

The European Commission's science and knowledge service

Joint Research Centre



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

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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 - periodic publication of the HPA
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- **Main achievement of the Geo HPI partnership**

Atlas of Human Planet

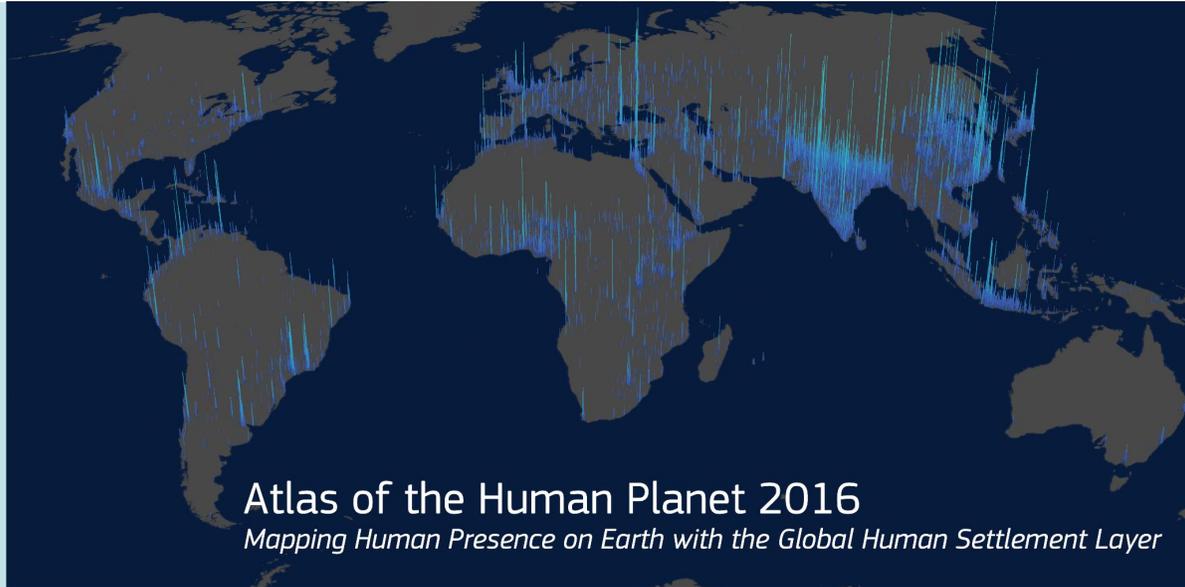
Human Planet Atlas (HPA) – a set of selected core evidences and derived indicators produced by the Human Planet Initiative.

- facts-and-figures
- cross-cutting thematic application
- Objective: to deliver ***periodic*** key messages and narratives based on the core evidences and derived indicators

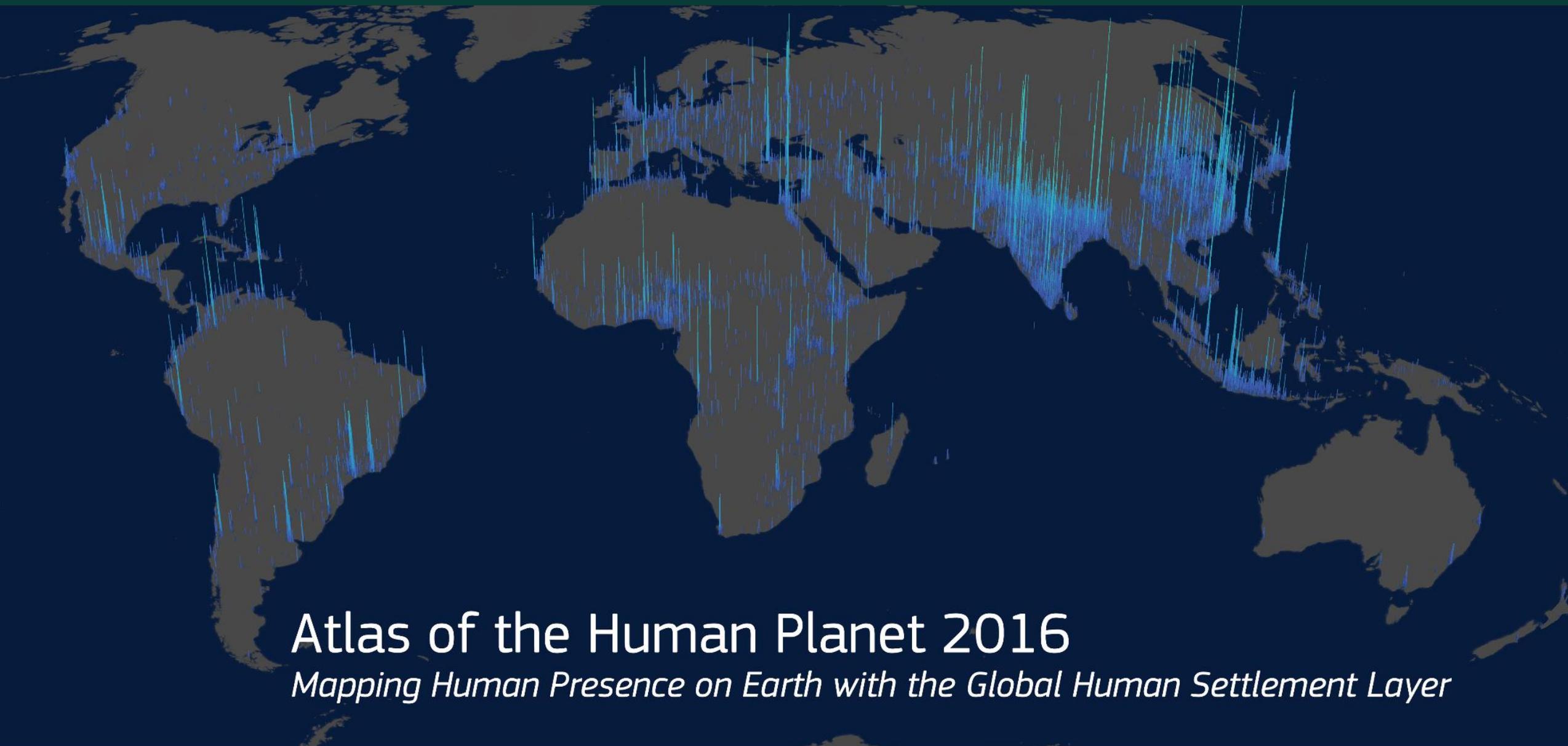
Atlases

- Achievement (up till date): Atlas 2016 and Atlas 2017
- Current Goal: involve the partners in the next releases

