

The State-of-the-Art in Map-like Visualization

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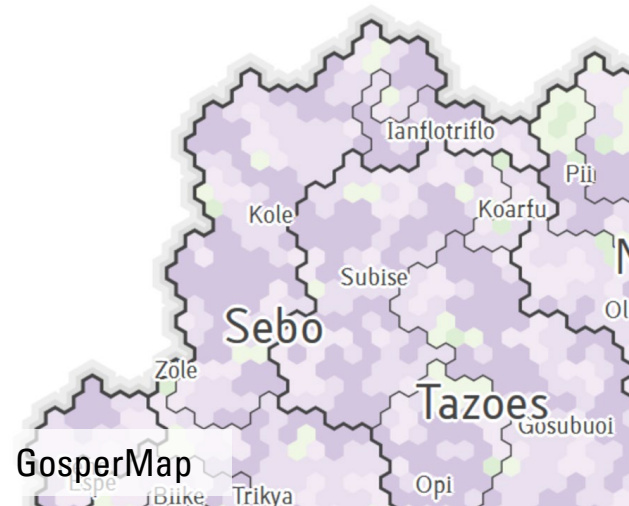
26th of May, 2020



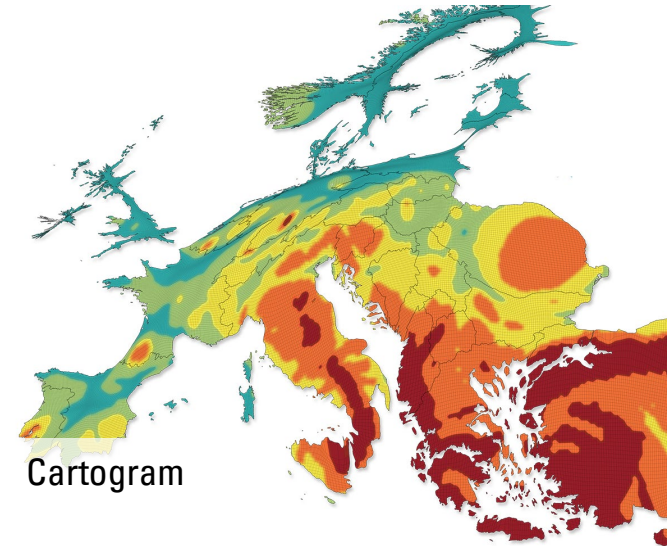
AARHUS
UNIVERSITY

ETH zürich

What is map-like visualization?



What are maps?



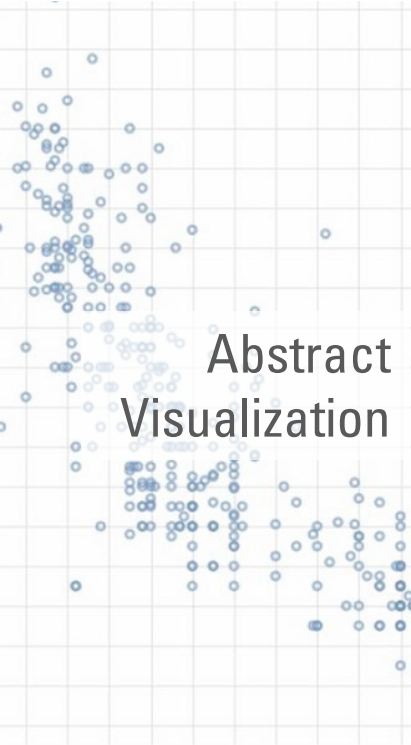
Contributions

- **Definition** of the term map-like visualization
- **Classification** of map-like visualization techniques
- **Literature Overview** of existing map-like techniques

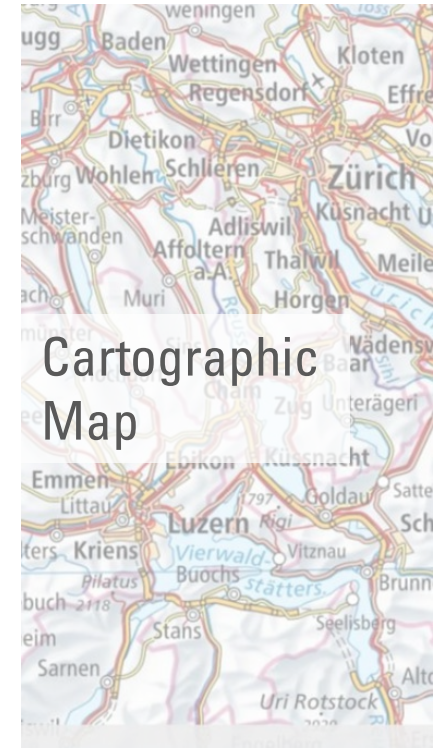
Defining

Map-like Visualization

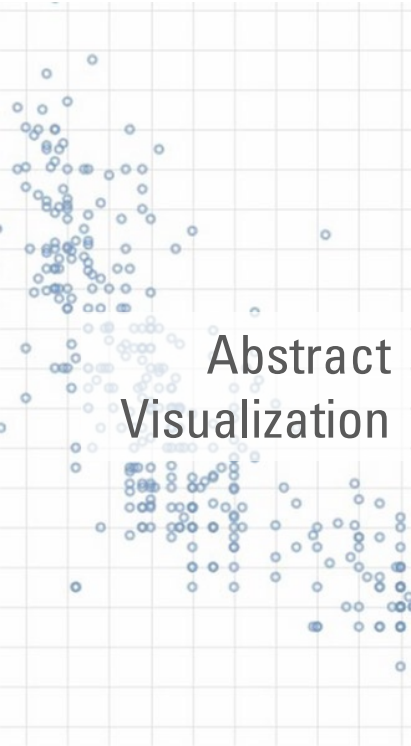
What is ...



Map-like
Visualization



Perspectives



Imitation



Map-like
Visualization

Schematization



Definition

A visualization is map-like, if it either **imitates** or **schematizes** a cartographic map

Classifying

Map-like Visualization

Map Elements

Point



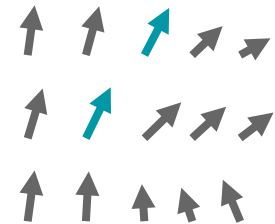
Area



Line



Field



Map-like Visualization

Perspective

Imitation

Schematization

Category

Point

Line

Area

Field



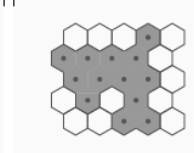
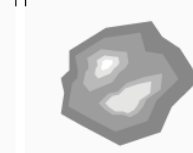
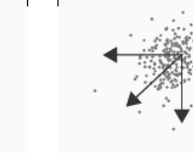

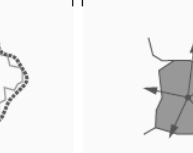
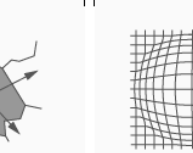
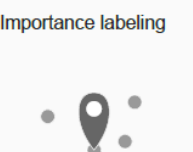

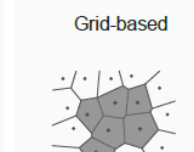
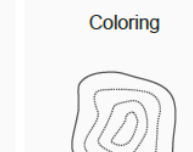


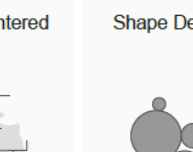
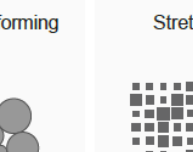
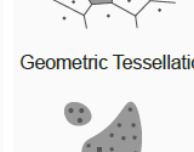
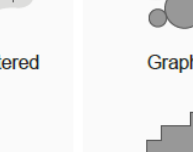
Point

