# Urban Thematic Exploitation Platform (urban-tep.eu)

## Processing, Analyzing and Visualization of Multi-Source and Large-Volume Data for Scientific Research and Urban Applications

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## Background

Urbanization is among the most relevant global trends related to the human presence on the planet. As such, it poses major challenge for the well-being of the next generation. To fully understand and properly mitigate the impact of this change, we need precise and up-to-date global monitoring of the urban areas. The TEP Urban platform focuses on delivering multi-source information on trans-sectoral urban challenges. It provides a set of tools for researchers and service providers to process Earth Observation data and integrate them together with data from other sources in order to provide relevant information for spatial planners, policy makers and other stakeholders.

Key component of the U-TEP project is the implementation of a web-based platform employing distributed high-level computing infrastructures and providing key functionalities for

i) high-performance access to EO data and derived thematic products and indicators,

ii) modular and generic state-of-the-art pre-processing, analysis, and visualization techniques

iii) customized development and dissemination of algorithms, products and services, and

iv) networking and communication.



Web-portal of U-TEP platform (www.urban-tep.eu)

## EO-Data and Products

UTEP provides access to product and services:

- Copernicus and Landsat archive,
- Global thematic datasets (e.g. WSF),
- Indicators and metrics (e.g. TimeScan),
- Value-added basic earth observation data, and
- Innovative demo applications and products.
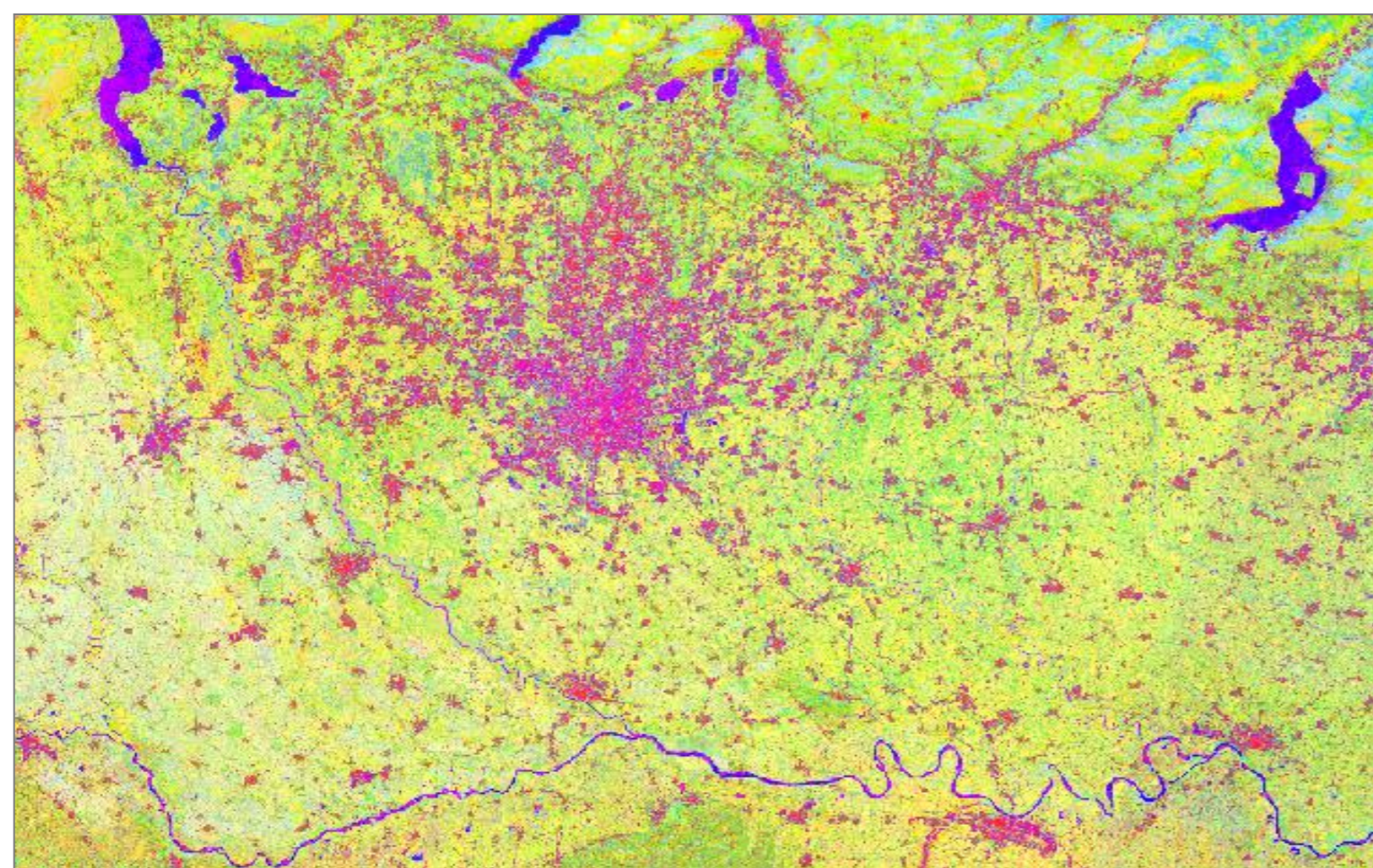


