

A GIS-based Approach to Tracing the Spatio-temporal Formation of Towns in the Philippines during the Spanish Colonial Period

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Abstract: Beyond dates, significant events, and personalities, there is an apparent lack of research in the general historical geography of the Philippines that seeks to situate events of the past, both important and relatively mundane, in relation its physical and human environment. With that probably also comes a lack of higher spatial understanding of how these specific geographies have influenced the evolution of settlements, economies, cultures, governance and other factors that matter in the concept of nation and state in the country. Picking up on the work of Dumol (2013) that sought to establish and quantitatively analyze the foundation dates of existing Spanish-era parishes as proxy indicators for the establishment of towns, the author attempts to expand on it with the use of Geographic Information Systems. Thus, this paper allows us to see a visual chronology of town-formation and seeks to trace the spatio-temporal patterns in the evolution of the Philippines under the Spanish colonial regime.

Keywords: Parishes, town-formation, Spanish colonial period, GIS, heat mapping, time animation

1. Introduction

History, as typically taught to and thought of by the public, has always been about past events, personalities, dates, and their impact on society. In parallel, the role of geography in history has mostly been simply the setting of significant events. What seem to be lacking are inquiries into the development of places as part of the whole story of nation formation, where each place is located and how each one relates to other places or the physical and human elements present or absent in space. Thus, it would be interesting to see a narration, not of events, but of the Philippines' town formation signifying the start of urbanization and ultimately, the Philippines as we know it today and situating it within the context of spatiality.

In 2013, Dr. Paul Dumol of the University of Asia and the Pacific, associated the foundation dates of Spanish colonial period parishes with the formation of towns in the Philippines. Based on a handbook for confessors coming from the Synod of Manila of 1582, he was able to establish that Christianization by the Spaniards, aside from spreading the Gospel, was also meant to establish civic life in the Philippines (Dumol, 2013). Thus, using the foundation dates of Catholic parishes in the Philippines he looked at the numbers

Dumol approached the topic by looking into the number of parishes per province and per century of Spanish rule in the Philippines and related the numbers to events and periods in Philippine history. However, in a conversation between the author and Dr. Dumol, the latter lamented the fact that he was limited by the tools that he has at his disposal and posed the challenge to the author to see the same data from a spatial perspective. Thus, armed with his data, this paper came into fruition.

2. Objectives

This paper describes the spatio-temporal characteristics of town-formation in the Philippines under the Spanish colonial rule. It

tries explore the data using heat mapping and time animation as well as basic visual observations and correlations on a GIS environment aided by descriptive statistical summaries. The data for this paper comes from Dr. Dumol himself which was compiled from the coffee table book entitled *La Casa de Dios* written by Rene Javellana. This contained a list of parishes founded during the Spanish-era, their locations, and foundation years.

3. Methodology

The author obtained and reviewed the list of parishes compiled by Dr. Dumol. This list was then standardized on MS Excel confirming records and completing missing and vague locations and foundation years using various sources but mainly the Javellana book and the Catholic Bishops' Conference of the Philippines' (CBCP) directory of parishes. Parishes which could not be located or dated were omitted from the dataset.

Each parish was then given map coordinates enabling them to be plotted on ArcMap 2.2. Ideally, each parish would have been given coordinates corresponding to the actual church locations but 828 parishes pose quite a challenging task. Thus, the coordinates were based mainly on the geometric centers of their respective municipalities and/or barangays.

The dataset was then explored using two GIS-based tools – heat mapping and time animation supported by statistical summaries. Heat maps generated through kernel density estimation were then produced for each 50-year period starting from 1550 up until 1899 deviating from Dumol's 100-year interval analysis in the hope of discovering more spatio-temporal patterns in the data.

Time animation supported by examining the data histogram was used to see visual chronology of parish establishments throughout the Philippines. This provides the first look into where parishes were being established on a yearly basis from 1550 to 1899.

4. Discussion

4.1 General patterns of distribution

Upon initial plotting of the parishes, it can be seen that they cover most of the Philippines from the Batanes Islands down to the northern and eastern portions of Mindanao with significant clusters around Manila, the western coast of northern Luzon, the Bicol peninsula, and western and central Visayas. They were noticeably absent in the central and southern portions of Mindanao, the Cordilleras, and the northern Sierra Madre mountains (see Fig. 1).

Note that this does not imply no settlements or semblances of towns in the archipelago prior to the arrival of the Spanish Catholic missionaries. In fact the first Sultan of Sulu, Sharif ul-Hashim, was known to have exercised dominion over a significant portion of Mindanao as early as 1405 (Majul, 1973).

