Twente University

Start

THE CARTOGRAPHIC VISUALIZATION OF PROCESSES AND CHANGES:

“CASE STUDY OF CHANGES OVER THE YEARS IN THE CITY OF VIENNA”

Degree: CARTOGRAPHY MSC. | Submitted by : TEA MURAJ

OVERVIEW

INTRODUCTION

This master's thesis explores the dynamic evolution of Vienna's urban landscape through the lens of visual representations and cartographic tools.

This research highlights the importance of visual representation in comprehending urban development and contributes to the field of cartography, by including change and process in its use.

OBJECTIVES

OBJECTIVE 01

- Understanding the meaning of process and change, by discovering how it relates to urban life and cartography

OBJECTIVE 02

- Observing different visualisation methods and approach the techniques that represent change and process better

RESEARCH QUESTIONS

RQ1.1.: How can processes and changes be effectively identified and distinguished?
RQ1.2.: What are the various visualisation methods employed in the field and how do they differ from one another?
RQ1.3.: Which visualisation methods are most suitable for specific types of cases or scenarios?

RQ2.1.: Which specific visualisation methods yield superior results in terms of representing data, and what are the key considerations for constructing a well visualised map?
RQ2.2.: Which conceptual frameworks and methods are commonly employed to describe processes and changes?
RQ2.3.: How do different visualisation methods interact within the field of cartography?

RQ3.1.: What are the effective techniques for visualising processes and changes on a map?
RQ3.2.: What role does time play in accurately representing processes and changes on a map?
RQ3.3.: What specific design approaches are utilised in urban settings for visualising processes and changes?

METHODOLOGY

a systematic literature review is chosen as the primary research method.This approach allows a closer examination to the different ways in which information is presented on maps in the field of cartography.

focus on how to visually represent things that change over time or across different areas.

presenting innovative ways to show the changes and transformations that have taken place in Vienna. These new ways of visualising data are intended to provide a clearer understanding of how Vienna has evolved over time.

IMPLEMENTATION

PHASE 01

Explaining change and process

PHASE 02

Vienna's history and transformation

PHASE 03

Visualising change and process

IMPLEMENTATION

PHASE 01

Explaining change and process

What is Change?

Change is constantly happening all the time and in general the overall idea of change in the academic practice is not indeed that fragmented. All of the disciplines and practices that seem to exist have an only partial of different kind of reviews for this matter. There seems to not be a specific map that concludes all these fields together, for a better understanding, and it must be considered that all these different perspectives range of different understandings.

IMPLEMENTATION

Change can be constantly ongoing or still undergoing, and many see it as a process or a series of changes. Technically, this is not the correct terminology as a process can continue indefinitely without a specific conclusion.