Existing release: Atlas 2016 & Atlas 2017



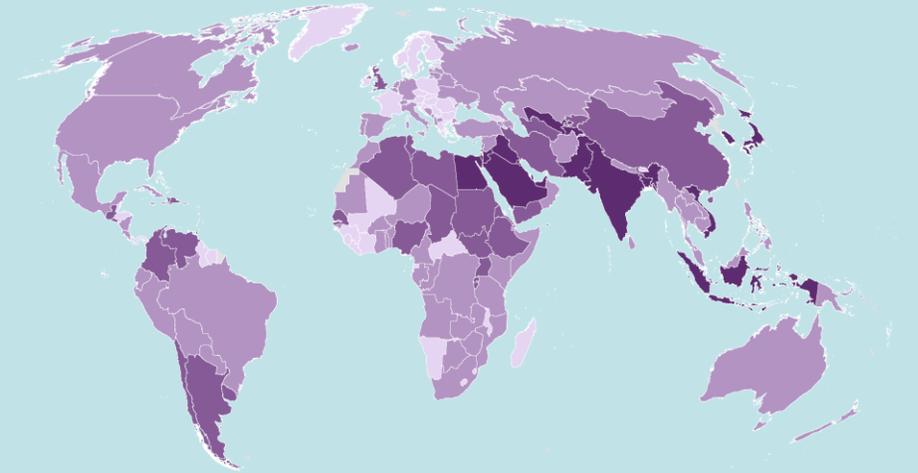
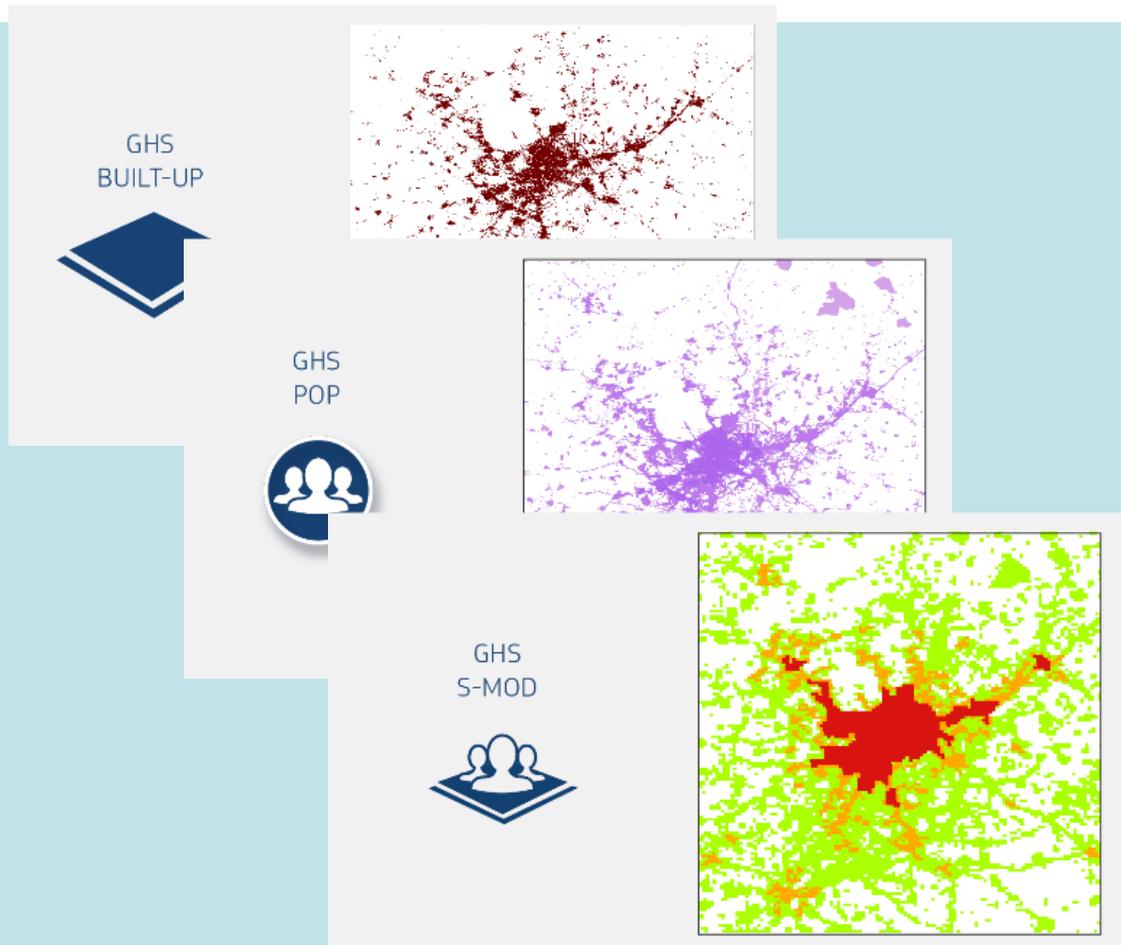
- Atlas 2016: Database
- Atlas 2017: Thematic application



Atlas of the Human Planet 2016

Mapping Human Presence on Earth with the Global Human Settlement Layer

Atlas 2016



- Global Analysis
- Regional Analysis (country, income group, geographic location)
- Multitemporal (past 40 years)

Atlas 2016: Example of Key Findings

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

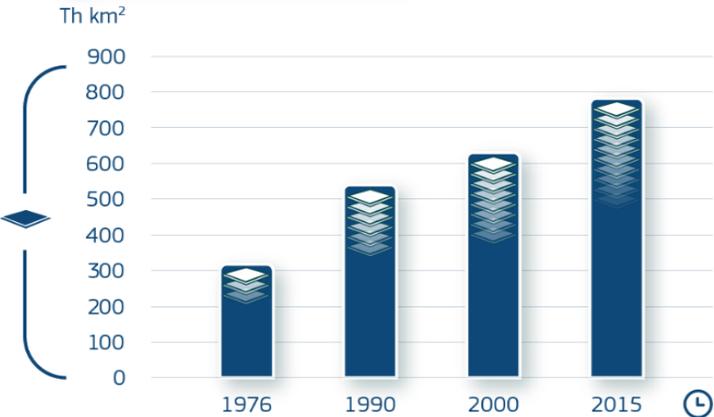


7.3 billion



7.6%

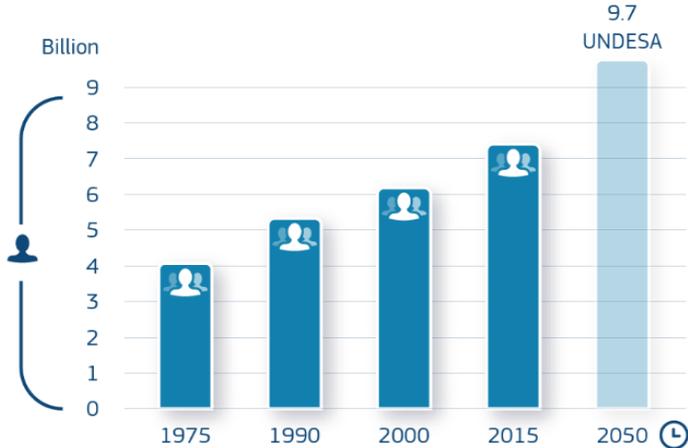
Built-up area



x 2.5

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

Population

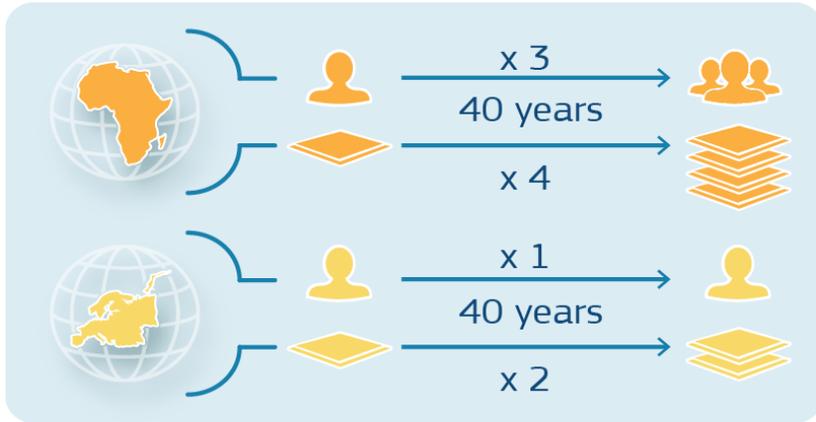


x 1.8

In the last 40 years population increased by 1.8 times

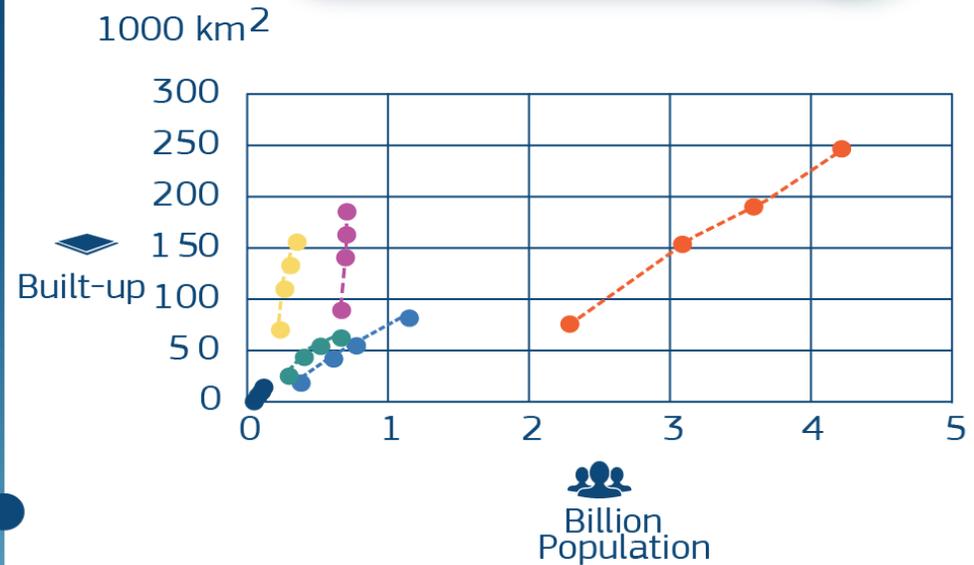
Atlas 2016: Example of Key Findings

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



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



Legend for the scatter plot:

- Oceania
- Africa
- Latin America & Caribbean
- Northern America
- Asia
- Europe

