



Scylla and charybdis 2.0: reconstructing colonial Spanish American territories between metropolitan dream and effective control, historical ambiguities and cybernetic determinism

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ABSTRACT: This paper tries to outline the main methodological obstacles that have to be addressed and overcome at reconstructing late colonial Spanish American territories and their development by means of a historical Geographic Information System (HGIS). First we try to show how historians with a broad gamut of research interests could profit from such a territorial HGIS infrastructure for that time and space. In a second step we try to show how certain aspects complicate the task. These include: vernacular concepts of territory (definitions of what actually is a “province”); the quality, focus, and methods of data gathering in contemporary geographic descriptions, cartographies, and other sources; the lack of definition of interior borders; the sometimes contradictory divisions in military, civil, ecclesiastical, and financial districts; as well as the general discrepancy between administrative control and political claims. And as if these aspects were not enough, there are the competing claims on territories of sovereignty in Latin America, which —by applying the *uti possidetis juris* principle— are largely based on colonial territories. In the last part, we outline the basic concept of a spatial database which tries to respond to the raised issues and furthermore incorporates a chronological axis. The model is illustrated by giving the example of the Puno-region.

KEYWORDS: Historical GIS; WebGIS; vernacular GIS; database design; colonial administration; socioeconomic history; bourbon reforms

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RESUMEN: *Scylla y charybdis 2.0: reconstruyendo los territorios españoles de América entre los sueños metropolitanos y el control efectivo, ambigüedades históricas y determinismo cibernético.* - En el presente trabajo hacemos hincapié en los mayores problemas metodológicos a los que se debe enfrentar al reconstruir los territorios de Hispanoamérica de fines de la Colonia. Primero, trataremos mostrar como una amplia gama de epistemologías podría sacar provecho de una infraestructura de SIG-histórico para tal época y espacio. Luego mostraremos como una variedad de aspectos —conceptos vernáculos de territorio; calidad, foco y métodos de recolecta de datos en descripciones geográficas, mapas y otras fuentes de la época; la faltante definición de fronteras interiores entre jurisdicciones; las a veces contradictorias divisiones en distritos militares, civiles y eclesiásticos; así como la discrepancia general entre control administrativo y pretensiones políticas— todos convergen y complican la creación de una sistemática coherente. Además, hay que considerar las conflictivas reclamaciones territoriales de los Estados-naciones de Hispanoamérica que, apoyándose en el concepto de *uti possidetis juris*, se basan en gran medida en territorios coloniales. En el último apartado, esbozaremos el concepto básico de una base de datos que aspira a responder a los problemas antes referidas, y luego concretizamos el modelo con el ejemplo de la región de Puno.

PALABRAS CLAVE: SIG histórico; WebGIS; SIG vernáculo; diseño de base de datos; administración colonial; historia socioeconómica; reformas borbónicas

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INTRODUCTION

This introduction is not the place to discuss the general applicability of Geographic Information Systems in the field of History —there exists a considerable number of good publications to that respect already (Gregory, 2003; Gregory, 2007; Knowles, 2002; Knowles, 2008; Martí-Henneberg, 2011; Crespo Solana & Alonso García, 2012; Crespo Solana, 2013). However, I still want to highlight some of the major benefits of HGIS precisely for the field of socioeconomic Spanish American history, in order to make peers less familiar with this tool understand its purpose and spark interest in its development.

In order to make proper sense of most socioeconomic data, the definition of the area they are associated to is a prerequisite (Gregory, 2002). Yet the methodological problems and the considerable labor that has to be invested in making maps, digitizing boundaries, or tracking the territorial divisions and relevant settlements of a certain area at a certain time lead to the absurd fact that most spatially organized socioeconomic historical data are still being published in tabular form only. Thus, the reader either has to possess a quite sophisticated mental map or remain ignorant of the spatial distributions, relations, and gaps of the data. And many authors who actually do use maps take one from other publications that fit their area and period of study “roughly”. Even if there exists a rough spatial representation —whether mental or through a roughly fitting map—, this is highly problematic: For example, population numbers collected for the Mexican province of “Puebla” possess a completely different diagnostic value for 1790 than they do for in 1800, because in 1792 the district of Cuautla-Amilpa was exchanged for Igualapa and Tlapa from the province of Mexico. In a table without spatial properties, the indiscriminate toponym/ area “Puebla” will simply have two values for “1790” and “1800”, blurring the existing spatial difference, insinuating a simply chronological development. And even when a historian really produces a proper analogue thematic map, the multiplier effect of the considerable effort is limited because geometry and data are crafted into one product. A territorial historical GIS can remedy many of these problems and become itself the basis for the production of thematic maps, the high art of cartography of course cannot be replaced by GIS.

Using GIS for visualizations, spatially organized storage and analysis of historical data are, of course, not necessarily limited to contemporary or 19th century history. In fact, it is especially the study of the distant past GIS is probably most used for, not by historians but by the more spatially oriented discipline of archaeology. Furthermore, ancient, medieval, and early modern periods alike are in the focus of the steadily growing group of historians who aim at fusing network analysis with GIS tools: Some examples for this are Stanford’s ORBIS project on trade and transport in the Roman world, led by Walter Scheidel,¹ the works of Johannes Preiser-Kapeller on “Topographies of Entanglement” in medieval trade networks in the Eastern Mediterranean;² the projects and publications of Ana

Crespo Solana (2012; 2013), and her team (Picazo Muntaner, 2013) on early modern Atlantic history; or the data on Spanish, British, and Dutch ship routes collected for the Climatological Database for the World’s Oceans 1750-1850 (CLIWOC), a 2001-2003 multi-institutional EU-project where historical and climatological epistemologies and methods converged on a specific source, namely logbooks of intercontinental ship voyages.³

One problem a historian (in most fields) faces when working with GIS is the lack of available and reliable historical spatial geometries, such as polygons representing historical territorial entities like administrative or ecclesiastical divisions. This is aggravated by the historians’ preference for eremitical research over cooperative work. Thus, tracking the developments of political, administrative, or ecclesiastical units, i.e. establishing a historical territorial “infrastructure” for the scientific community, is one of three main fields of application identified by Anne Knowles for the use of GIS in History, beside “history of land use” and “visual reconstructions of past landscapes” (Knowles, 2008: 14).

Where no such common GIS-infrastructure exists, HGIS studies are often narrowed to single case studies with very limited scope, since without shared data to build upon, investigators have to construct their own spatial geometries and cannot incorporate any other data than those processed by themselves. Moreover, such work is counterproductive because the different spatial framework and lack of common identifying attributes make data far less comparable. For pre-1800 history with its little exact cartographic sources and vague territorial concepts, and where a certain degree of arbitrariness is inevitable, this aspect has even more impact. This aggravates the general truth (and argument for shared infrastructures) that the same line digitized by two people, even done most exactly, will always result in two slightly different geometries with small overlaps and gaps, so called “slivers” (Fig. 1 shows some slivers between Omasuyos and Paucarcolla which were the result of using two different source geometries, one more refined for Peru and one more generalized for Bolivia). In such HGIS infrastructures, therefore, the focus is almost exclusively on the 19th and 20th centuries, especially in the sphere of “national historical GIS” infrastructures that aim at long-term reconstructions (Gregory, 2004), with the notable exception of the Chinese HGIS maintained at Harvard.⁴ Furthermore, to our knowledge, there is no such GIS infrastructure for any colonial geography (the US NHGIS only covers post-independence history).⁵

The main reasons for these two limitations are methodological. The US-NHGIS, which features boundary files for states and counties ranging from 1790 to 2012, parted from the desire to properly map older census data (originally that of 1980). They took the official geometries of the year 2000,⁶ tracked changes back from there, and only digitized new boundaries in those cases where no “modern” ones had existed. Tracking borders back from a precise status quo based on modern methods of geodesy is may be the most desirable way of reconstruct-

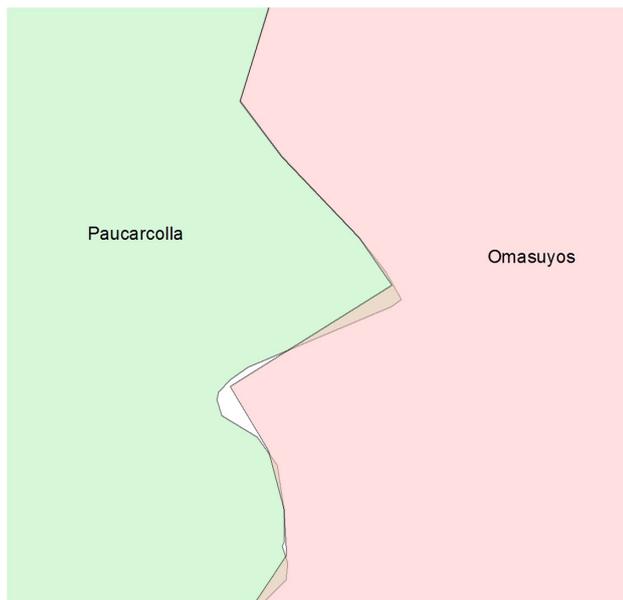


FIGURE 1: Typical digitizing slivers

ing historical territories, but it requires an end-to-end documentation of boundary changes.

