UNIVERSITAT POLITÈCNICA DE VALÈNCIA

50 anys

PhD in Water and Environmental Engineering

Can we use open data to optimize nature-based solutions for climate change adaptation?
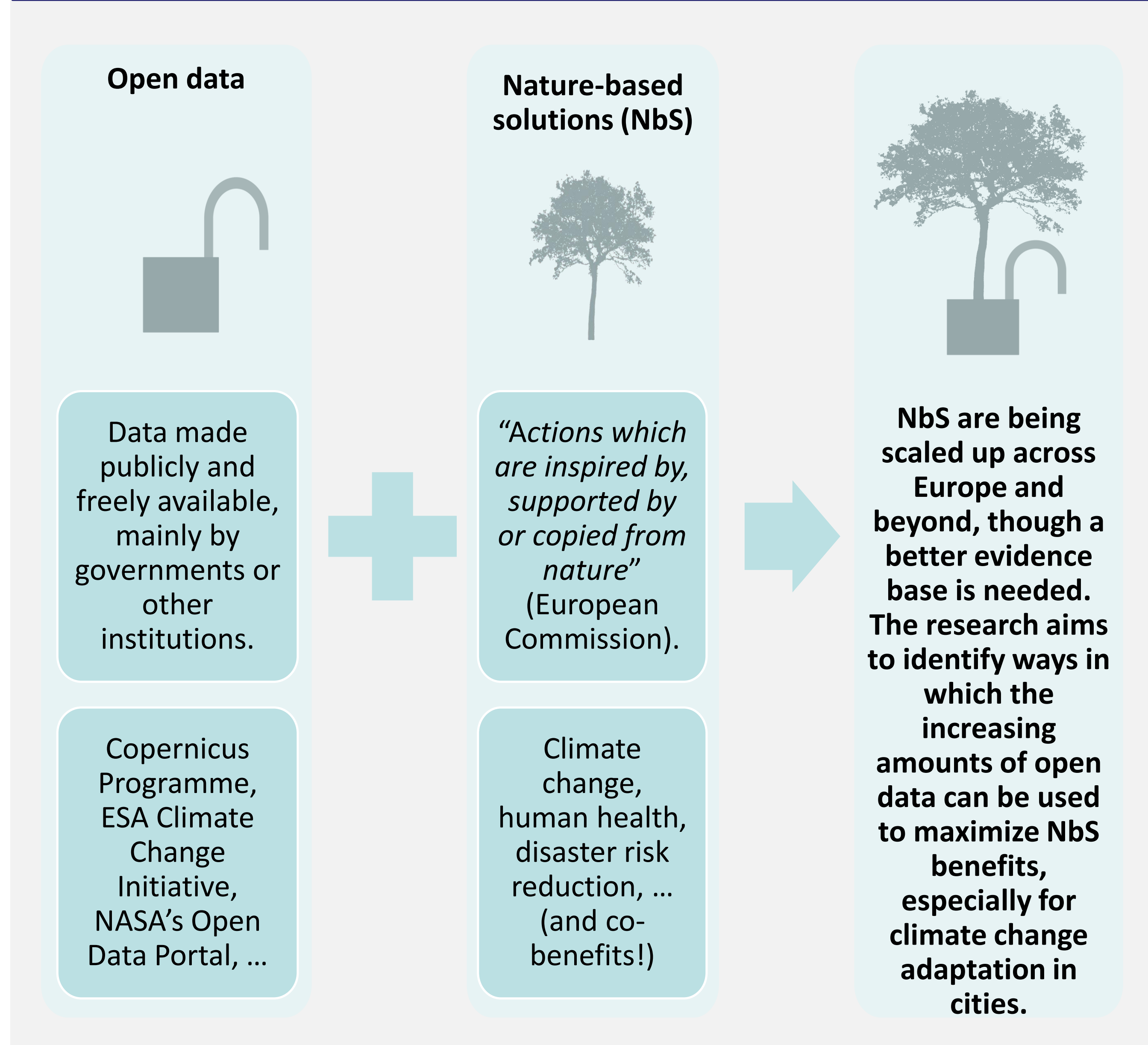
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1. Objective

Open data

Nature-based solutions (NbS)

Data made publicly and freely available, mainly by governments or other institutions.