Figure 1. Diagram representation of change

IMPLEMENTATION

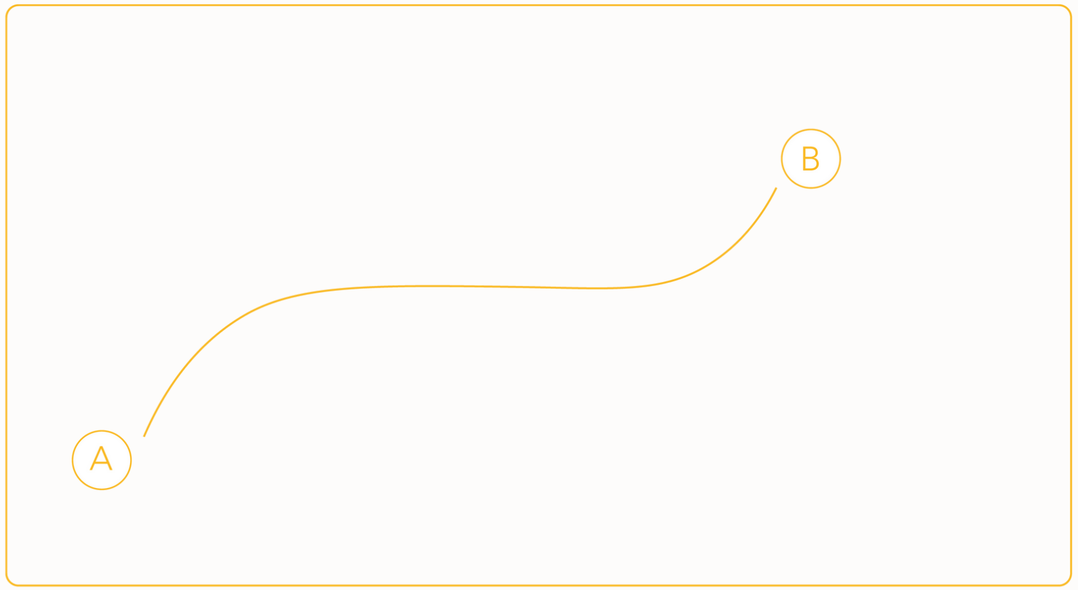

Figure 2. Process described in a visual form

What is Process?

A process can take time in virtue of there being an activity or an event involved, and when we speak about a process being interrupted, we might refer to the activity not culminating in the episode. The things which" undergo" processes are the elements of the first point, "a thing or an object".

IMPLEMENTATION

Figure 3.Process Diagram explained

IMPLEMENTATION

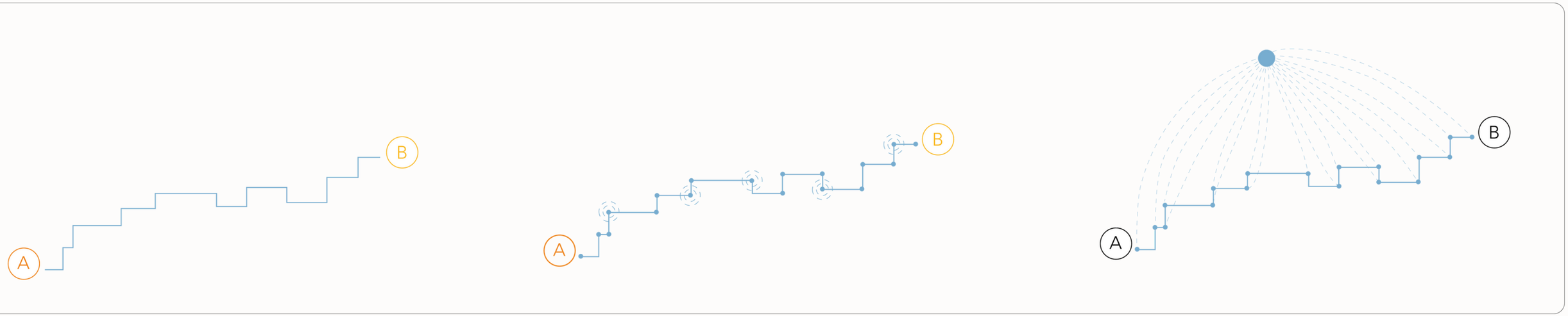

Figure 4.Change and Process

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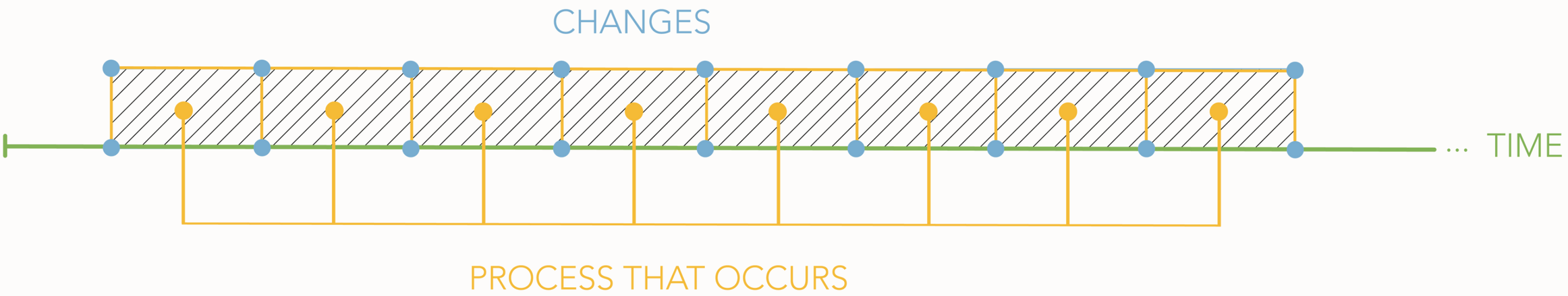


Figure 5.Change, Process and Time

IMPLEMENTATION

HOW TO REPRESENT CHANGE IN MAPS?