Furthermore, the spread of parishes in the Philippines reflect the overall extent of influence that the Spaniards had on the archipelago. This somehow supports the claim that Mindanao or majority of it should not have been part of the Treaty of Paris between the United States of America and Spain.

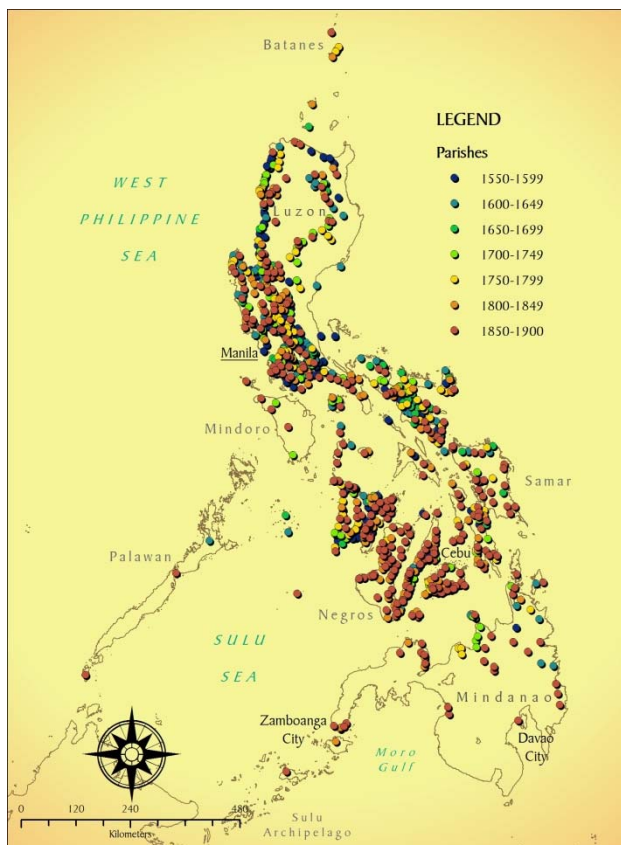


Fig. 1. Distribution of all parishes from the Spanish colonial period (1565-1899)

Overlaying this distribution with terrain, parish locations correspond mainly with the flat areas of the archipelago (see Fig 2).

Interestingly, the absence of parishes in highlands reflect the “duty” assigned to *encomenderos* by the Synod of Manila, as Dumol mentioned, to “gather natives living ‘isolated in the mountains and grasslands’ into towns (Dumol, 2013). Meaning, natives of the islands were to be convinced to go down from the mountains and converge into central locations.



Fig. 2. Parish correspondence to lowlands

To better see and understand the distribution patterns of the parishes, considering significant crowding in certain areas, heat maps were generated.

A heat map of all parishes founded from 1565 to 1899 (see Fig. 3) shows that town formation is the most intense within and around Manila stretching north to the provinces of Bulacan and Pampanga and south towards Cavite, Rizal, and Laguna. Other high-density areas, signified by the relatively darker shades of brown, are Pangasinan further up north as well as the Bicol peninsula and Iloilo down south. Minor growth centers can be found within the western Visayas region, Leyte, and Zamboanga City. These areas can be considered as highly populated areas where the church will establish new parishes to accommodate the growing population. Indeed, even in present times, most of these high parish concentrations match the population distribution in the Philippines (see Fig 4).

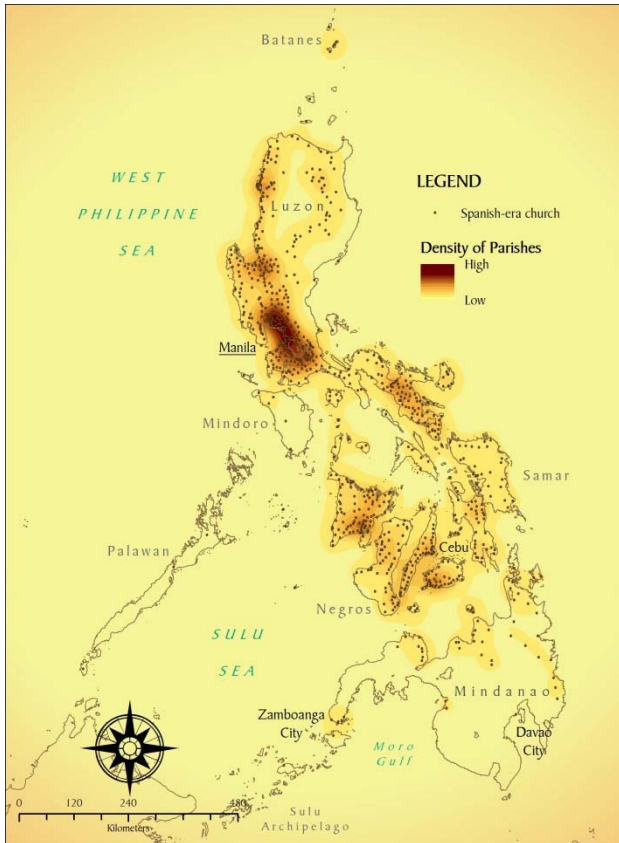


Fig. 3. Density of parishes (all parishes from 1565-1899)

