caño Rabón. Area shown is 49.45 km^2 . (After Plasas et al. 1993:49)

the nineteenth century (Reclus 1881; Simons 1879, 1881; Allen 1900; Todd and Carriker 1922; van der Hammen and Ruiz 1984; Strewé and Navarro 2004; Hooghiemstra and van der Hammen 2004).

The SNSM is striking not only for its ecosystems diversity, that ranges from tropical bays to frigid glaciers, but also for the vertical stacking of its systems, and their decreasing horizontal variation with altitude, as in other parts of the Andes. The general explanation is that the horizontal and vertical ecological variation is a consequence of climatic factors such as patterns of wind and marine currents that affect the mountain differently. For example, the region of the lower Gaira River drainage is affected by fohn-type winds that dry the area between the mountains and the sea (western side of the SNSM) (Figure 22.6). In contrast, the Tairona Park region is affected by winds that run from the sea to the mountain (Herrman 1984) or in the case of the upper Buritaca, by mountain valley winds. This wind variation affects the precipitation and consequently, the vegetation. Precipitation throughout the SNSM varies greatly as well, with altitude and wind patterns. In regard to vegetation zones, for example, the region of Gaira is

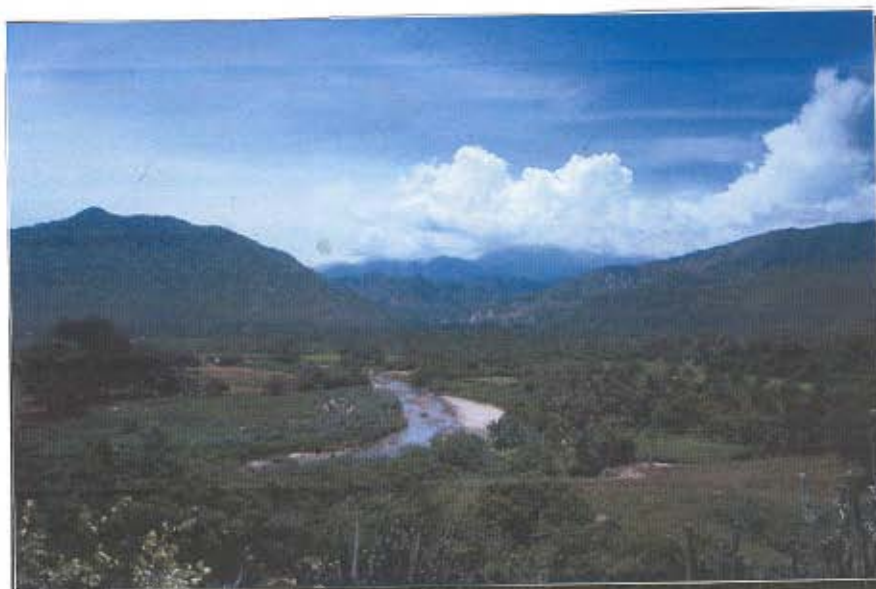


Figure 22.6. General view of lower Gaira floodplain. The hills have xerophytic vegetation. (Augusto Oyuela-Caycedo)

mainly tropical thorn woodland or semi-deciduous lowland forest (Cleef et al. 1984). Tairona Park vegetation changes gradually from west to the east, at the same altitude (0–500 masl), from tropical thorn woodland, to very dry tropical forest, to equatorial rainforest. In contrast, the upper Buritaca has an Andean rainforest known as upper montane rain forest (Cleef and Rangel 1984).

Topographic variation can be illustrated by considering slope within the regions under archaeological analysis. For example, Gaira is characterized by landscape inclination below 20%, but with the surrounding hills between 20 to 40%. In contrast, small floodplains and the end of the bays surrounded by hills with slopes between 60 to 80% characterize the Tairona Park. The upper Buritaca is located in a landscape where most of the terrain is between 60% to more than 80% of slope (Bartels 1984). Furthermore, the Gaira region is located on the littoral in an area of deep open bays with sandy and muddy floors, which are seasonally affected by the Magdalena River sediments. Tairona Park is characterized by several harbors with coral and rock floors that are affected by deep currents abundant in phytoplankton, that makes it one of the richest fishing areas of northern Colombia (Hernandez 1986).

Great ecological variation, however, is typical of the Andes generally, where unique combinations of temperature, precipitation, wind patterns, and landscape morphology create unique niches of alpha and beta diversity. Significantly, in the SNSM, our understanding of the distribution of rainforest and pre-Hispanic human communities is still problematic. The only rainforest that currently exists is restricted to the northwest corner of this pyramidal mountain, in valleys like the upper Guachaca, Buritaca, and Don Diego rivers (Figures 22.7, 22.8), the same area with the only pre-Hispanic urban settlements, with high residential density. These settlements consist of hundreds of terraces at intersections in a network of stone-paved roads (Oyuela-Caycedo 1990; Herrera 2000). In contrast, the northeast, south and most of the west side of the SNSM lacks gallery forest, as well as archaeological settlements comparable to those in the northwest (Figures 22.9, 22.10). The



Figure 22.7. General view of the tropical cloud forest of the upper Buritaca Valley. The main platform of the archaeological site of Ciudad Perdida is located at the center. (Augusto Oyuela-Caycedo)