- Actual Change
- Percentage change
- Swich View Layers

IMPLEMENTATION

Focusing on the time period of 1600s till today

PHASE 02

Vienna's history and transformation

Layering old maps to visualise and get the city data

IMPLEMENTATION

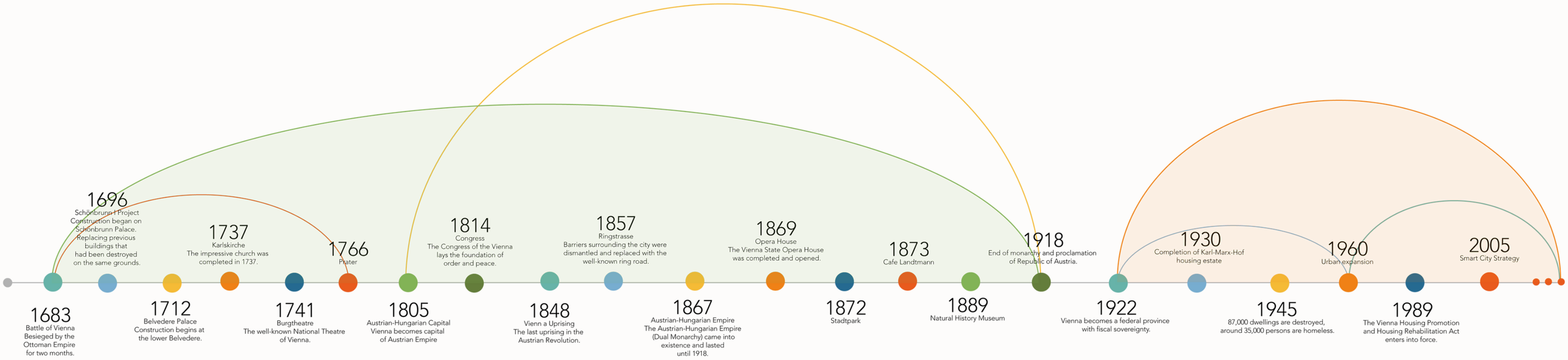


Figure 6: Timetable with specific changes that occurred in Vienna

IMPLEMENTATION

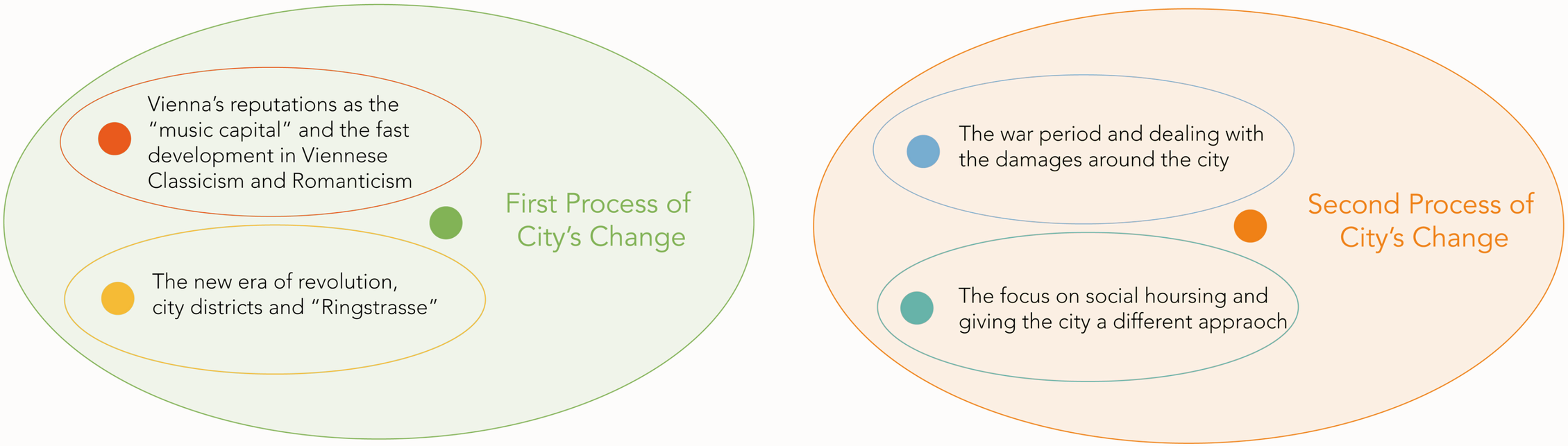


Figure 7:Generated processes of Vienna

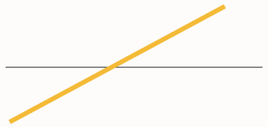
IMPLEMENTATION

PHASE 03

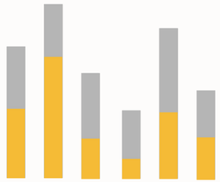
Visualising change and process

IMPLEMENTATION

The LINE



The STACKED BAR



The EVERYTHING

The SCATTER

The STACKED AREA CHART

The ANIMATION

The TIMELINE

The BUBBLE

The COLOR SCALE

Fig. 8: Ways to visualize and represent Change and Process

IMPLEMENTATION

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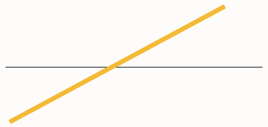

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The TIMELINE

The COLOR SCALE

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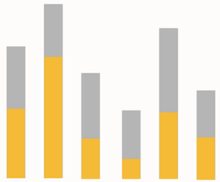

The STACKED AREA CHART

The BUBBLE

The EVERYTHING

The ANIMATION

Fig. 8: Ways to visualize and represent Change and Process

IMPLEMENTATION

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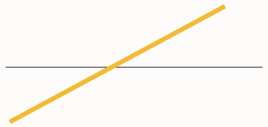

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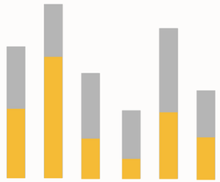