Animating town formations using parish foundation years showed some lulls in the sequence of events but did not allow an intimate look into the temporal patterns of the data. A histogram of the same data reveals significant highs and lows (see Fig. 5). Instead of a constant increase that one might expect, there are two significant drops in foundation activities and three noticeable peaks: during the early part of Spanish colonial rule, in the middle, and in their last century. Dumol, observing the same, found the first dip unusual since “this period coincides with Schumacher’s Golden Age of Christianity in the Philippines.”

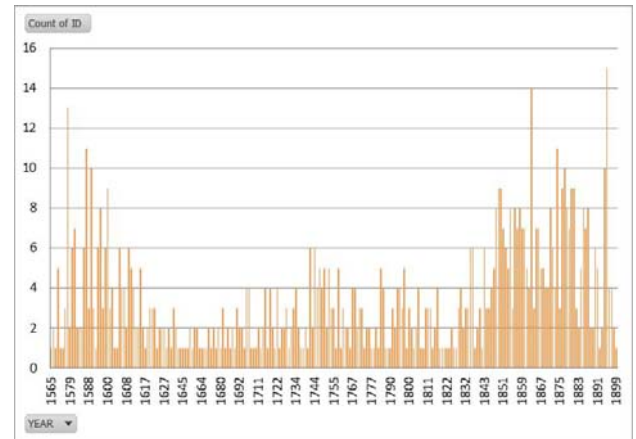


Fig. 5. Parishes founded per year (1565-1899)

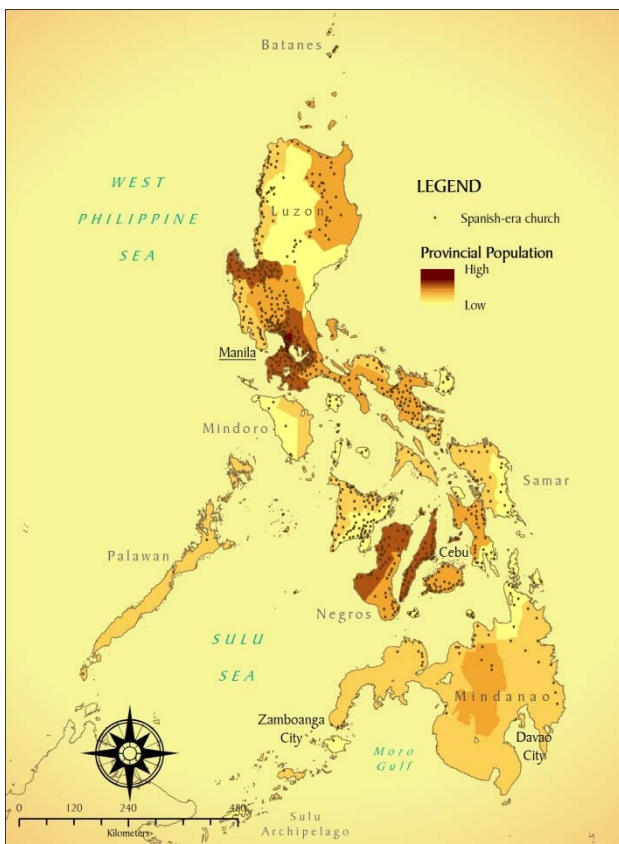


Fig. 4. Provincial Population (Philippine Statistical Authority, 2010)

4.2 1565-1599

The first parish appearing on Javellana’s list is in Cebu in 1565 (Javellana, 2010). They then appeared in Luzon and the Visayas a few years later. In these first few years, virtually half a century, town formation centered around the Tagalog region which includes the *Provincia de Manila* as well as the surrounding provinces of Bulacan, Rizal (Morong), Laguna, Quezon (Tayabas), Batangas, and Cavite. Smaller, but nevertheless significant concentrations came about along the western coast of Luzon (Ilocos provinces), the Bicol peninsula, and Panay Island (see Fig. 6).

