



A knowledge diffusion and decision platform for renaturing cities

## Festival dello Sviluppo Sostenibile 2019

Giovedì 23 Maggio 2019,  
Sala del Consiglio, Palazzo Isimbardi  
ore 14:30 - 17:30

Nature-Based Solutions come opportunità per la sostenibilità urbana

# NBS per la mitigazione del rischio urbano legato al cambiamento climatico

## gli esempi dei progetti UNALAB ed OPERANDUM

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[www.nature4cities.eu](http://www.nature4cities.eu)

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 730468



# The Challenge




# Climate Change



Flooding

Rapid growth/ densification




Water scarcity

Climate driven health issues



Water / air pollution

Habitat loss / fragmentation



Heat stress

Reduced biodiversity



**CITIES FACE SIGNIFICANT CHALLENGES OF URBAN DENSIFICATION AND EXTREME WEATHER CONDITIONS DUE TO CLIMATE CHANGE!**



# The Opportunity



Nature-based Solutions





Vegetated floodways



Green space establishment



Green walls and roofs



Rivercourse daylighting



Stormwater retention ponds & cisterns



Permeable pavements



Reforestation / street trees



Realtime environmental monitoring

**NATURE-BASED SOLUTIONS ARE INSPIRED AND SUPPORTED BY NATURE. THEY ARE COST-EFFECTIVE, PROVIDE ENVIRONMENTAL, SOCIAL AND ECONOMIC BENEFITS AND HELP MAKE CITIES MORE TO RESILIENT TO CLIMATE CHANGE.**

