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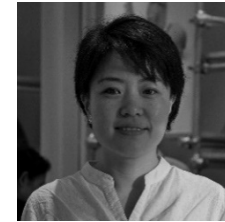
Visualizing and Understanding Guangzhou City, an Historic City in Rapid Transformation

The article proposes a research and pedagogical project in the city of Guangzhou in China with the usage of the digital tools of visualization. We would like to carry out a model which could help to understand the urban transformation by structuring the geographical, political, economic and social conditions together. By taking concrete sites and focusing on a relatively short period, the article aims to structure a research method and imagine new forms and uses of the city representation.

The transformation process of European historic cities such as Venice is relatively slow. When the research object concerns a historic city that has undergone radical changes in a short time, such as the case of Guangzhou (China), it is interesting

to carry out analyzes at a "micro-scale" and within a "micro-timeline".

The project is proposed for understanding how the modern city works differently than the old traditional city and how the contemporary conditions influence urban transformation. On one hand, we want to know how the modern city is struggling to overcome the geographical constraint. For this the Pearl River and the canals are the essential points of observation. On the other hand, we want to understand the ternary composition of the government-public-company, that represents a complex social relationship in contemporary China, which is unparalleled in the Western world, and its influence toward the production of urban space.



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1. INTRODUCTION

Data visualization technologies provide new tools enabling us to better understand cities as illustrated by the Visualizing Venice project. The outcome and benefits mainly relate to the representation of the architectural and urban form. The possibility to visualize the transformation of volumes and the patterns of the city by following a timeline can lead to significant discoveries. Changes which might be very small are highlighted. Furthermore, the digital technologies make access to historical documents different than the traditional manner. The visualized city becomes a large interactive library into which the user can navigate. The knowledge is organized, not on the shelves, but through different parts of the city. It becomes easier to collect and sort out information based on the visual location within the city. By combining the timeline navigation and the geographic navigation features, it is possible not only to synthesize the city transformation but also reveal the reasons of the changes.

The project is realized with master's students in architecture and urbanism. After taking seminars in the history of Chinese architecture and cities, they should take a concrete site as a study object.

China is a country that underwent a strong transformation from the end of the 19th century. After the opium war, the entire Chinese society is then brought into the vast reform program that brought radical changes in Chinese cities. In many cases, they are no longer recognizable today compared to what they were a century ago. This is the famous phenomenon of the *tabula rasa* in Asian cities engaged in strong growth also described by Rem Koolhaas[1]. But more than this, a certain continuity that straggles on the radical changes and the strong tension between them is nonnegligible.

For this program, the team members are invited to reconstruct the transformation of the city of Guangzhou by following the timeline from the end of the 19th century up to today. The objective is to understand the production mode of the urban space that is related to social, geographical, political and historical conditions. They should build the 3D models

of the selected site according to the historical phases. Then they should take surveys from the site, observe the environment and interview the people they meet. Finally, statistical tables complete the information. Eventually, the three parts of the work are brought together to give an ingoing interpretation.

2. METHOD

2.1 The choice of the site

Guangzhou is a commercial city marked by the water landscape. Two thousand years ago, the Pearl River that joins the sea 62 km from the old city was 2,000m wide. The new lands appear with the increase of its width little by little. Today, in the downtown part it is 180m wide[2]. (fig.8) The city, has grown thanks to these new lands, benefiting from its geographical situation and has become an important port since the 9th century[3]. It has been the starting point of the famous maritime silk route that reaches to East Africa. After the discovery of the sea route to India, it also connected Europe and America[4]. Guangzhou's ports were kept open even during the country's closure period, a politic measure taken by the Qing Emperor in the 18th century. The goods are transported not only out of the country by the sea, but also inland by the river routes.

At the beginning of the project, the target site must be representative of the three essential points of the city: the rapid urban transformation, the lively commercial activity and the influence of the Pearl River. The Haizhu square is thus chosen as the study site. (fig.2-7, fig.9) It is the crossroads of the monumental north-south axis of the city and the east-west banks of the river. The roads built on the northern and southern bunds, especially the northern one, are the first modern roads built in the city. While the Haizhu bridge built in 1933 is the first bridge joining the south bank. It marks the beginning of the extension of the city toward the southern land and the sea. As a crossing point of flows, the site is today a transport hub and a place where various elements meet together.