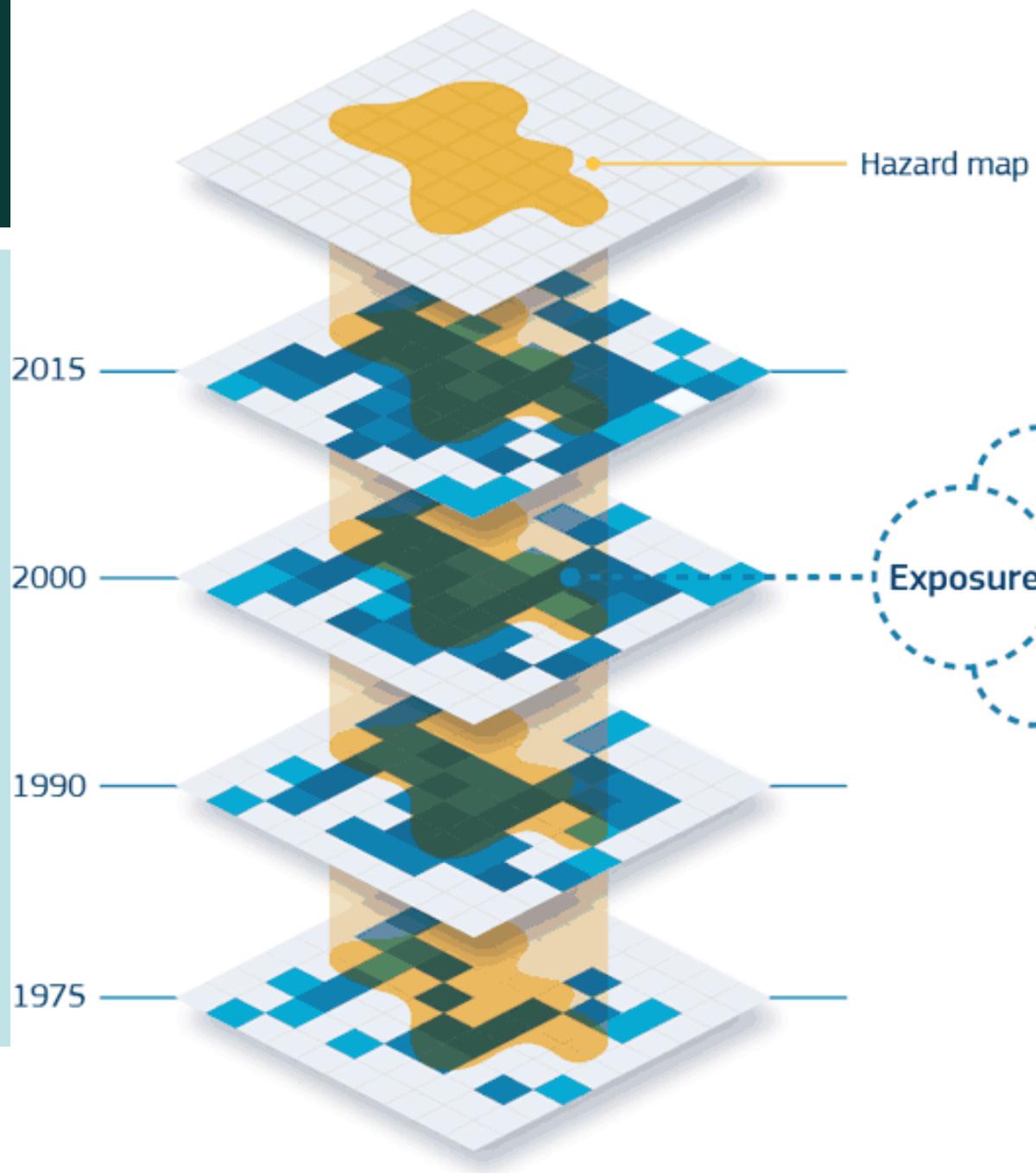
Timeline of years: 1975, 1990, 2000, 2015



Atlas of the Human Planet 2017

Global Exposure to Natural Hazards





Method



Population



Built-up

Repeated for 6 hazards



Earthquake



Volcano



Tsunami



Flood



Tropical
Cyclone Wind



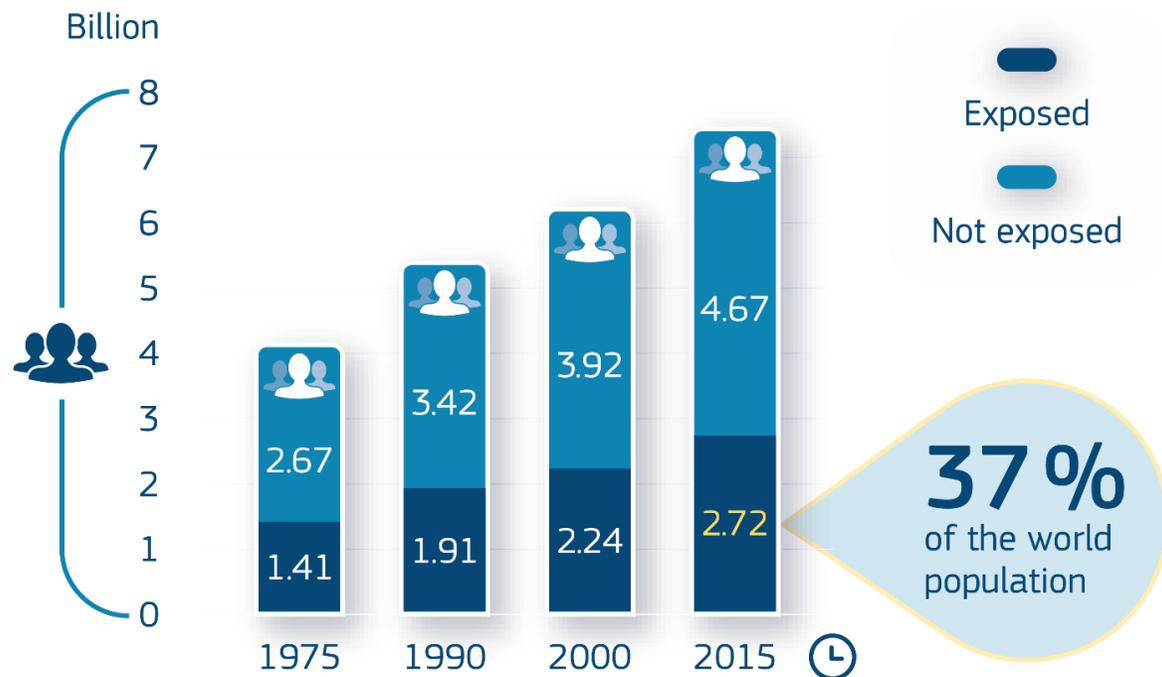
Cyclone
Storm Surge

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

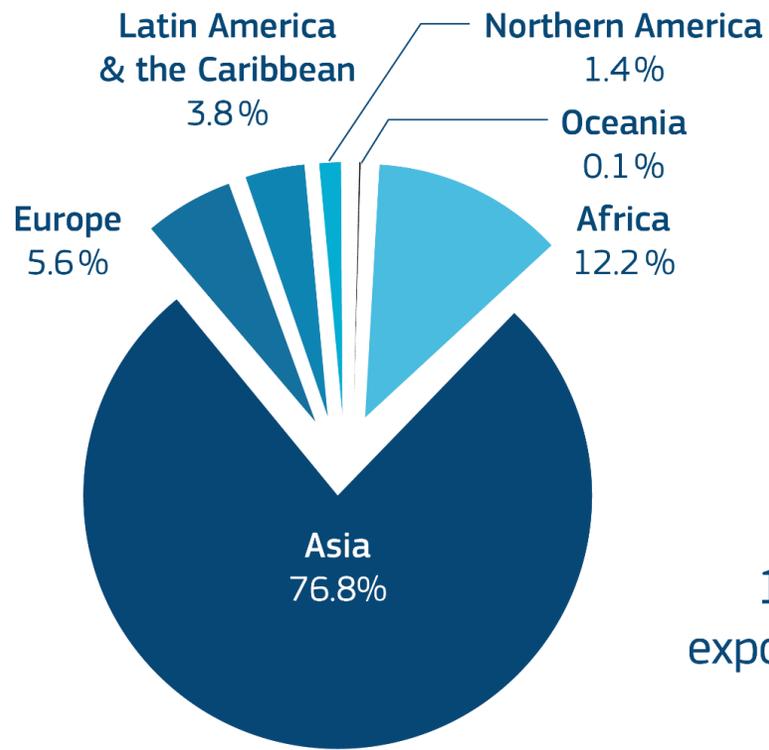


Atlas 2017: Example of Key Findings



FLOOD

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



1 billion people
exposed on the planet

Atlas – HPI partnership outcome

HPI partners contributed 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**

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

Atlas 2018

- New improved database
 - Improved grids
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 - Vector dataset on cities
 - spatial delineation (SMOD HDC/LDC)
 - a set of attributes
- **Call for contributions:**
 - **Data preparation**
 - **City attributes (characterization of city spatial domain)**

