

The European Commission's science and knowledge service

Joint Research Centre



GEO Human Planet Initiative

GEO GROUP ON
EARTH OBSERVATIONS



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

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

MODIS

NOAA



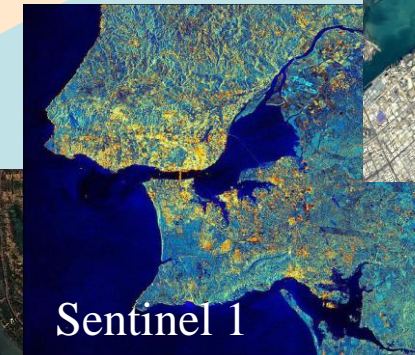
2008



Landsat



2014



Sentinel 1



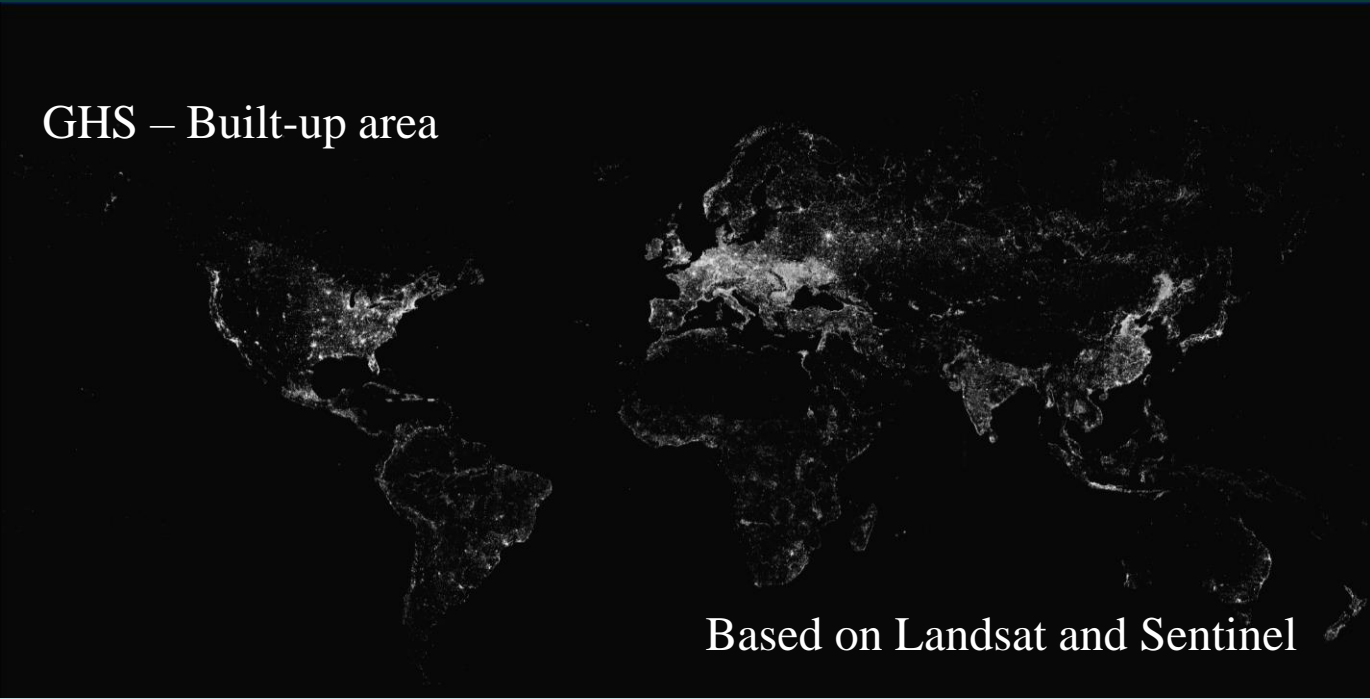
2017



Sentinel 2



GHS – Built-up area



Based on Landsat and Sentinel

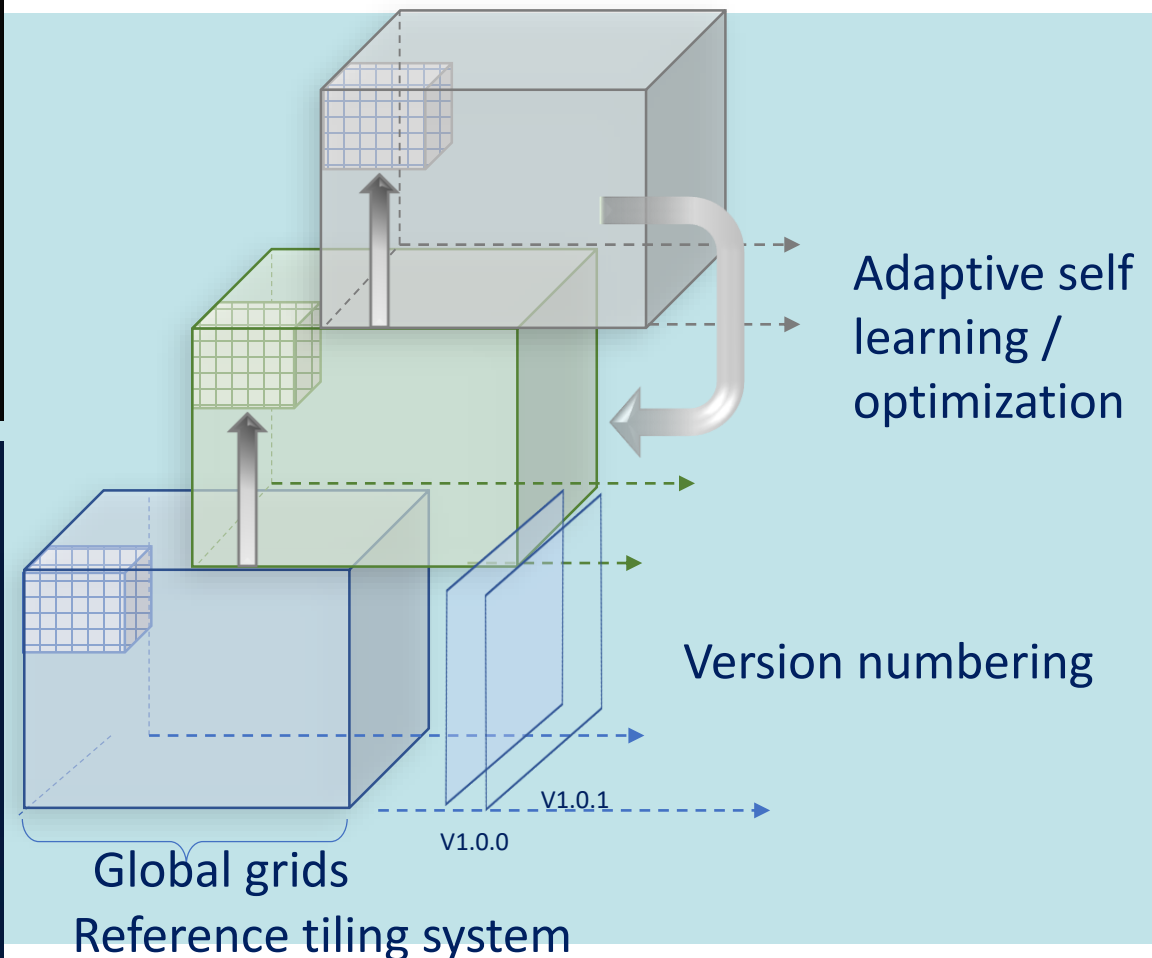
GHS – Population density