The U-TEP platform has been used to process the global "TimeScan Landsat 2015-2010-2000" product. This single, cloud-free dataset is distilled from >1,000,000 Landsat images acquired between 2000-2015. The TimeScan procedure helps users exploiting information from masses of EO data.
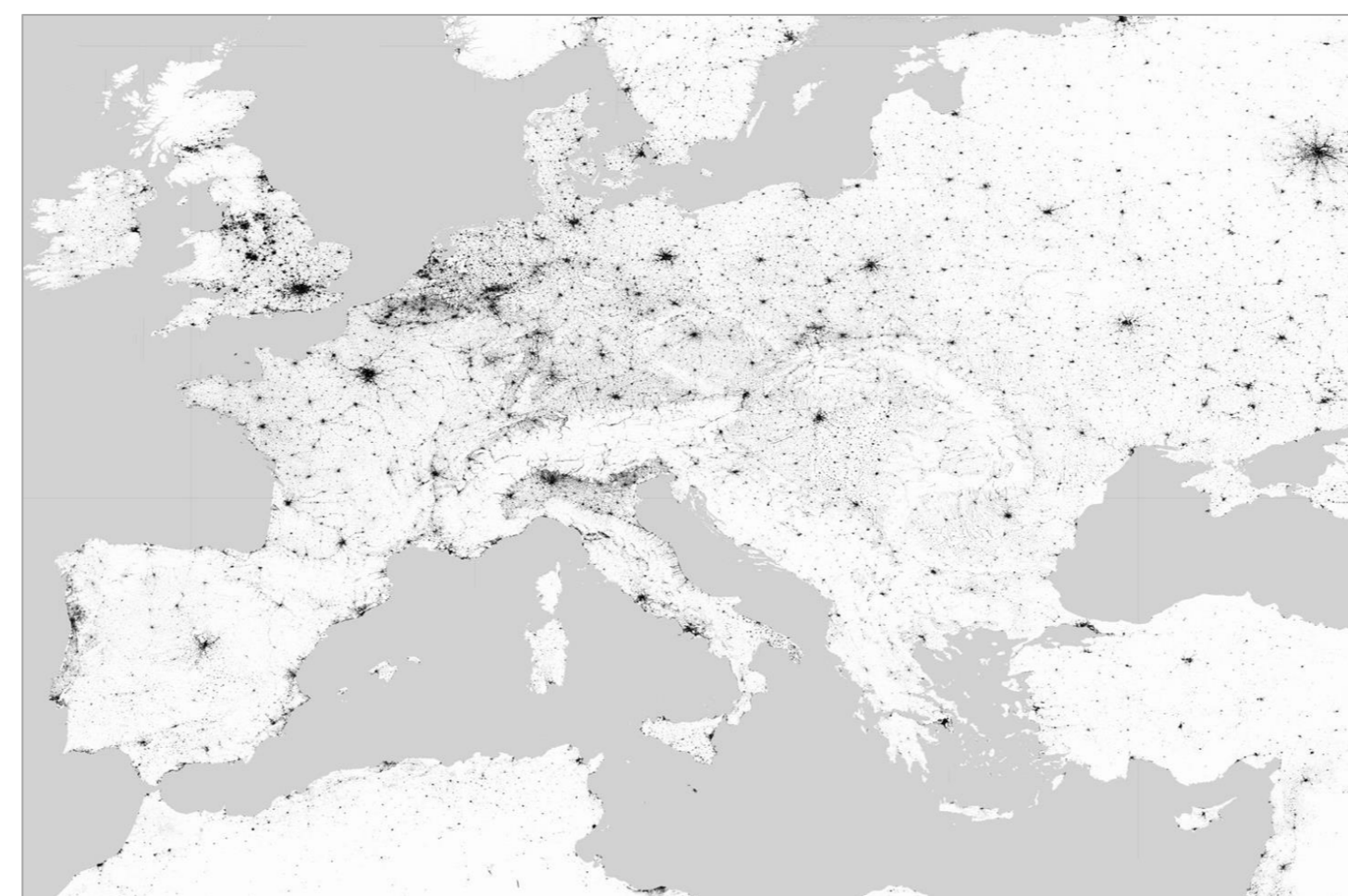


