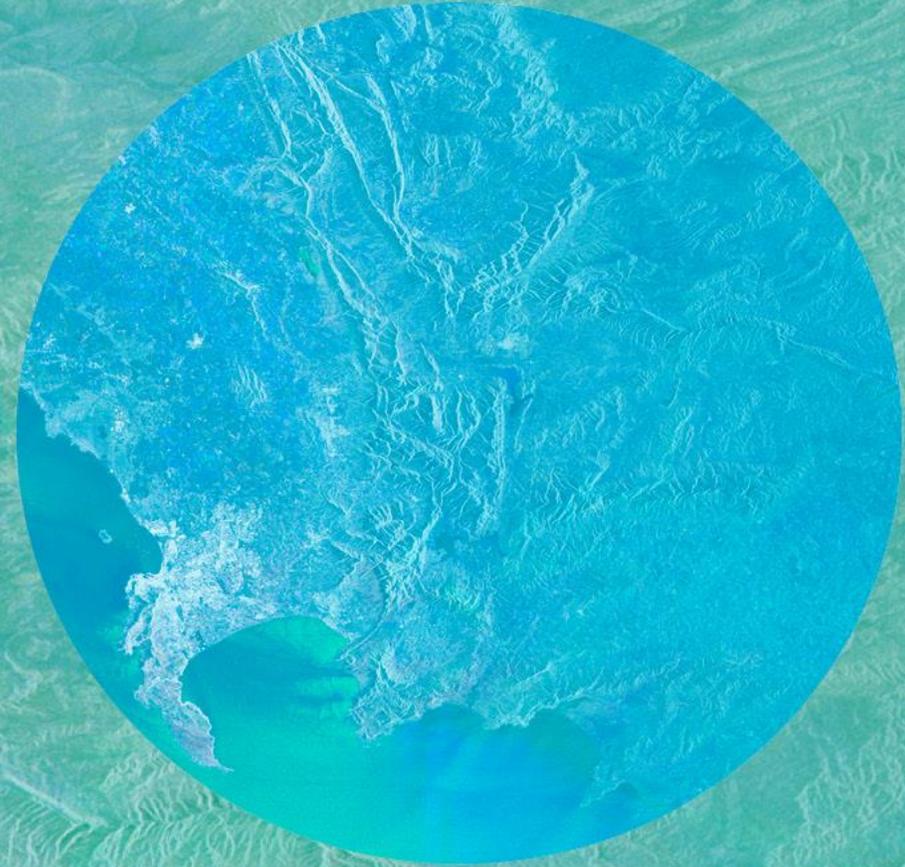


GEO WEEK & MINISTERIAL SUMMIT 2023

Flash talk

#TheEarthTalks



science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA



GEO WEEK
2023 MINISTERIAL
SUMMIT

GEO GROUP ON
EARTH OBSERVATIONS



**GEO
WEEK
2023**
MINISTERIAL
SUMMIT

#TheEarthTalks

GEO WEEK & Ministerial Summit 2023

Topic 4

The Copernicus Emergency Management Service
– supporting disaster risk reduction worldwide



Michele Melchiorri

Project Officer for the Copernicus
Global Human Settlement Layer,
European Commission's Joint
Research Centre



science & innovation

Department:
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REPUBLIC OF SOUTH AFRICA



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OUTLINE

Copernicus & the Emergency Management Service

Components

Exposure Mapping

Uptake and evolution



Copernicus: 6 satellite families and 6 Services

Space component

Sentinels (S1, S2, S3, S5p)
Copernicus Contributing Missions



In situ component

Land, sea or airborne monitoring systems
Geospatial reference or auxiliary data



Atmosphere



Marine



Land



Climate Change



Security



Emergency



Copernicus EMS Scope and objectives

“Copernicus EMS activities are one of the examples of best practices with worldwide recognition”

