URBAN CLIMATE SERVICES REQUIREMENTS AND INSPIRE DATA - ON-GOING WORK IN THE URCLIM PROJECT

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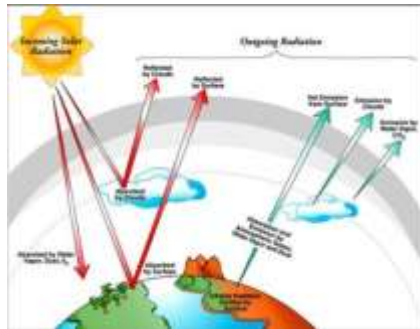LaSTIG, IGN-France, EuroSDR, MétéoFrance

Workshop Use of INSPIRE data

Warsaw, November 28th 2018

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CONTEXT : RESEARCH & INNOVATION FOR CLIMATE SERVICES

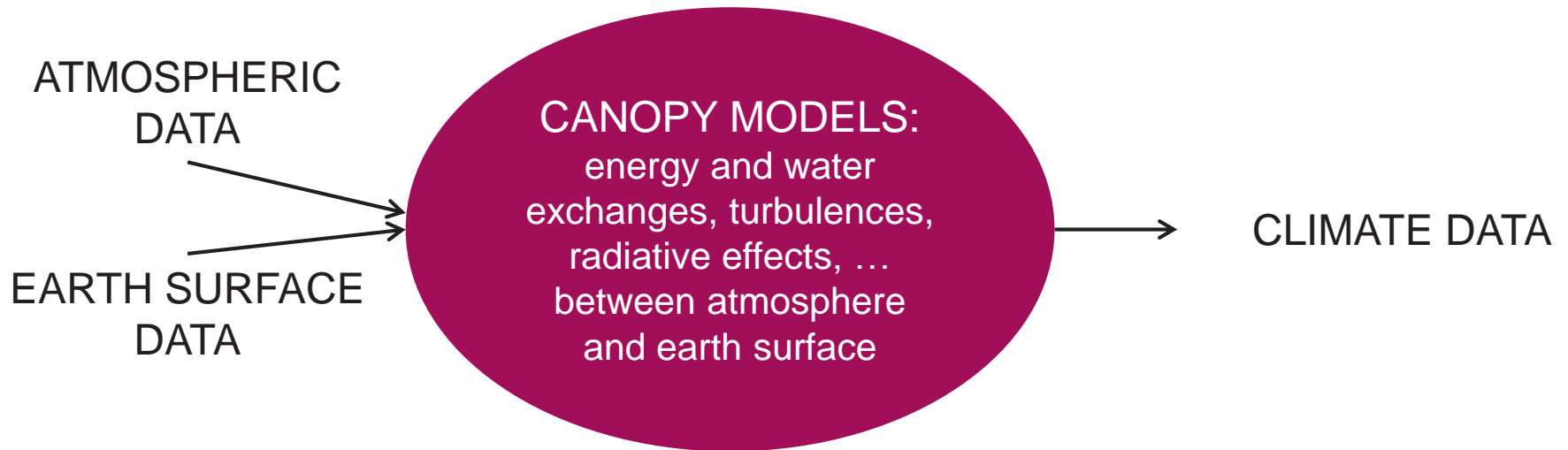# CLIMATE SERVICES, WHAT ARE THEY?

© S. Ackerman and J. Knox

Need for knowledge related to global/meso/micro climate dynamics and to adaptation strategy efficiency,
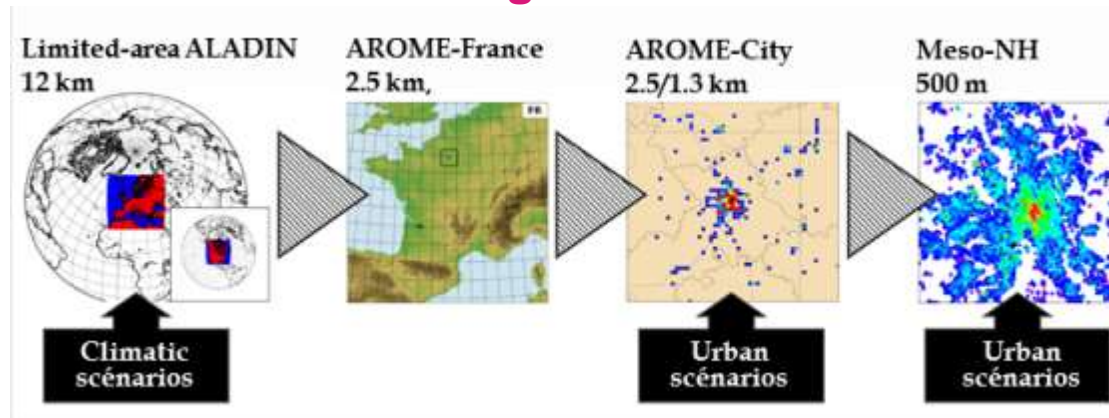
…communicated through climate services in a way that it is scientifically sound and easily understood,

