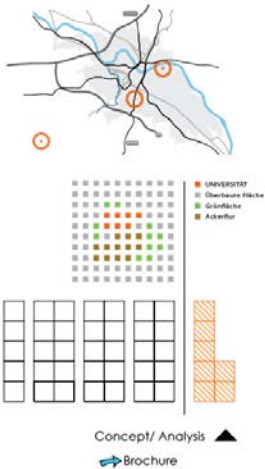March 15, 2018, Data Dialogue 9, School of Architecture, University of Virginia, Charlottesville

Visualizing peoples' perceptual responses to space through crowdsourced spatial photo content

Dr.-Ing. Alexander Dunkel, TU Dresden,
Department of Geosciences, Cartographic Communication

Workshop Files:
ad.vgiscience.org/tagmapsworkshop_uva/

background

▲ Illustration, central plaza design

▲ Still frame from 3D Animation, Design / Light Concept   ⟹ Animation/Video

OPEN SPACE ANALYSIS AND DESIGN

During the last part of studying landscape architecture at the UT Dresden, I focused on classical landscape architecture open space design projects such as the redesign masterplan for the **UT Dresden CAMPUS (1)**, **Wilhelm-Kuelz-Plaza Redesign (2)**, or a project in cooperation with Addis Abeba to develop unused open space structures in critical areas of the city **(3)**.
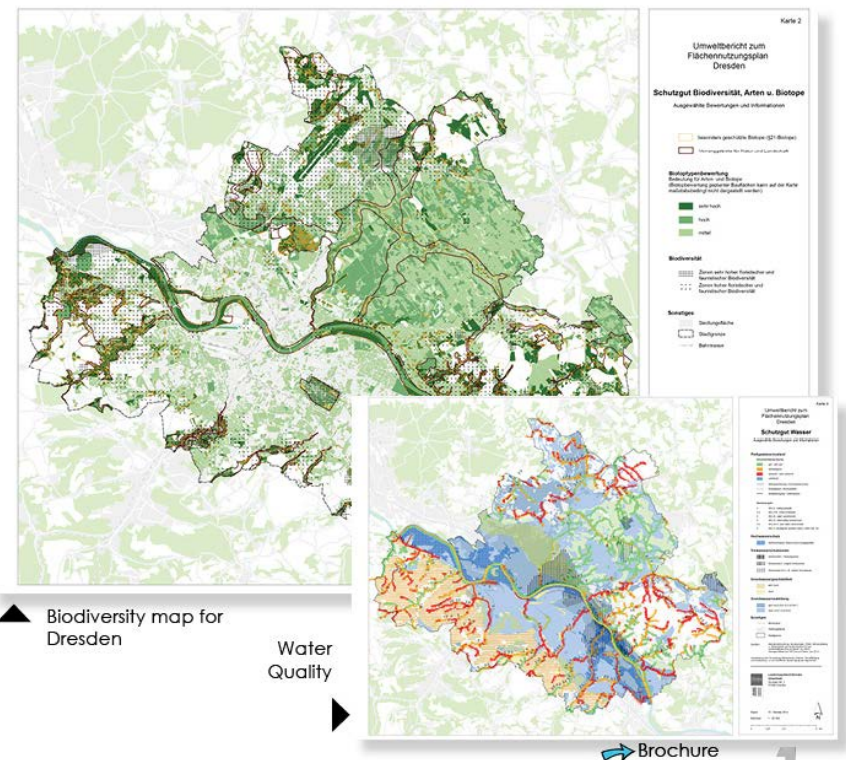
2007 - 2009