For our aims, a track-back procedure of reconstruction as in the case of the USA is virtually impossible to follow: First, it would require the existence of a Historical GIS in all or most successor nations, something that only exists for the parts of the Spanish Empire which is now part of the USA. So far, there are no encompassing “national historical GIS” projects existing in Latin America, but if such endeavours should be undertaken it is highly probable that they will be narrowly related to fragmented national tailoring, since questions of territory and sovereignty, as well as conflicting claims on border regions, are still a common trait in inner-American relations. The demand of an exact territory of sovereignty if applied to the colonial period results in an anachronism and contradicts the contemporary concepts of rule and territory. Lamentably, it is not only the “common sense” of the “modern” citizen to demand an exact boundary; it is also what a GIS usually does with its binary logic. Our approach to the issue is not to start from the present but instead to reconstruct a particular territorial situation at key moments in the late colonial period—the introduction of the intendancy system in many parts of the empire—and to track posterior adjustments and the previous territories of the administrative units from there. Thus, the starting point will be different for the main divisions of Spanish America: for example in New Spain the intendancy system was introduced in 1786, in Rio de la Plata already in 1784, and in New Granada, an especially problematic space for the task, it was not implemented at all.

All these aspects make the reconstruction of Colonial Spanish American territories a novelty and an endeavour that has to face several mythical dangers. In the following

paragraphs I try to identify various problems for such a digital reconstruction, some inherent to the historical sources, some related to their subsequent interpretations, and some inherent to the digital tools we are using in our efforts. In the concluding part, I will show—by giving a glimpse into the foundations of our database and providing a concrete sample—how we try to vanquish some of the “monsters” and in which cases we rather try to circumnavigate them.

BETWEEN METROPOLITAN DREAMS AND EFFECTIVE CONTROL

It is only consequent that in an epoch such as colonial Spanish America, when people could not resort to exact methods of measuring and cartographic representation, concepts of territoriality had to be fundamentally different to our modern understanding. Occasionally one even gets the impression as if there had been no territorial concept at all, but only hierarchies between officials and inhabitants of settled places. This conclusion would be premature, though, because of course there was territorial thinking, even if less in terms of a concrete spatial concept of social organization or political unity as we usually imagine it. It is probably more appropriate to interpret it as a holistic concept within which historical, political, physical-geographical and other factors all played their parts, similar to the cosmology found in the *mappae mundi* of medieval cartography. Even though the post-medieval maps every time less depicted historical, eschatological, biblical and apocryphal scenes, the representation of territory still incorporated a lot of semantic levels. Early modern world maps with their prettily colored cartouches that do not reflect the political entities of their time at all are the most evident witnesses of this kind of thought.

The definition of precise borders and territorial delimitations of administrative units became of enormous importance only during the formation of the nation-state, which is closely tied to the space over which its sovereignty is exercised. This intimate relationship between nation, its territory, and its assessment has been immortalized by a *bonmot* attributed to Louis XIV, who is said to have commented on the *Carte de la France corrigée* that chief surveyor Cassini and the members of the Académie des Sciences robbed him more territory than he had won in his wars because their map proved that France had a much smaller surface than previously estimated.⁷ Only the rise of the nation state in Latin America in the 19th century has initiated the need for a similar precise definition of the space over which national sovereignty was exercised—while it was absent in colonial times. The “territorialization” of the nation usually implies the assumption of a monolithic, eternal territorial nation. The paradigmatic example for this is *Eretz Israel*, but it is hardly unique and this idea has also been very present in Latin America’s identity formation. It seems to be of utter importance for Latin American national histories to trace back some territorial claim precisely into the colonial era,

even if the territory in dispute had never been clearly dominated by the Spanish crown.

There is also a secondary effect of the national fragmentation, less supportive of the state and less ideological than the question of sovereignty but nonetheless relevant: the simple interest of a national readership. An illustrative example for this is the incredible *Atlas ilustrado de pueblos de indios* (Tanck de Estrada, 2005), product of painstaking, detailed identification of over 4000 Indian towns that existed by the year 1800 in Mexico. But what was Mexico by 1800, and what is it in the *Atlas* and why? The answer could be given in a number of ways: One could consider all territories nominally part of the Viceroyalty of New Spain—including the Internal Provinces, the Philippines, Central America, and the Caribbean islands—; or exclude those effectively independent bodies and limit colonial Mexico to the jurisdictional districts of the Audiencias of Mexico and Guadalajara (which would include the Internal Provinces though). The *Atlas* takes a different approach, excludes the Internal Provinces, but then adds the Intendancy of Chiapas in the south, but again with an exception: the small portion of the *partido* of Soconusco to the south-east of Río Suchiate is missing. The obvious reason is the modern border between Mexico and Guatemala, but it was only fixed as late as 1902, the terminal point of a territorial conflict between the two nations which (for once!) was not even product of the ambiguity or lack of precision of colonial borders but a real political dispute that had started with the incomplete secession of Chiapas from the United Provinces of Central America in 1824 (de Vos, 1993). By 1800, the moment captured by the *Atlas*, Río Suchiate was of no significance as a border, but so it is presented to the modern audience.

The unity of territory, sovereignty, and control was much less central in the prevalent imperial thinking of European nations in most parts of America in the early modern period. Large strips of frontiers, overlapping claims and unstable realities, shaky control, absent or abysmal administrative penetration of areas were rather the norm than the exception. The *asientos* and *capitulaciones* of the Spanish crown with conquerors and merchant houses in the 16th century, due to the lack of knowledge about the new continent, usually only defined parallels as limits of jurisdiction or simply extended the assigned territory all the way south to the ocean. And the demarcation line as fixed in the Treaty of Tordesillas between the Spanish and Portuguese hemispheres surely mattered in terms of disputing the legitimacy of certain projects and expeditions, but hardly can be taken as a territorial boundary. If taken to this extreme, this would lead to a rather absurd political map of the world, just as if after the Treaty of Tordesillas the world had consisted only of Spain, Portugal and some small Christian kingdoms, just because the pope had said so.

Of course, this strikes us as absurd, but much of the cartographic reconstruction of colonial geographies follows this logic. For example a map on Wikicommons

shows the extension of the Viceroyalty of Peru in 1680 as seen through the eyes of a user with the telling nickname “Vivaperucarajo”. It shows the Amazonas region west of the Tordesillas-meridian as part of the Real Audiencia de Lima, and both the indomitable Patagonia and southern Brazil (including São Paulo and Rio de Janeiro, which both dared to be west of the Tordesillas-meridian) as parts of the Real Audiencia de Charcas.⁸ It would be too simple to wipe this off as a typical blunder and shake the head to the fact that—by March 2014—no less than 23 Wiki pages in 13 languages point to it. It is only one of many maps that follow this kind of thinking, not only on Wikipedia, but in handbooks and especially in the national atlases of most Latin American countries since the 19th century, in order to promote their usually extensive interpretation of national territories. The connection between the national territories and the colonial rough claims is the *uti possidetis juris*⁹ principle, which has been adopted as the basis of international law in Spanish American border disputes since the times of Simón Bolívar. Literally it means “as you possess by law”, meaning that independent territories should coincide with the territories of the colonial administrative units which were considered antecedents of the modern nations. This set of thinking, aimed at preserving peace, ironically lead to manifest wars or, in the better case, to “wars of maps” and the formation of border commissions as part of bilateral agreements or international arbitration boards. For our project, the *uti possidetis juris* has two positive and one negative consequence: On the positive side, the considerable efforts of national projects and bilateral commissions on reconstructions provide us with cartographic reconstructions and compilations of colonial sources which are also interesting for our purposes: royal decrees, maps, census reports, geographical descriptions of the epoch, etc, it would be hybrid on our part to claim to be the wiser about “where exactly the line should be drawn”. Second, since those endeavours had to face the same original sources they had to consider similar methodological problems and help identifying and tackling them. On the negative side, the weight attributed to certain sources and their interpretation is, of course, a dependent variable of the national claim. Therefore the validity and significance of the various outcome of territorial reconstruction for colonial history (and even more so for a spatialization of socioeconomic data) is highly debatable.

