The European Commission's science and knowledge service

Joint Research Centre

GEO Human Planet Initiative

Current and future international cooperation to monitor SDGs: Example for DBAR cities

Daniele Ehrlich and GHSL team of the Joint Research Centre

Digital Silk Road and International Partnerships

Session Title: Digital Belt and Road - Using Big Earth Data for Sustainable Development

United Nations World Geospatial Information Congress

DEQING, CHINA

19-21 November 2018

GEO Human Planet Initiative

The GEO Human Planet Core Partnership

DBAR WG within Human Planet

JRC Co-chairs DBAR Urban WG

- *__Measure__*
  coordinated, comprehensive and sustained __Earth observations__ and information".

- *__Understand__*
  "…. to support novel evidence-based assessment of the human presence on the planet Earth "

- __Inform__
  "… *informed future policies… __decisions and actions__ …*

- **Open image data**

- **Open geo-spatial products**

- **Open Tools**

Share data and info products

- **Measure and Monitor**
  - **Open data,**
    - NOAA, MODIS
    - Landsat archives
    - Sentinel Archives
  - **Open software**
    - Tools
  - **Open Layer**
    - GHSL project

2017

Sentinel 2

2014

2008

Sentinel 1

Landsat

MODIS

NOAA
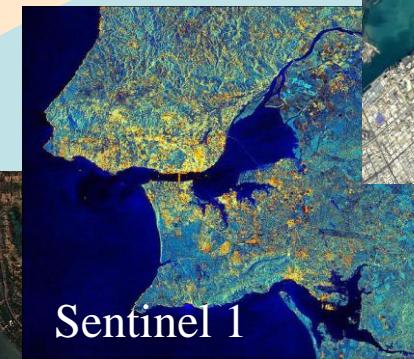
European Commission

GHS – Built-up area

Based on Landsat and Sentinel

GHS – Population density

Collaboration with CIESIN
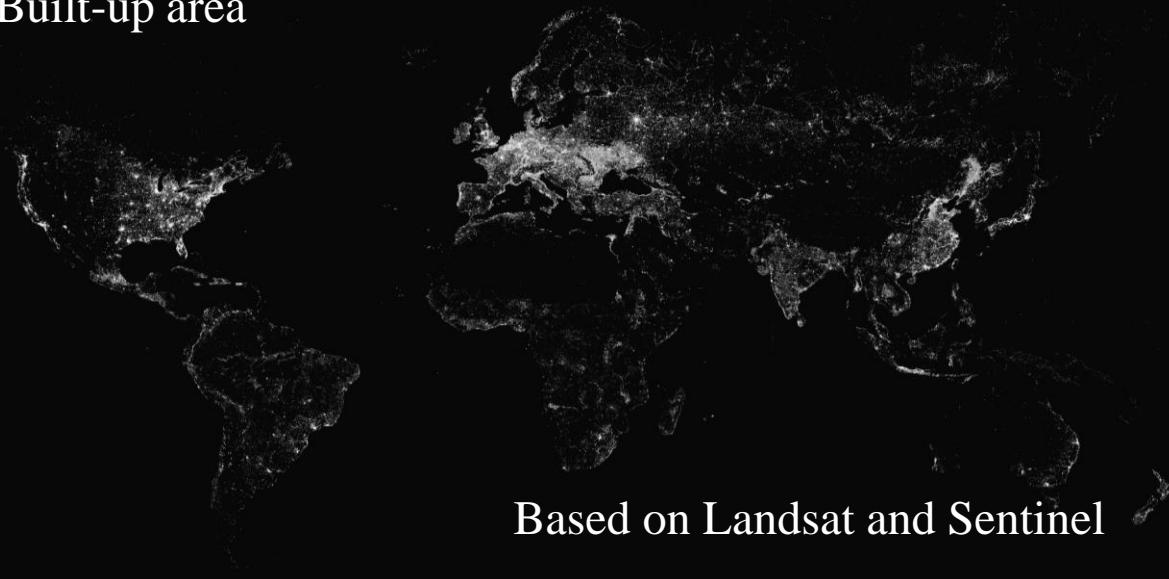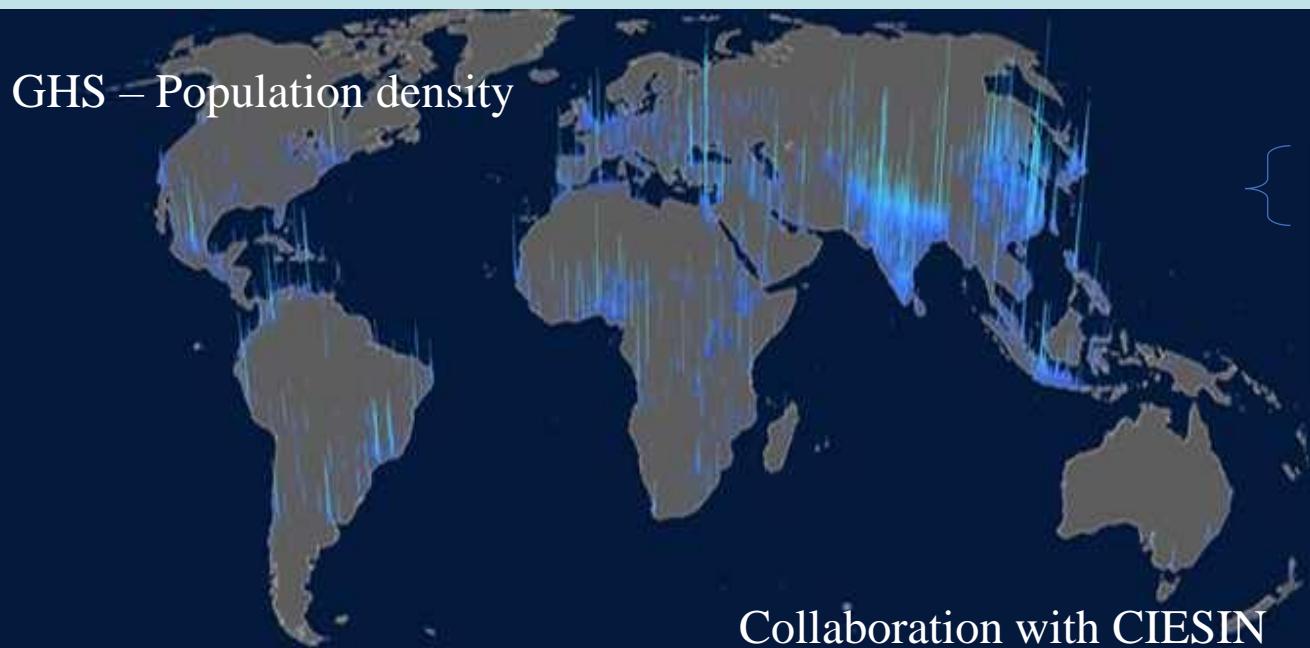
Share layers and tools