Line

Area

Field

Technique

 <p>Importance labeling</p>	 <p>Outline-centered</p>	 <p>Grid-based</p>	 <p>Coloring</p>	 <p>Reposition Data Points</p>	 <p>Border-centered</p>	 <p>Shape Deforming</p>	 <p>Stretching</p>
 <p>Map Icons</p>	 <p>Edge-centered</p>	 <p>Geometric Tessellation</p>	 <p>Contouring</p>	 <p>Reposition Nodes</p>	 <p>Path-centered</p>	 <p>Graphical</p>	 <p>Density-based</p>
		 <p>Geometric Hull</p>				 <p>Cellular</p>	

Perspectives × Categories



Imitation

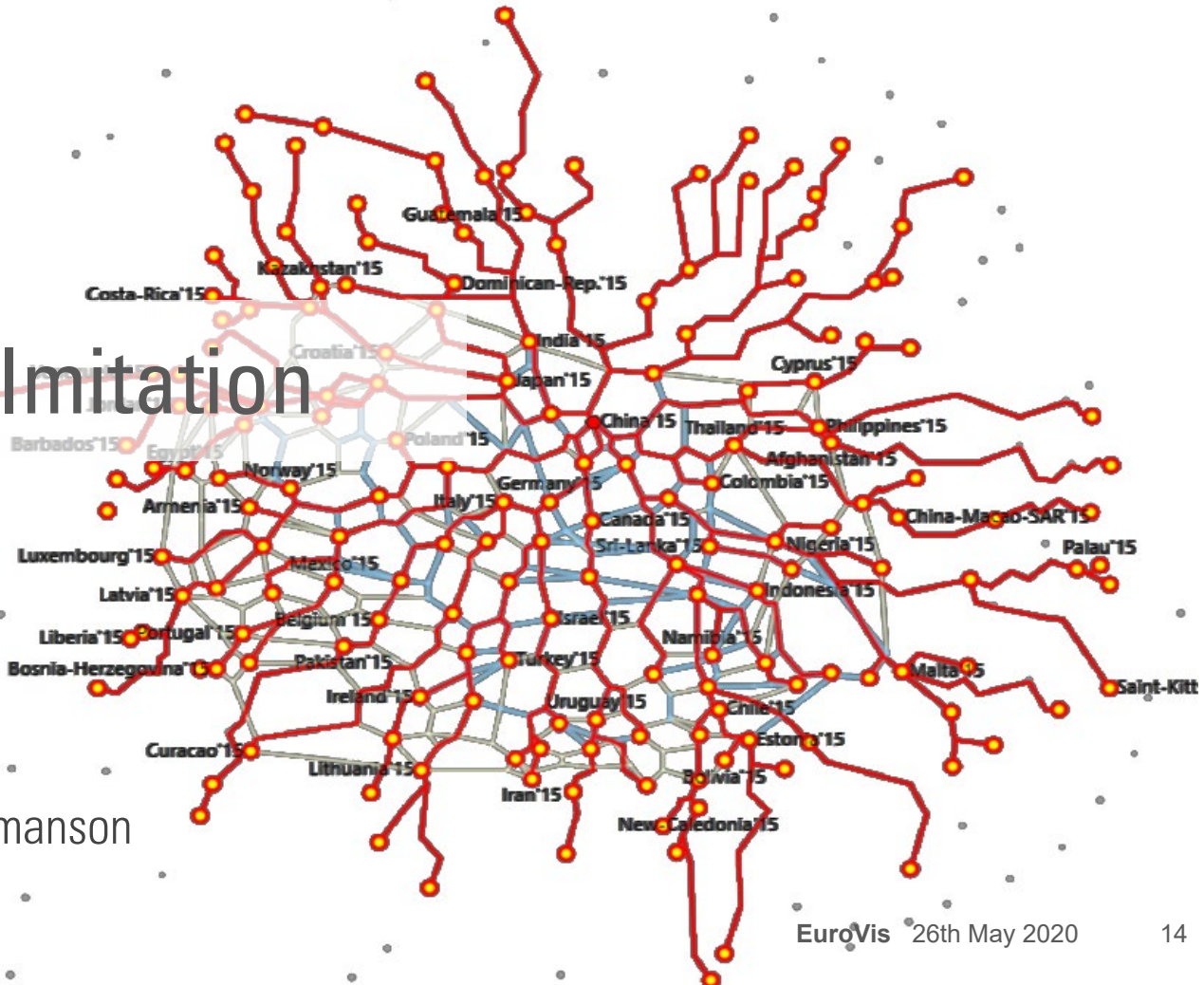
Making abstract visualization
similar to cartographic maps