The STACKED AREA CHART

The EVERYTHING

The ANIMATION

The BUBBLE

Fig. 8: Ways to visualize and represent Change and Process

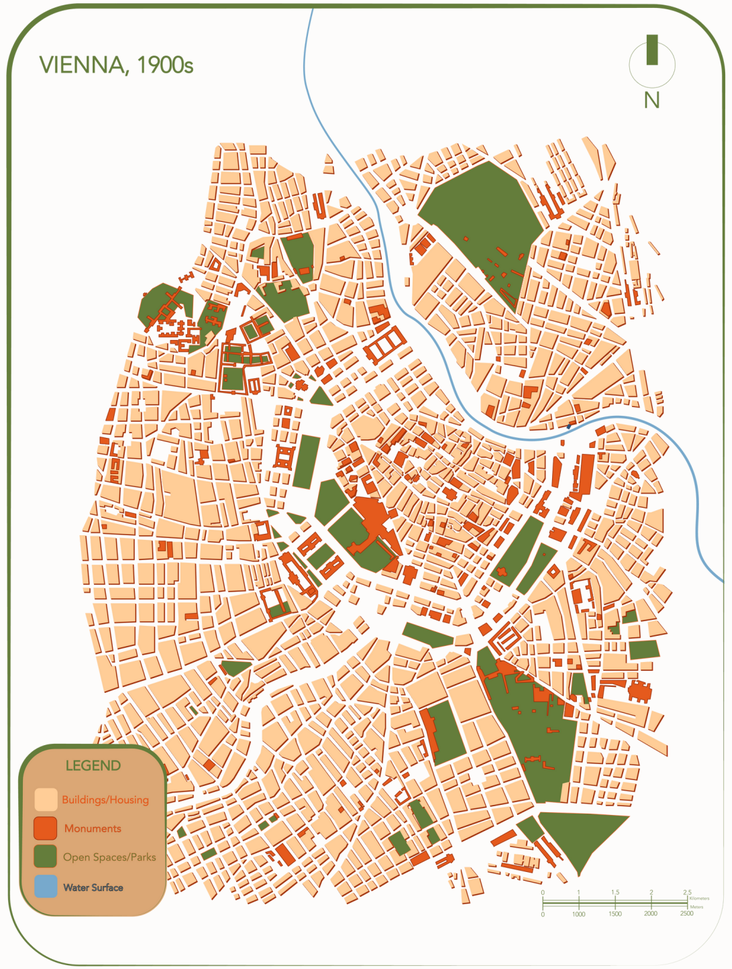

Figure 9,10 and 11: Maps of Vienna throughout the years

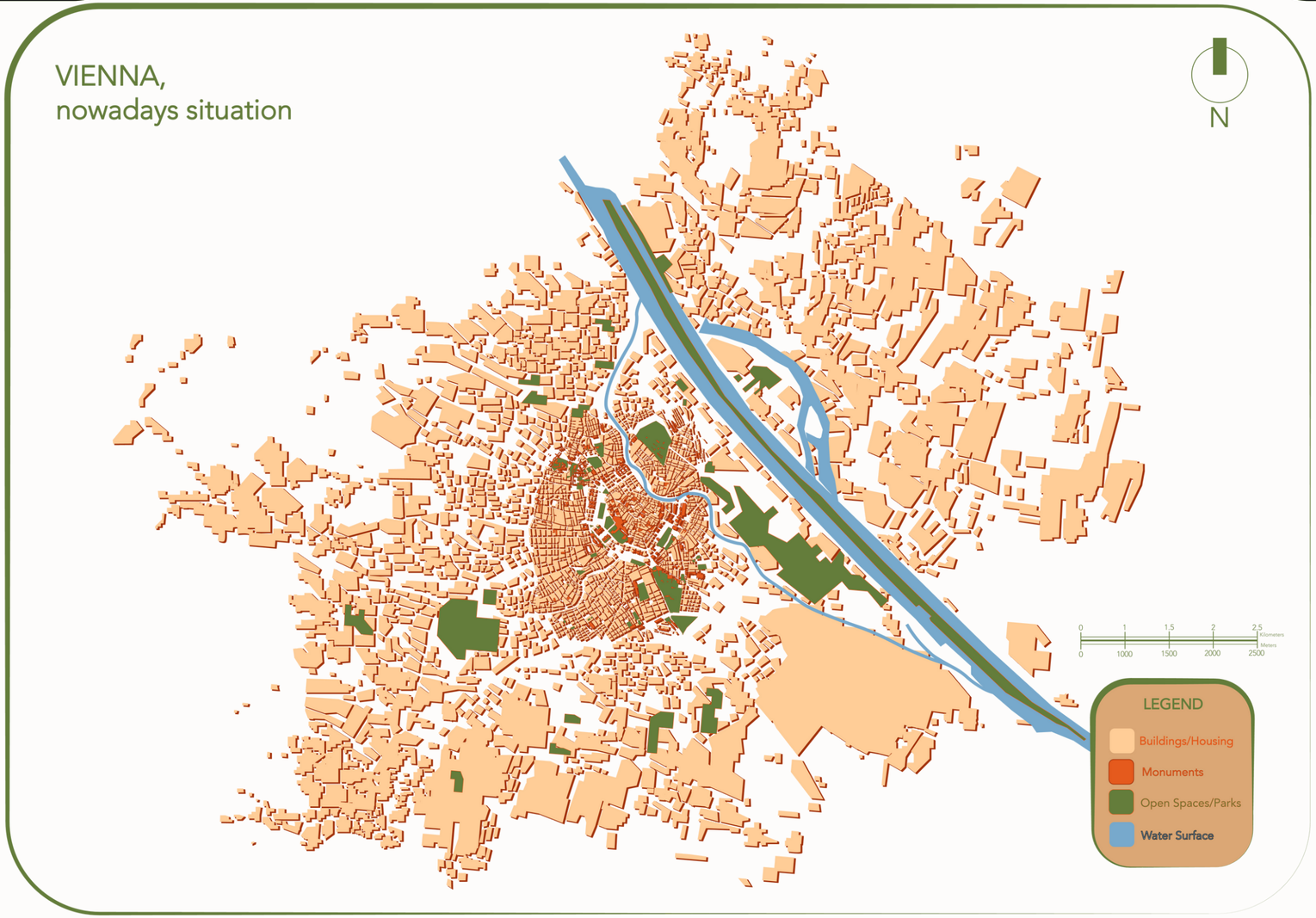

