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TERRITORIAL DISCONTINUITY AND THE FORMATION OF URBAN VOIDS: A GROWTH PATTERN IN INTERMEDIATE CITIES IN THE STATE OF SÃO PAULO

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Abstract

Urban voids are a phenomenon of contemporary urbanization, characterized by dispersion, sprawl, discontinuity, and fragmentation. They emerge from the interplay between urban expansion and speculative land retention, constituting both a process and a consequence of prevailing ways of producing "city." This article stems from research conducted to investigate whether, between 1950 and 2020, urban expansion, marked by the presence of urban voids, constitutes a physical-temporal pattern in intermediate cities across the state of São Paulo. The study analyzed the evolution of the urban areas and perimeters of eleven municipalities through mapping and characterization records. The findings have confirmed a growth pattern in the urban fabric marked by territorial discontinuity, with peripheral, interstitial and vacant-lot voids, in which four strategic periods of urban sprawl were distinguished. The approach challenges the predominant perspective regarding the onset of urban sprawl in intermediate cities throughout the state, offering a historical and comparative analysis that may inform public policies and contribute to broader reflections on the urban expansion pattern in the interior of the state of São Paulo.

Keywords

Urban Voids; Urban Sprawl; Urban Legislation; Urban Planning; Urban and Regional Management; Socio-Spatial Segregation; Intermediate Cities in the State of São Paulo.

ARTIGOS

DESCONTINUIDADE TERRITORIAL E FORMAÇÃO DE VAZIOS URBANOS: UM PADRÃO DE CRESCIMENTO EM CIDADES MÉDIAS PAULISTAS

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Resumo

O vazio urbano é um fenômeno da urbanização contemporânea, caracterizado pela dispersão, espraiamento, descontinuidade e fragmentação. Resulta da relação entre expansão urbana e retenção especulativa de terras, configurando-se como processo e consequência dessa forma de produzir "cidade". Este artigo é fruto de uma pesquisa destinada a verificar se, entre 1950 e 2020, a expansão urbana marcada pela presença de vazios constitui um padrão físico-temporal em cidades médias paulistas. Analisou-se a evolução da mancha urbana e do perímetro urbano de onze municípios por meio de mapeamentos e fichas de caracterização. Os resultados comprovaram um padrão de crescimento da malha urbana caracterizado pela descontinuidade territorial, com vazios periféricos, intersticiais e de lotes, sendo distinguidos quatro períodos estratégicos da dispersão urbana. A abordagem instiga a perspectiva predominante sobre o início do processo de dispersão urbana nas cidades médias paulistas, oferecendo uma análise histórica e comparativa que pode subsidiar políticas públicas e reflexões sobre o padrão de expansão urbana no interior paulista.

Palavras-chave

Vazios Urbanos; Dispersão Urbana; Legislação Urbanística; Planejamento Urbano; Gestão Urbana e Regional; Segregação Espacial; Cidades Médias Paulistas.

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Introduction

Urban voids refer to the existence of idle or underutilized spaces within the urban area. These spaces often appear as vacant plots or parcels of land, disrupting the continuity of the urban fabric and morphologically reflecting the effects of dispersive urban growth. The concept of "urban void" is polysemic, encompassing a range of conditions from the absence of built structures to situations of vacancy, abandonment, disuse, or the underutilization of urban areas (Moreira, 2024).

From a socio-spatial perspective, urban voids—in their dual dimension as *void*, signifying an absence of material content or use, and *urban*, as the product of social labor—embody, within the territory, the material expression of the perversity of social inequalities. As Clichevsky (2000) has argued, their formation is closely linked to the dynamics of the land market and speculative practices carried out by both public and private actors. Vacant land, governed by the interests of private property, plays a strategic role in the valorization of urban land, functioning as a concrete expression of inequality and segregation.

Urban voids are part of the dynamics of dispersed urbanization, which has become the dominant mode of spatial production in the contemporary Western world since the mid-twentieth century (Reis, 2006; Maia; Leonelli, 2020). Dispersion should be understood both as a process and as a form. As a process, it is associated with the emergence of a new spatial pattern shaped by technical-scientific-informational advances (Santos, 1997). The development of transportation and communication technologies has intensified the flows of people, goods, and information, thereby fostering the sprawl of urban activities (De Mattos, 2004).

As a form, dispersion gives rise to expansive, low-density territories fragmented into isolated urban clusters (Reis, 2006).

Dispersed urban expansion in Latin American cities has been investigated from various perspectives, including real estate speculation, changes in urban density, and socio-spatial dynamics. This phenomenon stems from a combination of population growth, shifts in economic patterns, and a lack of integrated urban planning (Maturana et al., 2021; Duque et al., 2019). Within this context, the use of spatial indicators to analyze urban expansion proves especially valuable, since it enables the identification of large-scale patterns. According to Wu et al. (2021), urban expansion in cities such as São Paulo, Mexico City, Buenos Aires, Bogotá, and Santiago can be characterized by a combination of concentric rings and spatial grids. The authors demonstrated that built-up areas are more concentrated in the urban core and become increasingly dispersed toward the peripheries, where growth occurs in a fragmented manner, lacking territorial continuity, marked by low density, and through the conversion of agricultural land into urban land with no proper provision of services.

The urban form of Spanish American cities tends to be more compact than that of Brazilian cities, largely due to rugged topography and natural constraints (Wu et al., 2021). The Andes Mountains, coupled with intense tectonic activity (involving the South American, Caribbean, Cocos, and Nazca plates), and volcanism associated with the Pacific Ring of Fire, have shaped the terrain of these cities, which has been marked by mountains, plateaus, and depressions (Audin et al., 2016). These physical barriers have restricted urban growth and, within metropolitan areas, often redirect expansion toward adjacent cities[1]. In contrast, although some Brazilian cities—such as Rio de Janeiro and Belo Horizonte—are located in more irregular terrain, much of Brazil's urban development has taken place on plateaus and less rugged depressions. Furthermore, only 0.63% of Brazilian territory is urbanized (Farias et al., 2017), which has facilitated large-scale expansion and sprawl of cities when compared to neighboring countries. Thus, while regional analyses of urban dispersion are particularly relevant to Spanish American cities, both regional

1. **Bucaramanga** (**Colombia**), located on a mountainous plateau, expanded toward municipalities at lower altitudes, such as Floridablanca and Girón. **Quito** (**Ecuador**), surrounded by mountains and volcanoes, expanded toward Cumbayá and Tumbaco, where the terrain is more favorable. **La Paz** (**Bolivia**), situated in a deep canyon, faced limited possibilities for occupation, prompting the growth of El Alto on the plateau above. **Medellín** (**Colombia**), in the Aburrá Valley, encountered natural barriers and expanded toward nearby municipalities such as Bello and Envigado. **Arequipa** (**Peru**), encircled by volcanoes and mountains, grew toward peripheral areas like Cerro Colorado and Socabaya. **Santiago** (**Chile**), constrained by the Andes and the Coastal Range, directed its expansion toward cities in the Central Valley, such as Puente Alto, Maipú, and San Bernardo. These cases illustrate how topography influences land occupation, restricting direct urban expansion and promoting dispersion into adjacent areas.

and intra-urban approaches are necessary to understand the Brazilian context. Although urban dispersion is well documented in Brazilian metropolises, it has also significantly affected intermediate municipalities in the interior of São Paulo following the industrial deconcentration of the 1970s. These municipalities became incorporated into the regional productive systems, gaining economic prominence through industrial attraction and the consolidation of commercial, service, and educational hubs (Reis, 2006). Demographically, they have expanded substantially in both number and size over the past 50 years (IBGE, [n.d.]a). However, this growth has occurred in a fragmented, "leapfrogging" manner, with peripheral areas increasingly distant from the traditional urban core, culminating in the proliferation of urban voids.

Studies on fragmented and dispersed urban space have gained prominence in Brazil, particularly since the 2000s, with a focus on large cities and metropolitan regions[2]. These studies, as a rule, have prioritized case analyses, whereas the present work adopts a comparative perspective encompassing different localities. In the case of intermediate cities in the state of São Paulo, although the literature has addressed urban dispersion as a historical process, it tends to situate its onset in the 1970s (Reis, 2006; Eigenheer; Somekh, 2017), linking it to the industrial deconcentration from the capital. This study proposes a broader analysis, taking earlier periods into account and aiming to identify recurring territorial and morphological patterns that may help to broaden the historical understanding of the phenomenon.

The aim of this article is to determine whether urban expansion, characterized by the presence of voids, has constituted a pattern of urbanization in intermediate cities in the interior of the state of São Paulo since the mid-twentieth century. In the discussion section, an analysis of urban dispersion is presented across four periods of time, beginning in the 1950s and 1960s and extending to more recent developments. These periods encompass the intensification of territorial discontinuity, the simultaneous occupation of older voids and the creation of new ones; the real estate boom; and, from the 2000s onwards, the strategic promotion of developable land. The article explores various patterns and typologies of urban voids, with particular emphasis on peripheral and interstitial forms. It also considers how environmental factors—such as topography and the presence of

2. Among the key contributions are those from the Laboratory for Studies on Urbanization, Architecture, and Preservation (FAUUSP), coordinated by Nestor Goulart Reis, and NEPO (Unicamp). In the context of intermediate cities in São Paulo State, the GAsPERR laboratory (Unesp), coordinated by Maria Encarnação Beltrão Sposito, and the LabDUC (Unesp), led by Estevam Vanale Otero, offer important perspectives, particularly regarding local specificities and real estate dynamics.

natural resources—influence the direction of urban expansion, while failing to prevent the persistence of territorial discontinuities.

This study contributes to the theoretical field by challenging the prevailing perspective regarding the origins of urban dispersion in intermediate cities in the state of São Paulo, proposing a historical analysis that identifies patterns emerging prior to the 1970s. Methodologically, it is distinguished by its comparative approach, encompassing multiple municipalities, and by its use of thematic mapping to reveal recurring morphological patterns. Moreover, the study provides valuable insights for public policies aimed at promoting more planned urban land occupation. It encourages critical reflections on socio-spatial inequalities, the impact of urban voids on territorial organization, and the pattern of urban expansion adopted in the interior of the state of São Paulo.