Point Imitation

Sen et al., 2017



Line Imitation

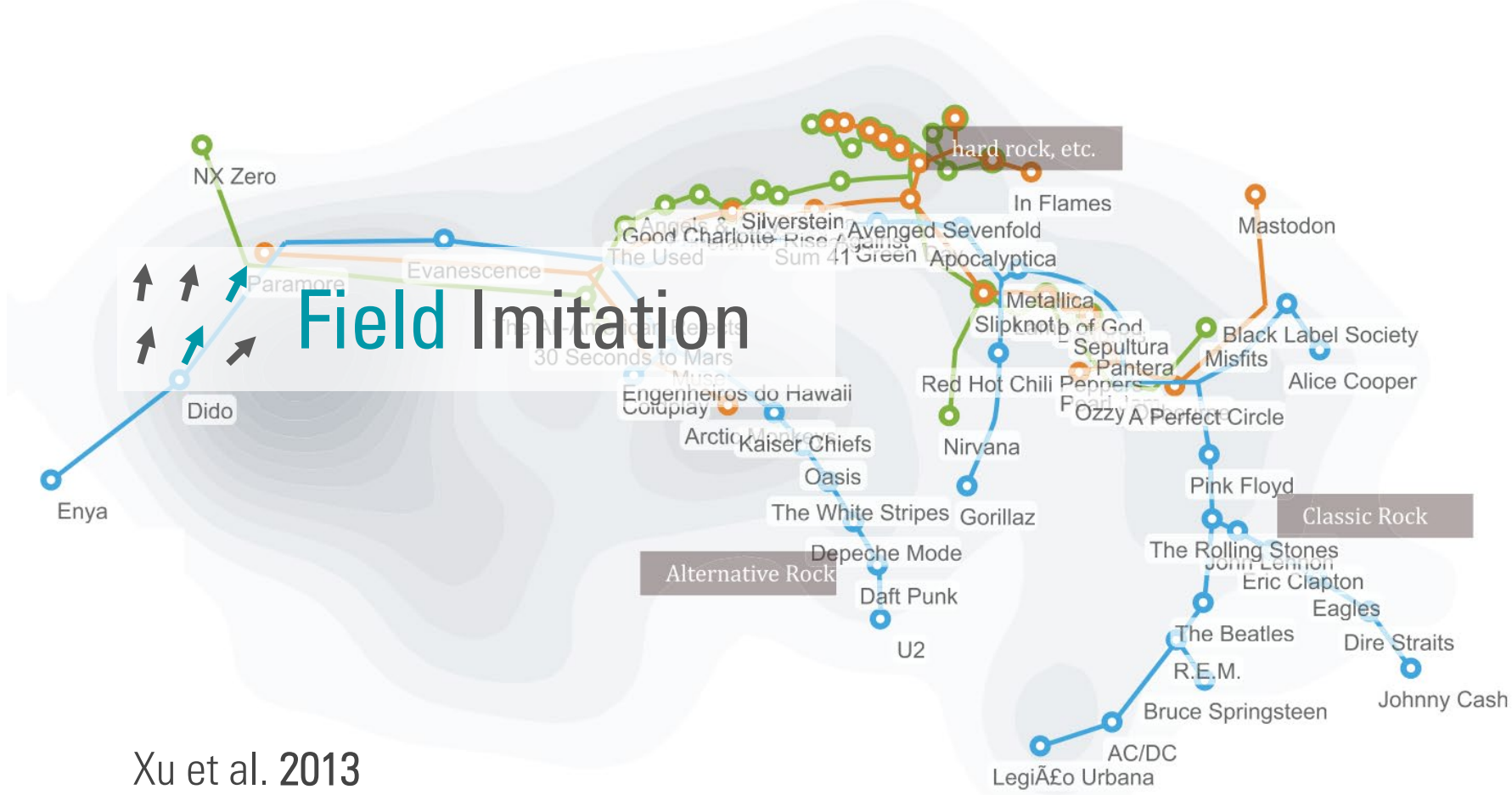


Mondal and Nachmanson
2018



Area Imitation

Hu et al. 2010



Xu et al. 2013

Map-like Visualization

Perspective

Imitation

Schematization

Category

Point

Line

Area

Field

Point

Line

Area

Field

Technique

Importance labeling

Outline-centered

Grid-based

Coloring

Reposition
Data Points

Border-centered

Shape Deforming

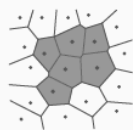
Stretching



Map Icons



Edge-centered



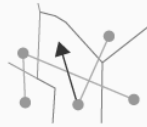