Since many of the definitions, as we have seen, lacked practical relevance, it is only logical that redefinitions, contradictions and double-assignments are ubiquitous, making impeccable, objective territorial interpretation an impossibility. This is especially true for the 16th century, but in many areas, the domain “by ink only” was something that continued well into the 19th century. Concerning the outer limits of the Spanish colonial possessions at their northern frontier, Alexander von Humboldt clearly noticed the discrepancy between claims and effective rule in his *Essai sur le royaume de la Nouvelle Espagne* of 1811:

L'on est incertain sur les limites que l'on doit assigner à la Nouvelle-Espagne, au nord et à l'est: il ne suffit pas qu'un pays ait été parcouru par un moine missionnaire, ou qu'un côte ait été vue par un vaisseau de la marine royale, pour les considérer comme appartenant aux colonies espagnoles de l'Amérique (Humboldt, 1811, III, 8: 84-85).¹⁰

But not only in the vastness of unknown North America there was a problem of definition. There have also been a lot of inner frontiers and questions of “sovereignty” concerning Indian populations and overlapping claims with foreign powers. Three of the best known examples are the “independent” Butalmapu territories in Chile between the Biobio river and the island of Chiloe; the Mosquito Kingdom on the Atlantic coast of Nicaragua/Honduras; and Belize on Yucatán peninsula. The Butalmapu and Mosquito areas are just as frequently shown as not belonging to the Spanish Empire as they are shown being part of it; Belize is almost always shown outside. Not without reason of course: Not only did the wars and conflicts with the Mapuche have an identity-establishing function in Chile, the treaty of Quilín between the Spanish and the Mapuche in 1641, by naming the Biobio as northern border of the Butalmapus, provides a formula that is in accordance with our concepts of sovereignty and the law of nations. In Argentina, historians often use the line of protecting fortresses south of Buenos Aires as the colonial “border”. Notwithstanding these facts, the incorporation of Patagonia into the national territories of both nations ignited a “war of maps” between Chile and Argentina (Lacoste, 2002) that recurs to colonial phrasings and projection and which is a persisting feature of both national histories.

In the case of Mosquito, our view is simply an effect of the British policy in the region which already began in the first half of the 17th century. Later, in 1740 they formed an alliance with an acknowledged king and declared the kingdom a protectorate. In the Treaty of Versailles in 1783 they officially gave up their claims to the coast, but eventually all this was of less than marginal importance: The Spanish had no control over the coast even

before 1625, nor after 1783 when the British changed the formal protectorate for an informal one (cf. Floyd, 1967; Offen, 2011). Still, the Mosquito coast is shown as part of Spanish America much more often than Belize, although both the legal and realpolitical situation was almost identical throughout the colonial period. The reason is of course that Belize ended up becoming an independent nation while the Mosquito coast was integrated into the national territory of Nicaragua after a treaty with England in 1860, so, an event of the second half of the 19th century fundamentally shapes our conception of the colonial geography of the 18th. In a lot of other cases, where the relations between Spanish and Indians were of a strikingly similar nature, no such tradition or documents exist. This is true for many cases in Central America or on the eastern slope of the Andes, areas depicted as “Spanish” on virtually every modern map. 18th century maps are sometimes more precise than we are today when they name certain territories—even though maintaining a claim—as *desiertos* (which should not be misunderstood as deserts of physical nature) or *despoblados* (see Fig. 2).

Similar to the phenomenon of “border commissions” in the national period, in the 18th and early 19th centuries, it were especially frontier areas and areas disputed with rival European nations or the USA—like Patagonia, Guayana, the Internal Provinces of New Spain (Torre, 2005; Porro, 2013)—that received privileged attention and visits by high profile military cartographers who were at the pulse of their art, while in the central areas there was no particular need for such expenses. This explains the rather anti-intuitive fact that some of the best defined “borders” of 18th-century Spanish America are to be found in the barely explored regions of the Amazonas basin, where—based on the stipulations in the Treaties of Madrid (1750) and San Ildefonso (1777) between Spain and Portugal—various *comisiones de límites* pinned down the border directly *in situ*.

Therefore, many inner divisions are even more complicated to grasp by comparison: Where the Amazonian frontier-government of Maynas ended and the more properly administered areas of Quito and Peru began is much

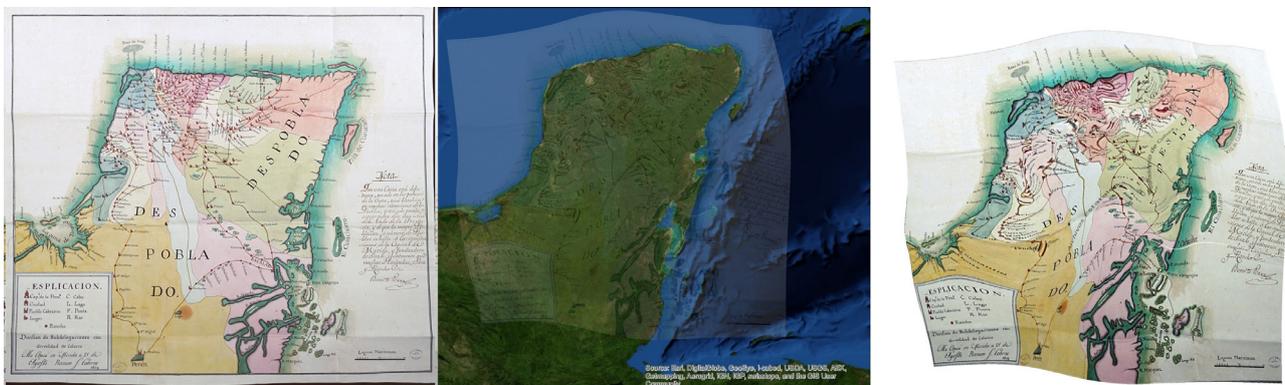


FIGURE 2: “Mapa político de la provincia de Yucatán”: España. Ministerio de Educación, Cultura y Depoarte. Archivo General de Indias, Mapas y Planos [AGI, MP], México, 756. Original and georectified

more difficult to tell than where Spanish and Portuguese agreed to divide up Amazonia. Even within the core areas themselves, where people locally surely knew where divisions were supposed to be, we can —when no river or mountain range served as indubitable border— sometimes only guess where borders may have been because neither contemporary cartography nor geographical descriptions reach a degree of accuracy and detail which would make this possible. Contemporary maps occasionally do not even exist or, more often, cannot be judged properly within our framework of understanding spatial representation since territorial surveys and trigonometric measurement were far too expensive to be seriously considered for such a vast space with a frequently shocking infrastructural situation. The usual methods of georectifying analogue maps for digitizing efforts are completely inadequate for colonial cartography and lead to distortions which make the maps illegible, the more so, the more densely populated an area. Figure 2 shows an 1809-map of Yucatan: To the left, the original, in the center the georectified map superimposed over a satellite map, and to the right the result without satellite map. It can be clearly seen that the densely populated zones around Mérida and Valladolid are among the parts of the map with the biggest distortions. And this map is among the examples of colonial cartography that come closest to a modern understanding of geography.

Where descriptions on boundaries at the district level (or even down to the parish level) exist, they are usually just as vague as the cartographic representations. While maps at least usually reveal on which littoral of a river a town was situated, in descriptions even this often remains interpretative. Politically and administratively it was of little importance where a division line between provinces was to be drawn precisely. What mattered was on the hierarchical relationship between one populated place and another. Minor territorial changes are often only documented by the fact that a settlement from a certain point ceases to be in the list of one jurisdiction and appears in another. Thus we can for the most part identify which place belonged to which district at a certain point in time, but not the exact area (Vollmer, 1967: 13). The lack of precision for areal calculations bothered Vollmer a lot because he understood that “population statistics are not conceivable without setting population and populated space into relation” (Vollmer, 1967: 12). Because he could not find adequate cartographic representations of the Viceroyalty of Peru for his purposes, Vollmer made his own map, narrowed strictly to what he called “tierras conquistadas” while he completely ignored territories without proper administrative penetration (Vollmer, 1967: 16), the result was a map that would surely shock “Vivaperucarajo”.

There is also an additional defect of “blurred boundaries” in the inner division of Spanish America: there is no unequivocal territorial division into provinces and subordinated districts that would be all encompassing or the only empirically relevant —especially for the history of economy, but also in other fields. Colonial administration

was many-layered, and hierarchies between its actors were multi-faceted, and varied from region to region.