▲ Concept/ Analysis
⟹ Brochure

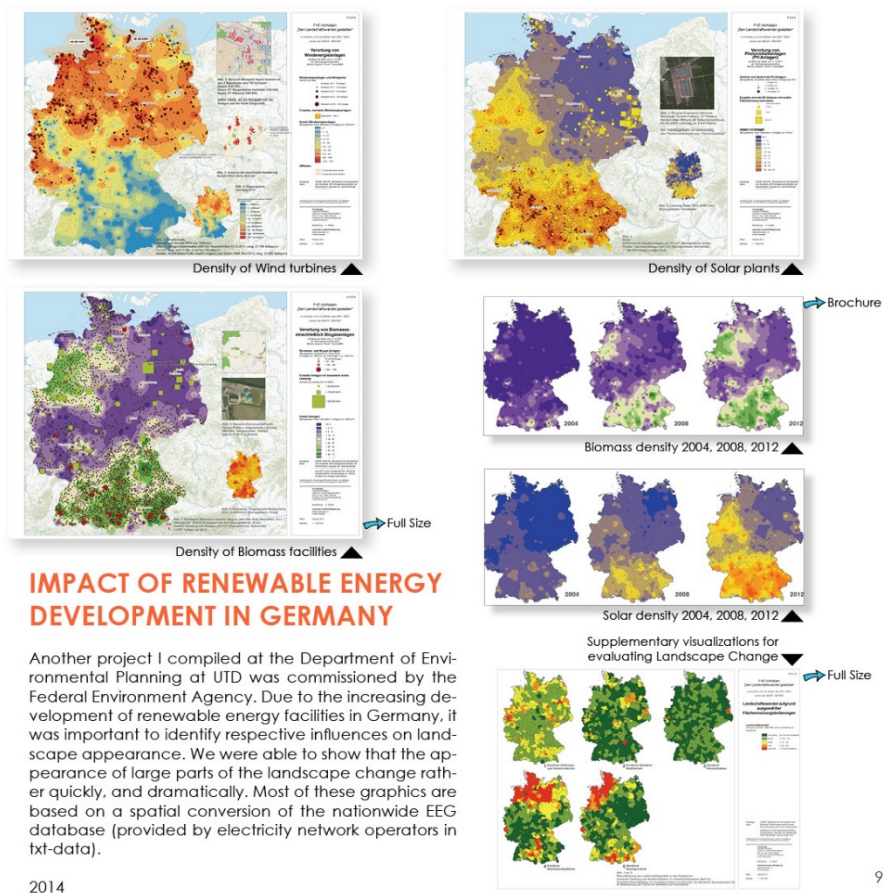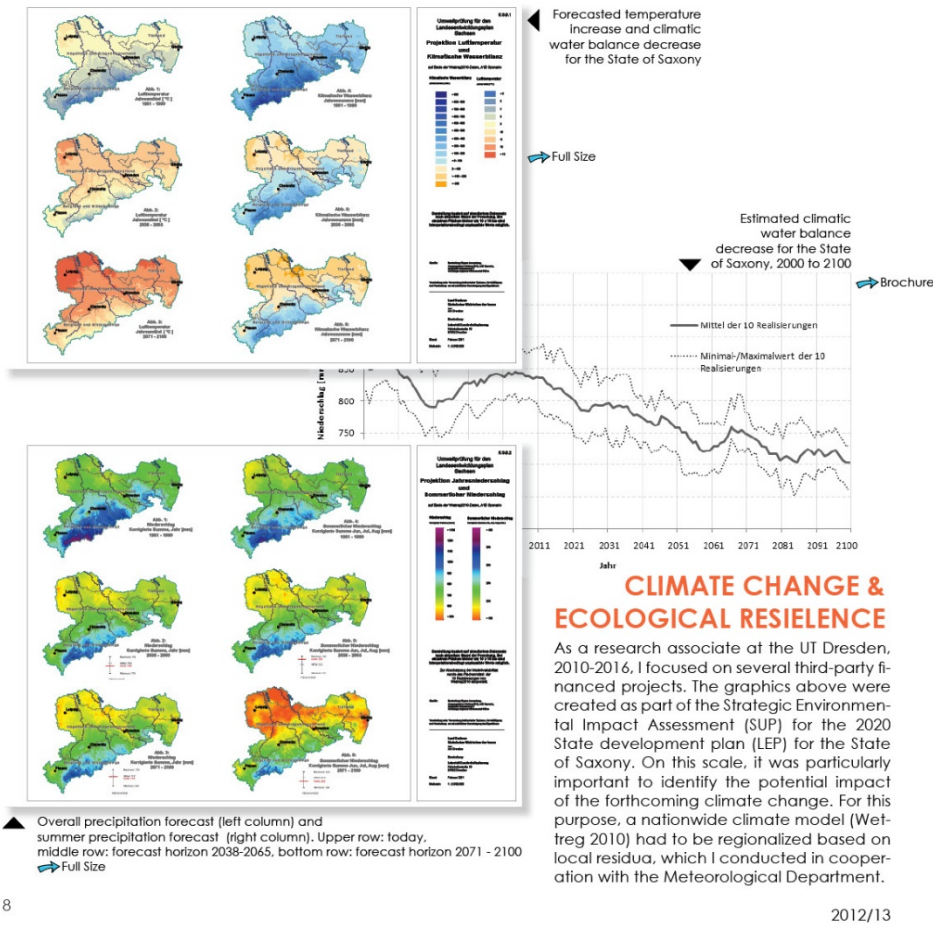ENTWURF   DETAIL KERNCAMPUS

▲ Design plan close-up   ⟹ Full Size

▲ Biodiversity map for Dresden

Water Quality ▶

⟹ Brochure

STRATEGIC ENVIRONMENTAL IMPACT ASSESSMENT

Landscape Architecture:
Public Space Design

Landscape & Urban Planning:
Decision Making

Forecasted temperature increase and climatic water balance decrease for the State of Saxony

Full Size

Estimated climatic water balance decrease for the State of Saxony, 2000 to 2100

Brochure

CLIMATE CHANGE & ECOLOGICAL RESIELENCE

As a research associate at the UT Dresden, 2010-2016, I focused on several third-party financed projects. The graphics above were created as part of the Strategic Environmental Impact Assessment (SUP) for the 2020 State development plan (LEP) for the State of Saxony. On this scale, it was particularly important to identify the potential impact of the forthcoming climate change. For this purpose, a nationwide climate model (Wettreg 2010) had to be regionalized based on local residua, which I conducted in cooperation with the Meteorological Department.

Overall precipitation forecast (left column) and summer precipitation forecast (right column). Upper row: today, middle row: forecast horizon 2038-2065, bottom row: forecast horizon 2071 - 2100
Full Size

2012/13

Density of Wind turbines ▲

Density of Solar plants ▲

Brochure

Density of Biomass facilities ▲

Full Size

Biomass density 2004, 2008, 2012 ▲

Solar density 2004, 2008, 2012 ▲

Supplementary visualizations for evaluating Landscape Change ▼

Full Size

IMPACT OF RENEWABLE ENERGY DEVELOPMENT IN GERMANY

Another project I compiled at the Department of Environmental Planning at UTD was commissioned by the Federal Environment Agency. Due to the increasing development of renewable energy facilities in Germany, it was important to identify respective influences on landscape appearance. We were able to show that the appearance of large parts of the landscape change rather quickly, and dramatically. Most of these graphics are based on a spatial conversion of the nationwide EEG database (provided by electricity network operators in txt-data).