2.2 Documentation

The documentation material contains principally

maps, photos and drawings. The texts containing technical information have priority at the beginning of the project. We have to struggle with the lack of archive service in China would not hold enough documents for this analysis. All kinds of resources are then allowed as source of raw material: books and articles, reports and blogs on the websites, satellite photos and online maps.

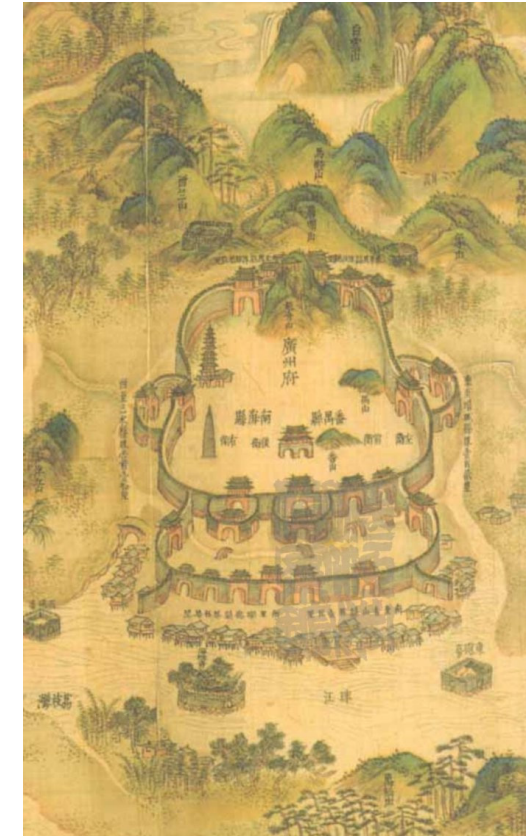


Fig. 1 - Representation of the Guangzhou City, 1685.

It's by going back in time that all the principal changes between the end of the 19th century and 2018 are noted. The objective of the documentation stage is to mentally construct the process of site transformation and identify significant phases. The dates represented by 3D models are those shown by the final appearance

of the site at the end of each transformation phase: 1933, 1968, 2000 and 2018. Because the landscape and the representation technologies are too different between the beginning of the 20th century, and the 1890's, one is made on an ancient map. Finally, the selected dates correspond either to the end of a

historical period, or a break-up marked by destruction or demolition. The documentation stage introduces a historical vision that naturally directs the team member to ask questions about the meaning of these changes.

Fig. 2, 3 - View toward the bund in 1937 and 2017.

Fig. 4, 7 - Haizhu Square in 1935, 1951, 1964 and 2018.

