Coastal plains climate

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The coastal plains are a lowland, mostly a plain stretching 3,200 km, from Cape Cod, then along the Atlantic Coast, to the west into Mexico.The average increase is less than 200m above sea level More than half of the Coastal Plains is less than 30m above the sea level The area is located many swamps, mostly swamps & marshes. Both are sources of shellfish & many other water lifeflows. Previously, the gradual sinking of the earth allowed the sea to sink lower-range streams that cross delta's plains, a place where the Mississippi River blows into the Gulf of Mexico and creates large areas of fertile land used for agriculture. Climate & temperatures vary across each part of the region In the north are cold, snowy winters, and hot, humid summers To the south is located subtropical weather, with mild to warm winters, as well as hot summers. Although snow is common, the total rainfall in the north is smaller than the south. Florida, for example, has upwards of 200mm of rain in the summer months. The soil is mostly sand, but natural vegetation in the plains has adapted to the sand, especially in some areas where lush jungles have grown. The vegetation was originally made up of mainly pine forests before the sand environment industry was established, which was found in the Coastal Plains, involving the processing, production and marketing of products, especially seafood and wood. Others include tourism & recreation, shipping, paper machinery, commercial fishing and forestry. Pollution is an important environmental issue of coastal plainsNoea is just the release of groundwater (SGD). Groundwater is released to beaches & nearby environments, and degrades the quality of seawater, bottom habitats & coral reefs. D.S.D. Araujo, in the Coastal Plant Communities of Latin America, 1992Astic coastal plains and associated types of vegetation are found along most of the tropical, subtropical and temperate Brazilian coastline. On this coast we find many different geomorphological formations with appropriate different plant communities, which were often classified in phytogeographical literature under the broad category of vegetation restinge. The chapter provides an overview of phytogeographical treatment in which four formations on sandy substrates were recognised in the broad category of resting: (1) beach halophyti, (2) coastal sclerophilic thickness, (3) coastal marsh forests and (4) lagoon hydrophytis. It also addresses the classification of plant communities on the sandy coastal plains of Brazil. Along the tropical Brazilian coast, attempts to classify sand coastal plains species were small and limited to one country or one region.Mr Carleton Ray, in the biodiversity encyclopedia, 2001Classification is essential as a comparative reference system, since otherwise data and information between estuaries cannot be compared. The experiments were different classifications or typoolyes of the estuary, but they are mostly physical; no typology specifically targets biodiversity, although the distribution of estuarine species has been caused by different classification schemes. In my knowledge, the first classification was the so-called Veneer System (Anonymous, 1959), in which estuaries were divided into salty areas. This was later changed by Bulger et al. (1993) on the basis of the tolerance of the saltiness of species. These schemes are quite closely matched and can be compared as follows (Anonymous, 1959 = V; Bulger et al., 1993 = B; PPT = parts per thousand): Limnetic: fresh water, 0,5 ppt (V); freshwater, 4 ppt (B) Oligohalin: 0,5-5 ppt (V); 2-14 ppt (B) Mesohalin: 5-18 ppt (V); 11-18 ppt (B) Polyhaline: 18-30 ppt (V); 16-27 ppt (B) Euhalin: 30 ppt full sea (V); 24-ppt marine (B)Reason for differences in saltiness between Venetian and Bulger and al. is that the former was derived from the saltiness, the latter being analytically derived from the tolerance for the saltiness of the species in which the areas were to overlap. In both cases, however, the compartments are too simplistic, as the estuaries demonstrate a number of characteristics that affect the bio biodiversity distribution and differentiation of estuarine areas, which are variablely defined as upper reaches, upper middle ranges, lower reaches, etc. Similarly, systems derived from saltiness do not distinguish areas according to differences in dna type, water movement, flow rate and other attributes relevant to the biote. The second classification refers to the geomorphology of the basins, which is of obvious importance for the circulation of samples. The classification on this basis occurs in a number of texts and can be summarised as:•the coastal plain of the estuary (drowned river valley): usually confined to areas with a wide coastal plain where seawater has been inhaled in existing rivers due to sea level rise since the Pleistocene ice age. In general, the estuary limit is approximately 0.06% (salinity about 0.1%); above this point it may be part of tidal freshwater.