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Joint Research Centre

**GEO Human Planet Initiative**

**GEO** GROUP ON  
EARTH OBSERVATIONS

European  
Commission

**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**

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# The GEO Human Planet Core Partnership

DBAR WG within Human Planet



JRC Co-chairs DBAR Urban WG

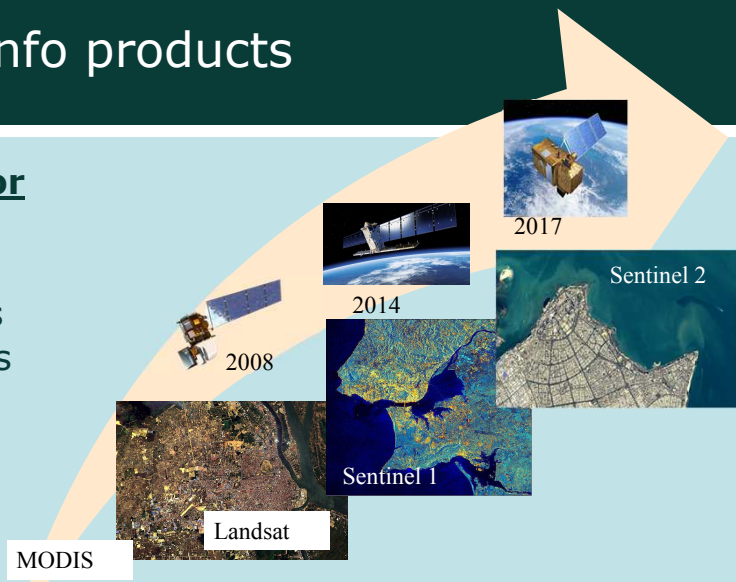


- **Measure**  
*coordinated, comprehensive and sustained Earth observations and information".*
- **Understand**  
*".... to support novel evidence-based assessment of the human presence on the planet Earth "*
- **Inform**  
*"... informed future policies... decisions and actions ...*
- **Open image 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

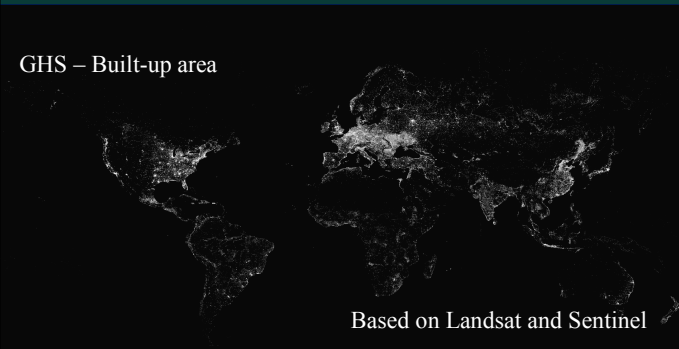


NOAA



## Share layers and tools

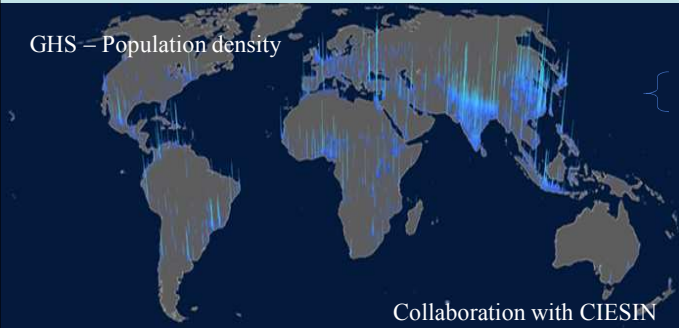
GHS – Built-up area



Based on Landsat and Sentinel

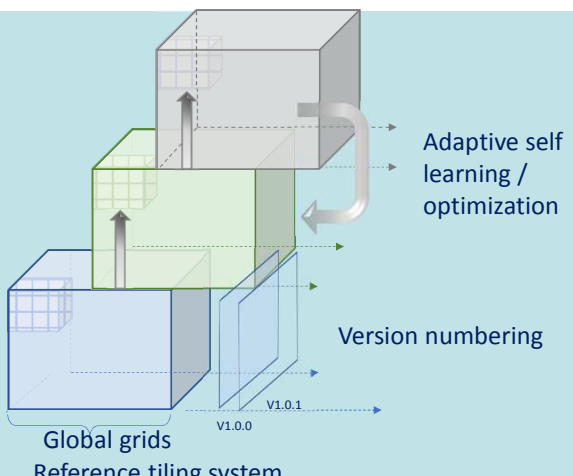
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GHS – Population density