Geometric Tessellation



Geometric Hull



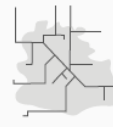
Contouring



Reposition
Nodes



Border-centered



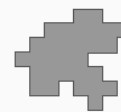
Path-centered



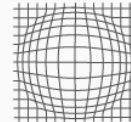
Shape Deforming



Graphical



Cellular



Stretching



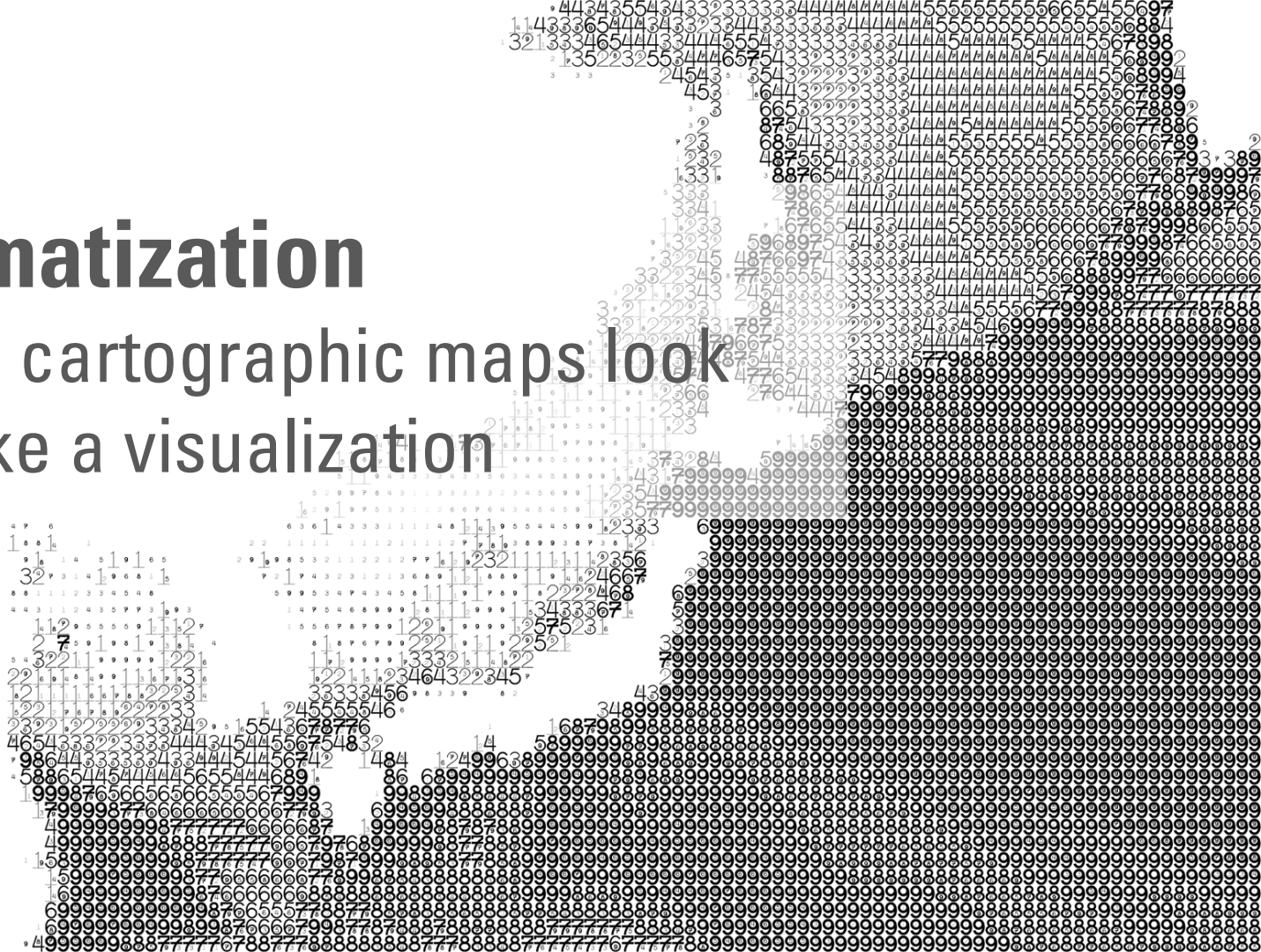
Density-based

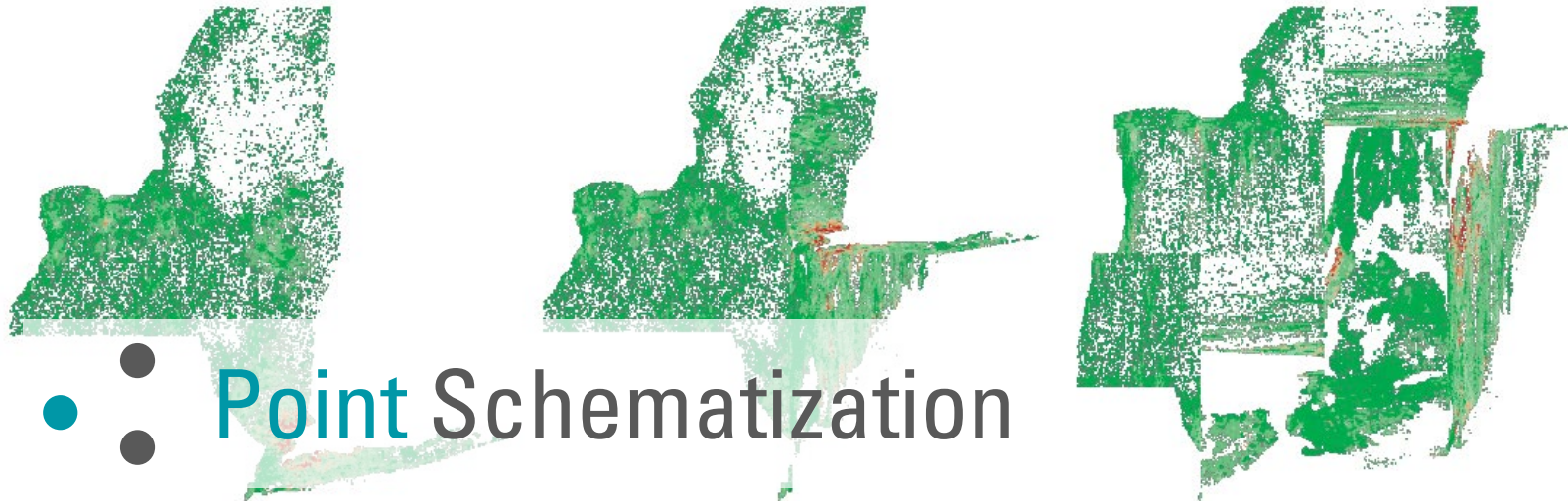
Literature Overview

Schematization

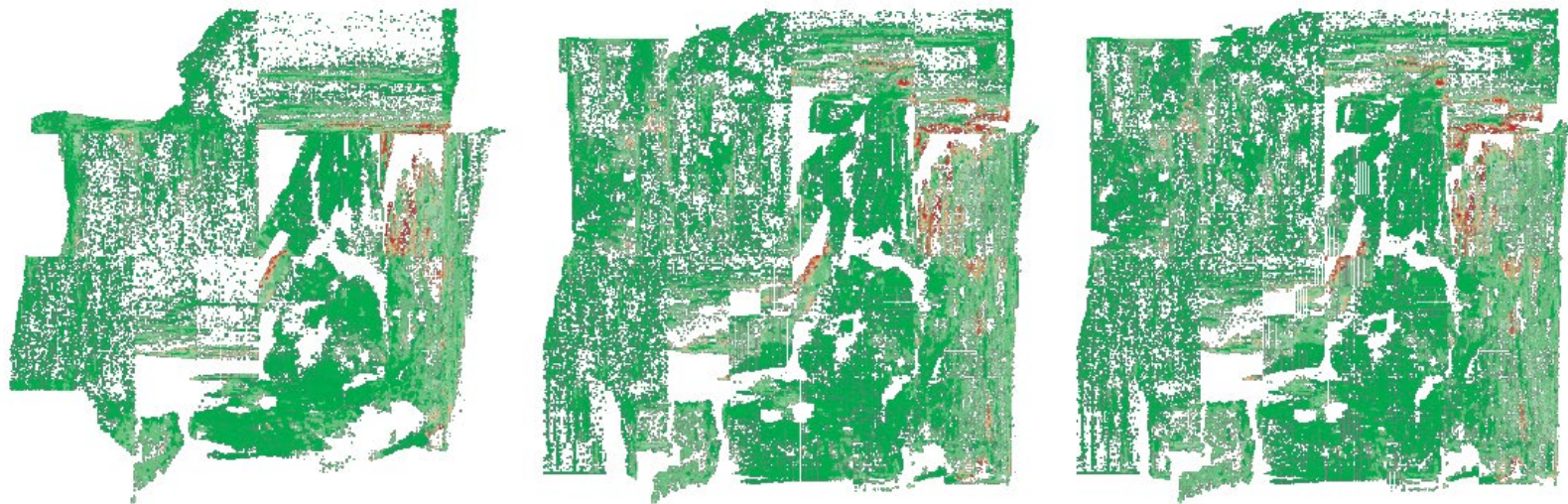
Making cartographic maps look
more like a visualization