World Settlement Footprint (WSF) 2015. The WSF product suite includes the WSF-2015, WSF-DenS, WSF-NetS and the WSF - Evolution. In addition, U-TEP makes the "Global Urban Footprint (GUF®)" human settlements map available at full spatial resolution of 12 m for scientific use, along with a 84 m version for any non-profit use.
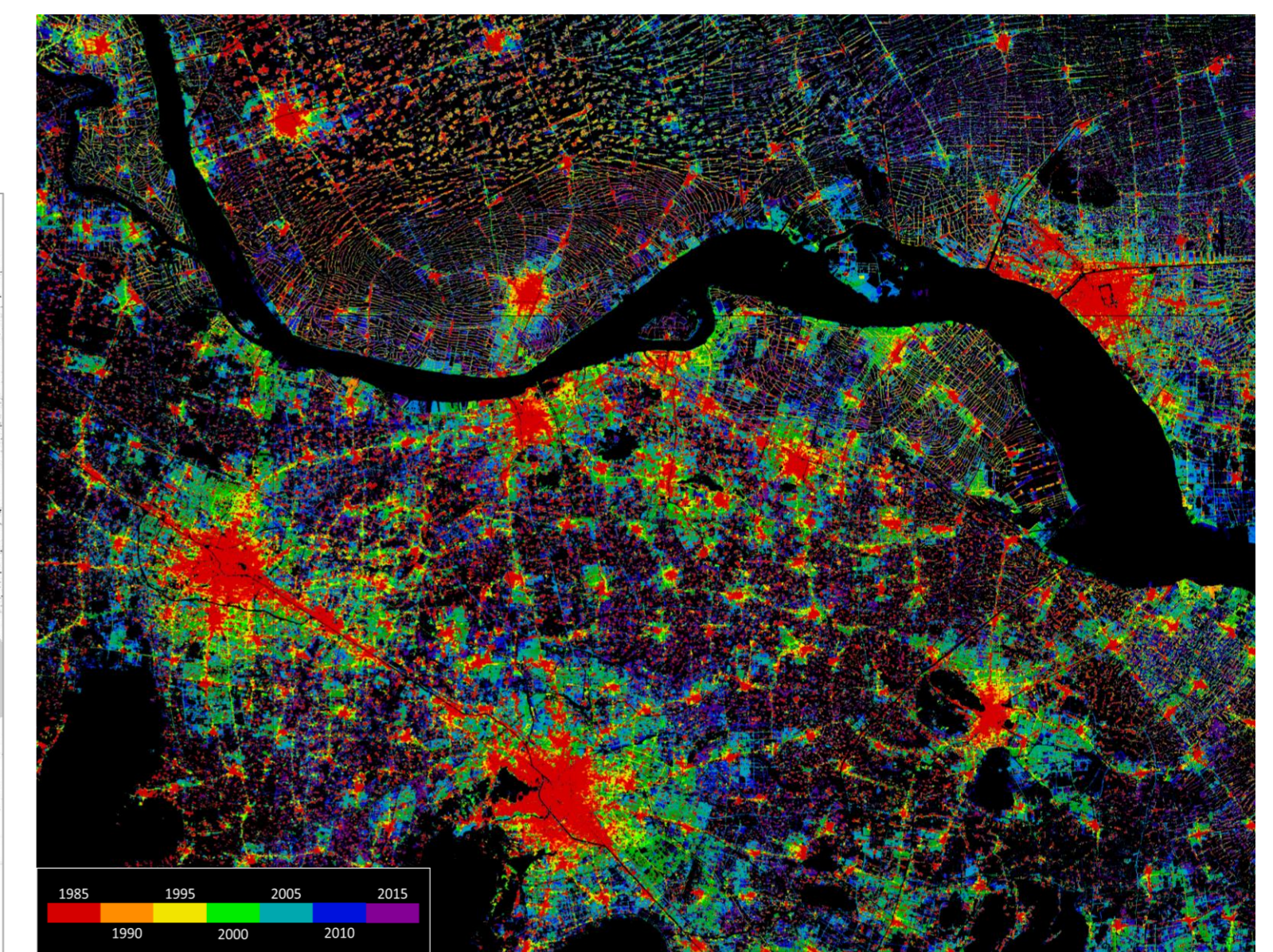