"Actions which are inspired by, supported by or copied from nature" (European Commission).

NbS are being scaled up across Europe and beyond, though a better evidence base is needed. The research aims to identify ways in which the increasing amounts of open data can be used to maximize NbS benefits, especially for climate change adaptation in cities.

Copernicus Programme, ESA Climate Change Initiative, NASA's Open Data Portal, ...

Climate change, human health, disaster risk reduction, ... (and co-benefits!)
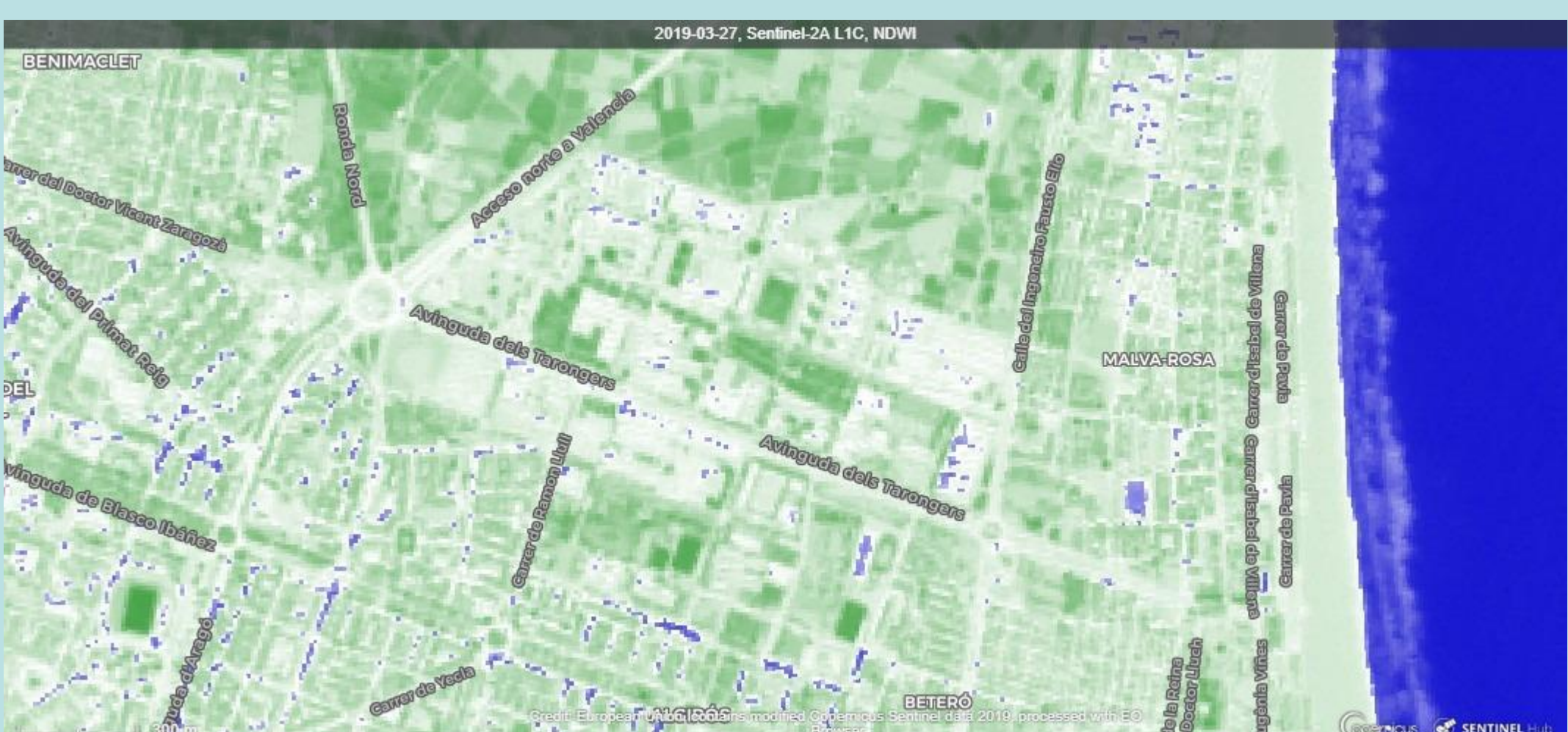
2. Main stages of research development: What?