Fig. 12: Nowadays situation of Vienna

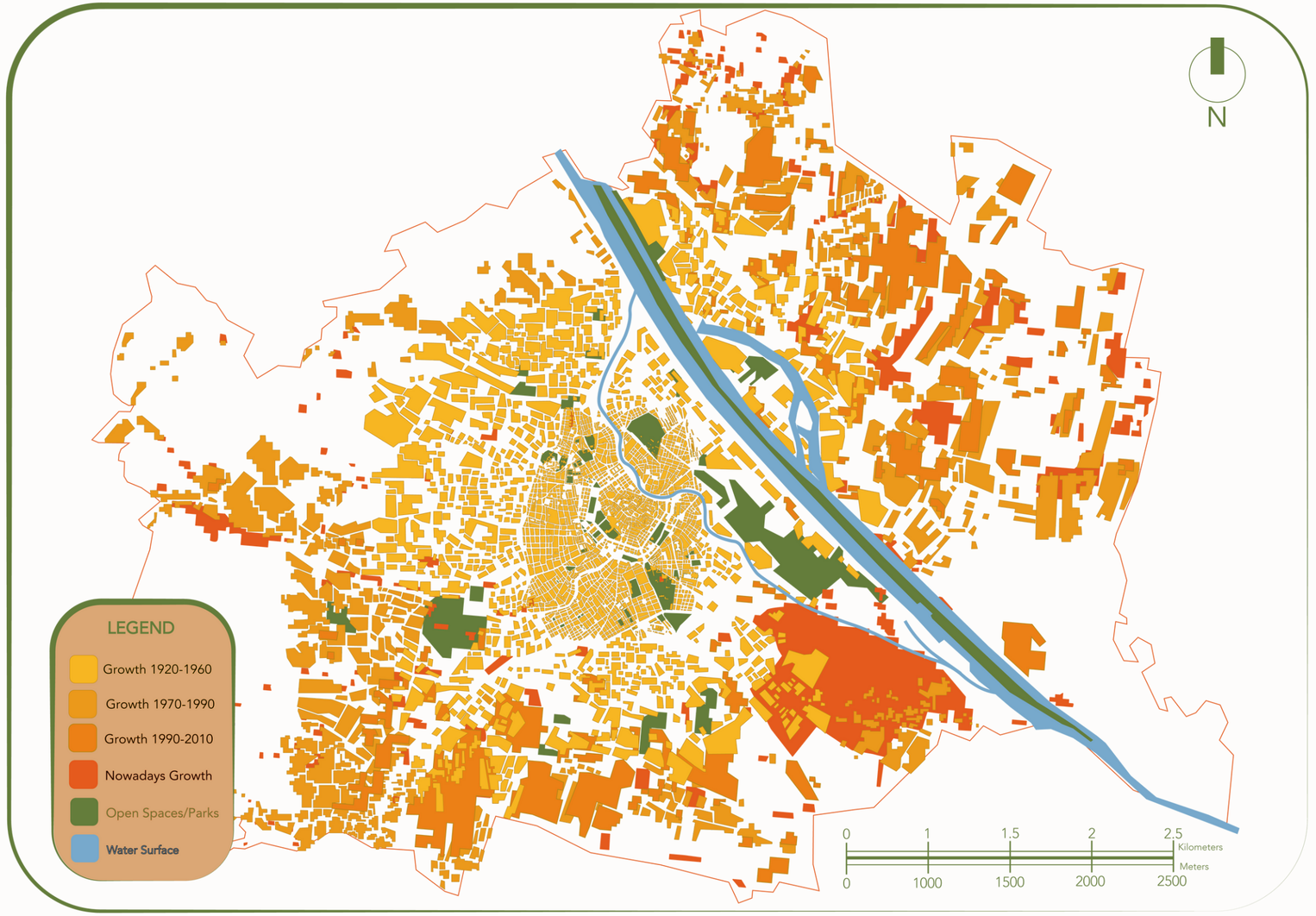

Fig. 13: Different timelines in the Vienna's development and changes

