Development and Consolidation of Geospatial Sustainability Services for Adaptation to Environmental and Climate Change Urban Impacts

The **DECUMANUS** project

General presentation

decumanus

European Commission

EUROSENSE

DLR

GeoVille

POLITÉCNICA

University of the West of England BRISTOL

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CONTENT

DEVELOPMENT AND CONSOLIDATION OF GEOSPATIAL SUSTAINABILITY SERVICES FOR ADAPTATION TO ENVIRONMENTAL AND CLIMATE CHANGE URBAN IMPACTS



EO-based Smart City Decision Support Services for Integrated Urban Governance

FP7 cofounded leaded by Indra Sistemas

Theme [SPA.2013.1.1-06]: Stimulating development of downstream services and service evolution

Project Start: December 2013

Project End: May 2016

THE CONSORTIUM - COMPLEMENTARY

Earth Observation Services providers

Urban users expert

Business model

indra

DLR

POLITÉCNICA

EUROSENSE

GeoVille

UWE BRISTOL University of the West of England

CWare

THE CONSORTIUM – USER FOCUS

DECUMANUS has been fundamentally user defined and driven

DECUMANUS enhances the capacities of urban planners regarding the assessment and management of climate related and other environmental variables at local level. It is anticipated that these products will have demonstrable impact on the service chain of the targeted community.

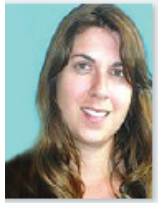
DECUMANUS User Feedback

"Climate change management requires reliable knowledge about the adequate scale of adaptation measures and, on the other hand, how the emissions from energy use can be effectively decreased. This is exactly what the DECUMANUS services will deliver to the cities of the Helsinki Metropolitan Area. Besides, we can use this data in monitoring the implementation of our regional climate strategies."

Johannes Lounasheimo, Climate Specialist, HSY

Marco Pialorsi
GIS Specialist, City of Milan

„City planners and Architects of the General Urban Planning Department of the municipality of Milano, along with technicians of AMAT (Municipal Agency for Mobility, Environment and Territory) will benefit from the innovative Green Roof detection Analysis and from the classification of land Imperviousness, performed by DLR. The tools will be used as a Decision Support System for urban planning and green spatial policies of the city."



"The city of Antwerp is looking forward to develop a set of geo-spatial products together with the service providers and city partners in the Decumanus project . By involving the end users, services will be tailor-made for cities tackling actual urban climate challenges. We expect Decumanus to be helpful in reaching the mitigation goals as put forward in the cities Climate Plan."

Griet Lambrechts, Policy advisor sustainable urbanism, City of Antwerp

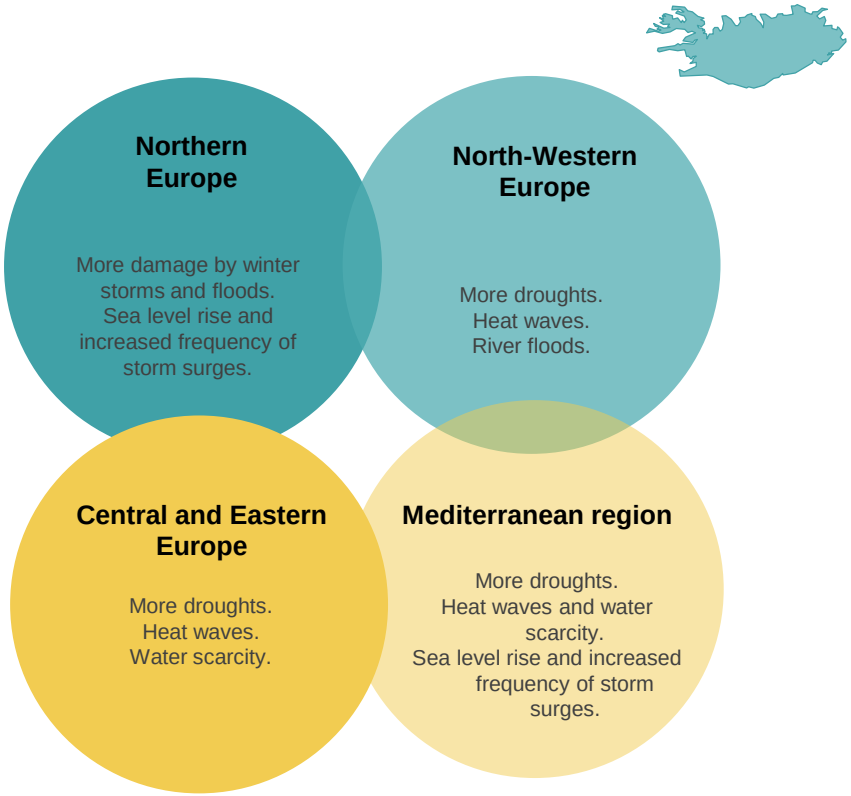
"A Decision Support System that will increase the proficiency of the city of Milan in understanding and managing climate change issues and in acting to protect population."

Simona Collarini, Director of General Urban Planning Department of the municipality of Milano
Maria Berrini, CEO and Director of AMAT (Milano Agency for Mobility, Environment and Territory)

CONTENT

WHAT ARE THE IMPACTS OF CLIMATE CHANGE IN EUROPEAN CITIES?

Falta referencia



Legislative drivers and policy commitments are encouraging European city administrations to take actions with regard to societal challenges including climate change adaptation, reduction of CO2 emissions, energy efficiency, poor air quality, and the re-naturing of cities

WHAT ARE THE IMPACTS OF CLIMATE CHANGE IN EUROPEAN CITIES?

- Directive 2012/27/eu of the european parliament and of the council of 25 October 2012 fro Energy Efficiency Directive
- Directive 2009/28/CE of the European Parlament and the Council, 23th April 2009 ofr the promotion of the use of energy from renewable sources
- European Energy Strategy 20-20-20 and the Roadmap 2030-2050
- European Directive 2010/31/UE for Zero emisiones buildings
- European Directive 2012/27/UE –Article 4 and 5 for rehabilitation of buildings
- Municipalities Urban planning and strategies for mitigation and adaptation of the cities for mitigation and adaptation to the climate change

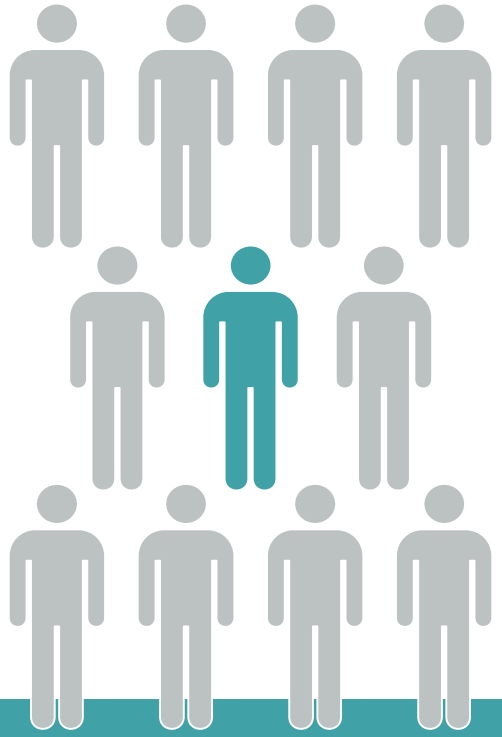
HOW DO THESE IMPACTS AFFECT OUR LIFE?: CITIZENS

- How much does climate change affect our cities?
- How green are our cities?
- How many people are affected by climate change effects?
- How much energy do our buildings lose?
- How high is the air pollution in our cities?
- How does bad air quality affect our daily life?

WHAT CAN WE DO?