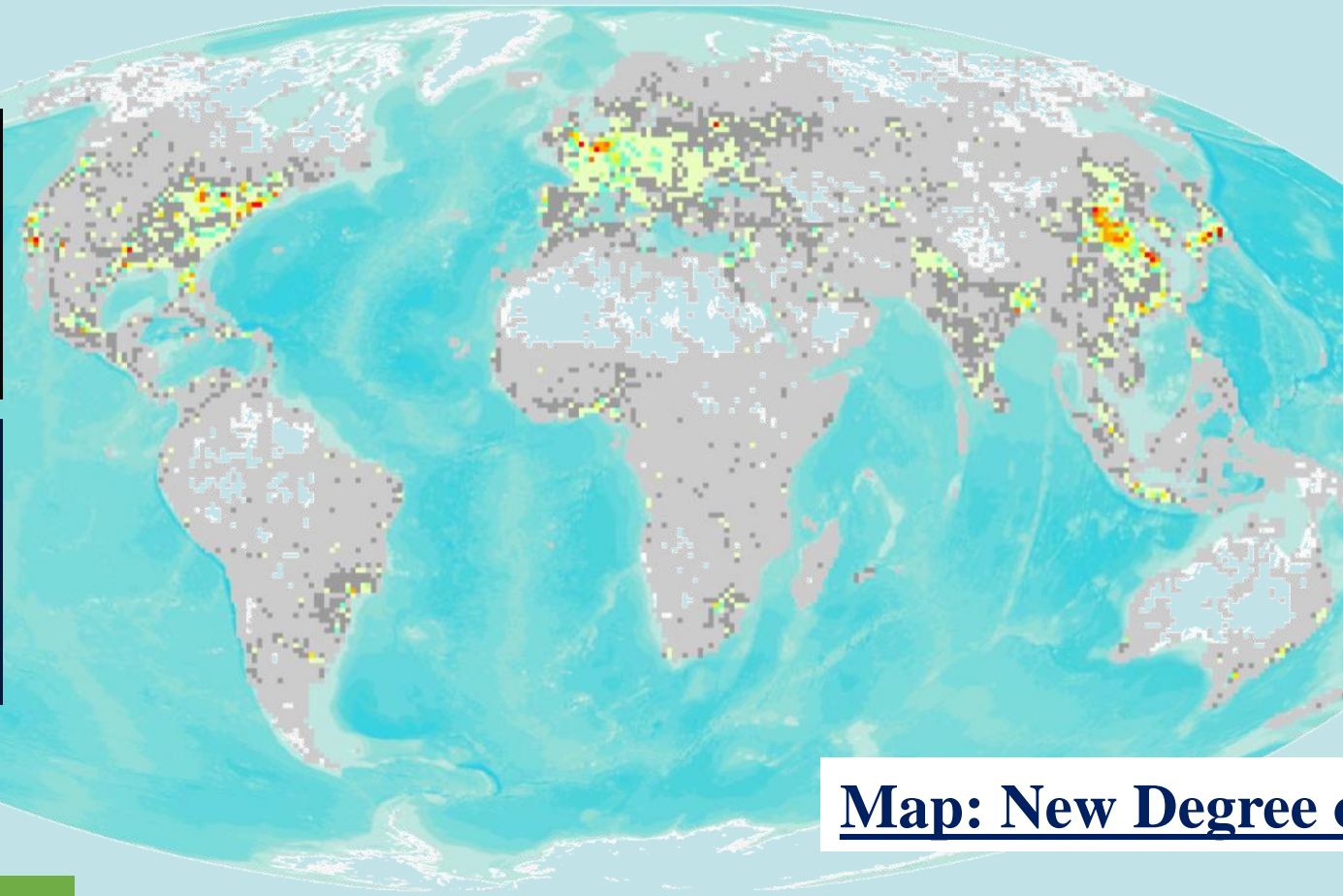
Collaboration with CIESIN

Share layers and tools

Big Data Processing Architecture



Understand urbanization



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

MODEL

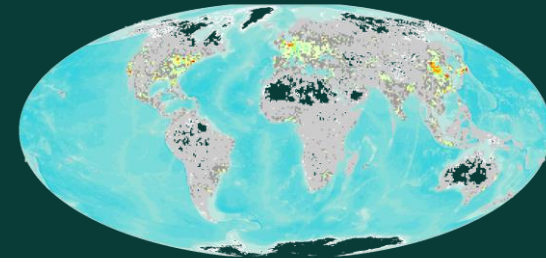
Urban Centre
(HDC)