Figure 22.8. General view of the ridge where Ciudad Perdida is located under the canopy; the central opening is the main terrace of Ciudad Perdida. (Augusto Oyuela-Caycedo)



Figure 22.9. The upper Palomino river valley from the archaeological site of Nebifí (Jaguar Creek). Deforestation is the result of human action since prehispanic times up to the present by the Kogi Indians. (Augusto Oyuela-Caycedo)



Figure 22.10. Archaeological terrace at Nebifí, close to 1,400 masl. Note projected slabs at the edge of the terrace and menhir beside human scale. (Augusto Oyuela-Caycedo)

northeast and east of the SNSM is where indigenous populations such as the Kogi and Ijka live today (Oyuela-Caycedo 1991, 1998; Reichel-Dolmatoff 1950, 1951a, b). The south and west were colonized for agricultural and cattle production from the seventeenth century on, and in the eighteenth century, a small population of English were granted rights to settle by the Spanish crown (Barros Blanco 1996).

The question is how can we explain the persistence of rainforest in an area where previous human occupation was so dense in such a delicate environment of steep slopes and rapid erosion? Most of the archaeological evidence of the hundreds of archaeological settlements of the Tairona culture are found in this northwest part of the SNSM. The rest of the SNSM is devastated (Cavelier et al. 1998), reduced to small fragmented patches of rainforest where no evidence of complex archaeological occupation exists, but where indigenous populations live, up to the present.

I believe that the prehistory and ecology of the SNSM rainforest can be understood from an historical ecology approach (see Chapters 11 and 12 in this volume for a discussion of this concept). The reduction of the rainforest to fragmented ridges in the indigenous territories can also be understood with a historical ecological study of its past.

A HISTORY OF HUMAN COLONIZATION, AD 600–1500

I believe that a religious movement that included peoples with different languages and from diverse political units (Reichel-Dolmatoff 1954a, b; Reichel-Dolmatoff and Dussan 1955; Mason 1931, 1936, 1939; Oyuela-Caycedo 1986a) produced the expansion of the “Tairona culture”. Tairona culture was a religious complex that promoted colonization of the SNSM. Its development was based on religious cult centers that were built in contrasting environments, beginning in the lowlands but gradually including centers at higher elevations. This created a network for resource exchange and specializations correlating with the particularities of climatic and altitudinal variation as well as the availability of raw materials (for a more detailed explanation see Oyuela-Caycedo 2001; Hoopes 2005). The pattern of expansion conforms to a frontier model of colonization in which the rainforest became fragmented and restricted to certain ridges of the mountain.

Our knowledge of the archaeology of the SNSM is limited to three regions. The best chronological sequence of artifacts and settlement patterns is in the lower Gaira region (Oyuela-Caycedo 1987b, 1989, 1995b). The sequence of occupation goes from at least 500 BC up to the present with evidence for continual occupation. In the Tairona Park region available evidence indicates human occupation from around 500 BC to the present (see Oyuela-Caycedo 1986b; Langebaeck and Dever 2002). For the upper Buritaca evidence begins in the tenth century AD, and continues until the seventeenth century (Herrera de Turbay 1984, 1985; Oyuela-Caycedo 1986c, 1987a, 1995b, 2001). Differences among the three sequences supports the argument for a process of colonization of the SNSM that expanded gradually from the lowlands to the highlands reaching its highest impact – around 2,000 masl – no earlier than conquest times.

It is likely that the SNSM had dispersed populations in the highlands, perhaps even hunter-gatherer groups during the last half of the first millennium BC. However, evidence reveals small villages along the bays and coastline that depended on agriculture and fishing. The settlement pattern shifted after a catastrophic environmental crisis around AD 500–550, just before the occupation of the Mamoron archaeological site (AD 550–800) as well as the site of Frontera in the middle Buritaca River. This time period also seems to

be related to a dry phase that coincides with the desertification of the Guajira at the end of the El Horno complex (see Reichel-Dolmatoff and Dussan 1951; Bray 1995). There also are data to support a massive uplift of the SNSM around this time, related to the disappearance of an estuary located in the lower Gaira area and Rodadero Bay. We know that the shoreline became more volatile as indicated by the history of the estuarine environments (see Oyuela-Caycedo 1996) of the Ciénaga de Santa Marta. Furthermore, evidence from bays like Cinto reveal episodes of massive flooding, sealing coastal settlements such as Nahuange, Cinto, Gairaca, and lower Buritaca with heavy colluvial materials, and ending the early occupations. Later the locations were reoccupied but they continue to suffer similar disasters in modern times.

Following the catastrophic environmental crisis of the sixth century the SNSM witnessed extremely rapid population growth and colonization in the northern and western drainage. Terrace systems permitted the construction of small towns on sheer mountain slopes that were linked by a network of steep roads. This is when material culture appears to have become standardized, coinciding with the rise of specialist centers for pottery production, salt extraction, manufacture of ceremonial lithic artifacts, and metallurgical centers. These specialized centers supplied new colonies on the coast of the Sierra and between the lowland of the Ciénaga Grande de Santa Marta and the west of the Sierra Nevada (Reichel-Dolmatoff 1953; Oyuela-Caycedo 2001).