•fjord: In general, the U-shape is in the cross-section in which the sides are steep and have been cut. It can feed on the river, have a deep basin, and shallow policon may be present near the mouth.•Bar built: It occurs in the level, areas where sand is normally deposited in bars which lie parallel to the coast. Usually shallow and mixed with the wind. It can be made up of drowned river valleys and embayments, and occurs when offshore sand barriers are built between coastal areas in a chain to process the body of water. It can feed on several rivers, but the total run-off space is usually not large.•Tectonic: Various categories, including estuaries, are made from faults or folding Earth's crust. They often have an excess freshwater current. The exchange of fresh water and seawater provides another classification. The inlet (mouth) must be of sufficient dimension to allow for the mixing of seawater and fresh water, and the dilution of seawater provides density gradients that guide typical circulation patterns. In the sense of this exchange is the general classification:•salt wedge: Where a layer of relatively fresh water flows on the surface.•partially mixed (moderately stratified): at tidal flow, turbulence, i mixing is increased, thesis that the deletion of the wedge of salt is erased.•vertically homogeneous: Utoku tide is jaci, the outflow of the river is bad, i we strattication is broken. Combinations of this tipoge su possible; this means that it is possible to find a stratified or mixed bar-built estuaries, whether or not a fjord with a salt wedge. In addition, the size of the salty areas can vary considerably for all categories. Such combinations of structure and hydrological process result in a wide variety of conditions in distribution, such as sediment, phytoplankton, submerged aquatic vegetation and fish and invertebrates. In addition, changes in freshwater inputs, circulation, turbulence and mixing can change the typology. The final classification refers to the evolution of estuary, such as Roy (1984) for the New South Wales Estuary, Australia. There are estuaries of three consecutive types: drowned river valleys, barrier esas and salty coastal lakes. It is typical of all that they enter in a relatively short time. This affects their size, configuration, invasion of mangroves and other aquatic vegetation and fish communities. Biodiversity is achieved in intermediate stages, as the density of faunal population and the diversity of species increases with ecological complexity. However, as casting becomes more advanced, the outflow simplifies and biological diversity declines. Therefore, estuarina geology, hydrology and biology form a hierarchical inheritance.W.H. Renwick, in the Encyclopedia of Inland Waters, 2009Ainland plains of northwestern Canada and neighboring Alaska is a unique lake region. This area is one of the extensive permafrost in an environment with a low embossed surface. Parts of this region were glazed during the Pleistocene epoh, but much was not. The Arctic lows are home to dozens of perhaps hundreds of thousands of shallow lakes. Some of these are forearms softened, while others lie on icy sediments or marine sediments from previous high levels in the sea. In the current age of rising temperatures, many lakes form and then dry out by thading permanently frozen soil. When ice-rich sediments begin to desue, they can settle when the water melts and is expelled from the sediments. Areas of shallow standing water form and because in the short warm season this water absorbs and stores more heat than the surrounding vegetation areas, desing and sediment accommodation below is accelerated. This process is called thermocarst, and has to result in the formation of lakes. At the same time, many lakes drain as the deceit and sediment settlement continues. Curtis J. Dell, Jeffrey M. Novak, and Agricultural Greenhouse Gas Management, 2012 Coastal Plain is a coastal plain that stretches from southern New Jersey along the Atlantic coast off the coast of the Gulf of Mexico to southeast Texas (Figure 3.1), and the crop comprises about 15% of the region's total land area (USDA, 2006). The coastal plain is forming with a series of rises and recessions and consequent depression and erosion (Siple, 1967). The landscape is relatively flat and typified by scars and terraces as a result of changes in ocean levels, sediment deposits and dissecting of the river over time. The elevation shall go from height to approximately 150 m (Daniels et al., 1999). Ultizoli are the dominant coastal level of the order of the soil. Stable coastal areas developed old lands that included the eluvial (E) horizon, imbued clay (Daniels et al., 1967a), and the red argyl B horizon (Daniels et al., 1967b). Due to extreme age, heavy rains and humid climates, many Ultisoli have high levels of weather leading to low pH (except lime), high clay weather (Shaw et al., 2004; Novak et al., 2009), low exchange capacity <2 to 