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Joint Research Centre

European Commission

Atlas of the Human Planet releases 2016, 2017, plans for 2018, 2019

Aneta J Florczyk & GHSL team

Geo HPI Forum 2017, Enschede (Netherlands), 13-15 Sept. 2017

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Atlas as Geo Human Planet Initiative outcome

- Geo 2017-2019 work programme:
  - Geo Human Planet Initiative: Spatial Modeling of Impact, Exposure and Access Resources
  - **Deliverable:** Human Planet Atlas (HPA) releases
    - periodic publication of the HPA

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- **Main achievement of the Geo HPI partnership**

Atlas of Human Planet

Human Planet Atlas (HPA) – a set of selected core evidences and derived indicators produced by the Human Planet Initiative.

- facts-and-figures

- cross-cutting thematic application

- Objective: to deliver **periodic** *key messages and narratives* based on the core evidences and derived indicators

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Atlases

- Achievement (up till date): Atlas 2016 and Atlas 2017

- Current Goal: involve the partners in the next releases

Existing release: Atlas 2016 & Atlas 2017

Atlas of the Human Planet 2016
Mapping Human Presence on Earth with the Global Human Settlement Layer

Atlas of the Human Planet 2017
Global Exposure to Natural Hazards
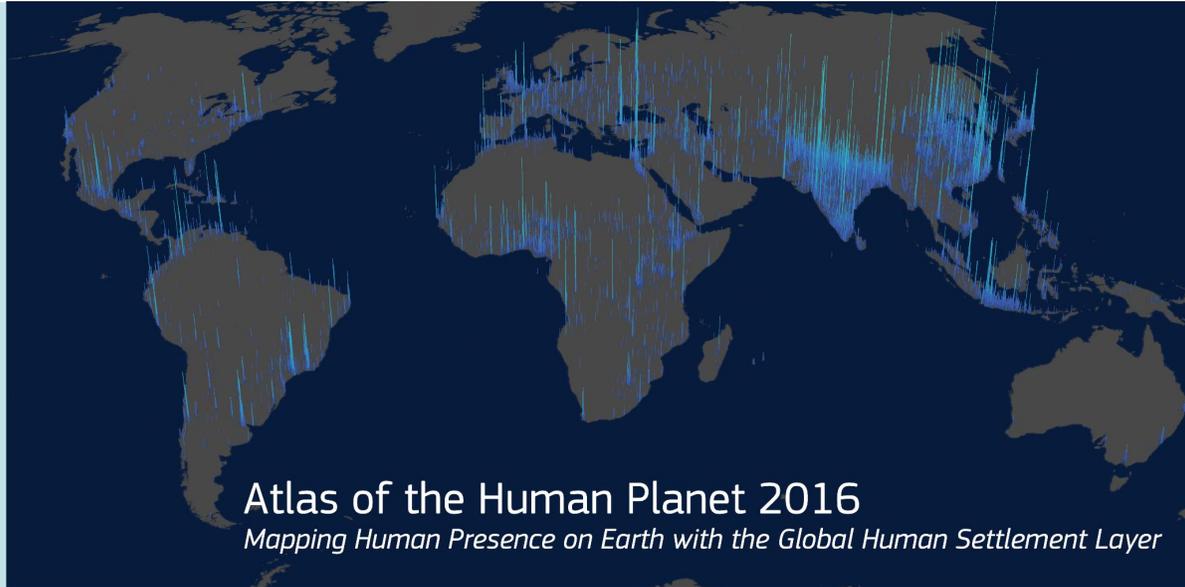
- Atlas 2016: Database
- Atlas 2017: Thematic application
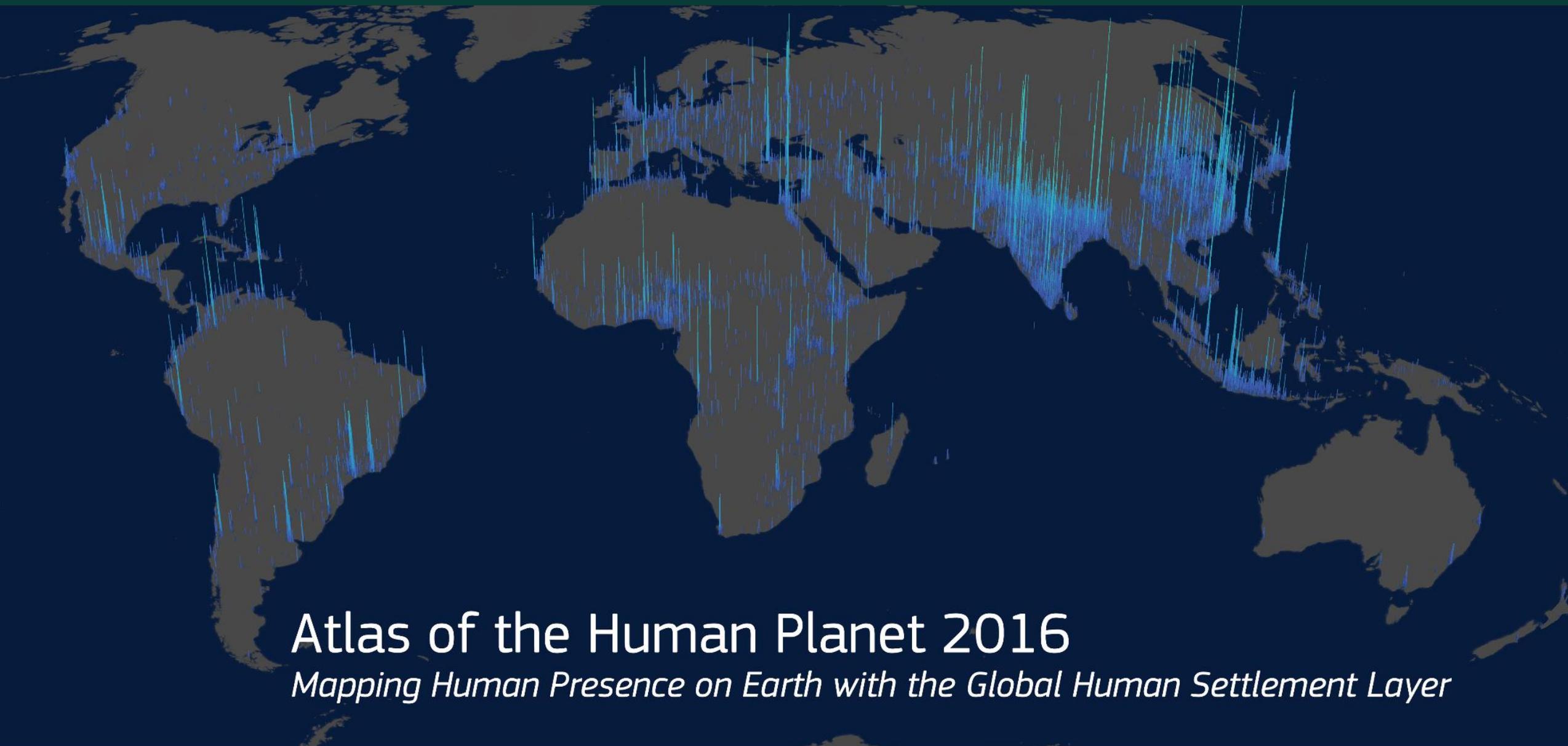
Atlas of the Human Planet 2016

