



TEP Urban

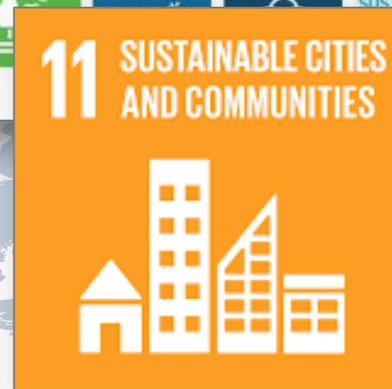
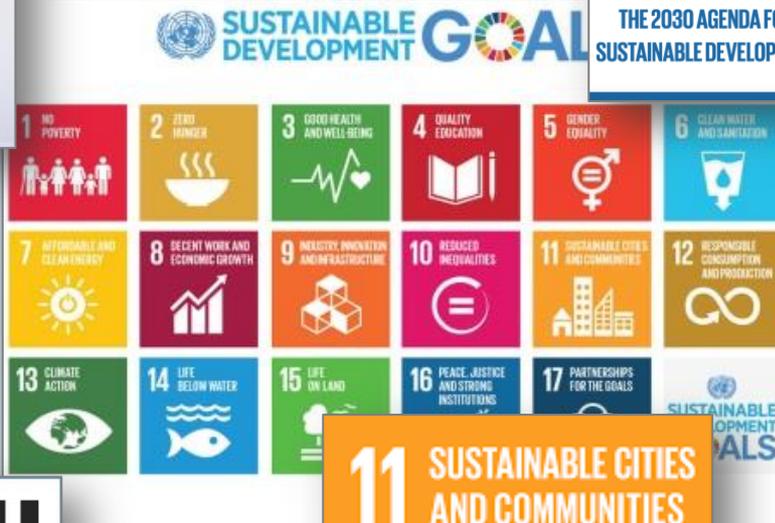
Urban Thematic Exploitation Platform (UTEP) for SDG Monitoring

Felix Bachofer

Felix Bachofer, Jakub Balhar, Martin Boettcher, Enguerran Boissier, Thomas Esch, Mattia Marconcini, Annkatrin Metz-Marconcini, Hans Permana, Tomas Soukup, Vaclav Svaton, Julian Zeidler



Motivation



Urban challenges

- Water
- Energy
- Waste
- Air pollution
- Climate
- Food
- Risk adaptation and mitigation
- Growth management
- Living conditions
- Basic services
- Transportation
- ...

Portfolio

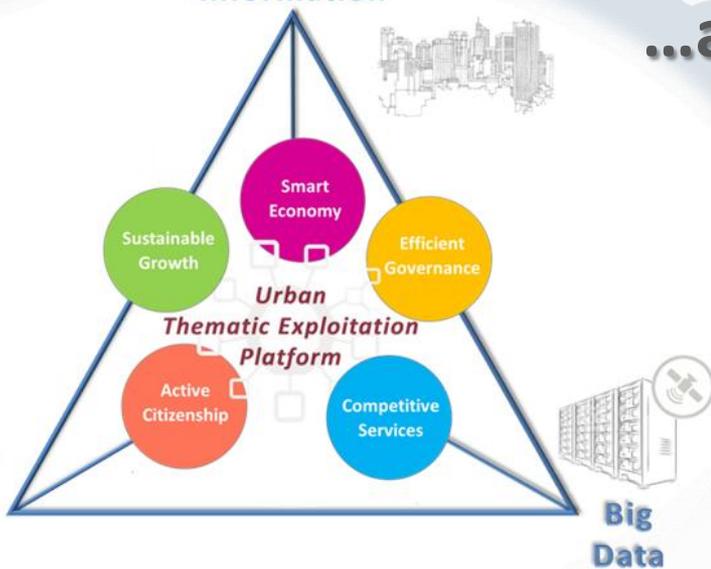
Data provision
 Data processing
 Analysis & Visualization
 Knowledge exchange

...all **data** and **tools** needed...

...available in **one place!**

end-to-end solutions ready to use

Information



User community

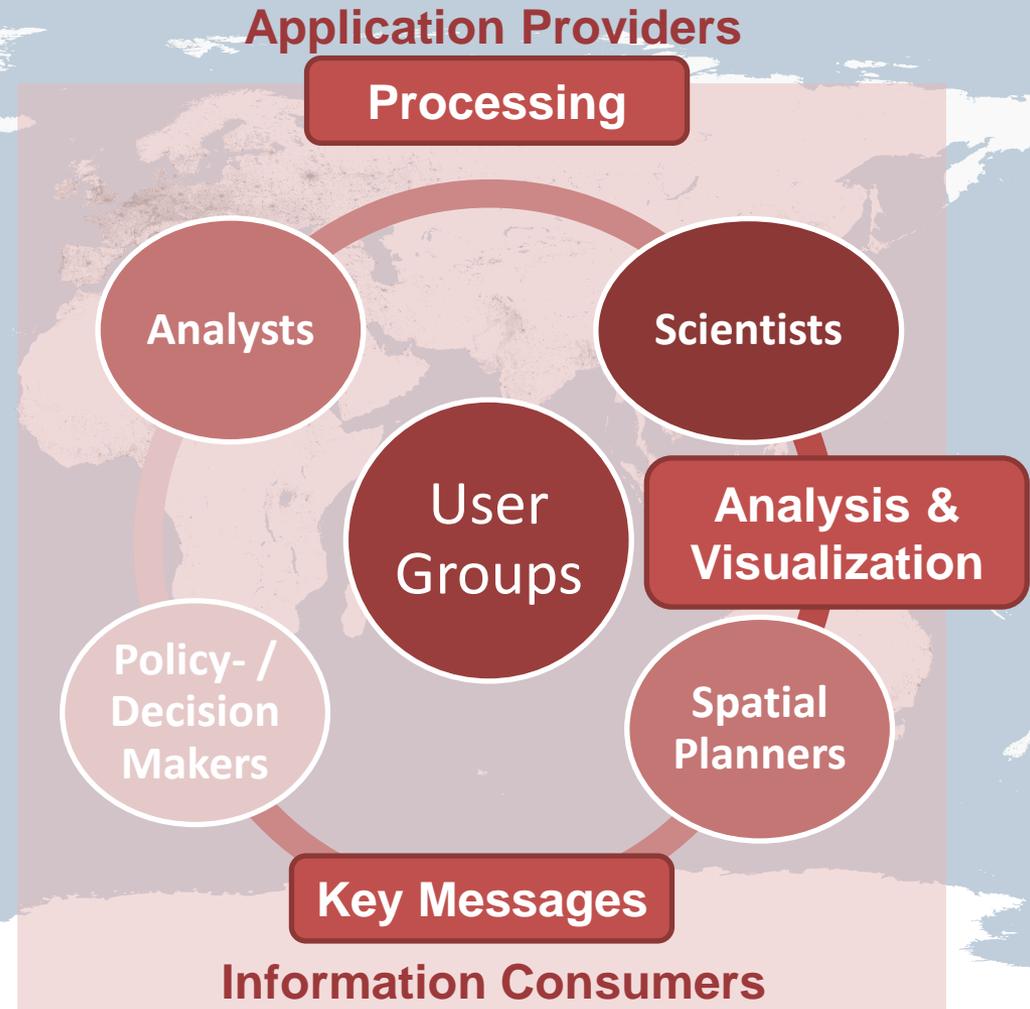


Number of users: > 465

Number of organisations: 46

Key users:

- World Bank Group
- United Nations
- OECD
- World Food Programme
- Bill & Melinda Gates Found.
- Group on Earth Observation (GEO)
- WorldPop
- Columbia University (CIESIN)
- MININFRA Rwanda
-





Live Demo




World Settlement Footprint (WSF) layer now available
 Discover DLR's new World Settlement Footprint (WSF) data at the Urban TEP platform and inspect the urban and rural human settlements pattern in a so far unique precision and consistency

[Browse WSF](#)



Data & Products Showroom



Visualisation & Analytics Center



Earth Observation Processing Services



Communication Hub

Urban Thematic Exploitation Platform (U-TEP)

A world map with a light blue background and white landmasses, centered on the Atlantic Ocean. The map is overlaid with the main title text.