Collaboration with CIESIN

Big Data Processing Architecture




Adaptive self learning / optimization

Version numbering

Global grids

Reference tiling system

v1.0.0 v1.0.1



## Understand urbanization



Urban Centre (HDC)


Urban Cluster (LDC)

Rural Grid Cells

**Cooperation**

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

**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
- CO<sub>2</sub> concentration
- PM2.5 emission

### DRR – exposure to

- Flood
- Earthquake
- Storm surge
- Heatwave

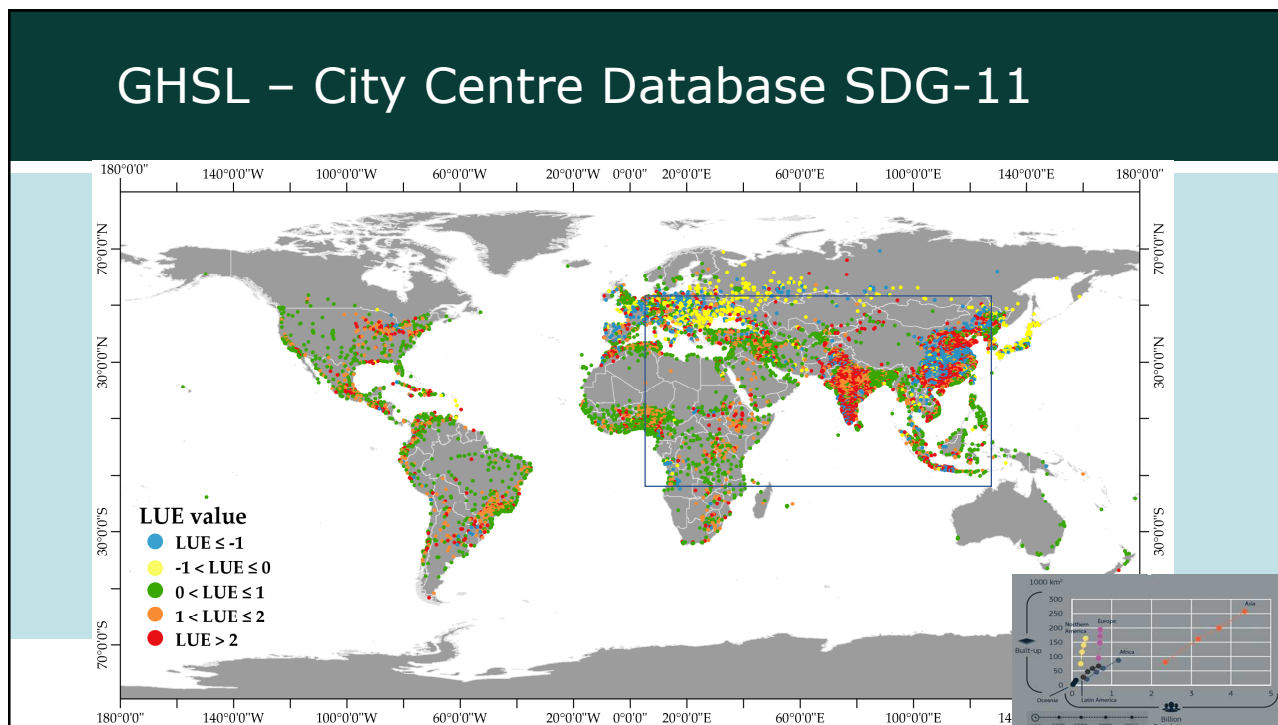
### Socio-economic

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

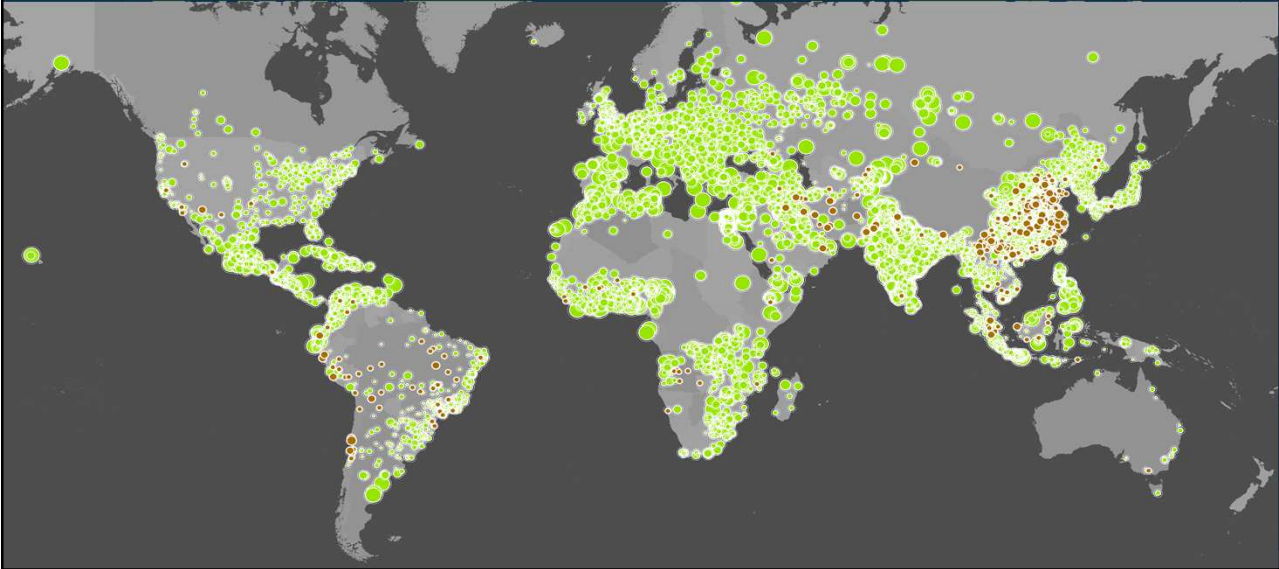


Estimated **SDG indicators**

Multi-temporal information  
1975-1990-2000-2015



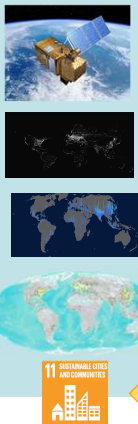
# GHSL – City Centre Database SDG-11



## 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



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https://doi.org/10.1080/17513758.2018.1471700

RESEARCH HIGHLIGHT

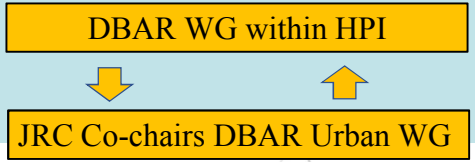
The Digital Belt and Road program in support of regional sustainability