The key to effective governance of cities is the generation of the necessary intelligence to inform decision making by politicians,

- to guide urban policy making and implementation
- to inform and engage all citizens in the delivery of sustainable urban development



DECUMANUS is dedicated to provide this urban intelligence, and aims fundamentally to secure the more effective governance of the cities of Europe.

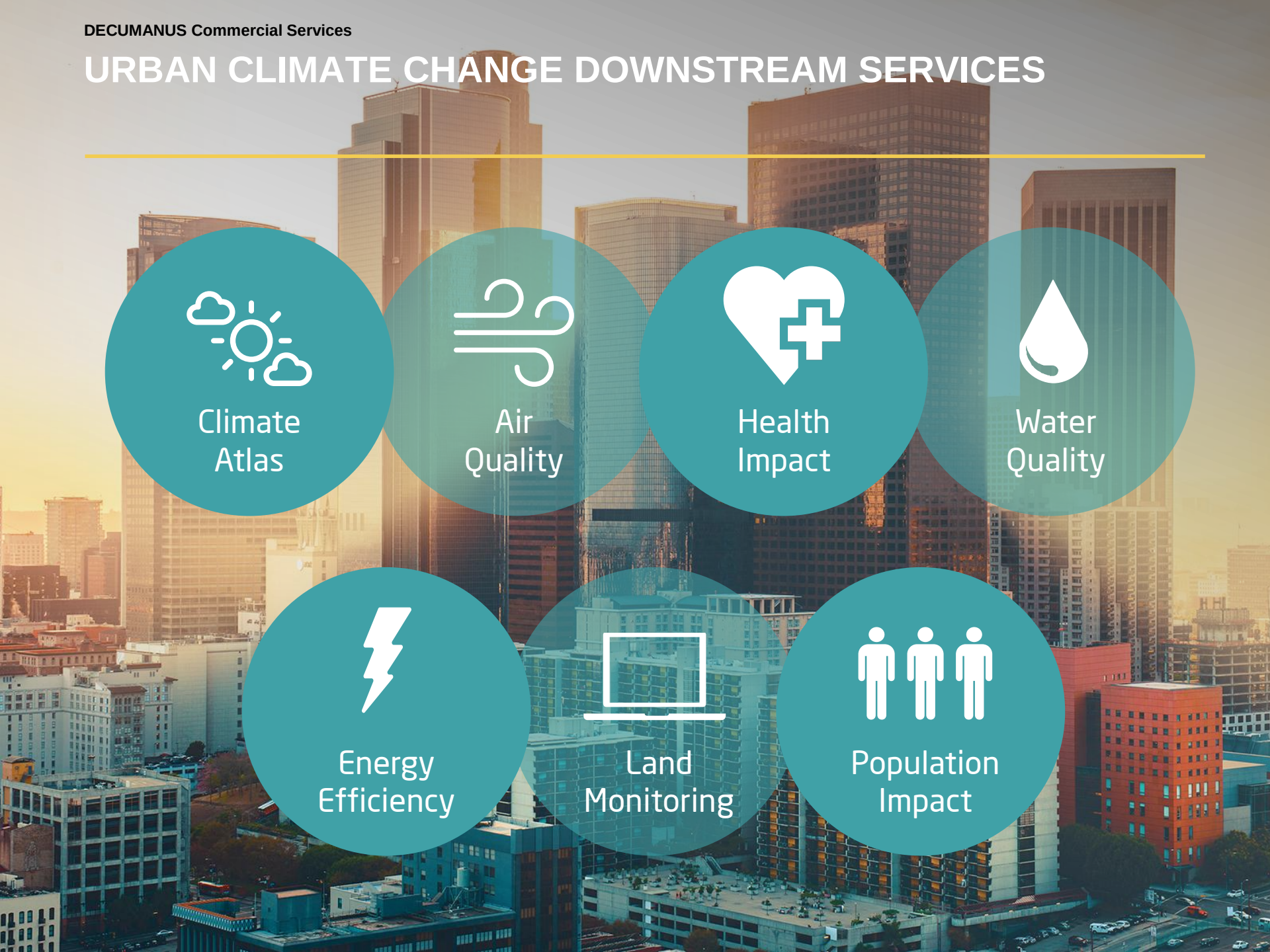
WHAT DO WE PROVIDE?

DECUMANUS provides services accessible to urban managers dealing with societal challenges including climate change, based on the philosophy that it is possible to adapt to, and mitigate, the challenges if you can understand and measure them.

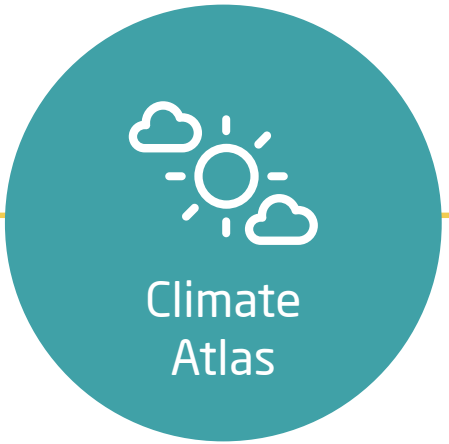
CONTENT

DECUMANUS Commercial Services

URBAN CLIMATE CHANGE DOWNSTREAM SERVICES

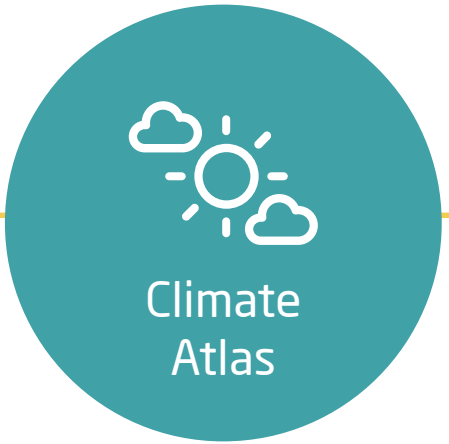


SOME TICS



- Basic and Advanced Climate variables
- Predictive mode for 2030, 205 and 2100
  IPCC scenarios: 4.5 and 8.5
- Basic product: 200 m
  Premium product: 50 m