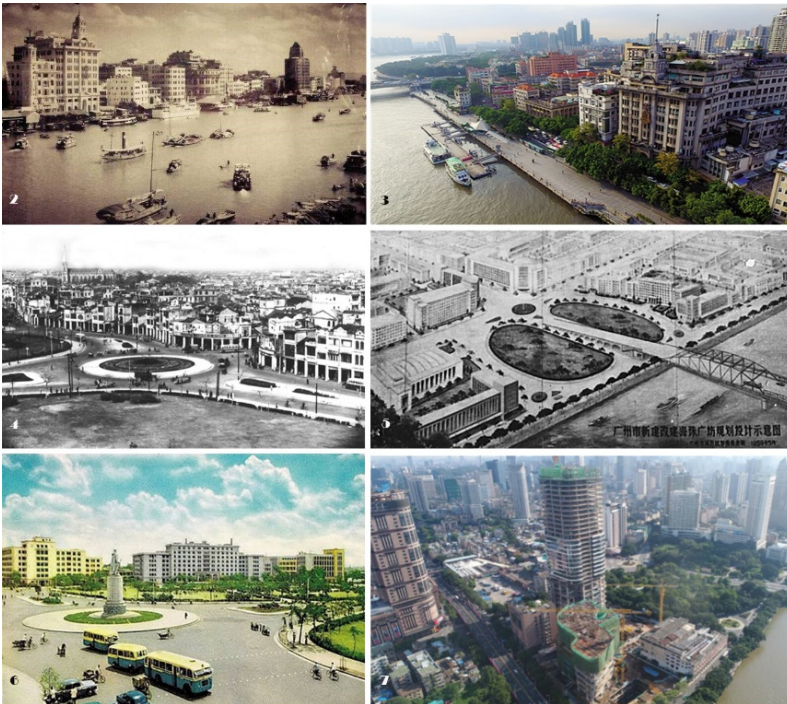
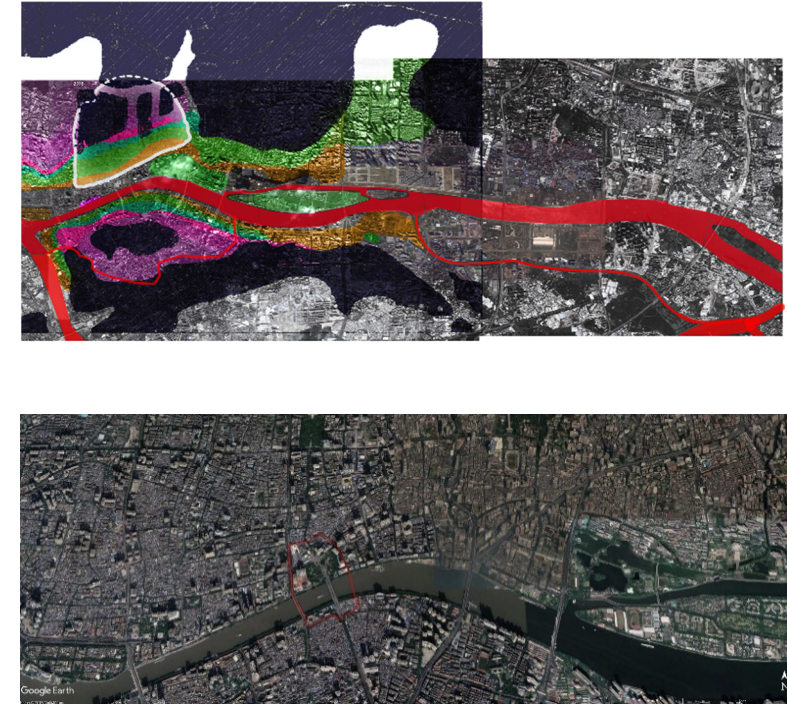


Fig.8 - The retreat of the Peal River from the 3000 B.C to Today

Fig.9 - Localisation of the Haizhu square



2.3 3D modeling

It is more operational to start from the current date because we have more information and address an environment closer to the current reality. The 2018's model is the base for 1968 and 2000 ones. The 1933's view, more difficult to reconstitute is referred as the *qilou* landscape. *Qilou* is a type of commercial and residential building appeared at the same time with the construction of the modern roads. Today, there are still many of these in the old city. It is also necessary to go inside of the site farther from the bund where the texture and the buildings of this time are more preserved. The samples taken from within the site, the photos taken during this period and the model of the city exhibited in the Urban Planning Museum are major resources for the realization of the model. From the 1890's representation, we can imagine the city composed especially by the city wall (fig.1) and the *zhutongwu*. *Zhutongwu* which is a type of the most ordinary building at this time. The models are thus also made in an abstract way to show the essential characteristics of the time. We have to compare the difference to identify the points of changes. When the models are put together by following the time line, some patterns emerge.

