

## COVID-19 Urban Form Digressions

### ***Urban life representations, citizen participation and sociospatial disaggregation patterns***

COVID-19, in urban areas, is associated with processes that indicate socio-spatial dynamics and practices in an urban morphology that, resulting from uneven urban development patterns, promotes serious health commitments to groups exposed to the risk of viral transmission. Through critical cartographies, based on public research databases, we question urban space transformation trends, urban morphology and living spaces - their nexuses with socioeconomic data, social vulnerability and support capacity. As a new layer, collaborative mappings promoted by diffuse entities and organizations are associated to significant aspects of urban reality. In view of the social isolation due to the pandemic COVID-19 we argue that critical cartographies and initiatives of citizen participation, can, on the one hand, be a counterargument to certain representations and contribute to a more effective reading of the transformations underway and, on the other hand, become an effective instrument for registering people's perceptions and interpretations, as well as a tool for empowering people.

*Urban Morphology, urban transformation, Covid 19, citizen participation, critical cartography*

## 1. Introduction

In contemporary cities we observe particular processes of functional and economic spatialization of urban areas where, in its new forms of cultural enunciation, urban fabrics and territorialities bring about new questions to the urban environment, thus also promoting new contiguous and ambiguous symbolic interpretations (ALVES, 2015; 2006). It is a matter of observing not only emerging urban forms and their culturally implemented referential universes, or intermingled relations between public space and public sphere, urban place and public spatiality, urban space and city consumption, but also collective forms of representation.

In a context where spatial patterns of urban fabrics are increasingly submitted to a global homogeneous process, contemporary thinking is confronted with the total tendency of capital upon public life. In the textualities of the multiple dimensions of today's city, a city whose paradigms have been destabilized by undetermined and diffuse territorialities, COVID 19, in urban areas, is associated with processes that indicate socio-spatial dynamics and practices, mainly related to the ways and places of working and housing, in an urban morphology that, resulting from uneven patterns of urban development, promotes serious health commitments to groups exposed to the risk of viral transmission.

In Brazil, as well as in other countries with expressive socio-spatial inequality, the constitutive and structuring dimensions of the territory quickly became the object of concern and of policies and programs intertwined with society's initiatives to combat the pandemic and to assist the most vulnerable population, not without conflicts.

In this country, the first registered COVID-19 case was on February 26, 2020, and by July 12, 2020, Brazil had totaled 1,866,416 confirmed cases and 72,153 deaths, making it one of the countries with the fastest spread of the disease in the world. The data are from the consortium of press vehicles (press outlets) that was formed after the federal government removed from the Ministry of Health portal the consolidated numbers and the history of the disease in the Brazilian states in early June. Links to data downloads in table format, essential for the analysis of researchers and journalists and which fed other dissemination and action initiatives, were also eliminated from the website. After resuming the disclosure of information, it was observed that the figures were conflicting and inaccurate, meeting the objectives of the federal government. Thus, the main press outlets in the country met in partnership to work collaboratively in the search for necessary information, with the 26 states and the Federal District.

Through official channels, in the same period, the state of São Paulo reached 366,890 confirmed cases of COVID-19 and 17,702 deaths, becoming the epicenter of the disease in the country, with emphasized dispersion routes towards the interior of the state by important highways (Figure 1). In this state, after sequential and diverse social isolation measures, the plan to resume economic activities suggests a simplification of the territory, ignoring a series of essential factors for the construction of solid planning. The actions were presented in scales and are registered in regions called "Regional Health Departments", which, in turn, respond to the delimitation of metropolitan regions, administrative regions and urban agglomerations provided for by law, in the state of São Paulo. However, the interpretation based on indicators of the service capacity of the health network disregards essential urban elements to think about greater or lesser propensities to contagion, as well as daily relationships that involve more than one municipality, especially related to work.

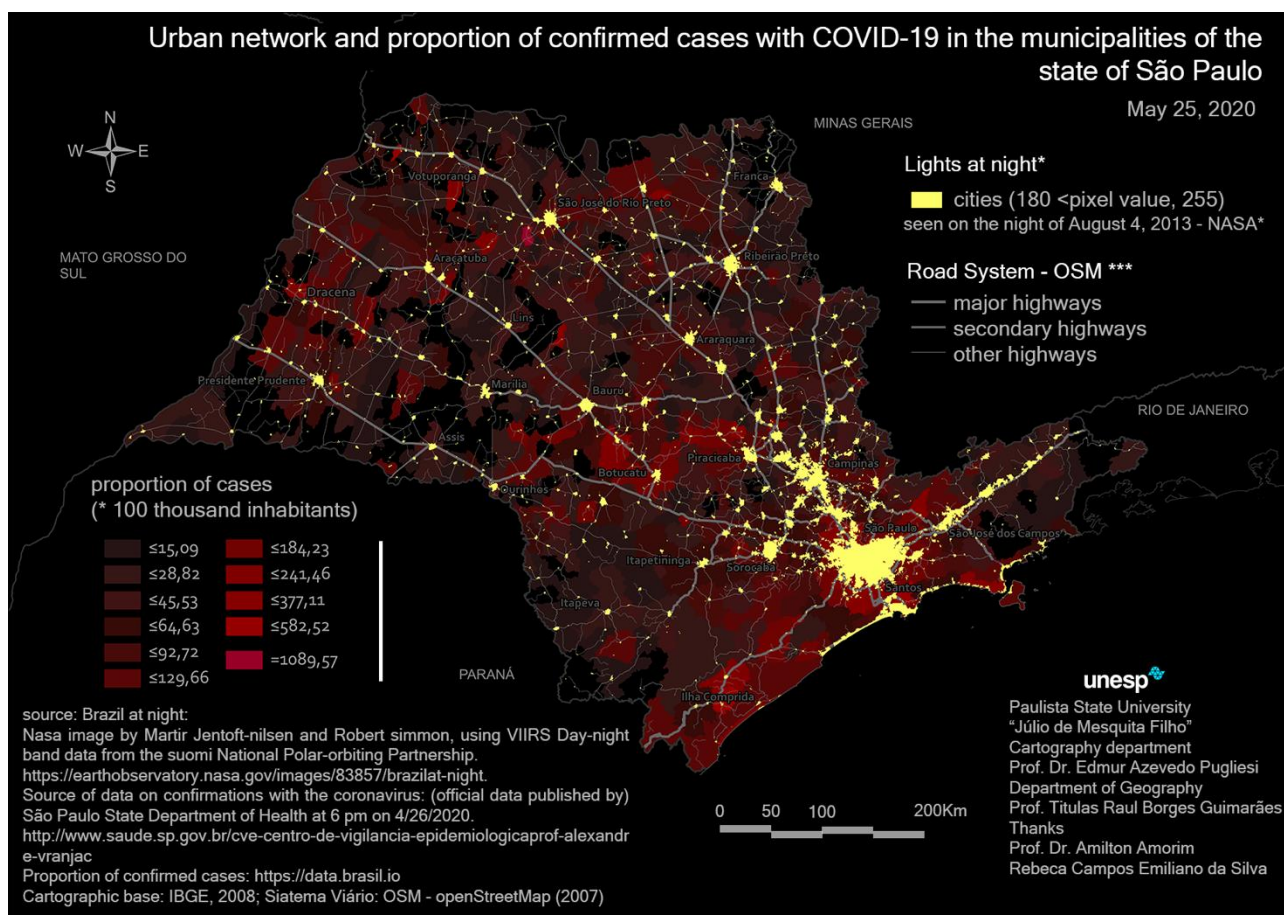


Fig. 1: Urban network and percentage of confirmed cases of COVID-19 in the municipalities of the state of São Paulo, Brazil (from May 25, 2020), with emphasis on the dispersion routes read from the main and secondary road systems. Source: Radar COVID-19, Faculty of Science and Technology, São Paulo State University (FCT/Unesp). Available at <https://covid19.fct.unesp.br/mapeamento-cartografico/>

In this context, the municipality of São Paulo, the main metropolis in the country that connects with several cities in the state and the world, presented 178,899 confirmed cases of COVID-19 and 8,188 deaths from the disease. Also alarming are the numbers of monitored suspected cases, 300,123, and suspected deaths by COVID-19, 5,559 (COVID-19 Daily Bulletin in the city of São Paulo, from July 12, 2020<sup>1</sup>).

In this city, an imprecise territory with different layers of invisibility quickly became evident. The behavior of the spread of the disease in São Paulo points to a complex and heterogeneous territory, from the point of view of urban structure and morphology, disclosing areas of incomplete urbanization, with a lack of water supply and sewage collection infrastructure, different forms of precarious housing, insufficient availability and coverage of public facilities linked to the health network, among others.

In our analysis, this type of reading is also added to the important discussion regarding the distribution of demographic density in the city, on the one hand portrayed by several urban studies that investigated the processes of emptying the city center and peripheral expansion. On the other hand, population displacements and their concentration vectors are linked to investigations about the most intense verticalization process experienced, especially in the last decade, due to the expressive formal housing production under an accumulation regime characterized by financial dominance, such as State policy, as will be addressed later.