First, the parallel structures of Spanish settlements which coexisted with the administration of the *república de indios*, the civil government of the *república de españoles* was usually not territorial at all but rather based on the urban institutions of town and city councils (*cabildos*), while the districts were more relevant to the *república de indios*. Sometimes, the territory of a Spanish city was completely outside the inner division of a *gobierno* or *intendencia*; at other occasions, as in the cases of Puno or La Paz, the two concepts were spatially overlapping: while the *cabildo* was responsible for the Spanish population of a city, its Indian population was subject to the official of the surrounding district.

Second, the parallel existence of “vernacular” concepts of territory (*reinos, provincias, partidos*) and institutionalized districts of administration: pretorial *audiencias*¹¹ at the highest level, *gobiernos, corregimientos* and *intendencias* at the what we might call provincial level and *alcaldías mayores, corregimientos* and later *subdelegaciones* on the district level, which stood in various hierarchical relations to each other. Government and administration was commonly understood to consist of four branches (*ramos*): *civil, militar, judicial, and hacienda* (financial). Frequently, one official was in charge of all branches and subordinate to another official with analogue competences for a larger area. The higher officials also used to accumulate titles and positions to unite these branches in their hand: Therefore, the viceroy of New Spain was also captain-general and president of the high court, while the governor of Yucatan was his equal as captain-general (military), yet subordinate in anything else; the governor of Guadalajara was subordinate in the military, but not *en lo judicial*, being President of Guadalajara’s high court, responsible for New Spain’s west and north.

With the introduction of the intendancies, the intendants were mostly installed as truly provincial intermediaries for all branches between the district officials and the viceroys/captains-general, but in some cases an intendante and the captain-general co-existed as separate charges over the same territory (Cuba, Puerto Rico, Venezuela) while there also subsisted some “independent” provincial governments which were subordinated to intendants in *hacienda* only (e.g. Texas and other northern governments to the intendante of San Luis Potosí; the governor of Tabasco to the intendante of Yucatán). Whether some entities like Tabasco are considered provinces or not therefore depends highly on the importance attributed to a certain aspect of government, and the number of hierarchical steps between the lowest and highest levels of administrative territories could differ between one and four, depending on the situation.

At the “district” level, the officials of larger, more complex areas often resorted to lieutenants (*tenientes*) who resided in other relevant settlements as aids. In some periods and spaces, *tenientes* were of less importance, and a *corregidor* could have subordinate *corregimientos*

or *alcaldías*: Before the intendancies, *corregidores* of major Peruvian Spanish cities were, for example, theoretical superiors of the *corregidores de indios* of rural districts especially in matters concerning the *república de españoles*. In late colonial New Granada the *alcaldía mayor* of Minas de Zaruma was subject to the *corregimiento* de Loja, while New Spanish *alcaldías mayores* were always proper districts, basically interchangeable to *corregimientos*. The number of *tenencias* frequently oscillated, depending on the availability of financial resources and local circumstances. In areas of diminishing Indian population, districts were often united under a single magistrate, sometimes as a rather temporary personal union, sometimes completely, in other cases with a *tenencia* in the less important former district. Still, out of tradition, both districts could be understood as different “vernacular” districts (*partidos*) which in turn could lead to a phantom-survival of former districts in geographical descriptions and even censuses. Other *tenencias*, which lacked a traditional territory, are hardly documented at all, or are considered *partidos* by one author and ignored by the next. This is particularly visible in the works of Peter Gerhard (1972, 1979, 1982), who organized his historical-geographical descriptions of New Spain into territories which he considered separate *partidos*, then describing when/how one such *partido* was consumed by another, or later split into several – thus creating a necessarily highly arbitrary vernacular map, based on divisions with sufficient identity for Gerhard to include them as entities. Of course there are many possible choices, and a historian with more focus on the 18th century would certainly have made a considerably different selection.

To make things worse, the “fifth” branch —*eclesiástico*— had of course its own hierarchies and territories, yet many tasks of local administration were carried out by the clergy who also kept records, functioning at the end of counts as proper administrative bodies. Thus, one faces a parallel structure of territorial organization in parishes and civil jurisdictions at the grass root level. Most parishes had one *pueblo cabecera* with a church where the priest resided, which was commonly called *curato*, *doctrina* (used especially in territories governed by missionary orders) or simply *parroquia*, and several subordinated *pueblos* without a proper priest, which were either called *vice-parroquia* (when they were considered more important and were frequently visited by the priest or had a lieutenant priest) or *anexo*; settlements outside of this logic —without church, chapel, or responsible priest— were simply called *aldea*, *sitio*, *villaje*, *parcialidad* or other terms). More often than not, the ecclesiastical territories coincided with the territorial units of jurisdictions or *partidos*, and several royal instructions for the establishment of a bishopric or intendancy explicitly mention that their respective territories should coincide. Still, there are several cases where a *curato* had one or more *anexos* in a different *partido*, simply because the settlements were more accessible from their parish center. Juarrós (1808, I: 63) also testifies to the overlap between borders of jurisdictions and *curatos*: According to the au-

thor, around 1800 the *curatos* Cuilco and San Cristobal in Totonicapan had the *anexos* Tacana and Olindepeque in Quetzaltenango, respectively. For the Viceroyalty of Peru, Vollmer (1967: 248-264), lists eleven such cases in 1792; and Peter Gerhard (1972, 1979, 1982) mentions several such cases throughout his work, albeit not systematically. Systematic listings of settled places within this scheme are rare, however. For the case of Peru, Vollmer (1967) elaborated a complete list of parishes and their annexes based on Bueno (1764-1778), but I do not know of similarly systematic breakdowns for other major areas. What is more: only in few isolated regional cases there are studies that track the development of parishes over time — which is an important aspect since depending on resources and the decline/rise of population numbers, there were periods of suppression and creation of curacies.

Some examples shall further underscore how all these confusions often converged. The first is a description of the Kingdom of Guatemala (Juarrós, 1808) that in the very same text applies no less than three different logics to divide Chiapas into *partidos*. On the one hand, he divides it into the three *partidos* of Ciudad Real/Chiapas, Tuxtla and Soconusco. All three had formed separate jurisdictions which were merged into the new intendancy. Then, in the description, he mentions three seats of *subdelegados* (Tuxtla, Soconusco, Comitán), which together with the capital district would make for four *partidos*, since *subdelegación* and *partido* were usually used interchangeably. Juarrós himself employs this conceptual identification when he lists the “subdelegaciones ó partidos [sic]” (Juarrós, 1808, II:39) of Chiapas, resulting now in eleven (!) *subdelegaciones*, while in fact (as stated above) only three *partidos* actually had their own *subdelegado*, the rest being governed only by *tenientes*. It perfectly fits the picture that Juarrós offers yet another division of Chiapas in his text when referring to “Tzondales” or “Zoques” —terms that correspond to the old, largely ecclesiastical division of the *Alcaldía mayor* de Chiapas before Tuxtla was segregated in 1768. These subdivisions to Juarrós are either *partidos* again, or he even refers to them as “provinces”, a term he usually reserved for larger political units, such as the intendancy itself.

Another example shall illustrate more in detail how, for different parts of the Empire, we have to take into account different definitions of a territory’s constituent elements. In Chile, contrary to what we have claimed as a general rule, territorial categories were often more important than a hierarchy of populated places. Also, descriptions (Bueno, 1764-1778; Carvallo y Goyeneche, 1875-1876), census lists (Archivo Nacional, 1953), and by consequence also secondary literature do not provide a similar coverage and overview of the curacy distribution as in Peru. Carvallo even mixes up and inverts the usual terminology of *vice-parroquias* and *anexos*, testifying to the irrelevance of the ecclesiastical structure (so central to Juarrós in Guatemala!) for his description of Chilean districts. The reasons for all this may be the dominance of military structures and the lack of congregation of the Indian population in comparison with Peru or New Spain.

In 1717, governor José de Santiago Concha commented on the “great disorder” in which the Chilean Indians lived and that “even in the most populated *corregimientos* and their *partidos* [sic!] there is one village that has more than a few houses” (Solano, 1990: 104). Even though there were efforts to congregate Indians into proper “*pueblos de indios*” in the second half of the century, the territorial concept prevailed throughout the colonial period: In his 1796 description of Chile, Carvallo y Goyeneche (1875-76)¹² frequently mentions for the various subdelegations that “they too live dispersed across the whole district”. And in the Chilean census of 1813, many tables, for example the “Censo de territorio. Distrito de La Compañía hasta la hacienda de Cutun en la provincia de La Serena, reino de Chile” explicitly did not even count the number of people for certain populated places but rather indicated the range of the district from north to south (Archivo Nacional, 1953: 68).