Nacenta et al.
2017

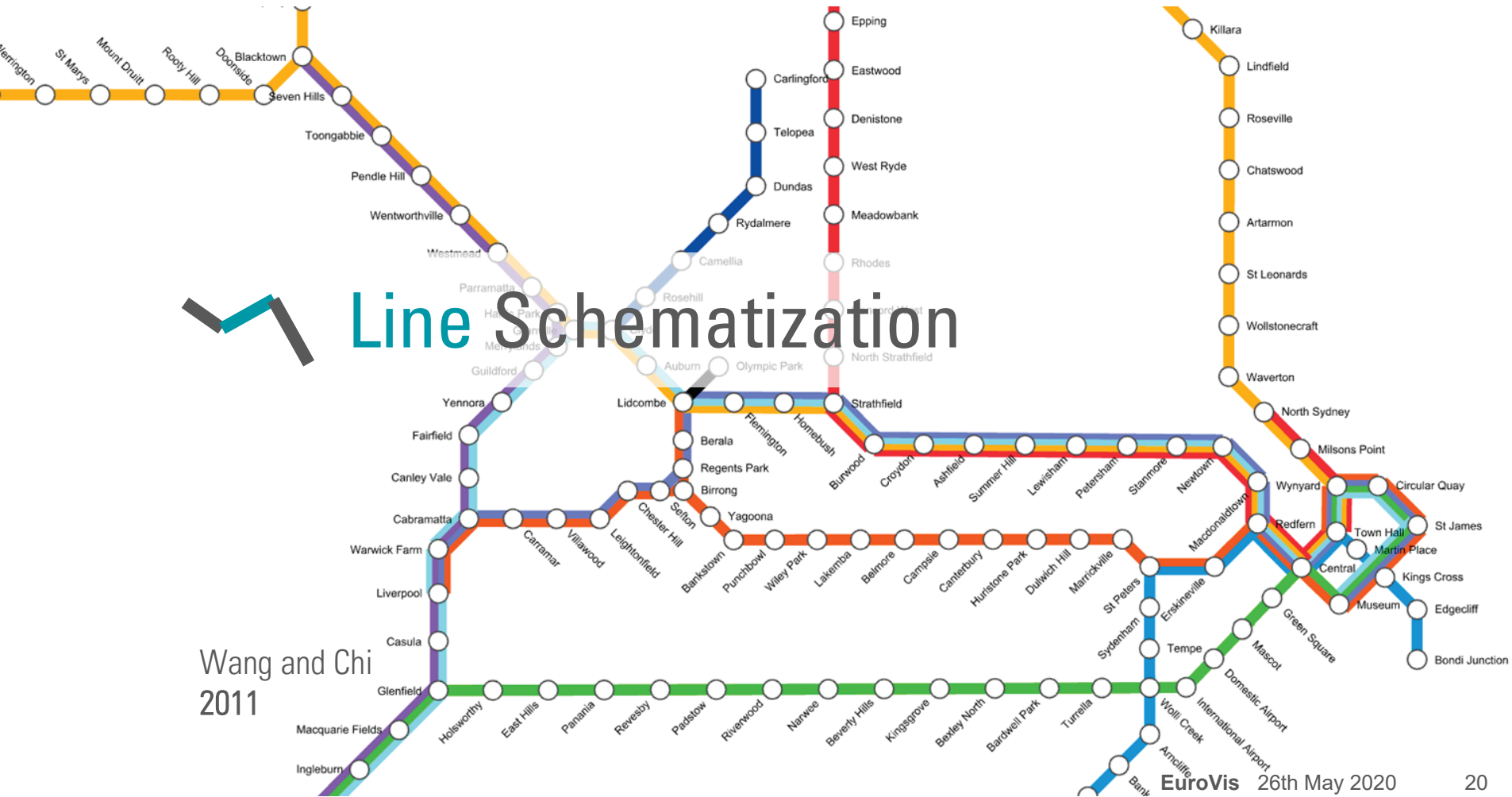


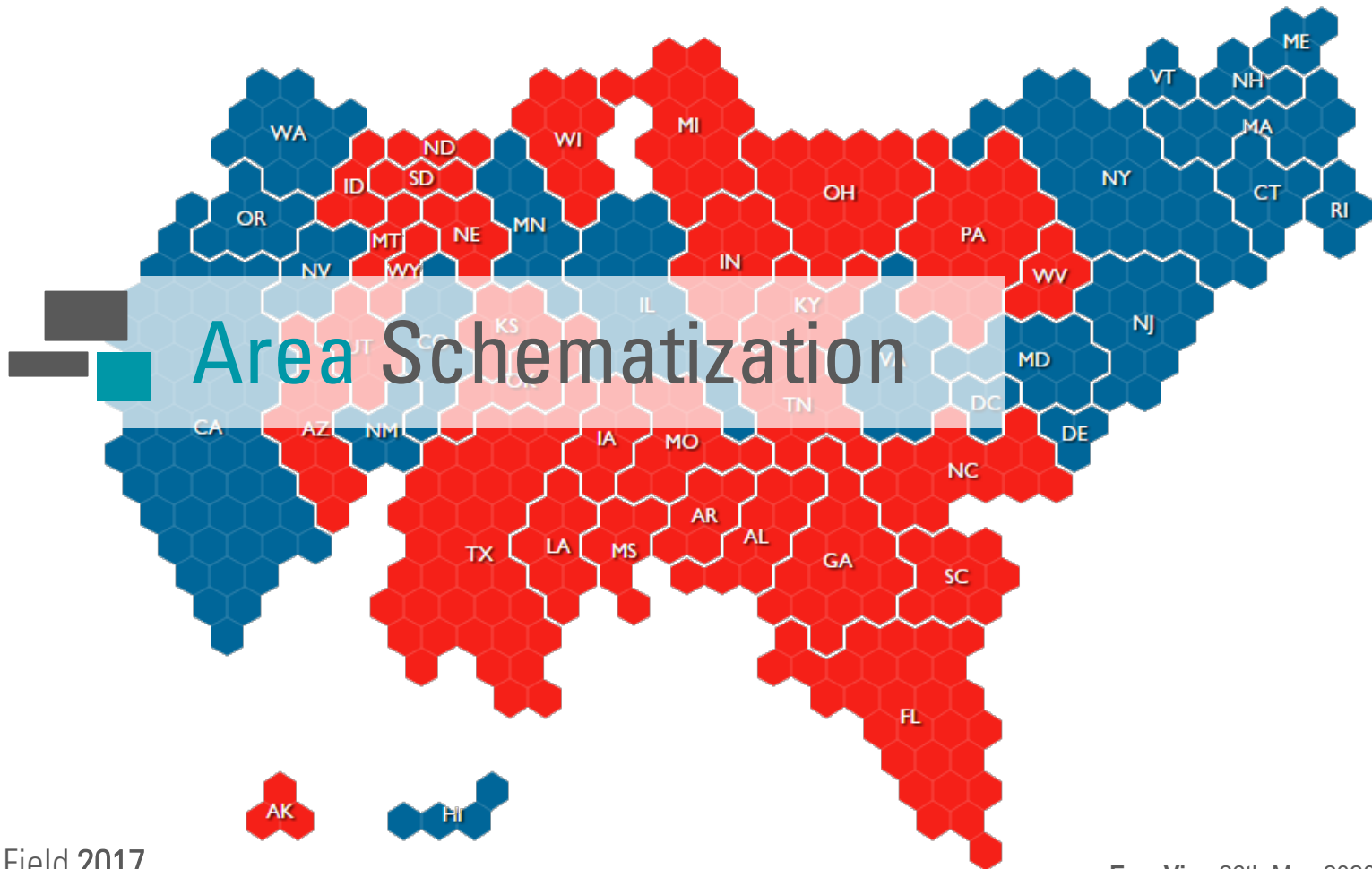


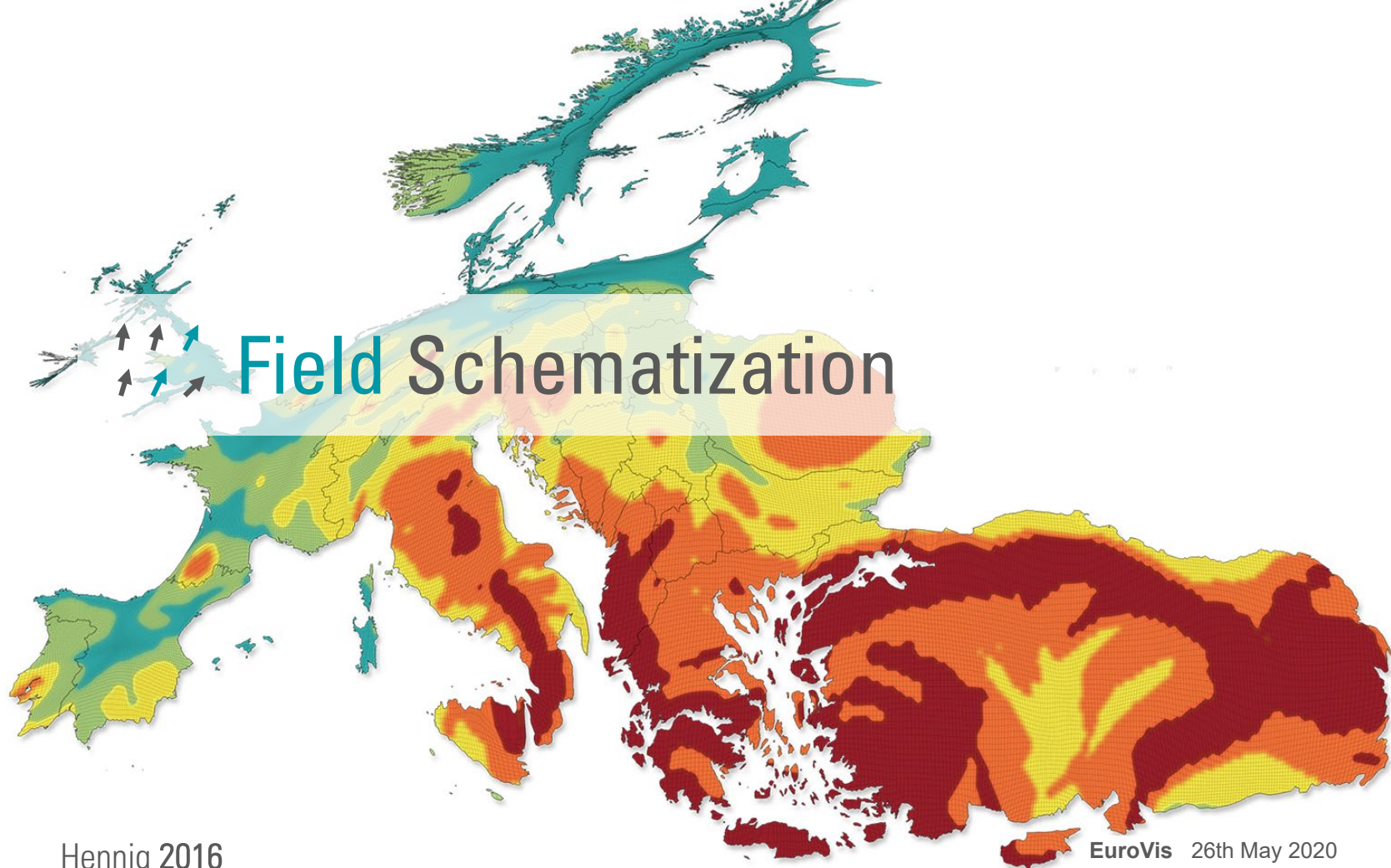
- ● Point Schematization



Keim et al.
2003







Field Schematization

Applying

Map-like Visualization

Imitation

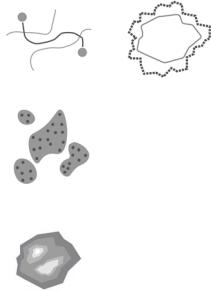