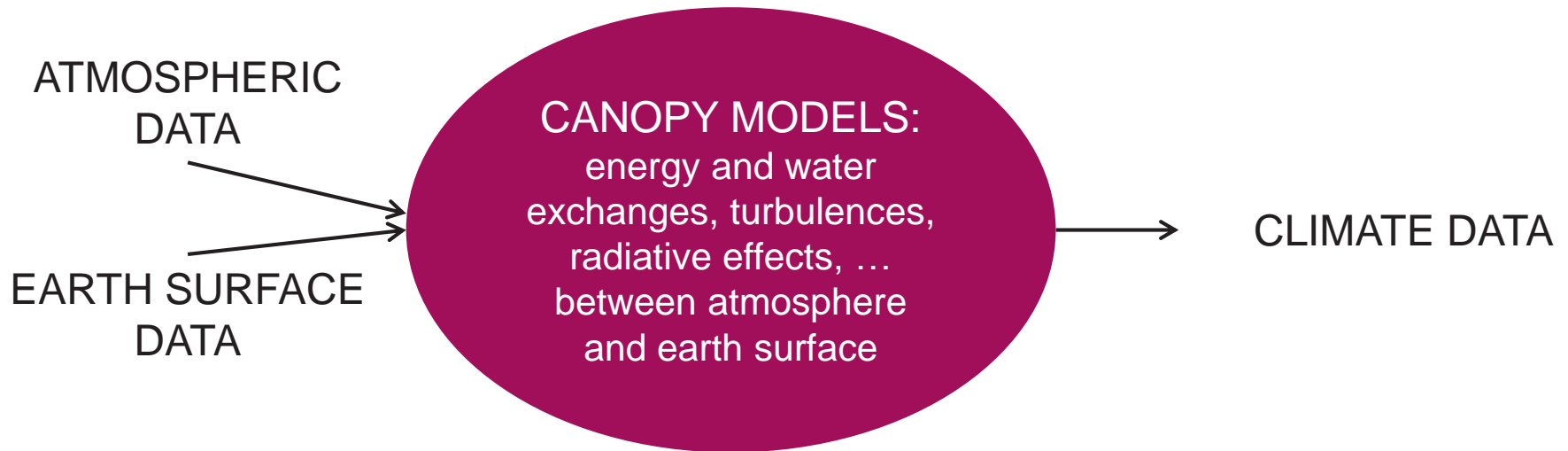**…for research, for operational decision-support, for public awareness.**

CANOPY MODELS AND DOWNSCALLING

ATMOSPHERIC
DATA

EARTH SURFACE
DATA

CANOPY MODELS:
energy and water
exchanges, turbulences,
radiative effects, …
between atmosphere
and earth surface