LIST OF VARIABLES



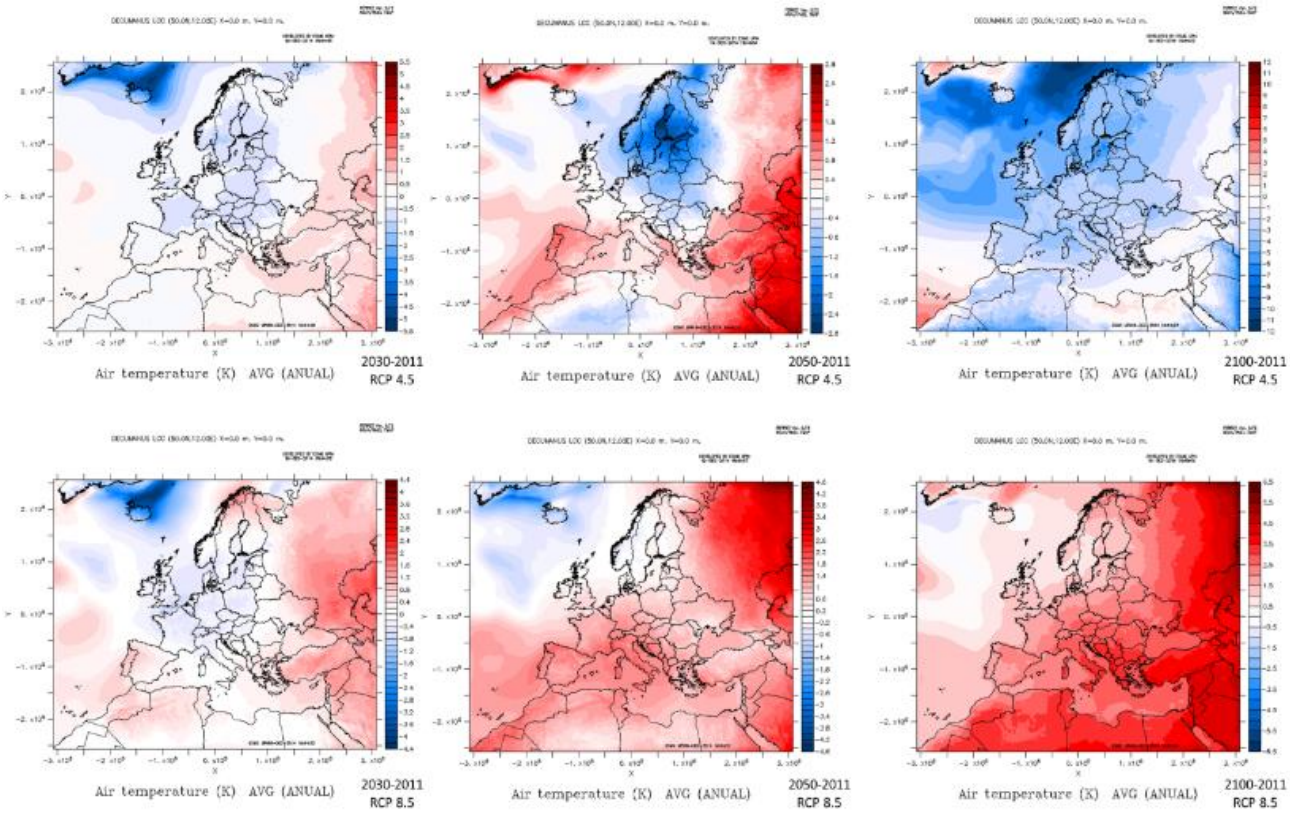
- Total Precipitation
- Temperature
- Heat Waves
- Pedestrian Wind and Thermal Comfort
- Daily Max & Min Temperature
- Tropical Nights
- Summer Days
- Energy fluxes

LIST OF VARIABLES

Climate Atlas

EUROPEAN DOMAIN WRF-CHEM 25 KM

Spatial distribution of the differences in annual mean air temperature (Kº) for 2030 (left), 2050 (middle), 2100 (right) respect to 2011, following RCP 4.5 (upper) and RCP 8.5 (bottom) scenarios.



SOME TICS

- Air quality indicators. Main pollutants monitoring
- Predictive mode for 2030, 2050, 2100 IPCC scenarios: 4.5 and 8.5
- Basic product: 200 m
  Premium product: 50 m

LIST OF VARIABLES

Basic and Premium Services

- Sulphur Dioxide (SO2)
- Nitrogen Dioxide (NO2)
- Nitrogen Monosxide (NO)
- Carbon Monoxide (CO)
- Ozone (O3)
- Particle Matter 10mm (PM10)
- EC
- Annual number of exceedances EU directive(Total)
- Non-attainment grid cells EU directive

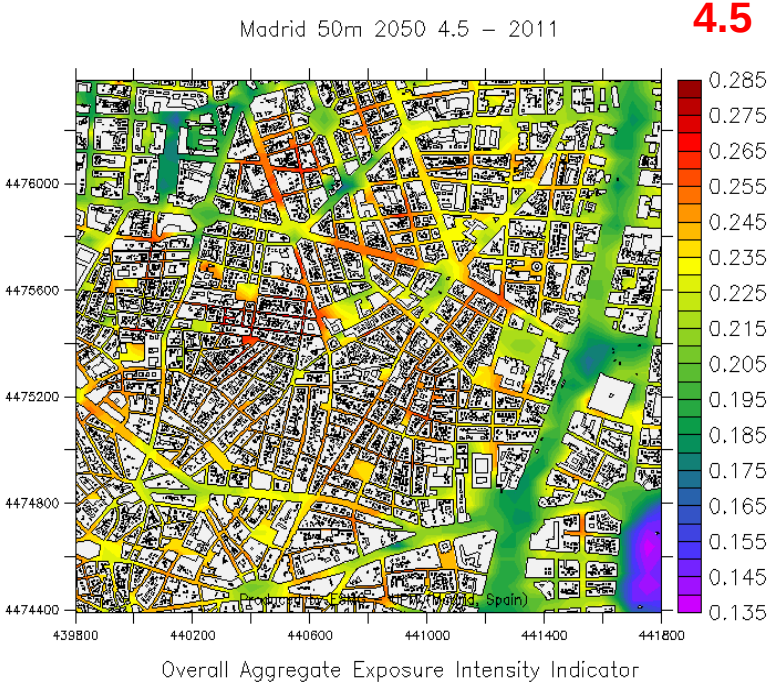
LIST OF VARIABLES

Air Quality

LOCAL DOMAIN: 5 european cities

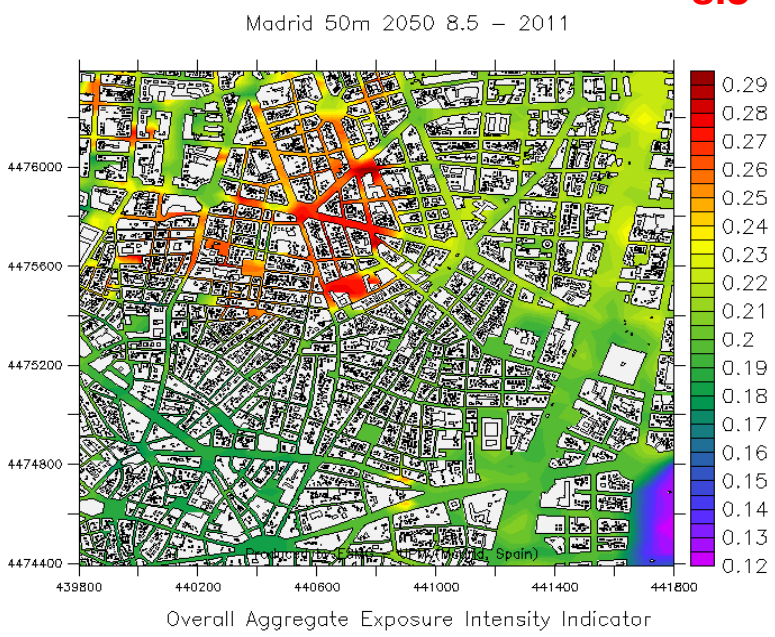
"OVERALL AGGREGATE EXPOSURE INTENSITY INDICATOR" : Identifies the more sensible areas for global climate change based on 15 climate indicators.

4.5



*Buildings covering areas less than 400m2 are not shown

8.5



*Buildings covering areas less than 400m2 are not shown

LIST OF VARIABLES

Air Quality

LOCAL DOMAIN: European cities

EC 2030 4.5 Scenario for Milan city (only traffic variations)

SOME TICS

- Citizen health impact indicators
- Predictive mode for 2030, 2050 and 2100
  IPCC scenarios: 4.5 and 8.5
- Basic product: 200 m
  Premium product: 50 m