Mapping Human Presence on Earth with the Global Human Settlement Layer

Atlas 2016

GHS BUILT-UP

GHS POP

GHS S-MOD
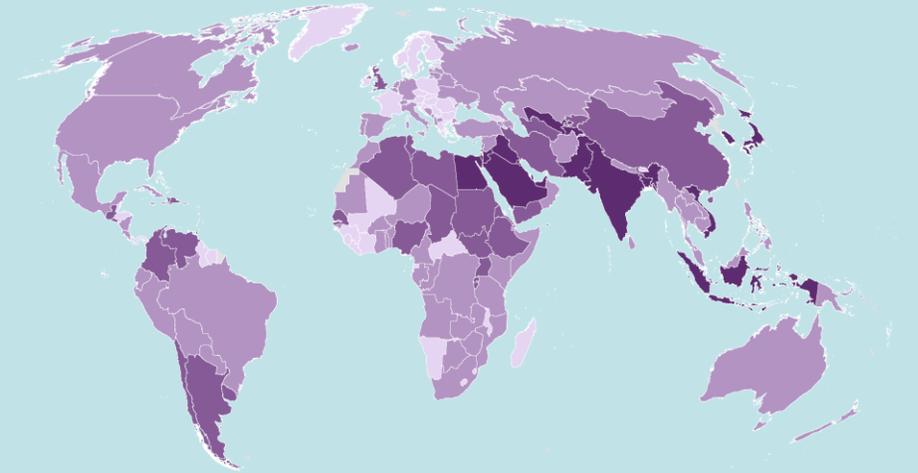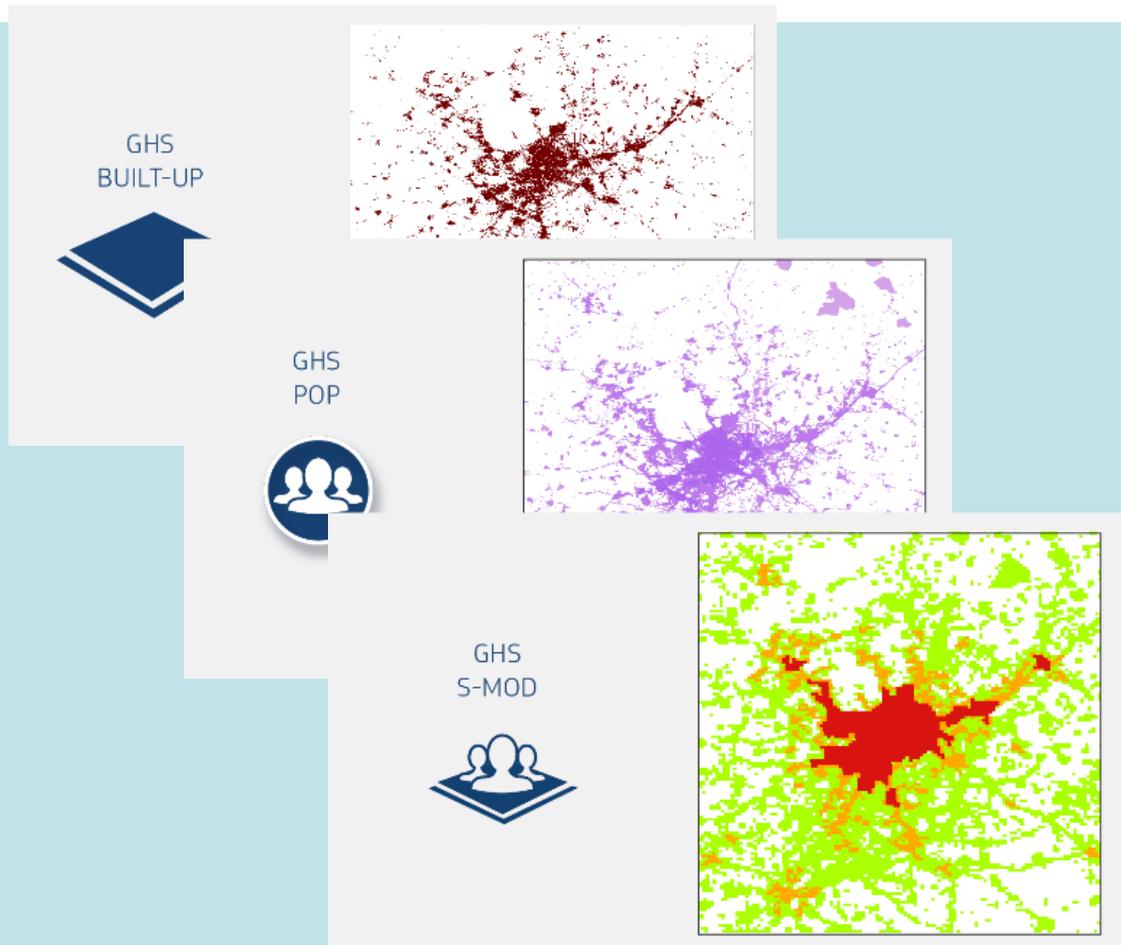
- Global Analysis

- Regional Analysis (country, income group, geographic location)

- Multitemporal (past 40 years)

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Atlas 2016: Example of Key Findings