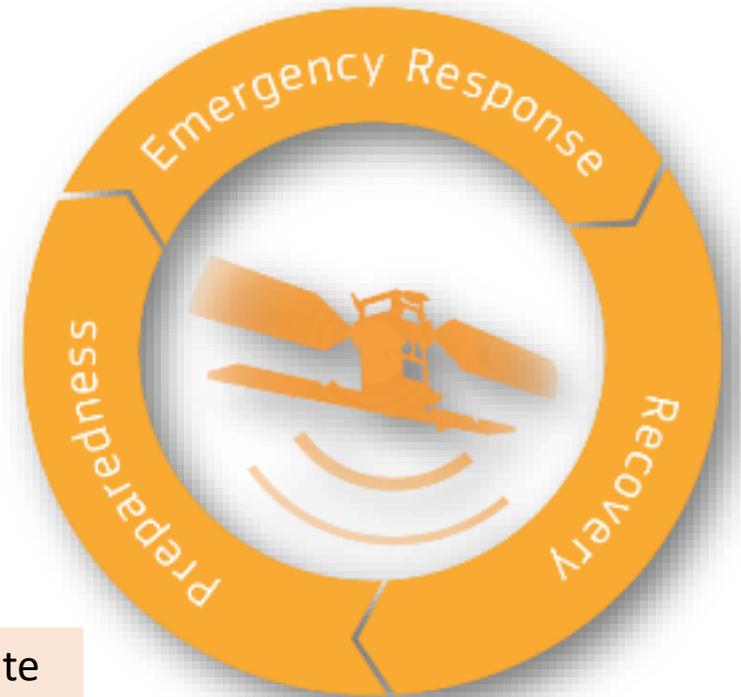
Mauro Facchini, DG DEFIS Head of Unit for Earth Observation

CEMS supports actors involved in the management of **natural and man-made disasters**.

It addresses all **phases of the disaster management cycle**:

- **Pre-disaster:**
 - Risk assessment, prevention, mitigation
 - Preparedness and early warning
- **Immediate response**
 - Event mapping and monitoring
 - Damage assessment
- **Post-disaster**
 - Recovery assessment, reconstruction and monitoring
 - Associated risk assessment

It provides **timely and accurate geospatial information** (derived from satellite remote sensing data and supplemented with available in situ or reference data sources).



Human Settlement information is essential for policy frameworks and crisis management



