Settlement Patterns in Terminal Postclassic Yucatan

How geo-hydrology affected the distribution of population in the Yucatan peninsula at the beginning of the XVI century: a topographical insight

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Terminal Postclassic Yucatan was well populated and presented many towns located in different environmental situations and contexts. With the help of an ethnohistorical reading of colonial documents and of a geo-hydrological analysis linked to the use of a database and a GIS, this paper wants to offer a vision of the geographical aspects that influenced the settlement pattern. 1.000.000 scale geographic shapefiles have been confronted with XVI century colonial data to have a full framework of the situation and reconstruct the topography of Yucatan just before the Conquest.

Keywords: Yucatan, Topography, Settlement, Terminal Postclassic, Geography, Geohydrology

Introduction

With this paper, I want to propose a study that focuses on settlement modes in Terminal Postclassic Yucatan, trying to deepen the fundamental geographical aspects that influenced it. Geology, hydrology, morphology and pedology have a great impact on settlement patterns and affect deeply the choice of the places to live. The presence of drinking water, building material, a defendable location, rich and fertile soils, and easy link to important communication roads are just some of the elements to be taken into account when analysing the position of an archaeological site. Yucatan geography, in this case, can seem homogeneous, but it hides many different contexts and environments that need to be analysed singularly to fully understand Terminal Postclassic topography in this region.

Methodological Premise

For this research it has been used the methodology of the Roman school of Topography, applying it to the Mesoamerican field. I have chosen the Yucatan region, as it was thought by the Spaniards during the Conquest: the area that goes from the Laguna de los Términos to the Chetumal region. So, the Acalan region has not been considered because of its distinct historical development. My goal was to understand the geographic criteria that influenced Maya settlement in Terminal Postclassic.

The focus is on the last decades of Terminal Postclassic, but I dealt also with diverse colonial lists and reports (first of all the 1549 Tax list; RHGY voll. I and II; DHY II: 55-65), giving them an ethnohistorical reading. Especially the pre-1552 papers have been of particular interest, being nearer to the pre-Hispanic settlement situation, chronologically.

Recent paleolimnological works have analysed climate variations in this region through millennia. Sediments analyses from some Yucatecan lakes[1] demonstrated that vegetation and weather remained rather similar, and are comparable to present, except for few drier periods (Brenner 2002: 145, 151; Kennet et al. 2012: 789, 791; Curtis-Hodell 1996: 45-46; Hodell et al. 2001: 1367-1370; Allen-Ricón 2003), so it has been possible to base the geo-hydrological study also on

1 Such as lake Chichancanab, Lake Cobá, Lake San Jose Chulchaca, Punta Laguna.

contemporary geographic studies and bibliography (for ex. Duch 1988, 1991; Miranda 1959).

To achieve my goal, I gathered data coming from XVI century colonial sources regarding geographical aspects, urban settings, distances or the road system and that gave information also on the Terminal Postclassic phase. I put them in a database, so that the data could be ordered and easily updated during the entire research time. Then I performed a GIS. I used an ITRF92, INEGI pedological map at 1:1000000 scale[2] and I superimposed it with a point shapefile, where I represented the Yucatecan towns that were attested by the colonial documents. To be sure of the locations, I used satellite imagery, and matched it with actual toponymic information and updated bibliography[3]. Finally, I analysed jointly all the data, to get answers on both geography, topography and urbanism, and to create a schema based on the geo-hydrological aspects that influenced settlement in Terminal Postclassic.