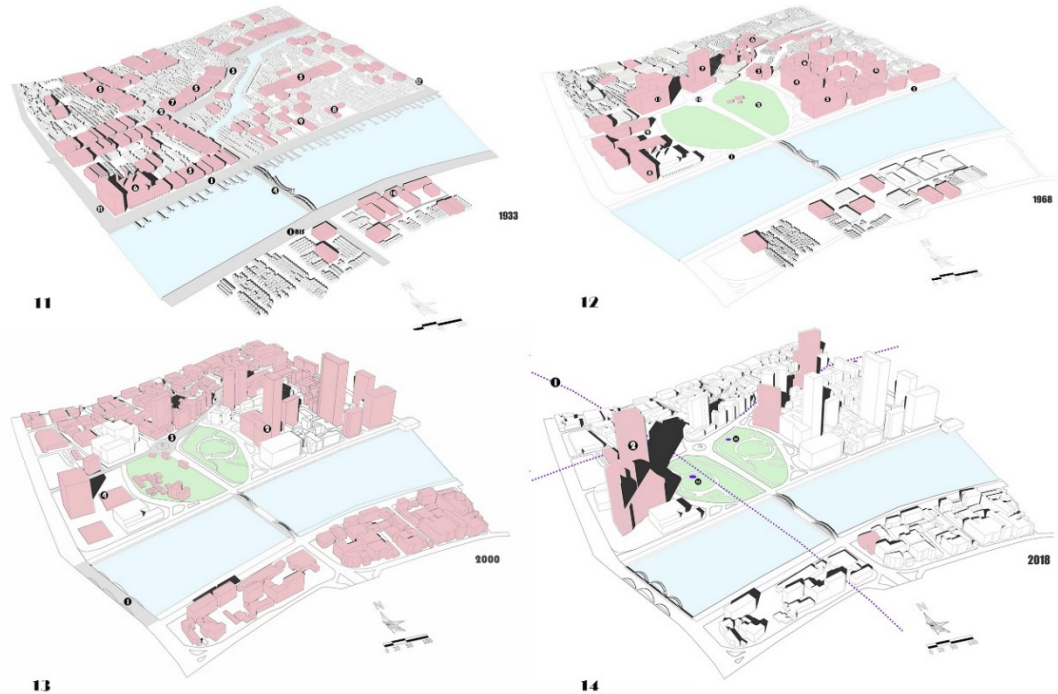


Fig. 11, 14 - The site in 1933; in 1968; in 2000; in 2018.



Fig.10 - The site in 1890

3. VISUALIZATION OF THE CITY

3.1 The bund out of the city wall (fig.10)

In 1890, the river is populated by boats. The majority of buildings are 4-7m wide and 7, 20m long and 5-6m high. Built in wood and brick, the buildings run along the streets and the bank. The set of routes adapted to the topographic situation looks like a comb: the streets perpendicular cross the river and the city wall. The main streets are 4m wide. The lanes are 1-2 m wide [5]. There is no bridge connecting the two banks. Transverse transportation is done by boats.

3.2 The infrastructure as the new mode of the urban space production (fig.11)

In 1933, the first modern infrastructures are built: the east-west oriented road on the former site of the city wall (Yide road, n_3 on the model), that of the bunds (n_1, n_1bis), the roads on the West (n_11) and the Est of the site (n_12), the electricity center (n_6) and the Haizhu Bridge (n_4). The construction of the *qilou* roads and the bridge restructured the city by connecting the monumental buildings in the northern part of the city. The new roads are 15-20m wide. It is important to note that the *qilou* buildings (n_5, 7) that

makes up the most visible change of the site are in fact a part of the modern roads [6]. With the recessed ground floor, they make up together the galleries protecting people from the sunlight. The government of this period, which undertakes road construction projects, adopts this type of road model.

3.3 The show window of the city (fig.12)

In 1968, the Haizhu bridge is the main transport artery. The part on its entrance destroyed during the wars is converted into a green space (n_2) in the form of the ring that serves to distribute the flow of automobile. The new large buildings are built around the square (n_3, 4, 5, 9, 7, 11). Shops and hotels are built for the commercial exhibition events. The ports disappeared. The landscape has already changed a lot, especially on the side of the bunds.

3.4 Full renewal, trade and tourism (fig.13)

The landscape in 2000 is denser and more complex. Yide Street (n_3) has become a commercial center. The bund is laid out in a promenade. The right to use the parcel behind the electricity center is sold to a real estate company but not yet built (n_4). The place is occupied for many years by a temporary wholesale market. The site is almost totally renewed compared to 1933.

3.5 The city in three dimensions (fig.14)

Compared to 2000, few new buildings are built in 2018. The essential change is the development of the urban space toward the sky (n_2, 2000: n_2) and in the underground. Two subway lines are built under the square (n_1). Not only the height of the facade of the square has further increased, but also the density has further developed with the construction of commercial spaces in the underground.