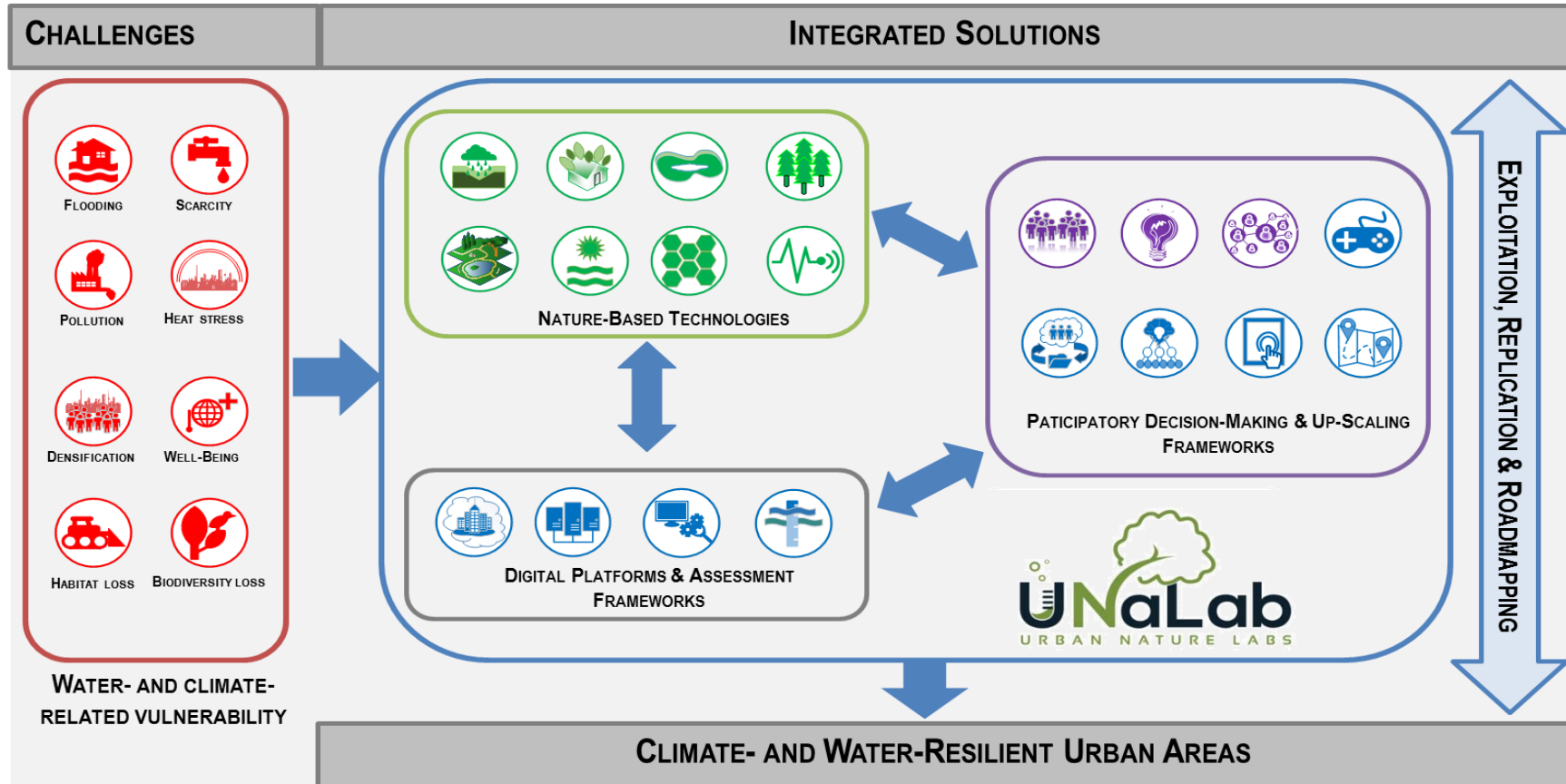


# Implementation and demonstration of co-created, innovative, replicable, and locally-attuned **nature-based solutions** to enhance the climate and water resilience of cities

28 partners (and 2 observers) from Industry, Research and Public organisations. 10 cities with a balanced geographical spread, diversity in size and climate conditions.

Front runner cities: Eindhoven, Genova, Tampere; Follower cities: Başakşehir, Cannes, Castellon, Prague, Stavanger; Buenos Aires, Hong Kong; Observer cities: Guangzhou (CN), Brazilian network of Smart Cities

- ✓ Implementation of 'living lab' demonstration areas of nature-based solutions to enhance climate & water resilience of cities
  - ✓ Solutions selected via co-creation with stakeholders & implemented in the context of an integrated urban ecological approach
- ✓ Demonstration of evidence in 3 front-runner cities within urban innovation ecosystems
  - ✓ Tampere (FI), Eindhoven (NL), Genova (IT)
- ✓ Knowledge transfer & replication planning in 5 follower cities & beyond
  - ✓ Stavanger (NO), Prague (CZ), Cannes (FR), Castellón (ES), Başakşehir (TR)
- ✓ Creation of a robust evidence base & European framework for innovative, replicable, and locally-attuned nature-based solutions







## STAKEHOLDER CO-CREATION

- Citizen engagement
- Local innovation ecosystems
- Co-development
- Co-implementation



## NATURE-BASED SOLUTIONS

- NBS catalogue validation
- Systemic DST
- Performance monitoring
- Impact assessment



## DIGITAL INTEGRATION

- Asset integration
- IoT harmonisation
- Federated real-time data management
- NBS visualisation



## EXPLOITATION, REPLICATION & ROADMAPPING

- Smart business & finance models
- Innovation management framework
- NBS roadmaps



## DISSEMINATION & ENGAGEMENT

- Public awareness & participation
- Stakeholder engagement
- Multi-format knowledge dissemination

TRANSFORMATION TO CLIMATE- AND WATER-RESILIENT URBAN AREAS

# The Consortium



# Who



COMUNE DI GENOVA



CITY OF TAMPERE



CITY OF STAVANGER



IPR  
PRAHA



BAŞAKŞEHİR  
BELEDİYESİ

**LAND**

European  
Network of  
Living Labs



ERRIN  
European Regions  
Research and Innovation Network



ENGINEERING



RAMBOLL

INN  
HUB

An initiative by Tune

IMPULS  
geeft energie



Infrastrutture Recupero Energia  
Agenzia Regionale Ligure



espaitec

Parc Científic, Tecnològic i Empresarial  
de la Universitat Jaume I de Castelló



REDE BRASILEIRA DE  
CIDADES INTELIGENTES  
& HUMANAS



universidade  
de aveiro

TU/e

Technische Universiteit  
Eindhoven  
University of Technology

Where innovation starts



THE HONG KONG  
POLYTECHNIC UNIVERSITY  
香港理工大學



Universität Stuttgart



- Objective of *OPERANDUM* is to **reduce hydro-meteorological risks** in European territories through co-designed, co-developed, deployed, tested and demonstrated innovative green and blue/grey/hybrid **NBS**, and push their **business** exploitation
- OPERANDUM
  - aims provision of **science-evidence** for the usability of NBS, **best practices** for their design based on **participatory** processes
  - foresees a multiple level of **stakeholders engagement** to promote its **diffusion** as a good practice
  - establishes the framework for the strengthening of **NBS-based policies** according to local legislation and promotes **technology** and **innovation** in NBS to create a **European leadership**