PROGRAMME OF THE EUROPEAN UNION



Rapid Mapping



Risk & Recovery Mapping



Floods



Fires



Droughts



Population



Built-up areas

GHSL Main Features

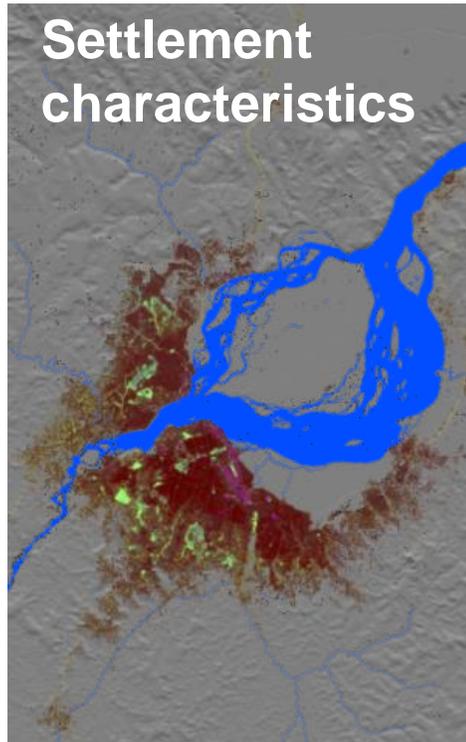
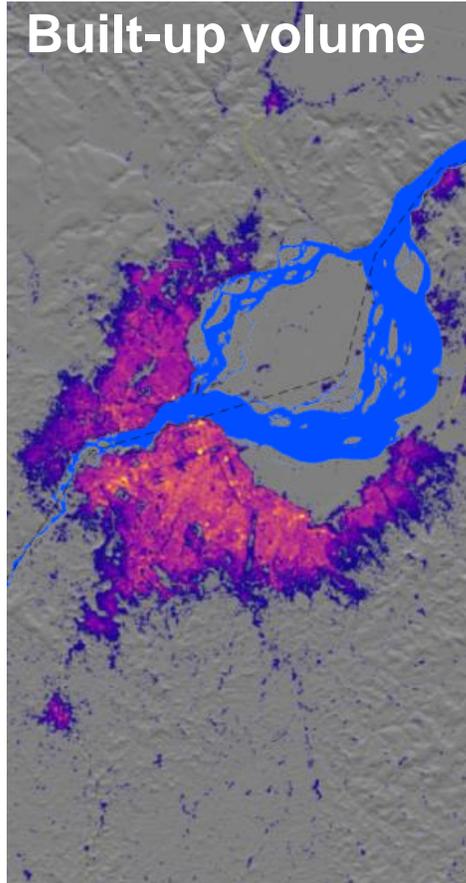
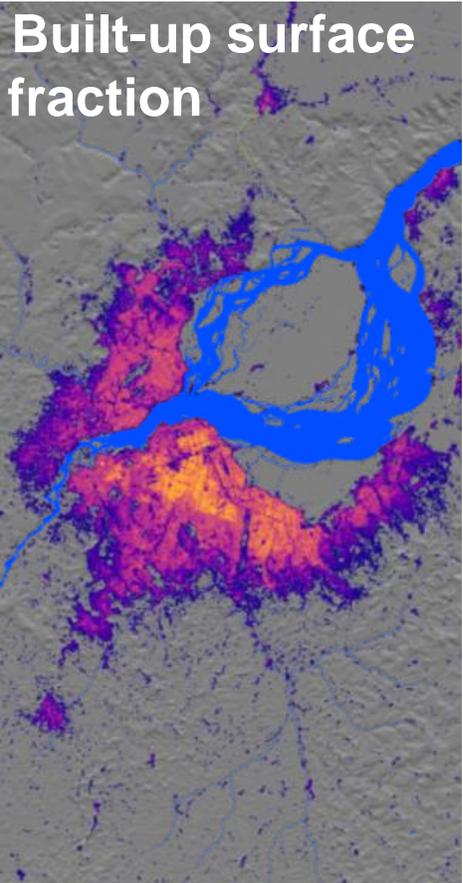
- **Extended time series:** 1975-2030 in 5 year intervals
- **Operational production:** 2022, 2024, 2026
- **Improved spatial resolution**
 - Built-up surface fraction at 10 m spatial resolution
 - Population density at 100 m
- **Built-up classification:** residential and non-residential uses
- Building height information at 100 m spatial resolution



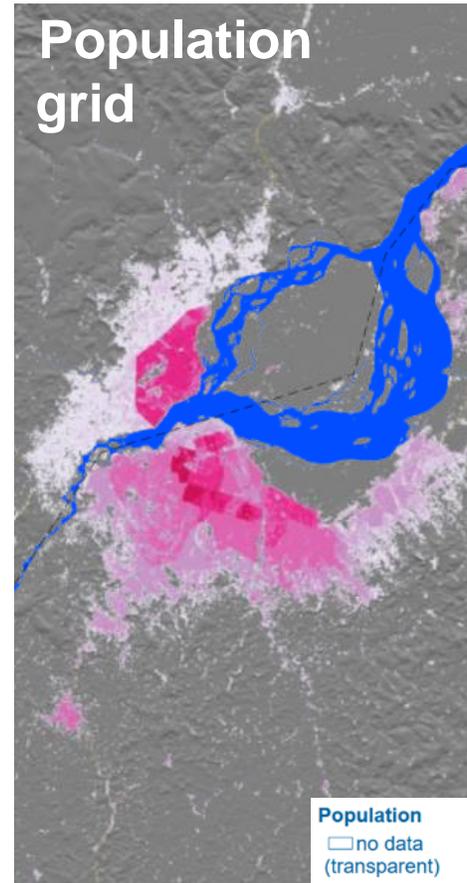
Melchiorri, M., & Kemper, T. (2023, May). Establishing an operational and continuous monitoring of global built-up surfaces with the Copernicus Global Human Settlement Layer. In *2023 Joint Urban Remote Sensing Event (JURSE)*
<https://doi.org/10.1109/JURSE57346.2023.10144201>