The northernmost towns of this period were along the coast of Cagayan Province. Butuan in Agusan del Norte became Mindanao’s first Christian town in 1596, incidentally also the southernmost.

The five-year period of 1586-1590 saw a spike in foundations of parishes with 30 (see Fig. 7) spread out from Ilocos Norte following a north-south orientation to Pangasinan. In contrast, the main center of activity, the Tagalog region, boasting of 36 parishes clustered around Manila developed constantly over a longer period of time from 1572 up until 1599.

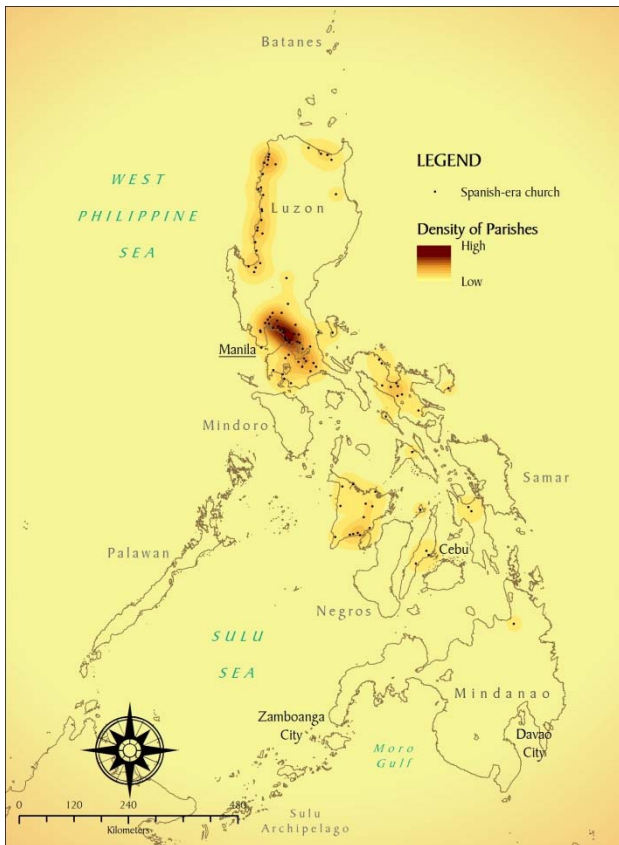


Fig. 6. Density of parishes (1565-1599)

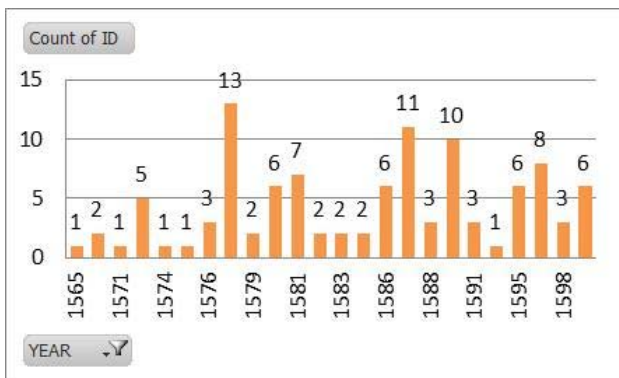


Fig. 7. Parishes founded per year (1565-1599)

4.3 1600-1649

This period marks a generally declining trend in the establishment of new towns from a high of nine in 1600 to a low of one in 1649 (see Fig. 8). However, Manila and its surroundings steadily increased during period as well as the Bicol Region and the province of Pangasinan. (see Fig. 9). Two provinces, Laguna and Pangasinan, gained the most during this period with 9 parishes each.

Of note is the expansion of parishes in Mindanao via Surigao which took around a quarter of a century to happen with the establishment of the parish in Tandag in 1622 as well as that of the extension into the Cagayan Valley. While the Cagayan Valley is accessible from Manila via Nueva Ecija, it appears, based on time animation, that the expansion started along the

mouth of the Cagayan River, then along the northern coast, and finally south into the valley.

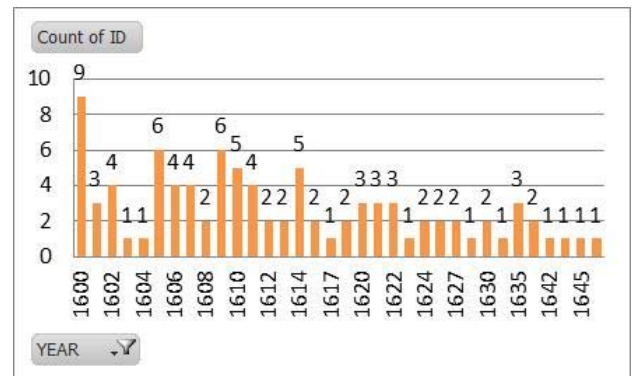


Fig. 8. Parishes founded per year (1600-1649)

Also noticeable is the first parish established in the province of Palawan in Taytay and in Cuyo both in 1622.