As a complementary layer of figuration in this heterogeneous urban space, in the context of the pandemic, readings resulting from collaboratively produced cartographies involving researchers, diffuse entities and social organizations, are highlighted. These cartographies are important tools for tensioning and questioning the data and actions proposed by the State, as well as subsidizing a set of community initiatives whose results, in terms of contagion control and meeting social demands, are now expressed in a very relevant manner.

<sup>1</sup> The daily epidemiological bulletins of the municipality of São Paulo, containing data on the disease in this city, correlated with data from the state of São Paulo and Brazil, are available at: [https://www.prefeitura.sp.gov.br/cidade/secretarias/saude/vigilancia\\_em\\_saude/doencas\\_e\\_agrivos/coronavirus/index.php?p=295572](https://www.prefeitura.sp.gov.br/cidade/secretarias/saude/vigilancia_em_saude/doencas_e_agrivos/coronavirus/index.php?p=295572)

## 2. São Paulo, Brazil: A fragmented and heterogeneous city

From the 2000s onwards, a diversified and multifaceted vision of peripheral territories, mainly centered in the Metropolitan Region of São Paulo, was evidenced in Brazil (RIBEIRO, 2000; TORRES et al, 2003; ARRETCHE, 2015; MARQUES, 2015), affirming the impossibility to thematize the “periphery” as if it were homogeneous, in dual opposition to the “center,” even though its structural differences were maintained. The critical cartographies produced by these studies question the transformation trends of urban space, urban morphology and living spaces, based on the combination of socioeconomic data, social vulnerability, related to the support capacity of urban infrastructure, spatial and economic processes, and the spatialization of urban elements, seeking to approach similarly transformed experiences that denote a sequence of dynamics on the territory.

On the one hand, it may be affirmed that this heterogeneity of popular territories was the result of public investments in interventions and urban improvements through sanitation works, equipment and services in peripheral neighborhoods and their connections with urban centralities, in processes highly mediated by political-electoral competition (MARQUES and BICHIR, 2001). It was also the result of the restructuring of the real estate market, driven, among others, by greater credit availability in the residential market and expansion of the housing market in popular territories. (ROLNIK, 2015; RUFINO, SHIMBO and SANTO AMORE, 2015). This achievement highlights an important process of spatial transformation and territorial restructuring, in a paradox that articulates the territorialization of poverty<sup>2</sup> in certain regions of the city and a network of centralities<sup>3</sup> (dispersed multicentralities), which also indicate marginal situations (not in criminality terms, but related to exceptional situations), adjusted to new productive vectors that also articulate major road reconfigurations and insertion of new types of buildings related to the logistical-financial sector (ROLNIK and SANTORO, 2017; SANTORO and NASCIMENTO, 2019).

According to MARQUES (2015), based on the comparative analysis of socio-demographic data collected by the IBGE Census of 1991, 2000 and 2010, and based on previous studies promoted within the scope of the Center for Metropolitan Studies, it can be stated that the heterogeneity of metropolitan spaces were mainly carried out on the poor peripheries, while the areas with the highest yields became more exclusive.

In this context, some efforts are highlighted in the sense of producing methodologies capable of “measuring” this urban heterogeneity, as is the case with intra-urban indicators built within the Institute of Advanced Studies of the University of São Paulo (NERY, SOUZA and ADORNO, 2019), based on: housing, population and sanitary and hygiene data collected by the last four Censuses, made available by the Brazilian Institute of Geography and Statistics (IBGE, 1980, 1991, 2000, 2010); the characteristics of displacement of the population of São Paulo, established in the origin-destination survey of the São Paulo Metro, in 2007; and, finally, the characteristics of the physical environment that make up the urban expansion areas of the municipality, through the São Paulo Metropolitan Planning Company (Emplasa, 2003 and 2006).

Based on the definition of certain units of analysis adjusted by the grouping of census sectors, and the application of nineteen indicators related to six dimensions of analysis, namely, urban mobility, criminal standards, sanitary and hygiene conditions, environmental conditions, housing conditions and population profile, the work resulted in the identification of eight types or groups of areas (Figure 2). From “A” to “H”, the clusters are characterized from areas located in the central region of the metropolis of São Paulo, with good levels of infrastructure, a higher proportion of verticalization and low presence of subnormal agglomerates, due to the high percentage of literate, high-income and low-crime family heads; to peri-urban areas, with more recent urbanization mixed with rural activities, with low demographic density, greater presence of geological risks and worse rates of water, sewage and waste collection services, as well as a low proportion of household heads with good income and high standard of crime.

If, on the one hand, this study potentially reveals a methodology capable of dealing with a large set of spatial data and information in territorial units of analysis adjusted from disaggregated records, demonstrating a truly fragmented urban space, on the other hand, the reading of urban patterns connected at different levels disregards an uncommon process of the city's production, not without transformations, and suggests the reinforcement of a type of reading that is also

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<sup>2</sup> As a set of representations of the popular territories in dispute, which mobilizes the notions of illegal, irregular, occupations/“invasions”, peripheries, slums, the center itself, and, more recently, the “neighborhoods section 1”, in reference to housing production project carried out through the main Brazilian housing program - Minha Casa Minha Vida, aimed at low-income families, which promoted already consolidated peripheries and also expanded the urban space by implementing new housing developments in discontinuous peri-urban areas.

<sup>3</sup> Peripheral centralities in relation to other centralities produced by and for the higher income strata, as highlighted by Nakano, Campos and Rolnik (2005: 127) for the case of the “historic center” of São Paulo, which, although “center”, also it keeps marginal situations in the sense assigned in this text. It is not, of course, a question of “new centralities” produced as a result of the saturation of what would be the main (or historical) center of the city in the face of the needs for capital reproduction and accumulation, but as highlighted by Rizek (2014: p.7 and 8 ), despite the naming difficulties, they are “indisputable centralities”, not only from the perspective of the logic of consumption, but also the networks and forms of sociability and leisure.

structured on the opposition between center and periphery, without revealing a set of nuances that constitutes a complex territory.

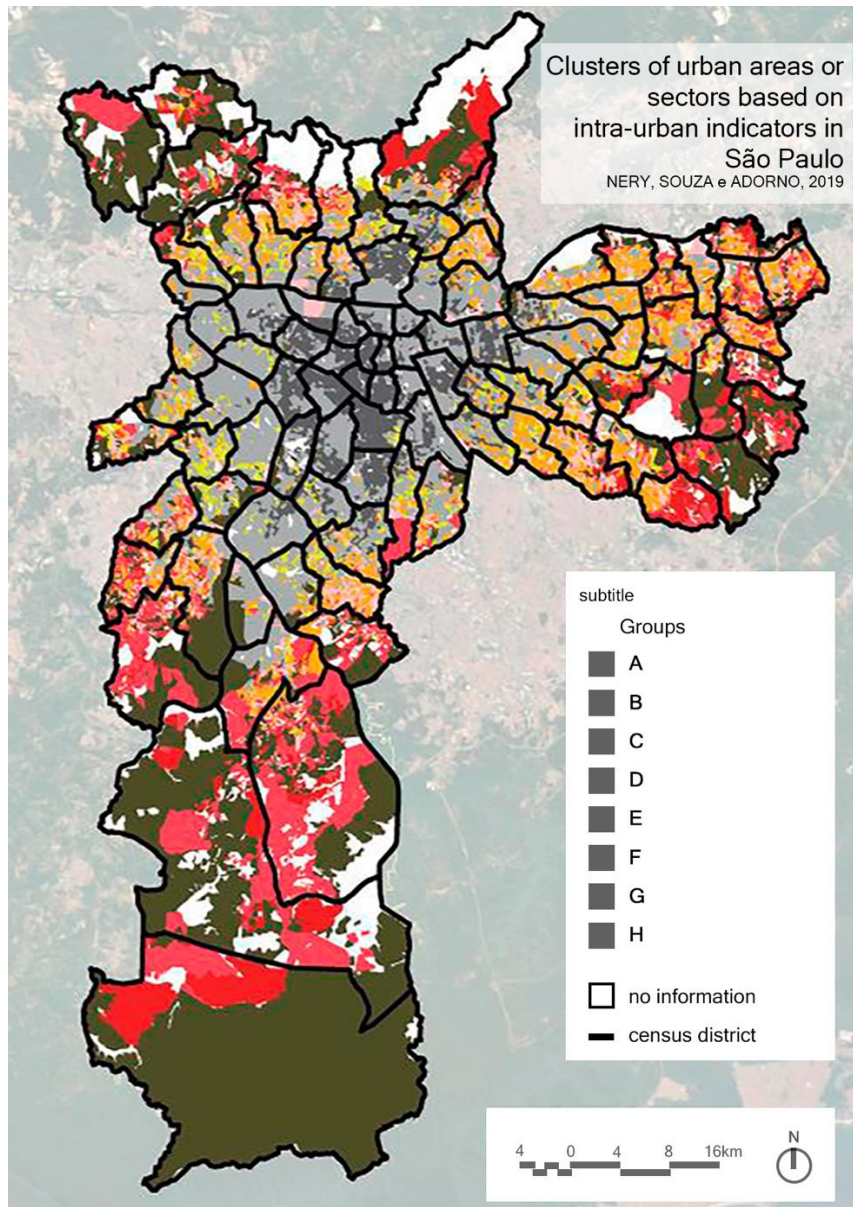


Fig. 2: Clusters of urban areas or sectors based on intra-urban indicators in São Paulo. Source: NERY, SOUZA and ADORNO, 2019.