Today 7.3 billion people live and work in only 7.6% of the global land mass

7.3 billion

7.6%

Built-up area

Population

Th km²

Billion

9.7
UNDESA

| | 900 |
| 800 |
| 700 |
| 600 |
| 500 |
| 400 |
| 300 |
| 200 |
| 100 |
| 0 |

1976 1990 2000 2015

1975 1990 2000 2015 2050
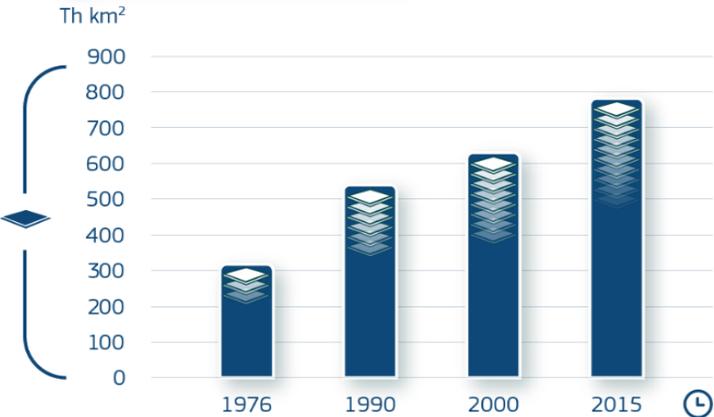
x 2.5

In the last 40 years built-up area
increased by approximately 2.5 times
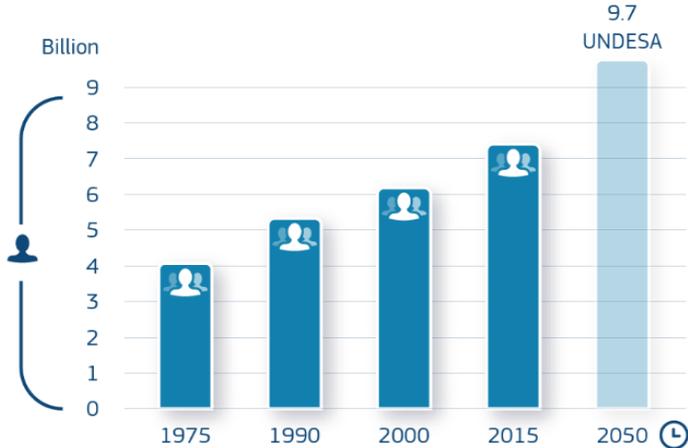
x 1.8

In the last 40 years population
increased by 1.8 times

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Atlas 2016: Example of Key Findings

The dynamic of population and built-up increase **have very strong regional differences**

x 3
40 years
x 4

x 1
40 years
x 2
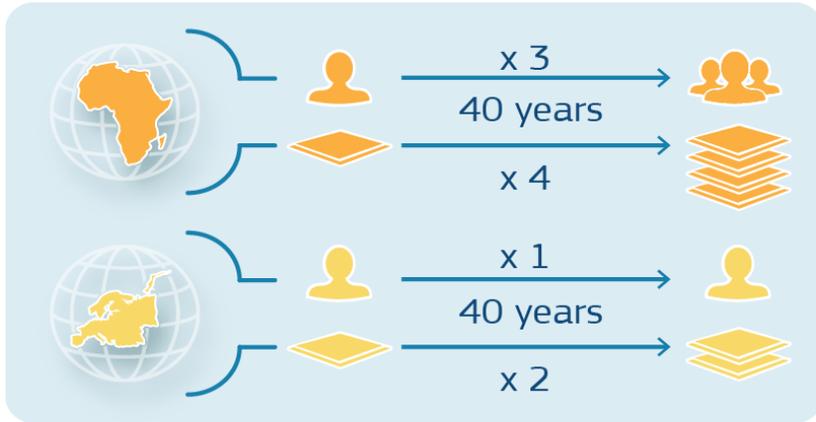
Asia is by far the most populated continent and has since the year 2000 also the biggest amount of built-up areas

Growth of population and built-up

1000 km^2

Built-up

Billion Population
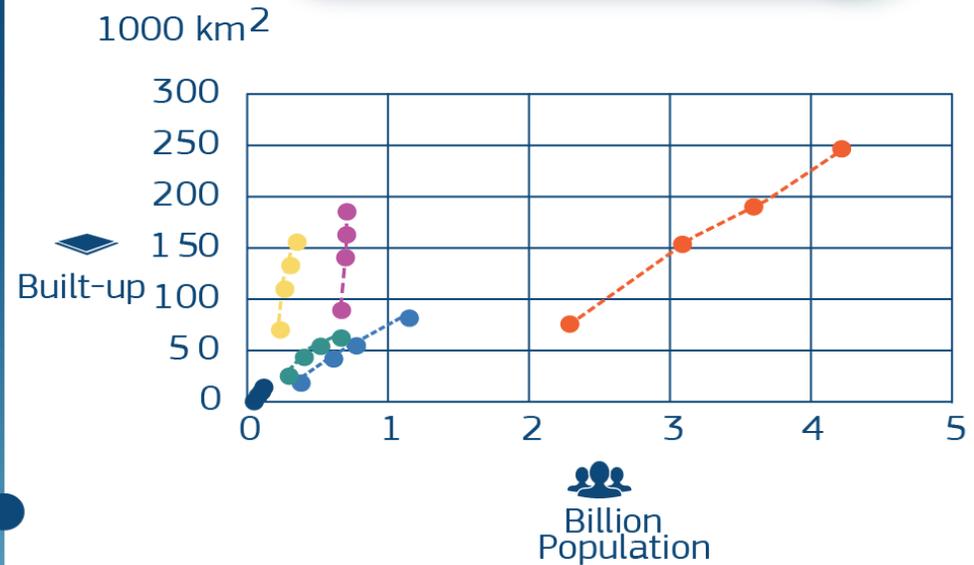
Oceania Africa Latin America &Caribbean Northern America Asia Europe