2014

Regional Planning:
Strategic & Long Term Goals

Part 1:
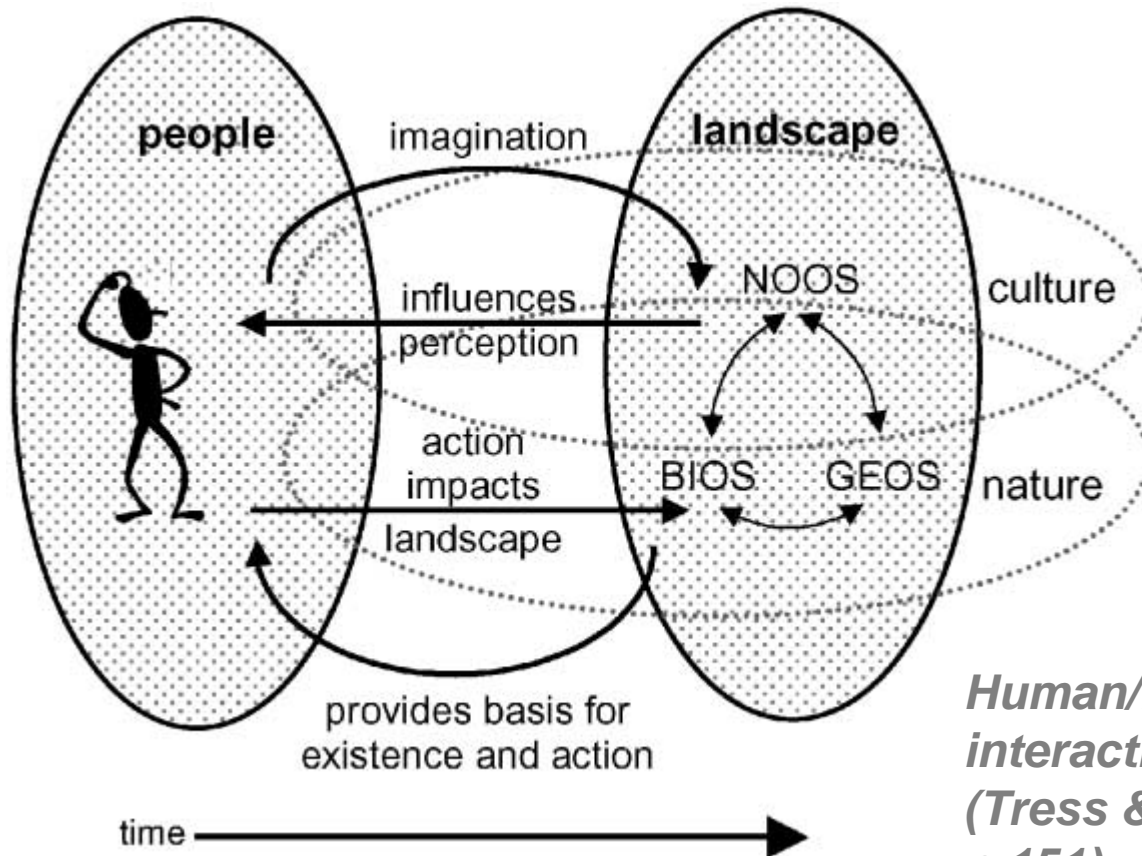
Theory

EU Landscape Convention:

… landscape "as a zone or area as perceived by local people or visitors" (ELC art. 1, para. 38).
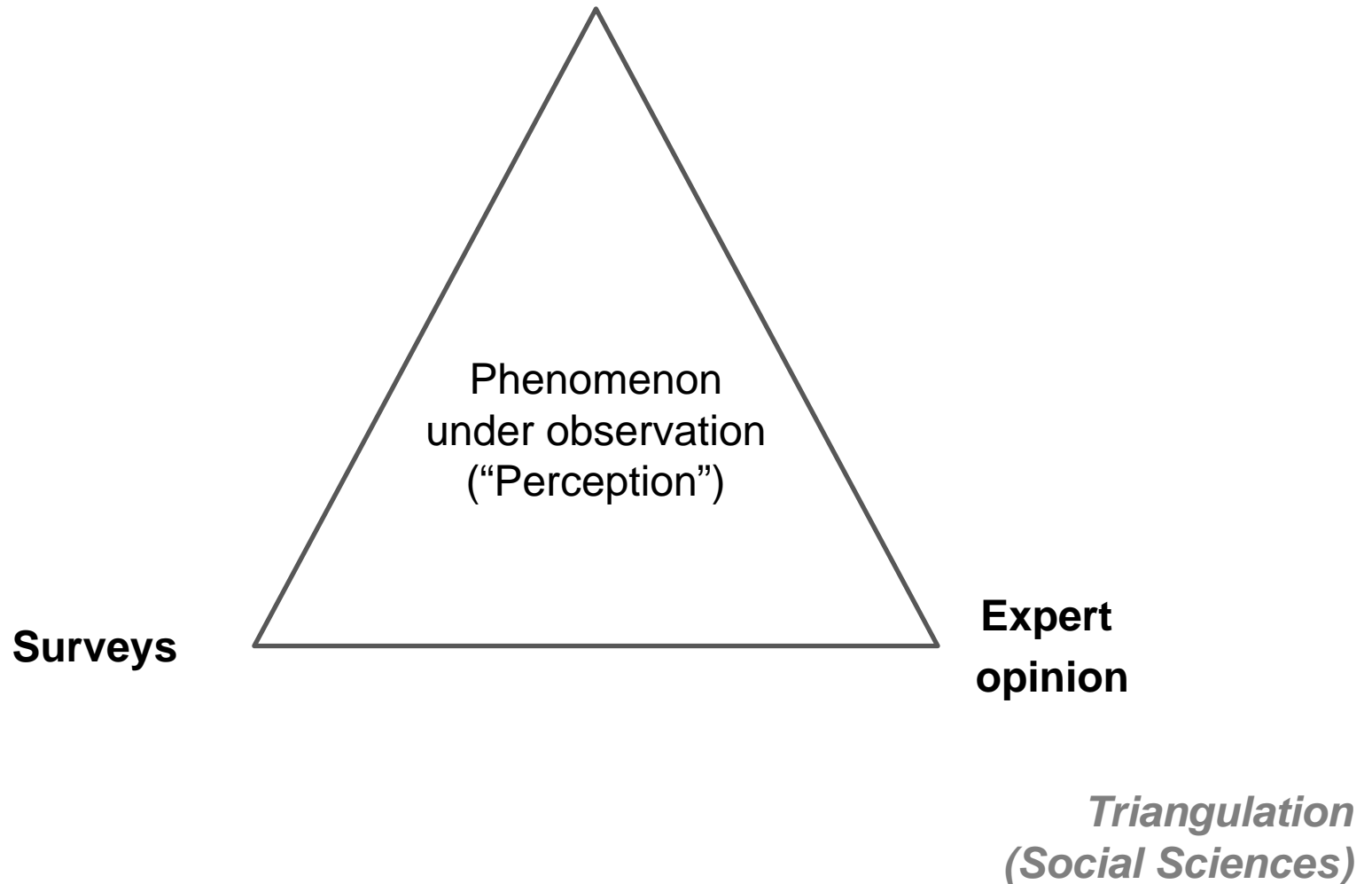
Problem(s):
Landscape and perception (= valuation)
of the landscape are inseparably intertwined.