GHSL R2022

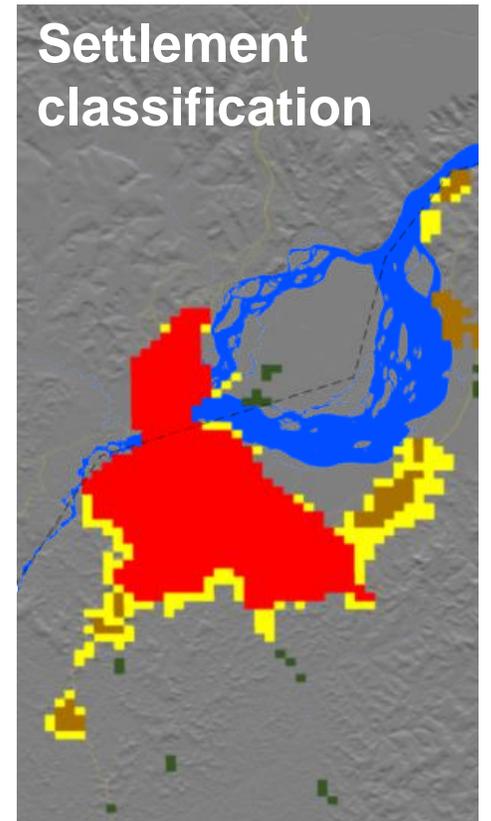
Brazzaville (Rep. Congo) – Kinshasa (DRC)



- Settlements characteristics**
- 01: open spaces, low vegetation surfaces NDVI <= 0.3
 - 02: open spaces, medium vegetation surfaces 0.3 < NDVI <= 0.5
 - 03: open spaces, high vegetation surfaces NDVI > 0.5
 - 04: open spaces, water surfaces LAND < 0.5
 - 05: open spaces, road surfaces
 - 11: built spaces, residential, building height <= 3m
 - 12: built spaces, residential, 3m < building height <= 6m
 - 13: built spaces, residential, 6m < building height <= 15m
 - 14: built spaces, residential, 15m < building height <= 30m
 - 15: built spaces, residential, building height > 30m
 - 21: built spaces, non-residential, building height <= 3m
 - 22: built spaces, non-residential, 3m < building height <= 6m
 - 23: built spaces, non-residential, 6m < building height <= 15m
 - 24: built spaces, non-residential, 15m < building height <= 30m
 - 25: built spaces, non-residential, building height > 30m