For the Viceroyalty of Nueva Granada, Marta Herrera Ángel (2001) has compiled and compared many of terminological confusion existing in geographical descriptions as sources for the subdivisions of the viceroyalty, which did not go unnoticed by authors of the epoch and notes a considerable difference in the number of provinces between a description by José de Pando of 1770 and another one by Francisco Silvestre from 1789, noting that “even if the differences may stem from administrative changes”, they more likely respond to different concepts of what a province is. According to Herrera Ángel, Pando mentions 14 provinces in 1770, a census of 1778 has 31 provinces, Silvestre in 1789 counts 30; for comparison, Alcedo (1786-1789: II, 208-209) counts 16 “provinces” divided “for better government” into 51 *corregimientos* and 5 military and 7 political *gobiernos*. This inconsistency is aggravated by the fact that it is often hard to tell which moment is actually captured by published geographical information.

Alcedo’s monumental *Diccionario geográfico-histórico de las Indias Occidentales ó América* (1786-1789) in 5 volumes is the best example for this problem. For one part, he was very unlucky to publish his *opus magnum* exactly when the Bourbon reformism installed the intendency system in New Spain and other regions. But of course, even if we ignore this, the information basis for his dictionary reaches decades into the past. For example it owes a lot to his father’s geographical research on Guayaquil (Alcedo Ugarte y Herrera, 1741) and the whole district of the Audiencia de Quito (Alcedo Ugarte y Herrera, 1915 [1768]), as is reflected in the high coincidence of place names between both works. Decades later, Antonio de Alcedo’s dictionary was republished as an English translation by George Thompson (Alcedo/Thompson, 1812-1815) in London, and eventually even made into an atlas by Aaron Arrowsmith (1819). Despite Thompson’s claim on the title page to have made “large additions and compilations from modern voyages and travels and from original and authentic information”, this is mostly true for British America and the USA, while for the most part of Spanish America the additions were lim-

ited to a few notable updates, mainly based on Humboldt.¹³ Thus, at a time when the intendency system was already itself mostly replaced (at least ideally) by the *deputaciones provinciales* according to the Constitution of Cádiz and when large parts of the Empire were in plain process of emancipation, the “General Table of the Kingdoms and Provinces into which Spanish America is divided” (Alcedo/Thompson, 1812-1815, I: xvi-xviii) is nothing but a reflection of the old *corregimientos* and *alcaldías* that existed when Dionisio de Alcedo and his son compiled their information between 1730 and 1780! This had already been commented upon in a review in a German geographical yearbook in 1819, whose author criticized that “we already know from Humboldt that the division of New Spain into the Kingdoms of New Spain, Michoacan and New Galicia is hopelessly obsolete” (Bertuch, 1819: 66). Ironically at the same time the reviewer repeated the absurd claim that the Spanish crown had been so concerned about Alcedo’s revelations that it tried to suppress its diffusion and only a few copies had escaped (Bertuch, 1819: 63; Alcedo/Tompson 1812-1815, V: iii) —another clever PR-motion aimed at the British public (always ready to accept the notion of a secretive and despotic Spanish government), which was to be influenced to support the independence movements (Francisco de Miranda played an important role in the publication history of Thompson’s Alcedo; cf. Guitarte, 1995-1996). I think it is not preposterous to claim that it should be also possible to trace fragments of that information in even later treatises which copied from Thompson.

BETWEEN HISTORICAL AMBIGUITIES AND CYBERNETIC DETERMINISM

The main purpose of our project is to lay the foundation of a territorial Historical GIS for Spanish America (plus possibly the Philippines, as part of the Viceroyalty of New Spain, although their inclusion will depend on how well we proceed), thereby preparing a common spatial framework and platform upon which we and other investigators can build in future. Already at the most elementary level, such an HGIS might help to improve the presentation of spatial data in historical publications of a broad gamut of Latin American historians, allowing peers without deeper software-skills to draw/extract proper base-maps that fit the individual purpose of the author (in terms of spatio-temporal extent and information layers), and ideally to contribute data associated to places or administrative units within the Spanish Empire.

A shared framework of boundary files through an established internet-presence, make for an excellent basis for comparative studies, as they require common units of analysis, layers, and data standards in order to produce good results by relating their data to shared spatial geometries (Knowles, Hillier & Balstad, 2008: 269). The spatial reconstruction of features (administrative territories, populated places, and vital nets of infrastructure like roads or postal routes) has to be the primary interest in the first stage of development (McMaster et al., 2005), not as

an autotelic goal but as a prerequisite for a meaningful interpretation of socioeconomic and other data. The requirement to concentrate on the spatial frame itself means that there won't be much aggregate data in the first place (unless some unexpected cooperation comes up), but it is necessary to first build a vessel and then fill it. Only after completing this, the provision of basic socio-economic — or “strategic”— data that are useful to a maximum possible number of historians, should be added. A shared framework is also idoneous to identify spatial *lacunae* of information or data on specific topics: Where do demographic data exist? For what periods/ moments? At which regional scale/ level?

The downside of a determinate framework is, of course, the binomial and deterministic nature of cybernetics itself: in or out, 0 or 1. This is not a particularly well-suited characteristic for a field like history, used to ambiguities, conflicting interpretations, and incomplete sources. Sure, much theoretical thought has been done to circumnavigate this mythical monster, and to reconcile the Humanities (Zadeh, 1997), and more precisely HGIS (Dragicevic, Marceau & Marois 2001), with fuzzy logic. But it is extremely time-robbing to actually implement concepts of fuzziness into a larger system and it quickly becomes so central that the original purpose becomes overshadowed. In this light, we have decided to rather offer one possible spatio-temporal interpretation of the territory in the GIS, conscious that it might spark controversy, and relegate some ambiguities and the justification of decisions to the descriptive level.

In order to stay consistent it is absolutely necessary to strictly follow some basic principles that have to be defined beforehand, like for example assuming “longest possible continuity” when determining the moment of a territorial reform,¹⁴ or to prefer the date of appointment of an official as the starting date for a new administrative territory over the mere creation of the very entity by decree. This is necessary because in various cases new units of administration were abolished/reformed before they even came into existence. This was the case (for example) of the Intendancy of Santa Cruz: Created by decree in January 1782, it was eventually stripped of the governments of Moxos and Chiquitos in 1783 and replaced by the Intendancy of Cochabamba, a city which originally was supposed to be subject to the Intendancy of Chuquisaca. Only in 1785, the first intendant, Francisco de Biedma, took possession (Acevedo, 1992).

The decision not to account for every possible ambiguity in the spatial geometries themselves is not only result of the lack of resources, it is also connected to the pragmatic purpose of the reconstruction: the highest possible compatibility of data. Modelling the relationship between identified territorial entities and the administrative practice of the epoch is essential, not where exactly on La Guajira the border was supposed to be between Riohacha and Maracaibo —even if Colombians and Venezuelans might disagree about the low priority given to the issue. In or out of a populated place on the census role or the parish record, in or out on a list of places in a geographi-

cal description is what matters to the colonial historian, completely in line with the concepts of territoriality of the epoch, even if not to the satisfaction of national interpretations or the demand of spatial exactitude contemporary geographers are used to. “Vernacular GIS” is a highly suggestive term coined by Baker (2013) to describe the pragmatic giving-in to endemic early modern understandings of spatiality when doing GIS. Added to the necessities and aims of a territorial “NHGIS”-like infrastructure as in the upcoming project, the result will be somewhat arbitrary, sure, but practical.

The database model we will use for building the GIS is a relational one (RDBM). We are aware that an RDBM raises a good number of issues, and that for digital humanities non-relational databases are often preferable. One major problem of RDBM to that respect is precisely what I have been constantly referring to in the previous paragraphs: “in the sources of historians’ information, the semantics manifest heterogeneity because people created these sources from different backgrounds and different ontologies, expressing varying models of the world” (Kantabutra and Owen, 2013). But non-relational ones have problems of their own: either one has to elaborate a predefined schema —which essentially creates a similar problem between the homogeneity and normalization of the schema and the heterogeneity of historical data, not so much different to a RDBM— or information becomes chaotic and the ability to query and structure the data suffers quickly. Databases with an “evolving schema” that allows to incorporate data which don't fit the initial systematization, in my view tend to become inconsistent easily: a new element is most often introduced only when pressure rises and a certain tolerance level is reached. Data entered into the database earlier under the more limited schema most likely has other properties than it would have if added at a later point. Again, pragmatism according to the task is to be called for: A digital edition of texts will most likely opt for an XML-schemed approach like TEI, a database for network analysis for a graph database, or maybe the ILE developed by Owen et al., etc. —and a territorial infrastructure database with the prime purpose to fit socio-economic data at various scales a more conservative RDBM: it is easily accessible, can easily be expanded by adding tables at its outskirts, and thus it is comfortable to work with.