1. Materials and methods

To identify the pattern of dispersed urban growth and the formation of urban voids, a descriptive-analytical-comparative methodology was adopted. This approach enables the identification of similarities, differences, and patterns in urban processes across distinct socio-spatial contexts, linking theory and empirical evidence.

The methodology was applied to eleven intermediate cities in the state of São Paulo, selected for their significance within the urban network of the state. These cities play intermediary roles, articulating regional and local dynamics, which renders their territorial expansion particularly relevant for understanding the phenomenon of urban dispersion and the consequent formation of urban voids in São Paulo—the most populous and economically prominent state in Brazil. The research was structured into four main stages:

i. ***Data collection and compilation***: Demographic, economic, social, and territorial data were gathered from both primary and secondary sources, such as the Brazilian Institute for Geography and Statistics (IBGE) and Ipeadata. Territorial information, including maps showing the evolution of the urban area, zoning maps, cadastral plans, and environmental maps, was collected from municipal governments, particularly through departments of urbanism and planning. Academic work, such as theses and dissertations, also contributed to a broader understanding of the local spatial dynamics, enabling subsequent comparisons across municipalities, something that would not have been feasible relying solely on primary data. Another essential source was the digital platforms of city councils,

from which urban legislation was retrieved, including master plans, land use and zoning legislation, and regulations on the expansion of urban perimeters. Approximately 450 legislative documents were consulted. During data collection, an effort was made to distinguish between units of observation (e.g., maps and legislation) and units of interpretation (e.g., morphological patterns), thereby ensuring greater analytical clarity.

ii. ***Systematization of information:*** The data were organized into standardized records for each municipality, containing information on the rates of urban population growth, urban expansion (urban fabric and developable land), and environmental and topographic aspects. This process enabled a systematized comparative analysis.

iii. ***Development of visual elements:*** Maps, charts, and infographics were created to illustrate and compare the territorial dynamics of each city. The synthesis maps depict the evolution of the urban footprint and the urban perimeter of the eleven municipalities analyzed, displayed side by side and subdivided by decade. Coverage radii were drawn, measuring the spatial distance from the traditional city center to the outermost urban lot—both in terms of the urban fabric (subdivisions) and the urban perimeter (developable areas)—which enabled a detailed analysis of urban sprawl. This approach enabled the construction of a broad historical periodization and the visual representation of growth characterized by territorial discontinuity over seven decades in the intermediate cities in the state of São Paulo.

iv. ***Comparative analysis*:** Building on the previous stages, a detailed comparative analysis was conducted across the municipalities, identifying patterns, similarities, and differences in the dynamics of urban dispersion and the formation of urban voids. This phase articulated the relationships between the general, the particular, and the singular, enabling the recognition of both recurring trends and local specificities.

The selected cities were based on a study of the 2018 Areas of Influence of Cities (REGIC), conducted by IBGE (2020), which classifies urban centers according to their territorial and regional relevance. The municipalities predominantly belong to the categories Regional Capital B and C, and Sub-Regional Center A, reflecting their strategic role within the Brazilian urban network[3].

3. In REGIC 2018 (IBGE, 2020), Ribeirão Preto was reclassified as Regional Capital A. However, its inclusion in this study is justified by its previous classification as Regional Capital B in REGIC 2008, thereby maintaining consistency with the criteria originally adopted for the selection of the cases analyzed.

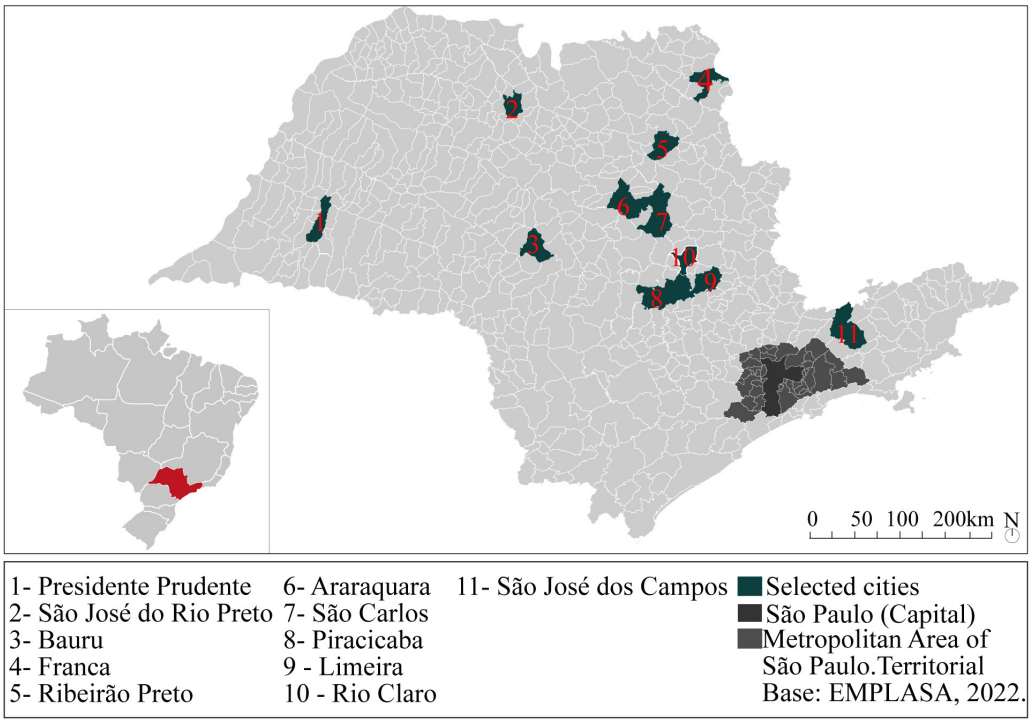


Figure 1. Locations of the selected municipalities

Source: Own elaboration based the EMPLASA, 2022 cartographic model.

The temporal scope of this study spans from 1950 to 2020, and is divided into three historical phases: 1950 to 1970, marked by rural exodus and agricultural mechanization; 1970 to 1990, characterized by industrial decentralization; and 1990 to 2020, a period defined by shifts in consumption patterns and the production of urban space. Incorporating these temporal and spatial dimensions was crucial to capturing the complex articulations and discontinuities that have shaped the processes of urban dispersion and the formation of urban voids in the contemporary urbanization of the municipalities examined.

The adopted methodology integrates the articulation between geographic scales, the analysis of processes and forms, and the relationship between space and time, as proposed by Sposito (2016). This approach enables an understanding of how patterns of urban dispersion and the formation of urban voids emerge in specific contexts while remaining connected to the broader dynamics of contemporary capitalism.

2. Results

An analysis of urban dispersion and the formation of urban voids in intermediate cities in the state of São Paulo was structured through a historical periodization divided into four phases: (i) the onset of territorial discontinuity in

the 1950s and 1960s; (ii) its intensification during the 1970s and 1980s; (iii) the simultaneous occupation of older voids and the creation of new ones between the 1980s and 1990s; and (iv) contemporary transformations, marked by intensified real estate activity between 2000 and 2020. The 1980s feature in two of these temporal segments, encompassing both the peak of territorial discontinuity (1970–1980) and the initial occupation of interstitial voids alongside the emergence of new peripheral voids (1980–1990), thereby reflecting its significance as a transitional moment in urban dynamics.

The analysis examines patterns and typologies of urban voids, such as peripheral and interstitial forms, and considers the influence of environmental factors, including topography and natural resources, on the territorial expansion. These factors are discussed as drivers, rather than barriers, of urban discontinuity.

This section traces the morphological transformations of the urban fabric over more than seven decades, contextualized within the history of dispersed urbanization. It examines the influence of demographic, economic, legislative, and social dynamics on the development of a discontinuous urban fabric marked by urban voids. The analysis is organized chronologically by decade to facilitate an understanding of the progression of urban dispersion.

To facilitate understanding, the figures — including charts and maps — are presented either immediately before or after their first mention in the text, and may be revisited to reinforce comparisons or to support complementary analyses. This arrangement ensures that temporal and spatial patterns are displayed clearly and comparably across the periods analyzed. The maps depict the urban expansion of the 11 studied cities over several decades, thereby enabling a comparative visualization of territorial evolution. However, for the municipalities of São Carlos and Presidente Prudente, distinguishing urban growth in the 1950s from that in the 1960s are unavailable. Thus, in these two cases, the maps show the cumulative expansion from 1950 to 1969, whereas for the other municipalities, urban expansion has been presented separately by decade.