Big Data Processing Architecture

Adaptive self learning / optimization

Version numbering

V1.0.1

V1.0.0

Global grids
Reference tiling system

European Commission
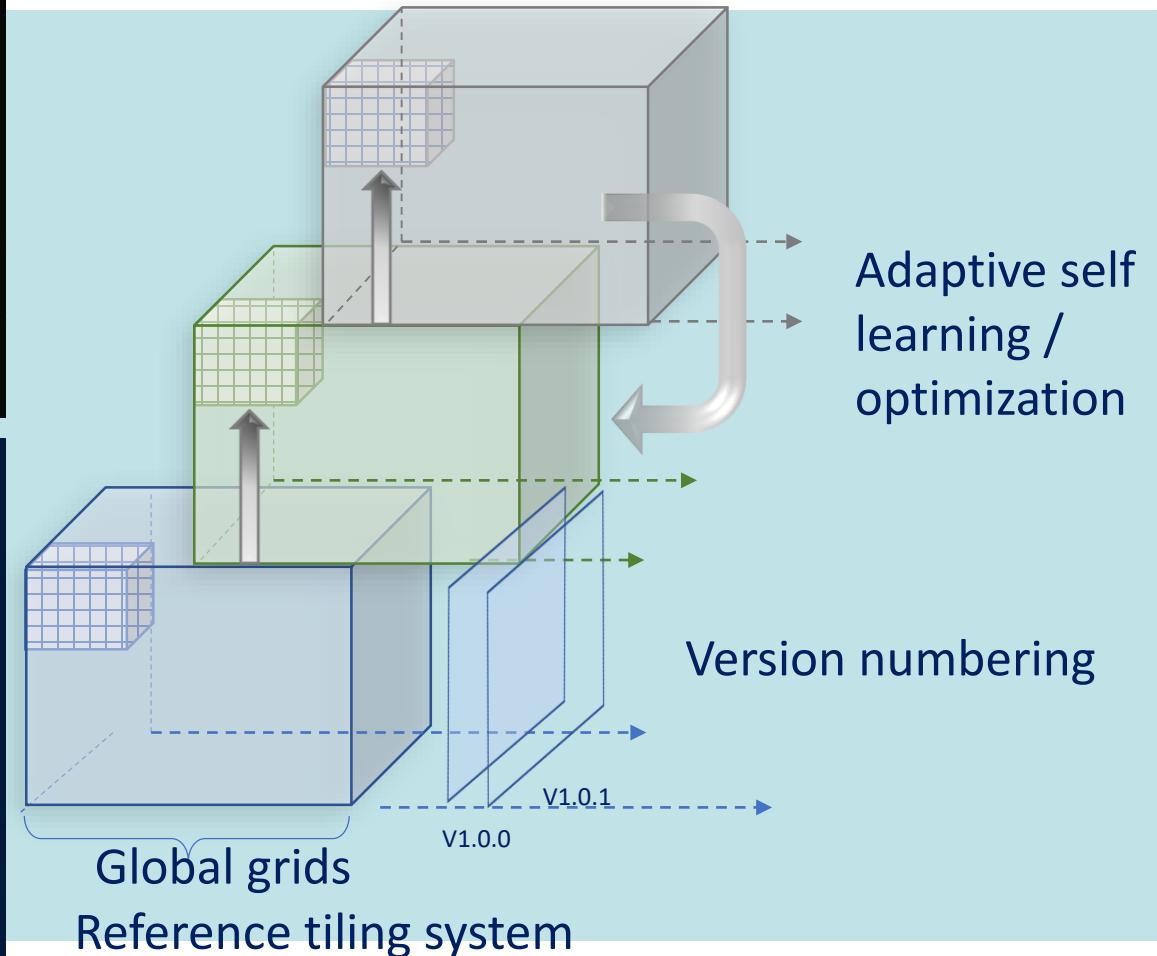
Understand urbanization