Nothing prevents NoSQL-databases to salvage its central elements, spreadsheets and tables (especially the gazetteer and the “entity table” of territorial and administrative entities) for their own purposes —the real key is data-sharing.¹⁵ For example, Tanck de Estrada's liberal policy concerning her data is a prime example of how the scientific community can be empowered by the readiness, and accessibility of interchangeable historical geographic data. With access to and use of her data we are able to populate our gazetteer with over 4,000 locations of Mexican Indian towns in one sweep, which helps us to check for their inclusion or exclusion in certain jurisdictions and track changes over time. We hope that our project, beyond the visualization of the evolution of territorial or-

ganization of the late Spanish Empire and beyond the ability to store normalized socioeconomic data, will likewise benefit the scientific community simply because we will not sit on the data but plan to make the geometries for key years freely accessible in standard data formats (xls, csv, shp), so even if our vernacular concepts of territoriality do not fit a specific epistemology or logic of sources, the data can be taken, fit to the purpose, refined, corrected or otherwise salvaged (Fig. 3 shows the basic concept of our database).

The core is the definition of the various vernacular and administrative entities that existed between 1701 and 1808, and to categorize them according to a set of standard types (*reinos*, provinces, jurisdictions, viceroalties, *audiencias*...) [Entity table]. A detailed reconstruction of the individual *curatos* will not be encompassed by the project because its reconstruction on such vast a space would exceed the available resources by far —because of their number and the frequent reorganizations, formations and suppressions over time, which are only locally documented. It may provide a field, though, where crowd-scholarship can be sparked by the HGIS. In a second table [Info table] we will define the properties (capital, title/type...) of entities for specific periods. A third kind of table [LCG tables] links the spatial features [LCG] to the entities. The name LCG stands for “least common geometry” and is a concept that has been successfully employed in the Belgian HGIS.¹⁶ This means that the spatial basis for our geodatabase is areas which share affiliation to the same entities throughout the whole period. Most often that means the LCG-polygons coincide with the jurisdictions, but —for example— if a town was moved to another jurisdiction at some date or if part of a jurisdiction responded to another dioceses in ecclesiastical matters, there are smaller LCG-particles. If at some later point we find out that a place changed from one jurisdiction to another, only two things need to be done: Identify the respective area, copy the records of the entity of which it is separated and change 1-2 lines to the LCG-tables for the new polygon, depending on where the information differs.

A special table [control table] testifies to our interpretation of the degree of effective control over an area by

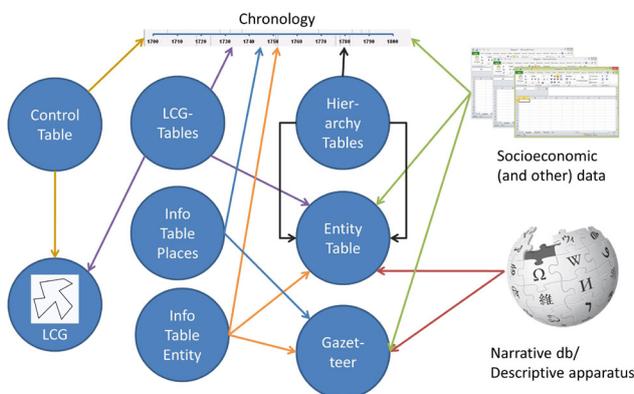


FIGURE 3: Database concept for HGIS Spanish America (simplified)

assigning various types of control to the LCGs for a period of time, ranging between type 1 “fully institutionalized administration” down to the really opaque type 5 “possible claim” for areas where it is not even clear whether the Spanish made a claim or not. The control table is only meant to keep track of the integration of an area in the Spanish sphere *per se*, and ignores short-time disruptions of colonial rule and rebellions.

Many ambiguities, uncertainties, and possible errors, however, —whether spatial, temporal, or conceptual— can be better addressed in a descriptive apparatus than represented in the spatio-temporal database itself. The apparatus shall be implemented as a Wiki-Database, and thus is supposed to become a cooperative component, related to the “timeless” entities.

PRELIMINARY WORK AND CONCLUSIVE WORDS

In the first stage, we start with a few sample areas to put the database structure to the test. The test areas are selected by a few criteria that might challenge the concept: first, Puno, because of the multiple administrative reassignments of its territory between Peru and Rio de la Plata, and between Cuzco, La Paz and Charcas; second, Yucatan/Tabasco because of the unclear border situation to Guatemala, the challenge of how to treat the Belize area, the cross-over of ecclesiastic authority of the bishopric of Yucatan over Petén (which in other matters was subject to Guatemala), and the particular situation of Tabasco as a distinct *gobierno* which in matters of finance nonetheless was subject to the intendancy of Yucatan; third, Popayán, like Puno split between two *audiencias*, with the additional challenges of the formation, suspension and renewed formation of the Viceroyalty of Nueva Granada, where the intendancy system was never introduced, and its frontier situation; and fourth the Chilean areas of Colchagua and Maule, each of which had to cede part of their respective territories to the newly formed subdelegation of Curicó in 1793.

The following paragraphs try to make the nature of the database vivid through the example of Puno. Figure 4 shows the identified populated places in the gazetteer and the LCG-polygons of the area in colonial times.

The methodology to build the geometries was to first identify the locations of the towns listed for each jurisdiction by Acevedo (1992) and Bueno (1764-1778) [Gazetteer, Table 1] and compare the result to the modern municipal territories of Peru and toponyms. Since the geographical literature is usually full of orthographic blunders (t for f, f for s, etc.) due to wrong transcription of sources (the effect is multiplied in when there are modern editions of colonial manuscripts) our project is also a tool for correcting many of these errors, not due to some superior skills, but simply because the identified locations have to be georeferenced and matched with existing place names: the misspelling found in geographical descriptions will be kept in the database as “alternative names” since more than likely these toponyms will be searched for frequently. The continuity at the provincial level between the colonial intendancy of

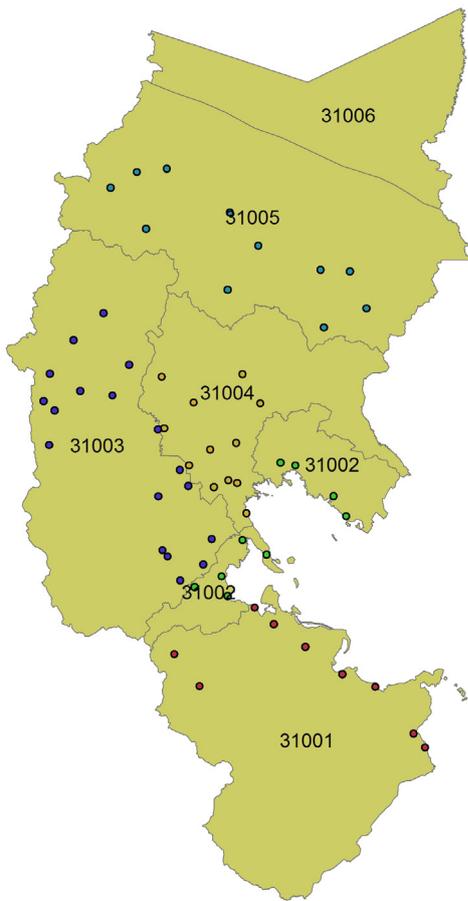


FIGURE 4: LCG polygons for the region of Puno and Gazetteer places

Puno and the modern Peruvian department is—as suspected—striking. Thus, without information to the contrary, we also assumed that a complete modern municipality fell into a certain colonial jurisdiction when there was at least one identified *pueblo* within its boundaries and when all these places belonged to the same jurisdiction. When there was no populated place and there was reasonable doubt about where to include a municipality, we checked an 18th-century map¹⁷ and the description of Bueno (1764-1778),

who makes notes about which jurisdiction borders which other to which compass direction.

One problem for Puno was the quality of “inner frontier” or lack of control in its northern part, where there is no clear distinction about where the jurisdiction of Puno ends and that of Cuzco begins. We already pointed out that a sensible reconstruction of the territorial development will have to account for both claim and effective control, even if such an interpretation will be plagued by ambiguities and *lacunae* which only detailed regional studies may be able to correct. For now, we simply drew a rough line where the highland area ends and the Amazonas-lowlands begin and made a separate LCG polygon (#31006) for the area north of it.