Human/landscape interaction model (Tress & Tress, 2001; p.151)

Traditional GI data (census information, landscape inventories etc.)

Phenomenon
under observation
("Perception")

Surveys

**Expert
opinion**

*Triangulation
(Social Sciences)*

Crowdsourced Photo Data:
A source for planners to understand
Collective Human Perception

Animation of 72 Million Photos taken in Europe

A. Dunkel, Source: Flickr, 2007-2017

PART 2:

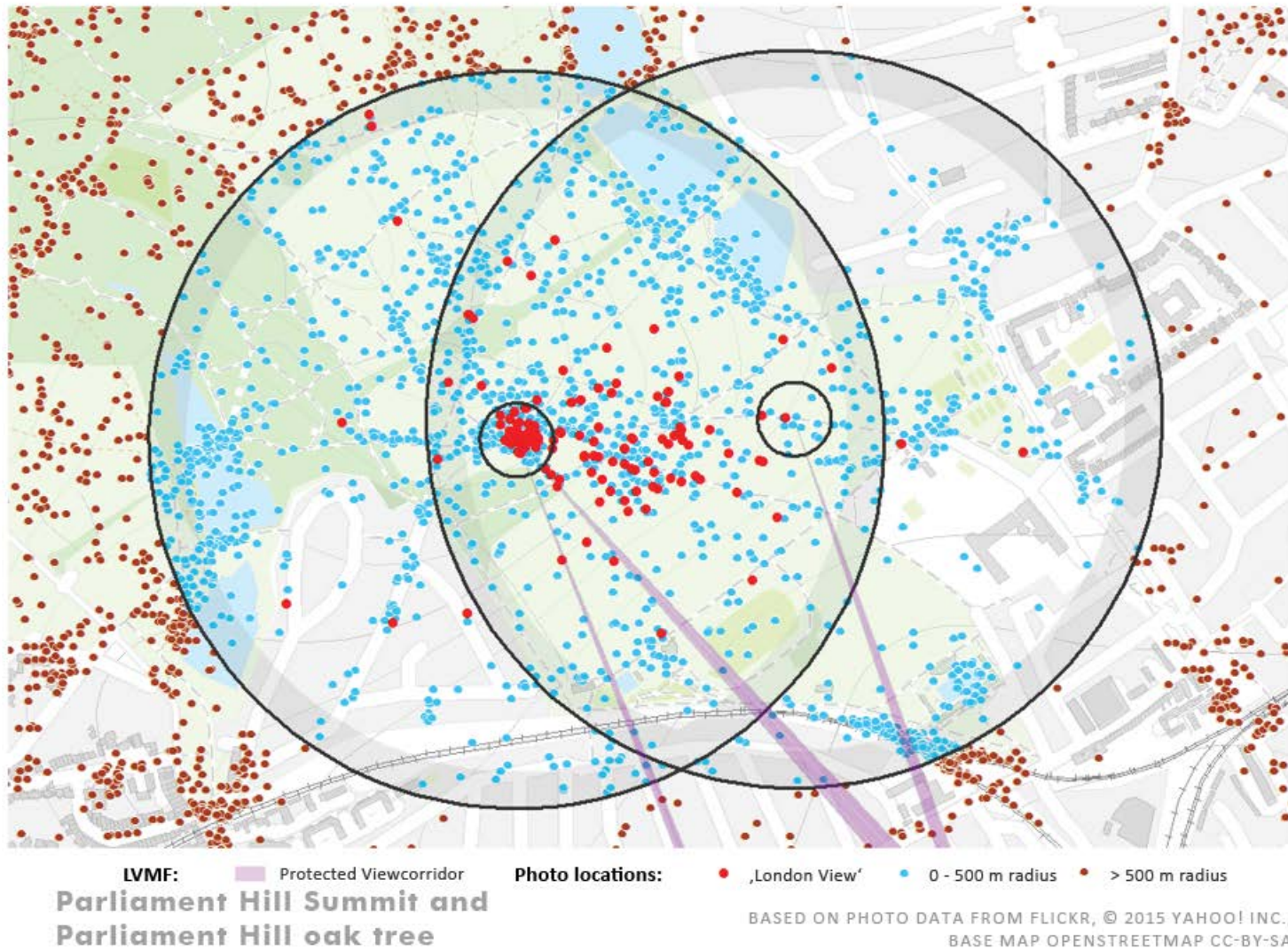# Application Examples

WHERE:

User Frequentation

London View (London Greater Authority, 2012);
Visual Assessment of London's unique Landscape
"as a support for visual impact assessment"
conducted by experts
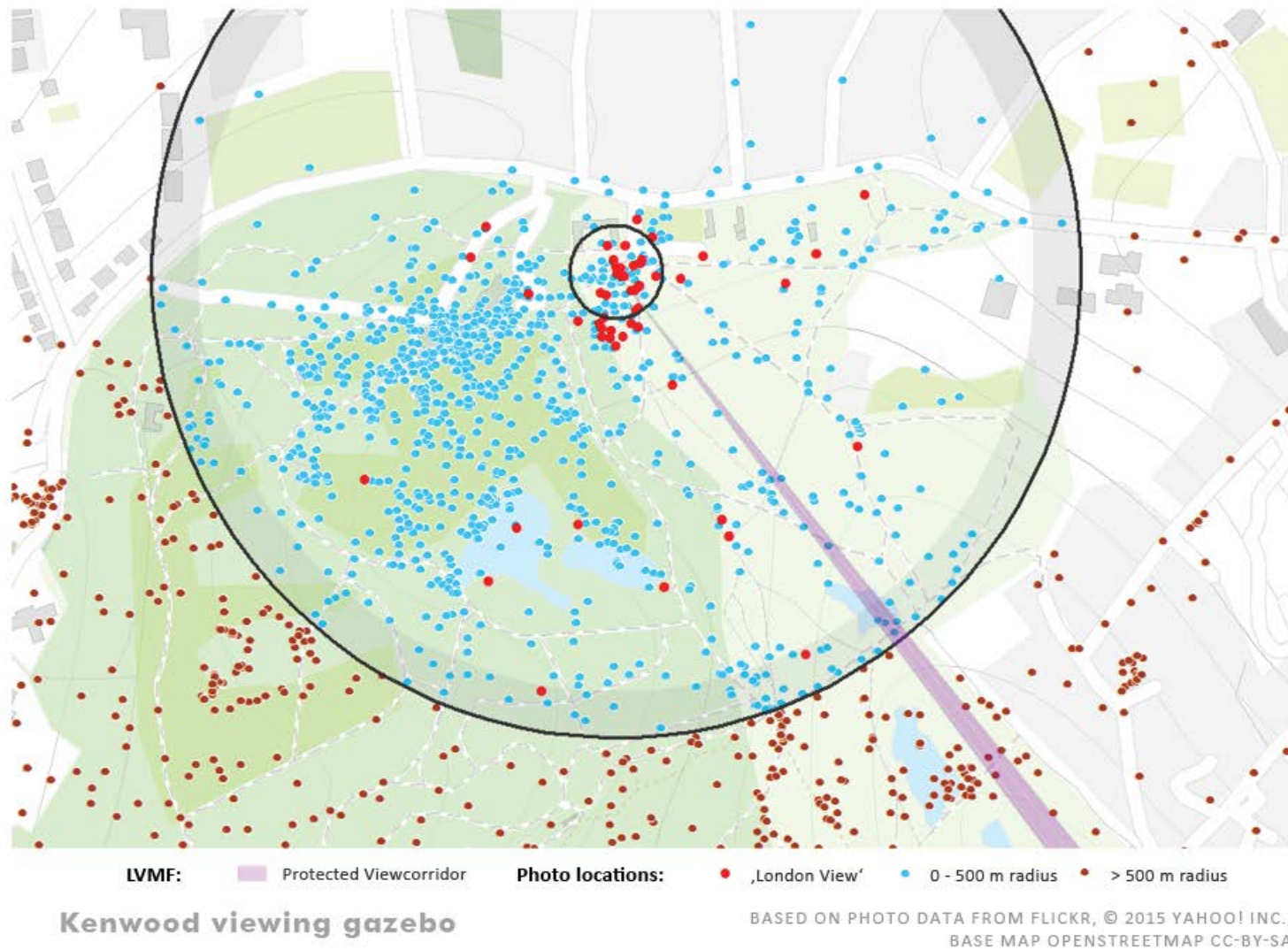
LVMF: ▨ Protected Viewcorridor **Photo locations:** ● ‚London View' ● 0 - 500 m radius ● > 500 m radius

Kenwood viewing gazebo

All photo locations (blue) and those where people attributed to the view of London (red)

LVMF: Protected Viewcorridor **Photo locations:** ● ‚London View' ● 0 - 500 m radius ● > 500 m radius

Primrose Hill Summit

BASED ON PHOTO DATA FROM FLICKR, © 2015 YAHOO! INC.,
BASE MAP OPENSTREETMAP CC-BY-SA

All photo locations (blue) and those where people
attributed to the view of London (red)

LVMF: ▥ Protected Viewcorridor   Photo locations: ● ‚London View' ● 0 - 500 m radius ● > 500 m radius

Parliament Hill Summit and
Parliament Hill oak tree

All photo locations (blue) and those where people
attributed to the view of London (red)

User Origin (WHO):