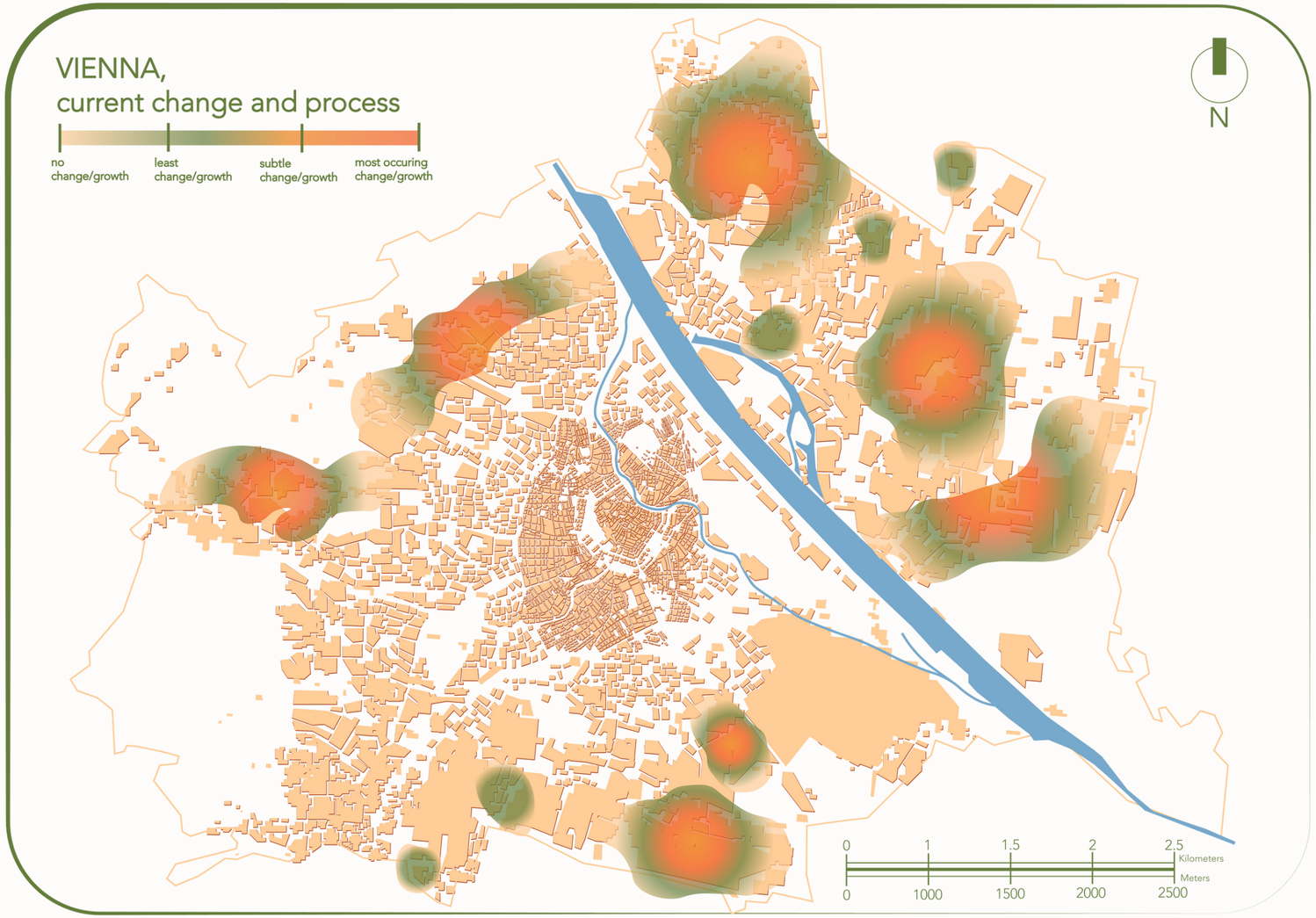

Fig. 14: Nowadays situation of Vienna's expected areas of transformation.