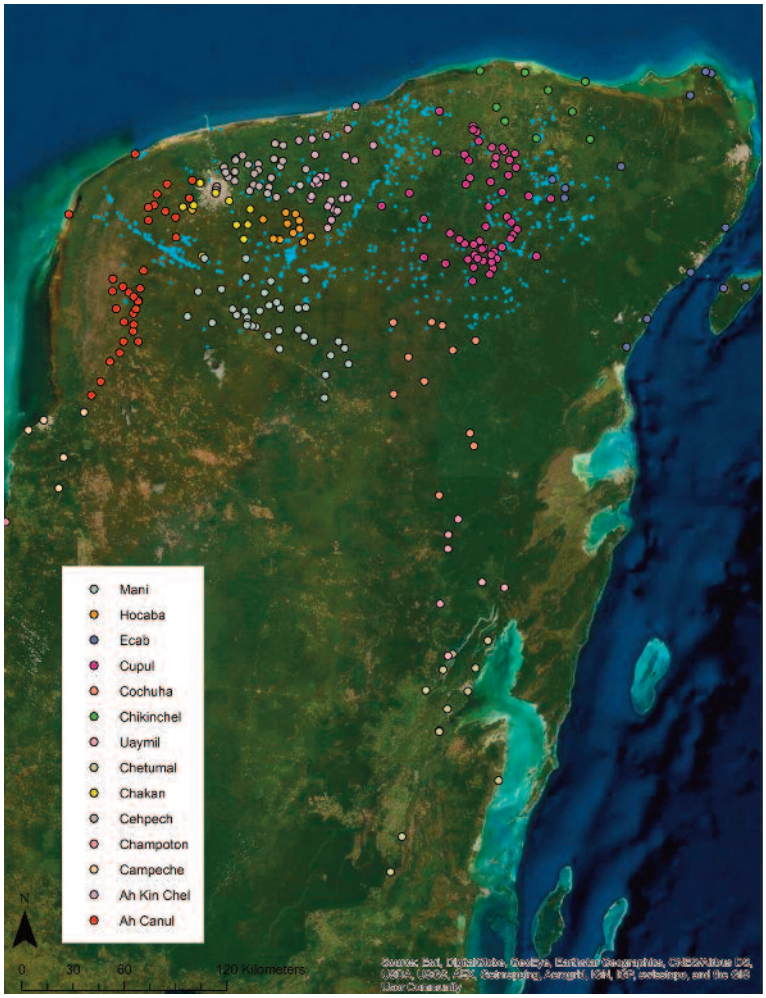

Figure 1 Distribution of attested Terminal Postclassic settlements with cenotes. Editing by the author.

Yucatan Geography

The Yucatan peninsula is a flat, calcareous region, with uplands not higher than 400 m (Miranda 1959: 164) and thin soils, generally not deeper than 1-10 cm.

The weather can be divided in two seasons: the wet one, from June to October, and the dry one, from October to June. The rainfalls originate from the blowing of winds from east, so the eastern areas are the most humid, 1200-1100 mm/yr, while the western ones are the driest (the zone around Progreso only receives 550 mm/yr) (Charvet 2009: 9; Giddings, Soto 2003: 79-81; Duch 1991: 26; Miranda 1959: 168). The rain rate has important repercussions also in pedology, in fact the runoff water drags the soil down, from the highest lands to the lowest. Because of this, lithosoils dominate in the highest parts of the entire region. On the contrary, differences can be seen in the plains, depending on the precipitation rate. The plains in the north-western, drier areas are characterised mostly by thin rendzina soil; in the more humid southern and eastern zones, rendzina is flanked by deeper, richer cambisoils, nitosoils and luvisoils (Duch 1988: 299, 306, 317-318). Moreover, the eastern zone is scattered by *rejolladas* – dry sinkholes that act as collectors of rain and soil. They have humid, well drained and incredibly rich soils, up to 2 m deep. Only in the *rejolladas* cacao growing was possible, in pre-hispanic Yucatan (Kepecs 1996: 70; RHGY I:76; II:42; Andrews 2014: 382).

Regarding hydrology, the peninsula of Yucatan is made of a very porous limestone, and it is affected by karst. Because of this porosity, no bodies of water can exist above ground. The rainwater falls and percolates directly into the aquifer. Doing so, it creates a freshwater lens floating on the saltwater, penetrating directly from the sea into the aquifer (Charvet 2009: 29; Perry et al. 2003: 121-123). So most of the freshwater used in antiquity came from the aquifer, and it was reached through sinkholes and artificial wells. Anyway, the aquifer wasn't reachable everywhere: while in the northern areas it runs only few meters deep and its access is quite easy, in the south it gets deeper, and in the Puuc region it reaches a depth of 100 m. Through time, in areas where aquifer was not reachable, ancient inhabitants

2 http://www.inegi.org.mx/geo/contenidos/recnat/geologia/infoescala.aspx.
3 In particular, the works by R. Roys, A. Andrews and S. Quezada.