Point

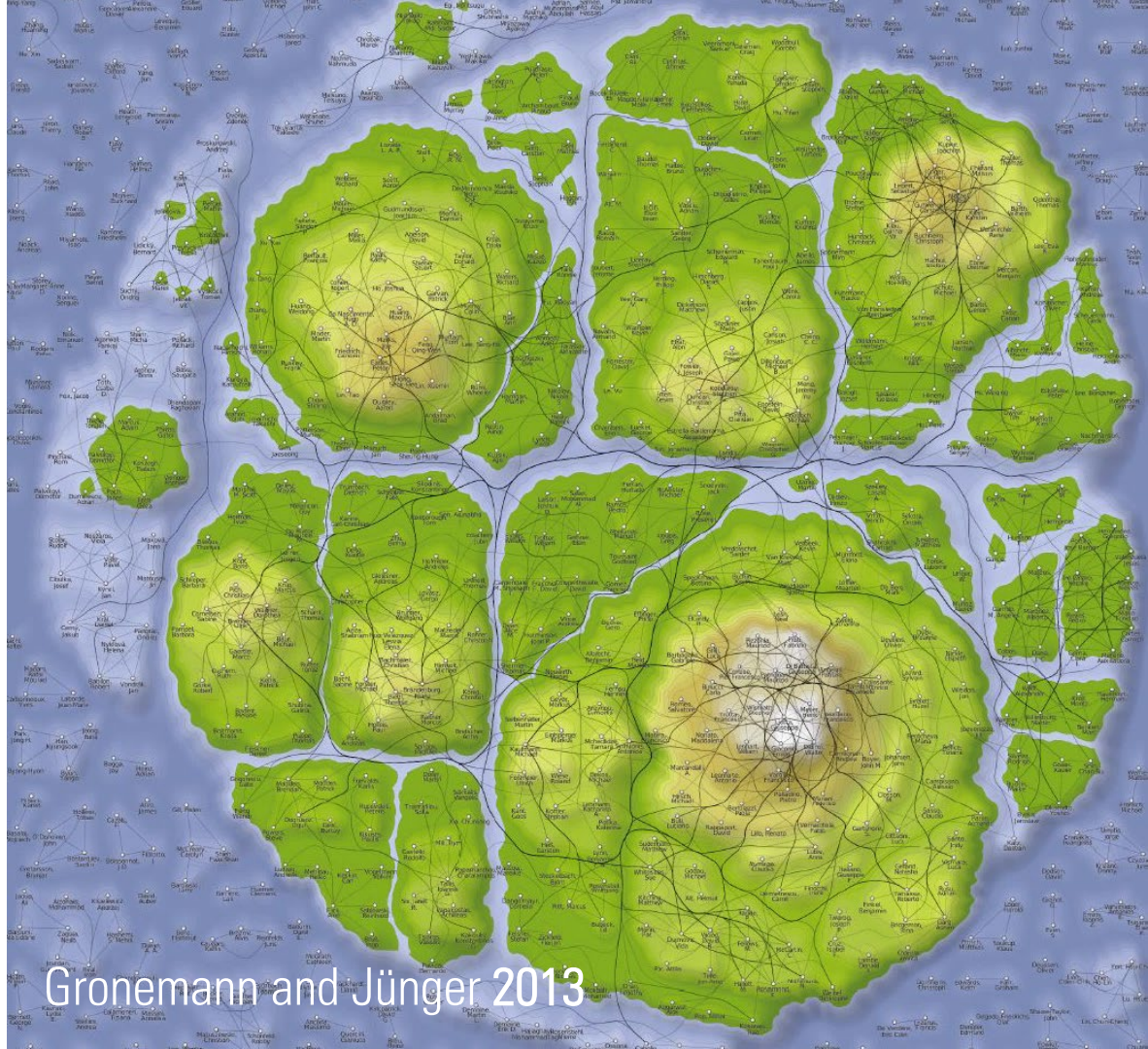
Line

Area

Field



Schematization



Gronemann and Jünger 2013

Imitation



Point



Line

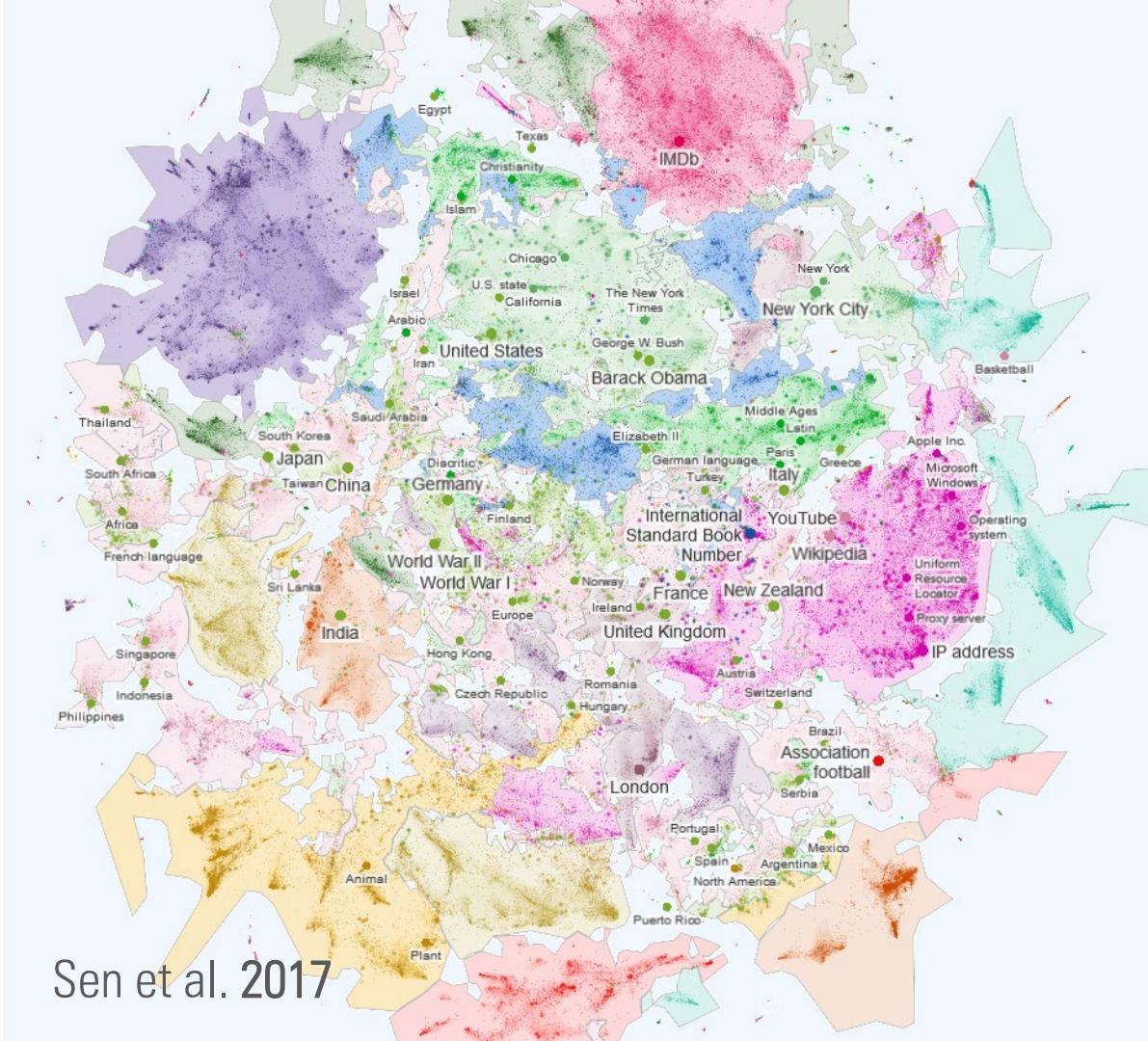


Area

Field



Schematization



Using

Map-like Visualization

Identify Location

Retrieve Value