After AD 900 settlement patterns in the lower Gaira, Tairona Park, and upper Buritaca are similar, with groups concentrated into nucleated settlements. Hundreds of settlements have been discovered that date later than the ninth century; all of them share the same religious icons in metal, ceramic and stone artifacts. Two of the largest sites have urban characteristics such as canalization of water, roads, terraces, and obvious urban planning. The first is Pueblito (Figure 22.11) located in Tairona Park. The other is Ciudad Perdida (Figures 22.12, 22.13, 22.14) located in the upper Buritaca. Both sites are settlements with monumental stone architecture, located in humid tropical forest. Their sequences of occupation are very similar, dating from the tenth to the end of the early seventeenth centuries. Together they represent the highest technological achievement in terracing and road construction in this very difficult landscape. Successful settlement in the tropical forest also seems to have involved management by selecting for specific species of palms.

The ecology of the upper Buritaca was intensively studied as part of the Ecoandes Project, coordinated by Thomas van der Hammen and Pedro M. Ruiz (1984). Transects were studied in detail, one on the Buritaca ridge between 500–3,300 masl, and a second across the upper Frio River from 3,300 to 4,100 masl. This research carefully considered human interventions using palynological as well as archaeological settlement pattern data (Herrera de Turbay 1984; Van der Hammen 1984). Settlement patterns of the upper Buritaca were mapped by intensive surveys, conducted later.

Several urban clusters have been found in the upper Buritaca that consist of collections of terrace groups, making it difficult to determine where a site begins and ends. Deep valleys cut one part of a settlement from another. The largest of the sites is Ciudad Perdida, built between 1,100–1,200 masl. The temperature is stable year-round with minor fluctuations between a maximum of 26 C° during the day and a minimum of 16.5 C° at night. The annual precipitation is approximately 4,000 mm. This carefully planned "city" is strategically located to dominate the Buritaca River Valley (for a discussion on Tairona urbanism see Aprile-Gnisset 1991: 33–113). It has 120 residential terraces, each with one or more circular house platforms of fine stone masonry where a large circular building formerly stood. These terraces are interconnected by a complex web of flagstone stairs and pathways



Figure 22.11. a. Main road of the archaeological site of Pueblito, Parque Tairona (before restoration in 1983).
b. The same main road after restoration by the Instituto Colombiano de Antropología in 1987. (Augusto Oyuela-Caycedo)

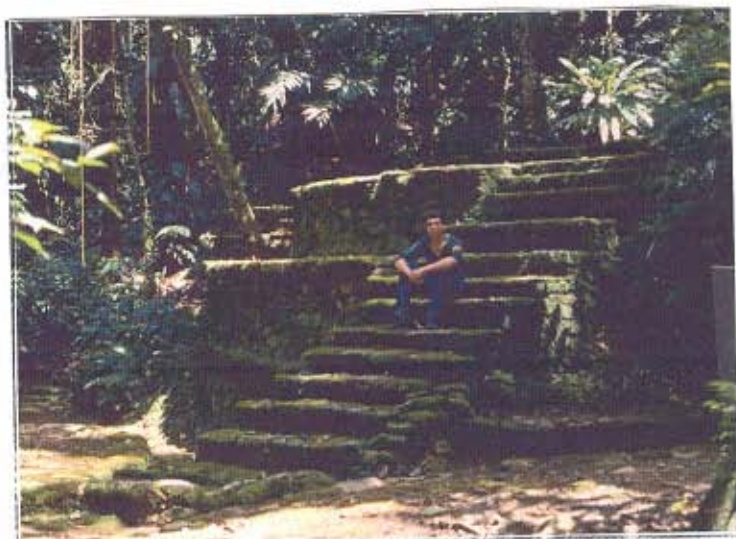


Figure 22.12. Terrace of the lower sector of Ciudad Perdida. (Augusto Oyuela-Caycedo)



Figure 22.13. Main road entrance that connects the lower sector with the principal terrace compound of Ciudad Perdida. (Augusto Oyuela-Caycedo)

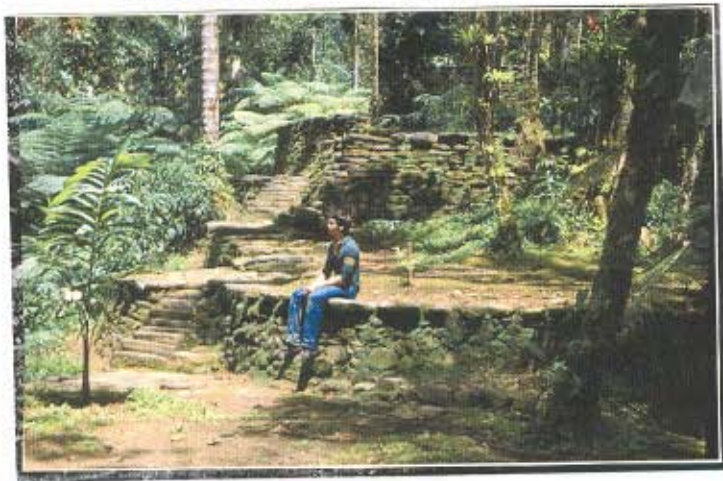
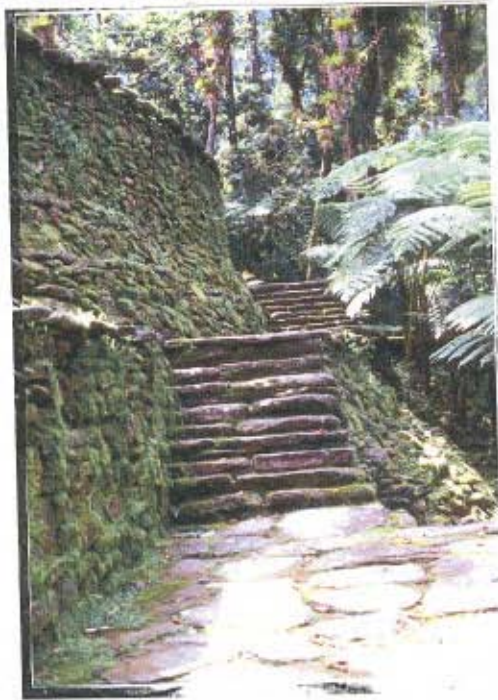