2.1. Period 1: 1950 to 1960 – The onset of territorial discontinuity

The urbanization of intermediate cities in the state of São Paulo was largely driven by the coffee economy, which from the nineteenth century onward was stimulated by the construction of railways throughout the interior of the state (Tavares, 2018). This infrastructure development facilitated industrialization, initially concentrated in the state capital, São Paulo, supported by subsidies for infrastructure works, sanitation, and urban beautification. These measures helped consolidate the intermediate cities as regional hubs for services and diverse economic activities. Although the capital played a central role, the state's urban

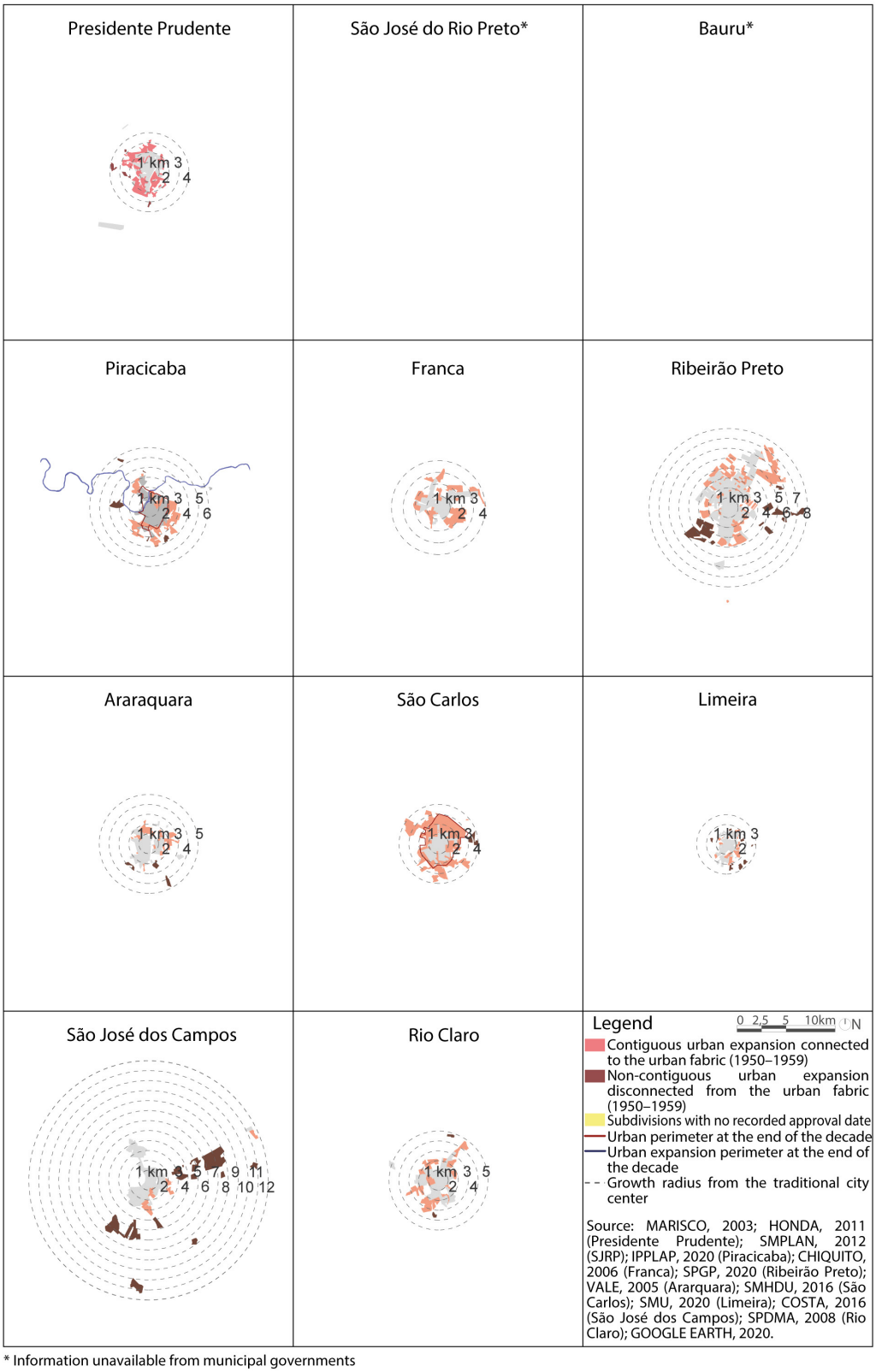
network evolved regionally in differentiated ways, with distinct areas of influence and varied economic and social characteristics (Lencioni, 2015).

In the 1940s, a decade after the decline of the coffee economy, the commerce and services sector became the leading contributors to GDP in most of the municipalities studied. However, Limeira, Presidente Prudente, and Rio Claro continued to exhibit agricultural predominance (IPEA, [n.d.]). During this period, the urban fabric of these cities was predominantly continuous, with notable exceptions such as Ribeirão Preto and Limeira. In Ribeirão Preto, territorial discontinuity arose at the end of the nineteenth century when the Antônio Prado colonial nucleus became separated from the city center by the railway (Melo, 2017). In Limeira, the development of subdivisions in the 1940s led to the creation of interstitial voids, even where these areas remained contiguous to the consolidated urban fabric (Maia, 2019).

In the 1950s, the selected intermediate cities underwent significant urban population growth alongside an intensification of industrial activities, especially in the eastern region of the state. This era was marked by the "pursuit of progress" and the construction of road corridors that connected these cities to the state capital and neighboring states. Noteworthy infrastructure projects include the paving of the Anhanguera Highway, extending to Campinas and Limeira, as well as the construction of the Presidente Dutra Highway through the Paraíba Valley, linking São Paulo to Rio de Janeiro (Bordo, 2005).

To illustrate this period, ***the synthesis map depicting the evolution of the urban area and the urban perimeter in intermediate cities in the state of São Paulo between 1950 and 1959*** (Figure 2) presents the onset of territorial discontinuity, with the formation of isolated urban fragments located away from the consolidated urban fabric in several municipalities[4].

4. This initial pattern will be further explored in the following sections, with new maps that follow the same analytical and representational structure.



* Information unavailable from municipal governments

Figure 2. Evolution of the urban area and the urban perimeter of intermediate cities in the state of São Paulo between 1950 and 1959

Source: Own elaboration.

The mapping approach distinguishes the original urban area in gray, with subsequent subdivisions developed over the decade shown in color. Lighter shades indicate areas integrated into the existing urban fabric, while darker shades represent non-contiguous fragments. Dashed gray circles represent the radii (in kilometers) extending from the traditional center to the outermost lot. Red lines delineate the urban perimeter, while blue lines indicate the expansion perimeter, more commonly visible in maps from the 1980s onward, reflecting greater data availability from municipal governments.

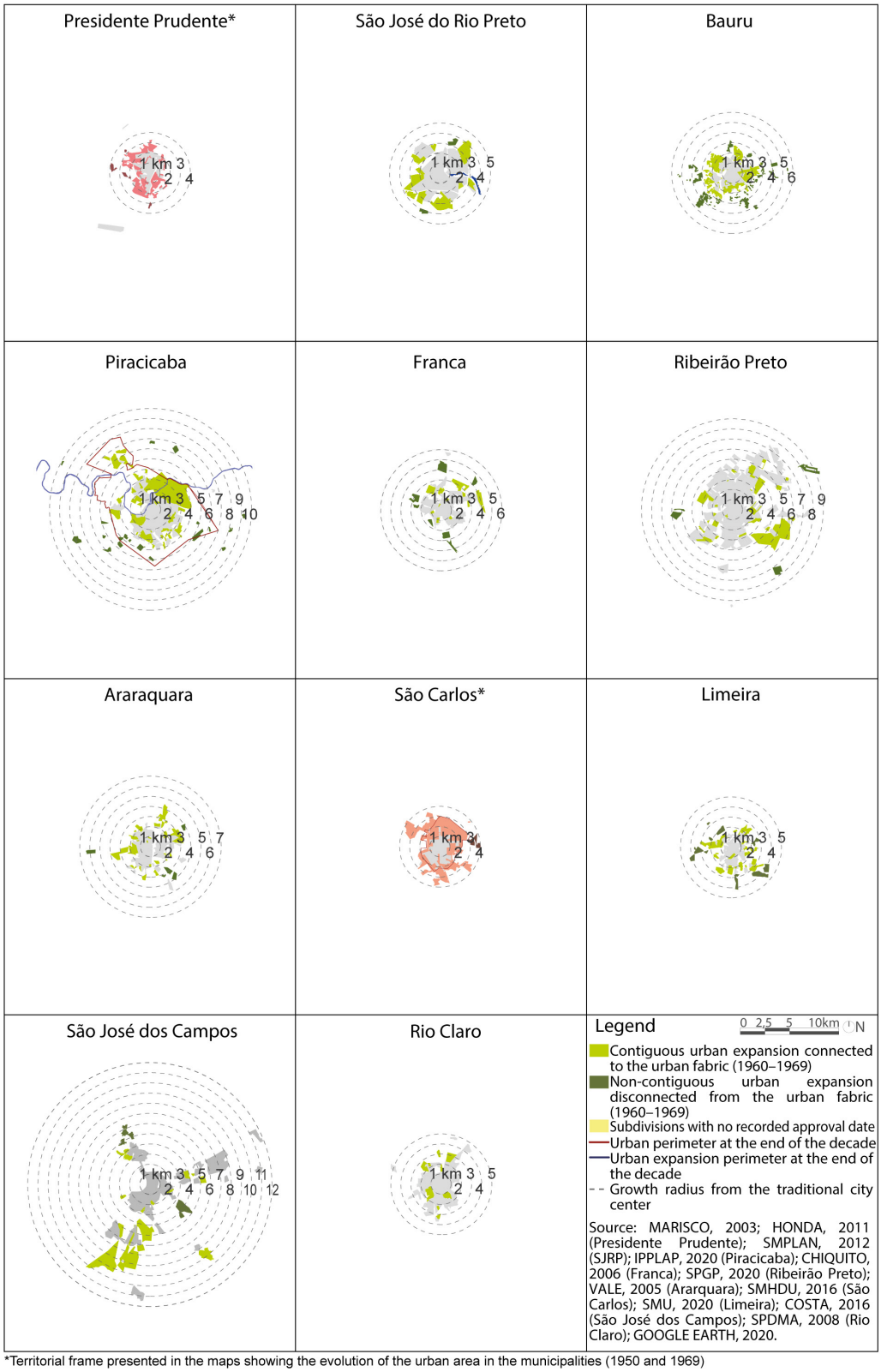
Notable instances of urban expansion may be observed in Piracicaba, Ribeirão Preto, and Araraquara, where non-contiguous urban fragments emerged approximately two kilometers from the consolidated urban fabric. São José dos Campos is particularly outstanding for its distinctive linear growth along the Presidente Dutra Highway (East-West axis), with urban clusters forming nearly 12 kilometers from the center.

