

Mapping Identity With Geo-Technology

Montelupo/Italy *Versus* Santa Leopoldina/Brazil

Bruno Amaral de Andrade

Departamento de Arquitetura e Urbanismo
Universidade Federal do Espírito Santo
Vitória, Brazil
deandradebruno@outlook.com

Renata Hermannny de Almeida

Departamento de Arquitetura e Urbanismo
Universidade Federal do Espírito Santo
Vitória, Brazil
renatahermannny@gmail.com

Abstract—This article is inserted in the hybrid-theme “Heritage and Representation”, in the field of new methods of iconographic representation of the territorial-landscape heritage, through digital models of cartographic construction. The problematic identified in representations of the territory is solved from an analytical hierarchy of observation, interpretation and comprehension of the relationship between biotic and anthropic dimensions, with consideration of the title role of the ecological aspect of the territory, and its relation to the construction of identity. The hypothesis guides the evaluation and experiment of a consolidated Italian approach and its adoption to the Brazilian context. The objects of empirical study are the cities of Montelupo/Toscany/Italy, and Santa Leopoldina/Espírito Santo/Brazil, as locus to elaborate a comparative method in the environmental heritage category. The aim of this article is revealing how the environmental aspect of the territory is relevant to the construction of identity, through mapping by GIS software.

Index Terms— representation, environmental heritage, identity, GIS.

I. INTRODUCTION

This work is important to the contemporary state of art in the hybrid theme “Heritage and Representation”, by the acquisition of technical and scientific repertoire for mapping identity, focusing on the environmental aspect of the territory, which guides processes of human settlements. The identity representation of the place [1], referred to in this research, as part of the set of advanced studies of the so called Italian territorialist approach, linked to a key triad - concept, representation and scenery - oriented by theoretical, methodological and technical basis for analysis, interpretation and intervention in the territory [2].

The method chosen is driven by the *Italian Territorialist Approach* or *Anthropobiocentric* [3], focusing on advanced studies regarding techniques and instruments for mapping, with digital geo-technologies, the environmental heritage [4]. The object of study is referenced by Santa Leopoldina, Espírito Santo, Brazil, that is a legacy of German European immigrants, from the mid-nineteenth century [5], and Montelupo Fiorentino, Toscana, Italy, a city near to Florence, with the aim to compare the environmental representations of the territory.

The problematic is in the representation of the territory that doesn’t consider the environmental as a heritage to support and guide urban and regional planning [6]. The hypothesis is that the territorialist method of iconographic representation is capable of revealing identity, which is conceptualized as the long-last territorial marks, that can be cognitive and physical, originated initially by the environmental layer of the territory, the one that conducts the human settlement occupation.

The territorialist approach tackles the problem of sustainability by focusing on the human environment, if a mountain subsides because of a hydro-geological imbalance caused by neglected terraces, it a problem for the territory, because the territory is a neo-ecosystem built by human civilizations over the years [7]. Landslides and floods threaten the inhabitability for the settled population living below the terraced mountain, like the cities of Santa Leopoldina and Montelupo. To understand the environmental aspect of the territory, changed and damaged by human establishment, and its direct influence on agriculture and urban expansion, as long as heritage preservation by identifying identity, is the biggest challenge for contemporary urban and regional planning [8].

II. METHODOLOGY

The so-called territorial approach is a current of thought of a research-intervention character created and consolidated by the iconic figure of Alberto Magnaghi, developed with the Italian Territorialist School. This article incorporates and adapts the approach, focusing on method of the territory’s iconographic representation. The map is an important tool for the architect and urban planner, and means more than a description of the territory to support the activities of space, since the interpretation of identity, obtained by a historical process, provides project indications. The definition of territorial heritage adopted by the Italian school is understood in an enlarged way, identifying the space as a living organism, composed of people, places, environment, landscape, urban settlement, knowledge, culture and crafts [9].

The territory itself can be understood by three layers: the environmental heritage, the territorial heritage, and the socioeconomic heritage. The natural environment is the basis for human settlement, and an important part of its identity, which can be seen at the landscape, a perception figure of the

territory. Recognizing the territorial identity, and its various geographic scales, is crucial in implementing processes of reterritorialization. This recognition can be done by interpreting processes shaping the territory over the long term to get the permanent material and cognitive sediments as the basis for new territorializing actions.