Figure 22.14. a. Main sector of "living" terraces. See the architectural solution of the road adjacent to the terrace. b. Sequence of "living terraces" in the main sector of Ciudad Perdida. (Augusto Oyuela-Caycedo)

(Figure 22.14). Everything is linked by a simple systems of water drainage with channels designed to control water force as it ran down the steep slopes. Water runs slowly along the stone walls next to stairs and pathways to end in streams that dissect the site. In this way the Tairona controlled erosion, one of the major problems typically arising in steeply inclined environments (Serje de la Ossa 1984). If we suppose that a terrace (Figure 22.14b) represents one family unit, in contrast to the traditional western assumption that each

circular house platform equals a family unit, then we can estimate that this site probably had a population of between 400–600 persons living in an area of 18 ha.

The socio-political organization of Tairona culture during the early part of the sixteenth century consisted of relatively independent chiefdoms, each including a priestly class and a hierarchy of chiefs as well as specialists in arts and crafts (e.g., gold workers, semiprecious stone engravers, merchants). This arts and crafts specialization, coupled with intensive exchange of agricultural products, was possible because of the regional ecological diversity found in the SNSM. The diversity encouraged the development of centers of specialization and regions of production for items such as ceramics, lithic artifacts, and agricultural products. At last archaeologists are beginning to understand the ancient system as they reconstruct the web of roads and pathways that connected all of the sites (Oyuela-Caycedo 1987a, 1990; Herrera de Turbay 1985; Kurela 1993; Herrera 2000).

To facilitate the redistribution of products the different regional chiefdoms of the northeast SNSM built an extensive network of paths, bridges, and paved stairs. Decentralized political complexes coordinated the whole commercial enterprise for one or more of the mountainous valleys, as indicated for Ciudad Perdida. The primary products exchanged from the coastlands into the valleys were fish, salt, shells, cotton, tobacco, and manioc. From hot-moderate interior climates came beans, avocados, and fruits. The moderate-cold climate areas contributed coca leaves, potatoes, and sweet potatoes. The exchange of squash and corn occurred at many altitudinal levels as did the exchange of craft items (Herrera 1985). Corn was the staple in Ciudad Perdida where numerous grinding stones were scattered throughout the settlement. The presence of irrigation canals along the coast and garden terraces in the mountain indicates that the Tairona cultivated the land intensively; areas beside the sea were exploited seasonally for salt, and in places where ecological factors dictated low yields of fish, agriculture could be intensified.

Evidence of early occupation in the Buritaca region is from the coast with a site that seems to date from AD 600 until 900 (Wynn 1975). Frontera, another early occupation in the middle Buritaca, with C^{14} date as early as AD 660, probably suffered destruction by landslide, and subsequent rebuilding. Frontera is located at 500 masl while Ciudad Perdida lies at 1,100 masl (Cardoso 1986).

Pollen studies by the Ecoandes Project show that the whole upper Buritaca area was covered by rainforest prior to the ninth century, but around the end of the tenth century human occupation and deforestation began. C^{14} dates obtained from an excavation I conducted in 1982 confirm that the early occupation of Ciudad Perdida began around 950 ± 60 BP. There is a close relationship between palms and areas of human activity in the archaeological past. This relationship is born out at Ciudad Perdida where *Dictyocaryum schultzei* (ivory-nut palm) predominates in the neighboring rainforest. The importance of this palm is in construction of roofs and walls. A dense population of *Bactris* sp. at 920 masl also relates to Ciudad Perdida. This palm, known as “chonta”, was important for making archers’ bows and other tools. Its spines were used and its edible fruit is an outstanding source of oil and protein. The ecological studies demonstrate how greatly and well the SNSM chiefdoms managed their landscapes, protecting and improving them.

The center was occupied until the sixteenth century when the Spanish conquest began its processes of war and destruction. The effects were catastrophic for the native population, reducing their numbers to less than 1% of pre-Hispanic highs following 100 years of continuous warfare. The region seems to have been completely abandoned around AD 1630 ± 55 , based on C^{14} dates from collapsed structures and garbage (Oyuela-Caycedo 1986c, 1987a). Soon vegetation expanded from the Buritaca and secondary ridges to cover

the remains of Ciudad Perdida. Cleef et al. (1984: 288–289, 384) recognize that the rain-forest of the upper Buritaca is the result of four hundred years of abandonment since the collapse of the indigenous chiefdoms.