From a demographic standpoint, these municipalities experienced high rates of urban population growth between 1950 and 1959, often surpassing the national annual average of 5.15%. Key examples include Presidente Prudente (6.10%), Piracicaba (5.59%), Franca (5.45%), Ribeirão Preto (6.22%), Araraquara (5.2%), and São José dos Campos (7.9%) (IBGE, [n.d.] b).

The 1960s saw the continuation of road infrastructure projects initiated in previous years, extending across both intraurban and regional scales (Bordo, 2005). During this period, the military dictatorship implemented federal planning and housing initiatives, such as the Federal Housing and Urbanism Service (SERFHAU) and the Housing Companies (COHABs), which spurred peripheral urban expansion. SERFHAU facilitated the development of master plans and land-use legislation, while COHABs concentrated on constructing housing complexes, a process that intensified further from the 1980s onward.

The ***synthesis map depicting the evolution of the urban area and the urban perimeter between 1950 and 1959*** (Figure 3) highlights the trend of non-contiguous territorial expansion and an increase in physical separation between the most remote subdivisions and traditional urban centers. This growth was not limited to isolated subdivisions established in distant locations but also introduced new expansion vectors aimed at “attracting” development and valorizing land plots situated along these routes.

For example, in the southern part of Ribeirão Preto, a subdivision emerged two kilometers from the consolidated urban fabric. Piracicaba exhibited an even more dispersed pattern, with isolated subdivisions spreading out into multiple directions. Notably, during the 1960s alone, Piracicaba’s radius of influence expanded by four kilometers, a spatial configuration that remained largely unchanged until 2010.



*Territorial frame presented in the maps showing the evolution of the urban area in the municipalities (1950 and 1969)

Figure 3. Evolution of the urban area and the urban perimeter of intermediate cities in the state of São Paulo between 1960 and 1969

Source: Own elaboration.

2.2. Period 2: 1970 a 1980 – The intensification of territorial discontinuity

From the 1970s onward, the development of intermediate cities in the state of São Paulo was largely driven by federal policies aimed at decentralizing industry from the state capital and promoting development in the interior (Brandão; Macedo, 2007; Lencioni, 2004), particularly through the National Development Plans and the National Urban Development Policy (Goulart; Terci; Otero, 2013). Additionally, municipalities such as Ribeirão Preto, Araraquara, Araçatuba, Bauru, São Carlos, São José do Rio Preto, Piracicaba, and Presidente Prudente benefited from the Proálcool program, which positioned São Paulo as a leading center for sugarcane-alcohol technology (Silva, 2018).

At the state level, various regional plans were developed to structure the territory of São Paulo and promote industrial expansion beyond the São Paulo Metropolitan Area (SPMA). Notable among these were the "Regional Action Plan" (1971), which set administrative guidelines; the Highway Plan for the Interiorization of Development (1972); the "Project Counter Plan" (1974), designed to provide strategic guidance to managers and entrepreneurs; and the Intermediate Cities Program (1977), which funded 76 cities across Brazil, 40 of which were in the interior of São Paulo (Steinberger; Bruna, 2001). In addition, research and technology hubs were created, especially in the Campinas region, to assist in defining corporate location strategies.

At the local level, municipalities competed to attract industries through tax incentives, the creation of industrial districts, and urban infrastructure improvements. However, despite targeted economic development initiatives, cities such as São José do Rio Preto and Bauru did not emerge as major industrial hubs. In Bauru, the 1968 Master Plan established guidelines for the creation of an industrial district, while in São José do Rio Preto, the Municipal Industrialization Commission was created in 1969, followed by PRODEI in 1970, to promote industrial expansion in the region (Teodózio, 2008). Despite these incentive measures, the tertiary sector has remained predominant in these municipalities since the 1940s. Although the industrial sector gained greater representation in municipal GDPs during the 1980s—reaching 27% in São José do Rio Preto and 34.6% in Bauru—it continued to lag behind the tertiary sector, which accounted for 68% and 61.3%, respectively (Ipea, n.d.).

The ***synthesis map depicting the evolution of the urban area and the urban perimeter from 1970 to 1979*** (Figure 4) illustrates an intensification of territorial discontinuity due to industrial decentralization and rapid demographic growth in the interior of the state.

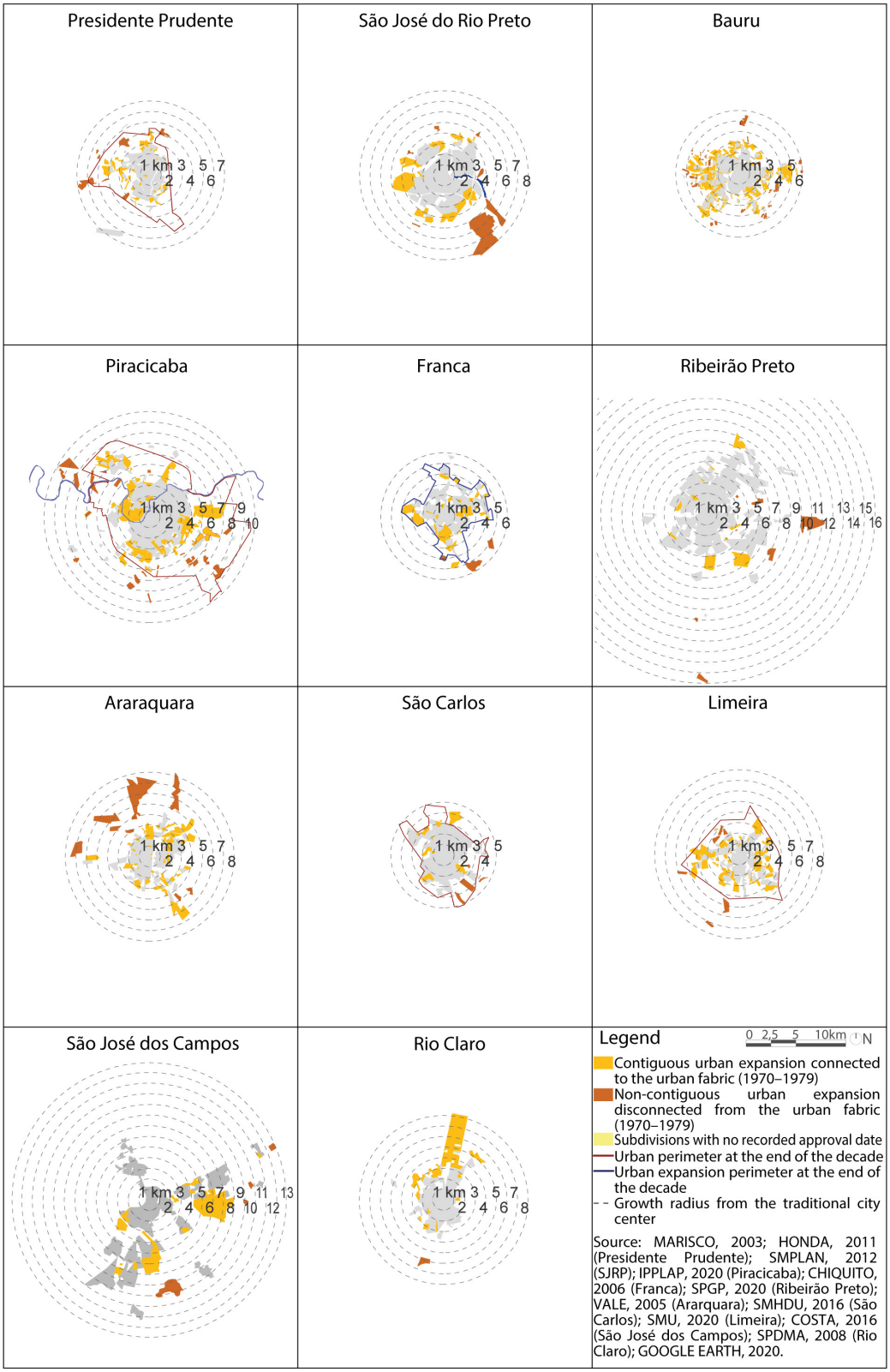


Figure 4. Evolution of the urban area and the urban perimeter in intermediate cities in the state of São Paulo between 1970 e 1979

Source: Own elaboration.

Figure 4 illustrates a significant increase in the distances between traditional centers and the outermost urban lots, reflecting the expanding spatial radius of urban reach. Ribeirão Preto experienced the most pronounced growth, with a 7 km extension, marking the onset of expansion along the southern axis, and area later consolidated over subsequent decades by high-income housing developments. Presidente Prudente, São José do Rio Preto, Limeira, and Rio Claro each recorded increases of approximately 3 km, while Araraquara, São Carlos, and São José dos Campos showed a 1 km increase during the 1970s. In contrast, Bauru, Piracicaba, and Franca maintained a stable radius of urban reach.

Despite these variations, all the analyzed municipalities exhibited growth in the urban fabric, typically occurring in leaps, driven by the implementation of new subdivisions. In some instances, these subdivisions incorporated industrial districts, as observed in Rio Claro, Franca, and Piracicaba. The expansion process progressed with no major physical barriers, as the topography of intermediate cities in the state of São Paulo is predominantly conducive to urbanization. However, both formal and informal processes led to the occupation of risk-prone and otherwise unsuitable areas.

Throughout the twentieth century, the ideology of progress in intermediate cities across the state of São Paulo encouraged the construction of marginal roadways near water resources, which were often perceived as obstacles to be overcome through rectification, canalization, or bridge building. In Bauru, housing complexes were built on floodplains, while in São Carlos and Piracicaba, the urban fabric expanded over canalized streams. Araraquara saw neighborhoods constructed over an aquifer, thereby exacerbating groundwater contamination. Franca promoted low-cost subdivisions near gullies due to the affordability of the land, while other unsuitable areas were filled in and sold. In São Carlos, housing complexes were developed to the south of the established urban fabric, overcoming water barriers and increasing the daily commuting distances for low-income residents. Meanwhile, in São José dos Campos, expansion followed a southern trajectory—despite fewer water resources—resulting in the occupation of environmentally fragile areas. Throughout this process, local urban legislation facilitated the establishment of recreational second homes and gated communities, while informal settlements emerged in precarious conditions.