**OPERANDUM**

OPEn-air laboRATORies for Nature baseD  
solUtions to Manage hydro-meteo risks







**OPERANDUM**

OPEn-air laboRAtories for Nature baseD  
soLUtions to Manage hydro-meteo risks

- OPERANDUM is based on **open-air laboratories (OALs)**, a fairly new concept that expands the Living Labs to a wider vision for **natural and rural areas**
- In OALs novel NBS in **7 European** countries and **3 in China and Australia** are implemented to address **specific risks** and their **effectiveness**, through innovative **monitoring** systems and **cutting-edge** numerical modelling approaches



## *OPERANDUM Open Air Laboratories*

- 1. OAL - Italy : Po Valley,**
2. OAL - Finland : Lake Puruvesi,
3. OAL - Germany : UNESCO Biosphere Reserve Elbe Valley,
4. OAL – Greece : Spercheios River,
5. OAL – Austria : Vögelsberg,
6. OAL – UK : Catterline,
7. OAL – Ireland : Dodder River,
8. OAL – Hong Kong : Hong Kong,
- 9. OAL – China: Shiyang River Basin,**
- 10. OAL – Australia: Weany Creek sub-catchment**



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10

## Open-air laboratories (OALs)

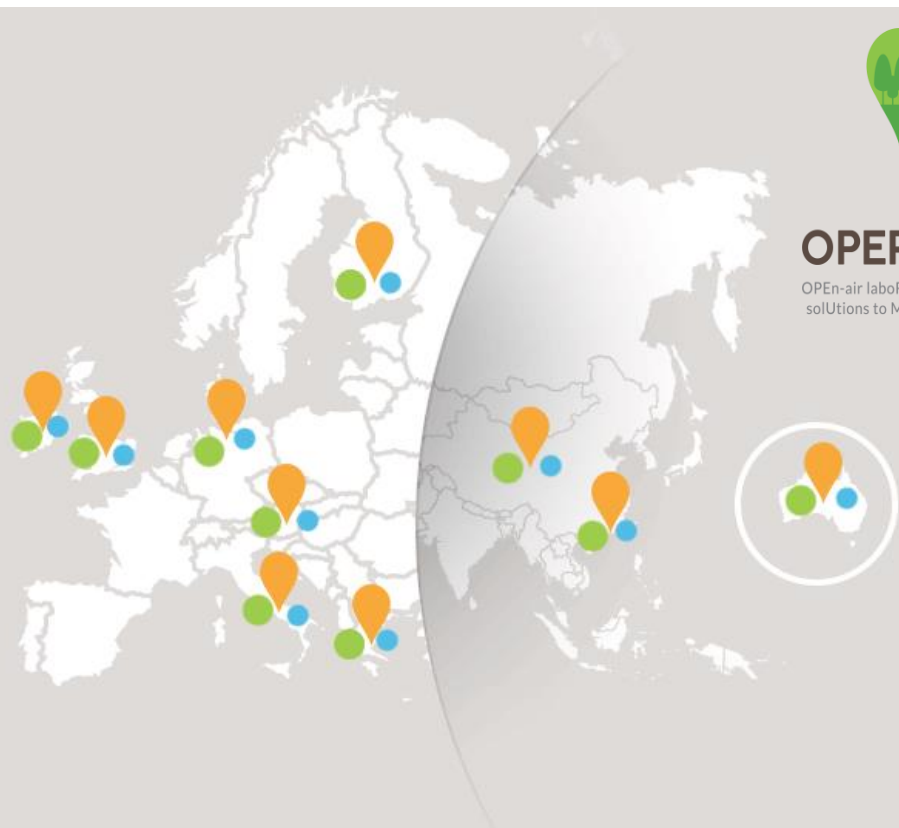
Austria, Finland, Germany, Greece, Ireland, Italy, Scotland (UK), Australia, China, China (Hong Kong)