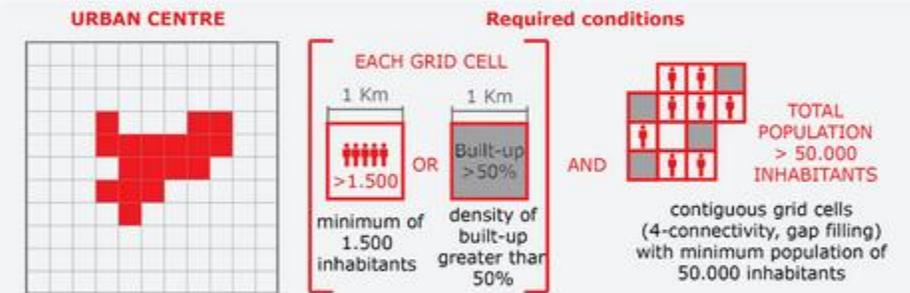
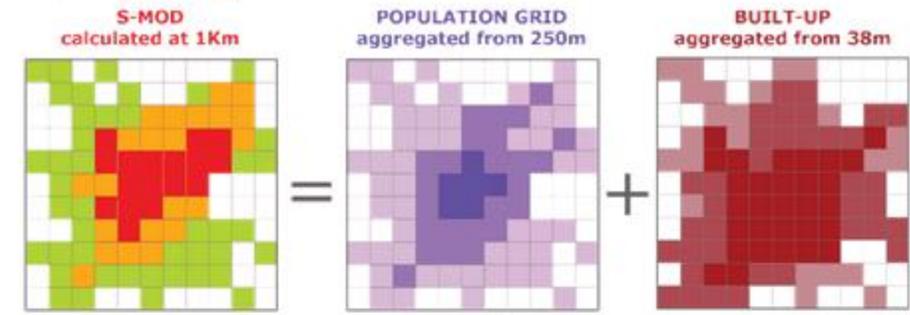
City spatial domain: global harmonized definition of cities and settlements

- 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

The GHSL Settlement Model

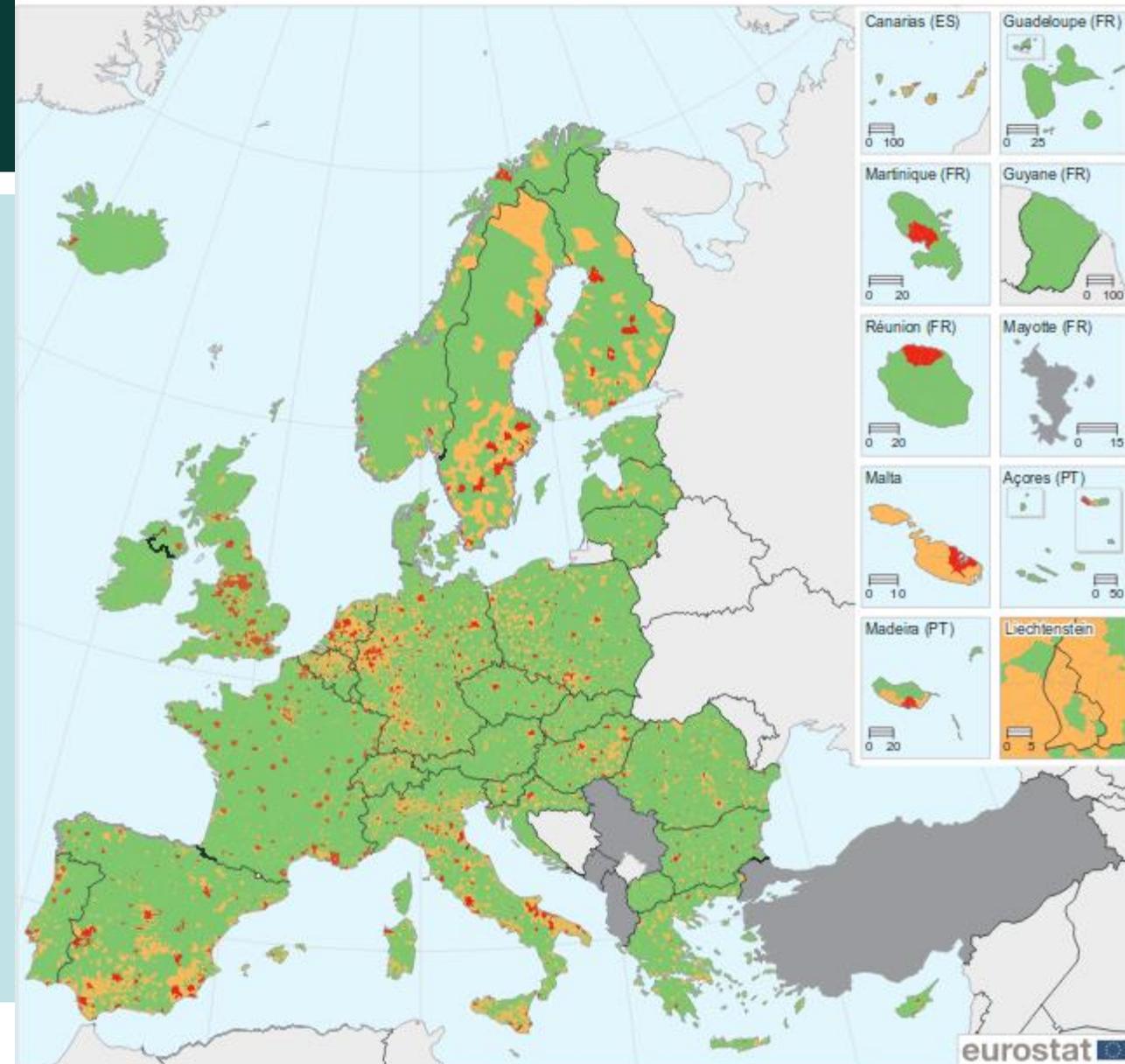
(Porting of the *Dequrba* model in the GHSL framework)



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.