4 cmolc kg−1; Kleiss, 1994) and low SOC content (0,2 to 0,8 g kg−1; Hunt et al., 1982; Novak et al., 2009). Coastal plain sandy soils often also have a restrictive subnet hard layer (Mullins, 2000; Chartres et al., 1990), which may limit root penetration (Busscher et al., 2001). Average precipitation is 1000-1500 mm yr−1 (rising north to south) and the highest rainfall in mid-summer in the eastern part and in winter and spring in the west. Average temperatures range from 13 to 20 °C (rising north to south), the average number of days without frost ranges from 200 to 305 (USDA, 2006). Piedmont stretches from the Apalati Mountains to the Coastal Plain, which stretches from Alabama to southeastern Pennsylvania (Figure 3.1). Agricultural land represents 8 % of Southern Piedmont, which is the main land area (MLRA) and 28 % of the Northern Piedmont MLRA (USDA, 2006). Piedmont can be extensively hilly and contain soils that are formation in stable positions where the expression of the soil profile has been limited (e.g. Inceptizoli, Entisoli). In more stable positions, such as on a gently rolling topography, the floor and will show more development of the soil profile (Alfisols and Ultisols). Piedmont's soil is often made of debris or alluvi along streams and rivers (Daniels et al., 1999), leading to textures that vary from fine-clay to hardness. The profile horizons of the Piedmont soil sequence are highly variable. Profiles may consist of kaolinitic, mixed and smectyal clay, but depending on age they are low in base saturation due to estuary from materials of the mother rocks (Daniels et al., 1999). Average rainfall

is 940-1525 mm yr−1 (rising north to south). Average temperatures range from 9 to 18 °C (rising north to south), average days without frosts range from 185 to 275 (USDA, 2006). The Appalam Ridge and Valleys stretch from northern Alabama through central Pennsylvania (Figure 3.1). Parallel ridges of limestone, cottage cougas and sandstone are separated by narrow to moderately wide valleys ranging from almost level to rolled hills. The soils are usually shallow on ridges, but can be deep and productive in larger valleys. The soils in the valley are classified as Inceptisols, Alfisols and Ultisols with timeless or clay textures and drains that usually drain from excessively drained to moderately well drained. The Crocodiles occupy about 15% of the ridge and valley of the landscape. Average rainfall is 800-1300 mm yr−1, with the highest rainfall from late winter to early summer. Average temperatures are 11-17 °C in the southern part and 7-14 °C in the north, while in the south average 205 days without frost and 180 days in the north (USDA, 2006). Much of northern Pennsylvania and New York lie on the ice-based Appalai plateau (Figure 3.1). The soil is formed mainly from the glacier to the outflow (April et al., 1986). The soils, which are formation on semi-stable plateaus, are classified as Inceptisoli or Alfisoli, with ailing texture. These floors range from shallow to moderately deep with a drain that ranges from the well to the very badly drained. The floors in the exhaust areas are classified as Entisols, Inceptisols, or Spodosols, and it may be good to be overly well off, especially if the texture dominates the sand (April et al., 1986). Crops are usually found on wide plateau peaks, which are almost level to moderately oblique and seeded with narrow steep walls. About 17 % of the area of land on the Appalachian Plateau is used for crop production (USDA, 2006). It should be noted that a large amount of rock material on the surface of the file and in the profile of the ice soils makes agricultural production difficult; extremely rocky land remained for forestry production. Average rainfall is 760-1200 mm y−1, with a high proportion of snowfall. The average temperature is 4-10 °C, the average temperature is 165 days frost-free per year (USDA, 2006). The physiographic province of New England (Figure 3.1) comprises the most northerly part of the eastern United States and is part of the Appalachian Highness. More than 80% of New England with less than 4 % of the land used for crop production. The largest part of the arable land is on gently rolled paths and coastal plains. The dominant working soils are Entisoli and Inceptisoli, which are made from the glacier to and the estuary. Average rainfall is 850-1400 mm y−1. The average temperature is 6-12 °C in the southern part of the region and 4-9 °C in the north, With 190 unfrozens given to the south, it slid on a 160-day low in the northern part of the region.R.A.J. Taylor, u Taylor's Power Law, 2019 Elbe's 2019 coastal-plain estuary, which is 140 km (140 miles) from the North must be up to ~ 40 km southeast of Hamburg. It is one of the most polluted rivers in Europe with drains and industrial waste. Holst et al. (1998) conducted a survey of the Rotifer community in the tidal reaches of Elba west of Hamburg. Weekly samples were from March to July 1995 at low tide and 1 and 2 h before and after