12

## Countries

26

## Partners



## OPERANDUM

OPEN-air laborATORies for Nature baseD solUtions to Manage hydro-meteo risks





## 3 main sites

salt intrusion/droughts

coastal erosion/storm surge

river flooding



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deep roots  
vegetation



halophytes



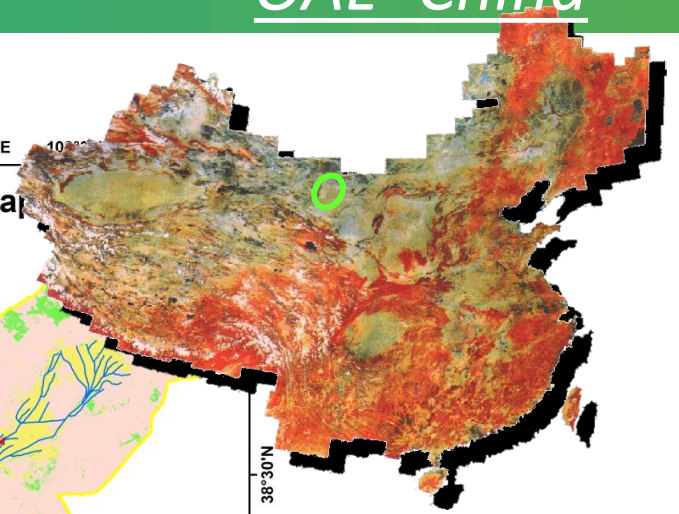
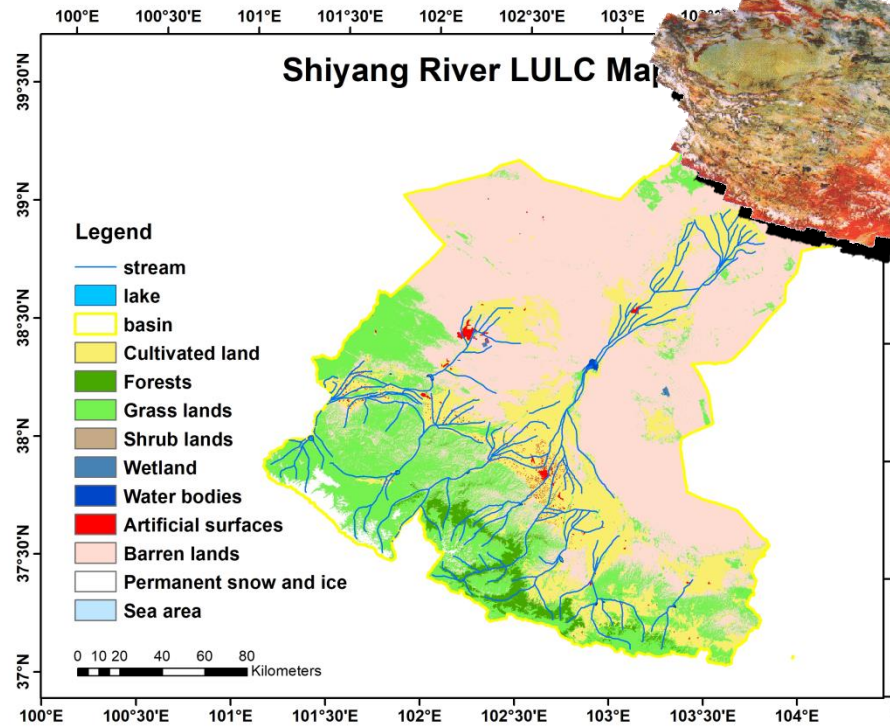
sand dune



**Drought.  
Soil salination.  
Desertification.**

Improvement of the tolerance of plant to water and salt stress by microbiology technology;

Optimization of the crop water use through crop types adjustment.