The global WSF - Evolution which describes the annual spatio-temporal development of the each human settlement from 1985-2015 (Example of Greater Shanghai Region, China)

## U-TEP Services

Develop and Offer Content: To foster innovation and collaboration, U-TEP allows for the individual development and deployment of analysis techniques, thematic products and application-oriented services. Therefore, the platform offers interfaces to upload and run user-defined algorithms and processes and provides functionalities to develop own methods and products directly on the platform (e.g., by using the Sentinel tool boxes). Developed applications or products can then optionally be presented and shared at the U-TEP application and product store.
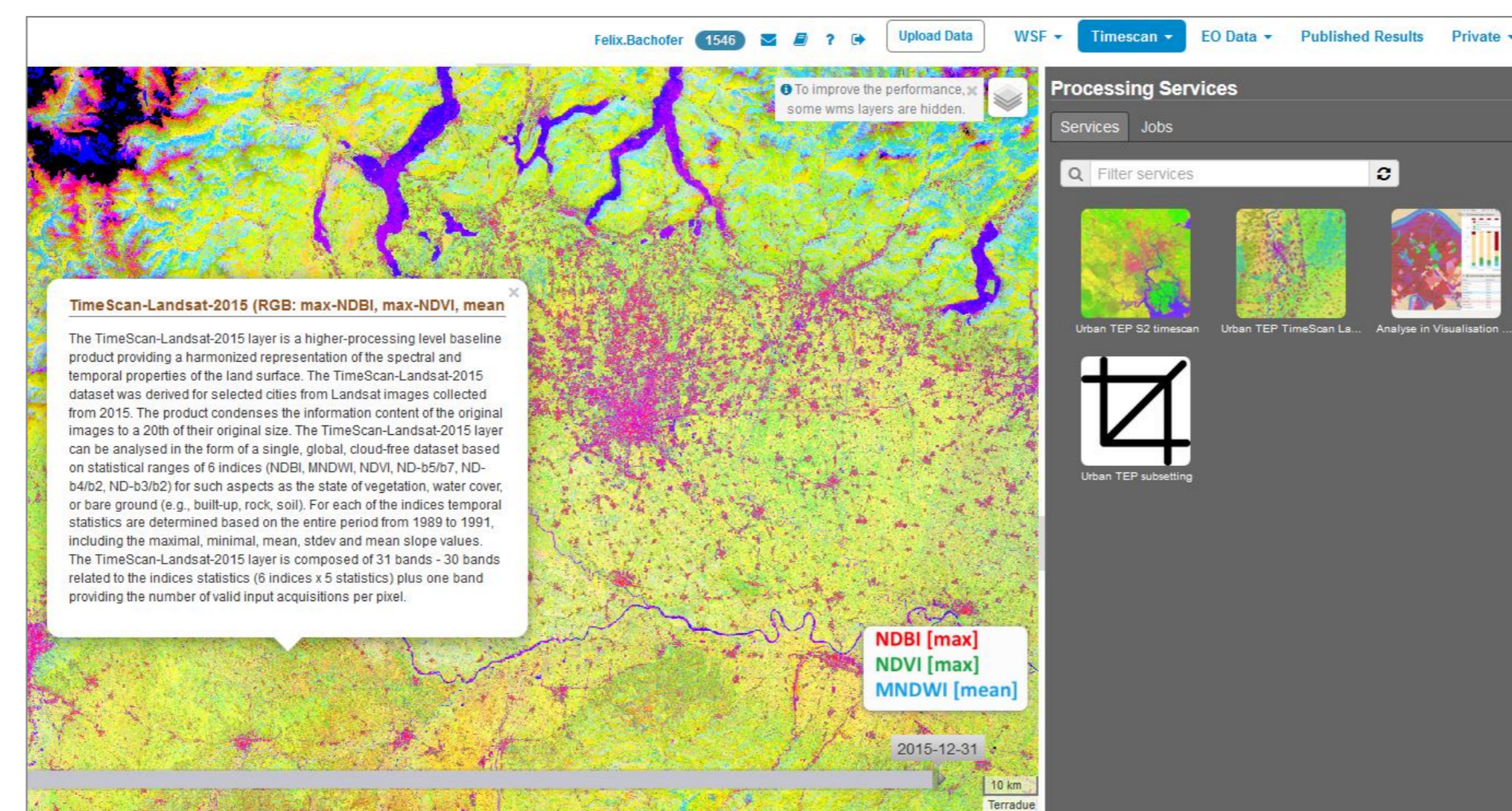