Cooperation
1 European Commission
2 OECD
3 UN Habitat
4 World Bank
5 FAO

Map: New Degree of urbanization
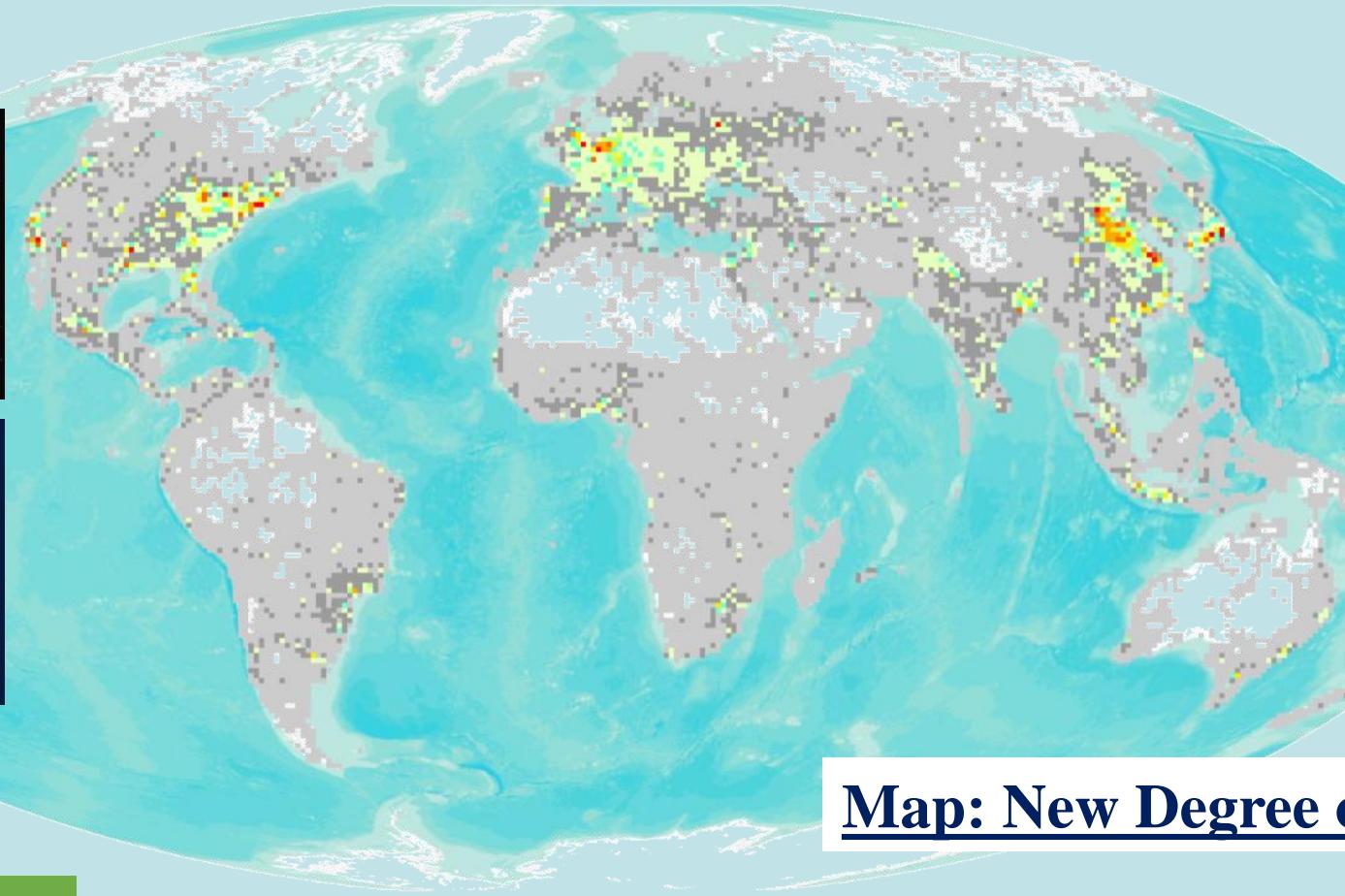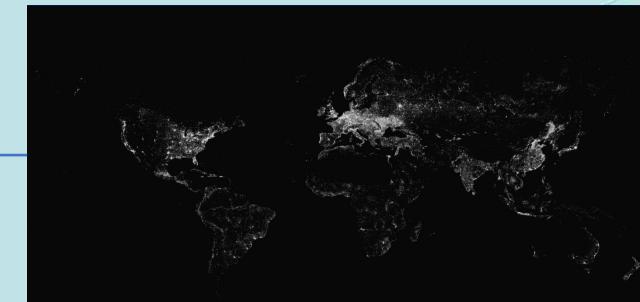
MODEL
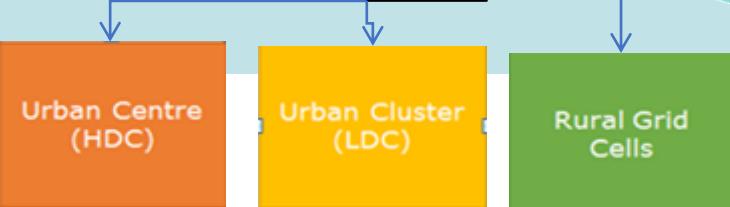
Urban Centre (HDC)

Urban Cluster (LDC)

Rural Grid Cells

European Commission

City Centre database 13000 cities
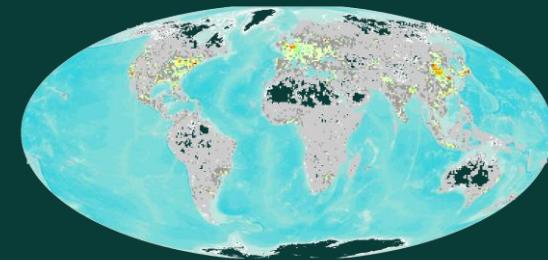
Geography
- Elevation
- Travel time to capital
- River basin
- Income class
- Name of the center
- etc.