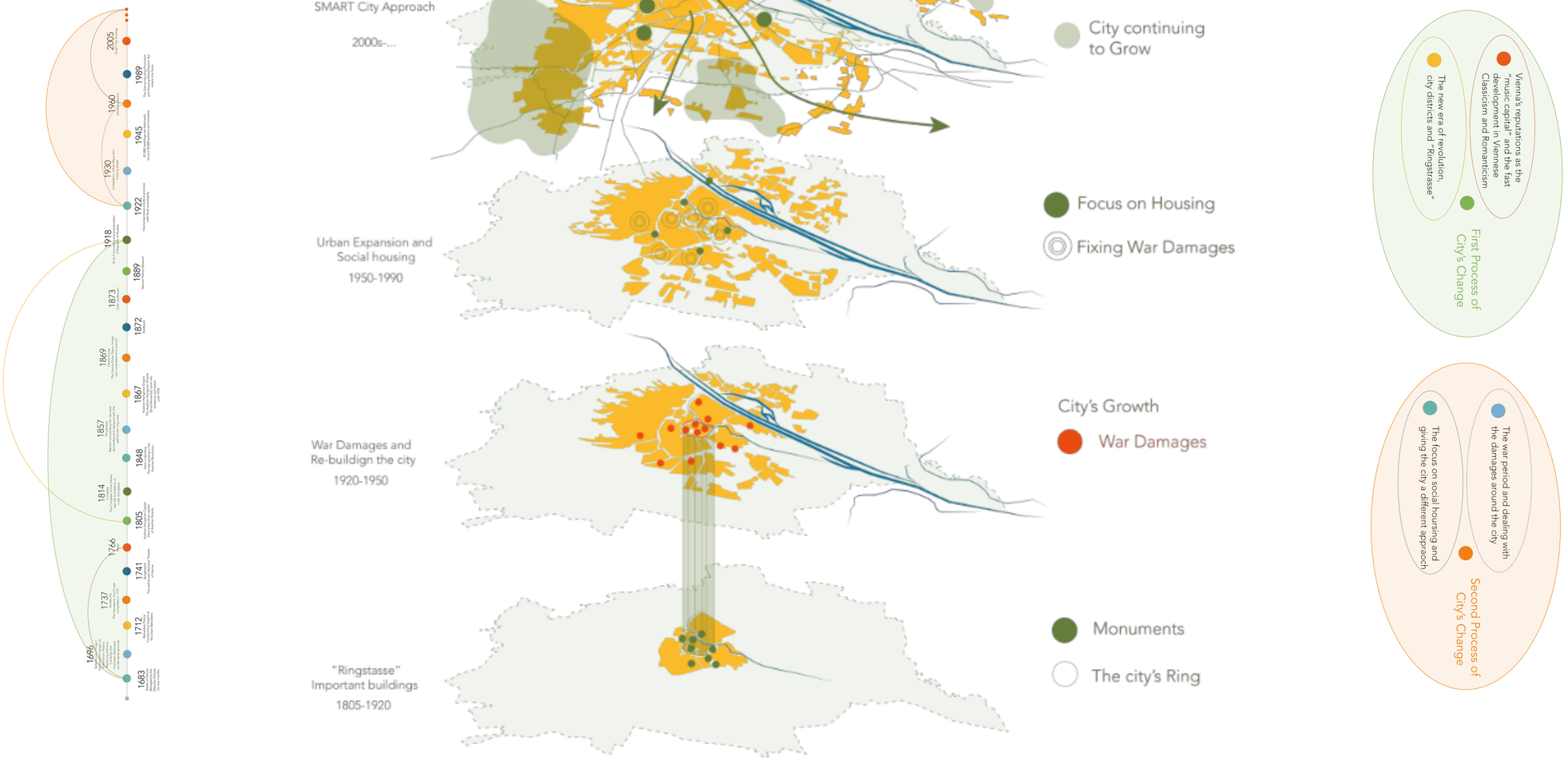

Fig. 15: An approach by using different visualization elements to represent change and process visually.

CONCLUSIONS

- This research has explored innovative approaches to representing change and process in urban environments
- It has demonstrated the potential of integrating change and process visualization into cartography, shedding light on the complexities of these phenomena.
- It acknowledges that the field of visualizing change and process remains diverse and ever-evolving, inviting further research and collaboration across disciplines.
- It emphasises that maps are dynamic narratives of urban evolution, capturing the essence of cities across time.

FUTURE WORK

- Re-evaluating the proposed visualisations
- Doing user studies with the created visualisations
- Using them in different cities with specific data
- Comparing which methods actually do represent change better
- Integrating the abstract topic, like change and process in cartography

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THANK YOU!

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