The research “Highrise living and the inclusive city”<sup>4</sup> also observes important transformations in the metropolitan urban space of São Paulo, based on the analysis of the recent verticalization process, which associates macroprocesses of production in the contemporary city, morphological and typological aspects of residential buildings and reconfigured socio-spatial practices. The cartographies and narratives developed by the Highrise Project, from the analysis of the most recent formal housing production, corroborate the hypothesis according to which, currently, the internal movement to the arrangement that deeply impacts the spatial production and reproduction dynamics in the metropolis has reoriented the productive activity in the building sector towards areas that, if not defined exclusively as central, are also far from the land profile that until recently marked the peripheral expansion sustained by the main Brazilian housing program, Minha Casa Minha Vida. Such reorientation of the activity in the development segment involves new strategies regarding the participation of the landowner in the accounting of real estate businesses and financial profitability.

<sup>4</sup> ANR-FAPESP Call. Binational project financed by FAPESP – Fundação de Amparo à Pesquisa do Estado de São Paulo and by ANR – Agence Nationale de la Recherche, coordinated by the researchers Christian Montés (Université Lyon 2) and Manoel Rodrigues Alves (Universidade de São Paulo / IAU-USP). IAU-USP researchers also participated, including postgraduate and scientific initiation students, EC-UFSCar, EEA-UFBA, FADU-UNL (Argentina), FFLCH-USP, UFBA and UNIARA.

From the point of view of its distribution in the urban space, Figure 3 expresses the intensity of verticalization in certain urban sectors of São Paulo, based on the spatialization of a set of data related to highrise buildings<sup>5</sup> (location, number of towers, number of floors, number of residential units), which highlight the central area, and also some well endowed areas with infrastructure that constitutes a boundary between a more consolidated and a more dispersed territory. Figure 4, on the other hand, reveals an urban narrative through which one can see an absolutely segregated space, with mixed different urban qualities and experiences.

Thus, the Highrise project built some dimensions of analysis by which they express, at the same time, singular adjustments and more generalizing patterns of the production process of the contemporary city under a financialized accumulation regime. By this research, the Vertical City could be interpreted by the conjunction of the “See” dimension, which points to physical limits that cloud the socio-spatial practices mediated and apprehended in different degrees; by the “Living” dimension, which attracts a set of perceptions and experiences about processes that are linked to vertical living in the contemporary city, bringing to the same field of decisions the production modes of urban space and the constitution of a determined heterogeneous and complex structure; and by a last dimension that places aspects of the “Verticalization Process” where different temporalities and new limits are interwoven with the production process of the contemporary city.

In relation to the heterogeneity of territories that constitute the urban space, an aspect that is increasingly present in different urban contexts, characterizing, as a rule, socio-spatial segregation processes, specifically in relation to São Paulo, was significant to investigate how the socio-spatial practices in the public spaces of the city are characterized, and/or altered, insofar as they are incorporated not only in the logics of urban space production, but also in highrise buildings. In this context, the partial results of the Highrise project<sup>6</sup> are expressed in relation to:

- that the nature of high-rise buildings, according to the current urban production logic, does not characterize an inclusive city. Particularly in São Paulo, where the issue of exclusion is in itself a given, where the architectural configurations seem to indicate the possibility of socially characterizing the high-rise buildings and their dimensions of "new" ways of life, inclusion and exclusion;
- that the nature of high-rises can be understood in view of the nature of their typology (since the diversity of housing units does not necessarily correspond to an equivalent profile diversity of the residents), impacting the very ideal and naturalization of “new” ways of life and socio-spatial practices of the urban space privatization;
- the pertinence of understanding the verticality and the singularity of the urban space, as well as the practices and representations of the residents that express differentiated relations with the verticality and the constitution of established social relations related to the management, economic and symbolic values (ideas) of the housing and the resident.

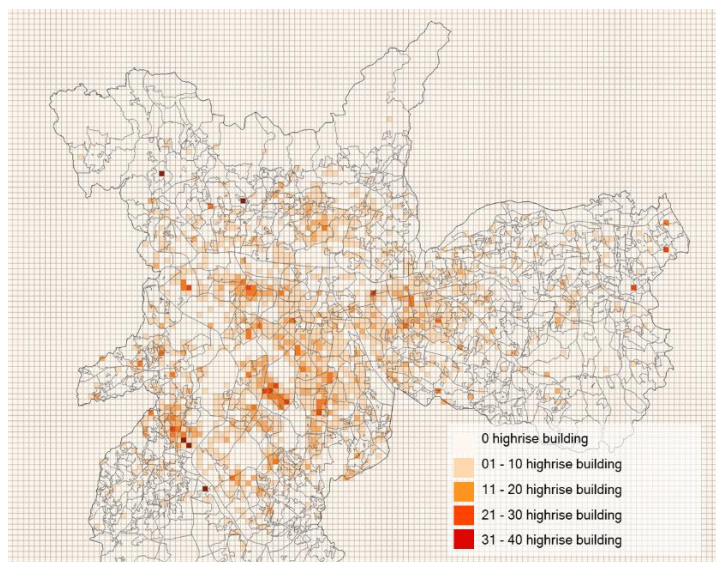


Fig. 3: Verticalization intensity based on the application of a 400 x 400 meter statistical grid (highrise buildings launched between 1985 and 2017, in São Paulo, excluding the southernmost region of the municipality). Source: Highrise Project Collection.

<sup>5</sup>The Highrise Project considers a high-rise building to be a residential building, which can be of mixed use, with 10 or more floors or with a template equal to or greater than 30 meters

<sup>6</sup>The scales and methodological analysis process adopted by the Highrise Project, as well as its results in terms of research on socio-spatial practices are developed in the article “Urban Verticalization Issues in France and Brazil: Highrise Project, microscales and narratives”, Revista Risco, Graduate Program of the Institute of Architecture and Urbanism of the University of São Paulo, 2020 (*in mimeo*).



Fig. 4: Narratives of Urban Segregation and Socio-spatial Practices - Red Series. Source: Luciano Costa and Ricardo Pinto. Highrise Project Collection.

Canova also suggests urban heterogeneity in São Paulo when addressing indicators structured from a given concept of urbanity, which is not consensual and is not necessarily relevant (according to its metrics) to the argument of spatial justice (Figure 5). Adopting a 200 x 200 meter grid as the territorial unit and adjusting the focus of the analysis, the study highlights a set of approach scales that focus on the citizen in his/her relations with the city, seeking to shed light on a specific propitious area to reflect upon, based on the State, a process of territorial restructuring, considering population density, compactness, mixed land use, accessibility, places of residence, land value, public services, job offer, capacity to service infrastructure networks, among others.

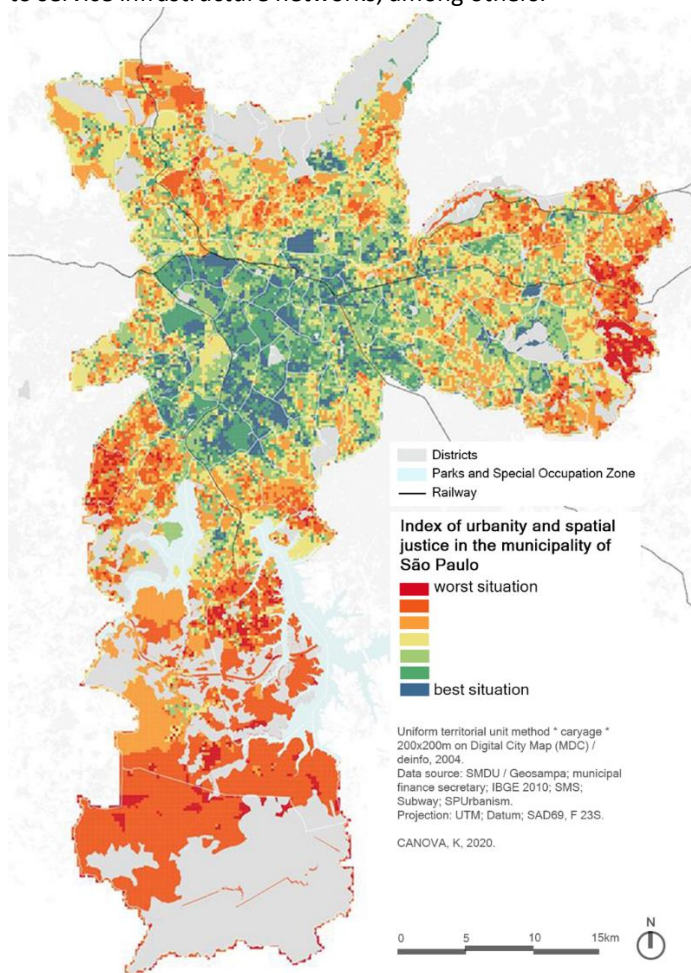


Fig. 5: Cartography to assess the urban and spatial justice situations in São Paulo. Source: CANOVA (2020)

Although divergent, in certain aspects, these readings point to a truly heterogeneous urban space, which will be essential to understand explicit features of the articulation that occur between the pandemic of COVID-19 and the territory, as an important analytical key for designing actions that are effective in controlling the disease and dealing with its consequences in economic terms.