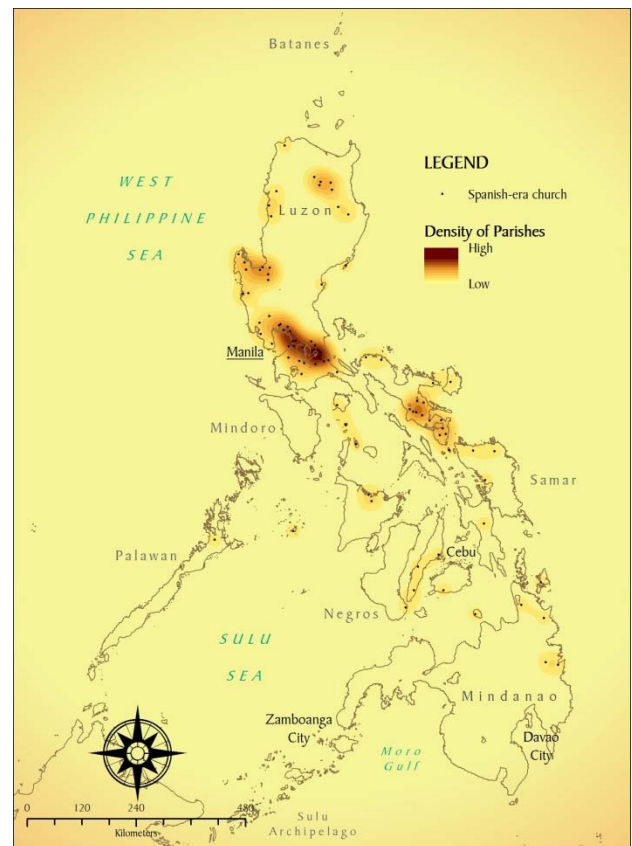


Fig. 9. Density of parishes (1600-1649)

4.4 1650-1699

This is one of the low periods of parish establishment in the archipelago. Less than 40 towns were formed during this period and the sparse distribution can be seen from the heat map (see Fig. 10).

The provinces of Albay and Laguna were the top performers being the only ones who had four new parishes in this 50-year

stage. However, it is worth mentioning that there was continuous foundations of parishes in the province of Manila and Pangasinan albeit producing only a total of three between the two of them. The province of Camarines Sur on the other hand made an impressive feat with three new parishes in a span of five years.

periodic ups and downs, four parishes in one year is not uncommon and towards the half of the century, the numbers have already picked up continuing into the latter half (see Fig. 12).

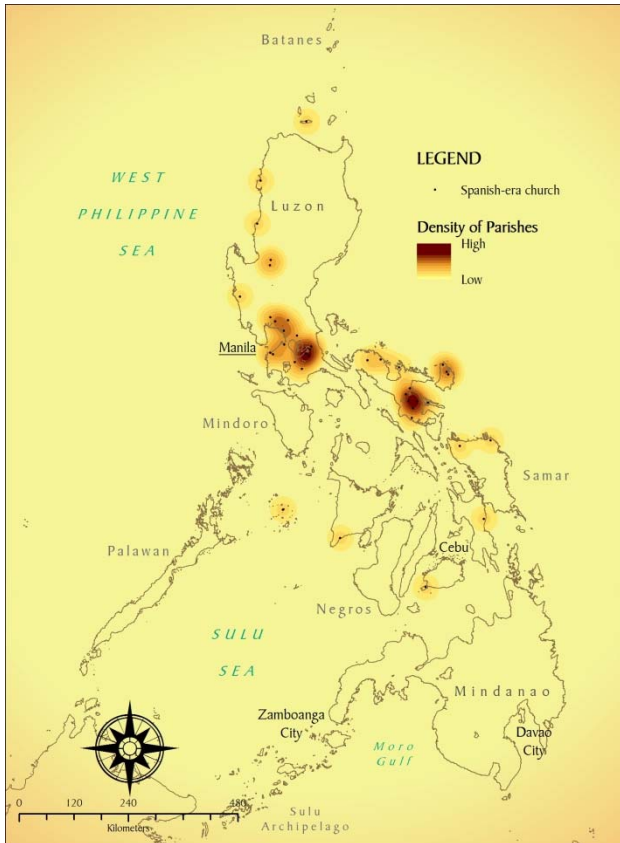


Fig. 10. Density of parishes (1650-1699)

A histogram of the inclusive years show that town formation averaged approximately only one per year (see Fig 11).