Representativeness
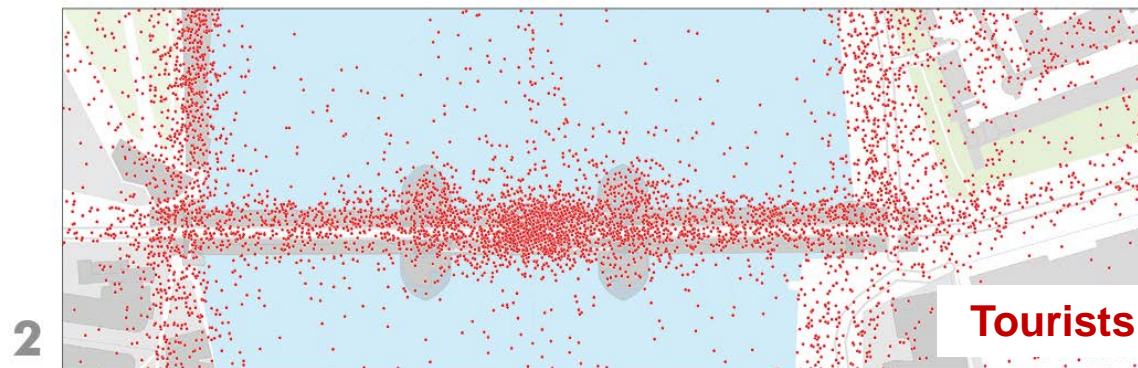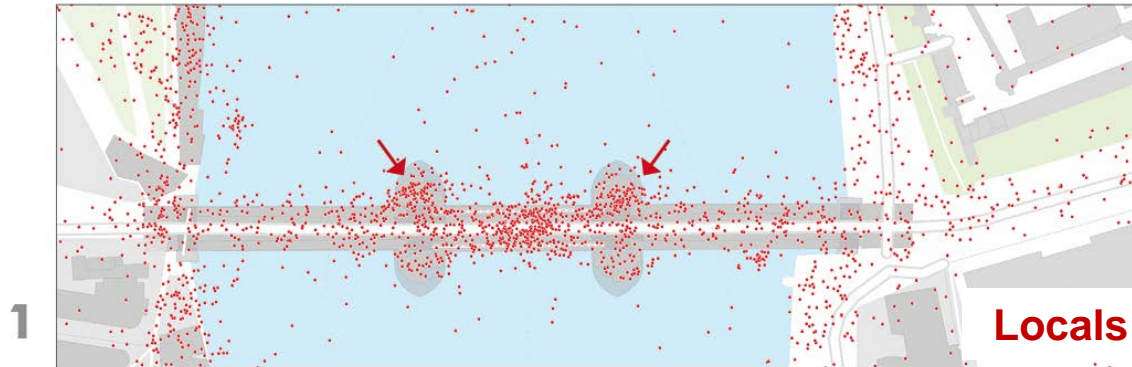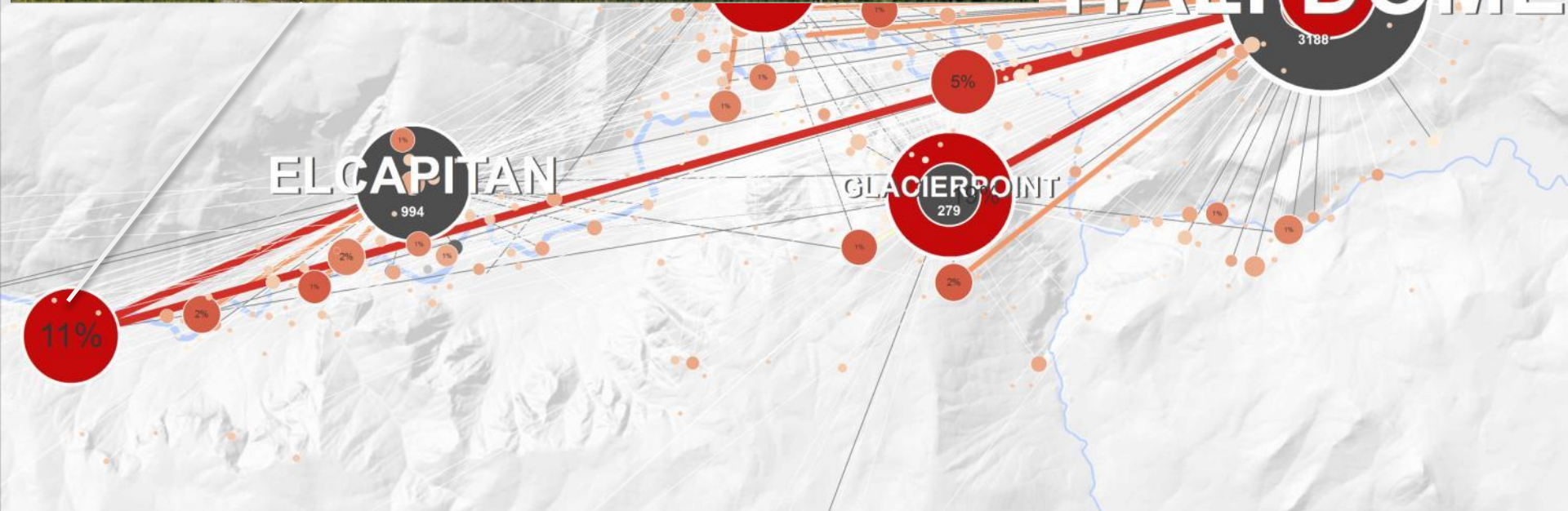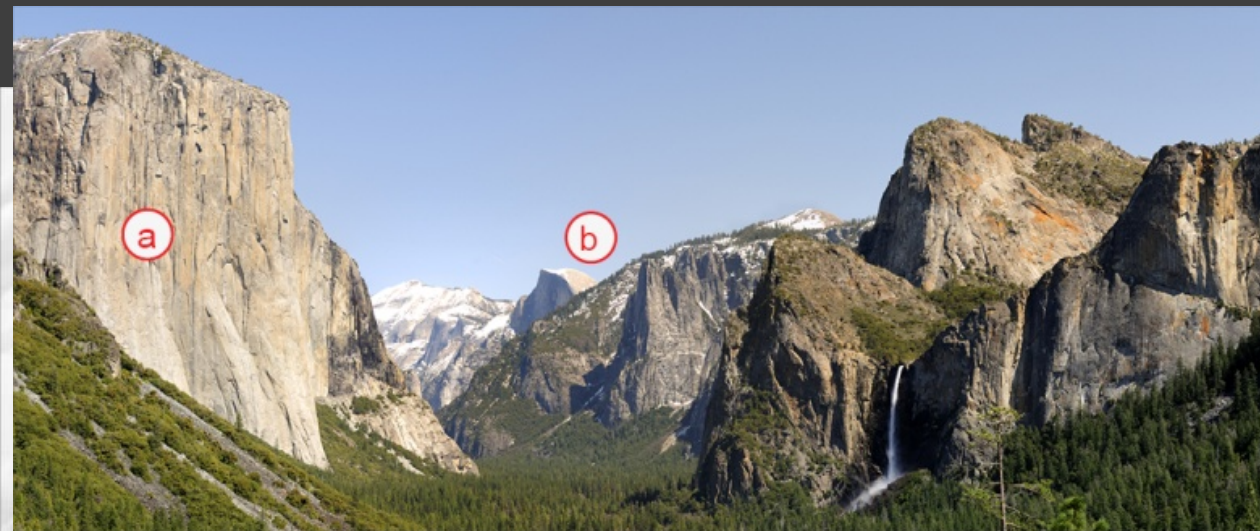
"Bias of Information"

Bias?