low tide in shallow abundance ~ 15 km downstream of Hamburg. In addition, 4 samples were also taken at low tide at 8 stations ~ 10 km apart in the main channel between Hamburg and the sea. All samples were 2,25 L of water taken from a top of 1 m and poased to extract the organisms. The rotors in all the samples were counted under a microscope. They examined the subsections and identified all the rotifers. More than 70, mostly freshwater species, were identified, and a single species, Keratella cochlearis, accounted for 32% of individuals. Holst et al.'s Table 1 is a list of 75 charges caught at the site at 11 sampling cases. Their Fig. 2 gives an average density (#/L) estimated from 5 samples clinging to low tides, and Table 1 gives an abundance of fees at each sampling opportunity with code 1-5 as < 1%, 1%-2%, 2%-5%, 5%-10%, or > 10%. Depending on the abundance codes and the average density at the sample date, approximate densities for each taxon-date combination can be calculated. Approximate densities were confirmed against Holst et al.'s Fig. 4 with a total density of 12 most ai billion species. Since samples were taken from the same location but at intervals before and after low tide TPL obtained from this data, hybrid TPLs.In Holst et al.'s Table 1, the dates on which the taxon was not recorded were left blank. If nothing is included in the TPL analysis, the results can have a profound impact. Assets and deviations of mixed species with (Fig. 9.3A) and without (Fig. 9.3B) zero numbers are based on different number of charges: 76 with zeros and 44 without (Appendix 9.C). The zeros not included also distort the end of the low density regression and reduce the correlation coefficient from r = 0,99 to 0,94 and significantly increase the TPL inclination by b = 1,70 ± 0,03 to b = 2,57 ±0,13. The same procedure applied to the TPL community also increases the inclination, but without losing data points or distortions at the low end, since most points above Poisson linijo.Sl. 9.3. Community (NQ = 76, NB = 11) and (NQ = 11, NB = 76) TPL rotors in the elbe estuary are different if zero numbers are included in the analysis. (A) Species found in at least one place are listed as zero numbers instead of missing entries (including zeros). (B) As reported by the authors with zero counts listed as countless (zero excluded). (Data from Tables 1 and Figs. 2 and 4 in Holst and Fig. (1998).) The zero-free effect on TPL has the question of when the absence of an individual from a sample should be considered zero or ignored. The absence of a taxon from a sample may be because it is indeed absent from the site or is present in a density below the pattern detection threshold. Increasing the efficiency of the sampler can be sensitive enough to catch a rare individual, but it will have no effect when sampling outside the target area. Pragmatically, if the taxon is absent from all samples on the spot, it seems reasonable to assume that it is genuinely absent and should not be counted in any sample. However, if it appears in one or more samples, it must be considered as zero in others. To count zeros, the mixed-species assessment is comparable to TPL's time and spatial community on estimates of rotators in Bowles(1974) samples from Lake Eufaula.Christopher R. Burn, and reference module in Earth Systems and Environmental Sciences, 2020Many thaw lakes in the Arctic coastal plains of Canada, Alaska, and Sibiria are longlonged and elonged in a common direction. Some lakes are focused on depressions caused by ice plot (Figs. 3 and 21), but it appears to be largely due to the wind-activated circulation of lake water (Mackay, 1963). In the sandy plains of the western Arctic coasts, lakes are oriented perpendicularly to the prevailing wind direction. This was attributed to the movement of water in two cells from the windy coast to each end of the lake, then to the Lee coast and back across the lake. The current must be the fastest at the ends of the lake due to the integrated flow along the windy coast. By contrast, in the sliils and clays of the Old Crow Flats, the separation is parallel to the prevailing wind. The difference is due to minimal erosion caused by lake currents in sediments that are not generally suspended in lake water but accumulate at the site of the wave, and the significant erosion that occurs when fine sediments can be stopped and removed from the shore of the lake (Roy-Léveillée and Burn, 2016).L.R. Dillenburg, ... M.L. Porto, in the Coastal Plant Communities of Latin America, 1992A the common feature of most sandy coastal grass forests is the reduced size of trees. Adaptation of wood and sheep species to survive on barren soils involves reducing growth rates and potential growth, selection for species and ecotypes with low soil demand nutrients (Grime, 1983). Low water retention capacity, ion adsorption, buffer strength and observed levels of micronutrients are characteristic of sand in general 1976). The forest floor is poor, both total N and available