Environment
- Climate
- Biome
- Temperature
- Precipitation
- Greenness
- CO_2 concentration
- PM2.5 emission

DRR – exposure to
- Flood
- Earthquake
- Storm surge
- Heatwave

Socio-economic
- Population
- Built-up areas
- GDP
- HDI
- Nighttime lights area

Estimate **3 SDG** indicators

Multi-temporal information 1975-**1990-2000-2015**

GHSL – City Centre Database SDG-11

LUE value

- 🔵 LUE ≤ -1
- 🟡 -1 < LUE ≤ 0
- 🟢 0 < LUE ≤ 1
- 🟠 1 < LUE ≤ 2
- 🔴 LUE > 2
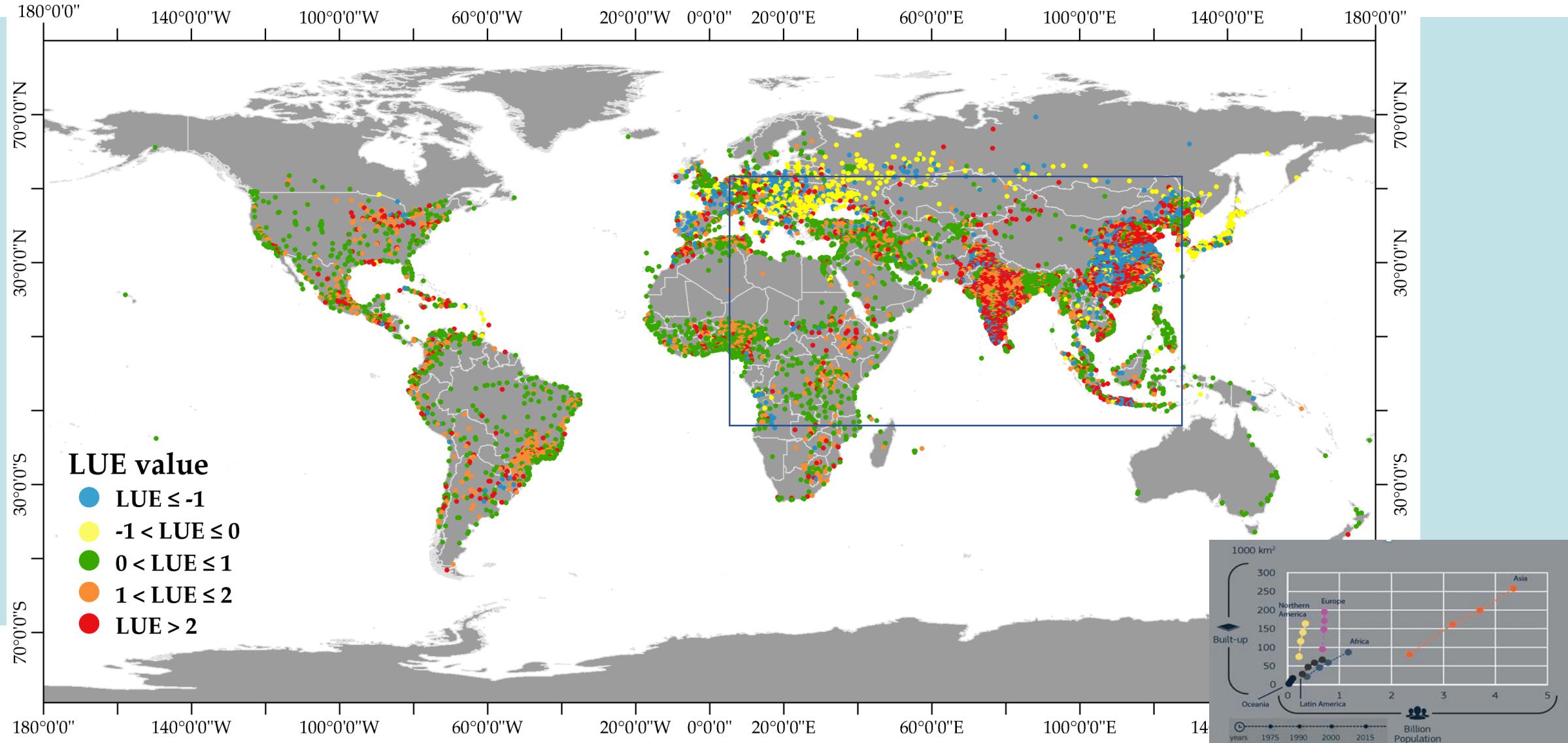
GHSL – City Centre Database SDG-11
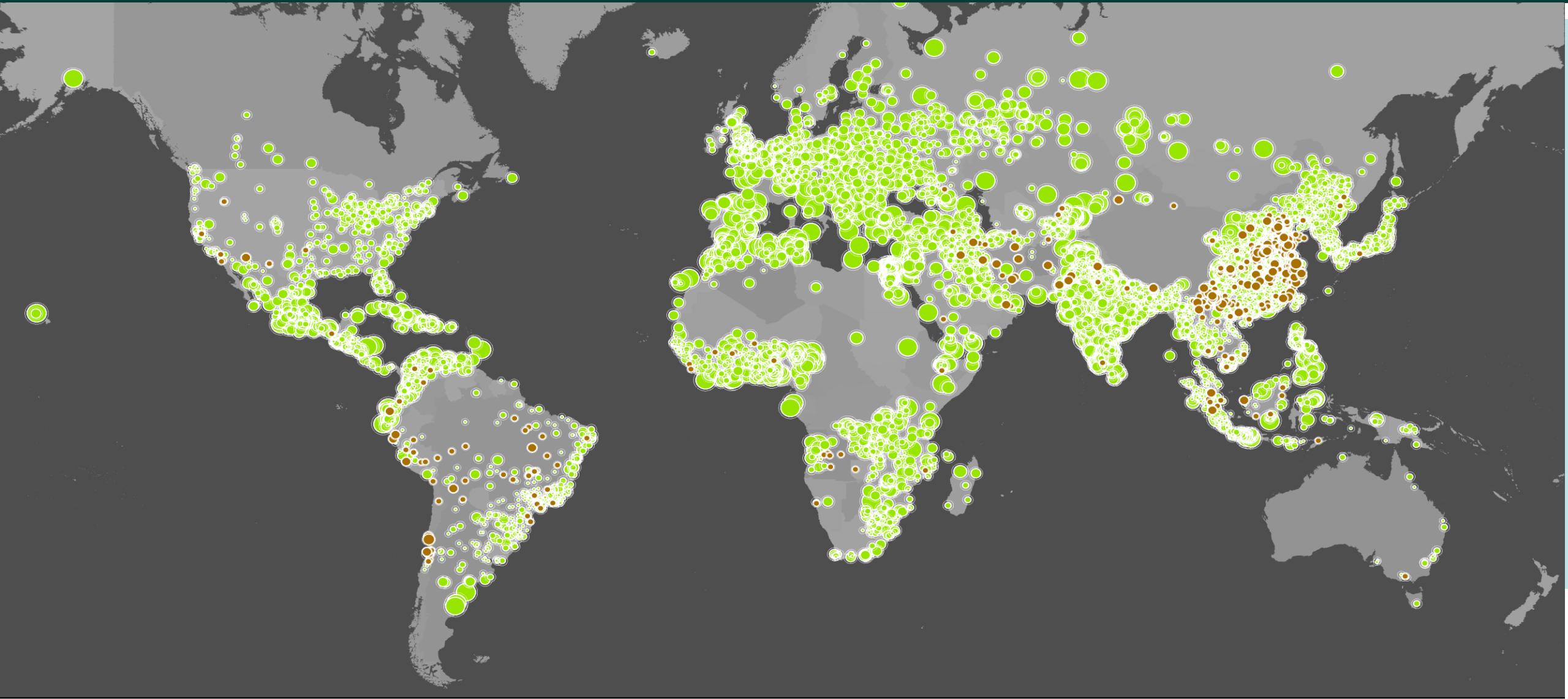
Today's <u>pressing</u> challenges require more international cooperation