LIST OF VARIABLES

Basic and Premium Services

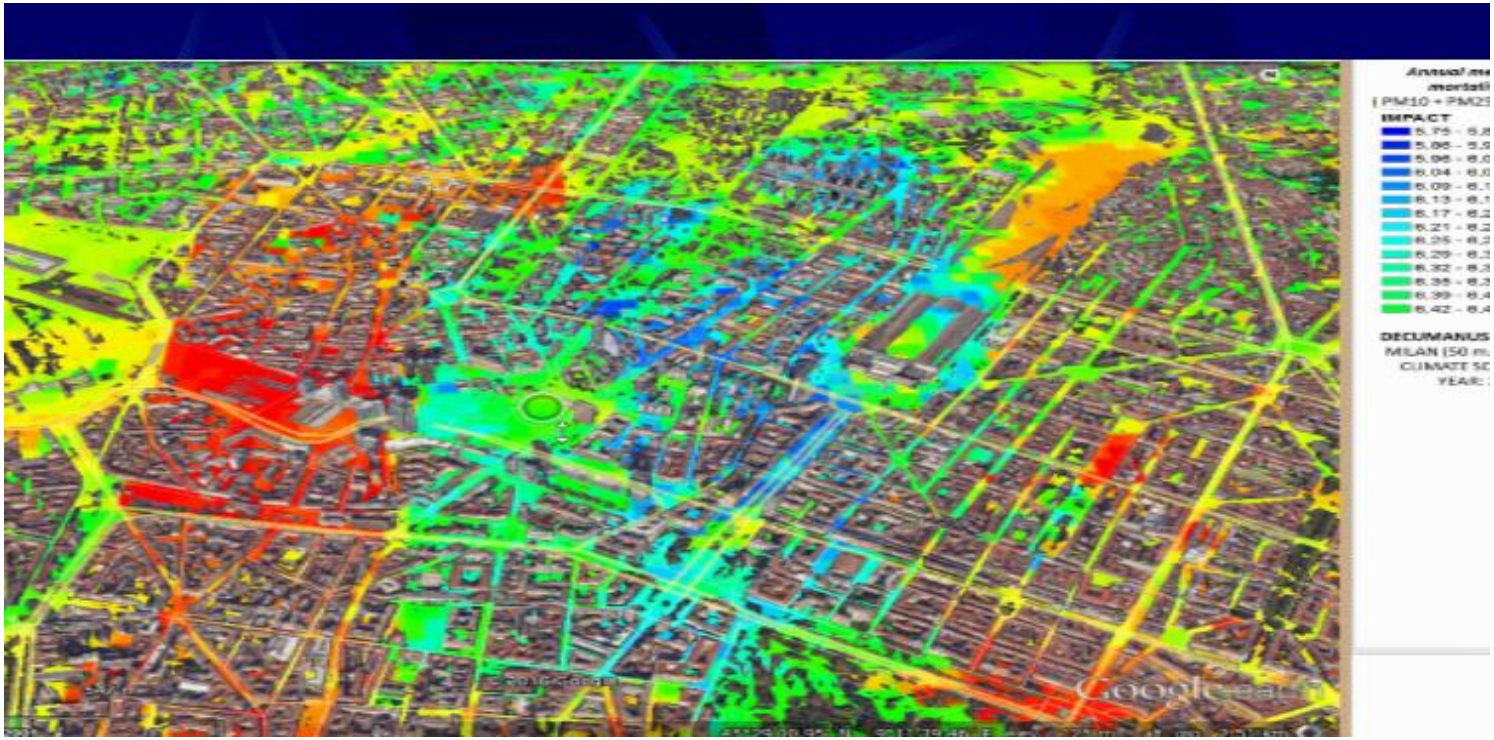
- Health outcomes:
  - Changes in Respiratory Hospital Admissions (%)
  - Changes in Cardiovascular Hospital Admissions (%)
  - Changes in Respiratory Hospital Admissions (%)
  - Increase in Mortality – All causes (%)
  - Increase in Mortality – Cardiovascular causes (%)
  - Increase in Mortality – Respiratory causes (%)
  - Increase in Mortality +65 years – All causes (%)
  - Increase in Mortality +65 years – Cardiovascular causes (%)
  - Increase in Mortality +65 years – Respiratory causes (%)
  - Changes in mortality – All causes (%)
  - Changes in mortality – All Cardiovascular causes (%)
  - Changes in mortality – All Respiratory causes (%)
- Exposure variables:
  - O3, PM10, NO2, EC
  - Heat waves, Apparent temperature
- Mortality and morbidity economical cost

LIST OF VARIABLES

Health Impact

LOCAL DOMAIN: European cities

Annual mean change rate in mortality all causes. 2030 Milan, RPC 4.5



SOME TICS

- Monitoring the thermal behavior of the city and light pollution
- Based on thermal imagery and optical data
- Basic product: 300 m
  Premium product: 0,5 m

LIST OF VARIABLES

Basic / Strategic Service

- Heat loss
- Light emission

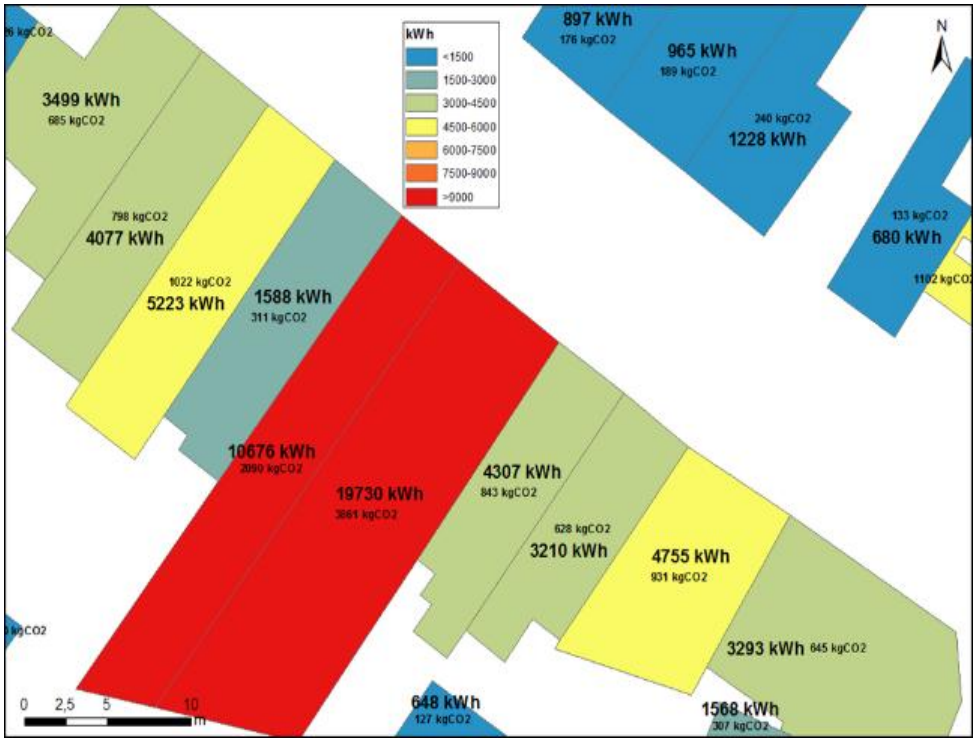
Premium / Local Service

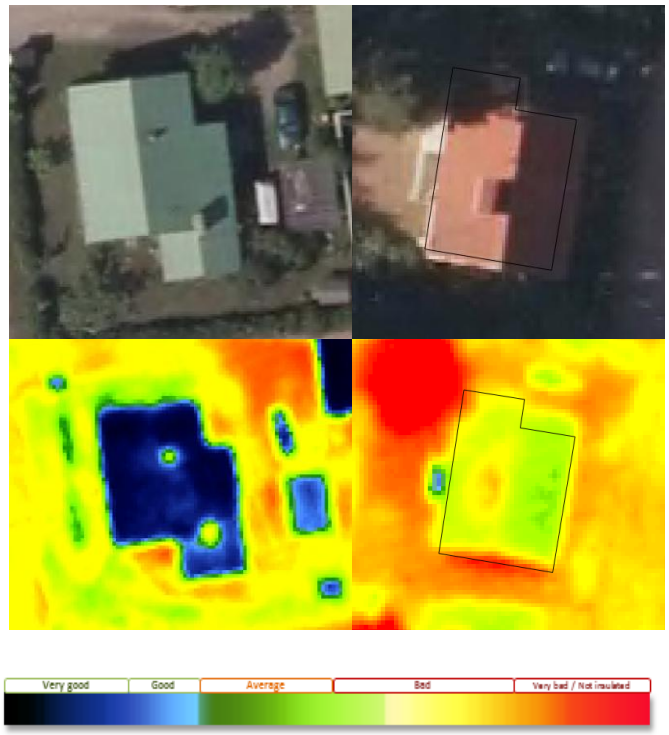
- Heat loss Light emission: ISS data
- Light emission: aerial data
- Photovoltaic potential
- CO2 saving (photovoltaics)