In this context, an analysis of physical and environmental conditions refutes the notion that territorial discontinuity stems from the necessity to overcome natural barriers. On the contrary, these areas were occupied to meet real estate demands, often disregarding essential environmental precautions and the well-being of residents.

As indicated in the literature (Reis, 2006; Eigenheer; Somekh, 2017) and confirmed by this research, the 1970s and 1980s saw the most significant expansion of subdivided areas within the study period. Alongside the development of industrial districts, the construction of social housing became particularly prominent. Housing companies such as COHABs and INOCOOP played a key role in this process, particularly in peripheral areas, bringing infrastructure and added value to the land parcels located "along the way".

In the 1980s, approximately 2,800 lots were developed in the northern and western regions of Presidente Prudente (Albano, 2013). São José do Rio Preto registered 5,000 lots in the northern and northeastern regions between the 1980s and 1990s (Vasconcelos, 1992), while Bauru recorded 19,690 lots (Otero, 2016), Ribeirão Preto 23,543 in the northern and western zones (Santos, 2017), and Limeira 21,300 lots during the same period. Additionally, in municipalities such as São Carlos, Araraquara, Piracicaba, and São José dos Campos, social housing developments emerged in peripheral areas (Vale, 2005; Otero, 2016; Costa, 2016).

This phase was marked by a substantial increase in urban voids, both peripheral and interstitial, linked to the expansion of urban perimeters and the implementation of subdivisions remote from the consolidated urban fabric. The ***synthesis map depicting the evolution of the urban area and the urban perimeter from 1980 to 1989*** (Figure 5) demonstrates that, as of 1980, peripheral voids began to be filled with new subdivisions, while new interstitial voids emerged between these developments. This pattern of "city production" persisted over subsequent decades, intensifying from the 2000s onward with the formation of additional peripheral voids—a topic addressed later in the text.

The map also reveals that, in most municipalities, the radius of urban reach—from the center to the last subdivision—remained stable, despite the implementation of new, non-contiguous fragments. The exception is São José do Rio Preto, which recorded a significant increase in this radius, reflecting a relative growth of nearly 200%. However, many of these urban clusters correspond to irregular settlements, some of which may predate this period but were not officially recorded by municipal authorities.

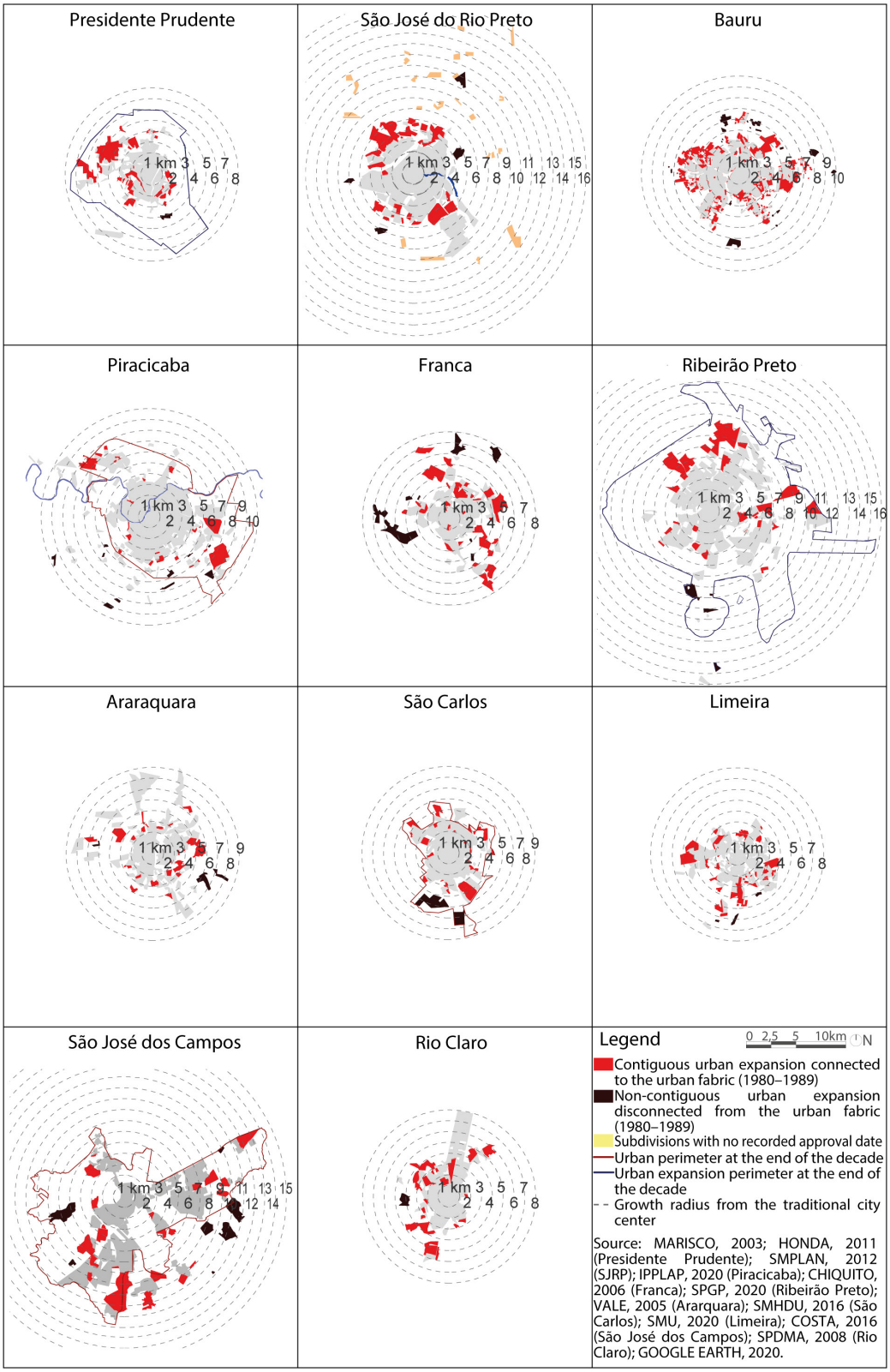


Figure 5. Evolution of the urban area and the urban perimeter in intermediate cities in the state of São Paulo between 1980 and 1989

Source: Own elaboration.

2.3. Period 3: 1980 to 1990 – The occupation of interstitial voids, the creation of peripheral voids, and the redefinition of locations within the urban structure

The 1980s marked a turning point between the processes of preceding and subsequent periods, highlighting both continuity and transformation in urban dynamics. While the 1970–1980 period was defined by intensified territorial discontinuity, driven by the rapid expansion of urban perimeters and the formation of urban voids, a transition emerged as of 1980 (Figure 5). In addition to the continued creation of new peripheral voids, the gradual occupation of previously formed interstitial voids began. This simultaneity reflected shifting patterns of land occupation and valorization, setting the stage for more complex urbanization strategies in the decades to follow.

In the intermediate cities of São Paulo, the expansion of the urban perimeter, coupled with the development of non-contiguous subdivisions, gave rise to different typologies of urban voids: peripheral voids, found in land parcels lacking infrastructure but holding potential for future valorization; interstitial voids, positioned between already-infrastructured subdivisions but remaining unoccupied; and lot-level voids, referring to unoccupied plots within subdivisions where infrastructure has already been installed.

This pattern has been observed in municipalities such as Piracicaba, Presidente Prudente, Ribeirão Preto, and São José dos Campos since the 1960s, and, from the late 1990s and early 2000s, also in Franca, Araraquara, Rio Claro, and Limeira. Conversely, some municipalities exhibit a more continuous urban expansion relative to the consolidated urban fabric, predominantly resulting in the formation of idle plots and interstitial voids, rather than peripheral voids—such as in São Carlos and Rio Claro. There are also situations in which interstitial voids, although equipped with infrastructure, are sometimes located in rural areas, as is particularly the case in São José do Rio Preto.

The **synthesis map depicting the evolution of the urban area and the urban perimeter for the period from 1990 to 1999** (Figure 6) reaffirms the stability of the radius of urban reach between the traditional center and the outermost subdivision. Additionally, it highlights a decline in the implementation of new subdivisions during this period.