Assess Distance

Trace Path

Identify Location



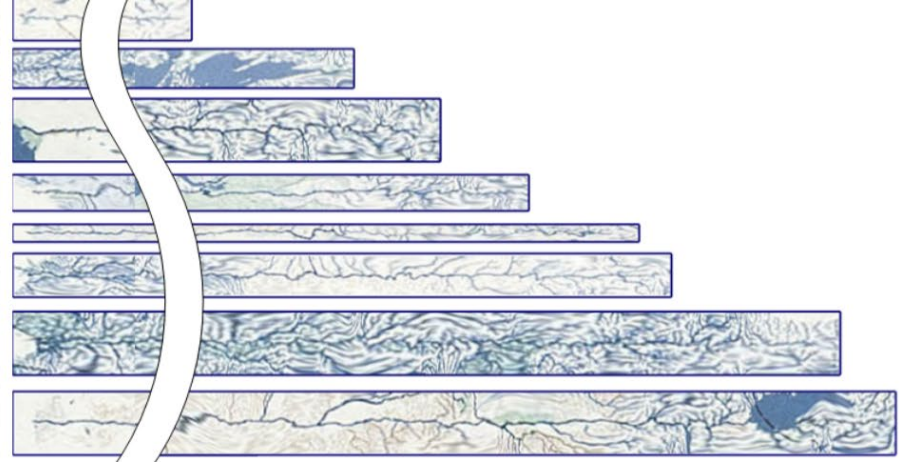
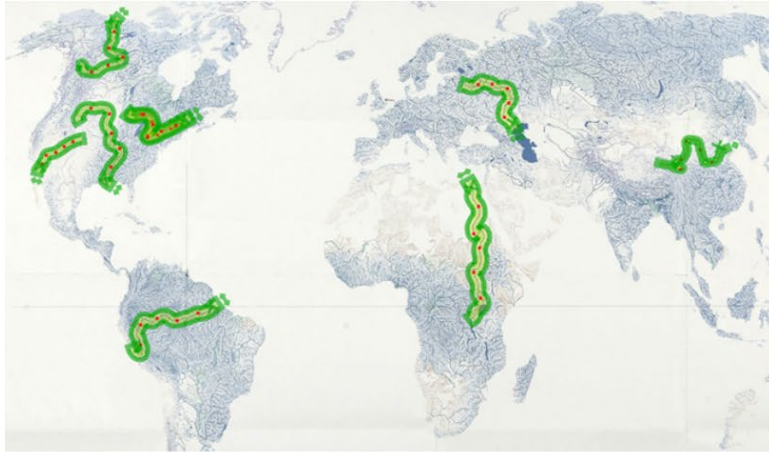
Sen et al. 2017

Retrieve Value



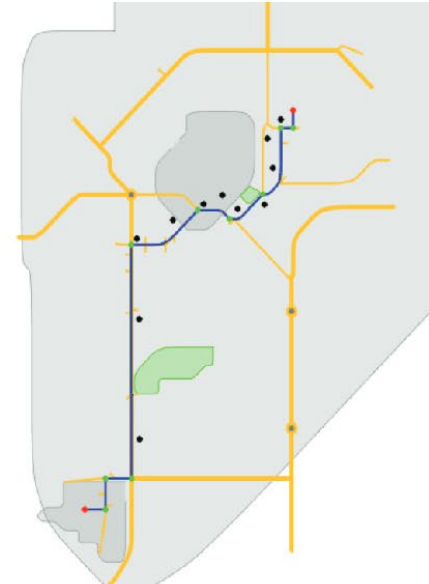
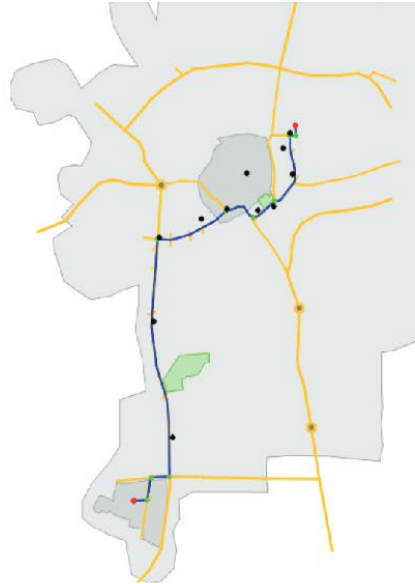
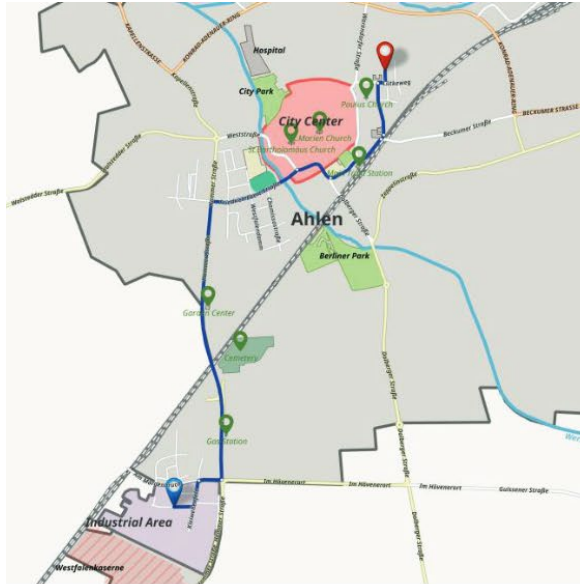
BigKnowledge 2020