Second we identified all relevant entities for our scheme that existed in the area in Bourbon times [Entity Table, Table 2]. After that we tracked spatial and other qualitative changes between the jurisdictions in the 18th century from a variety of sources. According to our information, the LCG-geometries coincide with the five jurisdictions since apparently no town changed affiliation in the 18th century (LCG-Jurisdictions, Table 3). The LCG for the *Audiencias* is equally simple as that of the jurisdictions—in the case of Puno it is a purely hierarchical

TABLE 2: Entity Table sample

Entidad	Nombre	Variantes	tipo_vernacular
PE801	Chucuito		partido
PE802	Paucarcolla	Puno; Huancane; Guancane	partido
PE803	Lampa	Urcosuyo en el Collao	partido
PE804	Azangaro	Collasuyo del Collao; Huanta	partido
PE805	Carabaya		partido
AU022	Lima		audiencia
AU025	Charcas	La Plata	audiencia
AU030	Cuzco		audiencia
PE102	La Paz		provincia
PE153	Puno		provincia
PE132	Maynas	Mainas	provincia
PE071	Cuzco		provincia
OB028	Cuzco		obispado
OB029	Arequipa		obispado
OB030	La Paz		obispado
OB031	Charcas	La Plata	obispado
VI02	Peru		virreinato
VI04	Rio de la Plata		virreinato

TABLE 1: Gazetteer sample

G_ID	Label	Nombre	NombreHoy	X	Y	Partido	Provincia	REG	Pais	Cert.	Categoria
00002	Lima	Lima	Lima	12,0561399	77,0268021	Lima	LIMA	PER	PER	1	Corte
00011	Charcas	Charcas	Sucre	19,0494995	65,2482986	Charcas	CHARCAS	CHA	BOL	1	Villa/Ciudad
00016	Cuzco	El Cuzco	El Cuzco	13,5165796	71,9783707	Cuzco	CUZCO	PER	PER	1	Villa/Ciudad
00092	Arequipa	Arequipa	Arequipa	16,4006901	71,5364075	Arequipa	AREQUIPA	PER	PER	1	Villa/Ciudad
00095	Puno	Puno	Puno	-15,905161	-70,032644	Puno	PUNO	CHA	PER	1	Villa/Ciudad
00098	La Paz	La Paz	La Paz	-16,496194	-68,134209	La Paz	LA PAZ	CHA	BOL	1	Villa/Ciudad
00486	Lampa	Santiago de Lampa	Lampa	-15,364625	-70,367346	Lampa	PUNO	CHA	PER	1	Cabecera
00487	Chucuito	Chucuito	Chucuito	-15,894901	-69,890559	Chucuito	PUNO	CHA	PER	1	Cabecera
00488	Crucero	Crucero	Crucero	-14,358576	-70,024973	Carabaya	PUNO	CHA	PER	1	Cabecera
00489	Huancane	Huancane	Huancane	-15,198879	-69,763291	Huancane	PUNO	CHA	PER	1	Cabecera
00490	Azangaro	Azangaro	Azangaro	-14,908666	-70,196157	Azangaro	PUNO	CHA	PER	1	Cabecera
26207	Paucarcolla	Paucarcolla	Paucarcolla	-15,746317	-70,054922	Puno	PUNO	CHA	PER	1	Cabecera

relationship with the jurisdictions (LCG-Audiencias, Table 4). The properties of the jurisdictions (Info Table, Table 5) and the various hierarchical dependencies (Provinces, Table 6; Principal Divisions Table 7), however, changed more frequently.

In order to document the ambiguity for the northern frontier-zone, we assigned it synchronously to both Lam-

TABLE 3: Linktable LCG-Jurisdictions

Polygon	Entidad	START	START_ex	END	END_ex
31001	PE801	1701	not_after	1809	not_before
31002	PE802	1701	not_after	1809	not_before
31003	PE803	1701	not_after	1809	not_before
31004	PE804	1701	not_after	1809	not_before
31005	PE805	1701	not_after	1809	not_before
31006	PE805	1701	not_after	1809	not_before
31006	PE132	1701	not_after	1809	not_before

TABLE 4: Linktable LCG-Audiencias

Polygon	Entidad	START	START_ex	END	END_ex
31001	AU025	1701	not_after	1809	not_before
31002	AU025	1701	not_after	1809	not_before
31003	AU025	1701	not_after	1786	not_before
31003	AU030	1787	exact	1809	exact
31004	AU025	1701	not_after	1786	not_before
31004	AU030	1787	exact	1809	exact
31005	AU025	1701	not_after	1786	not_before
31005	AU030	1787	exact	1809	exact
31006	AU022	1701	not_after	1786	not_before
31006	AU025	1701	not_after	1786	not_before
31006	AU030	1787	not_after	1809	not_before

TABLE 5: Info Table for entities

Entidad	tipo	Nombre	cabecera	START	START_ex	END	END_ex
PE801	Corregimiento de indios	Chucuito	00487	1548	not_after	1577	exact
PE801	Gobierno	Chucuito	00487	1578	exact	1783	exact
PE801	Subdelegacion	Chucuito	00487	1784	exact	1809	not_before
PE802	Corregimiento de indios	Paucarcolla	26207	1569	not_after	1656	not_after
PE802	Corregimiento de indios	Paucarcolla	90001	1657	exact	1667	exact
PE802	Corregimiento de indios	Paucarcolla	00095	1668	exact	1783	not_after
PE802	Subdelegacion	Guancane	00489	1784	exact	1809	not_before
PE803	Corregimiento de indios	Lampa	00486	1569	not_after	1783	exact
PE803	Subdelegacion	Lampa	00486	1784	exact	1809	not_before
PE804	Corregimiento de indios	Azangaro	00490	1569	not_after	1783	exact
PE804	Subdelegacion	Azangaro	00490	1784	exact	1809	not_before
PE805	Corregimiento de indios	Carabaya	00488	1569	not_after	1783	exact
PE805	Subdelegacion	Carabaya	00488	1784	exact	1809	not_before
AU025	Audiencia	Charcas	00011	1560	exact	1809	exact
AU030	Audiencia	Cuzco	00016	1787	exact	1809	not_before
PE102	Corregimiento	La Paz	00098	1548	exact	1783	exact
PE102	Intendencia	La Paz	00098	1784	exact	1809	not_before
PE153	Intendencia	Puno	00095	1784	exact	1809	not_before
PE031	Intendencia	Arequipa	00092	1784	exact	1809	not_before
PE071	Corregimiento	Cuzco	00016	1548	exact	1783	exact
PE071	Intendencia	Cuzco	00016	1784	exact	1809	not_before
OB026	Obispado	Lima	00002	1541	exact	1545	exact
OB026	Arzobispado	Lima	00002	1546	exact	2014	not_before
OB028	Obispado	Cuzco	00016	1536	exact	2014	not_before
OB029	Obispado	Arequipa	00092	1577	exact	2014	not_before
OB030	Obispado	La Paz	00098	1605	exact	2014	not_before
OB031	Obispado	Charcas	00011	1552	exact	1608	exact
OB031	Arzobispado	Charcas	00011	1609	exact	2014	not_before

pa (PE805) and Cuzco (PE132) in the LCG Table of jurisdictions for the whole period, and to Charcas (AU025) and Lima (AU022) from 1701 to 1786 in the LCG table for *Audiencias* —since from 1787 onwards, both Lampa

TABLE 6: Hierarchy Table Jurisdictions-Provinces

Entidad_base	Provincia	START	START_ex	END	END_ex
PE801	PE801	1701	not_after	1783	exact
PE802	PE102	1701	not_after	1783	exact
PE803	PE071	1701	not_after	1783	exact
PE804	PE071	1701	not_after	1783	exact
PE805	PE102	1701	not_after	1783	exact
PE801	PE153	1784	exact	1809	not_before
PE802	PE153	1784	exact	1809	not_before
PE803	PE153	1784	exact	1809	not_before
PE804	PE153	1784	exact	1809	not_before
PE805	PE153	1784	exact	1809	not_before

TABLE 7: Hierarchy Table Jurisdictions-Principal Divisions

Entidad_base	Region	START	START_ex	END	END_ex
PE801	VI02	1701	not_after	1783	exact
PE802	VI02	1701	not_after	1783	exact
PE803	VI02	1701	not_after	1783	exact
PE804	VI02	1701	not_after	1783	exact
PE805	VI02	1701	not_after	1783	exact
PE801	VI04	1784	not_after	1795	exact
PE802	VI04	1784	not_after	1795	exact
PE803	VI04	1784	not_after	1795	exact
PE804	VI04	1784	not_after	1795	exact
PE805	VI04	1784	not_after	1795	exact
PE801	VI02	1796	not_after	1809	not_before
PE802	VI02	1796	not_after	1809	not_before
PE803	VI02	1796	not_after	1809	not_before
PE804	VI02	1796	not_after	1809	not_before
PE805	VI02	1796	not_after	1809	not_before

and Cuzco responded to the new *Audiencia* of Cuzco and there is no more ambiguity. Finally, in the control table (Table 8), the polygon was attributed categorized as “type 2” —frontier area of rather peaceful nature— throughout the whole period, and the other LCGs as “type 1” —fully institutionalized area. Running queries on the database for certain years leads to different maps of the area, as the maps in Figure 5 show.