### **3. Collaborative cartography in the context of the pandemic: new representations of the territory and an action instrument.**

The concept of mobilized territory is in line with the discussion that highlights the spatial dimension of the multiple power relationships that involve domination and appropriation (HAESBAERT, 2007), in order to understand the territory based on the agencying encompassing its constitutive and structuring dimensions<sup>7</sup>. In this context, cartographies can mediate the power of the State over territories and populations and, on the other hand, they can also function as counter-images that reveal the forces at play in the constitution of the territory, which expose conditions of violence, poverty, pollution and inequality, which can be used as a resource to intervene in urban development processes or challenge dominant representations of locality (DOVEY, PAFKA and RISTIC, 2018).

Recently, different methodologies have emerged that coalesce in a complex process of analysis/reading and representation (in the sense of a constructed interpretation or of a specific representative intention) of the territory, producing or re-signifying various aspects related to the urban space and promoting new intervention prospects.

Maps are representations and show only part of reality, every map is the result of a choice that sheds light on some aspects and ignores others. In other words, more than a data repository, they are political instruments. The choice of scale (region, district, neighborhood, street) is one of the main elements that define what is meant to communicate, its narratives.

In Brazil, in the face of the COVID-19 pandemic, the processes for producing institutional and collaborative cartography have multiplied. Institutional cartographies, which involve private technology companies, official research bodies (IBGE and SEADE) and a database already established within the scope of the public administrative structure, are linked to the dissemination of medical bulletins and aim to inform aspects of the spread of the disease to the population, as well as justifying a set of emergency measures adopted by the State. In general, the fact that they start from a closed database and adopt different methodologies is criticized, to the point that a comparative temporal reading of certain information is not possible, or that they constitute complementary readings, resulting from the first ones presented.

The collaborative cartographies are produced by different organizations, mostly non-governmental, involving research groups linked to higher education institutions, collectives and social movements. Some of these groups and professionals had already, in some way, been developing data georeferenced territorial analysis. In this context, they contributed to the dissemination of other dimensions of investigation, much more intertwined with reading keys and / or spatial perspectives, important aspects to understand the heterogeneity of the territory.

To point out our research questions, in this article we have gathered some cartographic productions, developed from different authors and methodologies. These cartographies, which we classify as institutional and collaborative, use open databases from important research institutes in Brazil. As such, they pose a relevant research question: how does the process of building and producing data about the Brazilian population take place? What is its structure? For the design of public policies, what forms of appropriation of data are articulated in the processes of reading the territory? Or in the recognition of its heterogeneity? Such questions are intertwined in the dialogue that this article proposes with the cartographies here presented.

#### **3.1. Institutional Cartographies**

The Municipality of São Paulo publishes daily newsletters with quantitative updates on suspected, confirmed and lethal cases of COVID-19, as well as more specific data on municipal hospitals, contracted private hospitals and emergency field hospitals built to treat the disease. However, none of these data are presented spatially. This type of analysis will appear in the COVID-19 Epidemiological Bulletins, released every two weeks during the month of April (on March 31, April 17 and April 30, 2020) and in the COVID-19 Situational Report, released on May 29, 2020. In the cartographies presented, however, as well as in the data and information analysis, a simplified reading of a very complex and heterogeneous territory is displayed.

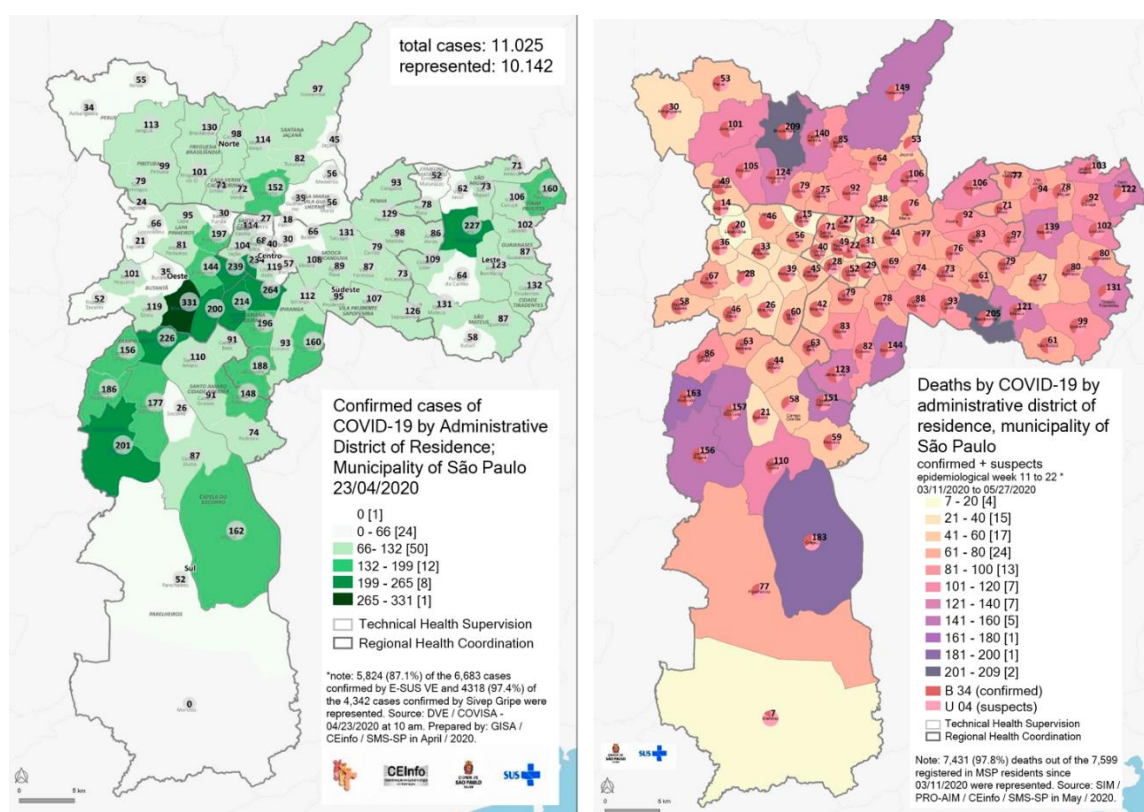
In these, initially, the data related to confirmed, suspicious and lethal cases (deaths) were spatialized according to the Health Surveillance Unit (UVIS) of residence, a territorial unit of analysis that obeys the organizational health structure in the municipality. After the second bulletin onwards, the Administrative Districts of residence were adopted as the

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<sup>7</sup> In the "rhizomatic" sense proposed by Deleuze and Guattari (1995), with headquarters in Lefebvre, based on a set of orders, commands, strategies and actions that are involved in the concomitant movements of territorialization and deterritorialization.

territorial unit of analysis (Figures 6 and 7). The distribution by race, by age group and overlapping with other health comorbidities, is only represented by means of analytical tables and graphs. It is noteworthy that in the third bulletin, the relationship between the epidemiological situation in the municipality and social vulnerability was only analyzed using a graph that convenes a territorial indicator of social inclusion/exclusion that, according to a note, summarizes “indexes related to a large number of databases, generating indicators of autonomy, quality of life, human development and equity in the different territories of the city's districts” (3rd. Epidemiological Bulletin COVID-19 at the MSP, of 04/30/2020, p. 45).

The COVID-19 Situational Report of the city of São Paulo, as the most robust document, presents a history of actions, assistance data and relative to the capacity of the hospital infrastructure, in addition to updating the cartographies regarding confirmed, suspicious and lethal cases of COVID-19. For the first time, it exposes the monitoring of social isolation based on a movement index by demographic density, once again using the Administrative Districts of residence as a territorial unit of analysis<sup>8</sup>. Although several cartographies, which show the degree of compliance with the isolation measures by district, have been disseminated by the media and have been mentioned in official government pronouncements, these are not included in the report and are presented only in graph form. The movement index is the result of georeferencing and social control of people's movements around the city, in real time, based on data from the main telephone companies, which suggests it is a mass monitoring laboratory, especially when considered that, from the measure, narratives of greater rigor in complying with imposed isolation measures gain strength, including the use of police force.



Figures 6 and 7: Cases confirmed and deaths by COVID-19 in São Paulo. Map on the left taken from the 3rd. Epidemiological Bulletin COVID-19 in the Municipality of São Paulo (04/30/2020) and on the right the Situational Report COVID-19 in the Municipality of São Paulo (05/29/2020). Source: Bulletins and Situational Report. Municipal Health Secretariat of São Paulo. Available at:

[https://www.prefeitura.sp.gov.br/cidade/secretarias/saude/vigilancia\\_em\\_saude/doencas\\_e\\_agrivos/coronavirus/index.php?p=295572](https://www.prefeitura.sp.gov.br/cidade/secretarias/saude/vigilancia_em_saude/doencas_e_agrivos/coronavirus/index.php?p=295572)

<sup>8</sup> Health Surveillance Units are decentralized surveillance units under the coordination of COVISA - Health Surveillance Coordination, located in the six health regions of the city of São Paulo (North, South, East, Center, West and Southeast). According to Municipal Law 13,399/2002, administratively, the municipality of São Paulo is divided into 32 sub-prefectures that administer the 96 districts in the municipality, defined by their geographical location and occupation history. The Census Sectors, on the other hand, is the territorial unit established for the purpose of cadastral control by the Brazilian Institute of Statistical Geography (IBGE), the body that conducts demographic censuses in Brazil, formed by a continuous area, located in a single urban or rural framework, with a dimension and number of households that allow for a survey by a census taker (around 300 households). Also, as a territorial unit of analysis used in São Paulo, the HDU - Human Development Units are areas within Brazilian metropolitan regions that can be part of a neighborhood, a complete neighborhood or, in some cases, a small municipality, where human development indicators are read.