years 1975 1990 2000 2015

Atlas of the Human Planet 2017
Global Exposure to Natural Hazards

European Commission

Hazard map

2015

2000

1990

1975

Method

Exposure
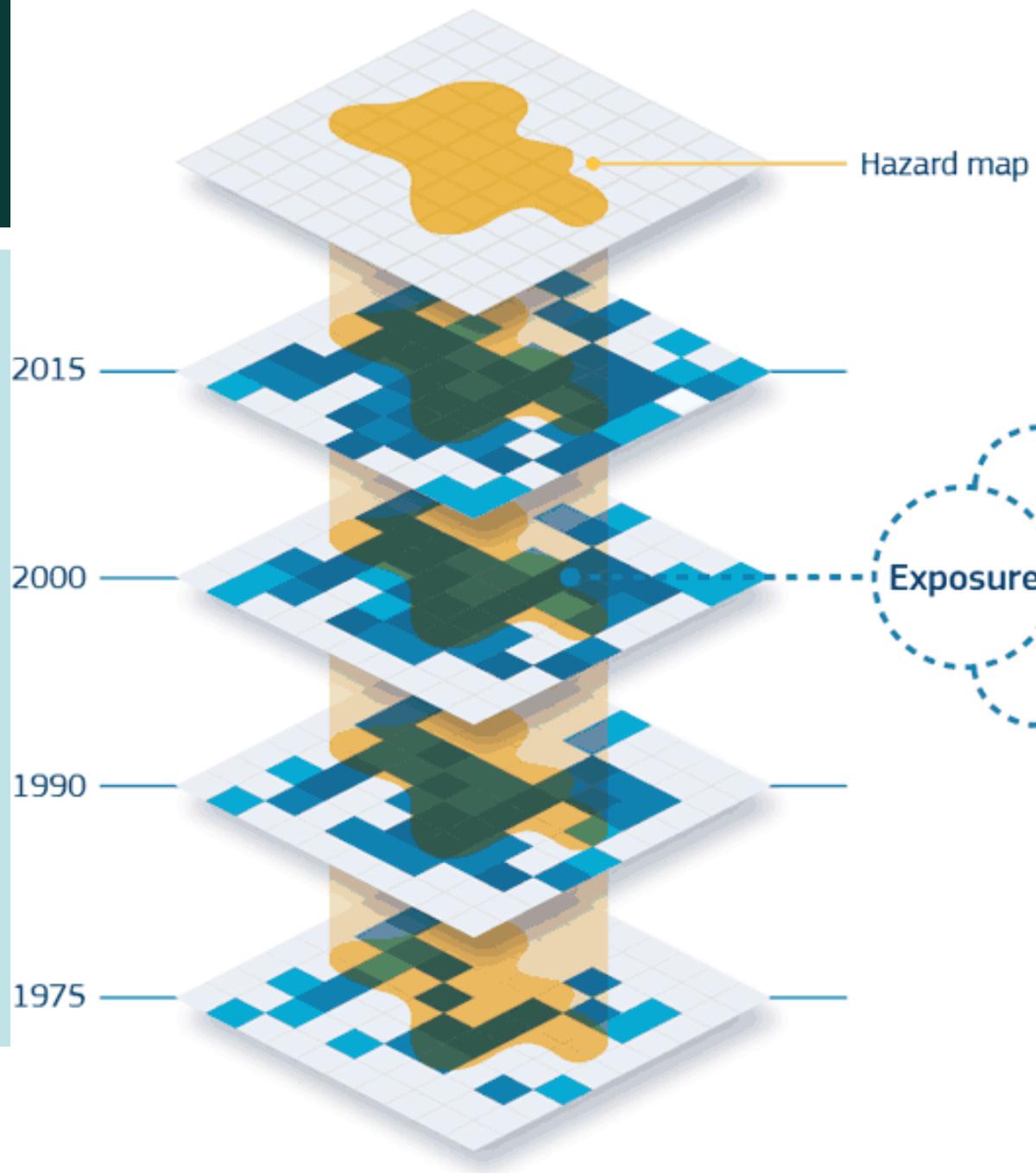
Population

Built-up

Repeated for 6 hazards

Earthquake

Volcano

Tsunami

Flood

Tropical Cyclone Wind

Cyclone Storm Surge

Atlas 2017: Example of Key Findings

EARTHQUAKE

Population potentially exposed to earthquakes (475 year RP) on the planet increased from **1.4 to 2.7 billion** between 1975 and 2015

Billion

- Exposed
- Not exposed

	1975	1990	2000	2015
Not exposed	2.67	3.42	3.92	4.67
Exposed	1.41	1.91	2.24	2.72

37 % of the world population

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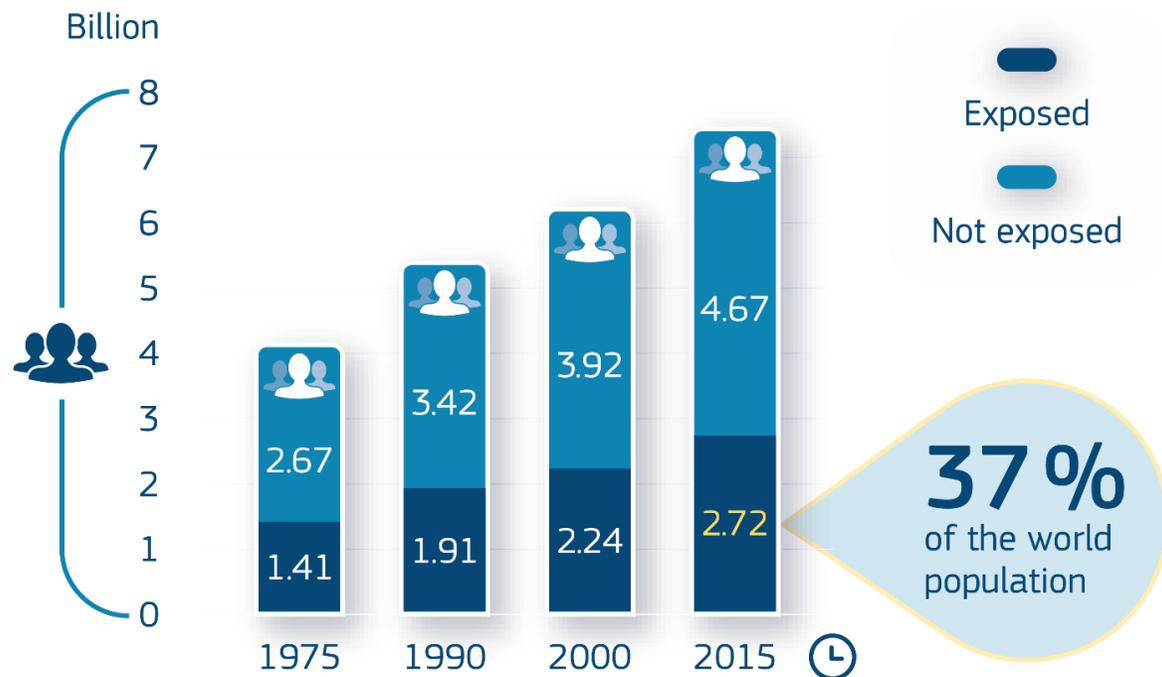
Atlas 2017: Example of Key Findings

FLOOD

Flood, the most frequent natural hazard, potentially affects people in Asia and Africa more than in other regions (100 year RP)

Latin America & the Caribbean 3.8%

Northern America 1.4%

Oceania 0.1%

Europe 5.6%

Africa 12.2%

Asia 76.8%
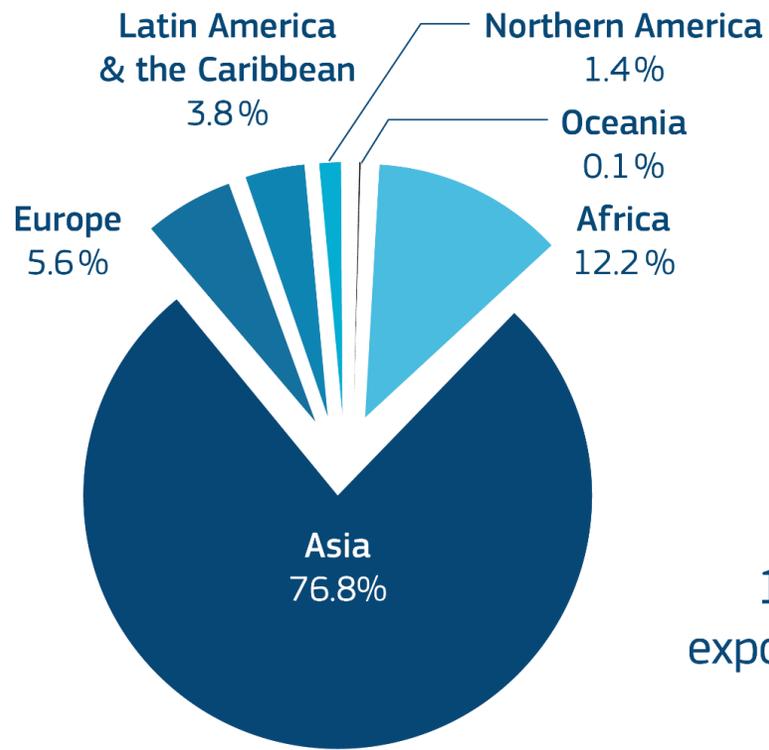
1 billion people exposed on the planet