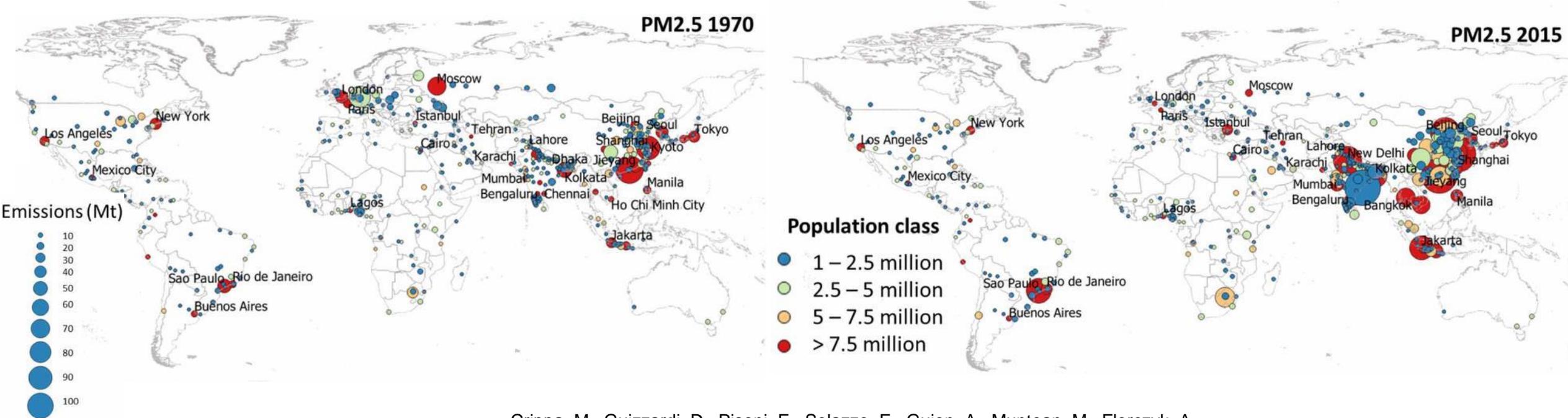


- Population**
- no data (transparent)
 - 0 - 5
 - 6 - 20
 - 21 - 100
 - 101 - 300
 - 301 - 500
 - 501 - 1,000
 - 1,000 - Max



- Degree of Urbanisation**
- Urban centre (City):**
 - Urban centre (City)
 - Urban cluster (Town & suburb):**
 - Dense and semi-dense urban cluster (Town)
 - Suburban or peri-urban cells (Suburb)
 - Rural grid cells (Rural area):**
 - Rural cluster (Village)

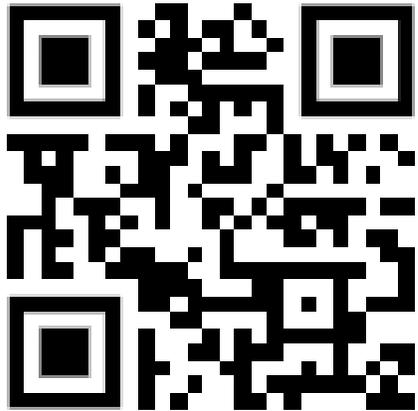
Global estimation of anthropogenic emissions (11.6.2)



Crippa, M., Guizzardi, D., Pisoni, E., Solazzo, E., Guion, A., Muntean, M., Florczyk, A., Schiavina, M., Melchiorri, M. and Hutfilter, A.F., 2021. Global anthropogenic emissions in urban areas: patterns, trends, and challenges. *Environmental Research Letters*, 16(7), p.074033.

Open and Free Geospatial Data for Download

<https://ghsl.jrc.ec.europa.eu/download.php>



Epoch

2030 2025 2020
2018 2015 2011
2010 2005 2000
1995 1990 1985
1980 1975

Resolution

2m 10m 100m 1km
3 arcsec 30 arcsec

Coord. system

Mollweide WGS84 UTM

GHS built-up surface (R2022)

[Read the technical details for this product](#)

Current selection:

Product: **GHS-BUILT-S**, epoch: **2030**, resolution: **100m**, coordinate system: **Mollweide**, classification: **Total RES+NRES**, scenario for the prediction: **LIN**

Select the classification and (for the projection epochs) the scenario

Classification (RES/NRES)

Total RES+NRES Non residential
① Residential (RES) or non residential (NRES) classification.