The official map in Figure 8 does not appear in any of the medical bulletins, but it presents a possible tensioning of the type of reading about popular territories, insofar as it relates the expansion of the virus to the presence of slums and housing developments in São Paulo. However, the adoption of the Administrative Districts of residence as a territorial unit of analysis is not a strategy capable of capturing the intrinsic complexity of these territories, leading to very superficial readings that reinforce a certain visibility regime based on the dual center x periphery category.

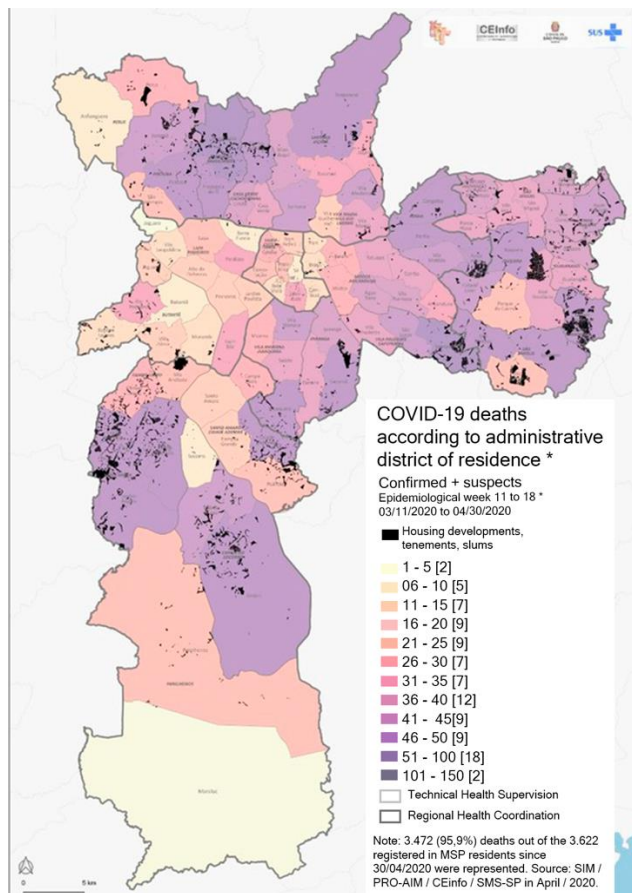


Figure 8: Official cartography presented by the Municipality of São Paulo listing Deaths by COVID-19 according to Administrative Districts and the location of popular housing developments, tenements, slums and irregular housing units. Source: G1 and São Paulo City Hall. Available at: <https://g1.globo.com/sp/sao-paulo/noticia/2020/05/04/bairros-com-maior-numero-de-mortes-por-coronavirus-em-sp-concentram-favelas-e-conjuntos-habitacionais.ghtml>

### 3.2. Collaborative Cartographies

In the context of advancing the disease and recognizing its effects, collaborative cartographies, considered activists, produced by researchers, collective identities and social movements, play an important role in complementing and questioning institutional information, in addition to being an important tool for the development of local initiatives to fight the disease and its social developments. Virtually all federal states presented collaborative actions involving the production of cartographies, widely disseminated on social networks that corroborated the creation of assistance networks composed of multiple actors<sup>9</sup>.

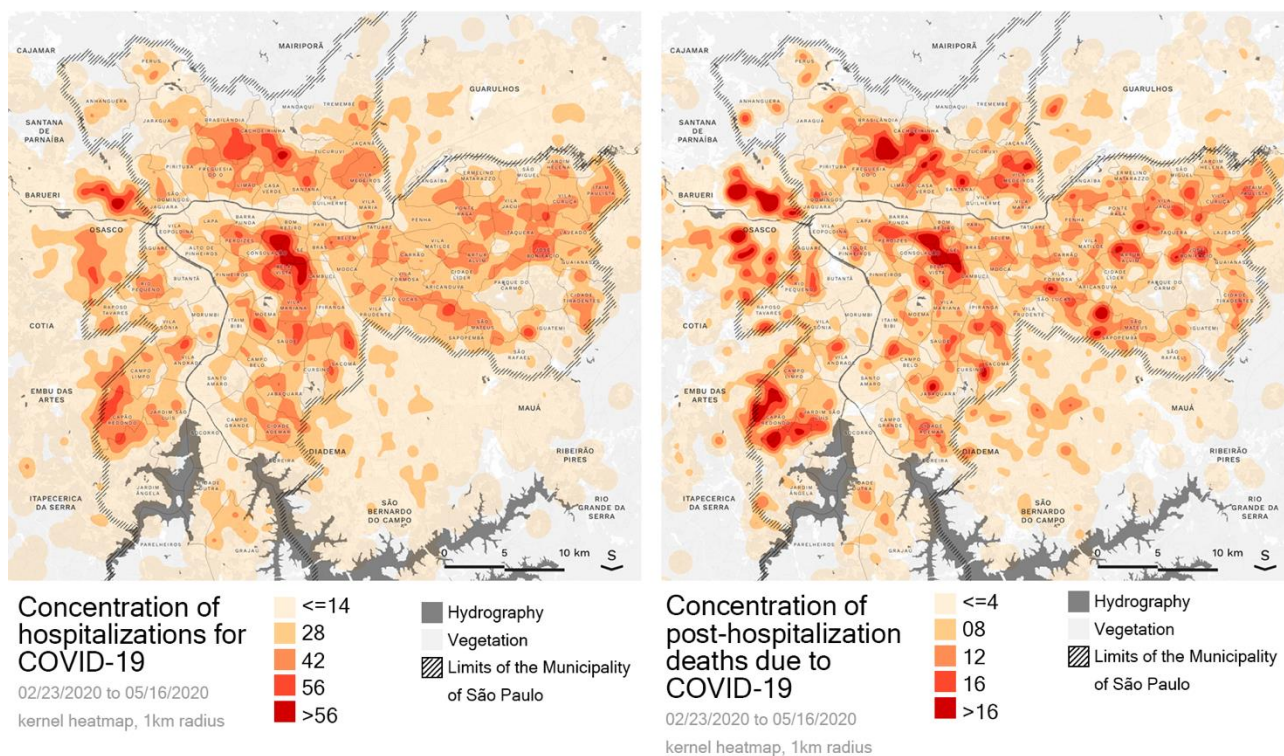
With regard to the municipality of São Paulo, we highlight the efforts of the Public Space and the Right to the City Laboratory, a research and extension laboratory at the Faculty of Architecture and Urbanism of the University of São Paulo (LabCidade - FAU USP), in creating a specific agenda called "Special Coronavirus", which actively works in three dimensions, namely: 1) Coronavirus, housing and urbanism, which gathers analyses and news on the impact of the

<sup>9</sup>As an example, in the state of Rio de Janeiro has the National Articulation of Networks and Civil Society Entities for combating Covid-19 in the peripheries and vulnerable groups, which brings together the National Forum for Urban Reform, BR Cidades, the Brazilian Institute of Urban Law (IBDU), the Observatory on the Rights to Water and (IBDU), the Observatory for the Rights to Water and Sanitation (ONDAS), the Observatório das Metrópoles Network, professional federations, NGOs and national popular movements, among other networks and articulations. This broad articulation gathers information on the action of the public authorities in combating the effects of the Covid-19 Pandemic, based on the experience of the most vulnerable communities and groups. The data and information obtained from this survey support complaints and initiatives of political influence in combating the effects of the Pandemic. For this survey, questionnaires were prepared for residents of favelas, towns, popular neighborhoods, urban and rural occupations; traditional, indigenous and quilombola communities, farmers, fishermen, the elderly and people with morbidities; homeless population; street vendors and informal commerce workers; collectors; incarcerated population, among others.

pandemic on cities and housing in Brazil and other countries in the world, highlighting the multiple critical dimensions of the current global health crisis, as well as implemented action strategies; 2) Actions to protect the right to housing, which combine measures adopted in different cities, states and countries by executive, legislative and judicial powers, by public ministries, public defenders, social movements and other entities to protect the right to housing, especially addressing the struggle to suspend evictions and repossession; 3) Campaigns and actions by the territories, which disseminate ongoing actions and campaigns promoted by different collective identities and networks that are politically active in the territories, in addressing the vulnerabilities, precariousness and risks of the most vulnerable populations, as well as supporting letters and campaigns with proposals and emergency measures.