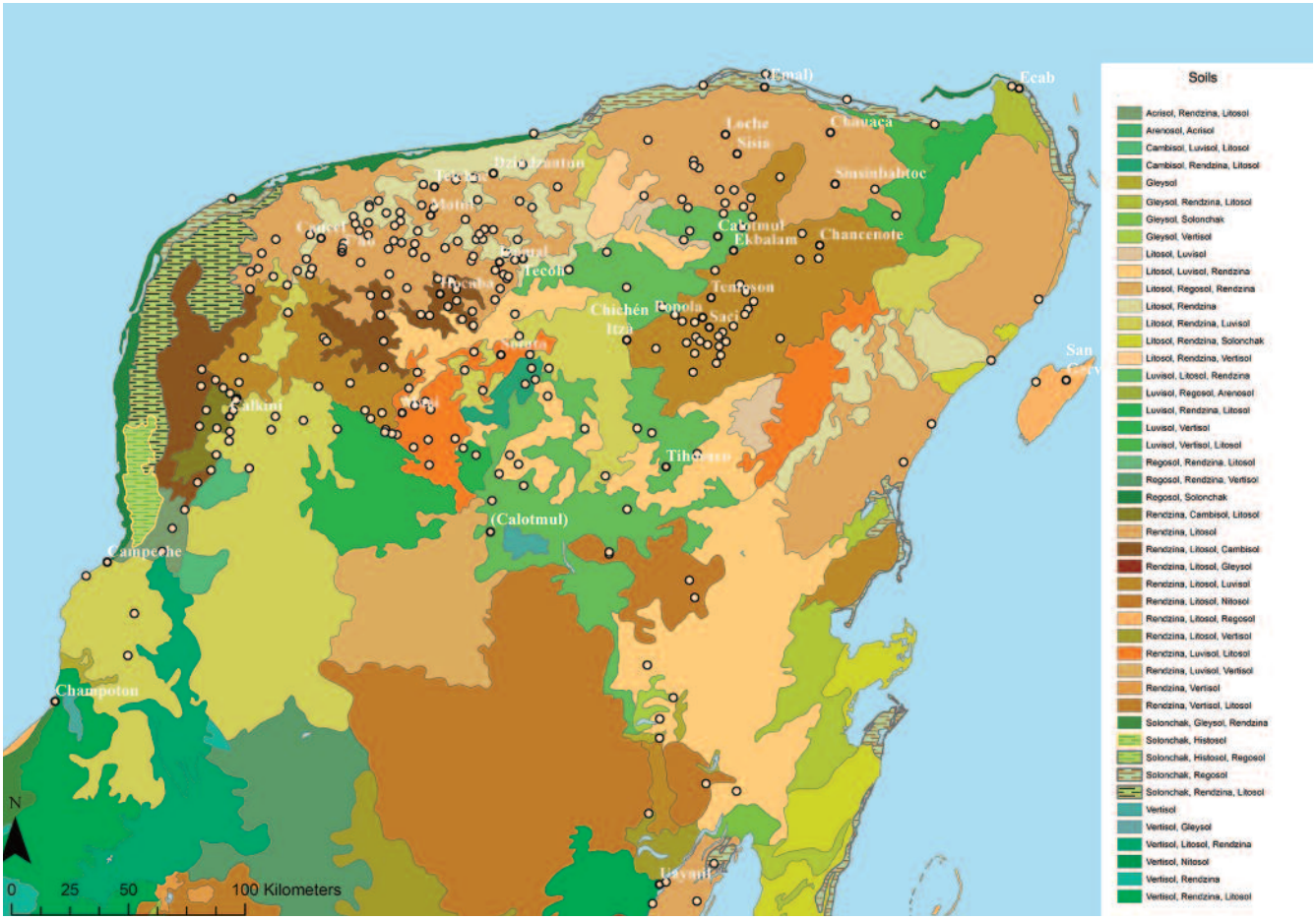

Figure 2 Distribution of soils and settlements in the Yucatan peninsula in Terminal Postclassic. Elaboration by the author.

solved the problem using natural *aguadas* and artificial tanks (Brenner et al. 2003: 64; Perry et al. 2003: 120).

Settlement Pattern in Terminal Postclassic Yucatan

In Terminal Postclassic, Yucatan was well populated. It was politically divided into a series of *cuúchcabaloob*, regional independent political entities guided by an *halach uinic* (Quezada 2014). Each of these regional potentates controlled people living in different towns, hamlets and other smaller entities. Normally, in Yucatan, there are not distinct and visible limits between urban and rural spaces, and the two merge between each other: the percentage of buildings and dwellings gradually decreases while moving away from the main centres into the farming lands, but it never ceases. In fact, usually Maya farmers lived next to their *milpas*, creating a very scattered settlement pattern. Still, centripetal forces existed and brought to the formation of towns and urban centres (Farriss 1992: 127). The two forces – the centripetal and the centrifugal ones – coexisted through time.

Colonial sources and cartographies report the presence of a series of towns that might have been more or less important on a political, administrative or economic point of view. Each *cuúchcabal* had a capital and it was organized into a series of secondary centres, where the *holpopob* or the *batabob* (secondary officials) lived and recollected tributes coming from other towns, hamlets and scattered dwellings. The major quantity of data comes from early colonial sources and it is referred only to towns, so this paper will focus specifically on Terminal Postclassic towns that lived also after the Conquest.