The surviving natives who were not absorbed by Spanish control into the indigenous “resguardos” of the coast found refuge in the northeast of the SNSM, in the upper parts of other rivers like the Palomino and San Miguel where they continue to live, practicing traditional religious beliefs. This occupation has not allowed forest to recover or expand as in the Buritaca region.

FINAL COMMENTS

This chapter has stressed the importance of recognizing the complexity of the colonization process developed by lowland chiefdoms to expand into high-risk landscapes and seasonally variable areas of food production. Permanent and often dense settlement was possible because of agricultural and management techniques that reduced the risk of “living” in landscapes subject to seasonal flooding, plagued by poor soils, or by extreme erosion on steep gradients. The anthropogenic landscapes created were products of political systems that were able to mobilize large populations to live in difficult areas such as active floodplains or the tropical forest of the SNSM. Only with significant investment in technology and management—such as ridged fields, residential mounds, and water channels in the Sinú and San Jorge river valleys—could the areas be incorporated into the network of exchange that promoted high population densities. The same occurred in the SNSM with expansion onto steeper gradients through terrace and drainage construction as well as integration into a vertical interchange of goods with paved roads. After the conquest, both areas suffered rapid demographic decline. However, impact on the landscape was long-term, still visible where forests and other biocommunities have recovered. The archaeological nature of modern Colombian ecosystems is a footprint of its pre-Hispanic chiefdoms.

NOTES

1. In the archaeological literature it is more common to write *Sinú* for the ancient society, but various scholars, myself included, are also writing *Zenú*, based on the village names, province names and personal names recorded by the Spanish. For the sake of simplicity in this chapter, I write *Sinú*.
2. The Sinú and San Jorge region has two major seasons: rainy and dry. The first rainy period starts in late April–June, followed by a small dry month around July–August (Veranillo de San Juan). After this, precipitation increases until the end of November, reaching a peak in October. Then the rain stops in early December, with the driest season in January and February; in some years there is no precipitation at all during these months. This climatic regime changes the landscape drastically, from verdant November into dry January to March with lush green quickly replaced by dead grass. The bimodal climatic regime also has a strong impact on the availability of fish, turtles, fruits and every growth cycle, annual or perennial.

REFERENCES

- Adelaar, Willem F. H. and Pieter C. Muysken, 2004, *The Languages of the Andes*. Cambridge University Press, Cambridge.
- Allen, J.A., 1900, List of bats collected by Mr. H. Smith in the Santa Marta region of Colombia, with descriptions of new species. *Bulletin of the American Museum of Natural History* 13: 87–94.
- Aprile-Gnisset, Jacques, 1991, *La Ciudad Colombiana*. Biblioteca Banco Popular, Bogotá.