Huadong Guo <sup>1</sup>, Jie Liu <sup>2,3</sup>, Yubao Qiu <sup>4</sup>, Massimo Menenti <sup>5,6</sup>, Fang Chen <sup>7</sup>, Paul F. Uhler <sup>8</sup>, Li Zhang <sup>9</sup>, John van Genderen <sup>10</sup>, Dong Liang <sup>11</sup>, Ishwaran Natarajan <sup>12</sup>, Lanwei Zhu <sup>13</sup> and Jiuliang Liu <sup>14</sup>

Check for updates

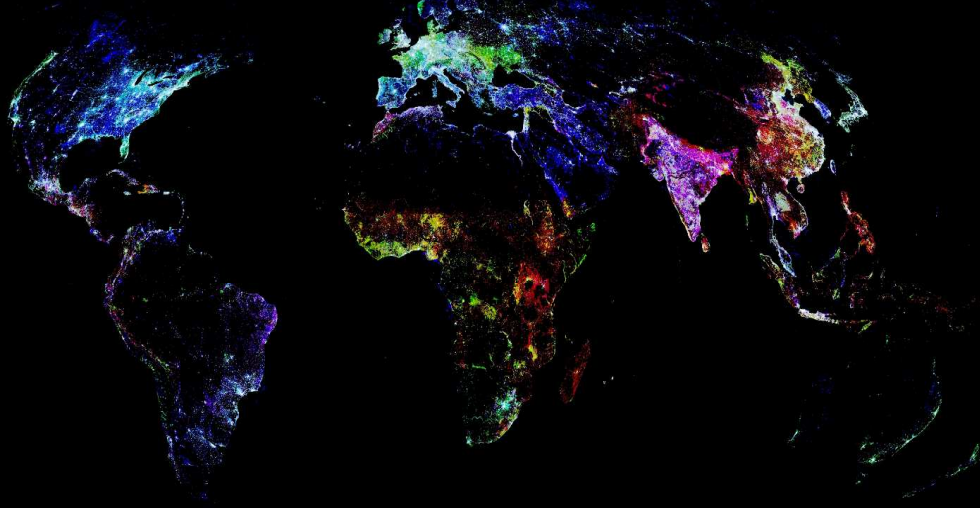
**Steps to the digital Silk Road**  
Sharing big data from satellite imagery and other Earth observations across Asia, the Middle East and east Africa is key to sustainability, urges Gao Huang.

The big data revolution is transforming the way we live and work. It is also transforming the way we understand our planet. Big data is being used to monitor and understand our environment, our health, and our society. It is being used to improve our lives and to make our world a better place. It is being used to create a more sustainable future for all.





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

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EUROPEAN COMMISSION  
Global Human Settlement

European Commission > EU Science Hub > GHS

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**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"

2014

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](#)

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THANK YOU