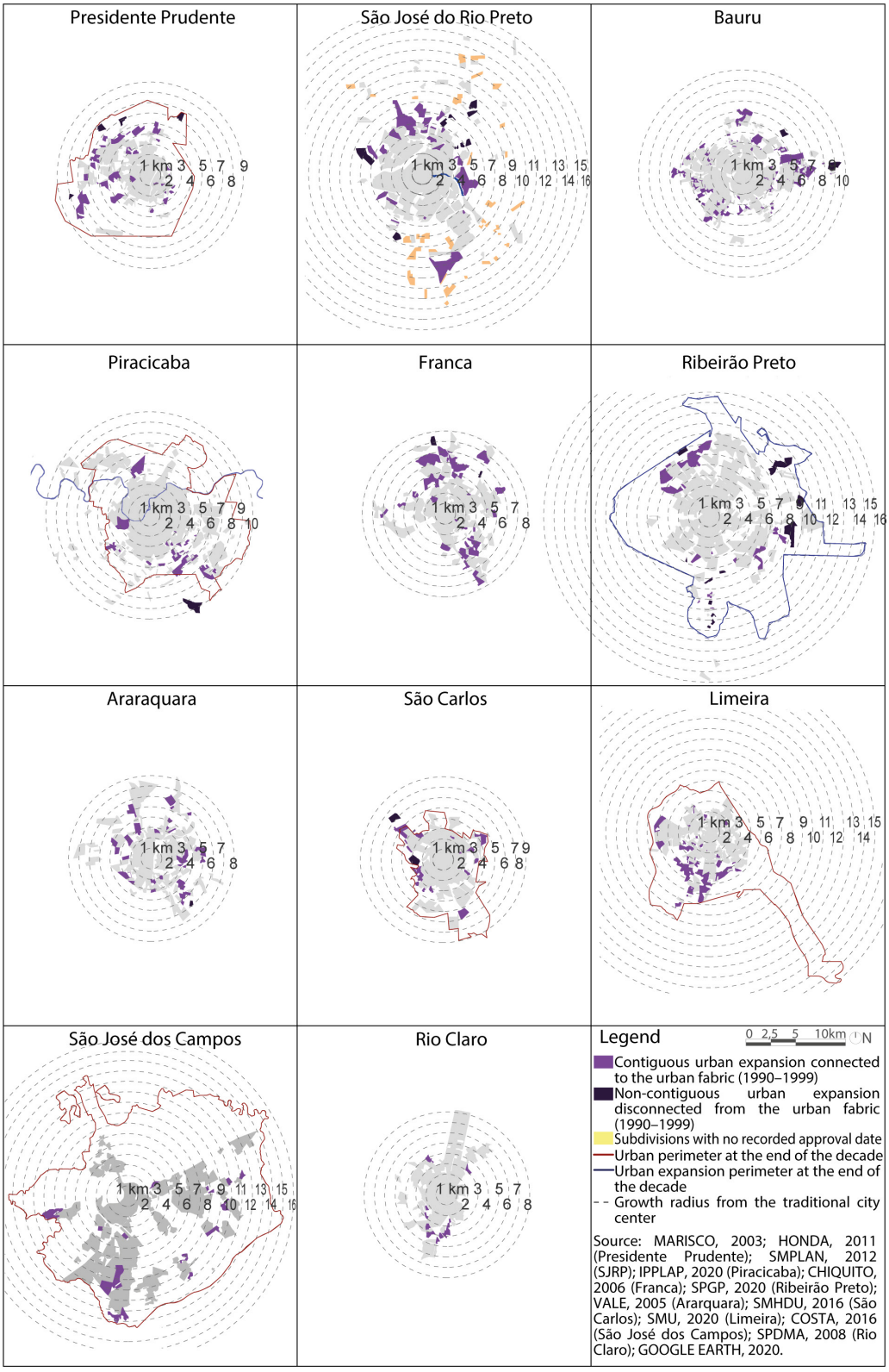


Figure 6. Evolution of the urban area and the urban perimeter in intermediate cities in the state of São Paulo between 1990 e 1999

Source: Own elaboration.

During the 1990s, urban population growth in the state of São Paulo declined significantly, averaging 1.9% (IBGE, [n.d.]b), alongside a relative decrease in the approval of new subdivisions compared to the previous period. Cities such as Piracicaba, Bauru, Franca, Rio Claro, Ribeirão Preto, and São José dos Campos experienced a decline in new land parceling approvals. In contrast, municipalities including Presidente Prudente, São José do Rio Preto, Araraquara, Limeira, and São Carlos maintained a similar proportion of approvals compared to the previous decade (Maia, 2019).

This period marks the emergence of gated communities and shopping malls, strategically positioned along specific urban vectors that transformed the peripheral urban landscape. These developments played a key role in redefining the traditional center-periphery pattern, which had long been associated with wealthy centers and poor peripheries. Urban dynamics began to shift with the establishment of projects such as gated communities on the urban fringes, which often physically coexisted with favelas and social housing complexes.

In Bauru, the proximity of social housing complexes and gated communities in the southern and southwestern sectors illustrates the physical closeness of groups with different income levels, though separated by social barriers (Otero, 2016). In São José dos Campos, the southern part of the city combines recreational second homes, gated subdivisions, and favelas—an arrangement shaped by urban legislation and the natural features of the territory (Costa, 2016). Franca and Ribeirão Preto also exhibit distinct patterns, with areas of expansion allocated to low-income subdivisions and specific vectors designated for high-income groups—for example, the southern zone of Ribeirão Preto, characterized by new gated communities (Chiquito, 2006; Melo, 2017). In the case of Piracicaba, high-income residents were more resistant to relocating to the peripheries due to their connection with and sense of identity linked to the Piracicaba River—a shift that only occurred toward the end of the 2000s (Otero, 2016).

Thus, urban peripheries began to exhibit the coexistence of low- and high-income vectors, thereby shaping a heterogeneous, socio-spatially fragmented landscape. As traditionally peripheral areas became focal points of interest for the real estate market, new forms of segregation emerged, further intensifying contradictions in the organization of urban territory.

2.4. Period 4: 2000 to 2020 – The real estate boom and the expansion of urbanizable areas

The early twenty-first century witnessed a substantial expansion of Brazil's real estate market, particularly in intermediate cities in the interior of São Paulo. This growth exceeded conventional patterns of equilibrium between supply and demand,

turning urban space into an opportunity for the valorization of capital (Otero, 2016). Key drivers of this urbanization included rising income levels and the expansion of credit, bringing about profound transformations in urban territories and reshaping the relationships between consolidated areas and new development projects.

The public listing of real estate companies tightened their ties with the financial system, with urban land increasingly treated as a speculative asset. The sector assumed a central role in local economies, influencing political decisions and infrastructure investments. Cities became strategic investment hubs, with agents driving up land values even amid stark social inequality (Fix; Paulani, 2019).

Rossi and Otero (2022) conducted an analysis of real estate production in the state of São Paulo, highlighting 25 of the most relevant municipalities. Drawing on data from Graprohab[5] and Secovi-SP[6], their study revealed a significant production of urban lots in the interior of São Paulo between 2010 and 2018, with particular emphasis on Regional Capitals. They noted that urbanization in the interior has outpaced that of the São Paulo Metropolitan Area (SPMA), a trend partially driven by the depletion of available land within the SPMA.

The interior of São Paulo currently attracts urban developers due to its consistent infrastructure, good accessibility, high per capita income, and lower land costs, all of which have favored urban expansion, especially since 2000 (Figures 7 and 8).

The large-scale commissioning of housing units through the Minha Casa Minha Vida [My Home My Life] Program (PMCMV) frequently failed to align with local needs and the pace of population growth during the period, as noted by Damasceno (2021). Concurrently, there was a significant surge in the development of gated subdivisions on urban peripheries, accelerating a trend, which had begun in the 1990s. This expansion of urban fringes by elite groups led to the reconfiguration of urban structures and reshaped spatial hierarchies in intermediate cities.

As a result, new centralities emerged, composed of exclusive developments such as shopping malls, private schools, and hypermarkets, all governed by condominium-style management systems. This transformation redefined the engagement of urban dwellers with public space, as traditional leisure activities gave way to consumption-driven experiences in privately owned collective-use spaces. Consequently, this process reinforced socio-spatial segregation by clustering individuals with similar socioeconomic profiles, thereby further widening the social distances between different groups.

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5. *Grupo de Análise e Aprovação de Projetos Habitacionais* – Housing Project Analysis and Approval Board.

6. *Sindicato da Habitação do Estado de São Paulo* – São Paulo State Housing Syndicate.

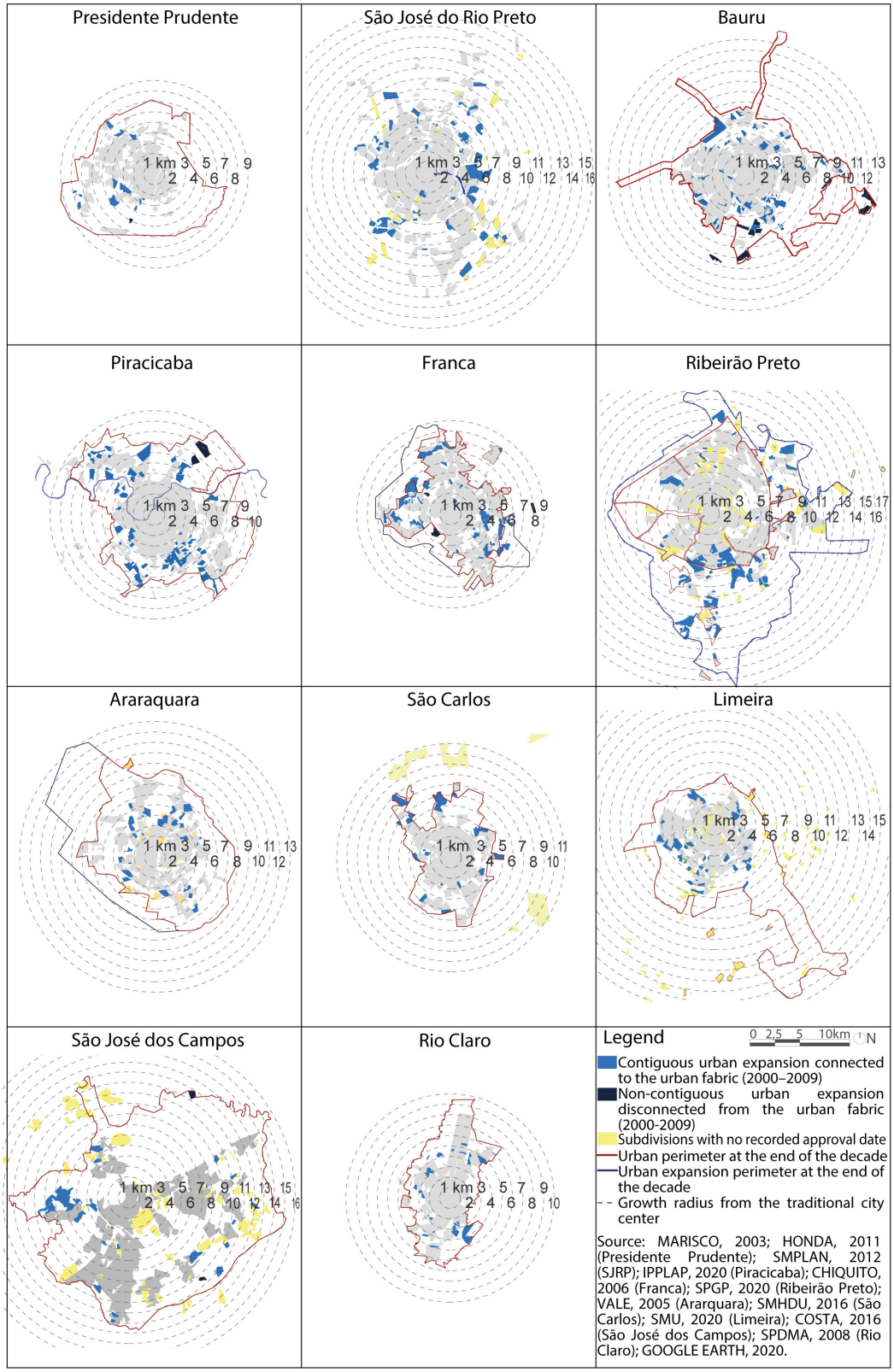

Figure 7. Evolution of the urban area and the urban perimeter of intermediate cities in the state of São Paulo between 2000 and 2009

Source: Own elaboration.