Discussion

The apparent homogeneity in Yucatan geography hides several different habitats, with specific characteristics, that influenced the distribution of settlements. The image that resulted from the GIS analysis clearly shows an irregular pattern, with more-or-less densely inhabited lands (Figure 1). The answer is historical but also environmental (Carosi 2016). Here I would like to analyze the most evident features.

All the northern band near the coast was uninhabited: in fact, all along the coast there was and there still is a swampy environment of swamps and marshlands.

It was flooded throughout the year. For its excessive salinity and drainage problems, this area was not attractive for settling. Nevertheless, the area was exploited: its brackish environment was perfect for saltworks, so this entire northern belt was used for collecting salt since very early times. The area around Rio Lagartos had the most productive saltworks of all Yucatan Peninsula, but saltworks were installed all along the northern coast (Andrews 2002; Roys 1957: 103-104).

Further south, settlements were distributed in two sections, one west and one east, divided by a strip of land, mostly constituted by lithosoils between Dzonotcahuic, Dzonot, Espita and Sucila (Figure 1-2).

The area between Hunucmá-Maxcanú and Dzilam Bravo-Temax, and the area between Yalsiho, Tahcab, Sinsimato and Rio Lagartos were highly populated. In both these northern populated zones, soils are generally thin, and lithosoils alternate to rendzina, while the aquifer is easily reachable – about 5/10 m deep. All the area abounds in *cenotes* and *aguadas (*Duch 1991: 148-149, Duch 1988: 94-95, 282). The relative proximity to the coast permitted to exploit sea products, such as salt and fish. Moreover, the inhabitants could insert themselves in the trading route coming from the area of Veracruz and going to Honduras. The analysis of colonial sources showed that, in all the areas near the coast, economy was based mostly on trade, fishing and salt collection, while agriculture had a minor impact.

Further south, in the west sector there is an almost triangular area left unpopulated. It is bordered on the west by the Bolonchén district hills, and on the east by Puuc hills. Being between two hilly areas, the sediments have accumulated in this zone through rains, and the soils are the deepest and richest in the entire peninsula: they are luvisoils, deeper than 1 m (Duch 1991: 190) and nitosoils (Bitacora). However, for the same reason, the aquifer flows very deep, between 90 and 110 m (Duch 1988: 289-290), and it was inaccessible for the technology of that age. Because of that, during the Terminal Postclassic, this area was not inhabited. Settlements lied instead on the west of Bolonchén district and on the east of the Ticul hills: here too, for the same reasons, the soils were deep and rich and water was still reachable[4]. Here it passed two of the most important routes in the peninsula: the route that connected Campech with Jó and the one linking Jó to Maní. Moreover, there are testimonies attesting that the fertile soils inside the triangular area were cultivated by Maya farmers that lived outside the area nearby, and moved regularly from their houses to that lands to farm them (Ciudad Real 1976: 362; Roys 1957: 61).

The eastern zone between Temoson, Tinum, Kaua, Tixcacalcupul and Chemax was highly populated too. The aquifer there flows 30 m deep and was still reachable. The wavy ground surface is characterized by a succession of lithosoils and rendzina in the highest zones, cambisoils and luvisoils in the lowest. Luvisoils were up to 80 cm deep, here. Somewhere, luvisoils could have hydro-morphism problems, and turn into vertisoils or gleysoils (Duch 1991: 174-176; INEGI *Suelos;* Duch 1988: 98-100).

It is more difficult to say something about settlement in the most eastern Yucatecan area because of historical problems and lack of sources. In fact, all the existing documents and city lists come from the colonial time, in particular they are all successive to 1546. These regions were the place of the ferocious punitive expedition following the great Maya revolt, that left the entire area almost unpopulated (Chamberlain 1948: 223-227). So we cannot have a real idea of the settlement pattern in this zone. All we know is what comes from the reports made by the first conquistadores: that is, it was a highly populated and rich region. The few cities of which we have attestation were all located along the coast. So surely the area was devoted to trade. But we have no data about the situation in the inland. It can't be excluded that it was populated too.

Conclusions

Geography and geo-hydrology are essential to understand deeply the reasons that brought a population to settle in a certain way. In the case of Terminal Postclassic Yucatan, population was quite well distributed in the peninsular territory, yet, some areas were left almost depopulated because of their lack of good environmental characteristics. For example, the northern, marshy bend near the coast or the Puuc area for the difficulty of getting access to drinking water.

This analysis has shown clearly that the most important geographic aspects that were taken into consideration for settlement in this period were the availability of water or, at least, the easy access to the aquifer, and the presence of fertile soils.

4 For example, Mani had two wells in 1588. Ciudad Real 1976 p. 367.

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