- Bartels, G., 1984, Morphoclimatic belts of the Sierra Nevada de Santa Marta. In *La Sierra Nevada de Santa Marta (Colombia): Transecto Buritaca - La Cumbre*, Vol. 2, edited by T. van der Hammen and P. Ruiz, pp. 99–130. J. Cramer, Vaduz, Liechtenstein.
- Bartley, B. G. D., 2005, *The Genetic Diversity of Cacao and its Utilization*. CABI Pub., Wallingford, UK and Cambridge, MA.
- Barros Blanco, José Agustín, 1996, *Dos Colonizaciones del Siglo XVII en la Sierra Nevada de Santa Marta*. Archivo General de la Nación, Bogotá.
- Bonzani, Renée M., 1997, Plant diversity in the archaeological record: a means toward defining hunter-gatherer mobility strategies. *Journal of Archaeological Science* 24:1129–1139.
- , 1998, Learning from the present: the constraints of seasonality on foragers and collectors. In *Recent Advances in the Archaeology of the Northern Andes*, Monograph 39, edited by Augusto Oyuela-Caycedo and J. Scott Raymond, pp. 20–35. The Institute of Archaeology, University of California, Los Angeles.
- Botiva Contreras, Alvaro, 1994, *Arqueología de Rescate Oleoducto Vasconia-Coveñas*. Co-cultura Ican, Bogotá.
- , G. Cadavid, L. Herrera, A. M. Groot de Mahecha, and S. Mora., 1989, *Colombia Prehispánica, Regiones Arqueológicas*. Instituto Colombiano de Antropología, Bogotá.
- Bray, Warwick, 1995, Searching for the environmental stress: climatic and anthropogenic influences on the landscape of Colombia. In *Archaeology in the Lowland American Tropics: Current Analytical Methods and Recent Applications*, edited by Peter Stahl, pp. 96–112. Cambridge University Press, Cambridge.
- Carbonó, E., 1987, Estudio Etnobotánico entre los Kogui de la Sierra Nevada de Santa Marta. M.S. thesis in Systematics. Instituto de Ciencias Naturales, Museo de Historia Natural, Universidad Nacional de Colombia, Bogotá.
- Cavelier, J., T. M. Aide, C. Santos, A. M. Eusse and J. M. Dupuy, 1998, The savanization of moist forests in the Sierra Nevada de Santa Marta. *Journal of Biogeography* 25: 901–912.
- Cleef, A.M. and J. O. Rangel-Ch., 1984, La vegetación del páramo del noroeste de la Sierra Nevada de Santa Marta. In *La Sierra Nevada de Santa Marta (Colombia): transecto Buritaca - La Cumbre*, Vol. 2, edited by T. van der Hammen and P. Ruiz, pp. 203–266. J. Cramer, Vaduz, Liechtenstein.
- , J. O. Rangel-Ch., T. van der Hammen and R. Jaramillo-M., 1984, La vegetación de las selvas del transecto Buritaca. In *La Sierra Nevada de Santa Marta (Colombia): transecto Buritaca - La Cumbre*, Vol. 2, edited by T. van der Hammen and P. Ruiz, pp. 267–406. J. Cramer, Vaduz, Liechtenstein.
- Cook, Noble David, 1998, *Born to Die: Disease and New World Conquest, 1492–1650*. Cambridge University Press, New York.
- Cristina Granda, Rita Maria, 1996, The Status of Zenu Women: A Study of Gender Relations in Ancient Colombia. M.A. thesis. Faculty of Arts and Science, Trent University, Peterborough, Ontario.
- Cuadros, Hermes, 1990, Vegetación caribeña. In *Caribe Colombia*, edited by M. Jimeno, pp. 66–83. Financiera Eléctrica Nacional, Bogotá.
- Dahl, George, 1971, *Los Peces del Norte de Colombia*. INDERENA.
- Denevan, William M., 1992, The pristine myth: the landscape of the Americas in 1492. *Annals of the Association of American Geographers* 82(3):369–385.
- , 1976, *The Native Population of the Americas in 1492*. University of Wisconsin Press, Madison.
- , 2001, *Cultivated Landscapes of Native Amazonia and the Andes*. Oxford University Press, New York.
- Fals Borda, Orlando, 1980, *Mompox y Loba, Historia Doble de la Costa*. Carlos Valencia Editores, Bogotá.
- Herrera, Antonio, 1936, *Historia General de los Hechos de los Castellanos en las Islas y Tierra Firme del Mar Océano*. Tipografía de Archivos. Madrid
- Herrera, Leonor, 2000, ¿Por dónde pasan los caminos Tairona? In *Caminos Precolombinos, Las Vías, Los Ingenieros y Los Viajeros*, edited by Leonor Herrera and Marianne Cardale de Schrimppf. Instituto Colombiano de Antropología, Bogotá.
- Herrera de Turbay, L.F., 1984, La actividad agrícola en la Sierra Nevada de Santa Marta (Colombia): perspectiva histórica. In *La Sierra Nevada de Santa Marta (Colombia): Transecto Buritaca - La Cumbre*, Vol. 2, edited by T. van der Hammen and P. Ruiz, pp. 501–530. J. Cramer, Vaduz, Liechtenstein.
- , 1985, *Agricultura Aborigen y Cambios de Vegetación en la Sierra Nevada de Santa Marta*. Fundación de Investigaciones Arqueológicas Nacionales, Bogotá.
- Hernandez, A. R. (ed.), 1986, *Proyecto Piloto de Evaluación para el Desarrollo de las Pesquerías Artesanales en la Región de Santa Marta*. Editora Guadalupe Limitada/ CIID-Colciencias-FES, Bogotá.
- Hooghiemstra, Henry and Thomas van der Hammen, 2004, Quaternary Ice-Age dynamics in the Colombian Andes. Developing an understanding of our legacy. *Phil. Trans. R. Soc. Lond. B* 359: 173–181.