Data and Products Showroom

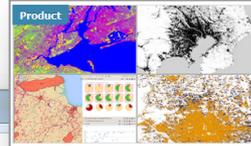
Product Portfolio

Geobrowser Product Portfolio



Explore or task thematic applications

Product and Service Portfolio



U-TEP Product Portfolio

by U-TEP

This application allows to visualise and inspect all U-TEP products and data from external sources in the geobrowser.

May 16th 2015

Services

- TimeScan Landsat on-demand
- TimeScan Sentinel-2 on-demand
- Functional Urban Area Definition
- Visualisation and Analytics Toolbox

The screenshot shows the U-TEP Geobrowser interface. At the top, there are browser tabs for 'ESA Urban TEP' and 'U-TEP Product Portfolio'. The address bar shows the URL: <https://urban-tep.eo.esa.int/geobrowser/?id=portfolio#1&context=GUf%2FGUf2012-12m>. The interface includes a search bar with 'EO Free Text Search', a navigation menu with 'Sign in', 'Register', 'Contact', 'GUf', 'TimeScan', and 'HAPS', and a world map. A timeline at the bottom shows a range from '1990-01-01' to '2016-12-31'. Below the map, there is a search result section for 'Query results for series guf201212m' with 'Total results 1' and a result for 'Global Urban Footprint 2012 (12m)'.

Tracing Global Urbanization: New Data from Space

▪ *Global Urban Footprint (GUF)*

- Data base: 182,249 TerraSAR-X/TanDEM-X images (3m) collected in 2012 (308 TB)
- Spatial resolution: 12 m (scientific use), 84m (non-profit use)
- Release: November 2016
- Users: >300 institutions from 43 countries

▪ *World Settlement Footprint (WSF)*

- Use of free and open data
- Multi-sensor (Sentinel-1, Landsat/Sentinel-2)
- Multi-date (use of all scenes available)
- Multi-facility (DLR, U-TEP, GEE)

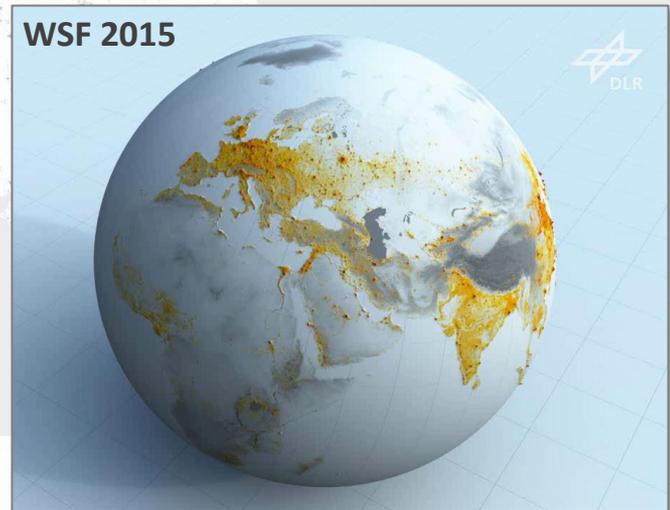
Product portfolio

- WSF 2015 (10m, binary mask)
- WSF 2015 Density (30m, imperviousness)
- WSF 2015 Network (settlement pattern)
- WSF Evolution (30m, 1984-2015)
- WSF/GUF 3D (average building volume)

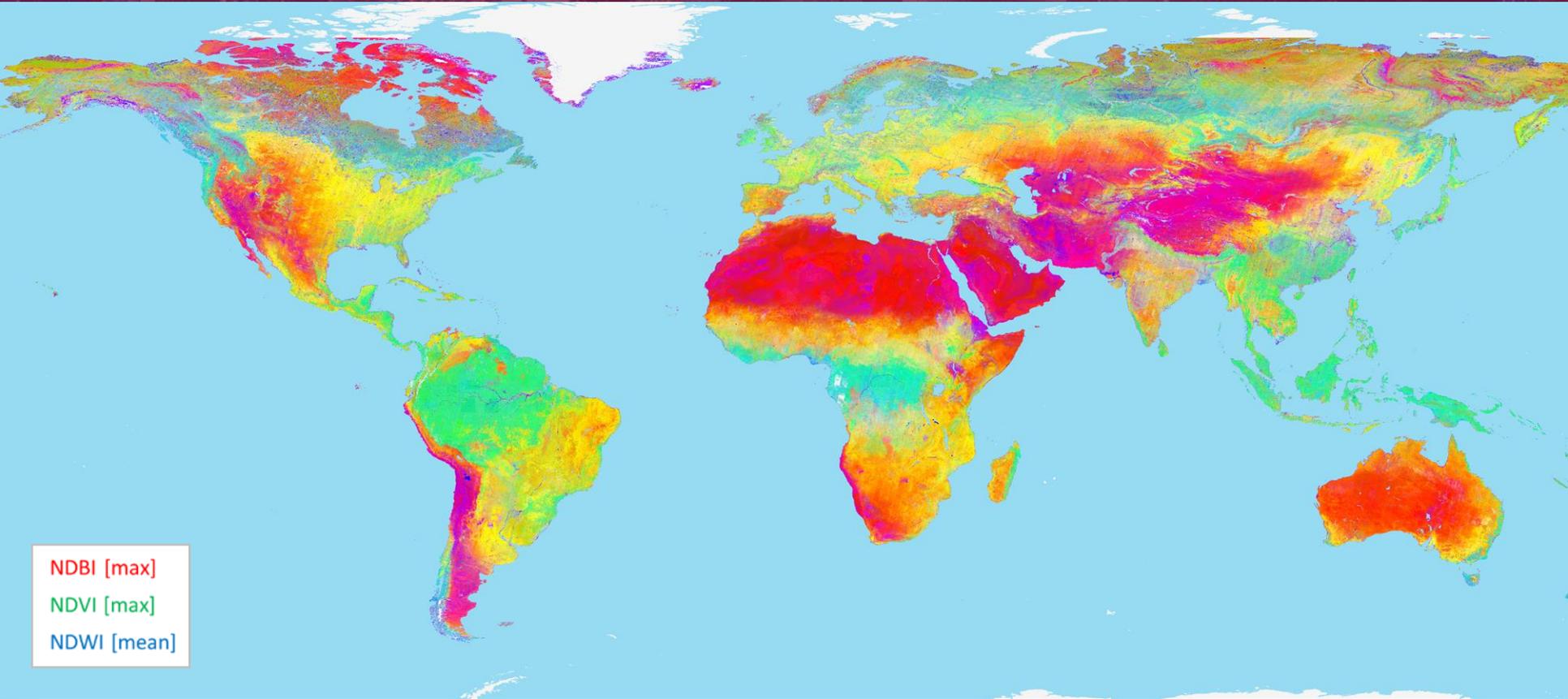
GUF 2012



WSF 2015



World Settlement Footprint: TimeScan Landsat 2015



NDBI [max]
NDVI [max]
NDWI [mean]