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Atlas – HPI partership outcome

HPI partners contributeded to:

- Data and analysis of results

- Voting the key findings

- Story telling & show cases

Contribution: Voting key findings

- Pre-selection of a set of relevant findings:
  - 38 findings
  - 4 categories (22 sub-categories): global, regional and city scales, and inequality
- Voting schema
  - Relevance score: 0 – 4 [not important – very important]
  - "I don't know", *No response*

- **Panel of Experts: survey to rank the findings**
  - HPI community: 29 responses

- Focus on the top findings

Partners`contribution: Show cases

- Measuring Global Urbanization using a Standard Definition of Urban Areas – Analysis of Preliminary Results, **World Bank**

- Using the GHSL for Monitoring Land and Population Growth for to Guide Public Policy, **University of Pennsylvania** and **Urban Spatial**

- Monitoring urbanization dynamics in mega cities in China, **RADI, CAS**

- Country-wide Mapping & Monitoring of settlements in South Africa *(Regional cooperation with the South African National Space Agency)*, **SANSA**

- Linking human and earth system models to assess regional climate change impacts and adaption in urban systems and their hinterlands, **NCAR** and **Arizona State University**

- Developing a Statistical Structure Inventory from GHSL Data *(Estimating the Consequences of Dam Breach Flood Inundation)*, **US Army Corps of Engineers**

- Population Exposure in Seismic Risk Assessment, **Kandilli Observatory and Earthquake Research Institute, Turkey**

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Future release: Atlas 2018 & Atlas 2019

- Atlas 2018: New Database
  - First results at World Urban Forum (Feb. 2018)
  - Release: end of 2018

- Atlas 2019: Thematic application (to be defined)

Atlas 2018

- New improved database
  - Improved grids
    - Built-up area (training on Sentinel 1)
    - Expecting improvements of population estimates
  - Vector dataset on cities
    - spatial delineation (SMOD HDC/LDC)
    - a set of attributes

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- **Call for contributions:**
  - **Data preparation**
  - **City attributes (characterization of city spatial domain)**

City spatial domain: global harmonized definition of cities and settlements

- GHSL Settlement Model – Global harmonized definition of cities and settlements (application at cell 1km GRID)
  - High Density Cluster (HDC) -> Urban centre
  - Low Density Cluster (LDC) -> Urban cluster
  - Rural cell area

Porting of the *Degree of urbanization (DEGURBA)* in the GHSL framework

Harmonized Definition

- DEGURBA people-base classification of cities and rural area. It classifies municipalities:
  - **Cities** have the majority of their population in an urban centre;
  - **Towns and suburbs** have the majority of their population in an urban cluster, but are not cities;
  - **Rural areas** have the majority of their population in rural grid cells.

Dijkstra, Lewis, and H. Poelmann. "A harmonised definition of cities and rural areas: the new degree of urbanization." European Commission Urban and Regional Policy. Working paper 1 (2014): 2014.

Degree of urbanisation for local administrative units level 2 (LAU2) (¹)

Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat
Cartography: Eurostat — GISCO, 05/2016

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9.00-10.30 hrs: Partner showcase session 1: ***Global harmonized definition of cities and settlements*** *Lewis Dijkstra, Economic Analysis Unit at European Commission Directorate General for Regional and Urban Policy*

Degree of urbanisation for local administrative units level 2 (LAU2) (¹)

Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat
Cartography: Eurostat — GISCO, 05/2016
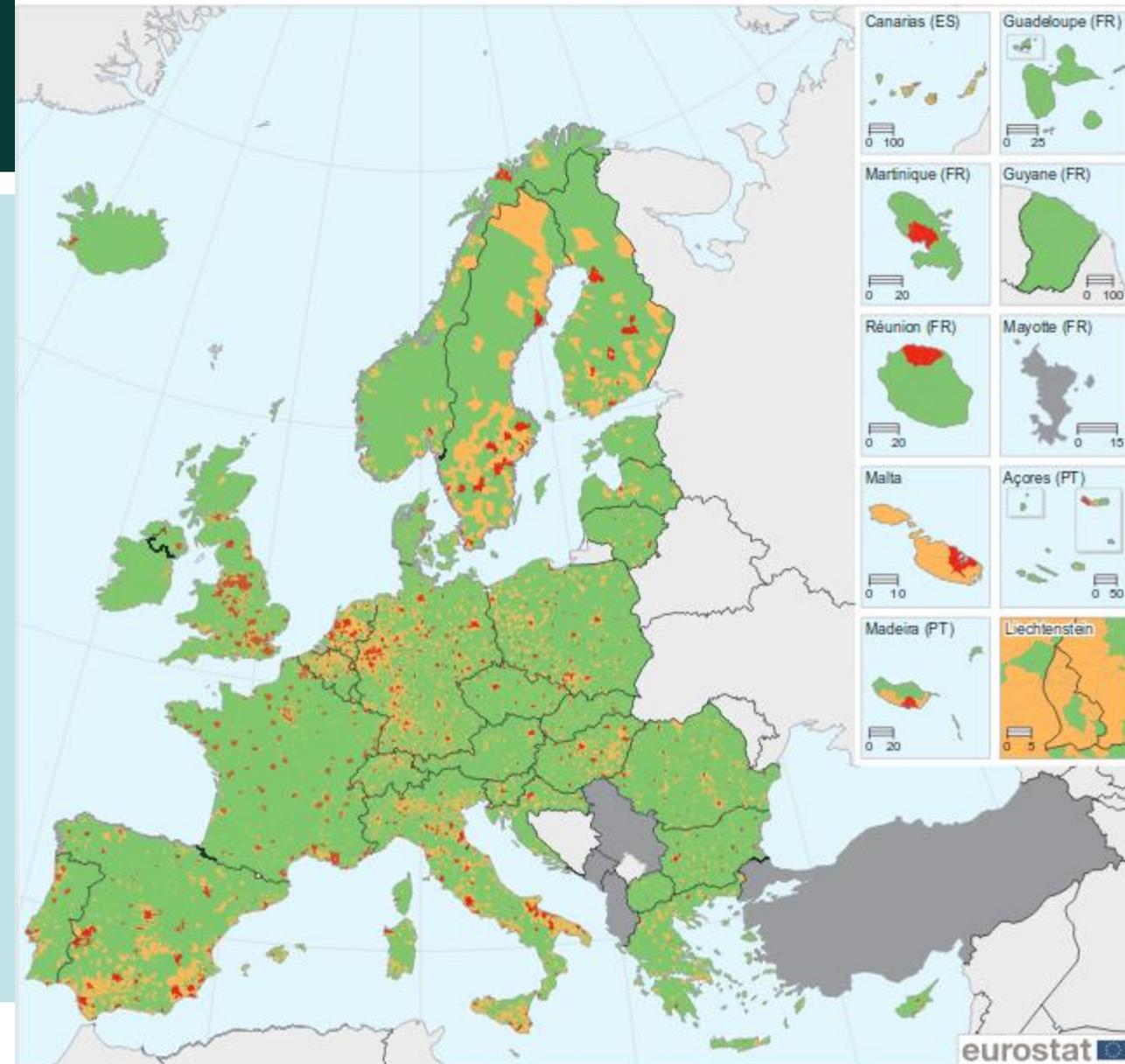
Amsterdam, Netherlands