Urban Cluster
(LDC)

Rural Grid
Cells

Map: New Degree of urbanization

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
- CO₂ concentration
- PM2.5 emission

DRR – exposure to

- Flood
- Earthquake
- Storm surge
- Heatwave

Socio-economic

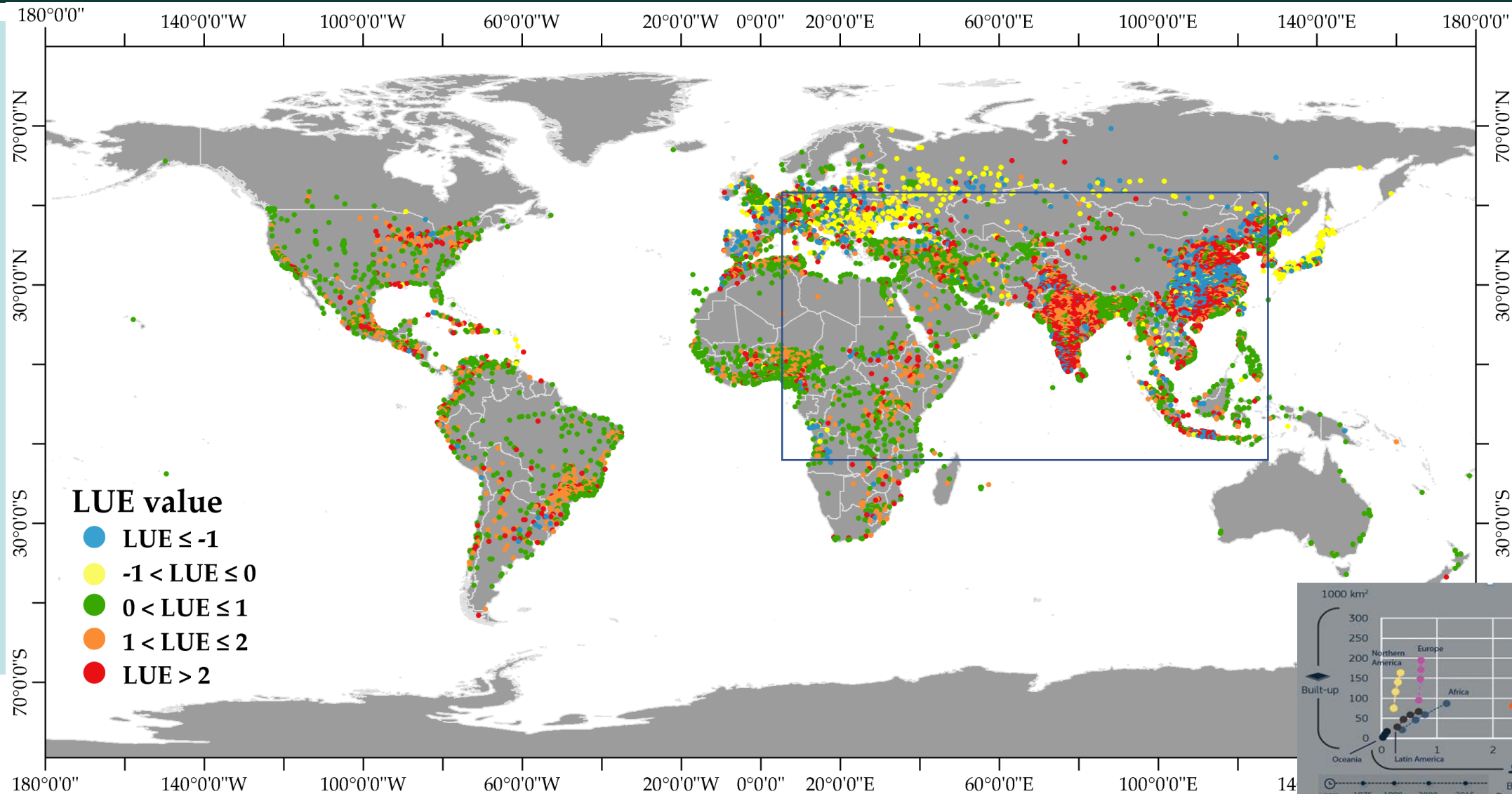
- Population
- Built-up areas
- GDP
- HDI
- Nighttime lights
- area