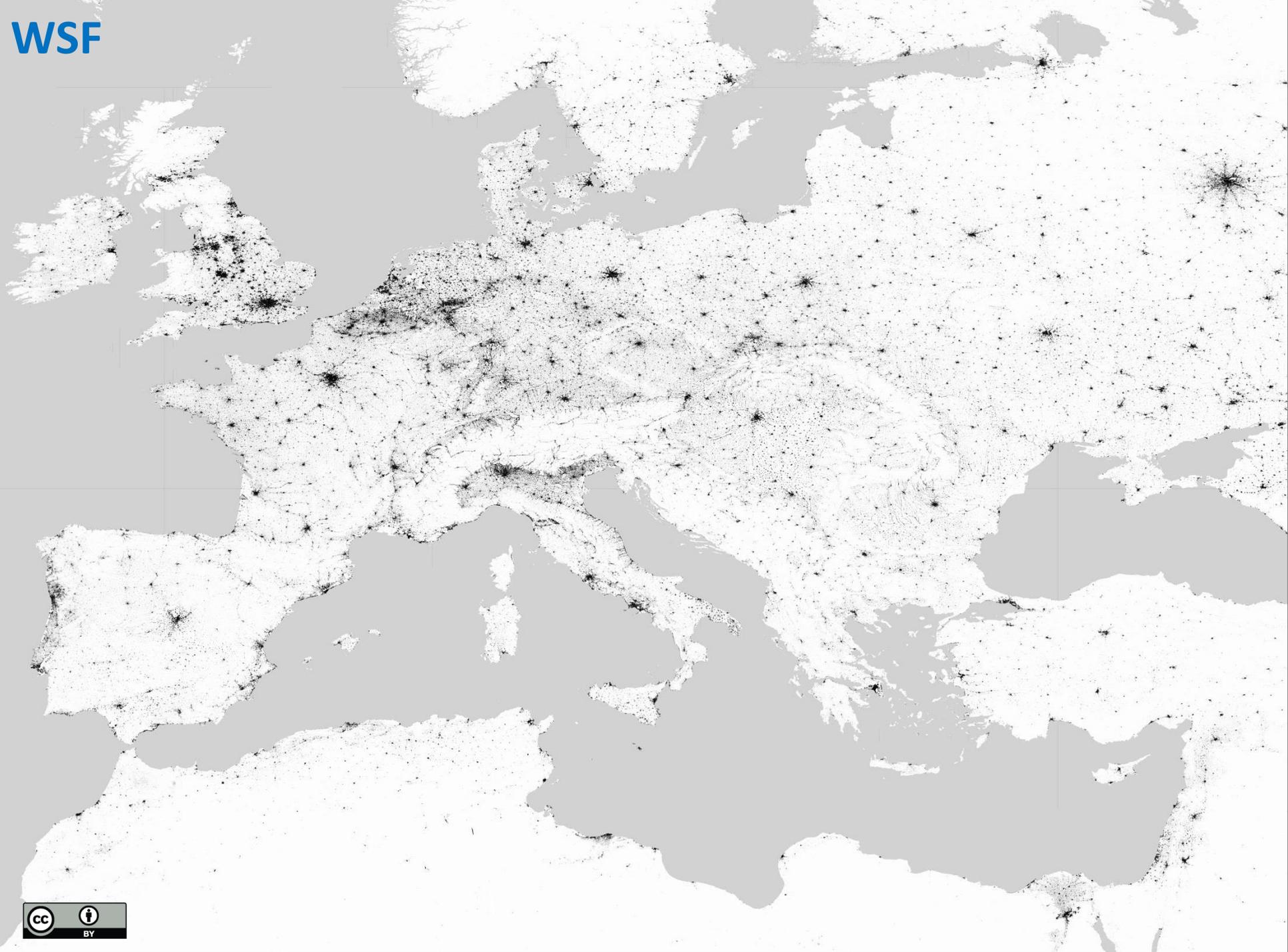
~460.000

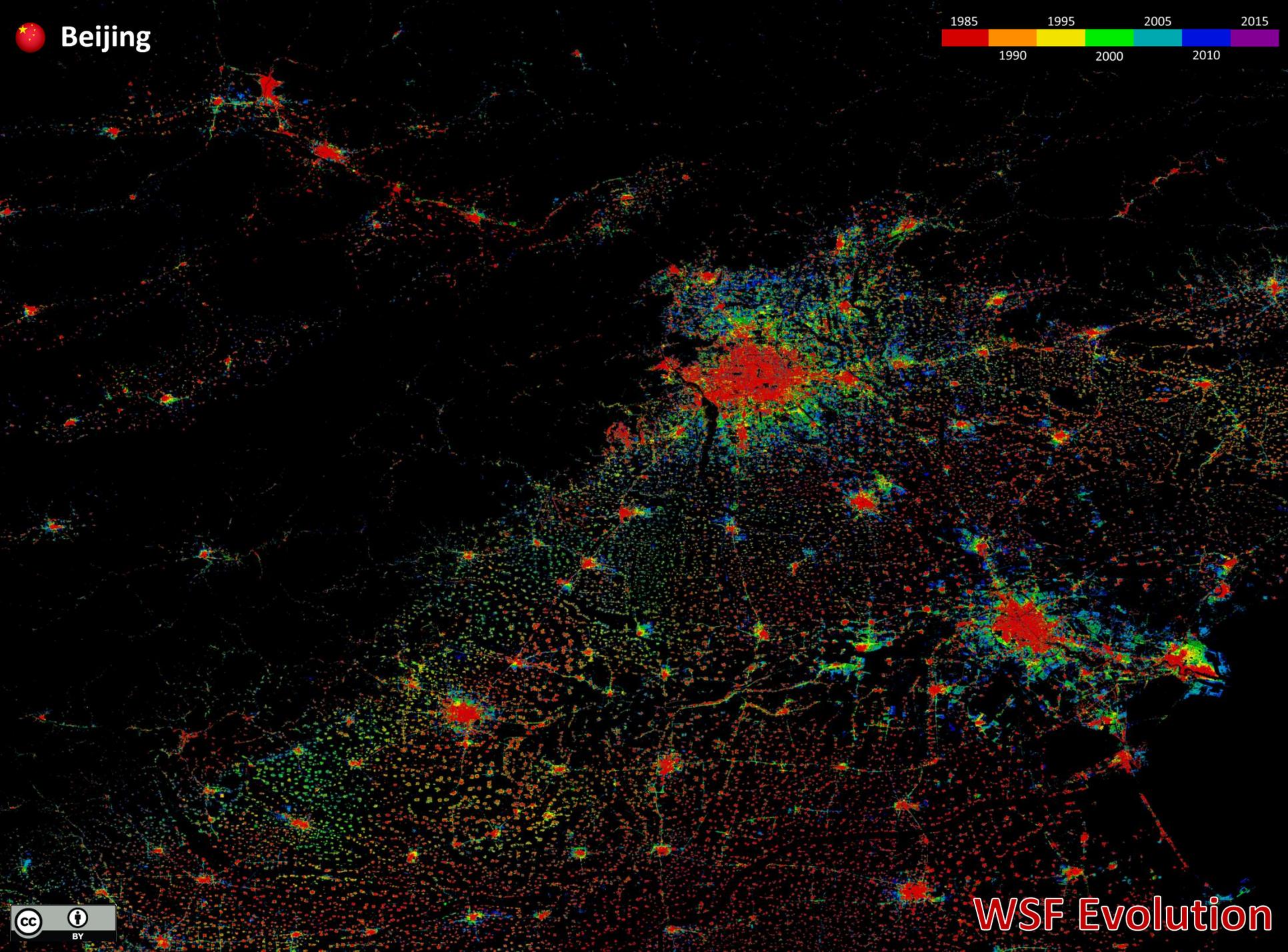
Landsat-8 scenes
collected in **2014-2015**