- Hoopes, John W., 2005, The emergence of social complexity in the Chibchan world of southern Central America and northern Colombia, AD 300–600. *Journal of Archaeological Research* 13: 1–47.
- Kopp, L. E., 1966, A taxonomic revision of the genus *Persea* in the western hemisphere. (*Persea*-Lauraceae). *Mem. New York Bot. Gard.* 14:1–120.
- Kurella, Doris, 1993, *Handel und soziale Organisation im vorspanischen nördlichen Andenraum. Zur politischen Ökonomie subandiner Häuptlingstümer im Gebiet des ehemaligen Nuevo Reino de Granada vor der Eroberung durch die Spanier im frühen 16. Jahrhundert.* Mundus Reihe Alt-Amerikanistik, Band 9. Holos Verlag, Bonn.
- Langeback, C. H. and A. Dever, 2002, Estudio regional en las bahías del Parque Tairona: arqueología, medio ambiente y desarrollo de sociedades prehispánicas. *Boletín de Arqueología* 17: 2–16.
- Le Roy Gordon, B., 1957, *Human Geography and Ecology in the Sinú Country of Colombia.* University of California Press, Berkeley.
- López Castaño, Carlos E., 1998, Evidence of Late Pleistocene-Early Holocene occupations in the tropical lowlands of the middle Magdalena Valley. In *Recent Advances in the Archaeology of the Northern Andes*, Monograph 39, edited by Augusto Oyuela-Caycedo and J. Scott Raymond, pp. 1–9. The Institute of Archaeology, University of California, Los Angeles.
- _____, 1999, *Ocupaciones tempranas en las tierras bajas tropicales del valle medio del río Magdalena Sitio 05-yon-002, Yondó-Antioquia.* Fundación de Investigaciones Arqueológicas Nacionales, Banco de la República, Bogotá.
- MacRae, W. D. and G. H. Towers, 1994, An ethnopharmacological examination of *Virola elongata* bark: a South American arrow poison. *Journal of Ethnopharmacology* 12:75–92.
- Mason, J. Alden, 1931, *Archaeology of Santa Marta, the Tairona Culture*, Part 1. Anthropological Series, Vol. XX, No.1. Field Museum of Natural History, Chicago.
- _____, 1936, *Archaeology of Santa Marta, the Tairona Culture*, Part 2, Section 1, Publication 358. Anthropological Series, Vol. XX, No.2. Field Museum of Natural History, Chicago.
- _____, 1939, *Archaeology of Santa Marta, the Tairona Culture*, Part 2, Section 2, Publication 446. Anthropological Series, Vol. XX, No. 3. Field Museum of Natural History, Chicago.
- Oyuela-Caycedo, Augusto, 1986a, De los Tairona a los Kogi: una interpretación del cambio cultural. *Boletín Museo del Oro* 17: 32–43.
- _____, 1986b, Contribución a la periodización cultural en el litoral del Parque Tairona. *Boletín de Arqueología* 1: 24–28.
- _____, 1986c, Excavación de un basurero en Ciudad Perdida. *Boletín de Arqueología* 1: 28–37.
- _____, 1987a, Aspectos culturales de las secuencias locales y regionales en los Tairona. In *Chieftdoms in the Americas*, edited by Robert D. Drennan and Carlos A. Uribe, pp. 213–228. University Press of America, Lanham.
- _____, 1987b, Gaira: introducción a la ecología y arqueología del litoral de la Sierra Nevada de Santa Marta. *Boletín Museo del Oro* 19:35–55.
- _____, 1989, Investigaciones Arqueológicas en la Región Baja del Río Gaira, Departamento del Magdalena. Ms. on file. Fundación de Investigaciones Arqueológicas del Banco de la República, Bogotá.
- _____, 1990, Las redes de caminos prehispánicas en la Sierra Nevada de Santa Marta. In *Ingeniería Prehispánica*, edited by S. Mora, pp. 47–72. Instituto Colombiano de Antropología and Fondo Eléctrico Nacional (FEN), Bogotá.
- _____, 1991, Ideology and structure of gender spaces: the case of the Kaggaba Indians. In *Gender Archaeology*, edited by D. Walde and N. D. Willows, pp. 327–335. Proceedings of the 22nd Annual Conference of the Archaeological Association of the University of Calgary. University of Calgary.
- _____, 1995a, Rocks vs clay: the evolution of pottery technology in the case of San Jacinto 1, Colombia. In *The Emergence of Pottery*, edited by William K. Barnett and John W. Hoopes, pp.133–144. Smithsonian Institution Press, Washington, D.C.
- _____, 1995b, Centralización e integración en la Sierra Nevada de Santa Marta. *Boletín Museo del Oro* 38–39:113–133.
- _____, 1996a, Gerardo Reichel-Dolmatoff: 1914–1994. *American Antiquity* 61 (1): 52–56.
- _____, 1996b, The study of collector variability in the transition to sedentary food producers in northern Colombia. *Journal of World Prehistory* 10 (1): 49–92.
- _____, 1997, Prologo al Gran Jaguar. In *Arqueología de Colombia* by Gerardo Reichel-Dolmatoff, pp.xi–xix. Segunda Edición. Presidencia de la República de Colombia, Biblioteca Familiar Colombiana, Bogotá.