Americans

Europeans

Tower Bridge
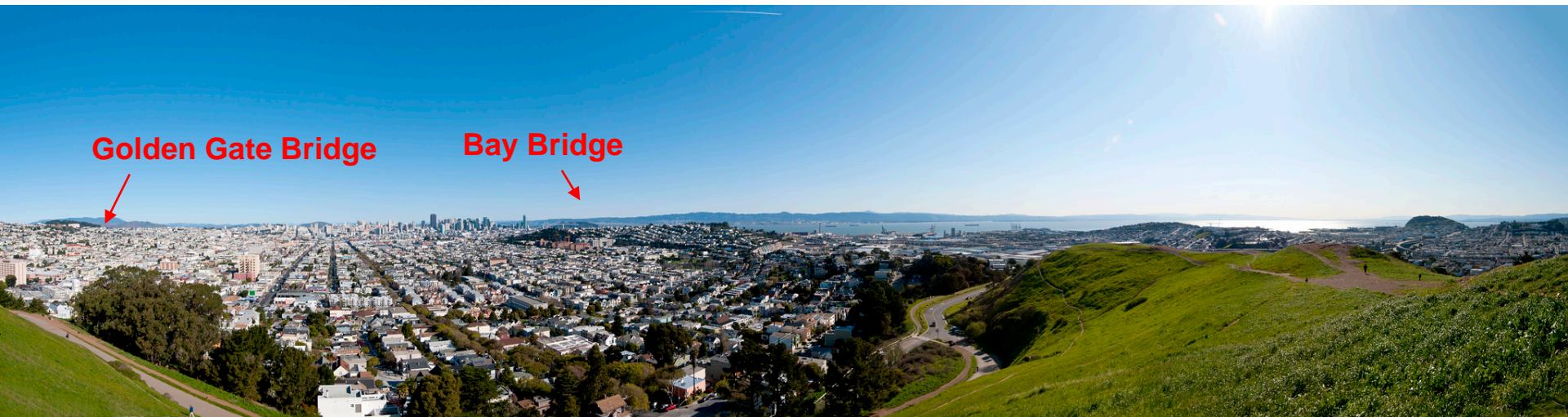

1 **Locals**

2 **Tourists**

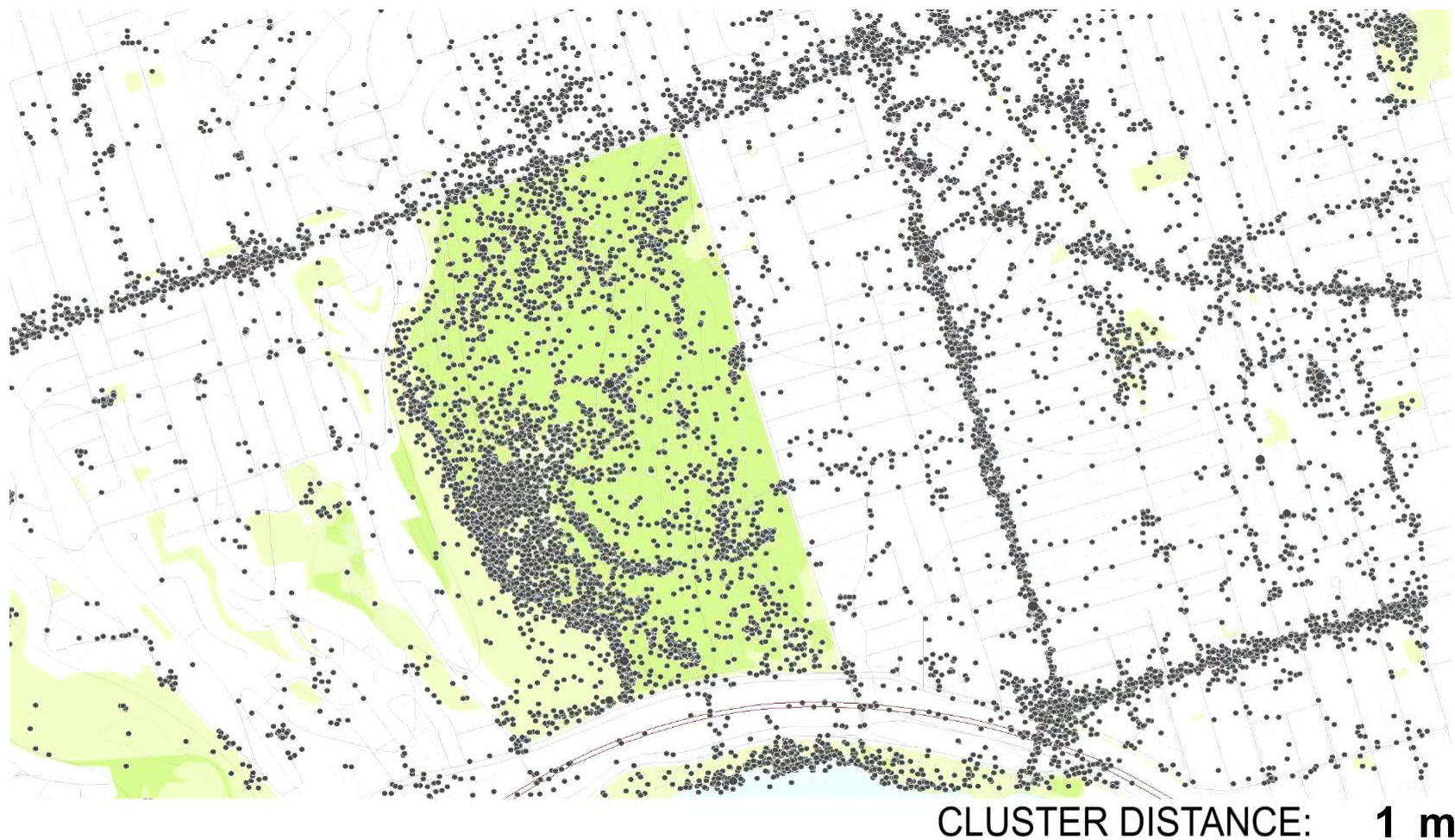ATTRIBUTION OF MEANING (WHAT):

Lines of Sight

Yosemite Valley

→ Meaning of a place as a **subject (grey)** compared to its meaning as a **vantage point (red)**

Perception:
## View from Bernal Hill, San Francisco

Dunkel (2012)

FINDING COMMON GROUND:

Tag Maps

Tag Map for Fort Mason Center, San Francisco

Number of photo locations:	41,777
Number of contributing users:	5002
Total available tags:	197,858
Period (date taken):	2007-2014