4. SITE SURVEY

The site survey is necessary for several reasons. First, we can obtain supplement the material environment information for the models, such as the volume of buildings, the scale and the street pattern. Then we

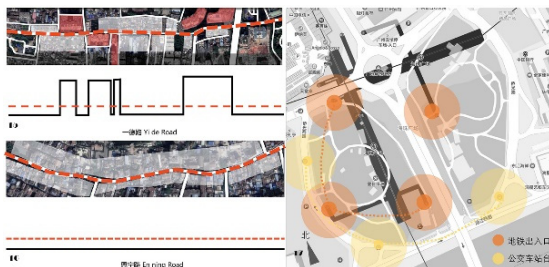
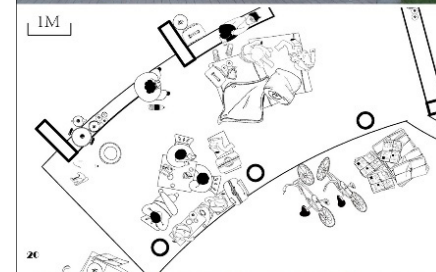


Fig. 15 - Yide road, facade fracture by the contemporary buildings
 Fig. 16 - En'ning road, continuity of a traditional qilou road
 Fig. 17 - The bus and subway Stations around the square
 Fig. 18 - Yide road
 Fig. 19 - Cart players
 Fig. 20 - Space occupation by the vagrants
 Fig. 21 - Vagrants

can observe the people who live and work there and the particular activities remarkable for the site. According to Henri Lefebvre, the production of the urban space organizes also the social rapport [7]. We try to discover the link between the urban condition and the people's life. During the surveys, three types of the urban space are identified for their particular landscapes and activities: the bund, Yide Street, and Haizhu Square. Promenade dedicated to tourism and leisure activities, the bund gives a panoramic view toward the left bank and access to the historical buildings. Yide Street is on the former location of the city wall. Bordered by *qilou*, the street is mainly occupied by wholesalers of seafood and stationery. The flow related to the goods movement by the small vehicles is extremely strong. (fig.18) Even if the contemporary buildings imitating the *qilou* offer more place, the density and the fracture on the urban pattern brought by them turn the situation worse. (fig.15-16) Haizhu square is one of the few green spaces along the river. As a park and an



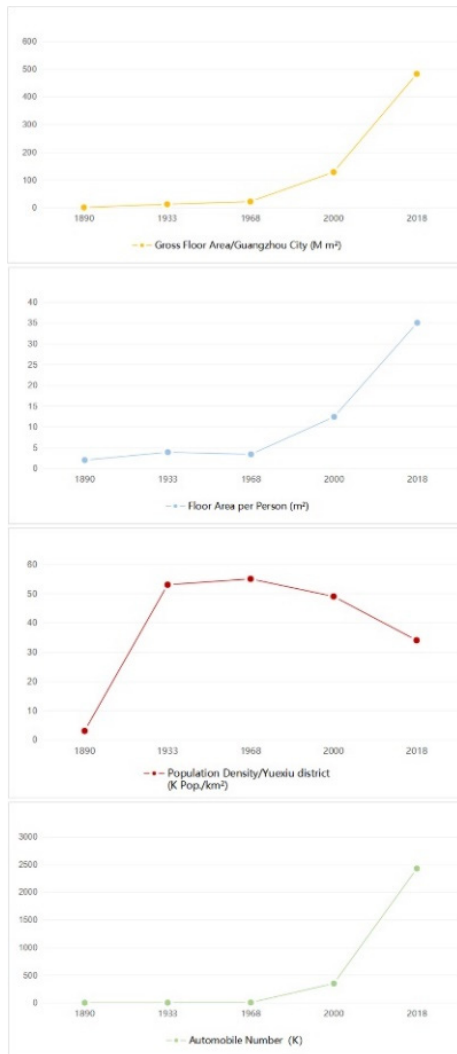


Fig. 22 – Statistic tables

exchange point, it contains a particular phenomenon: the party on the left (close to the bus and subway stations) is occupied by the vagrants, while in the right part (close to the hotels and residential area), card players. (fig.17-21)