P; a number of species could therefore be excluded. Low pH sandy soil can cause a toxic effect of interchangeable Al and interfere with nutrient availability (e.g. phosphorus). The toxic effect of Al can be estimated by its saturated value at the interchangeable soil particle sites (Al%), which reached 56 % between 30 and 45 cm. Values above 30 % have strong negative effects on plant development and the growth of cerrado vegetation of central Brazil (Goodland and Ferri, 1979). General soil infertility increased slightly with depth as reported for similar soils (Lemos et al., 1973). This can have important implications for root growth dynamics, as the roots will indicate the exploitation of the soil microsite with higher nutrients (Fitter, 1987). Most of the tree roots in a similar forest were concentrated on the surface of the soil (Oliveira, 1975). The common phenomenon of sclerosomorphity and juice in these forests is also associated with soil characteristics. Scleromorphyism of foliage may be the cause of low availability of phosphorus and nitrogen in local soils (Beadle, 1953; Loveless, 1961; Oliveira, 1975). The presence of terrestrial sic in the study area shows that water availability plays an important role in the formation of this type of vegetation. Although the average annual rainfall is 1318 mm/yr quite high, it is lower than in other regions of the country (Machado, 1950). In addition, wind speeds are higher along the coast than elsewhere and may have significant drying effects on tree foliage, especially if they are enriched with salt particles (Kuhlmann, 1956)The interpretation of the distribution of tree diameter represents several limitations (Leakage, 1964; Hett and Loucks, 1971; Johnson and Bell, 1975). However, the distribution of the diameter of the sampled trees indicates an age balance in the coastal ordinary forest and favourable conditions for tree regeneration. This also applies to individuals of S. klotzschiana, despite some gaps in the classes of larger diameter, which may indicate the past removal of mature trees. Homogeneous distribution of diameter C. sylvestris may indicate reduced regeneration under current conditions or rapid growth by the continuous movement of individuals from lower classes to the upper diameter (Knight, 1975). Approximately 33% of E. uniflora individuals had a diameter of between 5 and 10 cm. Top number of trees in class 10 and 15 cm (47 %) indicates a recent decrease in reproductive potential or rapid growth in the early stages, leading to a build-up of individuals in intermediate diameter classes (Knight, 1975). The State of Rio Grande do Sul is part of the biogeographical transition area between the northern tropical and southern cold temperate regions (Cordazzo and Seeliger, 1988). Local species Bumelia obtusifolia, Casearia sylvestris, Eugenia uniflora, Ficus organensis, Guapira opposita, Lithraea brasiliensis, Myrrhinium loranthoides, Ocotea and Rapanea umbellata have been reported tropical forests in the resting coast of Brazil (Ule, 1901; Reitz, 1961; Segadas-Vianna, 1967; Araujo and Henriques, 1984; Pinto et al., 1984). Other typical tropical forests in the resting have a southern distribution boundary north of the study area on the coast of Santa Catarina (Waechter, 1990). Most of the tree species sampled in this study have also been reported in similar forests in the southern coastal region of the country (Porto and Dillenburg, 1986), where vegetation is influenced by cold temperate elements. Sebastiania klotzschiana was the dominant species in the explored sandy coastal plain forest. Similar dominance was described for inland forest areas in Rio Grande do Sul (Baptista and Irgang, 1972; Knob, 1978; Jarenkow and Baptista, 1987). The geographical distribution of S. klotzschiana extends from Minas Gerais (Brazil) to Uruguay, Argentina and Paraguay. It is usually a pioneering species (Rambo, 1951, 1958), preferring moist places, but it is rare in dense, seized forest stands such as rainforests along the Atlantic coastal mountains (Mata Atlantica) (Rambo, 1960; Alvarez Filho, 1977; Reitz et al., 1963). Information on autoecology, reproductive biology and the competitive abilities of S. klotzschiane still have no explanation of the dominance of this species in several forests. Casearia sylvestris and Eugenia uniflora are common ingredients on well-lit open stands such as gallery and island forests, or appear on the edge of denser rainforest. C. sylvestris is a pioneering tree, but unlike S. klotzschiana, it is very important on dry, poor soil (Rambo, 1958; Reitz et al., 1963; Klein and Sleumer, 1984). Eugenia uniflora is often associated with the moisture of the city (Legrand and Klein, 1969; Reitz et al., 1963). Most of the other sampled species are rare or not from neighbouring rainforests (Mata Atlantica), except guapira opposites typical of coastal rainforests (Veloso and Klein, 1963), which were represented by only one individual in this study. The diversity of species (H = 