LIST OF VARIABLES

Energy Efficiency

Photovoltaic potential map of Antwerp and potential CO2 saving. 2015





Heat loss in Antwerp. 2015

SOME TICS

- Quantify and qualify city extension and key elements in the city
- Elements associated to urban planning
- Basic product: 30 m
  Premium product: 0,3 m

LIST OF VARIABLES

Basic / Strategic Service

- Spatio-temporal Urbanisation Mapping
- Impervious Mapping

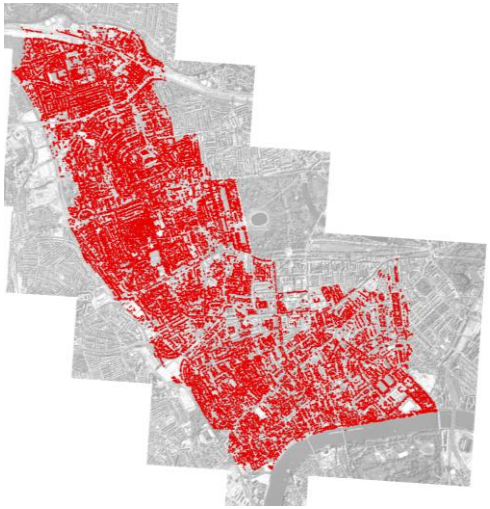
Premium / Local Service

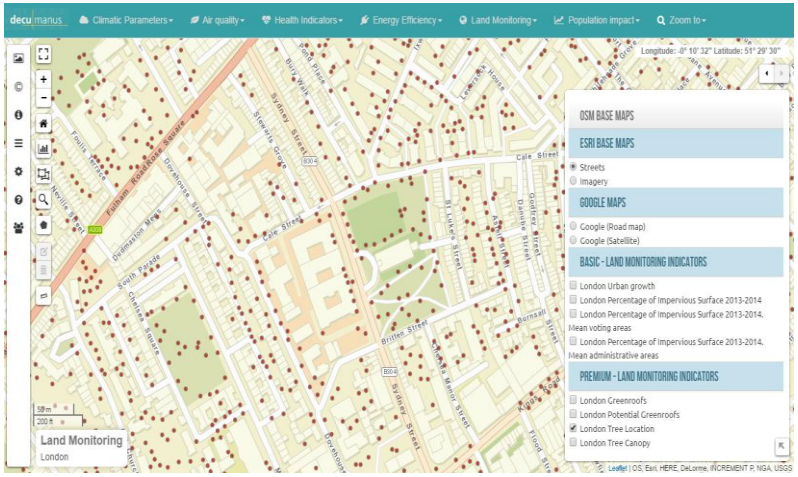
- Potential Green Roof Mapping
- Current green roof and status
- Tree Location and Canopy Mapping

LIST OF VARIABLES

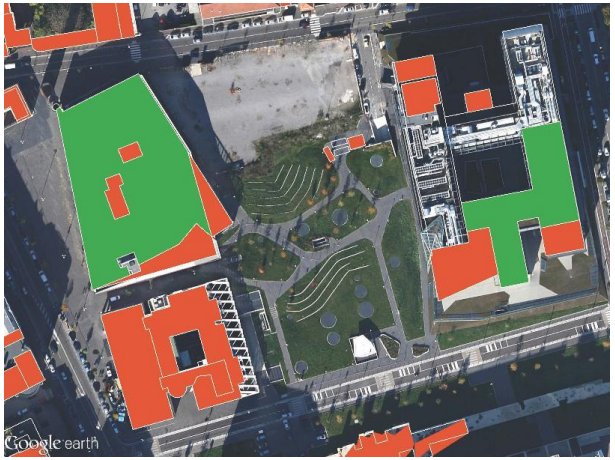
Land Monitoring

Individual Tree layer and Green of the Royal Borough of Kesington & Chelsea. 2015





Current and potencial Green roof layer for the Royal Borough of Kesington & Chelsea. 2015



SOME TICS

- Urban population distribution: day /night
- Oriented to quantified potential population affected by any phenomena
- Basic product: 200 m
  Premium product: Building level

LIST OF VARIABLES

Basic / Strategic Service

Night-time population distribution and impact assessment based on freely available EO-based land cover and land use data (200 m)

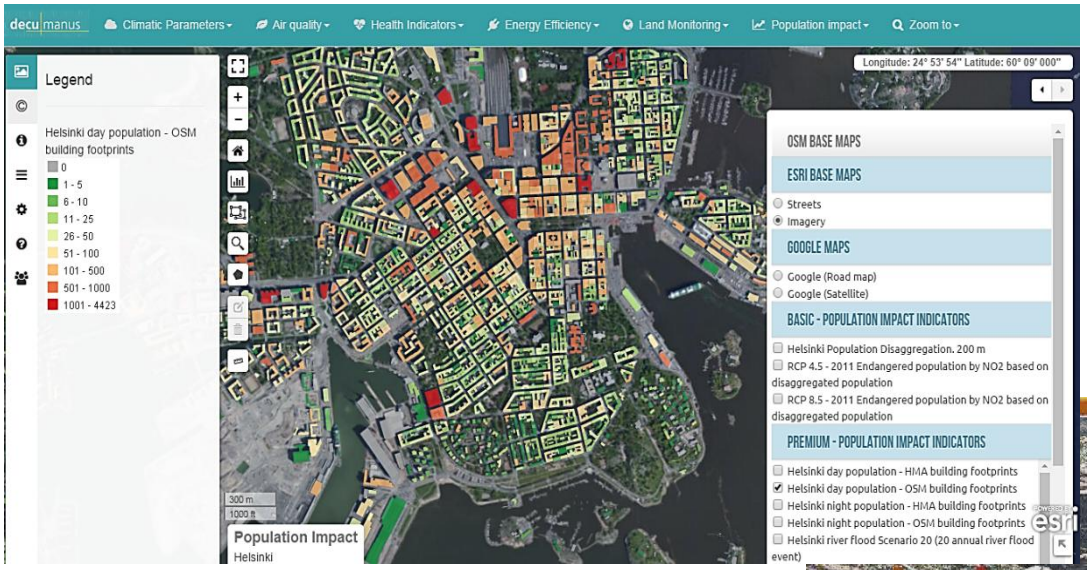
Premium / Local Service

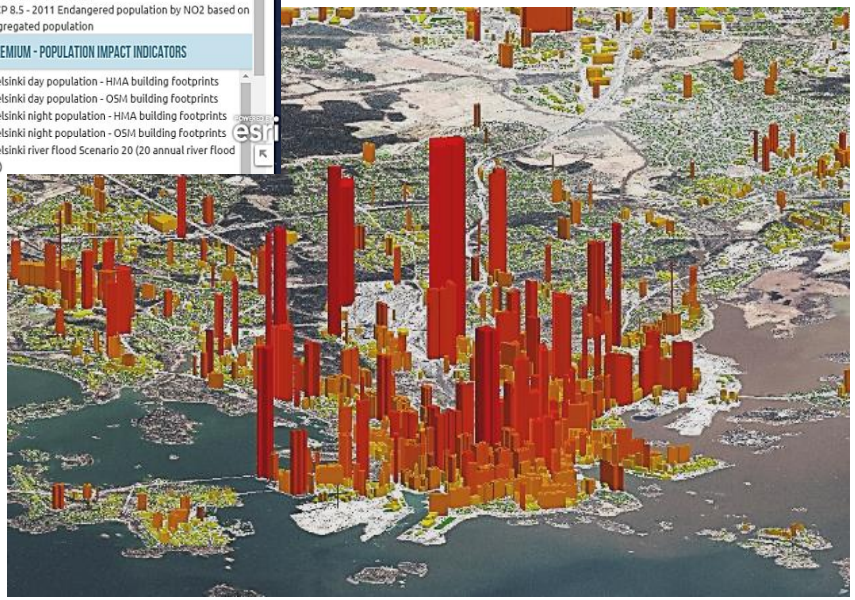
Day-time population distribution and impact assessment based on locally-provided data (building block or district level)