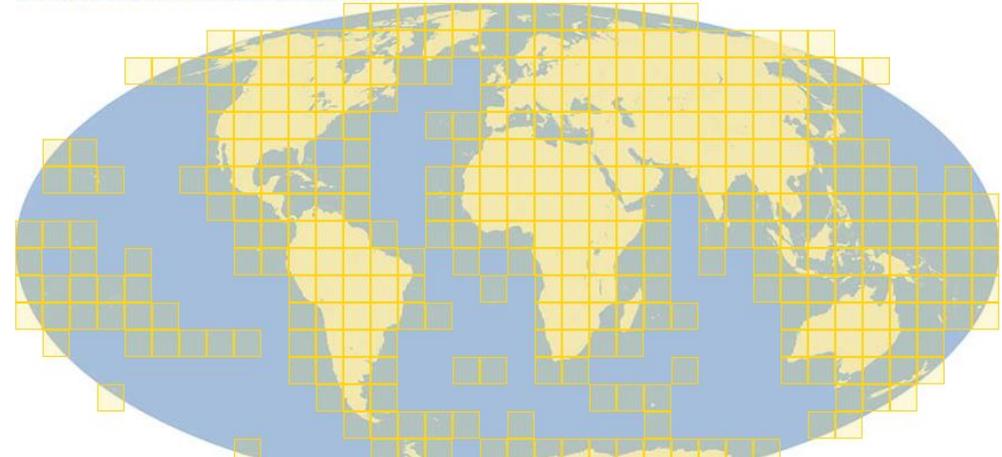
Scenario (LIN/PLY/MED)

linear (LIN) second-order polynomial (PLY) median (MED)
① Scenario for the prediction: linear (LIN), second-order-polynomial (PLY), and median (MED).

① To be noted that some variation might be available only for a certain product (e.g. the 30m resolution is only available for the GHS-BUILT multi-temporal classification)

Download by tiles (click on each box to download a single tile):

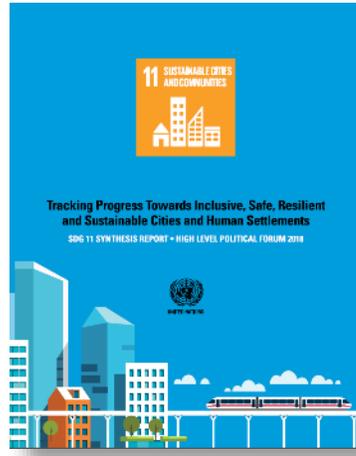
[Interactive visualisation of the GHS built-up surface \(R2022\)](#)



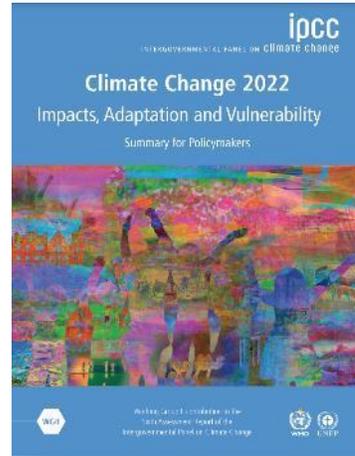
Use cases of GHSL in international policy frameworks



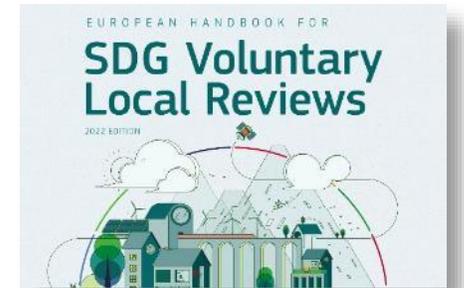
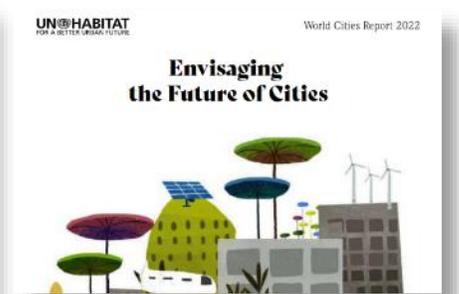
GEO 6 & GEO 6 Cities by UNEP urbanization statistics from GHSL Data



UN-Habitat SDG 11 synthesis report



UNEP WMO IPCC 6th Assessment Report



And many more ...