- _____. 1998a, Ideology, temples, and priests: change and continuity in house societies in the Sierra Nevada de Santa Marta. In *Recent Advances in the Archaeology of the Northern Andes*, Monograph 39, edited by Augusto Oyuela-Caycedo and J. Scott Raymond, pp.39–53. The Institute of Archaeology, University of California, Los Angeles.
- _____. 1998b, Bibliography of Gerardo Reichel-Dolmatoff: 1943–1997. In *Recent Advances in the Archaeology of the Northern Andes*, edited by Augusto Oyuela-Caycedo and J. Scott Raymond, Monograph 39, pp.ix–xv. The Institute of Archaeology, University of California, Los Angeles.
- _____. 2001, The rise of religious routinization. The study of changes from shaman to priestly elite. In *Mortuary Practices and Ritual Associations: Shamanic Elements in Prehistoric Funerary Context in South America*, edited by J. E. Staller and E. J. Currie, pp. 1–18. Archaeopress Publishers of British Archaeological Reports. Oxford.
- _____ and Renée M. Bonzani, 2005. *San Jacinto 1: A Historical Ecological Approach to an Archaic Site in Colombia*. University of Alabama Press, Tuscaloosa.
- Parsons, James J., 1952, The Settlement of the Sinu Valley of Colombia. *Geographical Review* 42: 67–86.
- _____ and William A. Bowen, 1966, Ancient ridged fields of the San Jorge River floodplain, Colombia. *Geographical Review* 56 (3): 373–343.
- _____. 1980, Europeanization of the savanna lands of northern South America. In *Human Ecology in Savanna Environments*, edited by David Harris, pp. 267–292. Academic Press, London.
- Plazas, Clemencia and Ana Maria Falchetti, 1990, Manejo hidráulico Zenú. In *Ingenierías Prehispánicas*, edited by Santiago Mora. Fondo Fen Colombia and Instituto Colombiano de Antropología. Bogotá.
- _____, Ana Maria Falchetti, Juanita Sáenz Samper and Sonia Archila, 1993, *La Sociedad Hidráulica Zenú*. Banco de la Republica, Bogotá.
- Reclus, E., 1881, *Voyage à la Sierra-Nevada de Sainte Marthe*. Librairie Hachette & Cie, Paris.
- Reichel-Dolmatoff, Gerardo, 1957, Momil: a Formative sequence from the Sinu Valley, Colombia. *American Antiquity* 22 (3): 226–234.
- _____. 1950, Los Kogi: una tribu de la Sierra Nevada de Santa Marta, Colombia, Tomo I. *Revista del Instituto Etnológico Nacional*, 4.
- _____. 1951a, *Los Kogi: una tribu de la Sierra Nevada de Santa Marta-Colombia*, Tomo II. Editorial Iqueima, Bogotá.
- _____. 1951b, *Datos Histórico-Culturales sobre las Tribus de la Antigua Gobernación de Santa Marta*. Banco de la República, Bogotá.
- _____. 1953, Contactos y cambios culturales en la Sierra Nevada de Santa Marta. *Revista Colombiana de Antropología* 1: 15–122.
- _____. 1954a, Investigaciones arqueológicas en la Sierra Nevada de Santa Marta. Partes 1 y 2. *Revista Colombiana de Antropología* 2: 145–206.
- _____. 1954b, Investigaciones arqueológicas en la Sierra Nevada de Santa Marta. Parte 3, Sitios de contacto español en Pueblito. *Revista Colombiana de Antropología* 3: 139–170.
- _____. 1965, *Colombia*. Thames and Hudson, London.
- _____. 1997, *Arqueología de Colombia*. Segunda Edición. Presidencia de la República de Colombia, Biblioteca Familiar Colombiana, Bogotá.
- _____ and Alicia Dussan de Reichel, 1958, Reconocimiento arqueológico de la hoya del río Sinu. *Revista Colombiana de Antropología* 6: 31–160.
- _____ and Alicia Dussan de Reichel, 1951, Investigaciones arqueológicas en el Departamento del Magdalena, Colombia en 1946–1950. Parte I: Arqueología del Río Ranchería. *Boletín de Arqueología* 3:19–208.
- _____ and Alicia Dussan de Reichel, 1953, Investigaciones arqueológicas en el Departamento del Magdalena, Colombia: 1946–1950. *Divulgaciones Etnológicas* 3 (4): 1–122.
- _____ and Alicia Dussan de Reichel, 1955, Investigaciones arqueológicas en la Sierra Nevada de Santa Marta. Parte 4, Sitios de habitación del Período Tairona II. en Pueblito. *Revista Colombiana de Antropología* 4: 191–245.
- _____ and Alicia Dussan de Reichel, 1956, Momil, Excavaciones el Sinú. *Revista Colombiana de Antropología* 5: 109–334.
- _____ and Alicia Dussan de Reichel, 1991, *Arqueología del Bajo Magdalena. Estudio de la Cerámica de Zambrano*. Biblioteca Banco Popular, Bogotá.
- Rosa, Nicolas de la, 1975, *Floresta de la Santa Iglesia Catedral de la Ciudad y Provincia de Santa Marta*. Biblioteca Banco Popular, Bogotá.

- Serje de la Ossa, M., 1984, Organización urbana en Ciudad Perdida. *Cuadernos de Arquitectura*. Escala No. 9, Bogotá.
- Simons, F. A. A., 1879, Notes on the topography of the Sierra Nevada de Santa Marta. *Proceedings of the Royal Geographical Society* 1: 689-694.
- _____, 1881, On the Sierra Nevada de Santa Marta and its watershed (State of Magdalena, U.S. of Colombia). *Proceedings of the Royal Geographical Society* 3: 705-723.
- Simon, Fray Pedro, 1981, *Noticias Historiales de las Conquistas de Tierra Firme en las Indias Occidentales*. Vol. 5. Biblioteca Banco Popular, Bogotá.
- Smet, P. A. de, 1985, A multidisciplinary overview of intoxicating snuff rituals in the western hemisphere. *Journal of Ethnopharmacology* 13: 3-49.
- Strewe, R. and C. Navarro, 2004, New and noteworthy records of birds from the Sierra Nevada de Santa Marta region, north-eastern Colombia. *Bull. B.O.C.* 124: 38-51.
- Thomson, R., 1894, Report on the Cultivation of Cacao, Bananas and India-Rubber in Districts Surrounding the Sierra Nevada de Santa Marta. Foreign Office, London. Notes from letter by Basil G. Bartley to the author, 13 January 1998. Manuscript on file.
- Todd, W.E. C., and M.A. Carriker, Jr., 1922, *Birds of the Santa Marta Region*. Annals of the Carnegie Museum, 14. Pittsburgh.
- van der Hammen, T., 1984, Datos sobre la Historia de Clima, Vegetación y Glaciación de la Sierra Nevada de Santa Marta. In *La Sierra Nevada de Santa Marta (Colombia): transecto Buritaca - La Cumbre*, Vol. 2, edited by T. van der Hammen and P. Ruiz, pp. 561-573. J. Cramer, Vaduz, Liechtenstein.
- van der Hammen, T. and P. T. Ruiz (eds.), 1984, *La Sierra Nevada de Santa Marta (Colombia): Trancecto Buritaca-la Cumbre*. J. Cramer, Vaduz, Liechtenstein.
- Wynn, J. T., 1975, *Buritaca Ceramic Chronology: A Seriation from the Tairona Area, Colombia*. Ph.D. dissertation. Department of Anthropology, University of Missouri.