Roma, Italy

Paris, France

© OpenStreetMap contributors. Thematic data layers © European Union
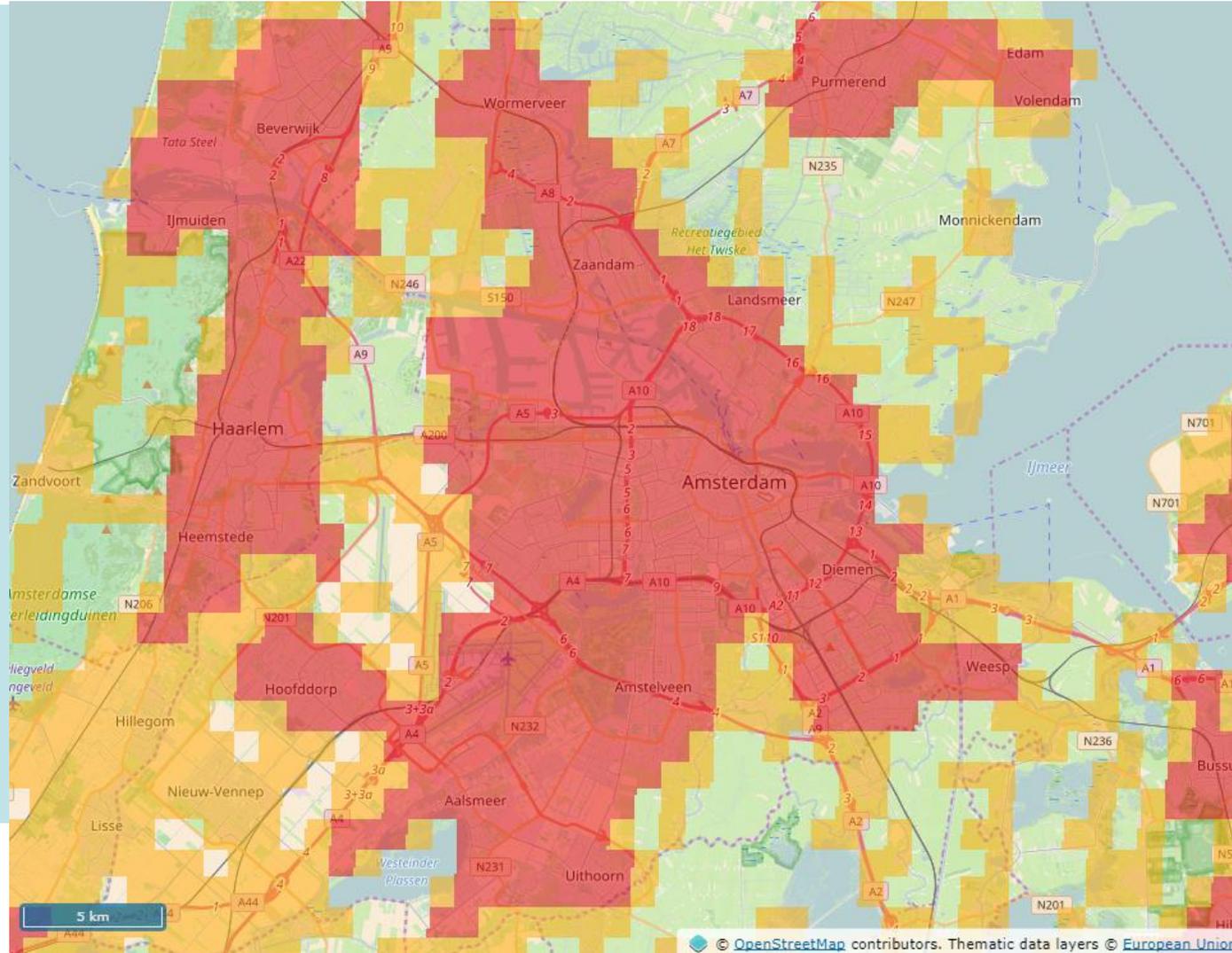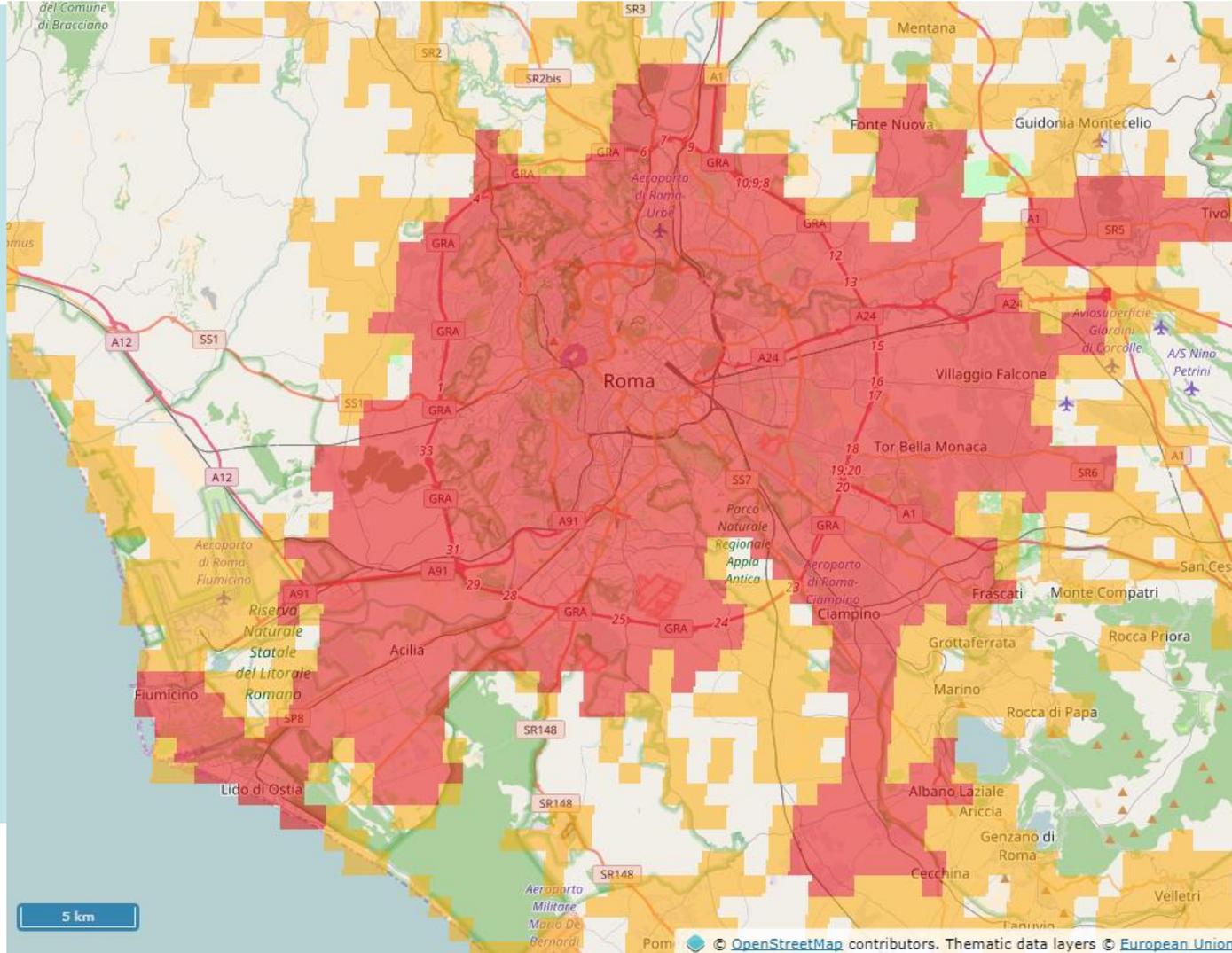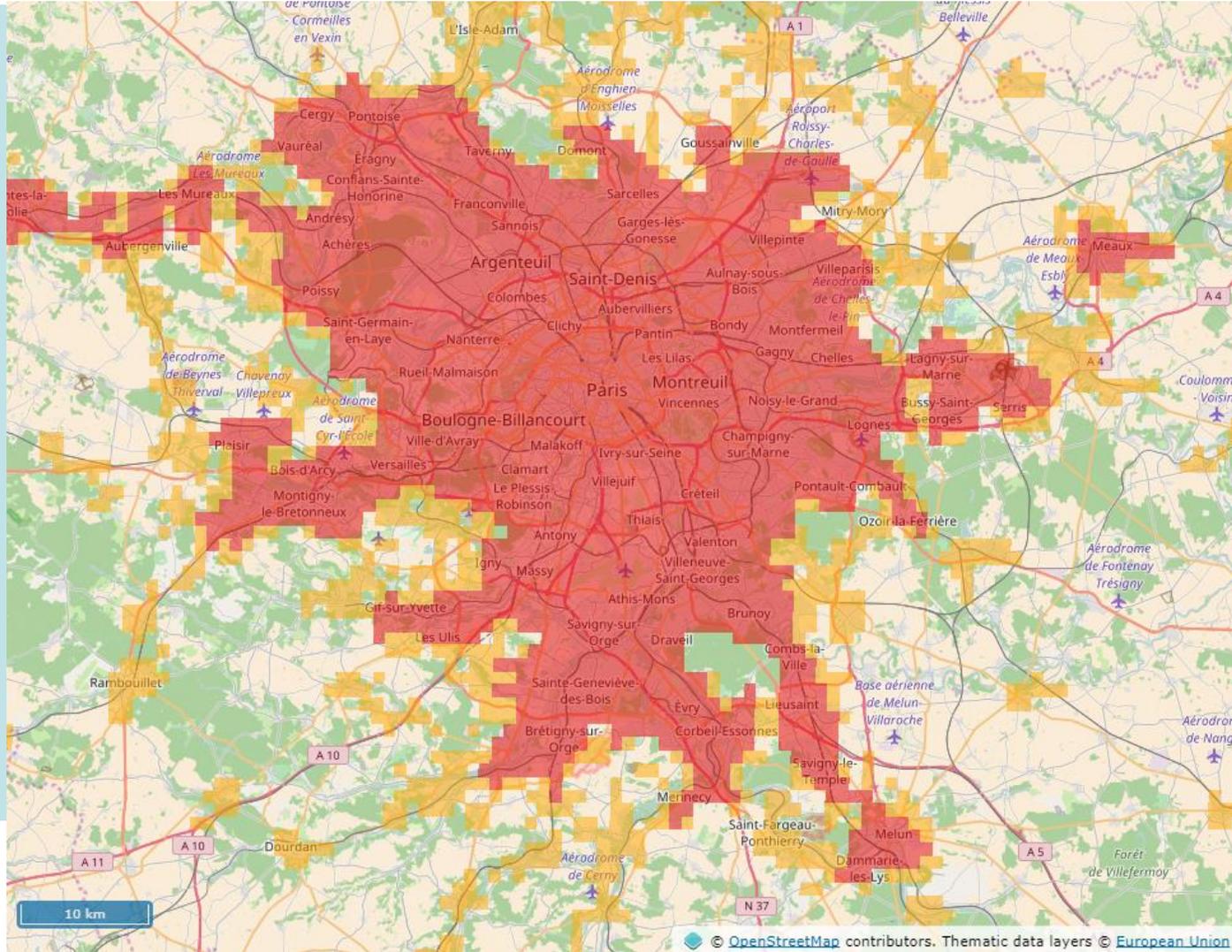
Beijing, China