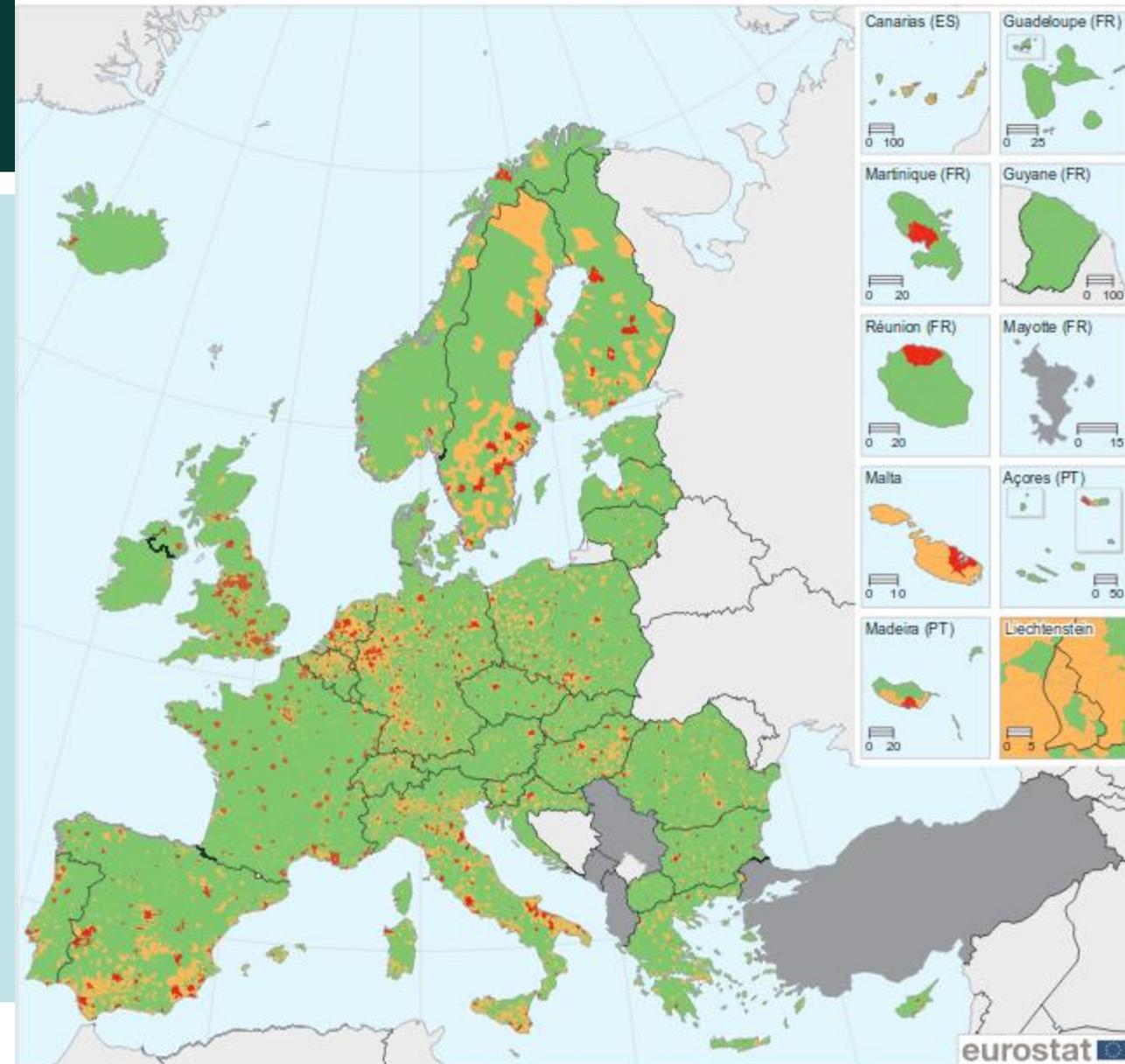


Harmonized Definition

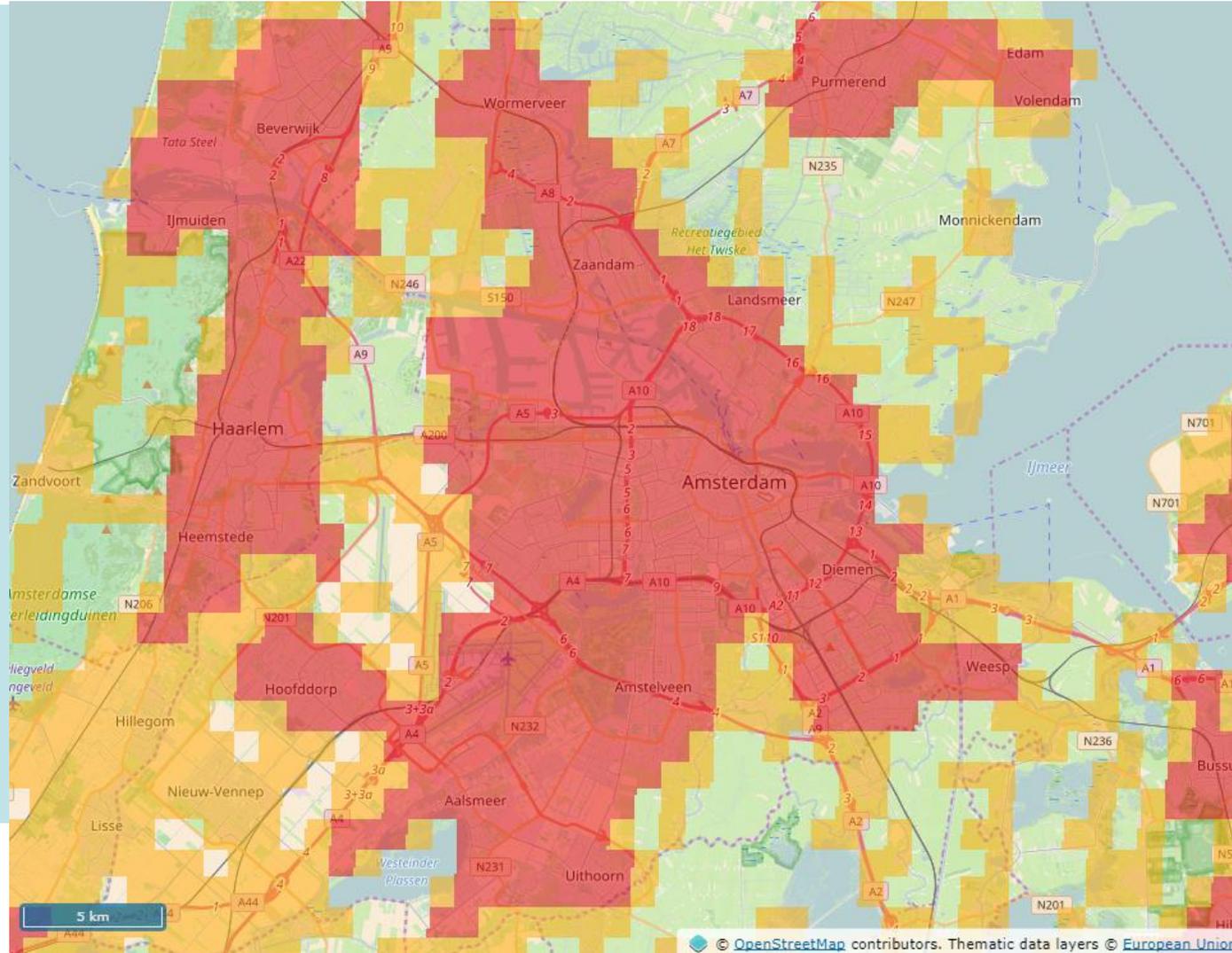
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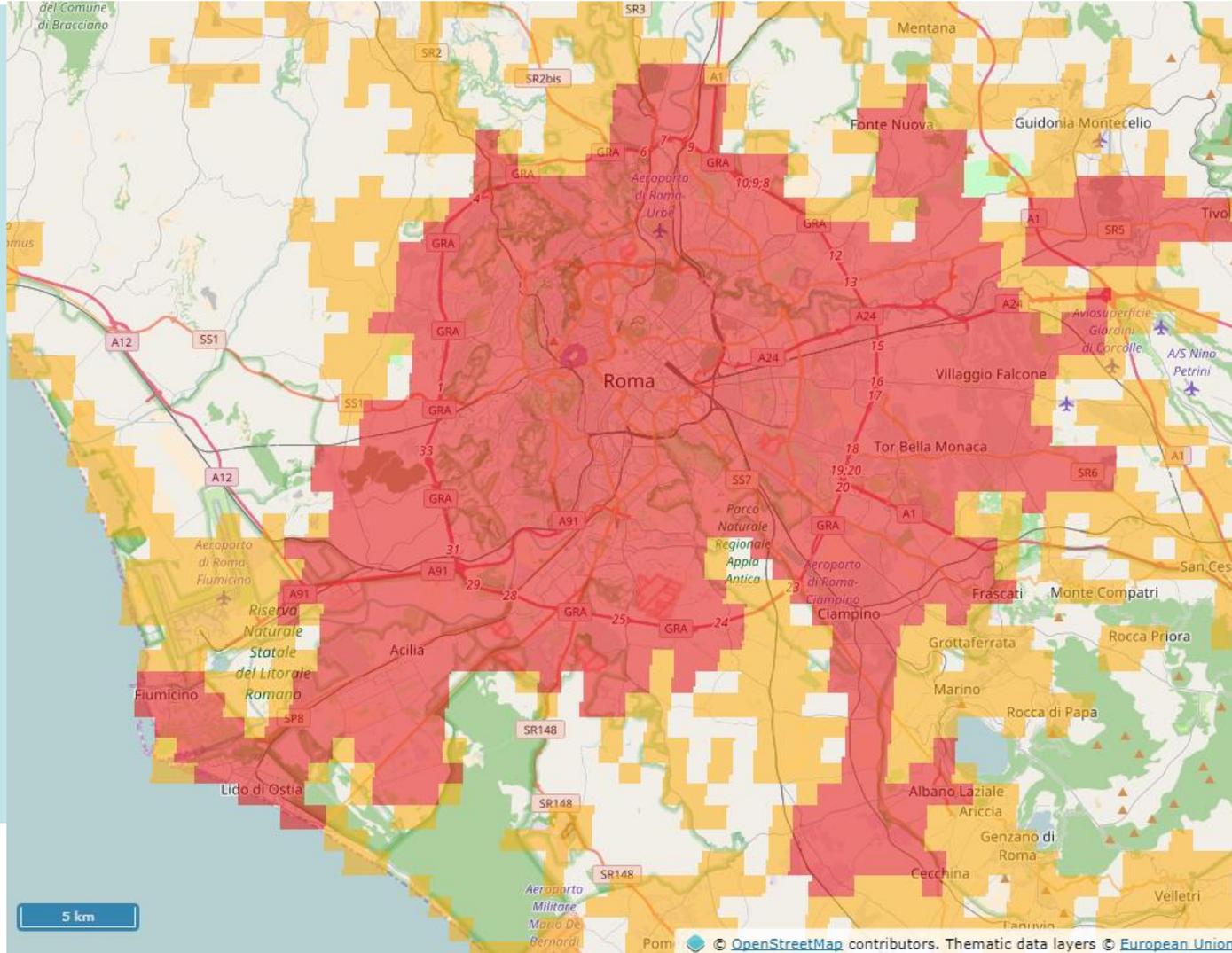
9.00-10.30 hrs: Partner showcase session 1:
Global harmonized definition of cities and settlements Lewis Dijkstra, Economic Analysis Unit at European Commission Directorate General for Regional and Urban Policy