Enhance International Cooperation

1. Image providers (**Share imagery**)
2. Information extractors (share information layers and tools)
3. **Big Earth data** processing
4. Understand: **Earth System processes** (impact of natural hazards)
5. Understand: Societal processes (i.e. Urbanization)
6. **Inform decision makers** all levels

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https://doi.org/10.1080/17538947.2018.1471790

RESEARCH HIGHLIGHT

The Digital Belt and Road program in support of regional sustainability

Huadong Guo [a,d], Jie Liu[a,d], Yubao Qiu[a], Massimo Menenti[a,b,e], Fang Chen[a], Paul F. Uhlir[f], Li Zhang[a], John van Genderen[c], Dong Liang[a,d], Ishwaran Natarajan[a], Lanwei Zhu[a] and Jiuliang Liu[a]

Steps to the digital Silk Road
Sharing big data from satellite imagery and other Earth observations across Asia, the Middle East and east Africa is key to sustainability, urges **Guo Huadong**.

11 SUSTAINABLE CITIES AND COMMUNITIES

DBAR WG within HPI

JRC Co-chairs DBAR Urban WG

European Commission

Thank you
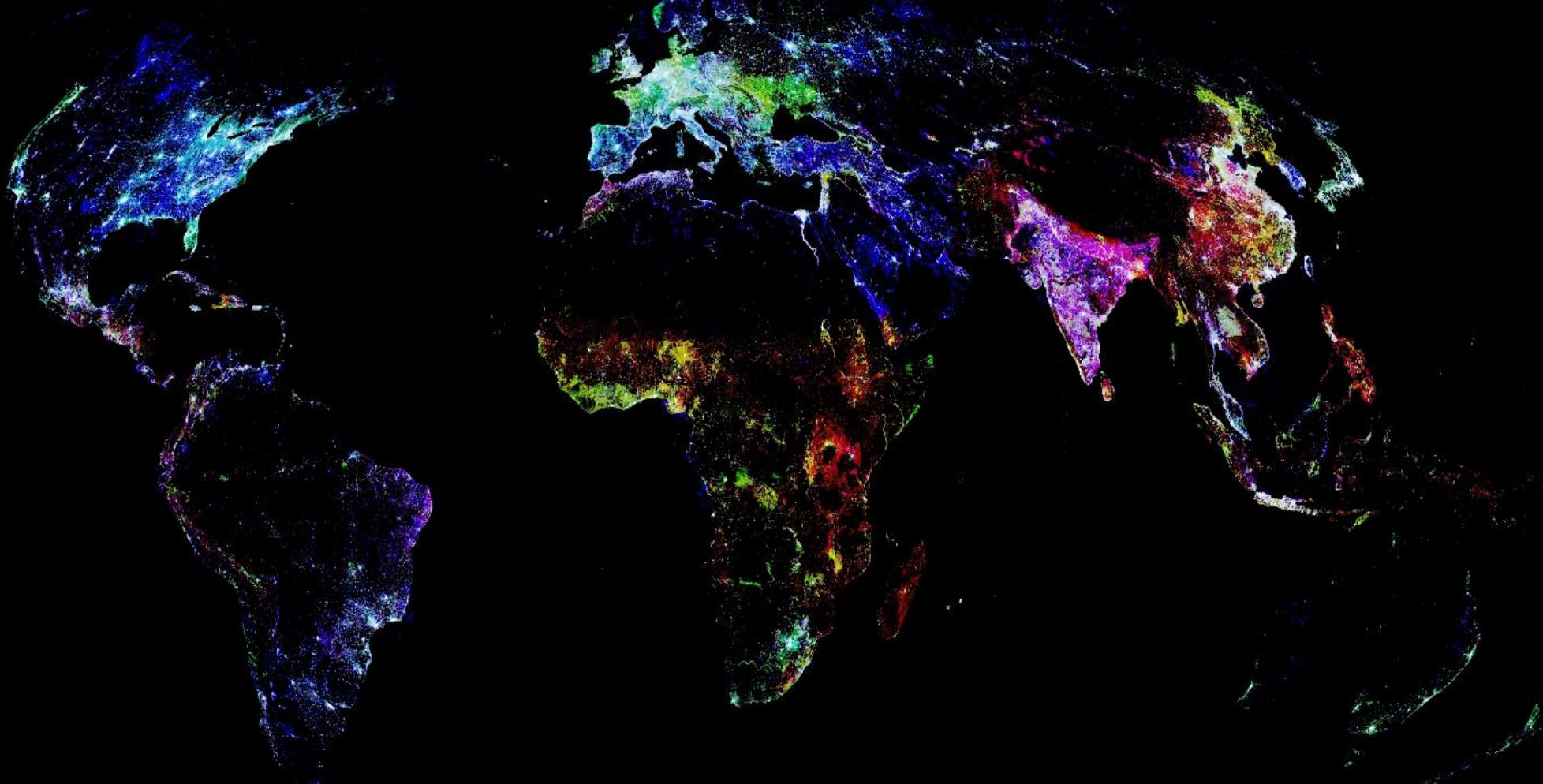
Global Human Settlement Layer (GHSL)

The most complete, consistent, global, free and open data set on human settlements. from the village to the megacity, for the epochs 1975 – 1990 – 2000 – 2015

Full open free data and tools at http://ghsl.jrc.ec.europa.eu
http:/www.geoportal.org/

THANK YOU