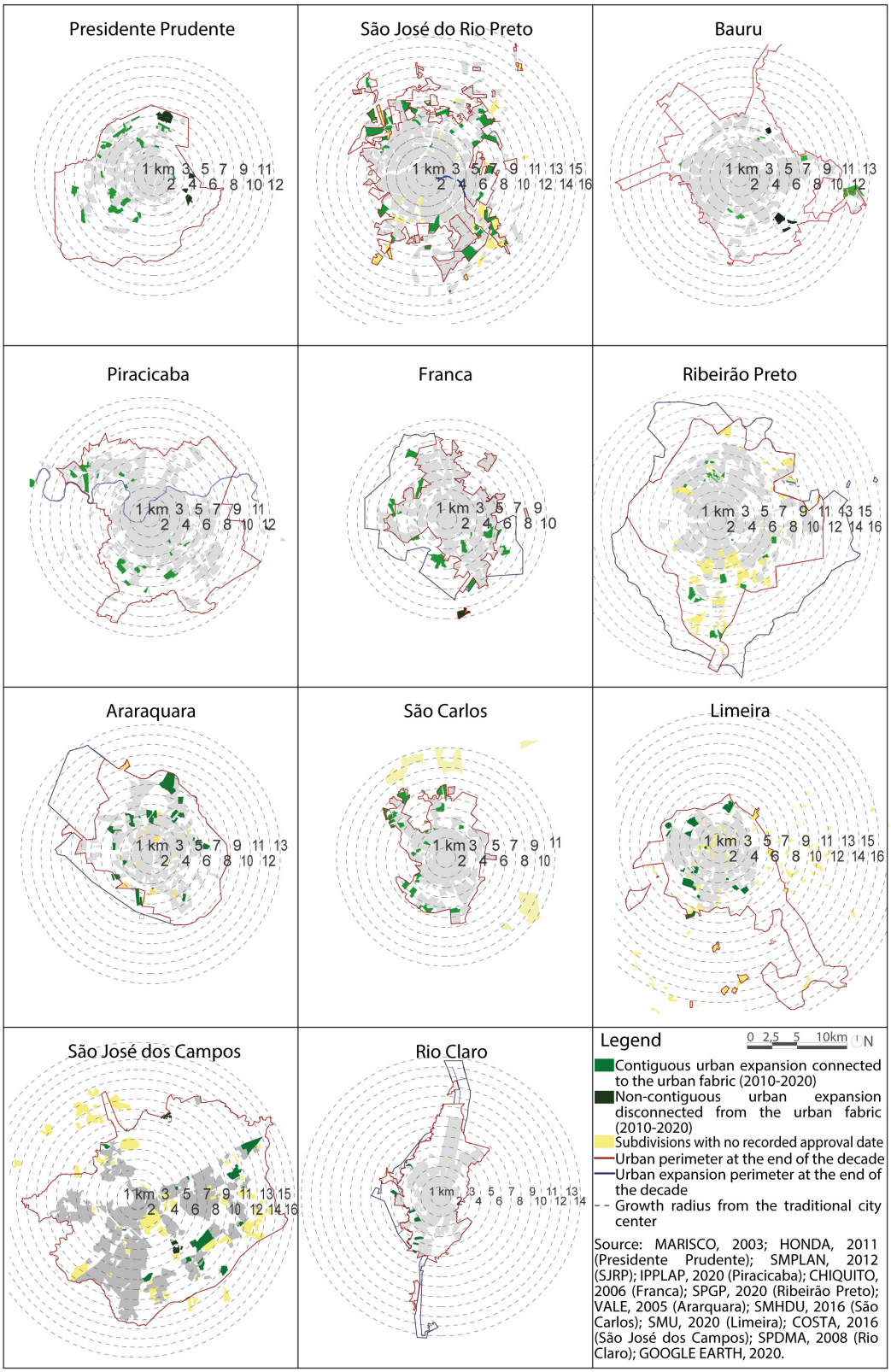

Figure 8. Evolution of the urban area and the urban perimeter of the intermediate cities in the state of São Paulo between 2010 and 2020

Source: Own elaboration.

This period is defined by the morphological characteristics of territorial discontinuity and the emergence of urban voids, particularly evident in patterns of urban sprawl and the spatial organization of urban nuclei. A central feature is the large-scale production of lots and the flexibilization of urban perimeters, which facilitated the creation of urbanizable areas and the development of subdivisions far from the consolidated zones, thus amplifying both physical and social distances.

The **synthesis maps depicting the evolution of the urban area and the urban perimeter from 2000 to 2009** (Figure 7) **and from 2010 to 2019** (Figure 8) reveal the persistence of the spatial radius between the outermost plot and the traditional city center. Despite the intense production of land parcels, many of which remain non-contiguous with the consolidated urban fabric, the creation of new urban voids was reaffirmed, a dynamic observed in previous decades. The growth of urban fragments has unfolded in multiple directions across the municipalities studied.

A defining characteristic of the intermediate cities studied is the successive expansion of their urban perimeters, which have become increasingly adaptable to the demands of the real estate market. The cases presented illustrate that these expansions have occurred both over large areas, through revisions of master plans and zoning regulations, as well as in a more targeted manner via the annexation of specific plots through decrees or supplementary legislation. Between 1950 and 2019, municipalities expanded their perimeters on numerous occasions: Ribeirão Preto carried out 28 expansions; São José dos Campos, 17; São José do Rio Preto, 165; Piracicaba, 24; São Carlos, 19; Araraquara, 32; and Bauru, 45.

São José do Rio Preto and Franca represent notable exceptions, as their legislation imposes specific requirements for the conversion of rural land into urban land. In both cases, expansions have been driven by real estate market demands for the subdivision of targeted areas. In Rio Preto, this practice dates back to the mid-1950s and has continued until today, resulting in a fragmented “patchwork” configuration (Maia, 2019). In Franca, the concept of an elastic perimeter emerged in the 1970s, in response to a shortage of urbanizable land to meet the demand. In the following decade, the city council permitted perimeter expansion exclusively for areas with existing infrastructure (Law No. 2,852/1983). This policy changed in 2003 with the adoption of the Master Plan (Law No. 50/2003), which designated a broad expansion area that was further extended in 2009 and 2013 (Laws No. 140/2009 and No. 235/2013).

Figure 9 illustrates that, in nearly all cases, the expansion of the urban area defined by the perimeter has outpaced both population growth and the physical

extension of the urban fabric. Although comprehensive data for all municipalities across the seven decades analyzed are unavailable, there is a clear increase in perimeter size in master plans adopted following the enactment of the City Statute (Mocci, 2020).

However, the perimeter does not fully function as a constraint on expansion. In all the cases analyzed, isolated urban clusters have emerged within rural areas in the form of recreational second homes catering to high-income groups. These developments involve the subdivision of rural plots into lots ranging from 1,000 to 3,000 m^2, often through private informal agreements that are later regularized by local governments and incorporated into the urban perimeter. In Limeira, more than 370 such fragments are currently undergoing regularization (Maia; Leonelli, 2024). In São José do Rio Preto, municipal legislation has acknowledged this type of development since the 1960s (Law No. 1,143/1965 and Law No. 3,504/1984), allowing for the subdivision of rural land for urban purposes.

In summary, Figure 9 provides a schematic representation of the territorial discontinuity of intermediate cities in the state of São Paulo between 1950 and 2020, mapping urban fabric expansion in relation to its corresponding period. The diagram reveals a distinct territorial and temporal pattern of urban expansion characterized by discontinuity. It illustrates expansion rays (strips) and their respective periods of implementation, with colors denoting each decade. These strips represent the incremental radius of urban expansion (one kilometer per line) from the traditional city center to the outermost lot. The core (gray strips) symbolizes urban occupation up to 1949, while the colored strips show the increase in the discontinuous urban fabric at the end of each decade. Irregular urban fragments in rural areas were not included in the diagram, as their dates of implementation could not be determined.