CLIMATE DATA

Global →regional →local

Limited-area ALADIN
12 km

AROME-France
2.5 km,

AROME-City
2.5/1.3 km

Meso-NH
500 m

Climatic
scénarios

Urban
scénarios

Urban
scénarios

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CANOPY MODELS AND INTEROPERABILITY REQUIREMENTS

ATMOSPHERIC DATA

EARTH SURFACE DATA

CANOPY MODELS: energy and water exchanges, turbulences, radiative effects, … between atmosphere and earth surface
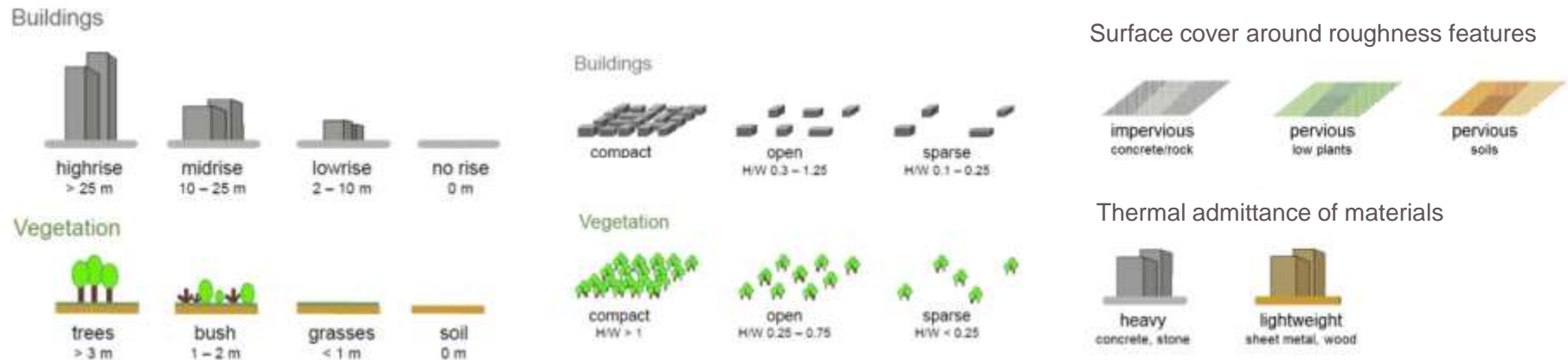
CLIMATE DATA

Need for comparable climate data across the world and across time (millesimal data)

The climate community designs:

- **reusable canopy modules,**

- **de facto standards for earth surface data (content and production process)**

A DE FACTO STANDARD FOR LOCAL EARTH SURFACE DATA : LOCAL CLIMATE ZONES (LCZ)

Stewart and Oke 2012 : a defacto standard to depict earth surface in homogeneous components for many local canopy modules.

A PLATFORM ENSURING COLLABORATIVE AND HOMOGENEOUS ENOUGH PRODUCTION OF LCZ DATA ACROSS THE WORLD : WUDAPT

AN ERANET FOR R&D IN CLIMATE SERVICES : ERA4CS

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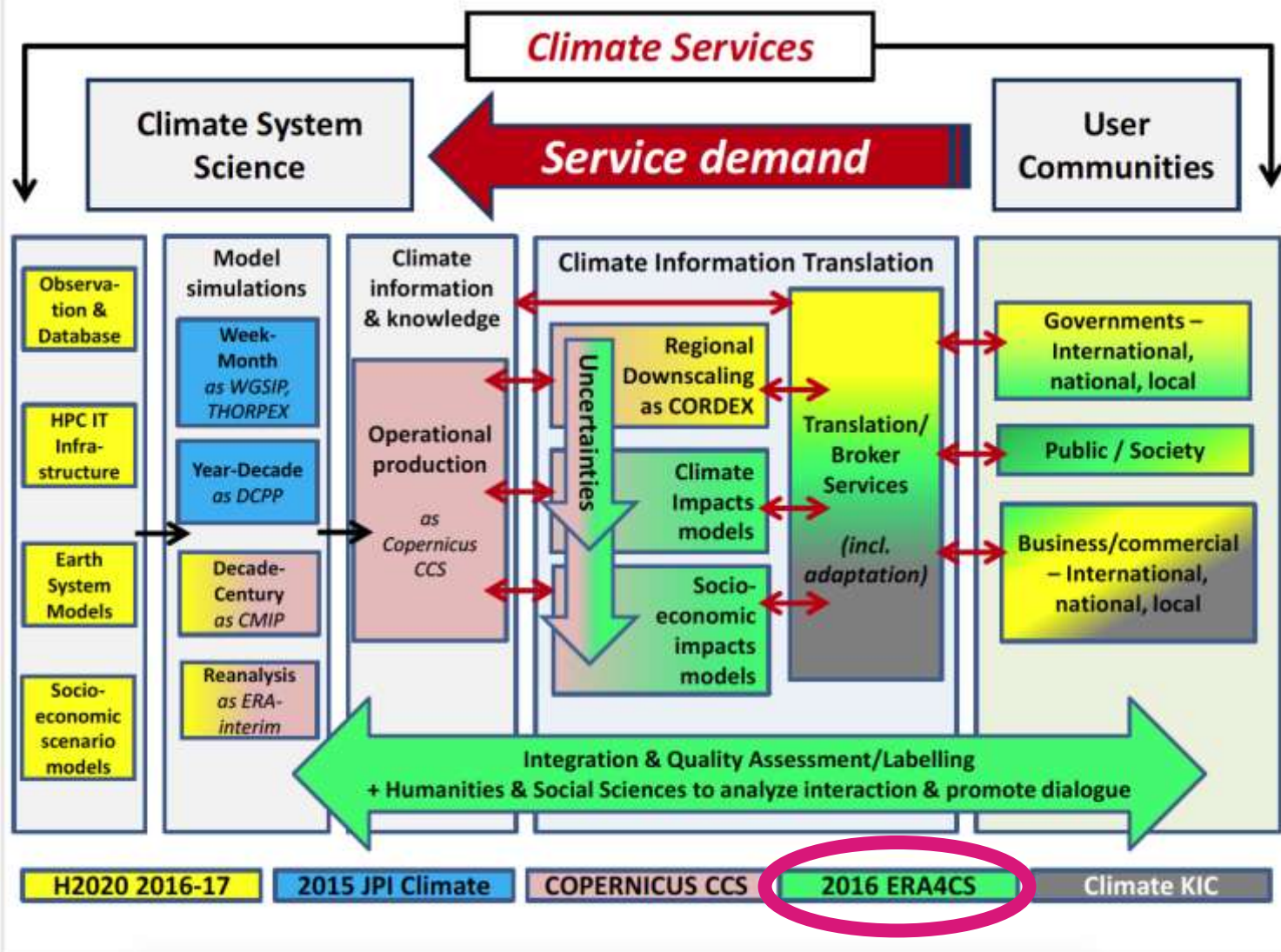
www.urclim.eu