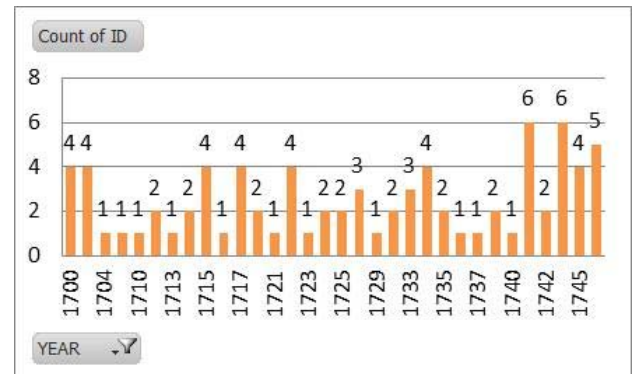


Fig. 11. Parishes founded per year (1600-1649)

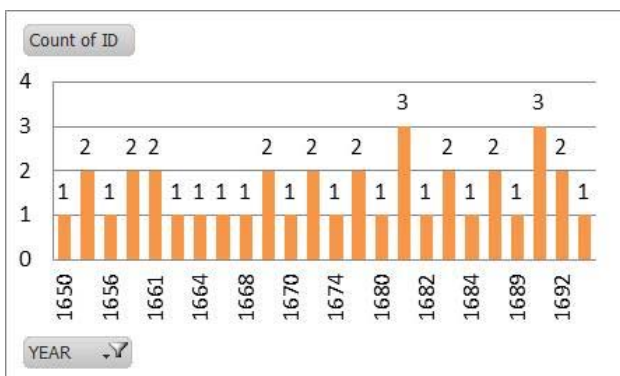


Fig. 13. Density of parishes (1700-1749)

4.5 1700-1749

The first half of the 18th century marked the resurgence of town foundations in the archipelago. Although characterised by

Hot spots for this period are Camarines Sur topping with eight parishes, followed by significant developments in Iloilo and a third and major establishment in Mindanao within the province of Misamis Oriental where three parishes were simultaneously started in 1744 followed by another one in 1749 (see Fig. 13). As usual, Manila and Pangasinan had new parishes. Another significant development here would have to be the establishment of towns deep into the Cagayan Valley which finally happened after more than 50 years.

4.6 1750-1799

The Albay-Camarines Sur cluster of southern Luzon witnesses the most town formations in the latter half of the 1700s. This is followed by the Bulacan-Pampanga cluster which although much fewer appear darker on the map due to their proximity to each other (see Fig 14.).

Significant foundations also happened in Sorsogon and the southern portion of Panay and Bohol Islands while the northernmost parish was established during this time in the Batanes.

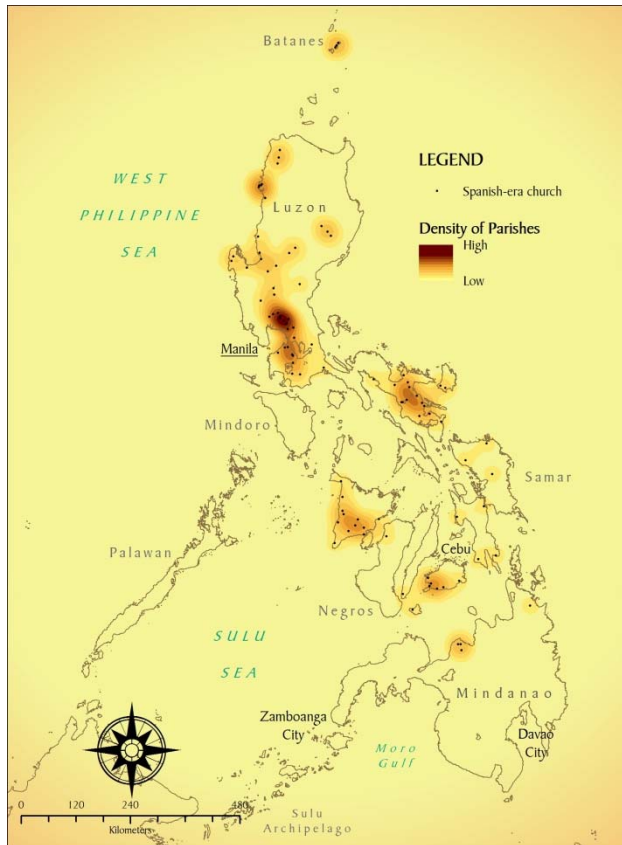


Fig. 14. Density of parishes (1750-1799)

This period represents the minor peak of activity in town formation during the Spanish colonial period with numerous years having four or five parishes in a year (see Fig 15).