In the scope of the production of collaborative cartographies, LabCidade seeks to understand and present aspects of the spatial diffusion of COVID-19 in São Paulo, using DATASUS, a database of the Brazilian Unified Health System. The heat maps (Figure 9) represent the places where there is a higher concentration of hospitalizations due to Severe Acute Respiratory Syndrome (SARS) and deaths due to COVID-19, georeferenced from the identification of residence ZIP code<sup>10</sup> of the affected people, producing much more accurate reading of spatial diffusion of the pandemic than the official maps. This same cartographic resource and methodology were also used to map unidentified cases, contributing to the discussions about the underreporting of the disease<sup>11</sup>.

### Heat maps with concentration of hospitalizations and deaths by COVID-19 in São Paulo



Data: DATASUS, Center for Metropolitan Studies / Base: Geosampa / IBGE, Secretary of the Environment (SP) / Datum SIRGAS 2000, Proj. UTM 23S.

Fig. 9: Heat maps with concentration of hospitalizations and deaths by COVID-19 in São Paulo. Source: LabCidade, FAU USP. Available at: <http://www.labcidade.fau.usp.br/simplificacao-da-leitura-do-comportamento-da-epidemia-no-territorio-dificulta-seu-enfrentamento/>

In order to produce a reading table more attentive to the multiple scales present in the territory, LabCidade, in partnership with the Pólis Institute, also works on the overlapping of data related to the COVID-19 pandemic and a set of other layers related to the urban structure of São Paulo metropolis, such as flows of urban mobility, areas of commerce and intense circulation, location of hospitals, places of residence of health professionals, concentration of the elderly and racial data. The cartographies generated from this procedure suggest, for example, that at the beginning of the expansion of the disease, there was a strong association between confirmed cases of COVID-19 and residential

<sup>10</sup> CEP (ZIP code) is the postal code of buildings in the Brazilian territory.

<sup>11</sup> The data and cartographic bases used and produced are available on open data platforms such as the Open Street Map Foundation, Carto Maps, DATASUS, IBGE, among others (<http://www.labcidade.fau.usp.br/dadosabertos/>)

areas with a high circulation flow, due to the presence of commercial and transport terminal areas, as well as the high rate of health professionals' positive testing (Figure 10).

On the other hand, the laboratory performed a territorial reading of the spread of the disease considering the displacements of people going to work, based on the mapping of trips made by people without higher education and in non-executive positions for work reasons identified in the Survey Origin-Destination data carried out in São Paulo, in 2017, correlated to the residential zip code of people hospitalized for unidentified respiratory disease and COVID-19. The map (Figure 11) shows that those who went out to work and made long commuting routes are the ones who were most impacted by the deaths that occurred. This factor was more associated with confirmed cases of the disease than with the demographic density often associated with slum areas and popular neighborhoods – although, in Brazil, the work dimension is strongly associated with the dimension that reveals the location and housing conditions – pointing to the possible inconsistency of the planned reopening policy of shops and restaurants that imply greater travel densities and greater circulation of people on public transport.

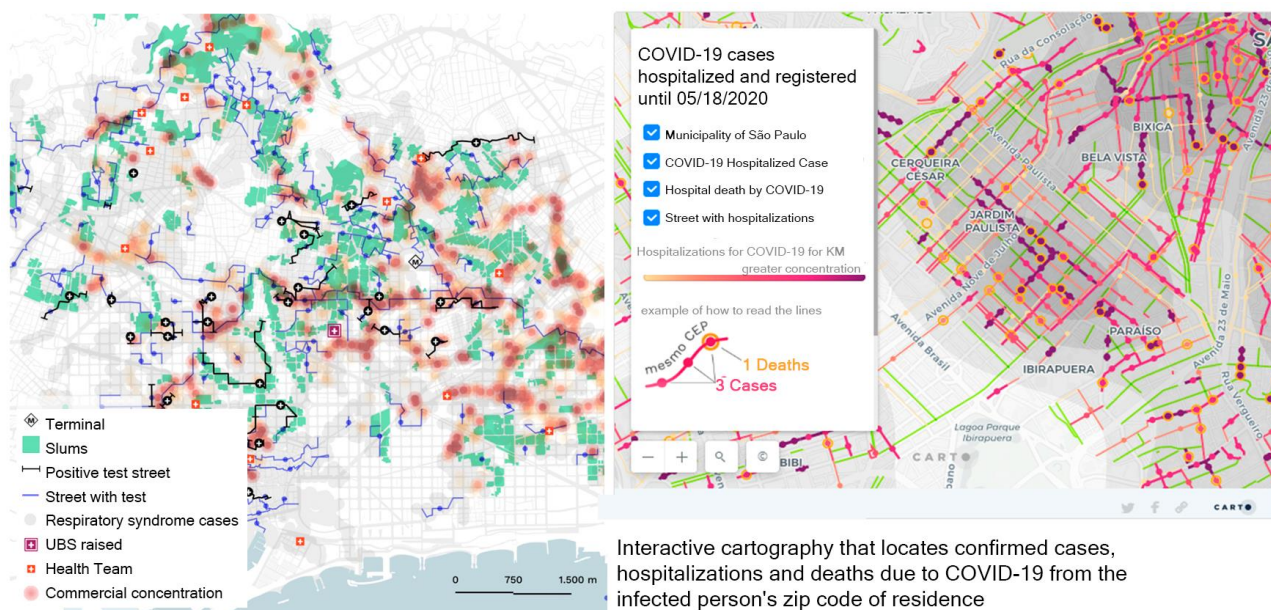


Fig. 10: Interactive cartography that locates confirmed cases, hospitalizations and deaths by COVID-19 from the ZIP code of the contaminated person's residence in São Paulo, cross referencing this data with other urban information data in the city. Source: LabCidade FAU USP. Available at: <http://www.labcidade.fau.usp.br/simplificacao-da-leitura-do-comportamento-da-epidemia-no-territorio-dificulta-seu-enfrentamento/>

**Concentration of hospitalizations due to SRAG  
(18 / May) and distributions of sources of public  
transport travel**

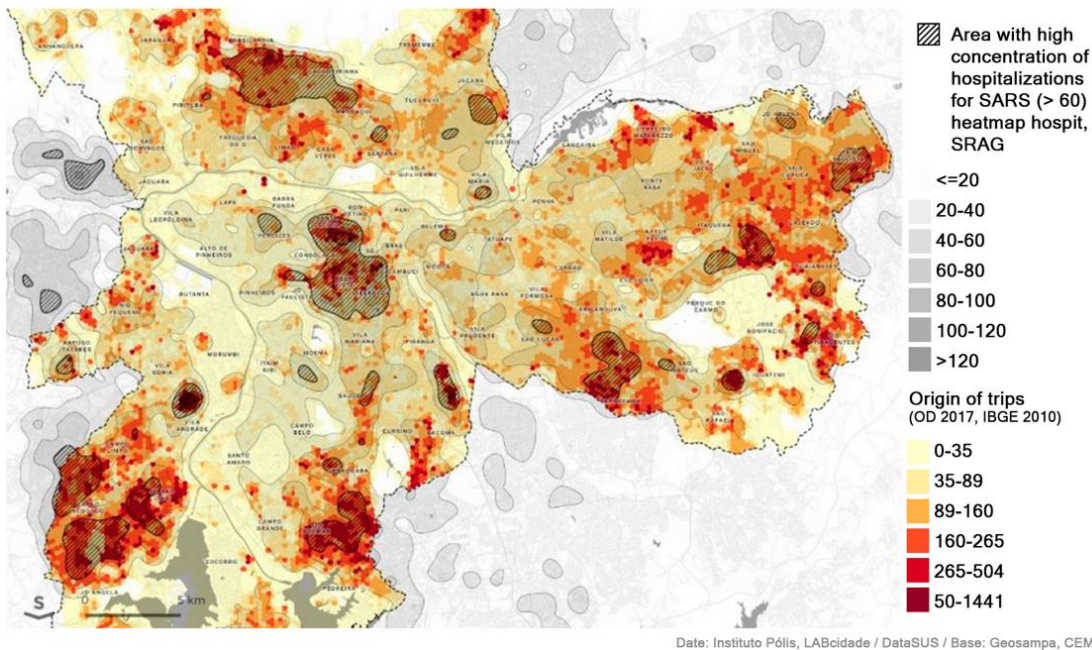
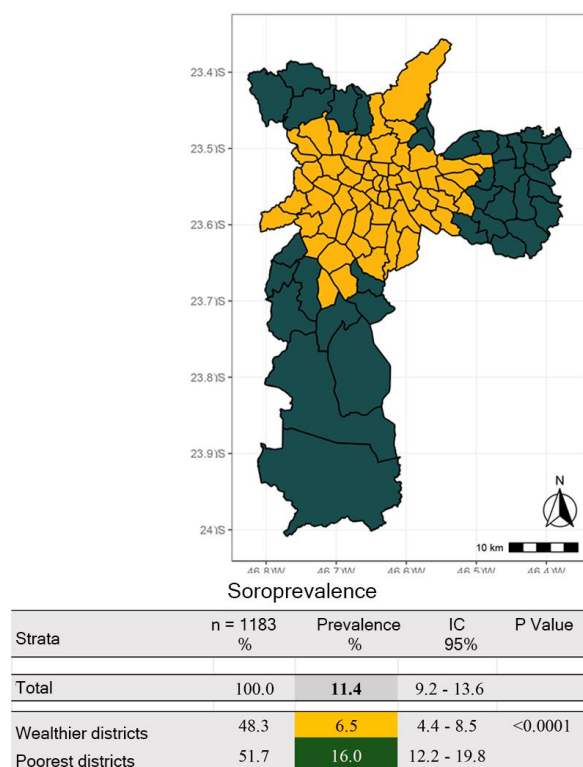