URCLIM : URBAN CLIMATE SERVICES DESIGN

How cities interact with local meso climate flows to generate micro-climates (scale: the city block) ?

How efficient are adaptation strategies currently adopted ?

URCLIM (2017-2020) AMBITION

To prove the concept of integrated Urban Climate Services (UCS) to model several phenomena related to micro-climates (urban heat islands, extreme precipitations, snow and ice events, air quality)
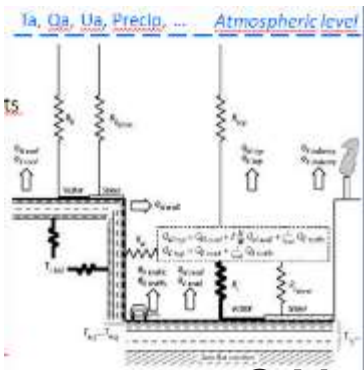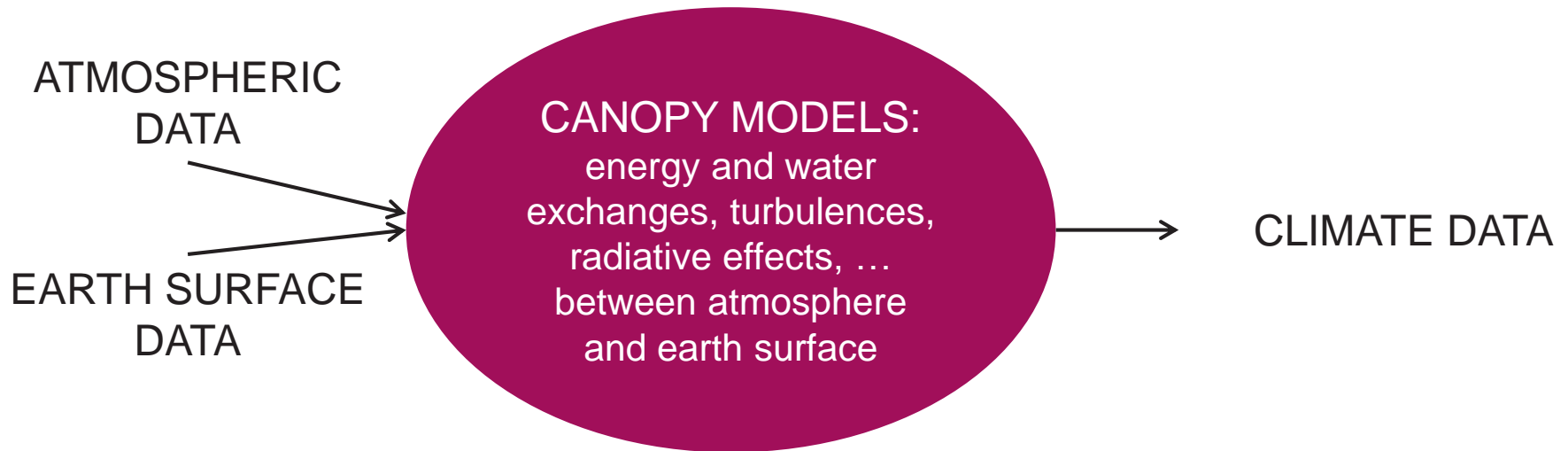
Thanks to downscalling methods and uncertainties assessment (down to a 100 meters grid, city block) and thanks to multi-criteria evaluation of adaptation strategies