What?

- Identification of the most suitable open data sources for the assessment of:
  - Current vulnerability or projected impacts due to climate change
  - Presence and current state of green and blue infrastructure
  - Potential for NbS introduction or improvement
- The bigger, the better: prioritisation of global datasets if possible, in order to maximize the potential impact of the research.
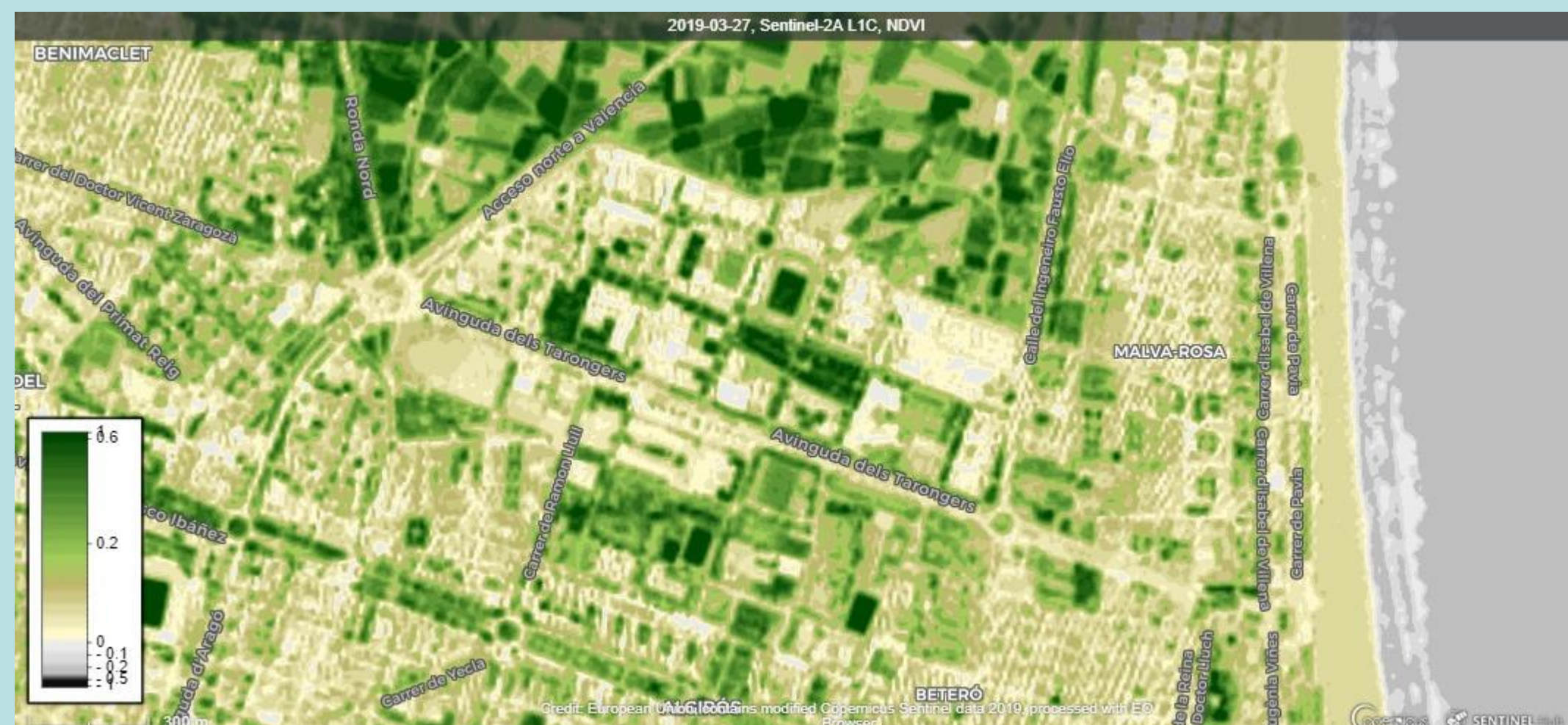
The Normalized Difference Vegetation Index (NDVI) calculated from Sentinel-2 satellite imagery can be used to map and assess green infrastructure


The Normalized Difference Water Index (NDWI) calculated using Sentinel-2 data can be used for water body mapping (blue infrastructure)

3. Main stages of research development: When and where? How?

When and where?