6 spectral
indices
5 temporal
statistics

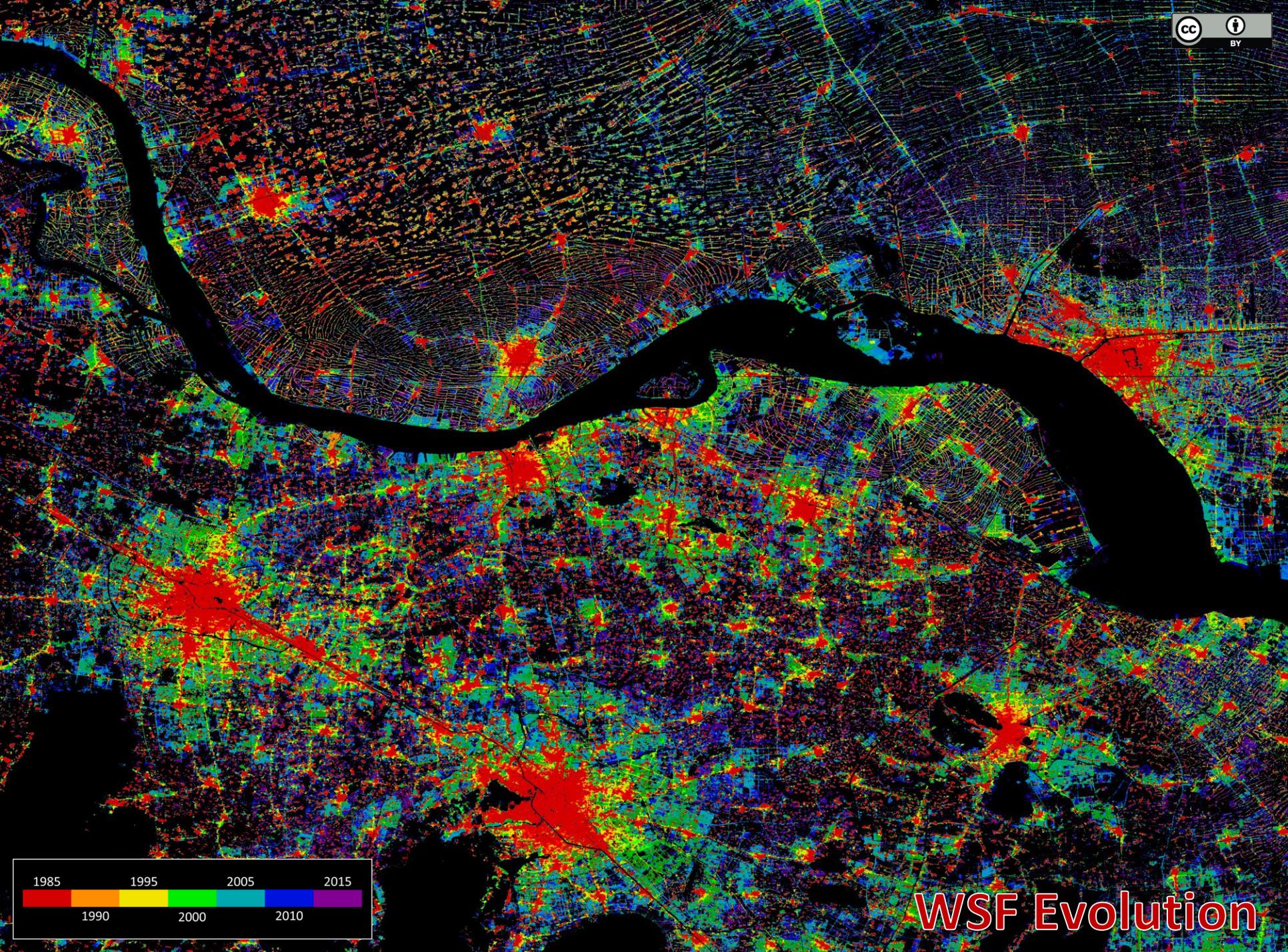
30m
spatial
resolution

> 1.5 PB
intermediate products
25 TB
final product





WSF Evolution



WSF Evolution

A world map with a light blue background and white landmasses, centered on the Atlantic Ocean. The map is overlaid with the title text.

Earth Observation Processing Services

Processing of On-Demand Services

Felix.Bachofer

1837

Upload Data

Products

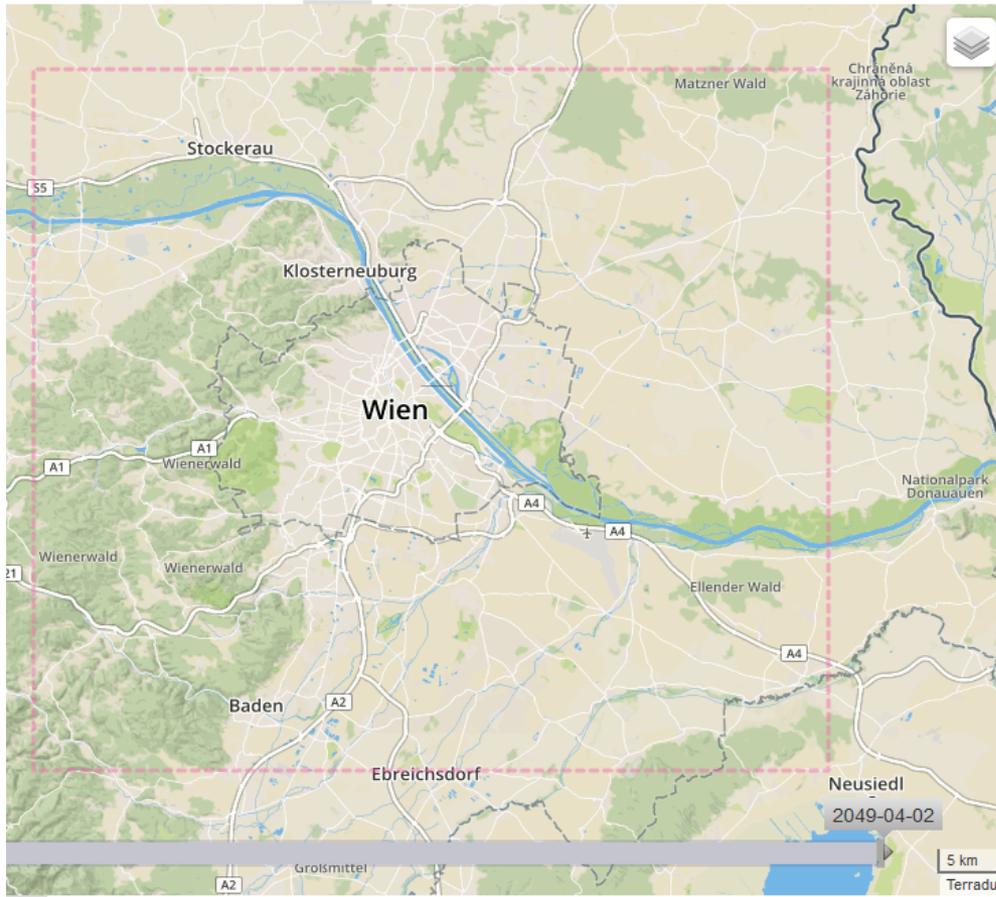
WSF

Timescan

EO Data

Published Results

Private



Features Basket Data Packages

Total results 4 | sel.all | inv.sel | Remove all | Save

Processing Services



Urban TEP S2 timescan

id: b04fa2dd-8ce9-4c95-864c-357f8cc97f41

publisher: Brockman Consult

version: 1.0



Job title *

Urban TEP S2 timescan

Production name

Vienna_calling

Input data set name

Sentinel-2 L1C (Africa, Germa

Date from

2018-01-01

Date to

2018-12-31

Region WKT

POLYGON((16.011 47.964,16.011 48.437,16.805 4

ndbiExpression

(B11 - B8A) / (B11 + B8A)