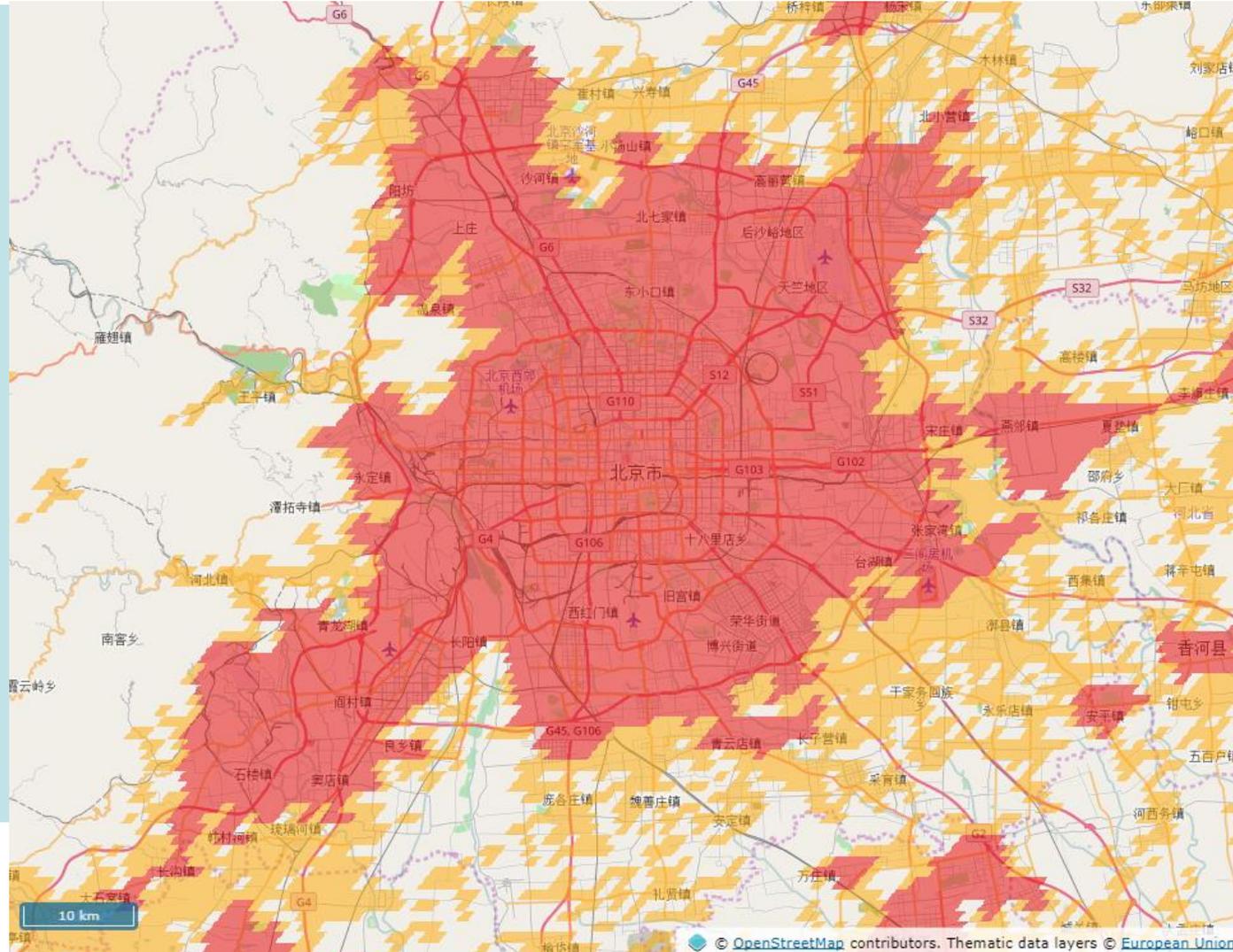
Moscow, Russia
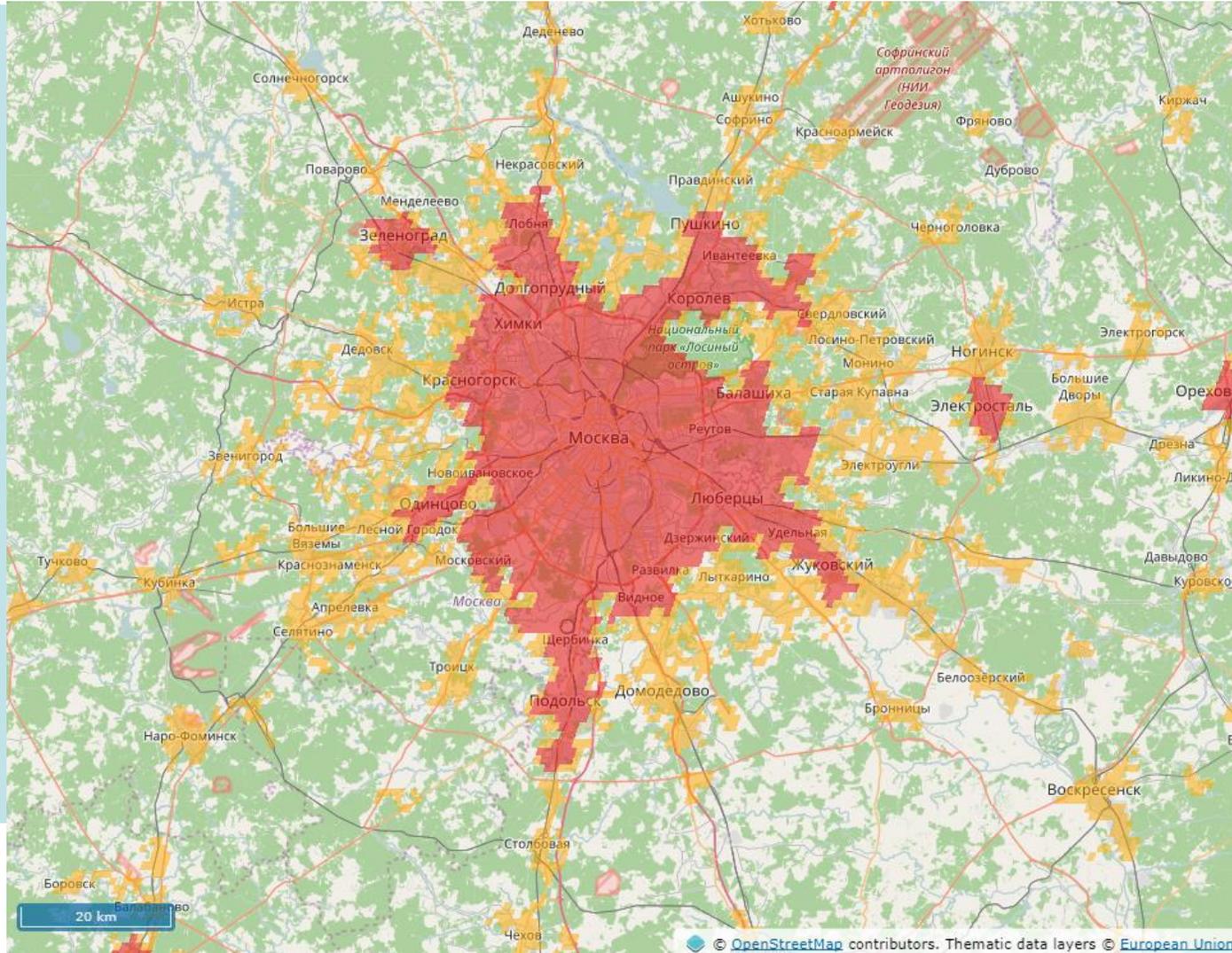
Pretoria, South Africa

Tokyo, Japan

Resources

- ## GHSL web site
  - http://ghslsys.jrc.ec.europa.eu/

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Thank

Any questions?

You can find me: aneta.florczyk@ec.europa.eu

Joint Research Center (JRC Ispra)
Directorate E. Space, Security & Migration
Disaster Risk Management Unit

European Commission

Call for contributions

- Data preparation

- **City attributisation**