The core of the territorial approach is in the return of the place in urban and regional planning that occurs through methodological steps, focusing on technique of identity's representation, organized in a heritage territorial atlas. The territorialist approach is summarized in a project scheme, which seeks a self-sustainable local development; however, it's marked in red the steps used for this article, the physical aspect of the territory, which originates the *Territorial Type Landscape* (Fig. 1).

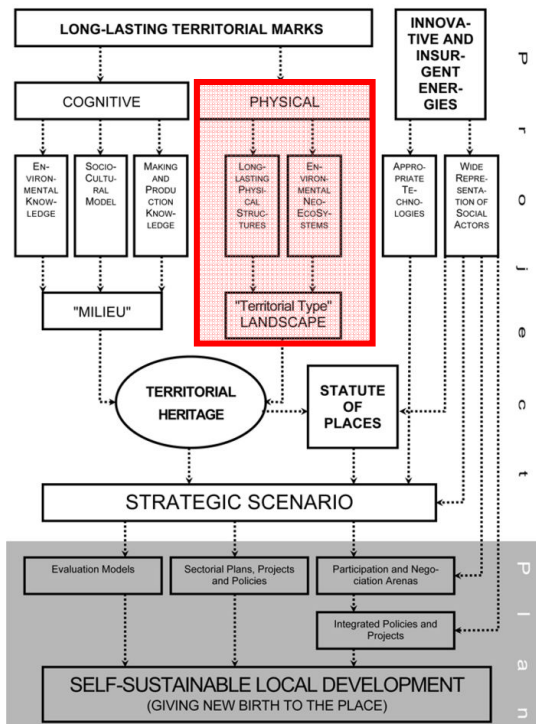


Fig. 1. A planning process scheme for local self-sustainable development: the "hydraulic" scheme by Alberto Magnaghi.

III. OBJECT

The object of study is the city of Montelupo, Italy, and Santa Leopoldina, Brazil. The clipping of objects is shown in the mapping below, developed with geo-technologies, focusing on the environmental heritage's representation.

Montelupo Fiorentino is located in the province of Florence, Tuscany's region, Italy, 19 km from Florence, with about 13,684 inhabitants. It has archaeological site containing graves of Etruscan origin, and remains of a Roman villa of the republican era. It stands out for its ceramics, which began during the Renaissance, and has rich religious architectural heritage and urban form characteristics of Italian old center. Structure by the river Arno, and has a perceptive morphology of valley and mountain, which dominates the city landscape.

Santa Leopoldina is located in Espirito Santo State, Brazil, 47 km from the city of Vitoria. It stands out for the production of ginger, banana and coffee, and architectural and urban heritage built by European immigrants, especially Germans, Austrians, Swiss, Dutch, Luxemburguenses and Italian. Own neo-colonial and eclectic architecture and urban form characterized by a *Strassendorf* [10], main street as the axis of the settlement, parallel to the river. It is structured by the river Santa Maria da Vitoria, and has a perceptive morphology of valley and mountain, which dominates the city landscape.

IV. MAPPING IDENTITY

The long-term development of territorial identity reveals its individual features and personality, reinforcing the landscape, connoting its unique nature and specific elements produced by anthropic influence. The data information of environmental and built character of the territory allows the settlement's analysis and interpretation, with particularity to dynamic legacies processes of the relationship between natural and man-made system, characterizing the basis for the understanding of identity [11].

The mapping produced with the software *QuantumGIS* allows contact with themes concerning the knowledge of orography, geomorphology, and perceptive morphology of the landscape, through interpretation of georeferenced data and manipulation of orthophoto. It is presented the mapping of Montelupo Fiorentino and Santa Leopoldina, focusing on the representation of the environmental heritage, which visually defines the landscape by a spectator.

A. Montelupo

The first map show the altimetry of Montelupo, where the black spots reveals the lower hights quotas, and the white highest quotas (Fig. 2). It's clear the Arno river basis in the valley of the territory, and therefore its protagonism as a heritage element to the settlement.