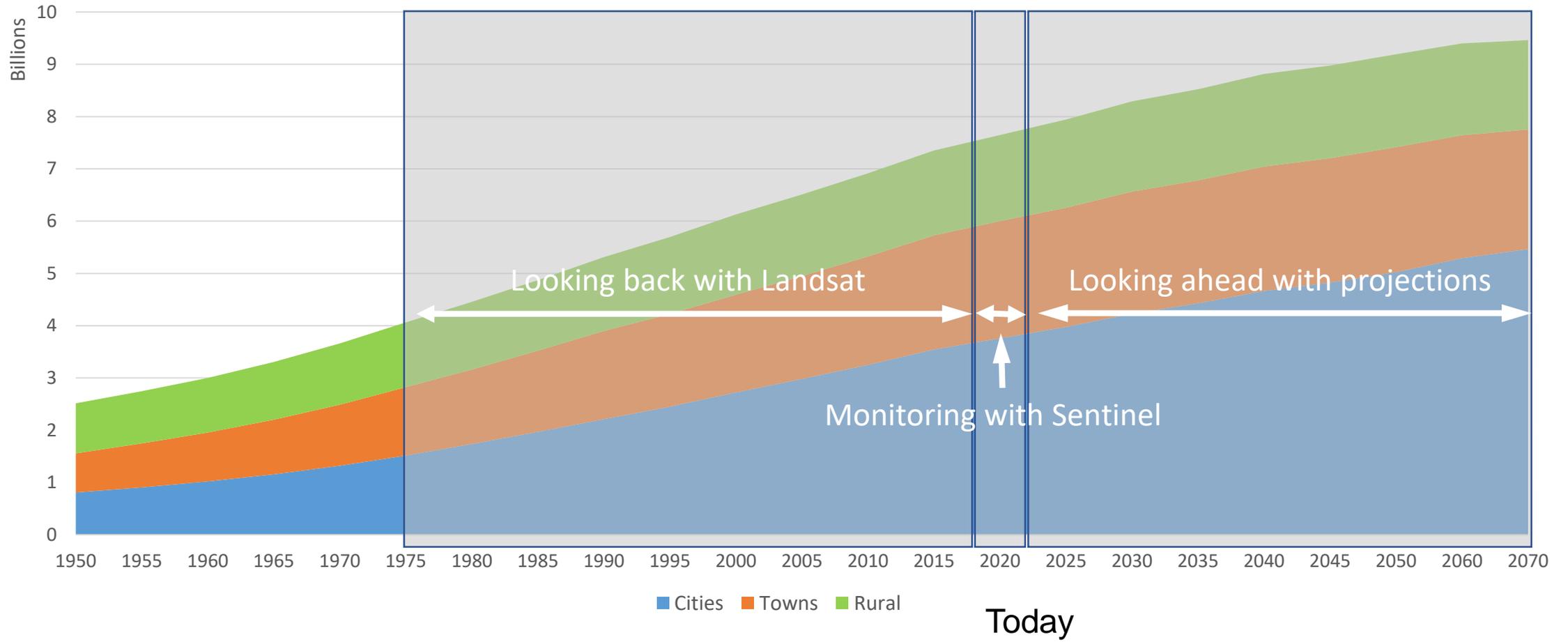


EARTH OBSERVATIONS FOR THE SUSTAINABLE DEVELOPMENT GOALS



Earth Observations Toolkit for SUSTAINABLE CITIES AND HUMAN SETTLEMENTS

Measuring & understanding human settlements: past, presence & future



STAY CONNECTED

EVENTS, ONLINE, and MAP VIEWERS



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More Information on the
Global Human Settlement Layer:



ghsl.jrc.ec.europa.eu



Rapid
Mapping



Risk & Recovery
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Floods



Fires



Droughts



Population



Built-up
areas



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