LIST OF VARIABLES

Population Impact

Day population distribution in Helsinki





SOME TICS

- Monitoring of urban water sheets, harbors and water for human consumption reservoirs
- 5 key parameters (future connections with WQ in situ data)
- Basic product: 30 m
  Premium product: 0,5

LIST OF VARIABLES

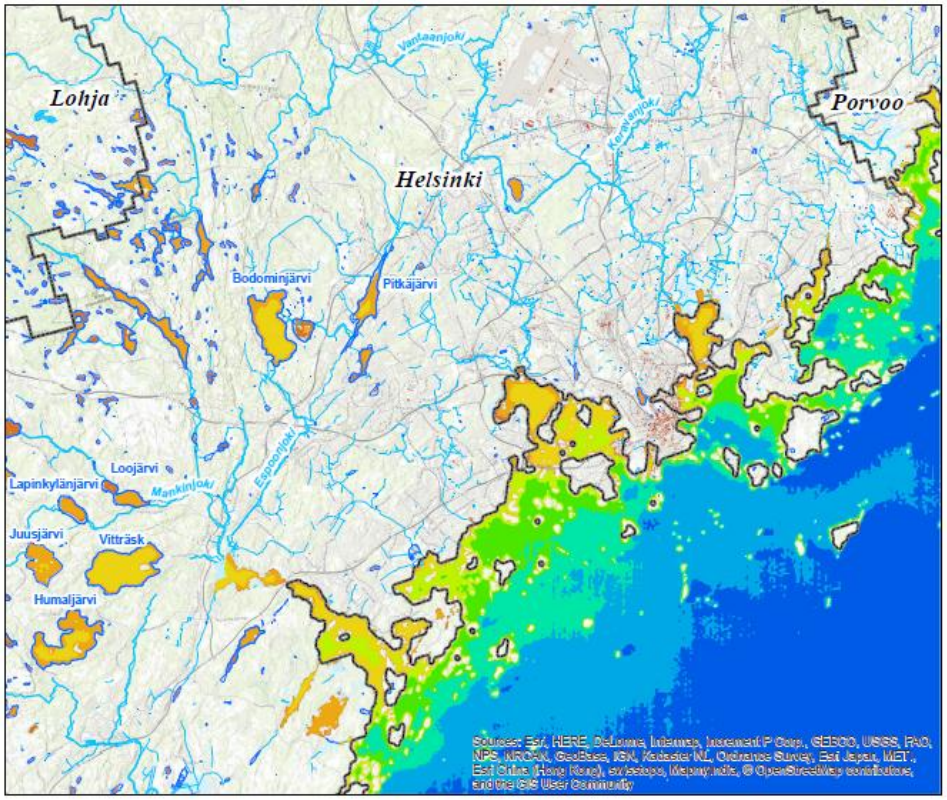
Basic and Premium Service

- Turbidity
- CDOM
- Clorophyl
- Sea Surface Temperature
- Hidrocarbons presence

LIST OF VARIABLES

Water Quality

WATER SURFACE TEMPERATURE



Cartographic Information

1:200.000 Projection: WGS 1984 UTM Zone 31N

Legend

Temperature (ºC)

14,2 - 16,9
13,2 - 14,2
12,9 - 13,2
12,7 - 12,9
12,4 - 12,7
12,3 - 12,4
12,1 - 12,3
12,0 - 12,1
11,6 - 12,0
10,0 - 11,6

Ancillary data

Cities
Finnish Sub-regions
Lakes
Rivers

Map Information

This map shows water surface temperature, espressed in degrees Celsius, in the corresponding EO data acquisition date over the waters layer studied. This map focuses the interest in the inland waters of the Greater Helsinki region, as well as Helsinki Archipelago and surrounding waters. Note: product not yet validated.

Data & Sources

Input Data: Landsat-8 from 03.07.2015 and in situ data from Finnish Environment Institute (SYKE) from June-July 2015.
Vector data: Main source: OSM; Secondary sources: GADM (Global Administrative Areas), and European Environmental Agency (EEA).

Framework

DECUMANUS initiative aims to generate the necessary geo-intelligence to inform decision-making by politicians, to guide urban policy making and implementation, and to inform and engage all citizens in the delivery of sustainable urban development. DECUMANUS monitors the most important elements that take part of an urban ecosystem and set them in a climate change scenario.