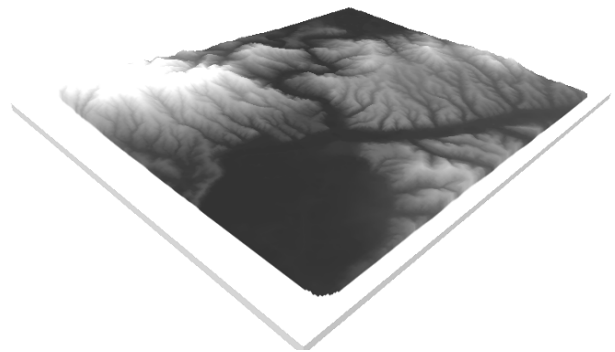


Fig. 2. Montelupo's Altimetry.

The next map highlights the parts of the land with the same exposure (Fig. 3), present in the study area. It is performed by tracing for each point of the contour lines a meridian and a line of maximum slope. The measure of the angle between these two segments results the exposure value, divided into different classes every 30° of exposure in relation to the cardinal points. The classes are colored green and blue in the exposed north,

and yellow and red on the exposed south. That means there is more sun incidence on the south regions of Montelupo.

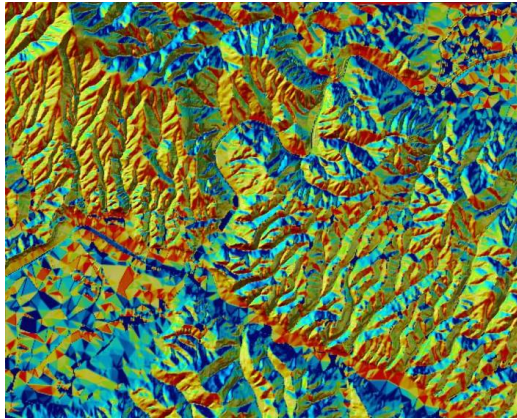


Fig. 3. Montelupo's Aspect.

The next map shows the territorial heritage (Fig. 4), as an environmental and settlements synthesis system, in order to understand the relationships between the components and operation of environmental characters with perceptive morphology and long lasting territorial marks, mostly throughout the Arno River. The next figure presents the city of Montelupo in 2014 (Fig. 5).

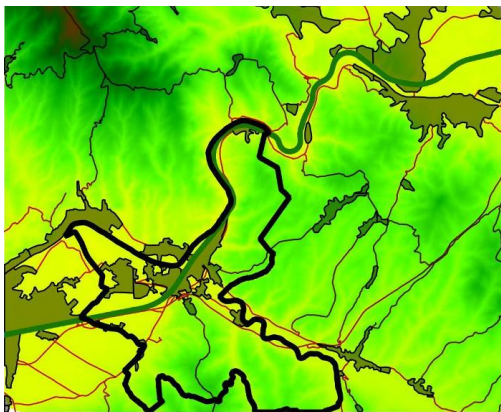


Fig. 4. Montelupo's territorial heritage



Fig.5. A view of Montelupo and the Arno River

B. Santa Leopoldina

The first map show the altimetry of Santa Leopoldina, where the black spots reveals the lower hights quotas, and the white highest quotas (Fig. 6). It's clear the Santa Maria river basis in the valley of the territory, and therefore its protagonism as a heritage element to the settlement. The map shows there are less plain lands and more declivities compared to Montelupo.

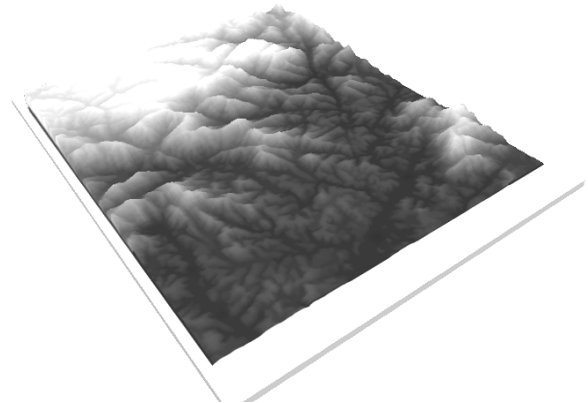


Fig.6. Santa Leopoldina's Altimetry

The next map highlights the parts of the land with the same exposure present in the study area (Fig. 7). It's possible to see that the same exposure method to evaluate Italy can't be the same for Brazil, as the south exposure is the hottest in Italy, and the north is the hottest in Brazil. So the graphic of colors should be inverted in relation to Montelupo. Although it reveals that in blue colors, here considered North, receives more sun exposure.