Run existing processing services and develop your own processing applications
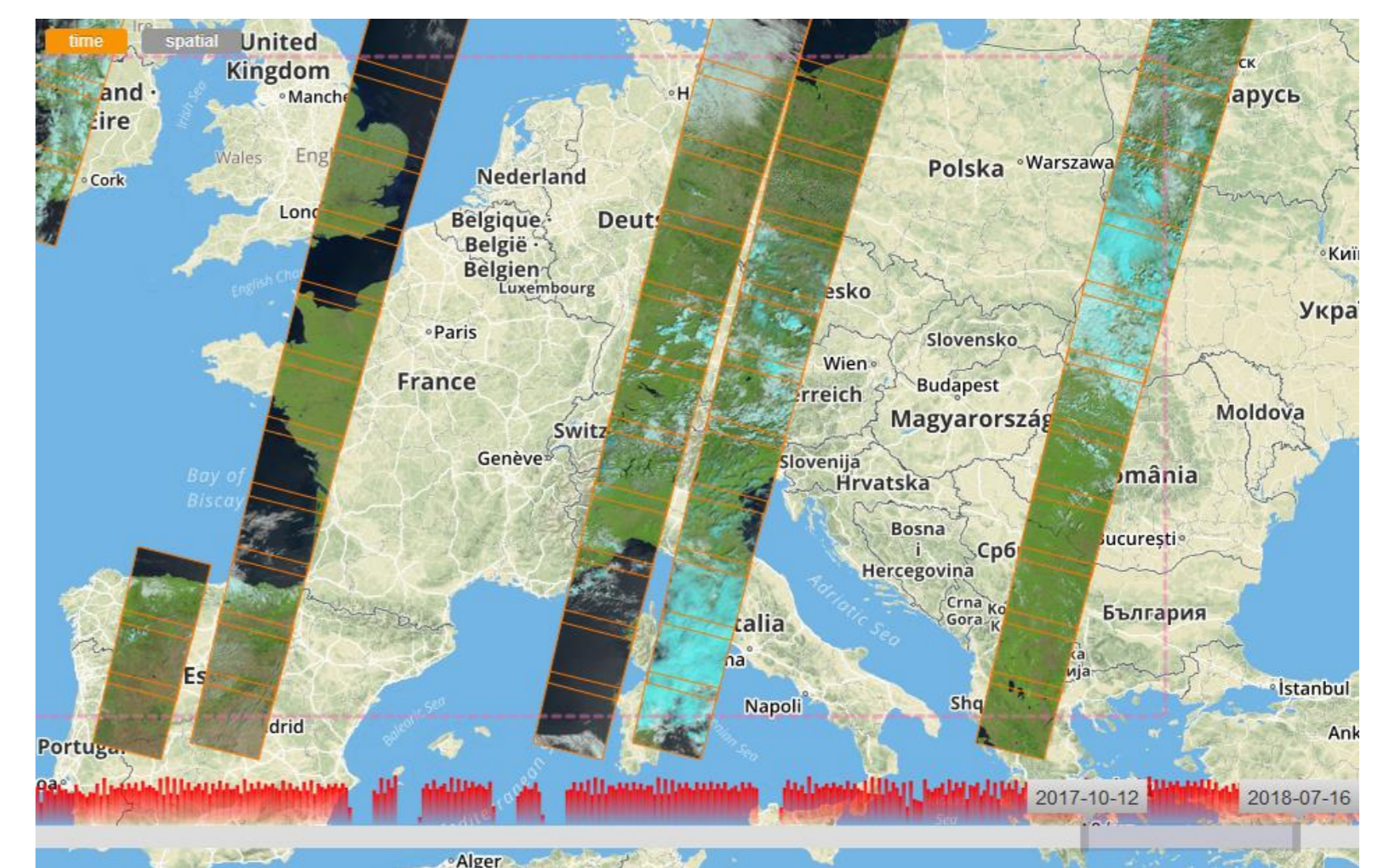