- Identification of the scale(s) and stage(s) where available open data can be used:
  - Green infrastructure planning at neighbourhood, urban or regional scale
  - NbS project design at site scale
 - Monitoring performance of existing NbS initiatives
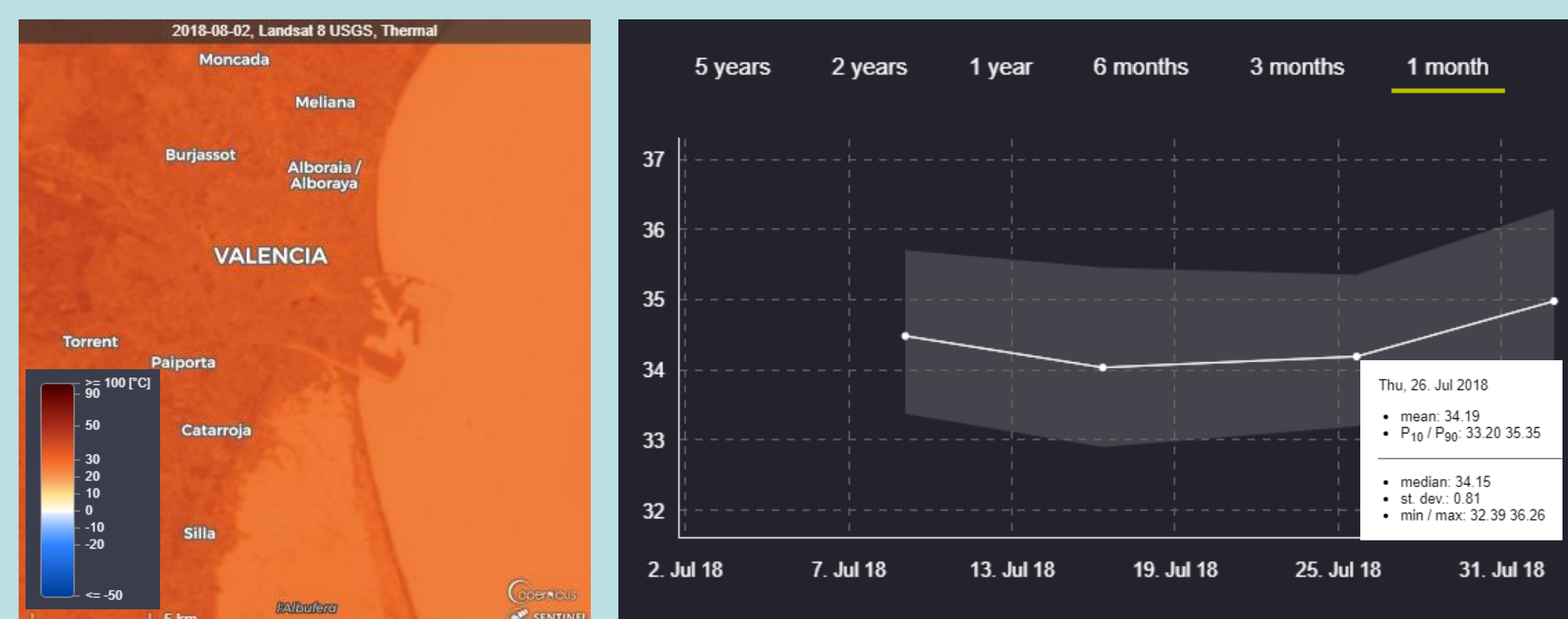
Landsat 8 Thermal data (image on the left) can be used to monitor the impact of NbS on the Urban Heat Island (on the right, statistical info extracted for a defined Area Of Interest)
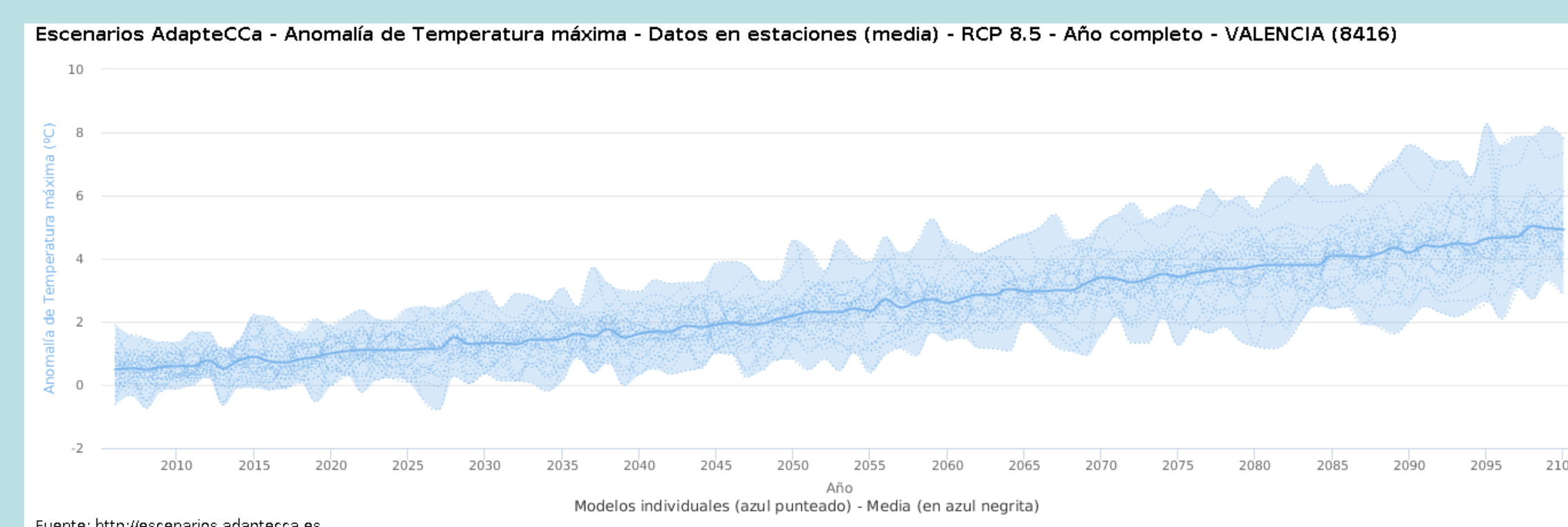
Climate change projections (such as the maximum temperature anomaly for a high emissions scenario, shown on the image) emphasize the need for climate change adaptation, and can be used for NbS planning and design