Sentinel + Landsat Archive - Search and Access

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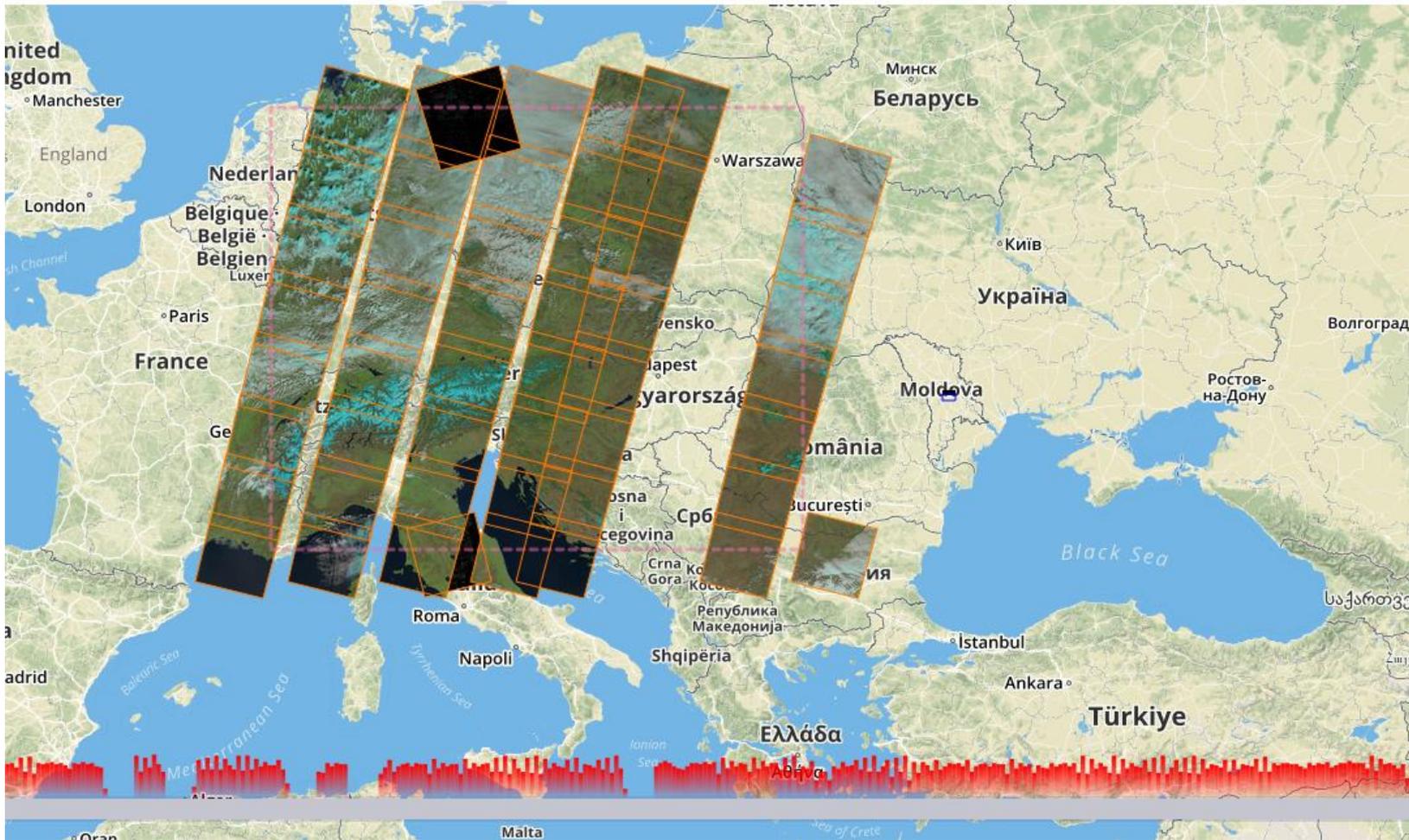


Upload Data

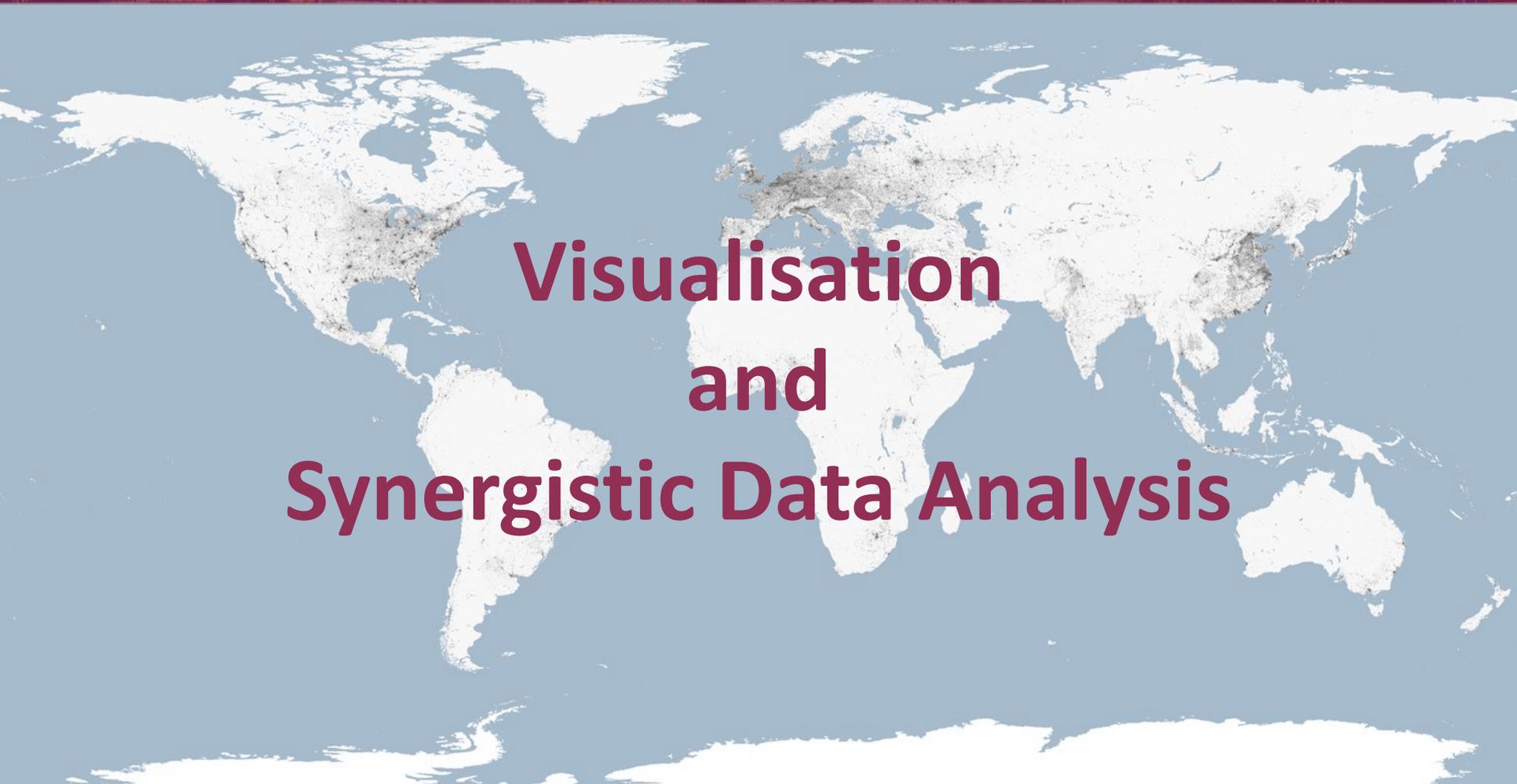
WSF

Timescan

EO Data



Thematic Applications

A world map is centered on the slide, showing the continents in a light beige color against a dark blue background. The map is slightly faded and serves as a background for the main title.