Contact

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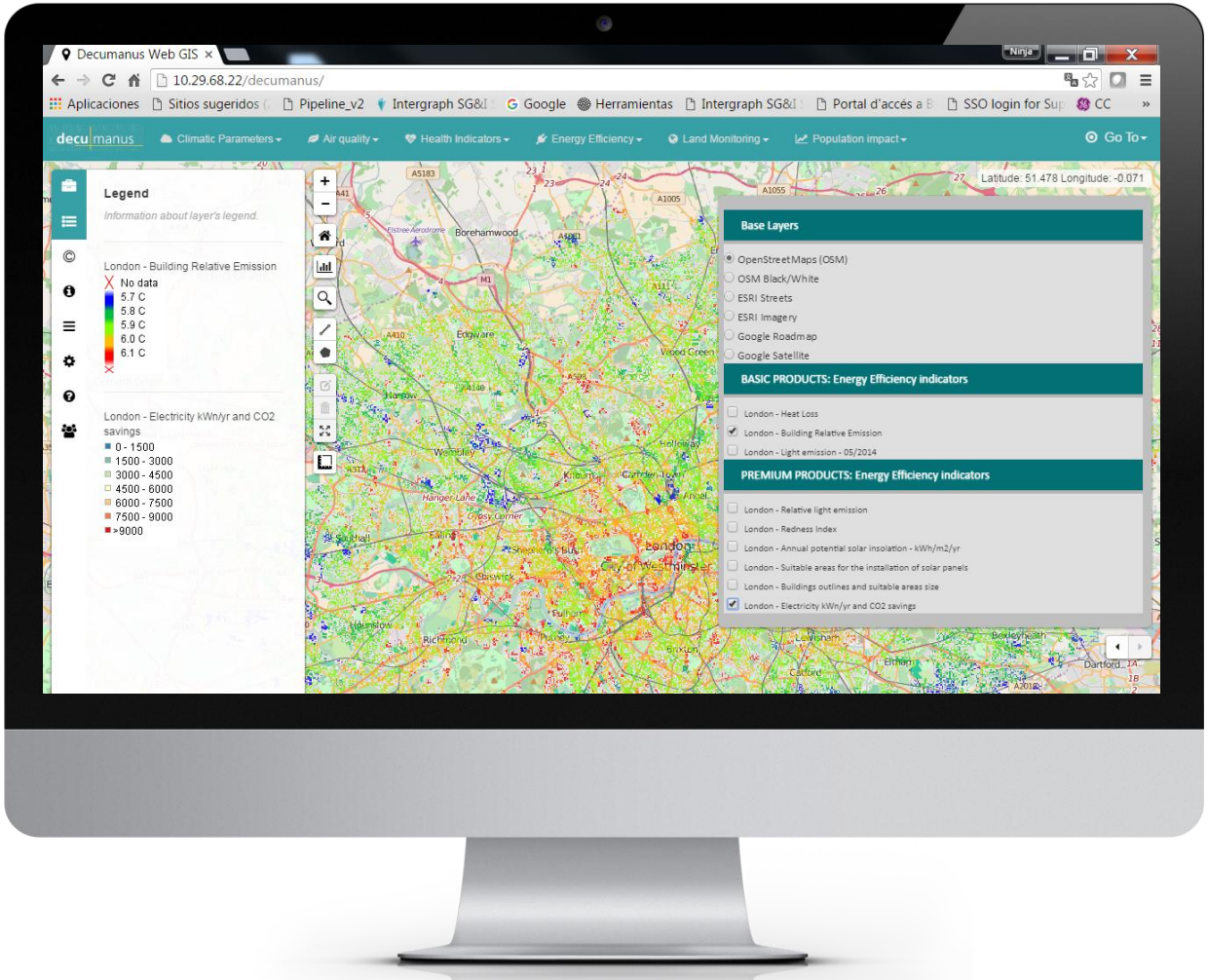
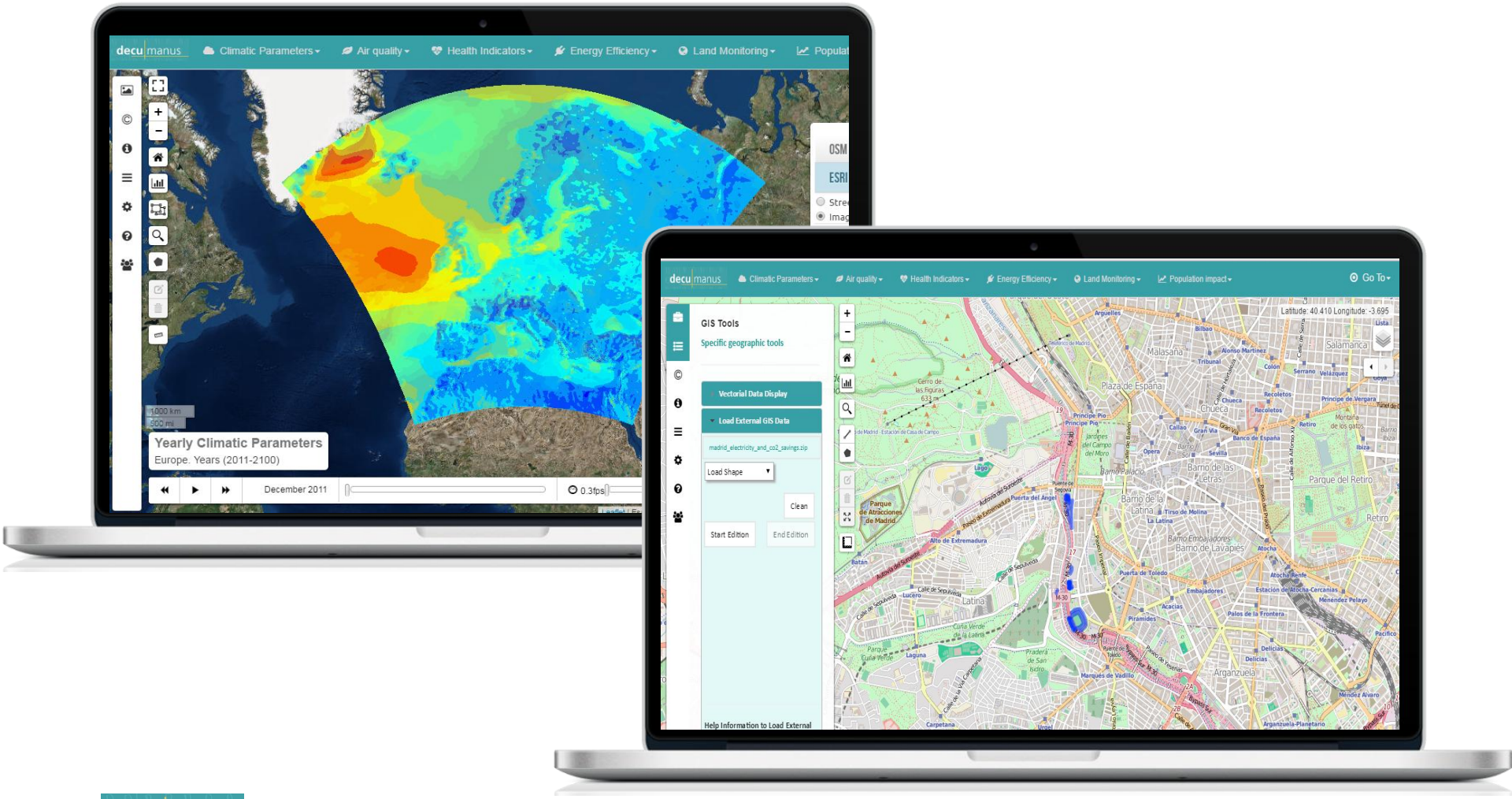
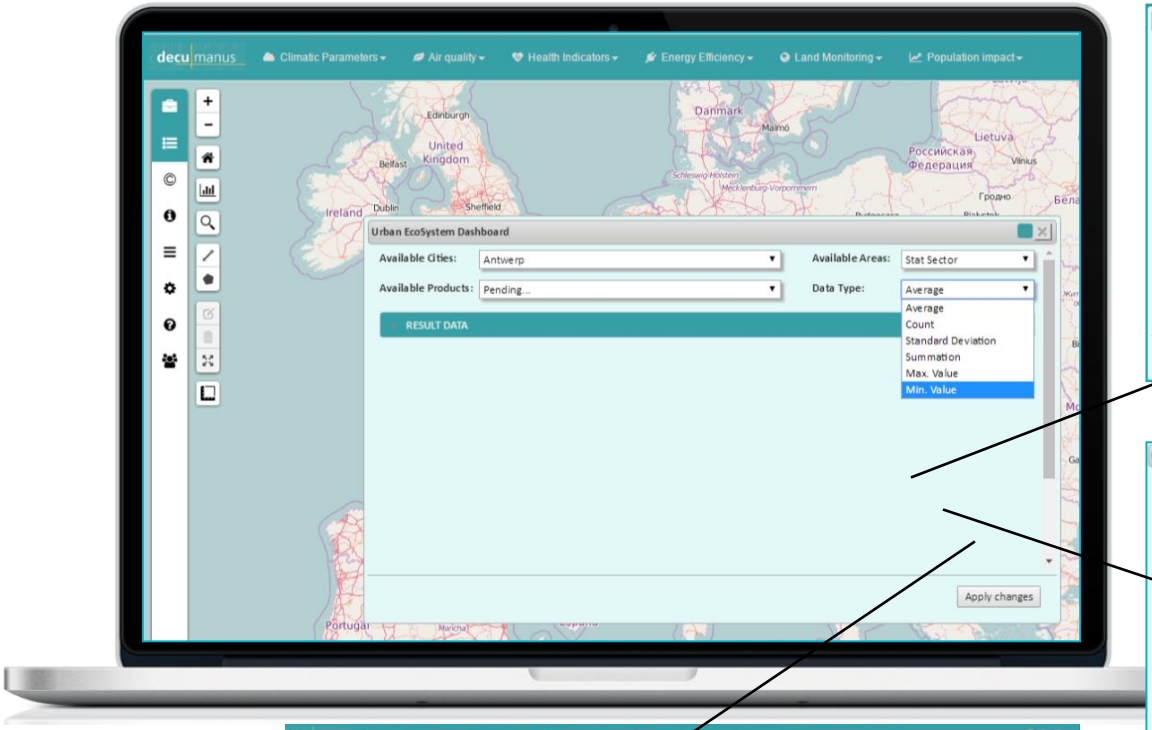
THE DECUMANUS GEOPORTAL FOR DATA ANALYSIS