CLUSTER DISTANCE: **1 m**

Single-linkage clustering as implemented in Tag Maps:

A *bottom-up* approach to mapping similarity patterns

WHEN:

Monitoring
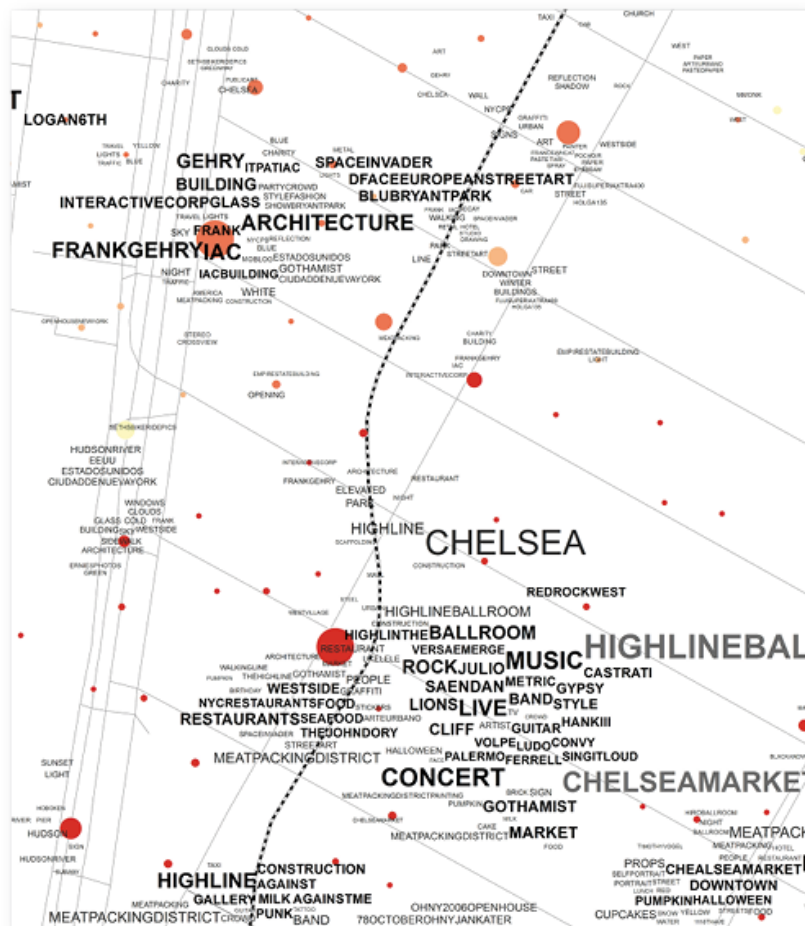
High Line, NY

2006-2009
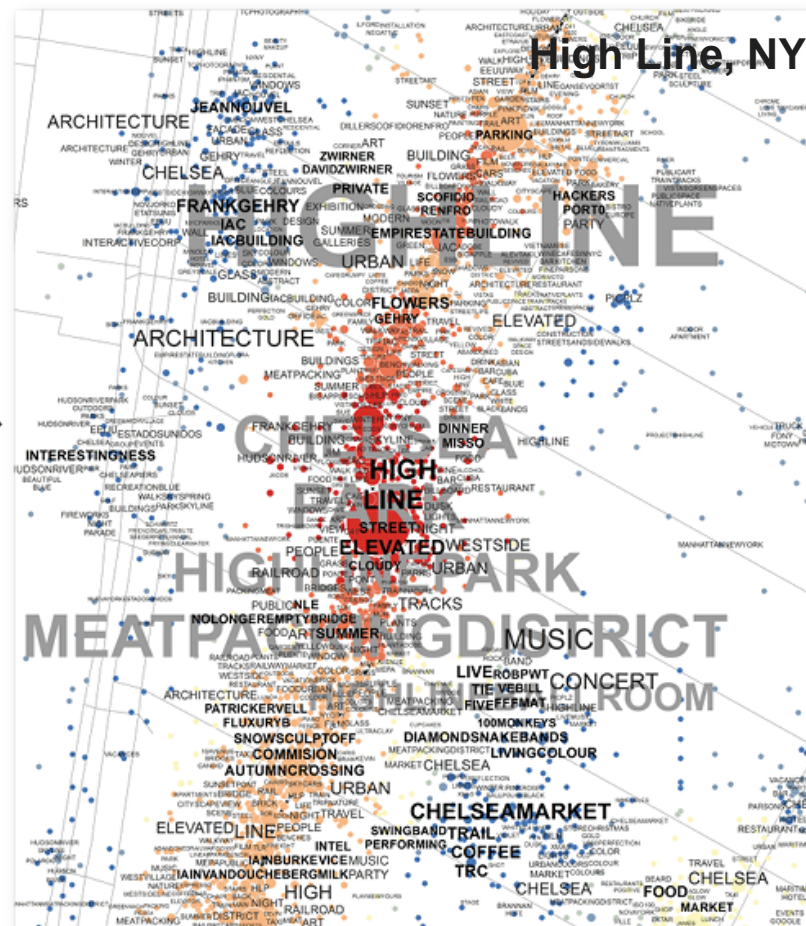
2009-2011

fieldoperations This High Line book is out! One last look, at the last chapter. Order link in bio, and @phaidonsnaps Today: 07_Unforeseen

Once built, the High Line quickly became an icon and a symbol of NYC, its level of popularity taking us a bit by surprise! This chapter explores the many unforeseen aspects of the High Line, ranging from the different ways people use it, to its economic impacts, to how it has influenced other cities' approach infrastructure reuse. The two maps above, by Alexander Dunkel, show the spike in Flickr photos taken on the High Line before and after Phase 1's opening in 2009. @highlinenyc and continues to skillfully guide the High Line's everyday operations, maintenance, art, and programming, ensuring it strikes a balance between popular destination

EMOJI CLUSTERING:

Sentiment?

TU Dresden Campus (Instagram & Flickr)

Thank You