Visualisation and Synergistic Data Analysis

Thematic Applications

Visualisation and Analytics Toolbox (VISAT)

Urban TEP

Product Portfolio

HAPS

Explore External Data Layers

DEMO: Settlements Analysis EU

DEMO: Functional Urban Areas

E04SD

E04SD

E04SD Urban: City Products Exploration

E04SD: Informal Settlements

World Bank Group

City Level Analysis SE Asia

Built-up, Population per Countries

Population distribution & density SE Asia

EOWorld2 City Analysis

Objectives

E04SD-Urban aims at demonstrating the benefits of EO-based geo-information products and services to support urban planning tasks in the context of programs related to the IFIs and stakeholders in Client States. Specifically, its goals are:

- To provide convincing demonstrations of the benefit and utility of EO-based information in the urban framework;
- To provide the intended services on a regional basis for about 40 cities;
- To ensure that the products and services are user-driven via a strong engagement with IFIs, stakeholders and Client States;
- To provide an operational urban service portfolio offering quality controlled products;
- To provide a technology transfer via capacity building exercises in the selected study regions;
- To ensure a robust organization of service networks with the regional counterparts via dedicated local offices;
- To develop new business opportunities in urban EO services for the European industry.

In cooperation with the ESA' Urban Thematic Exploitation Platform (UTEPE) project, the E04SD-Urban project results are made available also via the UTEPE visualization and exploration platform. This shall further streamline the E04SD Urban information services visibility and support further open dialog with MDB staff, Client State government representatives and other stakeholders. It shall also promote best practice examples sharing in more interactive way and thus support the overall exploitation, dissemination and promotion activities in Phase 2.

[Find out more on E04SD-Urban project website.](#)

Land cover

This dataview provides the information about Land cover/ Land use structure of selected cities based on HR and VHR imagery. The theme is divided into three basic visualization: Structure of artificial land, Land cover structure - overview and Land cover structure - detail. All cities are comparable up to the level III for two horizons 2006 and 2016.



Land cover change

This dataview provides information about land cover change based on VHR imagery and showing detailed structure of formation and consumption of land cover land use classes for chosen land cover flows.



Urban greenery - Overview

The information about the urban greenery status and change are visualized at this dataview