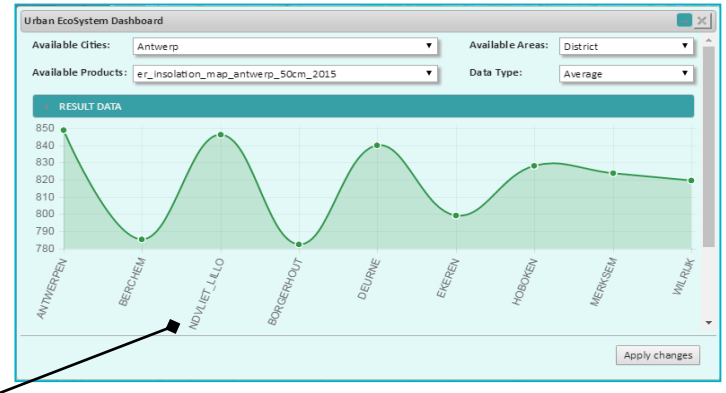


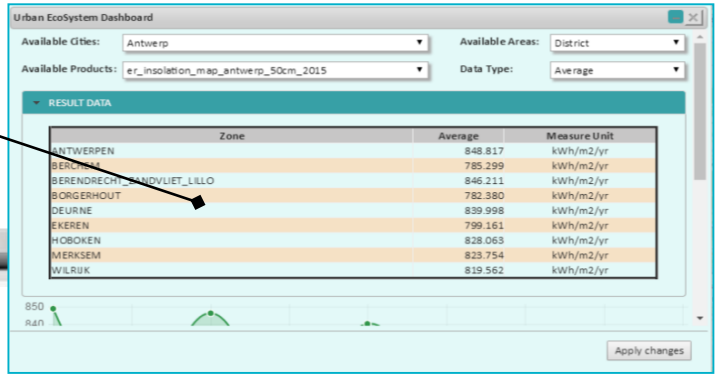
THE DECUMANUS GEOPORTAL WITH SOCIAL MEDIA AND *IN SITU* DATA INTERACTIONS

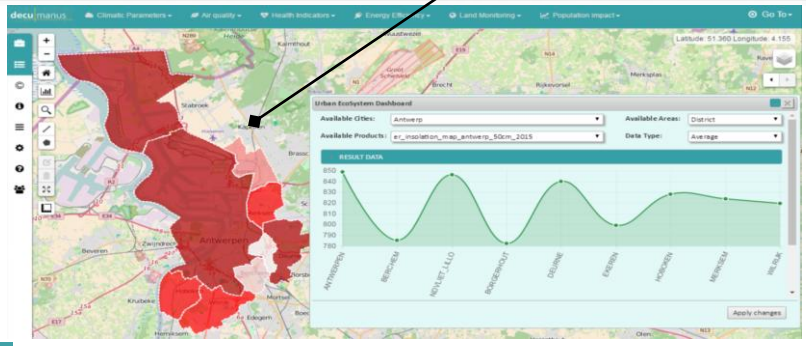


THE DECUMANUS GEOPORTAL FOR DATA ANALYSIS





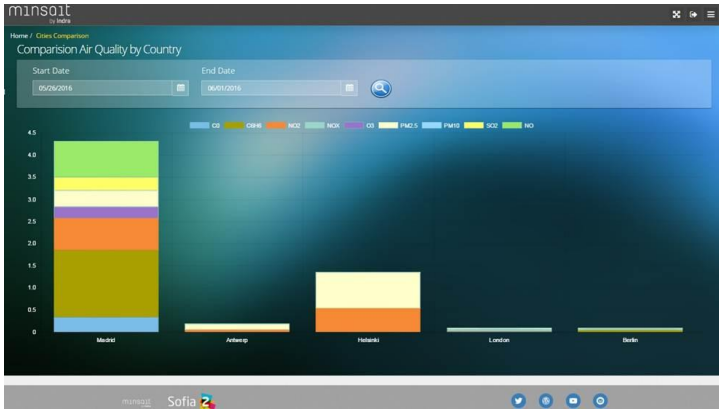




THE DECUMANUS GEOPORTAL FOR DATA ANALYSIS

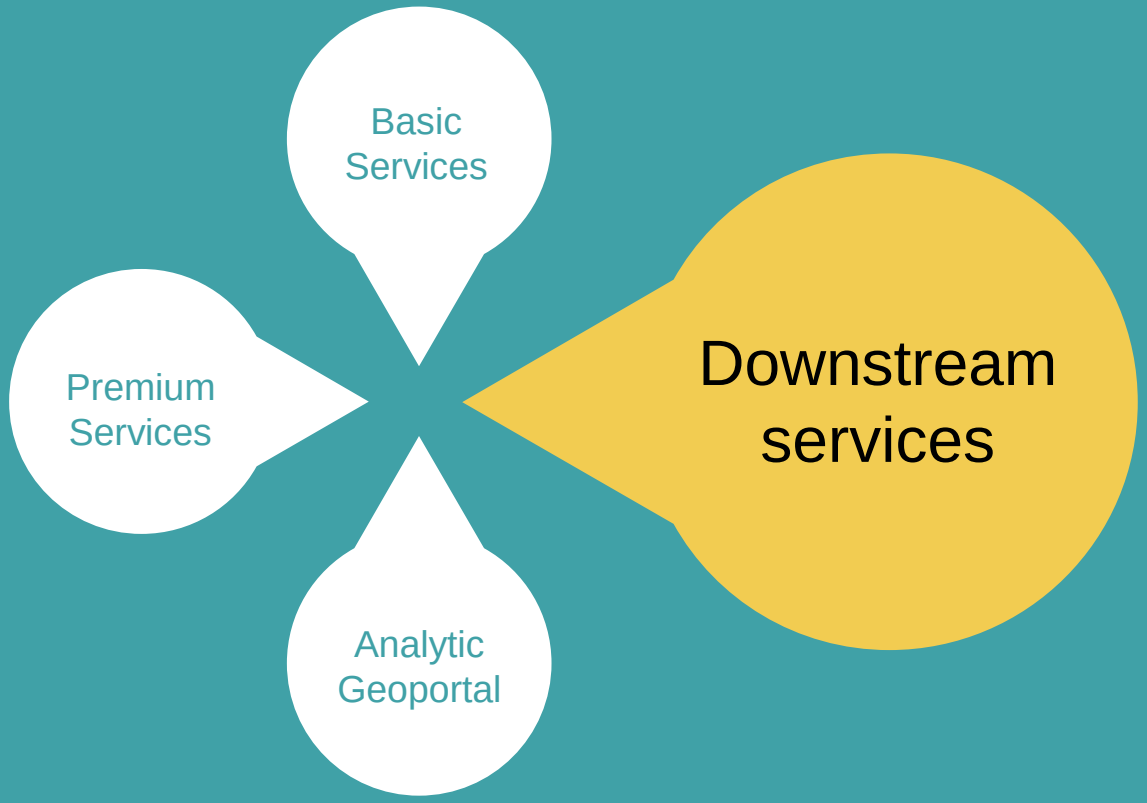
European Air
Quality *in situ* networks

Social Media connections



CONTENT

THE MODEL



Focus in the development of innovative, creative and high value added downstream services for urban applications.

THE MODEL

Data + technology + ideas.
Smart Donwstream services are empowered with latest technological trends in data management.

CONTENT

DECUMANUS STRENGHT

The Team

Unique European working group supplying The Team urban services as one

The Portfolio

More than 90 urban indicators supplied for just an unique consoritum

Distribution

Commercial geographical distribution. Easy to reach in different European counties and around the world

Data+ Technology

Last trends in data management and smart solutions integrated in the consortium

Thank you for your attention!

Interested in a tailored solution?

Contact the Consortium
Julia Pecci, jpecci@indra.es