5. CONCLUSIONS

By following the site evolution, we can immediately note the power of the infrastructure that orients the urban. From river transport to that of the automobile and the subway, it guides the production of the urban space. Around 1900, the urban texture is composed of low-rise buildings that have a better connection between them. (fig.11) They form a topological landscape. While from the middle of the 20th century, the "individual" buildings seem like blocks gradually replace the old ones. (fig.12-13) The development towards the third dimension of the city makes the site more like a place of passage than a place of connection. The public spaces "catch" the flow thanks to its situation of cross.

Before 1890, there was no real urban policy in the modern sense. It means that the city management was not managed by a specific institution competent for this. The city was not a place of production but dedicated mainly to administrative and military uses. During the period of the self-reinforcing movement, the construction of the bund testifies the recognition of the structural, economic and landscape values of the banks. Land economy is becoming more and more important. The government gets profits with the new land produced by the construction of the bunds and the land value increased with the infrastructure construction [8]. Around 1990, the land use right is put on the market, while it was public since 1949. The land speculation is particularly visible on the small empty ground on the western part of the site. (fig.13, n_4) It was bought by a real estate company that has not built anything for twenty years. The construction of the project is launched shortly after the construction of the subway. (fig.14, n_2)

The effects of political, economic, and social changes can be seen through the visualization of the city. In the

1950's, the site severely damaged during the wars was laid out to become a place. In this period, the state adopts the regime of the planned economy. It thus takes national and international trade under its control. Under the influence of the USSR and his monumental urban projects, the large fairs and hotel buildings compose around the square that make up the iconic landscape of the city. (fig.12) In 1980's the government adopts the market economy. The effect is visible in 2000's with the large buildings responding to booming commercial activities. (fig.13) The mix use buildings, including offices, shops, apartments and leisure spaces appeared. In the begging the 2000's, with the implementation of the heritage policy, the site is protected as part of the old city. The center of electricity is thus preserved. Otherwise, the site has already totally changed. It is amazing to see the return of the wholesalers to the same area- at the foot of the wall city where were vegetable and grain markets in the 19th century, even if the ports nearby do no longer exist. In spite of the completely transformed urban landscape, the memory is preserved and some kind of invisible connection with the past is particularly resistant.

It is necessary to combine the statistical analysis to have a more precise understanding. (fig.22) Although the volume of buildings has increased significantly, the population density curve is turning down. This is mainly due to the urbanization of the suburban areas. This does not necessarily mean that the density of the site is diminished. The growth of the automobile use and the development of the infrastructure rather suggest that there is a strong flow on the site. Commercial and recreational activities contribute to the density.

According to the architect of the metabolism movement Fumihiko Maki who established his theory of the group and the infrastructure in the 1970's, the city could be structured by a set of groups [9]. They create links between themselves. This reflection, aimed at extremely dense postmodern cities, finds its echo on Haizhu square. But there are flaws that make difference from the organic perfection imagined by Maki. The vagrants and the card players like the last

resisters of the city in the strong transformation phase. The carriers who use small vehicles every day have nothing to do with the flyovers and the subway which are adapted to the automobile and long voyages. Is the site an example about the *tabla rasa* in the extremely modern cities? Has it nothing to do with “what used to be called the city”, as is claimed by Rem Koolhaas? Certainly. In fact, the radical transformation in Guangzhou city has already started one century ago. During this time, several elements are brought together in an impact situation. The Haizhu square represent an energy landscape that is “made of elements designed and managed in a disparate and often conflicting way” [10], and in a scenography demonstrating human sensitivity to the urban environment.

This study which is still in the experimental phase, gives some remarks. City visualization is an excellent research and pedagogical tool. It makes the transformation of the city visible, but it is intelligible only with other types of information. In the case of this study, they are the site survey and the statistical analysis. In our project, the historical approach is adopted in the beginning. It guides and frames the visualization work that gives in the end a more complete interpretation without be constrained by the information that is too rich to be control. Finally, we find also elements difficult to be identified or worth to be studied more. The project will be more thorough in the future.

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