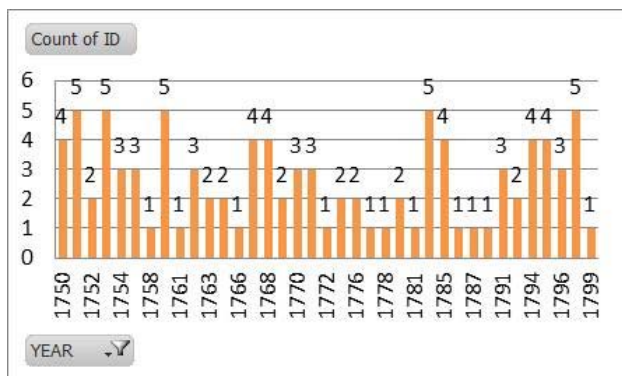


Fig. 15. Parishes founded per year (1750-1799)

4.7 1800-1849

The early part of this half of the century is marked by a long period of low activity, picking up only in the mid-1830s (see Fig. 16). However, the rise becomes constant only in the last five years and finally reaching a high number of 9 parishes in the last year.

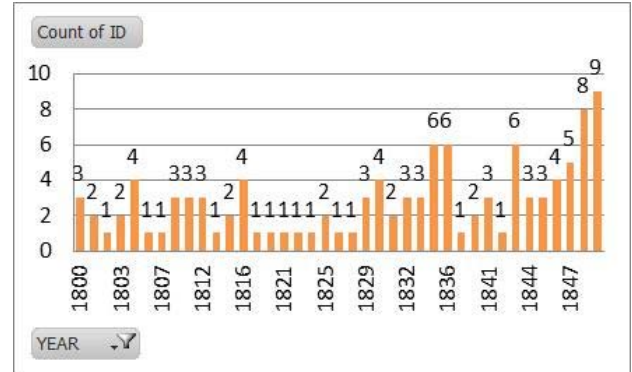


Fig. 16. Parishes founded per year (1800-1849)

The heat map (Fig. 17) shows intensive town formation happening in the Tarlac-Pangasinan-Nueva Ecija cluster north of Manila with 18 towns between the three provinces. On the other hand, although not showing as a dark-region cluster western and central Visayas had the most towns with 39. Cebu alone had 10 parishes founded.

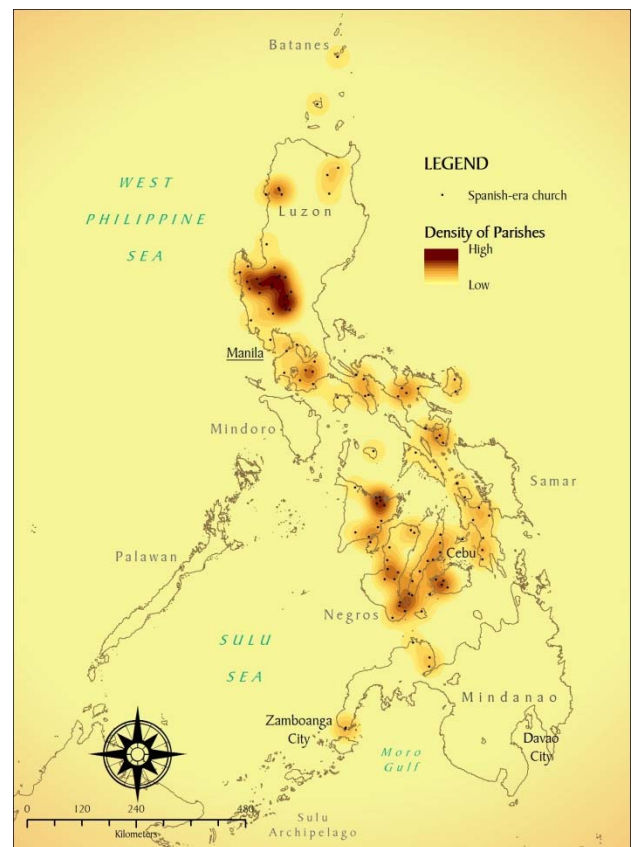


Fig. 17. Density of parishes (1800-1849)

In this period, we see the church establishing new towns in Misamis Occidental and reaching further south down to the tip

of the Zamboanga Peninsula to what is now known as Zamboanga City. Also in this period, the province of Manila gets to know almost no new parish except for one, Pateros.