With reproducible enough methods across big cities in Europe (Toulouse, Ghent&Brussels, The Randstad, Helsinki, Bucarest) using open urban data to produce a specific urclim urban map as input to urban canopy models
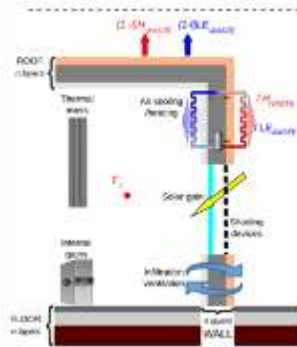
Designing specific services –incl. co-visualisation- for decision support for urban planners and related stakeholders.
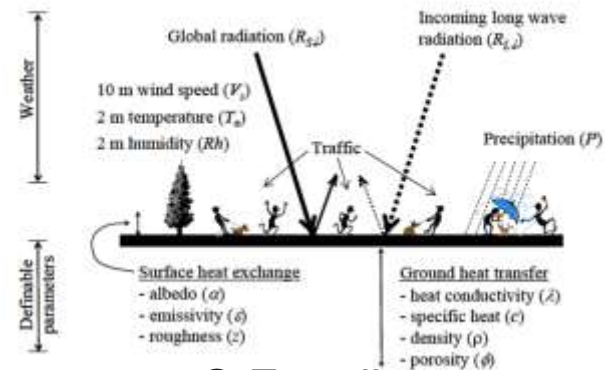
LOCAL CANOPY MODULES USED IN URCLIM

ATMOSPHERIC
DATA

EARTH SURFACE
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CLIMATE DATA

© Masson (TEB)

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DESIGNING THE URCLIM URBAN MAP (~ URBAN LOCAL CLIMATE ZONES)

The URCLIM project wants to reuse a former result yielded by partners on France to include more morphological information and socio-economic elements

… with INSPIRE-like data

Bocher, E., Petit, G., Bernard, J., Palominos, S.. A geoprocessing framework to compute urban indicators: The MApUCE tools chain. Urban Climate, Elsevier, 2018, 24, pp.153-174.

Table 1: Input spatial data sets used by the MApUCE tool chain

Table 2: Input statistical data set used by MApUCE tool chain

Buildings : height, nb of levels, nb of inhabitants, floor_area, volume, perimeter, convexhull, form factor, number of neighbor, walls area, …

Spatial units (voronoi) : vegetation area, roads area, roads length, sidewalkd length, hydrographic area, hydrographic length, nb inhabitant, nb households principal residence, nb households in collective housing

Municipalities : urban fabric typology (dominant in the municipality)

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data set	Description
	Topographic data, in vector format, provided by the French National Geographical Institute (IGN) (see bdparcellaire)
Gridded population	This data set depicts the distribution of human population across the french territory. The data is distributed by the French National Institute for Statistics and Economic Studies (INSEE) (see https://www.insee.fr/en/accueil)
IRIS contouring	The IRIS contouring contains a set of polygons that represents an area of 2,000 grouping inhabitants. The median area is about 780 ha, and maximal size is of 36,700 ha. This data set is provided by IGN.

Table 1: Input spatial data sets used by the MApUCE tool chain

data set	Description
Household survey	The french household survey is provided by the National Institute of Statistics and Economic and Studies (INSEE). This survey is linked to the IRIS contouring thanks to a key index.