Fig. 11: Concentration of hospitalizations for respiratory diseases (position on May 18, 2020) and distribution of the origins of public transport travel. Source: LabCidade FAU USP. Available at: <http://www.labcidade.fau.usp.br/circulacao-para-trabalho-inclusive-servicos-essenciais-explica-concentracao-de-casos-de-covid-19/>

Adopting the census sectors as territorial units of analysis, the Fleury group, with the support of the organization Todos pela Saúde, develops research called “SoroEpi MSP – Serial epidemiological surveys to monitor the prevalence of SARS – CoV-2 infection in the city of São Paulo,” which intends to identify the proportion of the population that has antibodies against the coronavirus in the city of São Paulo, through the application of serial serological tests. In addition to the distribution of households selected by census tracts, the survey also considered the population's income distribution, measuring half of the seroprevalence of virus infection in higher income districts, and the other half in lower income districts, where it concluded that the different prevalence of antibodies reflects social inequality in the municipality of São Paulo (Figure 12). The study concludes that there are two epidemics with different propagation dynamics in the municipality, considering that the spread of the disease is brutally greater when the individual has a low level of education, when he/she is black and when sharing the living space with five or more people.



\* Chi-square test with Rao-scott adjustment

The measured soroprevalence is 2.5 times higher in the districts with the poorest half of the population (16% versus 6.5%)

## Soroprevalence of infection by the SARS-CoV-2 virus, in the richest and poorest districts of São Paulo

Variable	n = 1183 %	Prevalence %	IC 95%	P Value
Total	100	11.4	9.2 13.6	
Sex				
Male	46.6	11.6	8.7 14.5	0.8192
Feminine	53.4	11.2	8.5 13.9	
Age				
18 to 34	34.7	9.2	6.0 12.3	0.1998
35 to 44	19.8	11.0	6.3 15.6	
45 to 59	25.2	15.1	10.7 19.5	
60+	20.2	11.1	6.0 16.2	
Schooling				
Less than fundamental	19.3	22.9	15.3 30.6	< 0.0001
Fundamental or medium	53.2	9.0	4.6 13.4	
Higher	27.4	5.1	1.8 8.4	
Race/color*				
Black	10.5	19.7	10.7 28.7	0.0008
Brown	34.6	14.0	10.6 17.3	
White	54.9	7.9	5.6 10.2	
People at home				
1 to 2	26.2	8.1	3.9 12.3	0.0371
3 to 4	42.6	10.2	7.2 13.3	
5+	31.2	15.8	11.2 20.4	

\* 38 yellow, 10 indigenous, 11 did not respond/psum

Fig.12: Soroprevalence of infection by the SARS-CoV-2 virus, in the richest and poorest districts of São Paulo. Source: Grupo Fleury. Available at: <https://www.monitoramentocovid19.org/resultados>

Cartographies prepared by collective identities and social movements favor the local scale, neighborhoods and slums. Most of these mappings facilitate donation and aid networks, such as the Corona Map in the Peripheries (Figure 13) and the Humanitarian Support Network in and in the Peripheries. Others give visibility to the impacts of Covid-19 on daily life, such as the work of the Observatório De Olho na Quebrada, a group associated with UNAS - Union of Centers and Associations of Residents of Heliópolis and Region, which is a non-profit entity established in 1978, for the right to housing and land tenure, from the residents committee of the Heliopolis slum, and that in the context of the pandemic, has been producing reports on the impact on the local economy of Heliopolis<sup>12</sup>.

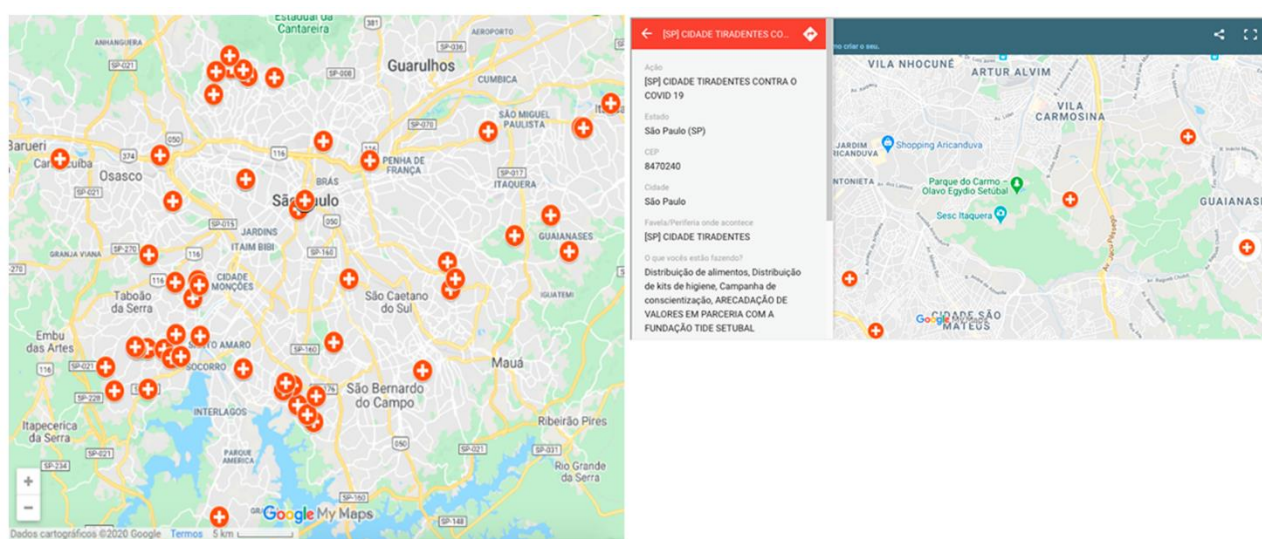


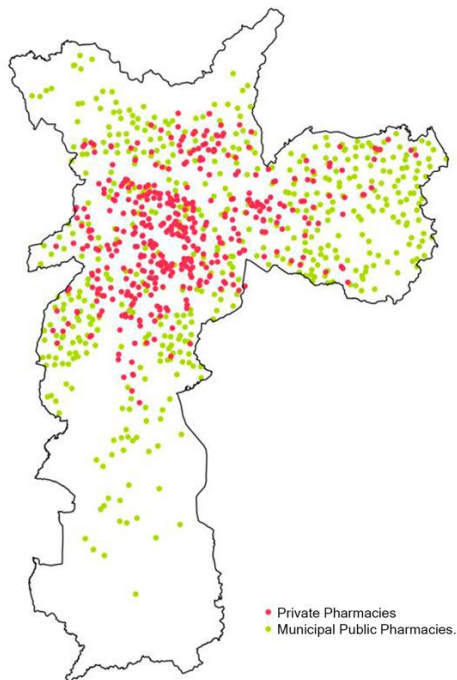
Fig. 13: Collaborative cartography that locates community actions developed due to the COVID-19 pandemic. Available at: <https://www.institutomariellefranco.org/mapacoronanasperiferias>

<sup>12</sup> <https://www.unas.org.br/single-post/familias-com-menor-renda-sao-as-mais-impactadas>

The collective “Desenrola e Não me enrola,” active in the southern region of São Paulo, also provided a data production program that disseminates and monitors the work of solidarity actions promoted by social organizations, collective identities, football teams and social movements in peripheral territories in the context of the pandemic. The “Brigada Solidária da Saúde,” which brings together Public Health students from the University of São Paulo, maintains an interactive map of solidarity initiatives made up of community and popular networks, as well as also producing thematic maps that associate informal work, deaths related to COVID- 19 and the territory, which, added to the cartography of black territories in São Paulo, illuminate aspects of social inequality and their relationship with the territorial developments of the disease (Figure 14).