4.8 1850-1899

The last 50 years of Spanish rule in what is known as the Philippines witness a massive formation of towns around the archipelago. On the average, around eight were being founded every year (see Fig. 18).

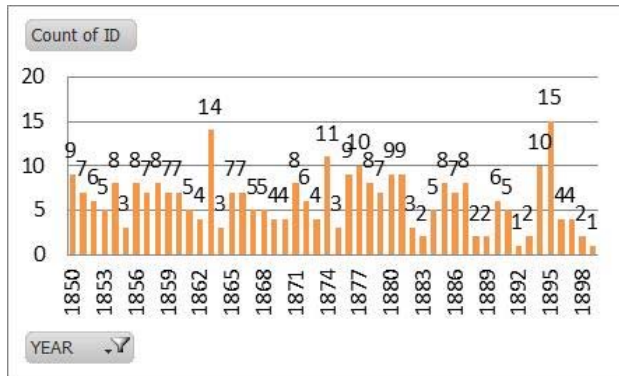


Fig. 18. Parishes founded per year (1850-1899)

In terms of reach, a parish was established in the island of Sulu and in Cotabato – both in the heartland of the Sultanate of Sulu. In terms of numbers, the busiest was the western and central Visayas cluster once more centering around Bacolod in Negros Occidental (see Fig. 19) who gained 25 new parishes exceeded only by Cebu with 26.

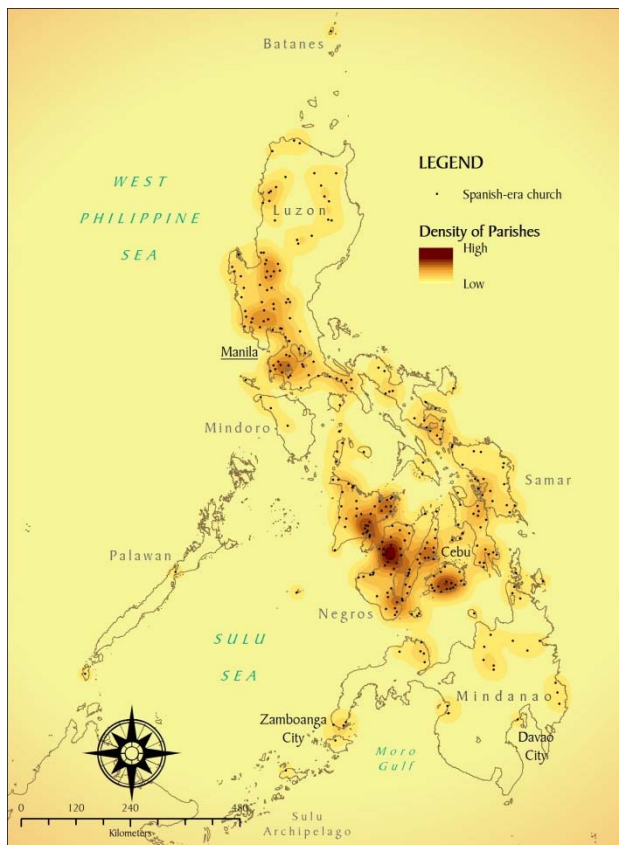


Fig. 19. Density of parishes (1850-1899)

Major expansion was also felt throughout Central Luzon especially in Zambales and in Cavite and also in the eastern and central side of Mindanao from Bukidnon to Surigao.

5. Concluding Remarks

Seeing the data through time animation and heat maps shows us several interesting insights on the history of the Philippines in terms of town formation. Manila and its surrounding provinces had a steady outcome of parishes indicating a steady growth of population in these areas. The same can be said for areas like Pangasinan, Ilocos Norte, Bicol Peninsula, and the Visayas. The interest after seeing the distribution and dispersal patterns of towns that can be seen from the mapping begs for explanations and correlations with other datasets. In terms of extent and influence, this puts into question Spain’s sovereignty over the whole of Mindanao and right to cede it to the Americans under the Treaty of Paris of 1898 (United States of America; Kingdom of Spain, 1898).

Time animation in showing parish foundations for the whole of the Philippines from 1565 to 1899 proved to be an interesting method of reconstructing history. Although able to show the temporal spread of events, it is hampered by lulls in the sequence as well as high numbers of events happening simultaneously. Dividing the data into specific time segments and producing static maps for each does help in further investigating the spatio-temporal patterns of distribution and dispersal.

Future studies can include settlements outside the Spanish sphere of influence to have a more complete picture of this view of national history.

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