TABLE 8: Control Table

Polygon	Tipo_Control	START	START_ex	END	END_ex
31001	1	1701	not_after	1809	not_before
31002	1	1701	not_after	1809	not_before
31003	1	1701	not_after	1809	not_before
31004	1	1701	not_after	1809	not_before
31005	1	1701	not_after	1809	not_before
31006	2	1701	not_after	1809	not_before

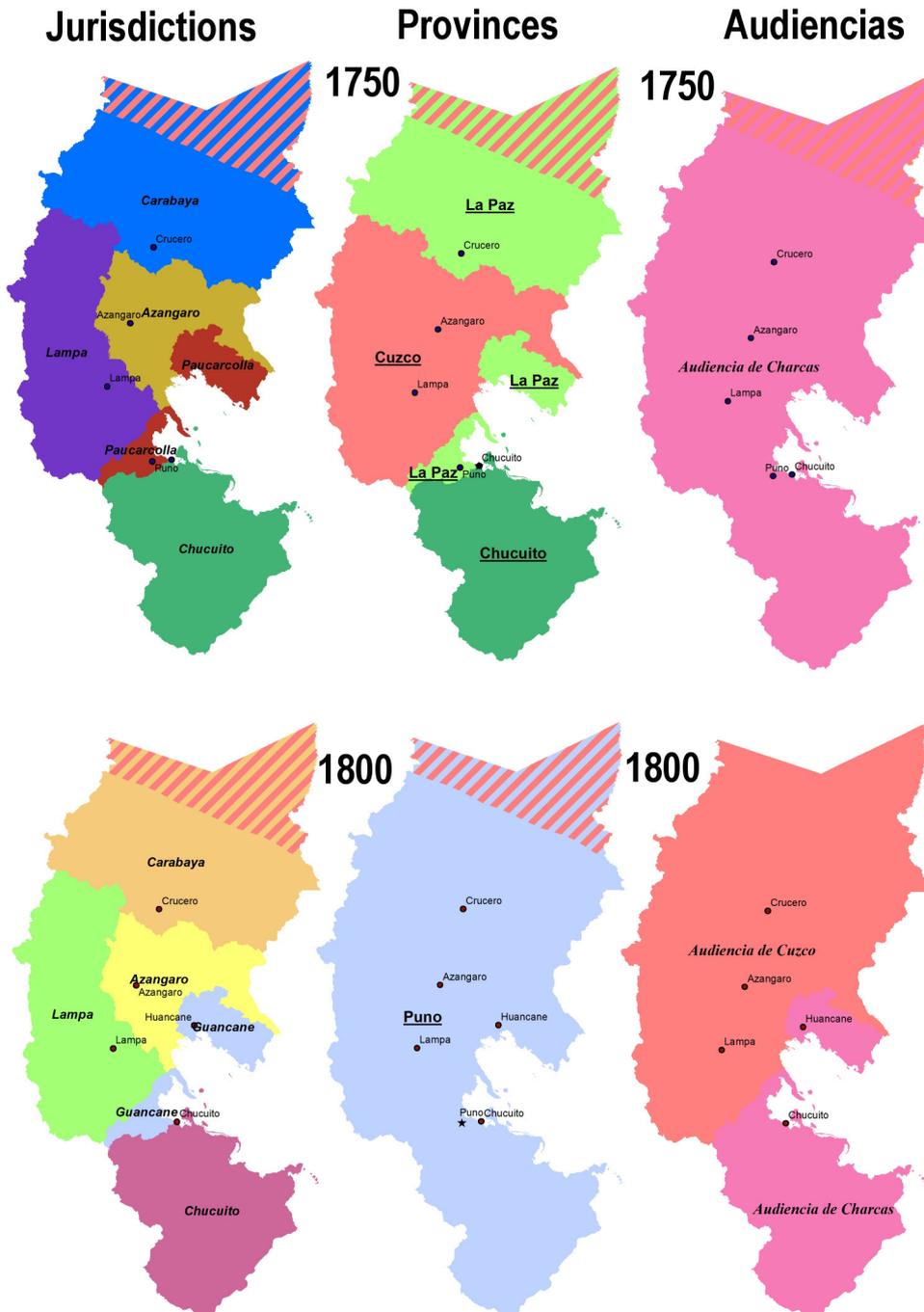


FIGURE 5: Results of various queries on the sample data

We try not to make false claims: our reconstruction of territory will not be able to represent all “vernacular” concepts of colonial Spanish American space. We will reduce complexity and therefore lose semantics in the process. The need to cover the whole Spanish American sphere will lead to a certain amount of error and the lack of precision in the sources (be they cartographic, descriptive, primary or secondary) to some arbitrary line-drawing. Our taxonomies and hierarchies will hardly be uncontested, nor will they fit every specific purpose. But they should suffice to incorporate most temporal socioeconomic data with a certain tolerance, and thus to make ample comparisons possible and *lacunae* visible.

As a final word I want to stress again the centrality of data sharing and would like to subscribe what Anne Knowles and her colleagues defined as important for the succeeding of HGIS:

It is essential that shared infrastructure enable [...] the preservation and maintenance of geospatial databases, and access to historical geospatial data via Internet-based resources. [...] For HGIS to succeed, we must continue to cultivate an ethic of sharing data and develop metadata standards [and] data formats [...] that make sharing practical (Knowles, Hillier & Balstad, 2008: 268-269).

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NOTES

1. <http://orbis.stanford.edu/> [accessed 15/February/2014]
2. <https://oeaw.academia.edu/JohannesPreiserKapeller> [accessed 15/February/2014]
3. <http://pendientedemigracion.ucm.es/info/cliwoc/index.htm> [accessed 15/February/2014]
4. <http://www.fas.harvard.edu/~chgis/> [accessed 15/February/2014].
5. <https://www.nhgis.org/> [accessed 15/February/2014]
6. <http://www.census.gov/geo/maps-data/data/tiger-line.html> [accessed 15/February/2014]
7. This anecdote is reproduced in many works, e.g. Peters (2004: 235, endnote 80); however, I have not been able to identify its original source.
8. http://commons.wikimedia.org/wiki/File:Audencias_of_Viceroyalty_of_Peru.PNG [accessed 16/March/2014]
9. A principle which is often confused with the—in fact almost contrary—“simple” *uti possidetis*, where the effective control guides the decision making, not the juridical title.
10. “It is not sure where the limits of New Spain have to be assigned to the north and east. It is not enough that a land has been visited by a missionary monk, or that a coast has been seen by a ship of the royal marine in order to consider this or that land part of the Spanish colonies of America.” I am indebted to Torre (2005: 299), where I first found this quote.
11. I.e. districts of high courts (*audiencias reales*) whose presidency was united with the office of Viceroy or Captain-General.
12. Carvallo’s work dates from 1796 but remained unpublished until 1875/6.
13. It has to be acknowledged that in Arrowsmith’s companion-atlas, the reference to Alcedo in the title was nothing more than a PR move to sell his overworked earlier maps. On the sheets Arrowsmith mentions the various additions and earlier versions of his maps, and nowhere he actually claims that he incorporated information from Alcedo himself.
14. A principle backed by the generally strong territorial continuities which make it even possible to use colonial administrative divisions as a source for reconstructing precolumbian territories (Herrera Ángel, 2006; Tomaszewski and Smith, 2011).
15. Once data are freely available, it is amazing to which extremes use can be taken. For example, the data of the CLIWOC project mentioned in the opening paragraph has been used as source for the highly suggestive temporal visualizations by James Cheshire, Ben Schmidt and others. The visualizations have become quite popular by videos on Youtube or inclusion in blog entries of the “50 maps to understand the world”-type spread through social media. James Cheshire’s original maps: <http://spatial.ly/2012/03/mapped-british-shipping-1750-1800/> [accessed 15/February/2014]; an overworked version has been published in D’Efilippo & Ball (2013: 92-93); Ben Schmidt’s video of “100 years of ships” <http://youtu.be/tnqxrcFUMsw> and “One year of ships” <http://youtu.be/EcHZ9fSdktM> [accessed 15/February/2014].
16. http://www.hisgis.be/start_en.htm [accessed March 15th, 2014], under “Technical Background”.
17. Archivo General de Indias [AGI], Mapas y Planos, Buenos Aires 154.

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