Access the Copernicus and Landsat archives

Explore, Task and Visualize Thematic Applications: The user is enabled to discover and select a broad spectrum of existing thematic content on manifold urban themes provided on the U-TEP. Moreover, the user can upload data and content (e.g. statistics) of her/his own and jointly analyze and visualize the available thematic layers based on state-of-the-art tools of Geographic Information Systems (GIS) and data visualization. Any openly available thematic content or generated result can be exported.
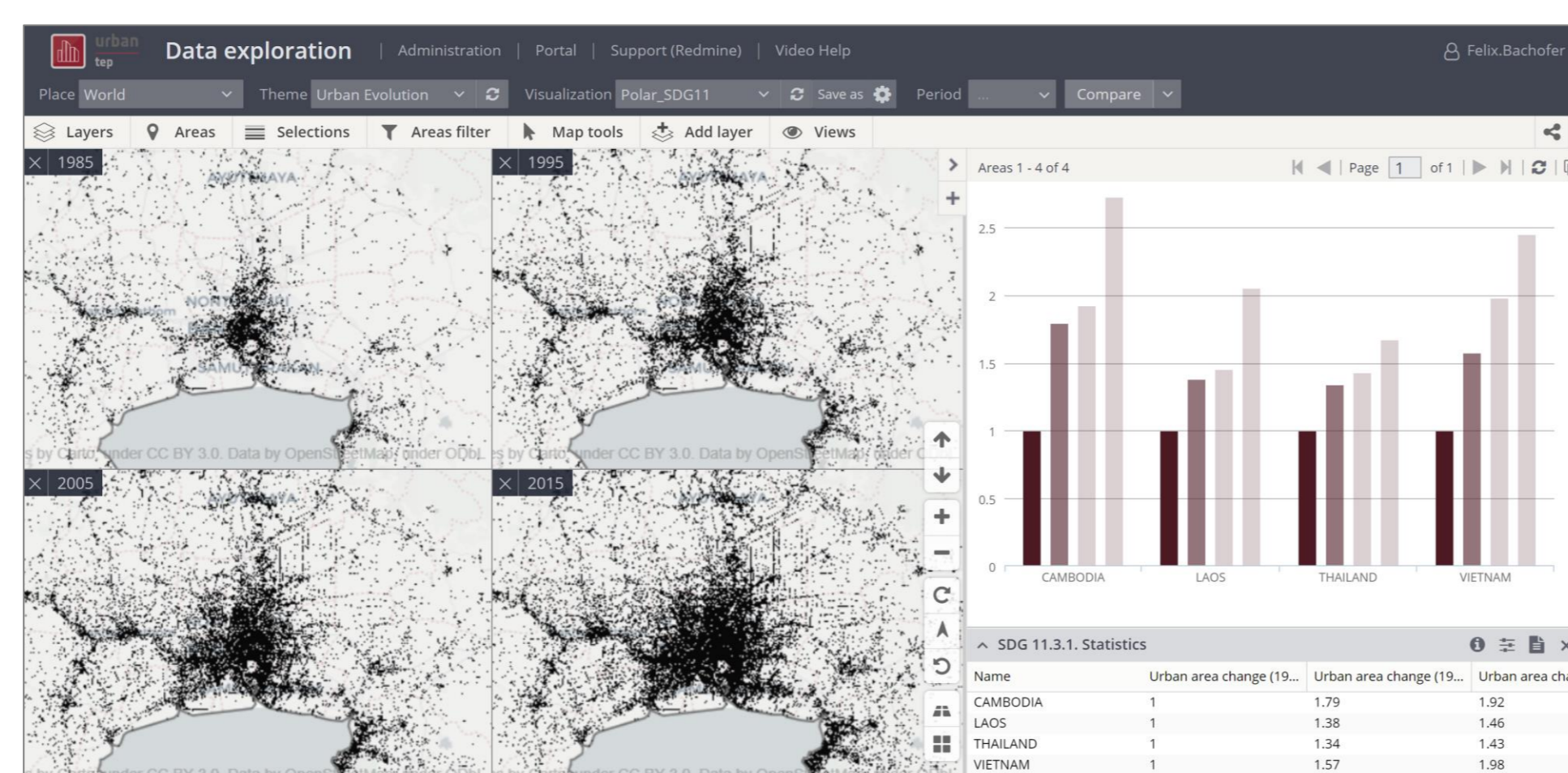


WSF Bangkok 1985, 1995, 2005 and 2015. Bar Chart & Table: SDG 11.3.1 Indicator: Population Change normalized by Settlement Area Change. The higher the ratio the more unbalanced the development between population and settlement area.

Connect with Users and Communities: The U-TEP provides various opportunities to inform about innovative products, applications and initiatives and the latest state-of-the-art methods and solutions. These approaches and products might even be available for first testing on the platform by the interested user and the user can also contribute a rating of or feedback to the method or solution in order to support further optimization and/or operationalization.

Communication Hub

## Outlook

UTEP has currently entered the operational phase. Currently, the platform is streamlined based on the user feedback, new products are prepared /WSF Suite) and additional services developed.

The technological progress, that U-TEP is expected to initiate, will provide a number of advantages for the users, including:

- Free and open access to state-of-the-art infrastructures (computing, data management, storage), techniques (e.g., multi-source data fusion and analysis) and EO-derived information,
- Exploitation of EO data streams and archives,
- Validated and benchmarked algorithms and products,
- Access to network of experts and stakeholders that share experiences and best practice applications,
- Market place of ideas and driver of innovation,
- Gaining of better knowledge on urban system and increased efficiency, effectiveness and sustainability of functions and services in policy, planning, economy, and science.

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