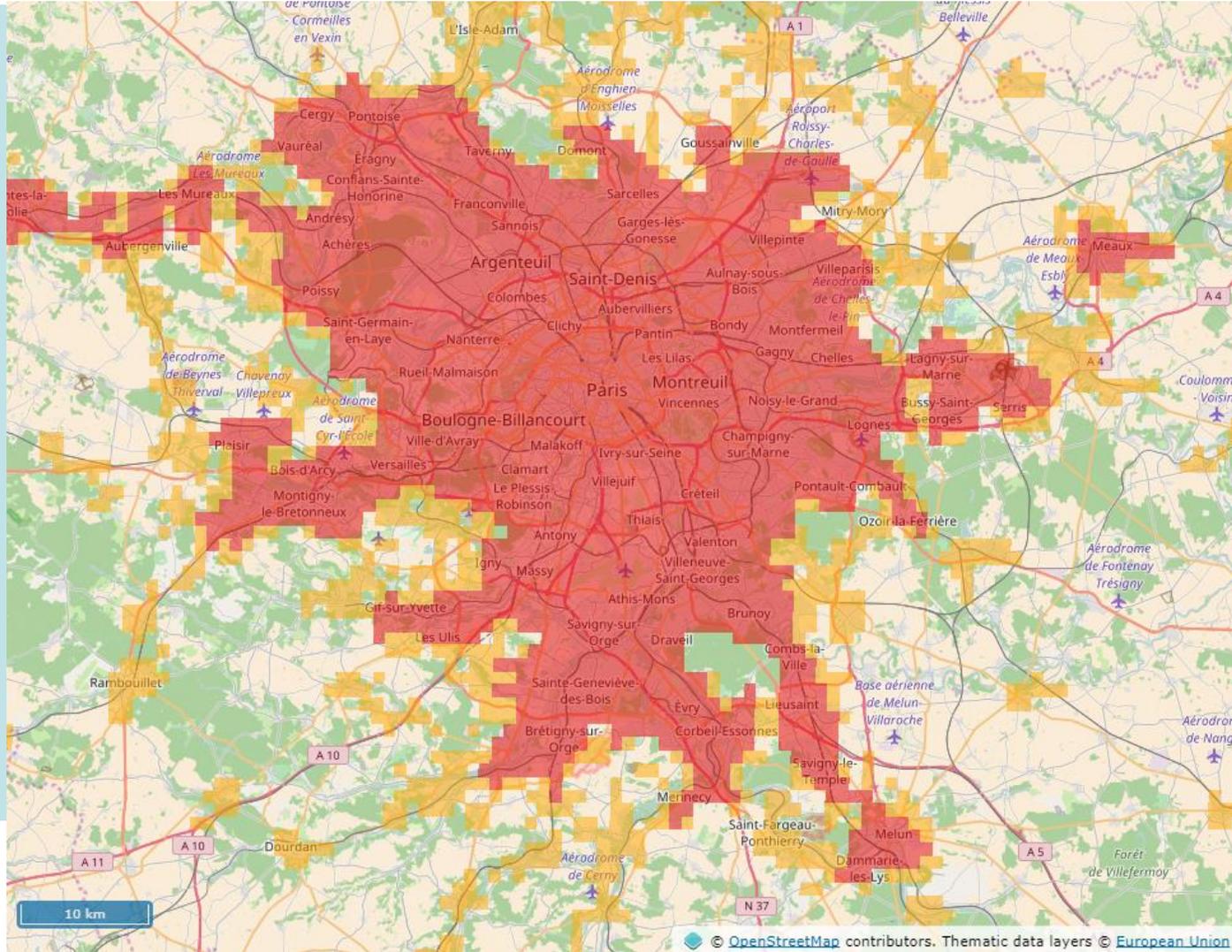
Amsterdam, Netherlands



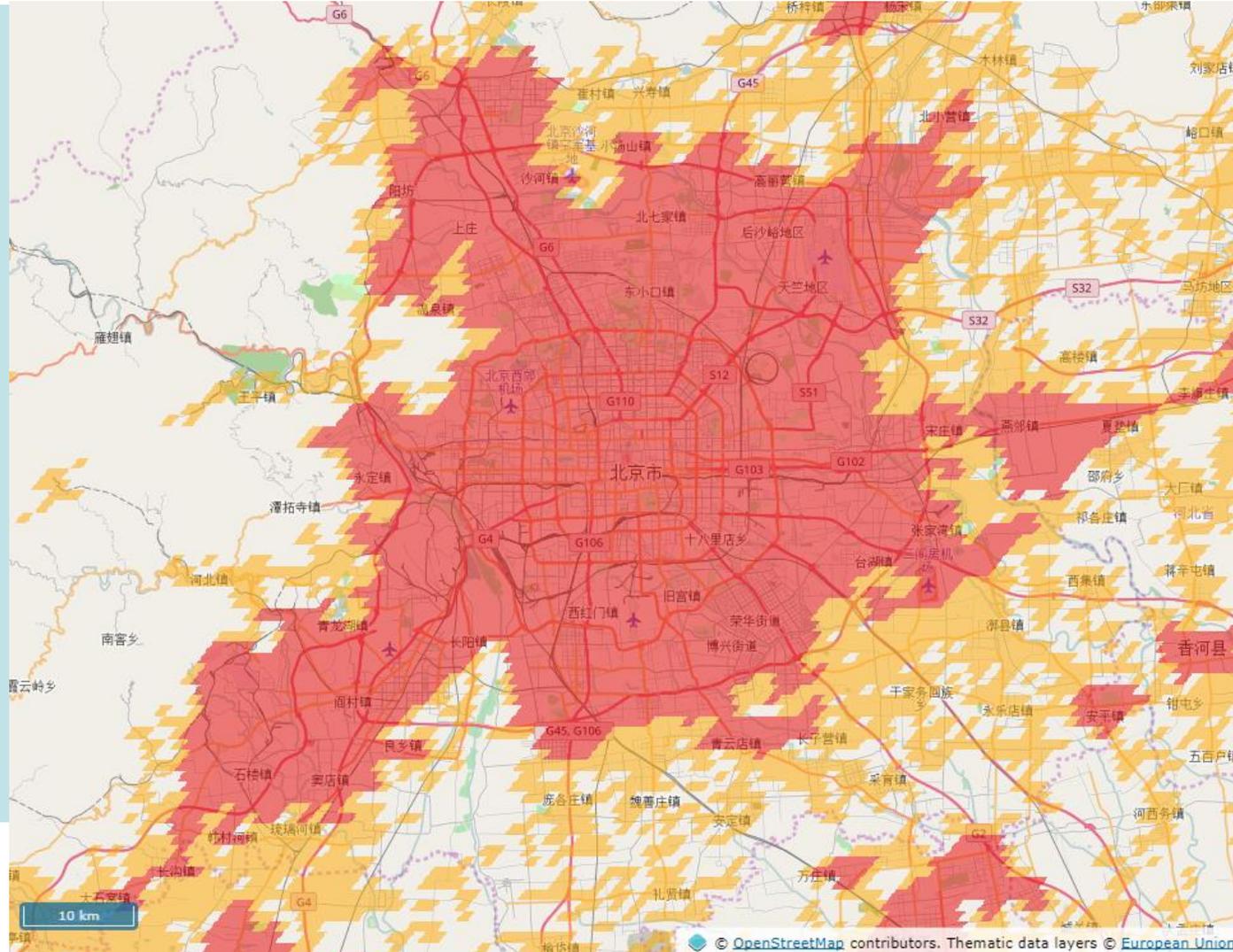
Roma, Italy



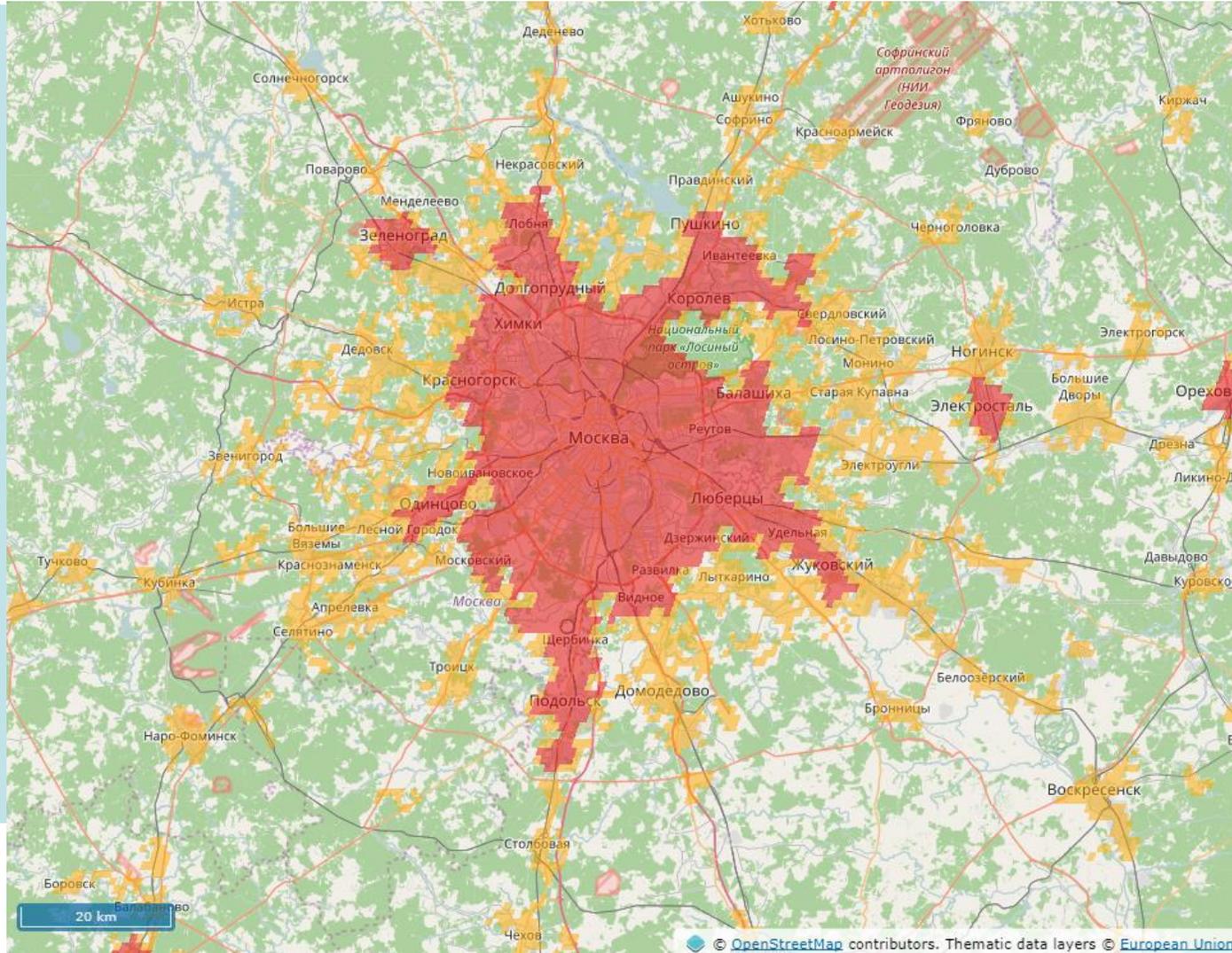
Paris, France



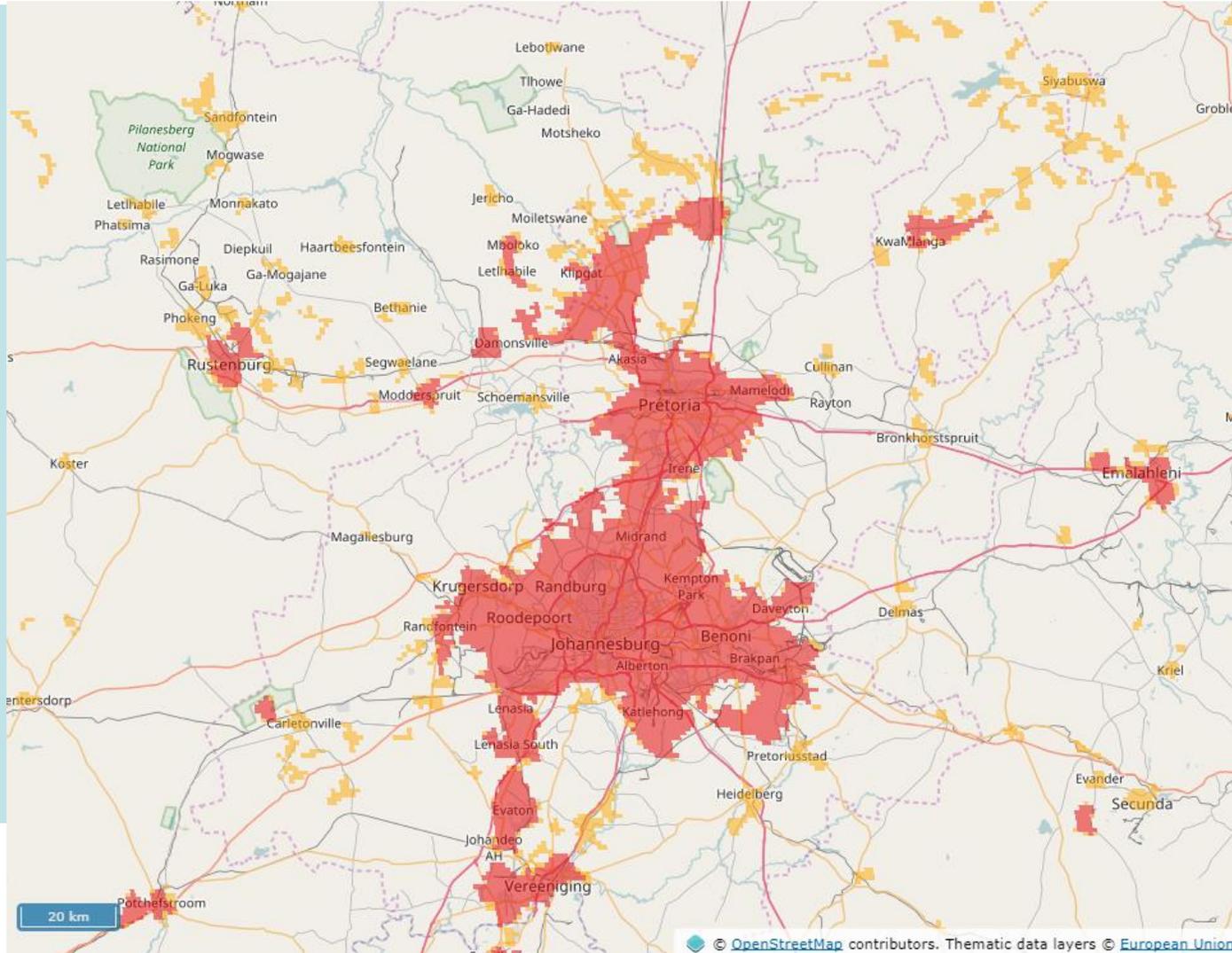
Beijing, China



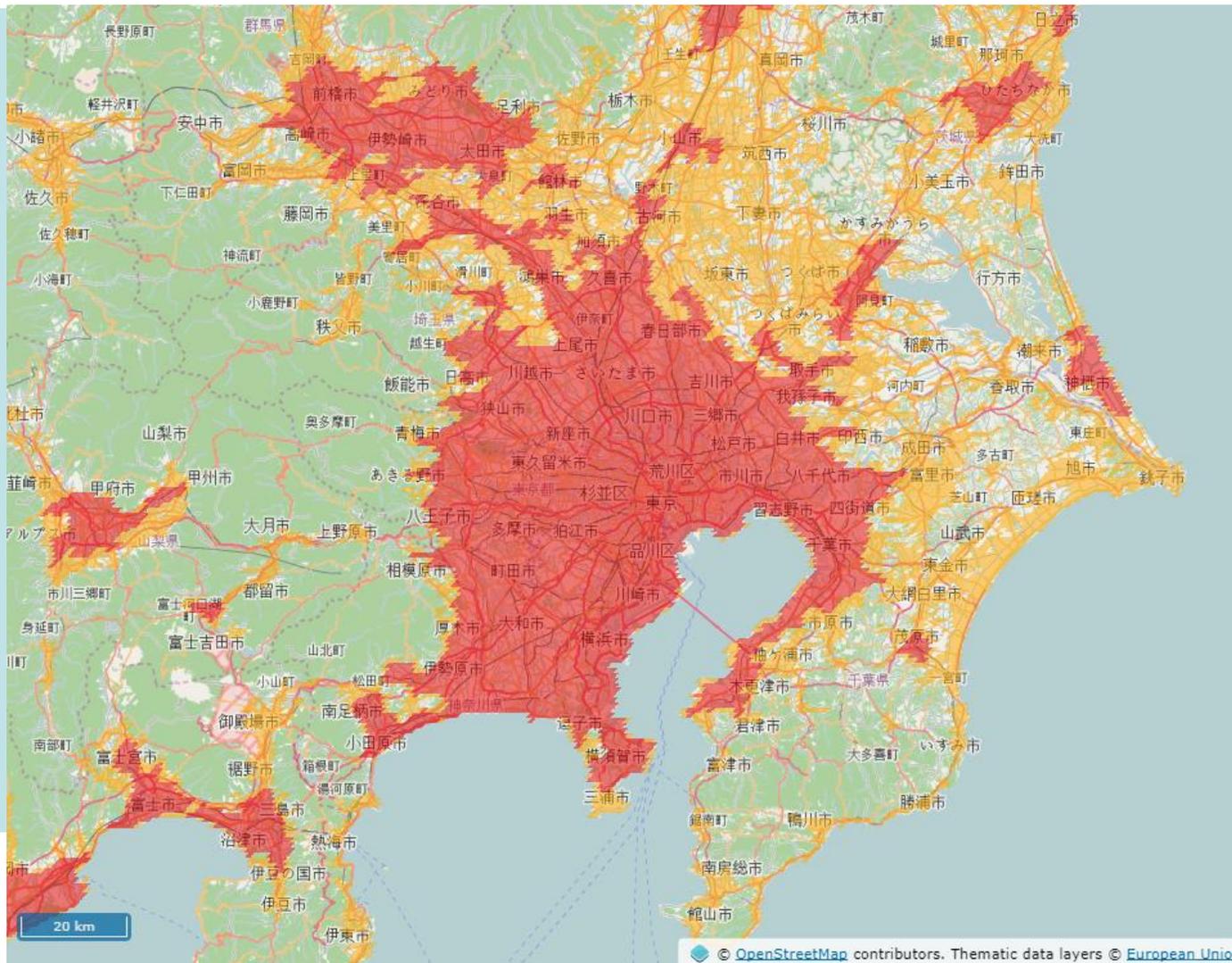
Moscow, Russia



Pretoria, South Africa



Tokyo, Japan



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Resources

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

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

The Atlas of the Human Planet 2016 is the first outcome of the Human Planet Initiative and aims to support the monitoring of the implementation of the post-2015 international frameworks:

- the UN Third Conference on Housing and Sustainable Urban Development (Habitat III, 2016)
- the post-2015 framework on Sustainable Development Goals (SDGs)
- the UN Framework Convention on Climate Change, and the Sendai Framework for Disaster Risk Reduction 2015-2030 (DRR)

The Post-2015 international frameworks include targets to be achieved and measured through indicators that focus on measurable outcomes. These indicators are action oriented, global in nature and universally applicable.

The Human Planet Initiative supports the implementation of a platform contributing to the UN Technology Facilitation Mechanism and enabling the test and the collective debate of alternative options in operationalization of the indicators. The Human Planet Initiative is an international partnership. It started in 2014 with the "Manifesto for a Global Human Settlement Partnership" which evolved to the "Human Planet Initiative" in the frame of the GEO work programme.

Atlas of the Human Planet 2016 (14.45 MB)	Atlas of the Human Planet 2016 Exec summary (239.60 KB)	GHSL Basic facts (999.99 KB)	Atlas of the Human Planet 2016 Key findings (111.32 MB)

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Atlas of the Human Planet 2017
Global Exposure to Natural Hazards

The Atlas of the Human Planet 2017 - Global Exposure to Natural Hazards summarizes the global multi-temporal analysis of exposure to six major natural hazards: earthquakes, volcanoes, tsunamis, floods, tropical cyclone winds, and sea level surge. The exposure focuses on human settlements assessed through two variables: the global built-up and the global resident population. The two datasets are generated within the Global Human Settlement Project of the Joint Research Centre. They represent the core dataset of the Atlas of the Human Planet 2016 which provides empirical evidence on urbanization trends and dynamics.