How?

- Development of a methodology to integrate the identified open data sources throughout the whole NbS life cycle to maximize their impact for urban adaptation to climate change.
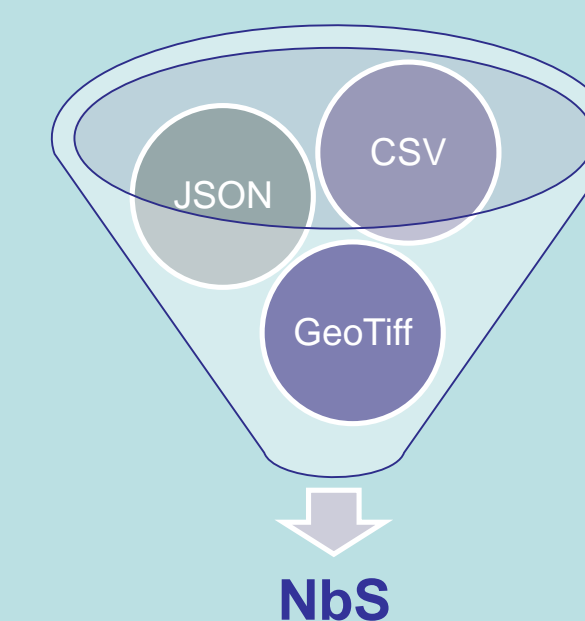
4. Expected results and potential profits

Development of a framework for the integration of identified open data sources for planning, design and management of nature-based solutions for climate change adaptation. Since only based on open data, it would be easily and freely replicable. The spatial extent of the selected datasets will define the potential scope of application of the framework.