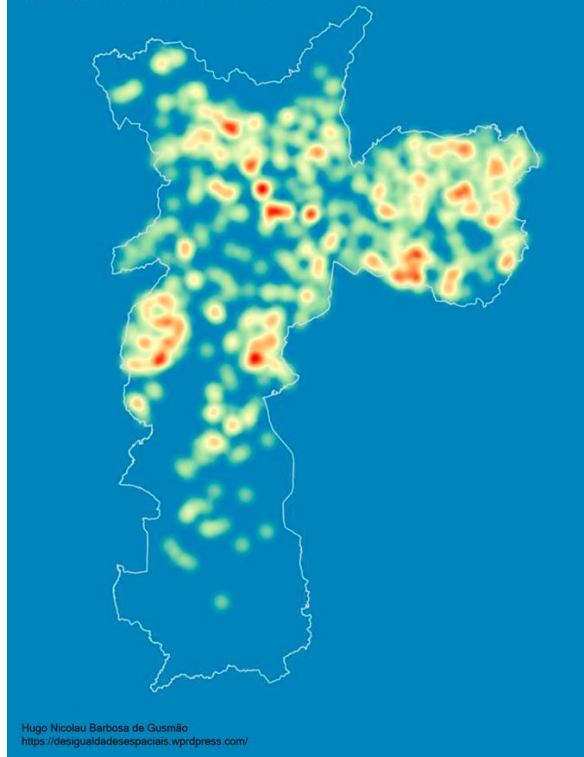
Fig. 14: On the left, Informal Work and Deaths by COVID-19 in São Paulo. Source: Brigada Solidária da Saúde. Available at: [https://brigadasolidariadasaude.com/pt\\_br/](https://brigadasolidariadasaude.com/pt_br/) . On the right, the deaths by COVID-19 and their relationship with black territories in São Paulo. In: MARINO, Aloísio. Cartographies of the pandemic. May 1, 2020. Source: Folha do Estado de São Paulo. Available at: <https://www.quatrocinco.com.br/br/artigos/a/cartografias-da-pandemia>

Location of public and private pharmacies in São Paulo



Hugo Nicolau Barbosa de Gusmão  
<https://desigualdadesespaciais.wordpress.com/>

Heat map of public pharmacies in the municipal network in São Paulo



Hugo Nicolau Barbosa de Gusmão  
<https://desigualdadesespaciais.wordpress.com/>

Fig.15: Spatial analysis cartographies on public and private pharmacy networks in São Paulo. Source: Desigualdades Espaciais. Available at: <https://desigualdadesespaciais.wordpress.com/tag/farmacias/>

It is worth mentioning a number of individual cartographic productions disseminated and discussed in groups organized on social networks such as Facebook and WhatsApp, which mobilize thousands of people, and which contribute to the more diverse representation of such a heterogeneous and complex territory. Thus, pandemic cartographies play an important role in that they respond more quickly to an effective reading of the territorial dynamics that must be taken into account in the formulation of policies to combat the pandemic, and of assistance, at various levels and fields, to the population in general, at a time when the universe of data made available by the government shrinks and is distorted.

Associated with the reality evidenced by these cartographies and data, there is a set of elaborated documents that address intervention proposals in these territories, suggesting a certain appropriation of information and an active position in the fight for rights related to public health. In this sense, the Center for Peripheral Studies, formed by researchers from UNIFESP and leaders of collective identities working in peripheral territories, issued an open letter<sup>13</sup> which recognizes the importance of support networks organized autonomously, but demanding actions from the State regarding expansion of the health network infrastructure that serves these areas of greatest vulnerability, as well as social assistance policies, considering the impacts on local economies. The ONDAS – National Observatory for the Right to Water and Sanitation, released a document prepared by eighty entities, entitled “Combating the Covid-19 pandemic in urban peripheries, slums and with vulnerable social groups: immediate and strategic proposals for action from the perspective of the right to the city and social justice,” as well as organizing documents, manifestos and articles, and holding virtual meetings to discuss issues related to sanitation and precarious housing in the context of the COVID-19 pandemic.

## Conclusion

The article proposes to illuminate the debate around the representation and figuration of certain aspects of the heterogeneity and complexity intrinsic to the constitution of the territories that structure the city of São Paulo. We believe that the concept of precise, safe, structural and orthodox territory, which is understood as a legal center or not, explicit or not, but powerful enough to govern the geographical extension and strive to produce stability, continuity, integrity, must give rise to a notion of relative, uncertain, heterodox territory, through which legacy or legitimacy is in permanent confrontation and negotiation.

<sup>13</sup> Link for the document:

<https://drive.google.com/file/d/1CXKlpf5Mlr5KbMH3X7dMd30AXAod8iRZ/view?fbclid=IwAR2B-Y8HGhg4C1pd2cKY2HJd4zZegvn>

In the context of the COVID-19 pandemic, we have discussed this idea, based on a set of readings resulting from critical collaborative cartographies, involving researchers, diffuse entities and social organizations, taken as an important instrument for questioning data and actions presented and proposed by the State, as well as support a set of community initiatives whose results, in terms of contagion control and meeting social demands, begin to very relevantly express themselves.

Taken together, all these initiatives play an important role in alleviating the situation of vulnerability in the face of the pandemic, since some of these popular territories have, more recently, data on contamination and lethality that prove a more effective control of COVID-19. As an important new front of analysis, Instituto Pólis, for example, has been working on analyzing the relationship between community actions and data related to the disease. This is the case of the Paraisópolis favela, which coordinates twelve initiatives involving the entire population, which includes the hiring of ambulances and nurses, the training of residents as first responders to support the emergency bases created with the presence of civil firefighters and the use of public facilities, such as a school, for assisted isolation of infected families.

It is important to highlight that this type of analysis, as well as the collaborative and autonomous production of cartographies, has been compromised from the moment the federal government decided to omit part of the data related to the pandemic in Brazil.

What we aim to highlight is a certain transformation in the visibility/invisibility regime that operates in the configuration of popular territories in São Paulo, within the scope of heterogeneity produced and also transformed by macroeconomic processes that involve the contemporary city. We understand that cartographies and critical citizen participation initiatives can, on the one hand, be a counter-argument for certain representations and contribute to a more effective reading of the transformations in progress and, on the other hand, become an effective instrument as an empowerment tool to also register the perceptions and interpretations of people.

## REFERENCES

- ALVES, M. 2015. Transformações Culturais e Contradições Urbanas do Espaço Público Contemporâneo. In *Cidades*, v. 11, 470-497.
- Alves, M. 2006. Público y Privado: cultura, consumo y la espacialidad de la ciudad contemporánea. In *Polis*, Revista FADU/UNL, v.9, 42-53.
- ARRETICHE, M. (org.). 2015. A metrópole de São Paulo no século XXI: espaços, heterogeneidades e desigualdades. São Paulo: Ed. Unesp/CEM.
- CANOVA, K. 2020. Urbanidade e Justiça Espacial na cidade de São Paulo: metodologia de análise e subsídio para tomada de decisão no planejamento urbano. São Paulo, Faculdade de Filosofia, Letras e Ciências Humanas, Universidade de São Paulo (FFLCH-USP), Tese de Doutorado, *in mimeo*.
- DELEUZE, G.; GUATTARI, F. 1995. *Mil-Platôs: capitalismo e esquizofrenia*. Vol. 1. RJ: Editora 34.
- DOVEY, K; PAFKA, E. e RISTIC, M. 2018. *Mapping Urbanities. Morphologies, Flows, Possibilities*. New York: Routledge.
- HAESBAERT, R. 2007. Território e multiterritorialidade: um debate. In *Geographia*, Niterói, UFF, Ano 9, n. 17, 19-46.
- MARQUES, E. (org.). 2015. A metrópole de São Paulo no século XXI: espaços, heterogeneidades e desigualdades. São Paulo: Editora Unesp/ Centro de Estudos da Metrópole.
- MARQUES, E. e BICHIR, R.M. 2001. Investimentos públicos, infra-estrutura urbana e produção da periferia em São Paulo. In *Espaço & Debates*, v.27, n.42.
- NERY, M.; SOUZA, A. A. L. de; e ADORNO, S. 2019. Os padrões urbano-demográficos da capital paulista. In *Revista Estudos Avançados – USP Cidades Globais*, n.33 (97), 07-36.
- NAKANO, K; CAMPOS, C. e ROLNIK, R. 2005. Dinâmicas dos subespaços da área central de São Paulo. Disponível em: [https://cebrap.org.br/wp-content/uploads/2017/03/11Nakano\\_Malta\\_Rolnik.pdf](https://cebrap.org.br/wp-content/uploads/2017/03/11Nakano_Malta_Rolnik.pdf)
- RIBEIRO, L.C. de. 2000. O futuro das metrópoles: desigualdade e governabilidade. Rio de Janeiro: REVAN/FASE.
- RIZEK, C; SANTO AMORE, C; CAMARGO, C. 2014. Política Social, Gestão e Negócio na produção das cidades: o programa Minha Casa Minha Vida “Entidades”. In *Salvador, Caderno CRH*, v.27, n.72, 531-546.
- RIZEK, C. 2014. Cotidiano, cidade e experiência. Questões e apontamentos de pesquisa. In *Anais XIII Seminário de História da Cidade e do Urbanismo*, Brasília.
- ROLNIK, R. 2015. *Guerra dos Lugares*. São Paulo: Boitempo Editorial.
- ROLNIK, R. e SANTORO, P. 2017. Novas frentes de expansão do complexo imobiliário-financeiro em São Paulo. In: *Cadernos Metrópole (PUCSP)*, v.19, 407-431.
- RUFINO, SHIMBO e SANTO AMORE (orgs.) 2015. *Minha Casa... E a cidade? Avaliação do programa Minha Casa Minha Vida em seis estados brasileiros*. Rio de Janeiro: Letra Capital.

SANTORO, P. E NASCIMENTO, D. 2019. Processos de Reestruturação urbana sobre Territórios Populares: Belo Horizonte, Salvador e São Paulo. XVIII Enanpur – Sessões Livres, Natal.

TORRES, H. da G.; MARQUES, E.; FERREIRA, M. P.; BITAR, S. 2003. Pobreza e espaço: padrões de segregação em São Paulo. In Revista Estudos Avançados, n.17, 97-128.