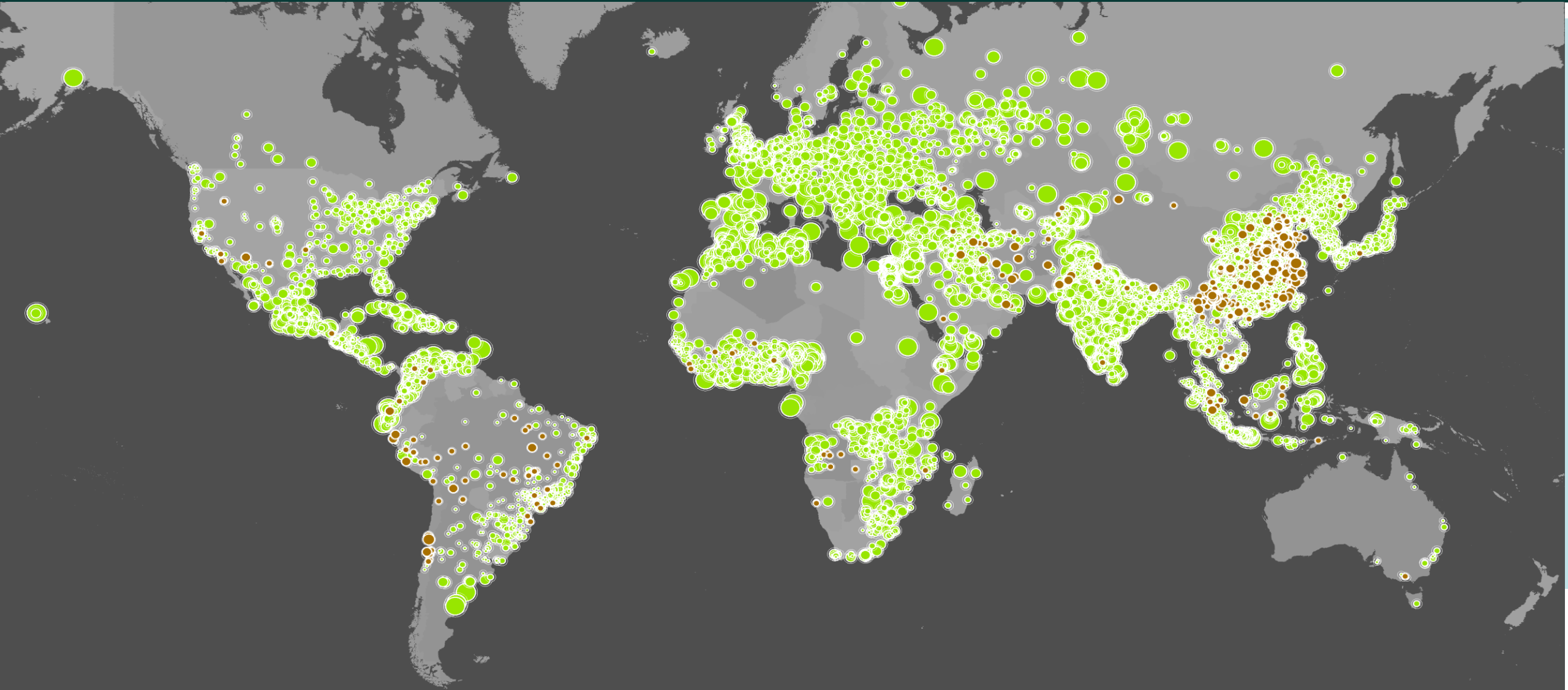
Estimate 3 SDG indicators

Multi-temporal information
1975-1990-2000-2015

GHSL – City Centre Database SDG-11



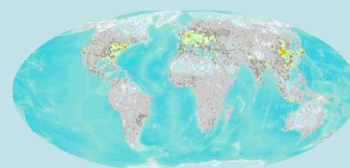
GHSL – City Centre Database SDG-11



Today's pressing 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



INTERNATIONAL JOURNAL OF DIGITAL EARTH
2018, VOL. 11, NO. 7, 657-669
<https://doi.org/10.1080/17538947.2018.1471790>

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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. Uhlig^f, Li Zhang^a, John van Genderen^c, Dong Liang^{a,d}, Ishwaran Natarajan^a, Lanwei Zhu^a and Jiuliang Liu^a

Check for updates

Many developing countries, such as Mongolia, have rural economies, so projects that can provide farmers with up-to-date agricultural information are crucial.

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.

The ancient Silk Road trade routes connecting Asia, Europe and Africa lay behind the development of many great civilizations. Today, solar panels and smartphones have replaced silk, and trains and airplanes have superseded camels. But the Silk Road spirit of peace, mutual benefit and learning has been revived in an ambitious plan to bridge East and West, launched in 2013 by Chinese President Xi Jinping.

The 'Belt and Road' initiative promises more than US\$1 trillion of Chinese investment in some 60 countries (see 'Belt and Road'). All other nations are welcome to join in. The main aim is socio-economic development through improving the routes for land and sea trade. The initiative will also boost science and technology across the region, for example through research into artificial intelligence, nanotechnology, quantum computing and smart cities (see go.nature.com/2mrv6co).

But protecting the environment while supporting economic growth will be challenging. The Belt and Road region is home to more than 65% of the world's population. It includes 18 cities that have populations of greater than 10 million, such as Beijing, Cairo, Moscow, Manila and Istanbul. Environments are diverse and fragile.