The figures presented in the Atlas of the Human Planet 2017 show that exposure to natural hazards doubled in the last 40 years, both for built-up area and population. Earthquake is the hazard that accounts for the highest number of people potentially exposed. Flood, the most frequent natural disaster, potentially affects more people in Asia (76.9% of the global population exposed) and Africa (12.2%) than in other regions. Tropical cyclone winds threaten 89 countries in the world and the population exposed to cyclones increased from 1 billion in 1975 up to 1.6 billion in 2015. The country most at risk to tsunamis is Japan, whose population is 4 times more exposed than China, the second country on the ranking. Sea level surge affects the countries across the tropical region and China has one of the largest increase of population over the last four decades (plus 200 million people from 1990 to 2015). The figures presented in the Atlas of the Human Planet are aggregate estimates at country level.

The value of the GHSL layers used to generate the figures in this Atlas of the Human Planet is that the data are available at the scale and exposure and the rate of change in exposure can be computed for any area of the world. Researchers and policy makers are now allowed to aggregate exposure information at all geographical scale of analysis from the country level to the region, continent and global.

Atlas of the Human Planet 2017 (1.30 MB)	GHSL Basic facts (999.99 KB)	Atlas of the Human Planet 2017 Key findings (111.32 MB)

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Layers selected:

- Built-up - Sentinel-1 (resolution: approx. 20m): none
- Built-up - P2016 (resolution: approx. 38m): none
- Residential population - P2016 (resolution: 250m): none
- Degree of urbanisation - P2016 (resolution: 1km): SMod 2015
- Base: Marker, OSM, Place names
- *Porting of the Degubur model in the GHSL framework (SMOD).

Disclaimer:
The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the European Union concerning the legal status of any country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.
Note: This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1991 and the ICJ Opinion on the Kosovo declaration of independence.