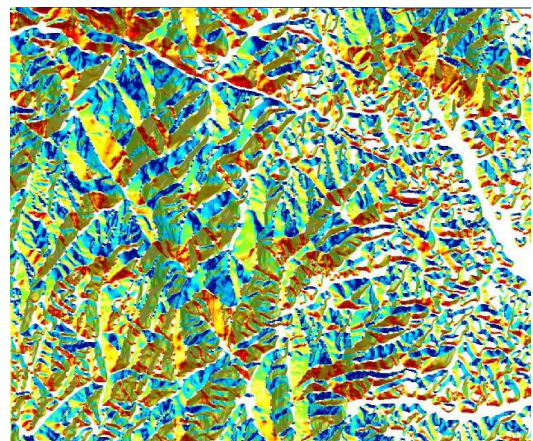


Fig. 7. Santa Leopoldina's Aspect

The next map (Fig. 8) shows the overlap of roads and highways tangential to the waterways identified as prevalent directions in the territory. It is evident that the roads built in the valleys, though narrow, between low and medium quotas, set a connector road frame throughout the landscape, mainly the production centers of family farming to highways. The yellow

color refers to 20 meters from the sea, and through the brown one, the higher altitudes.

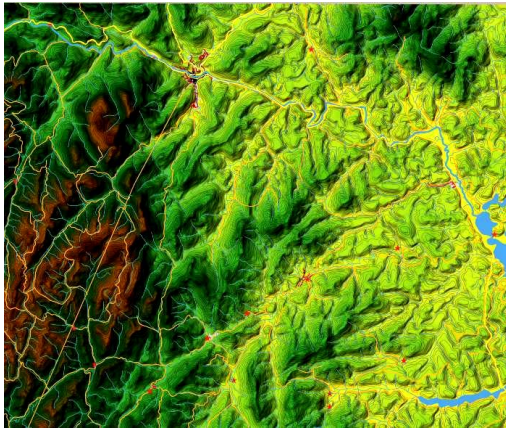


Fig. 8. Santa Leopoldina's territorial heritage

In addition, there is much less data and cartography information available for Santa Leopoldina compared to Montelupo, specially a historical ones. Now-a-days, with the open access to geo-technologies and data information, and iconographic base, it happens to be more equal the analysis of recent urban settlement expansion. The next figure presents the city of Santa Leopoldina in 2010 (Fig. 9).



Fig. 9. A view of Santa Leopoldina and Santa Maria's River

V. CONCLUSION

The GIS is an effective resource in characterizing heritage values and elements, data analysis and synthesis, and composition of the studied objects. The innovation speed in the field of knowledge demands continuous learning of spatial reality, which is constantly changing [12]. This paper aims to promote a more accurate picture of the environmental heritage of cities, such as guiding the construction of the concept of identity, seen perceptively in the landscape.

There are two diverse contexts and dynamics of anthropization faced in the territory to reveal identity by mapping tools. In common, Montelupo and Santa Leopoldina are both small cities, structured by a river, next to a big city, Florence and Vitória, respectively. The study scope is

interested in representing graphically the territorial heritage by the use of geo-technologies to analyze the environmental layer of the territory. In conclusion, the topography, the river and hydrography, and the dimension of the valleys, characterize the human settlement, and therefore, its identity, in a material and cognitive dimensions.

It has been proposed treating arguments, such as identity, territory and heritage, to understand the dynamic of historical human settlement, in the biotic and anthropic dimensions, to be able to see that through GIS tools it's possible to compare to different cities in different parts of the globe, and still find similarities and differences. The environmental heritage of a city is an important long lasting structure that conducts the comprehension of its identity, and the interest to preserve and find sustainable solutions to the urban expansion.

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