1,98) of the tree component in the sandy coastal plain forest was low compared to the Araukar forest (H = 2,93) in the state of Rio Grande do Sul (Jarenkow and Baptista, 1987), tropical suspicion (H = 3,6) u state of São Paulo, Brazil, (Martins, 1979), i well-drained sums stand (H = 4,3) u amazoniji (Pires et al. , 1953). The low diversity found on the forest stand studied may be related to the interaction of latitudinal, edafo-climatic, temporal and historical factors. The increase in latitude greatly reduces the diversity of species (Buzas, 1972) and limits the distribution of arboreal vegetation. Tropical components gradually disappear and move south from St. Catarina state to Rio Grande do Sul State (Waechter, 1990). In addition, forest chaos in Rio Grande do Sul is increasingly being restricted in number and size in the southern part of the country. soil conditions and dry coastal winds further limit the number of tolerant tree species as observed elsewhere (Rodrigues, 1961; Anderson et al., 1975; Prance, 1989). Finally, of all species sampled or observed in this forest, none is limited to this physiographic region; most have a wide distribution throughout the country of Rio Grande do Sul. After Rambo (1954), the geologically young substrate of the coastal plain colonized the pre-arrival species of older continental substrates. Therefore, the recent geological history of the coastal sandy plain may have limited the successful colonization of many tree species. Poorly developed forests on well-drained sand plains off the northern coast of The Rio Grande do Sul are likely to form edaf formations (Klein, 1961), as they are strongly at odds with the pluvial cutting-edge forests on the slopes of coastal mountains in similar climatic conditions. A significant invasion of species from mature pluvial forests was only observed on forest stands on moist plains, where the runoff is neither too high (e.g. sand forests) nor too low (e.g. There is some discussion as to whether forests on the sandy coastal plains represent successive phases of mature pluvial forest, as proposed by Velos and Klein (1963), or only represent edaf formations limited in their development due to the specificities of the substrate. Long-term follow-up studies or careful comparison between places of different ages but similar topographic and edafical conditions are needed to answer these questions. T. Ichihara, in Tsunamiites, 2008Phra Thong Island and Khao Lak have flat coastal plains bordered by flat beaches. Phra Thong Island (Figure 8.2A) is about 100 km north of Phuket Island. The western side of the island is flat and mainly covered with grass, with small sandy ridges near the coast. The tsunami has poured this part of the island. We conducted a survey along the transecte parallel with the outing of the tsunami direction. Figure 8.2. Areas eaten by a tsunami (modified from the Department of Environmental Geology, 2005) and points of research. (A) Phra Thong Island; (B) Khao Lak. Copyright © 2005 The Khao Lak study area ranges 13 km from Khao Lak to Cape Pakarang (Figure 8.2B). It is a 2 km wide coastal plain, vegetation with coconut trees. The tsunami has enraged the coast and spilled most of the plains. We examined three transectees perpendicular to the shore. U.A. Naher, and Advances and Agronomy, 2014Acid sulfate soils appear sporadically in coastal planes of countries around the world. The soil is characterized by low pH and the presence of sulfur horizons, too many sulphide materials, mostly pyrite (FeS2). This pyrite is immediately oxidised when the soil is oded to make way for development (e.g. agriculture). During the process of oxidation of the pyrite, a straw-yellow mineral called jarosit is formed and finally acidity and toxic aluminium are released into the environment, which affects crop growth. This chapter reviews studies carried out in South-East Asia on soil management for sustainable crop production. Some of the soils are used for growing rice, oil palms and cocoa with mixed success due to their particularly low fertility, and Al and/or Fe toxicity. Lemon, basalt or organic fertiliser may be used to relieve soil infertility. The use of cotton wool or basalt increases soil pH, resulting in precipitation of al hydroxide inert. Oil palm can be successfully grown on acidic sulphate soils if an appropriate water management practice is implemented. The effluents in the oil palm plantation must be designed in such a way that excess water is removed from the area while maintaining the level of the water table above the pyritic layer. Cocoa grows poorly on acidic sulphate soil due to low pH and Al toxicity. However, with appropriate limestone using minced magnesium limestone and organic matter, soils can be productively used for cocoa production. In general, acidic soil sulphate can be productive for rice, oil palm or cocoa cultivation by increasing the pH of the soil with cast or basalt, the use of organic substances or the adoption of appropriate water management