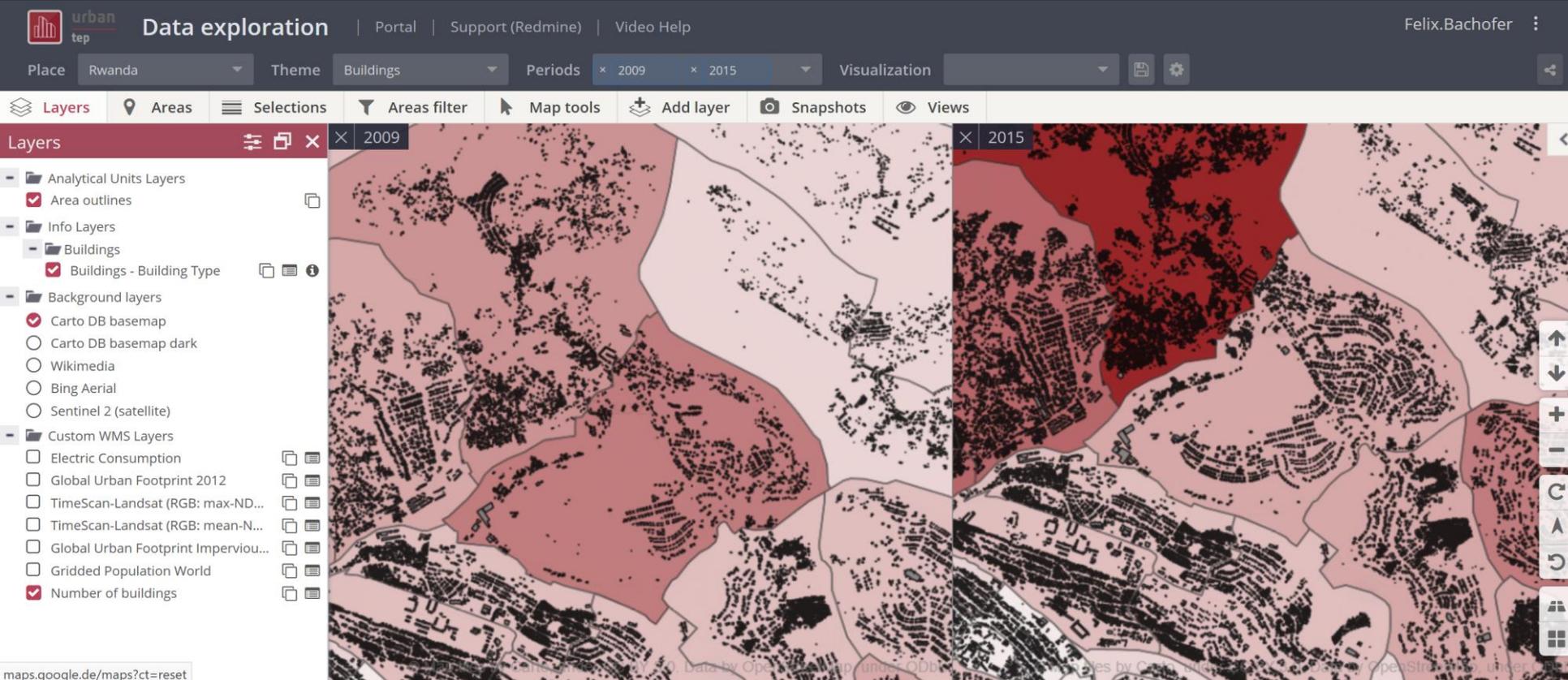


Informal settlements

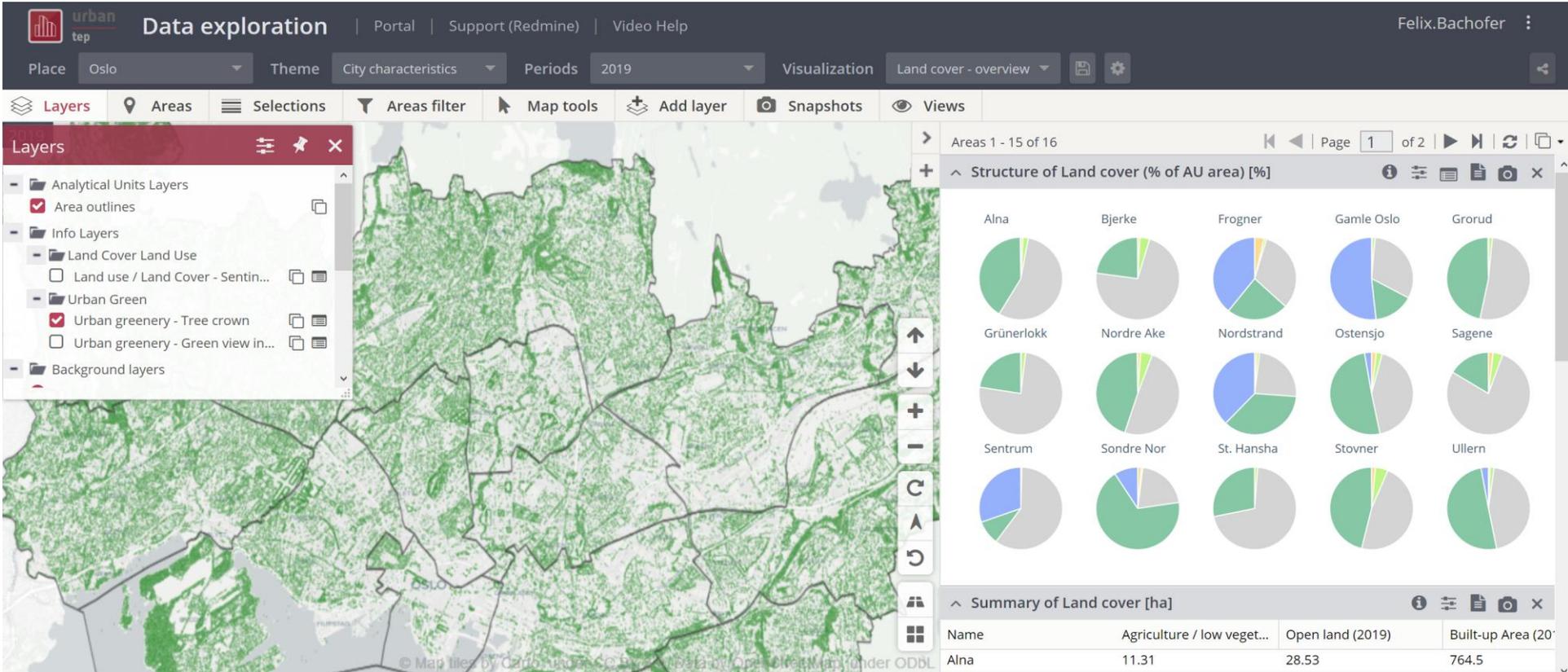
Open and Green Areas

Transportation network

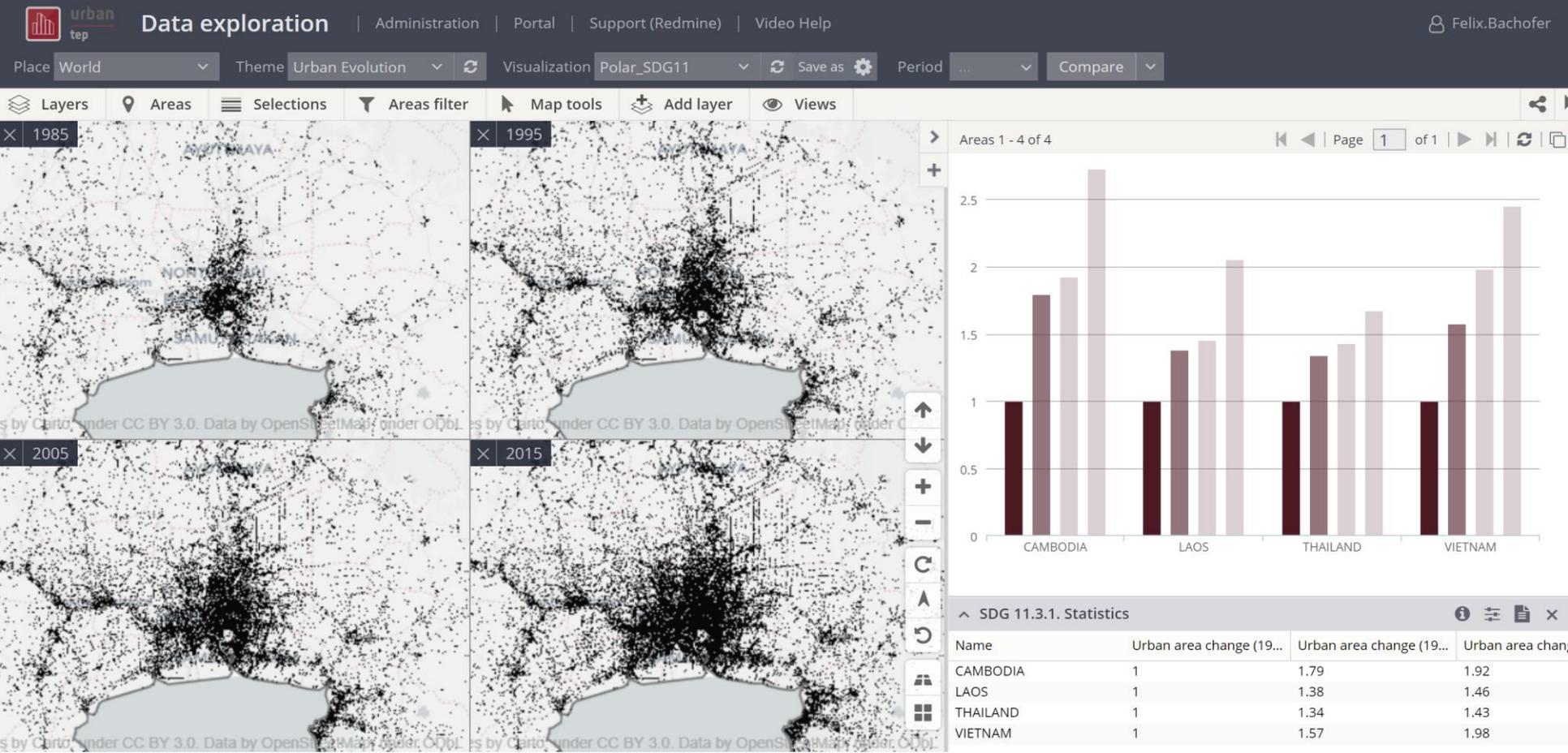
Kigali / Rwanda – Housing Inventory



Oslo Tree Cover / Urban Green

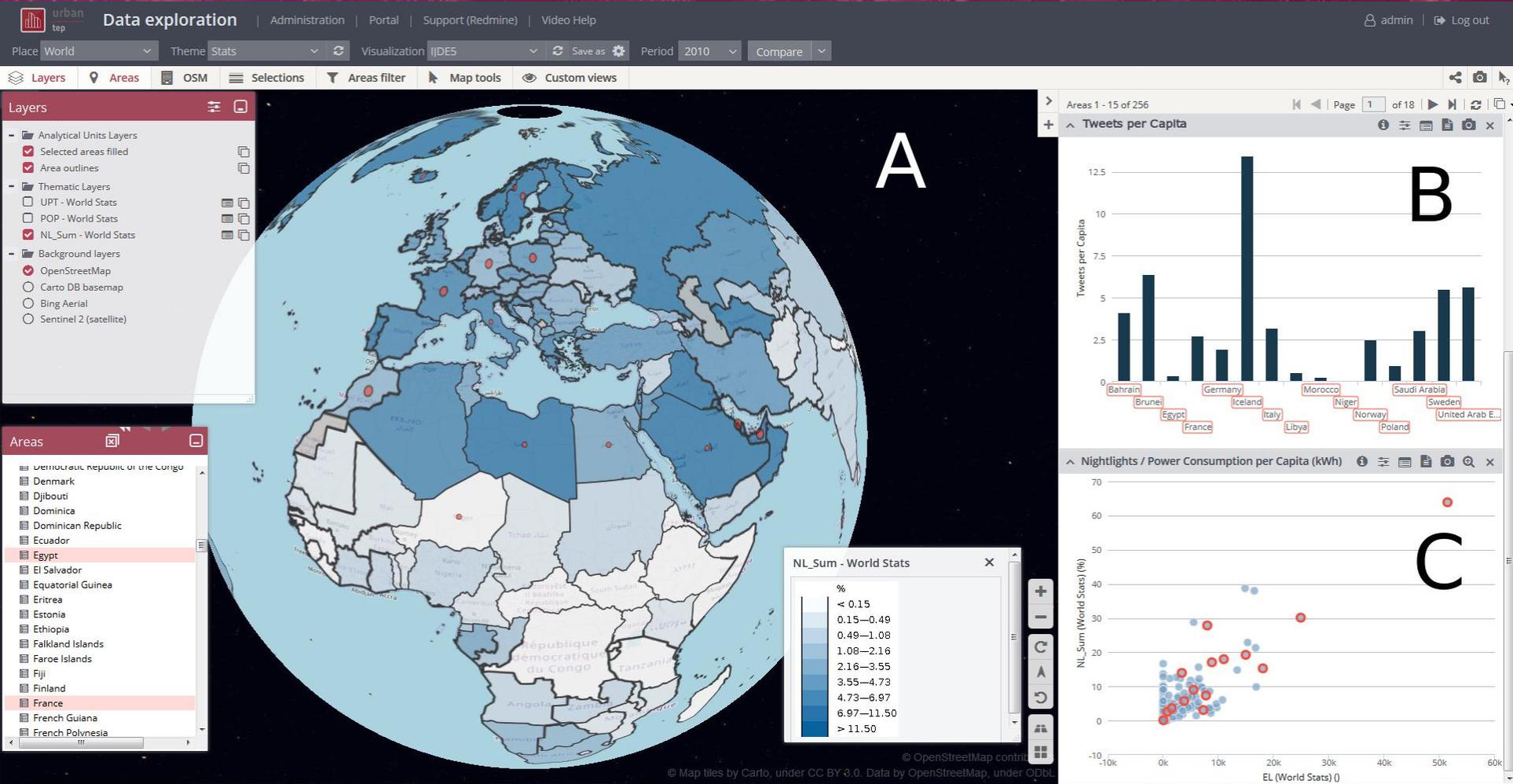


SDG 11.3.1 - SE-Asia



Map: WSF Bangkok 1985, 1995, 2005 and 2015. Bar Chart & Table: SDG 11.3.1 Indicator: Population Change normalized by Settlement Area Change. The higher the ratio the more unbalanced the development between population and settlement area.

Thematic Applications - Global

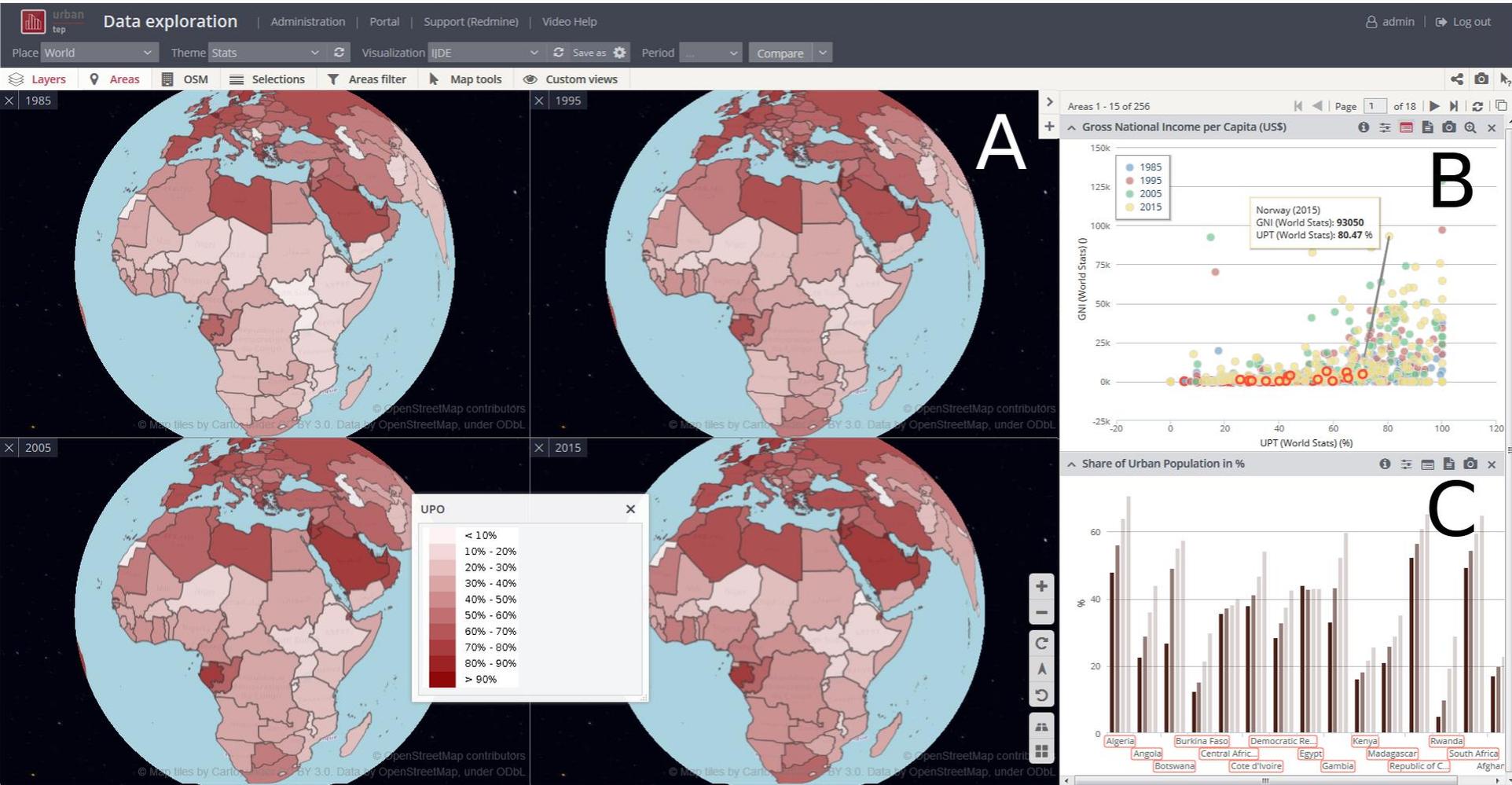


A: Accumulated nightlights intensity of 2015 in relation to the total population of a country in 2015

B: Number of geotagged tweets per capita 2016

C: Accumulated nightlights intensity of 2015 in relation to the electric power consumption per capita [kWh]

Thematic Applications - Global



A: Urban population in % of total population (1985 – 2015)

B: Gross national Income per capita (US\$) (Development 1985 – 2015)

C: Urban population in % of total population (1985 – 2015)

Outlook

- Kick-Off for the pre-operational phase October 2018
- Streamlining of operations, design and functions (until May 2019)
- Release of more functions and datasets to the urban community (e.g. processing services, WSF products)
- Striving for sustainability during operational phase

Esch, T., Asamer, H., Bachofer, F., Balhar, J., Böttcher, M., et al. (2018): **Digital World Meets Urban Planet - New Prospects For Evidence-based Urban Studies Arising From Joint Exploitation Of Big Data, Modern Information Technology And Open Knowledge**. In: - International Journal Of Digital Earth, 1-22, DOI: 10.1080/17538947.2018.1548655.



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German Aerospace Center (DLR)
German Remote Sensing Data Center (DFD)

Dr. Felix Bachofer

Tel.: +49 8153 28 - 3183
Felix.Bachofer@dlr.de