Disclaimer: This designation shall not be construed as recognition of a State of Palestine and is without prejudice to the individual positions of the Member States on this issue.

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Overview Degree of urbanisation

Testing the degree of urbanisation at the global level
Country summary of the Netherlands

Please select a country from the list below to generate the report.
It is also possible to download a PDF version.

Netherlands [Get the PDF](#)

Netherlands

Introduction

This country summary is provided to support the assessment of the degree of urbanisation by national statistical institutes. The goal of this assessment is to see whether the degree of urbanisation accurately captures a country's cities, smaller settlements and rural areas. Please note that inaccuracies in this country summary may be due to data quality. The results presented here are based on a combination of two data sources: population and built-up areas.

The population source data are collected by the [Center for International Earth Science Information Network \(CIESIN\)](#) mostly from the national statistical offices - more information on the reference years and the geographic scale can be found below. Built-up areas are detected by the European Commission's Joint Research Centre using the Global Human Settlement Layer method on satellite imagery from Landsat.

The degree of urbanisation can be applied to other data (e.g. census updates, better spatial resolution) that may improve the available classification. The degree of urbanisation is applied first to a population distribution grid. The results at the grid level are subsequently used to classify municipalities. This second step could not be applied to the globe as municipal boundaries were not consistently available.

Amsterdam, Netherlands

Legend:
■ Urban centres
■ Urban cluster
 Rural grid cell (transparent)

Degree of urbanisation:
■ Urban centres
■ Urban cluster
 Rural grid cell (transparent)

Map scale: 1:20m; none
 Projection: UTM
 Datum: WGS 1984
 SRS: EPSG:31466
 Units: Meter
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Visualisation

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Any questions?

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

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Disaster Risk Management Unit

Call for contributions



- Data preparation
- City attributisation

