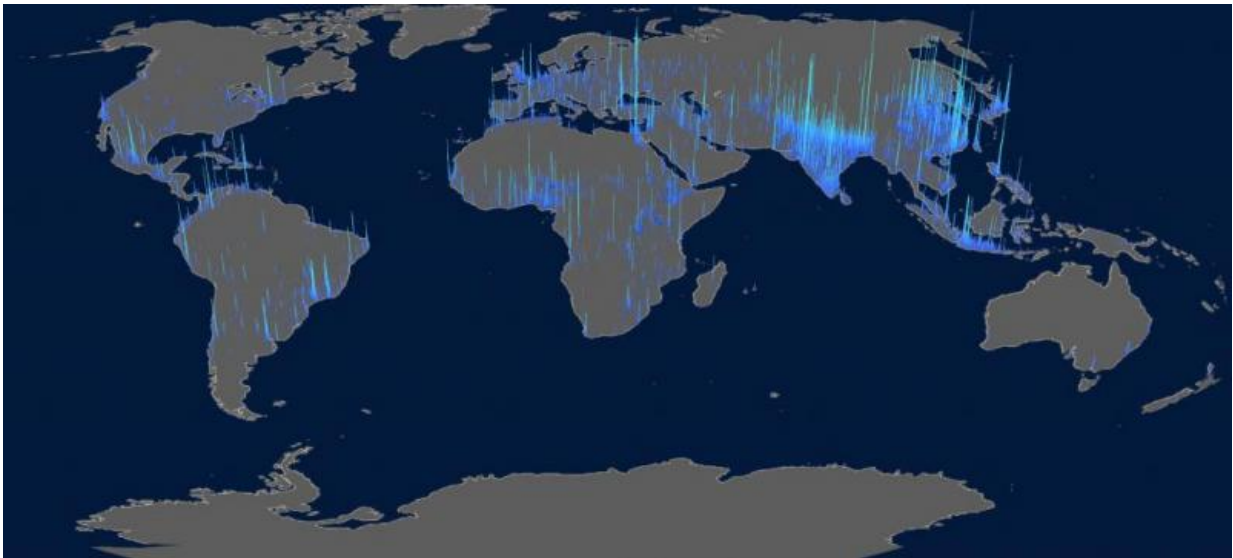# New satellite image database maps the dynamics of human presence on Earth

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The new data platform enables to analyse the growth of built-up areas and population globally over the past 40 years. Map shown is for 2015. Credit: EU, 2016

Built-up areas on the Earth have increased by 2.5 times since 1975. And yet, today 7.3 billion people live and work in only 7.6% of the global land mass. Nine out of the ten most populated urban centres are in Asia, while five out of the ten largest urban centres are in the United States. These are some of the numbers calculated by a new global database which tracks human presence on Earth, launched on 18 October 2016 by

the European Commission's Joint Research Centre at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III).

Global Human Settlement Layer (GHSL)

While the growth of the global population is closely monitored by statistical offices, until now there has been little consistent, open and detailed information on the spatial distribution of people, and hardly any information on built-up areas with complete and global coverage. For the first time, the Global Human Settlement Layer (GHSL) developed by the JRC with the support of the Directorate-General for Regional and Urban Policy (DG REGIO) makes it possible to analyse in a consistent and detailed manner the development of built-up areas, population and settlements of the whole planet over the past 40 years.

The GHSL is the most complete, consistent, global, free and open dataset on human settlements from villages to megacities. The datasets are based on more than 12.4k billions of individual image data records collected by different satellite sensors in the past 40 years. It combines satellite imagery on built-up areas, green areas and night lights with census data on population.

The GHSL can be used to check where and how people live, to measure the size of built-up areas and map their growth of over time, to calculate the density of cities and to analyse how green or how exposed to disasters urban centres are. It also provides a practical tool for the monitoring of the implementation of international frameworks.

Built-up area increasing globally, strongest growth in low-income countries

The GHSL shows that over the past 40 years, built-up areas increased by about 2.5 times globally, while the global population increased by a factor of 1.8. The changes in population and built-up areas show major regional differences. The strongest growth can be observed in low income countries. For example, over the past 40 years, the population of Africa tripled and the built-up area quadrupled. During that same period, the population of Europe remained stable, while the built-up area doubled.

Much of the expansion in population and built-up areas has taken place in locations that are at risk to natural disasters. For example, the world urban population of coastal areas has doubled over the last 40 years, from 45 to 88 million people.

Most densely populated urban centres are in low-income countries

Today, most of the world's population is living in agglomerations with a density greater than 1.500 people per square kilometre and with more than 50 000 inhabitants. The GHSL counts more than 13 000 of these urban centres from the data for the year 2015.

The ten most populated urban centres in the world are Guangzhou/Donguan, Cairo, Jakarta, Tokyo, New Delhi, Kolkata, Dhaka, Shanghai, Mumbai and Manila. Thus, nine out of the ten most densely populated urban centres are in Asia and seven are in low-income countries.

Urban centres with biggest built-up area are in high-income countries

Los Angeles is the largest urban centre in the world, with its built-up

area extending over 4 734 km2, followed by Tokyo, Jakarta, Guangzhou/Donguan, New York, Chicago, Johannesburg/Pretoria, Dallas, Miami and Osaka. Consequently, eight out of the ten largest urban centres are in high-income countries and five of them are in the United States.

The different growth trends in the different continents lead to an unequal distribution of built-up per capita globally, the built-up area per capita in urban clusters in Northern America being almost ten times that of Asia.

Vegetation in urban clusters increased by 38% in 25 years

Large regional and income inequalities are reported in accessing electricity, as observed from night light emissions of urban centres. At the same time, a relative decline of night light emissions can be observed in urban centres of high income countries, possibly related to the implementation of environmental protection and energy saving policies. According to the evidence collected by the GHSL, our urban centres, towns and suburbs are becoming greener: the average intensity of vegetation associated to built-up areas in the whole urban clusters of the planet has increased by 38% in the past 25 years.

Atlas of the Human Planet

The GHSL is the core baseline data supporting the first release of the "Atlas of the Human Planet", an international collaborative effort within the Group of Earth Observation (GEO) Human Planet initiative. It 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).

European Commission's Joint Research Centre experts presented the Global Human Settlement Layer (GHSL) open data tools and the analytical findings included in the "Atlas of the Human Planet 2016" at the Habitat III conference in Quito, Ecuador, on 17 – 20 October 2016.

About Habitat III

Habitat III aims to reinvigorate the global commitment to sustainable urbanisation, to focus on the implementation of a New Urban Agenda to secure renewed political commitment for sustainable urban development, assess accomplishments to date, address poverty and identify and address new and emerging challenges. Scientific data and tools like GHSL are concrete examples of how data and scientific knowledge contributed to the new policy developments.

Provided by CORDIS