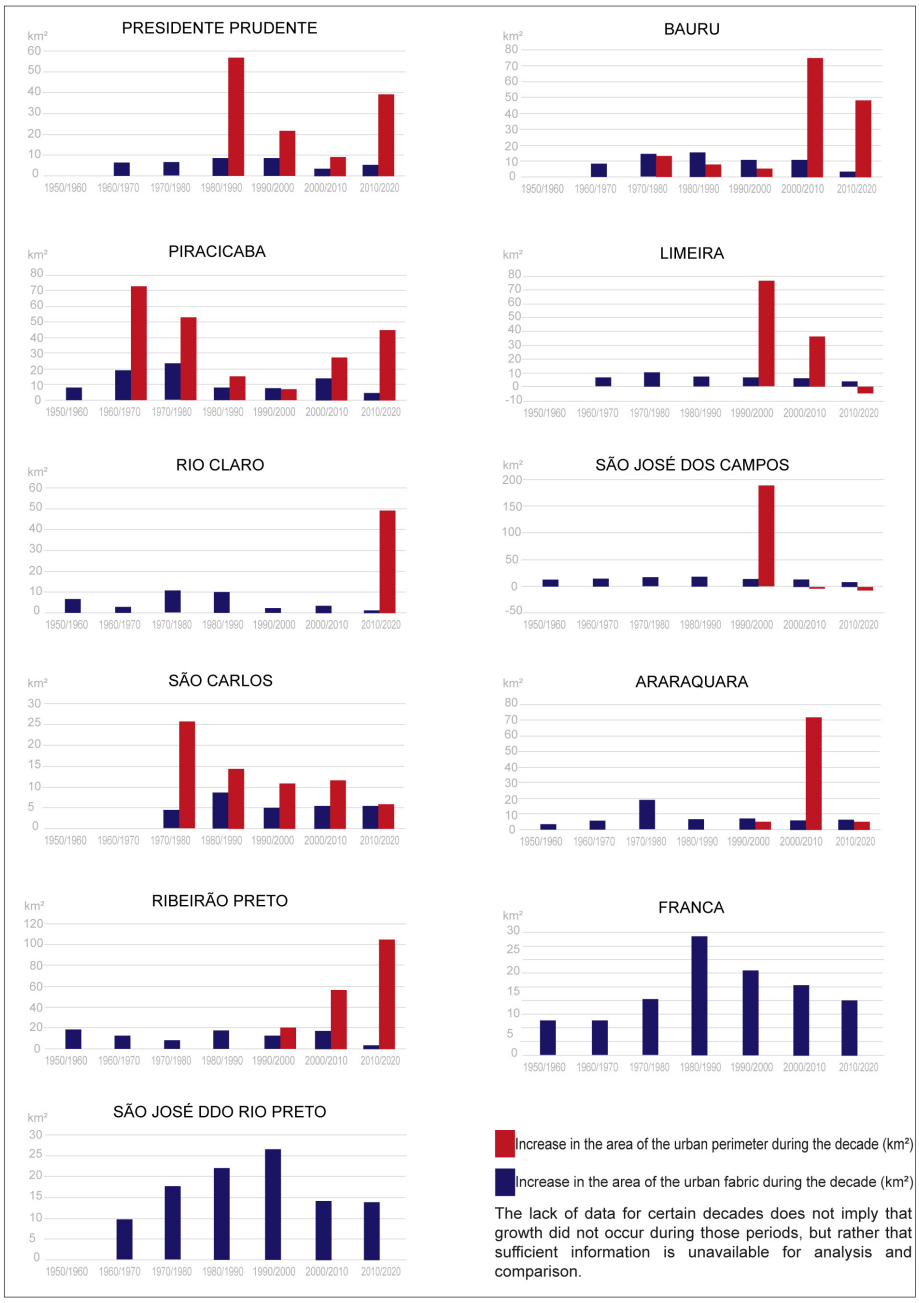

Figure 9. Evolution of the urban fabric and the urban perimeter (km²) between 1950 and 2020

Source: Municipal master plans, zoning laws, decrees and supplementary laws for the expansion of urban perimeters, and urban expansion maps for each municipality. Own elaboration.

The diagram highlights the onset of urban dispersion during the 1950s and 1960s (pink and green rays, respectively). In 1950, São José dos Campos experienced a significant increase, followed by Piracicaba, Bauru, and Araraquara during the 1960s.

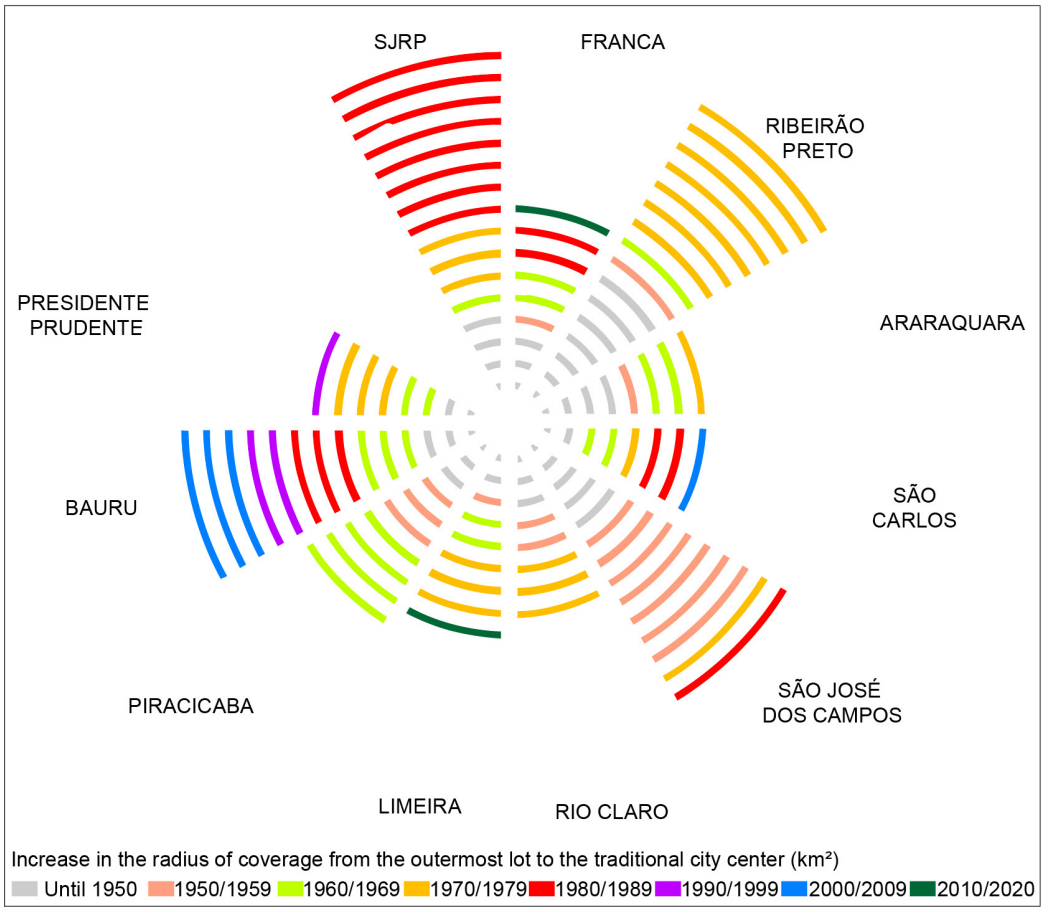

Figure 10. Infographic – urban expansion and the radius of subdivision growth from the traditional center between 1950 and 2020

Source: Own elaboration.

The 1970s and 1980s marked the most extensive sprawl of subdivided areas within the studied period. During this interval, the distance between the traditional center and the outermost subdivision reached its highest recorded expansion. Municipalities such as Presidente Prudente, Ribeirão Preto, Limeira, and Rio Claro expanded significantly during the 1970s, while São José do Rio Preto, Franca, and São Carlos stood out in the 1980s. In many cases, the radius established during this period has remained unchanged to the present day, with the urban area growing within this limit, generally across multiple axes simultaneously.

During this period, the spatial distance between the traditional center and the outermost subdivision reached its peak expansion. Municipalities such as Presidente Prudente, Ribeirão Preto, Limeira, and Rio Claro experienced substantial urban growth in the 1970s, while São José do Rio Preto, Franca, and São Carlos saw notable expansion in the 1980s. In many cases, the spatial radius established during these decades has remained unchanged, with urban development continuing within these boundaries, often expanding along multiple axes simultaneously.

During the 1990s, the approval of subdivisions and the expansion of the urban fabric declined, despite a disproportionate increase in urban perimeters relative to population demand. In Bauru, urban growth adopted a linear pattern after 1990, extending approximately 13 kilometers eastward, largely influenced by the appeal of the highway and the presence of physical barriers at municipal boundaries in other directions.

Between 2000 and 2020, a period marked by the highest volume of real estate production, the established pattern of radial expansion and urban sprawl remained dominant. However, the continued expansion of urban perimeters led to the creation of new developable areas and contributed to the proliferation of peripheral urban voids, diverging from the declining rates of population growth observed since the 1990s.

In less populous municipalities, the spatial distance between the traditional center and the outermost subdivision has remained approximately eight kilometers since the 1970s. In contrast, more populous municipalities, such as Ribeirão Preto, São José dos Campos, and São José do Rio Preto, have witnessed urban clusters extending up to 16 kilometers from the traditional center.

Conclusion

This study has identified a distinct territorial and temporal pattern of growth in intermediate cities in the state of São Paulo, structured across successive periods. In the 1950s and 1960s, urban dispersion began with the formation of isolated clusters located beyond the consolidated urban fabric, thereby marking the rural-urban transition. Within this context, municipal administrations prioritized investments in intra-urban infrastructure, particularly the expansion of roadway networks, driven by a prevailing discourse of modernization.

During the 1970s and 1980s, urban sprawl reached its peak, with the proliferation of distant subdivisions and the widening of the spatial radius between the traditional center and the outermost lot. This period was also defined by industrial deconcentration, promoted by federal and state policies that stimulated competition among municipalities to attract industrial activity, even though such efforts did not consolidate in all localities.

Between 1980 and 2000, previously created urban voids gradually became occupied, while new ones emerged due to the subdivision of valorized areas and the continued expansion of urban perimeters. In the 1990s, despite declining rates of population growth and a modest reduction in the approval of subdivisions, urban perimeters continued to expand, often exceeding actual housing demand.

Peripheral voids, generated through successive expansions of urban perimeters, have become the predominant typology among the various forms of urban voids. This trend has been facilitated by the flexibility of urban planning legislation in response to the real estate market. While physical factors such as topography and natural resources have influenced expansion, they have not necessarily prevented the occupation of environmentally fragile areas, including valley floors and aquifers, which are often altered through river channeling and rectification.

This study concludes that dispersed urban expansion has been a prevailing pattern of urban growth in intermediate cities in the state of São Paulo since its emergence in the 1950s.

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