Assess Distance



Brosz et al. 2013

Trace Path

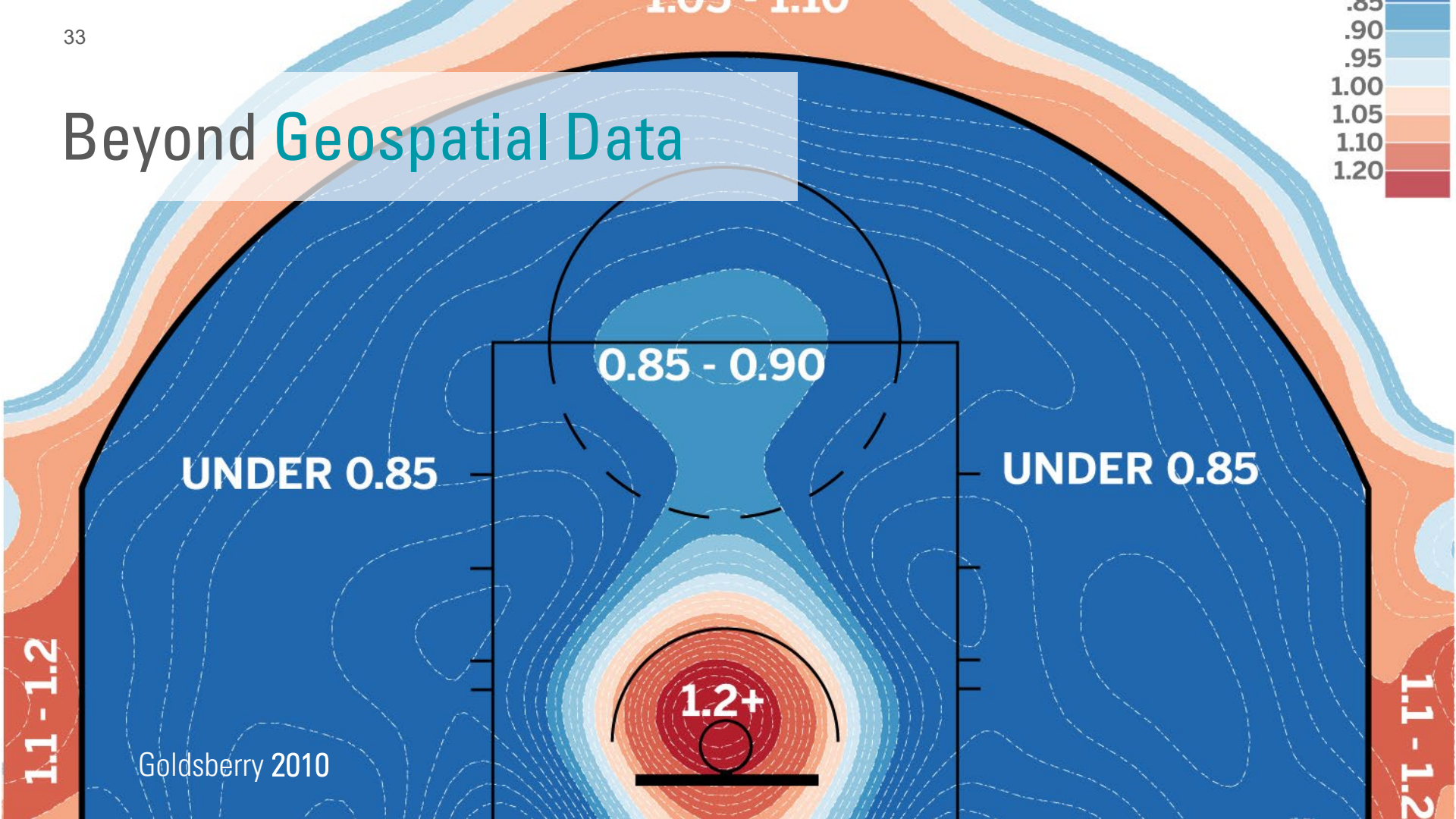


Schwering et al. 2019

Expanding

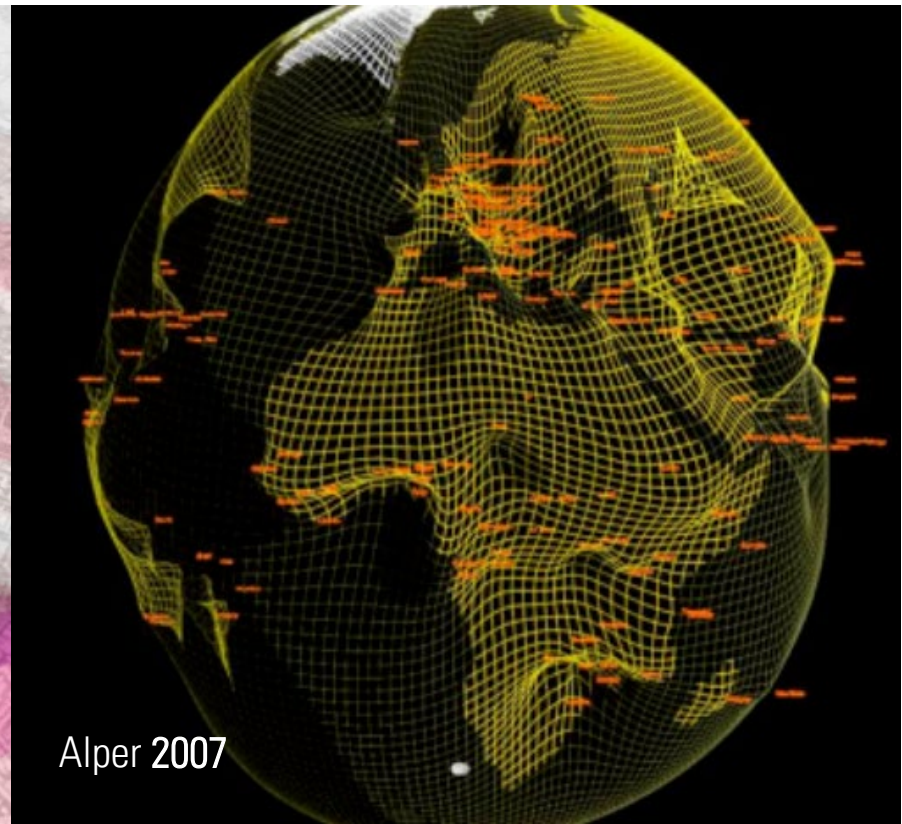
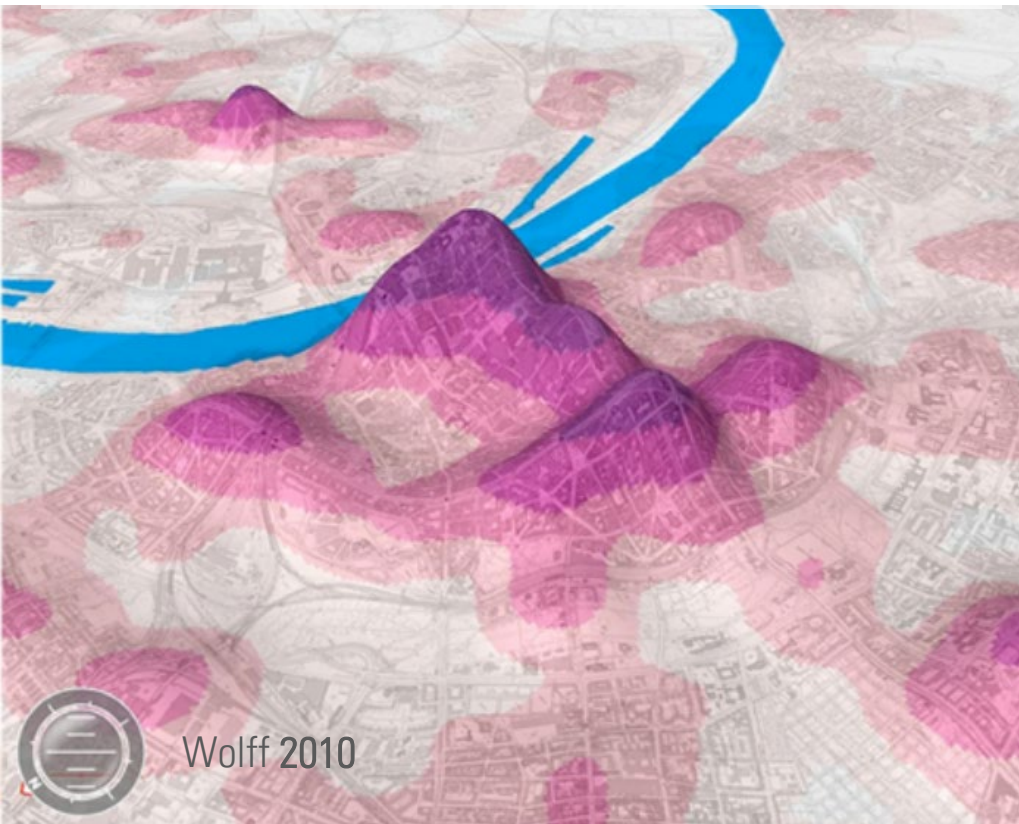
Map-like Visualization

Beyond Geospatial Data



Goldsberry 2010

Beyond Maps



Contributions

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