practices.G. MILTON WARD, ... AMELIA K. WARD, in the rivers of North America, 2005 The basin of the River Suwannee lies within the physiographic landscape of the Coastal Plains (CP), an area with relatively little relief. The upper reaches of the suwannee drainage lie in the Tyton sinks and the Okefenokee pool of physiographic units. The Tyton sink is a low-terrain plane with uplands lying 15 to 60 m above relatively narrow valleys. The Okefenokee basin is characterised by very low relief, numerous and extensive marshes and local sandy ridges. The sediments of the upper basin of the River Suwannee are of marine origin and characteristic of coastal plains. They are very permeated and poorly consolidated, dominated by sand, clay and gravel until the Holocene age (Department of Environmental Protection 2002). Soil types in the Suwannee river basin vary according to the lifting and pedestal of geology. The soil in the Alapahe river basin is well-healed, with loamy-sand surface soils and a sudden sub-zel, with those in Withlacoochee being less well-off (sandy soils where a layer of aluminium and organic matter has accumulated due to poor ottering). Further east in the Okefenokee Swamp, the soil is very organic, extremely acidic and saturated or covered with water for much of the year. The hydrological and biological characteristics of the Suwannee River are intimately bound by the physiology and geology of the region. What is now the panhandle and peninsula of Florida is a necessary part of a larger geological feature called the Florida Plateau, which consists of sand, clay and limestone strates up to a depth of a kilometre or more (Rosenau et al. 1977). Upper Limestone and dolomite deposits contain extensive aquifer covering all of Florida, as well as parts of southeastern Alabama, southern Georgia and southwestern South Carolina. In Florida, it's known as the Florida aquifer. Basically an Artesian aquifer, the Florida aquifer contains large amounts of channels of solution, cavity and sink through which surface water exits and enters the system. Impassable surface deposits stem a large part of Florida's aquifers, but in suwannee and nearby pools, these deposits are blown out to expose a large number of springs originating from the aquifer base. The Suwannea basin lies entirely within the earthly ecological region of the southeastern Itiff forests. In Georgia, the basin is vast with the well-known long-term pine forests of southeast Alabama and southwestern Georgia. However, there is little left of native stands, and there are now many species of pine and mixed oak and pine forests in the region. Most of the original conifers and hardwood were replaced by commercial forests, mostly converted into commercial pine species. In the upper Suwannee basin in Georgia, 62% of forest land is in commercial forest (Department of Environmental Protection 2002). In Florida, upper Suwannee was historically dominated by flat slabs of north Florida, hanging hardwood hanging plates, pine-turkey oak hills and swamp hardwood (SRWMD 2001). The middle suwannee regions contained long-form pine-turkey oak, mixed hardwood and pine, hanging hardwood hanging panels and swampy hardwood. The climate in the Suwannee river basin is characterised by hot summers, mild winters and heavy rainfall. The air temperature patterns for the Suwannee river basin are similar to those in other eastern bays. The annual temperature for the pool is 20,2 °C and moves from 18,3 °C in the upper parts of the basin to 22,2 °C in the south. The typical daily air temperature for the most contaus months, July to August, is 27 °C and for the coolest month, January is 11 °C (see Fig. 4.21). The medium-annual rainfall (134 cm) is similar to other eastern Gulf pools, moving from 114 inches/year in Georgia to 142 inches/year in Florida. Precipitation occurs as precipitation and the basins are relatively evenly distributed throughout the year, although it may be slightly drier from mid to late autumn (see Fig. 4.21). Interestingly, near the Gulf Coast (Wilcox, Florida), many conveccial storms form a pattern in summer, with maximum rainfall from June to August. FIGURE 4.21. Monthly air temperature, precipitation and runoff for the Suwannee River basin. The eastern waters of the Suwannee Basin are protected within the Okefenokee Wildlife Refuge. South of the refuge are vast swamps, little agriculture and little urbanization. In the western waters, the rivers Withlacoochee and Alapaha, agriculture is much more abundant, many are small towns. Some sub-parties are up to 80% agriculture. Although has little impact on many major ripar areas, smaller tributaries have had quite riparian vegetation removed. A large part of the Suwannee basin remains forested (38%), although a significant share in managed pine plantations (G.M. Ward, unpublished data). Of the rest, 30% were in agriculture, 22% were in the area, < 1% urban or suburban. The main population centers are Lake City, Florida and Valdosta, Georgia. Georgia.