1 FEBRUARY 2018 | VOL 554 | NATURE | 25
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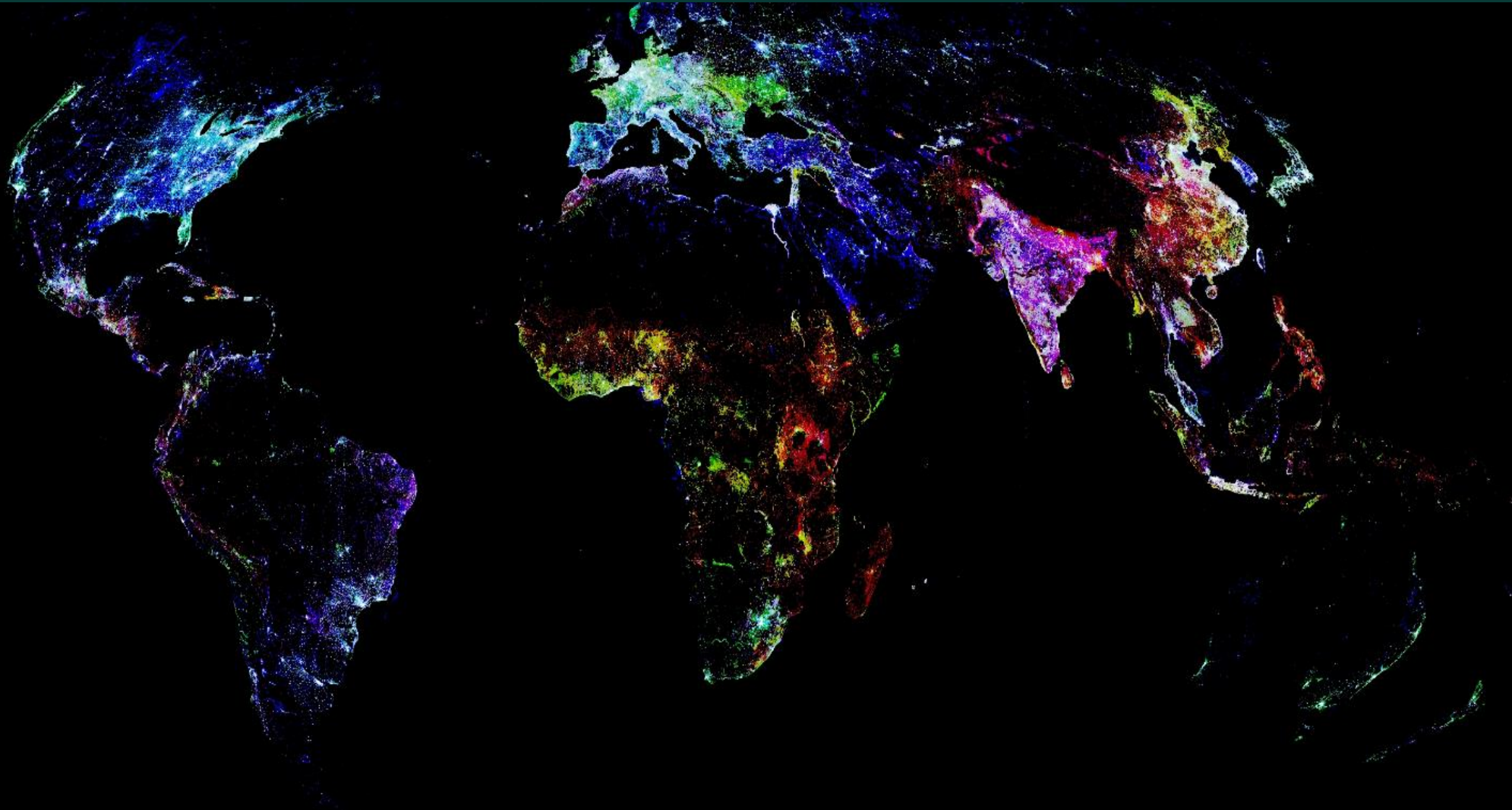
DBAR WG within HPI



JRC Co-chairs DBAR Urban WG




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



The screenshot shows the homepage of the Global Human Settlement Layer (GHSL) website. At the top, there is a navigation bar with links for 'Legal notice', 'Cookies', 'Contact', 'Search', and 'English (en)'. Below this is the European Commission logo and the text 'EUROPEAN COMMISSION Global Human Settlement'. A secondary navigation bar includes 'Home', 'About', 'Copernicus', 'Documents', 'Atlases', 'Global Definition', 'Data', 'Tools', 'Visualisation', and 'News'. The main content area features the title 'GHSL - Global Human Settlement Layer' and a sub-headline: 'A new open and free tool for assessing the human presence on the planet'. A list of bullet points describes the tool's capabilities and its support by the JRC and DG REGIO, along with the GEO Human Planet Initiative. A 'Geospatial World Excellence Award' badge is displayed on the right. A news section at the bottom highlights a 2017 update on urbanisation.

Legal notice | Cookies | Contact | Search | English (en)

EUROPEAN COMMISSION
Global Human Settlement

European Commission > EU Science Hub > GHS

Home | About | Copernicus | Documents | Atlases | Global Definition | Data | Tools | Visualisation | News

GHSL - Global Human Settlement Layer
A new open and free tool for assessing the human presence on the planet

- Produces new global spatial information, evidence-based analytics and knowledge describing the human presence on the planet
- Operates in an open and free data and methods access policy (open input, open method, open output)
- Supported by the Joint Research Centre (JRC) and the DG for Regional Development (DG REGIO) of the European Commission, together with the international partnership [GEO Human Planet Initiative](#)

Geospatial World Excellence Award

News 11/09/2017 **Degree of urbanisation** - New page of our website, contains country fact sheets used to inform the discussion on the "global harmonized definition of cities and settlements"



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

[Click here to find out about the technology behind this image](#)

THANK YOU