Table 2: Input statistical data set used by MApUCE tool chain

How to propose a method to yield such data, in a comparable form across space and time (in terms of data content but also production process) ?

APPROACH 1 : DESIGN A GENERIC PIPELINE BASED ON OPEN DATA

Approach investigated by Bocher et al. 2018 :

- Adapt the french MAPUCE model to OSM data,
- Design a WPS chain distributed on the cloud,
- Get volunteers to produce the data
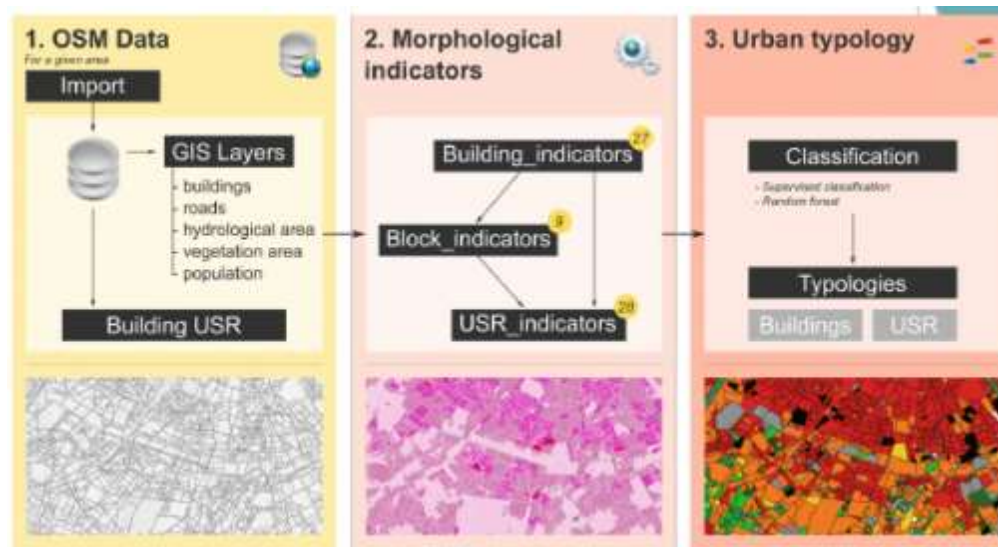
APPROACH 2 : DESIGN A COLLABORATIVE CATALOGUES OF « RECIPES », INCL. LINEAGE METADATA DOCUMENTATION

Adopt a brokering approach rather than single pipeline
Inspired by current successful social platforms.

URCLIM infolab : a collaborative platform to exchange knowledge (recipes and clues) so that each partner can produce the data he needs based on 1) available reusable data on his specific city and 2) on the others experience
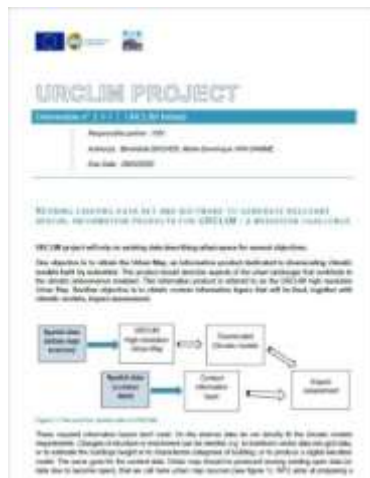
URCLIM INFOLAB IMPLEMENTATION (ON-GOING), CONNECTED TO A EUROSDR PLATFORM

Why a EuroSDR platform ?
- **Share our learnings about user requirements,**
- **Use the network to help adapt a process description from one country to another**
- **Prototype the design of a technology neutral, scientifically sound, user legible, uncertainty anagement framework**

CONCLUSION

Climate services : an important use case for INSPIRE data

OSM : a community of developers that contribute a lot to demonstrating the added value of structured data.

- **We should collaborate based on our respective assets**

Reproducibility accross Europe :

- **Design a process fed with ELF-ELS (on-going at IGN-F… we need help),**

- **Could ELS also mediate with a « non authoritative open data layer » ?**

Reproducibility accross time : **sampling European 2000 years history for comparable facts = the futur great challenge** ?
https://timemachine.eu/

THANK YOU FOR YOUR ATTENTION

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