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OPEN-air laborATORies for Nature baseD  
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## Weany Creek

**Gully erosion issues on grazing lands,  
Transport of sediments from  
gully systems to receiving  
waters.**

**Restoring** degraded land using environmentally friendly and sustainable biotechnology.

**Developing** methods to limit transport sediments and limit erosion.

**Improving** the economy of the area.



**OPERANDUM**  
OPEN-air laboRatories for Nature based  
solUtions to Manage hydro-meteo risks





OPERANDUM realizes a multi-dimensional open and flexible **platform** enabling stakeholders and end users to **improve knowledge** in NBS to mitigate climate change as well as ways to **promote** and **exploit** the improved/preserved environment while increasing **business opportunities**

**GEOIKP**

To display **climate model data, impact analysis** and OALs **results** data;

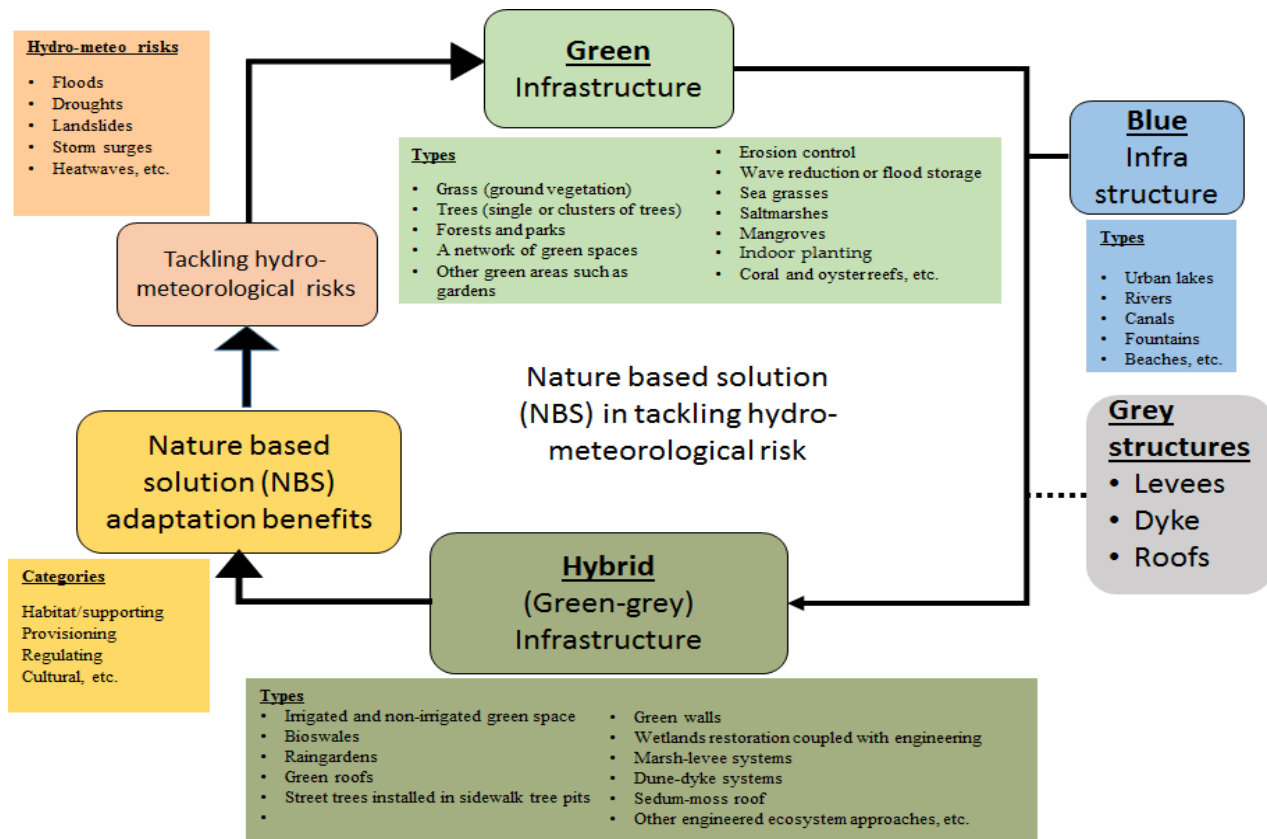
To expose a **geo-catalogue of existing NBS** in Europe;

To **deliver spatial/temporal datasets** in fast and configurable way through standard OGC web services strictly aligned to INSPIRE, GEOSS and World Wide Web best practices;

To deploy a **data storage** ensuring a unique entry point to harmonized data for all stages of NBS life cycle for the whole Europe;

To serve as a **knowledge-base marketplace**;

To provide **communication** platform for the different stakeholders/users



A comprehensive and harmonized collection of NBSs, enriched by a set of innovative parameters developed to overcome current gaps in data, policies and potential barriers for implementation



**OPERANDUM**

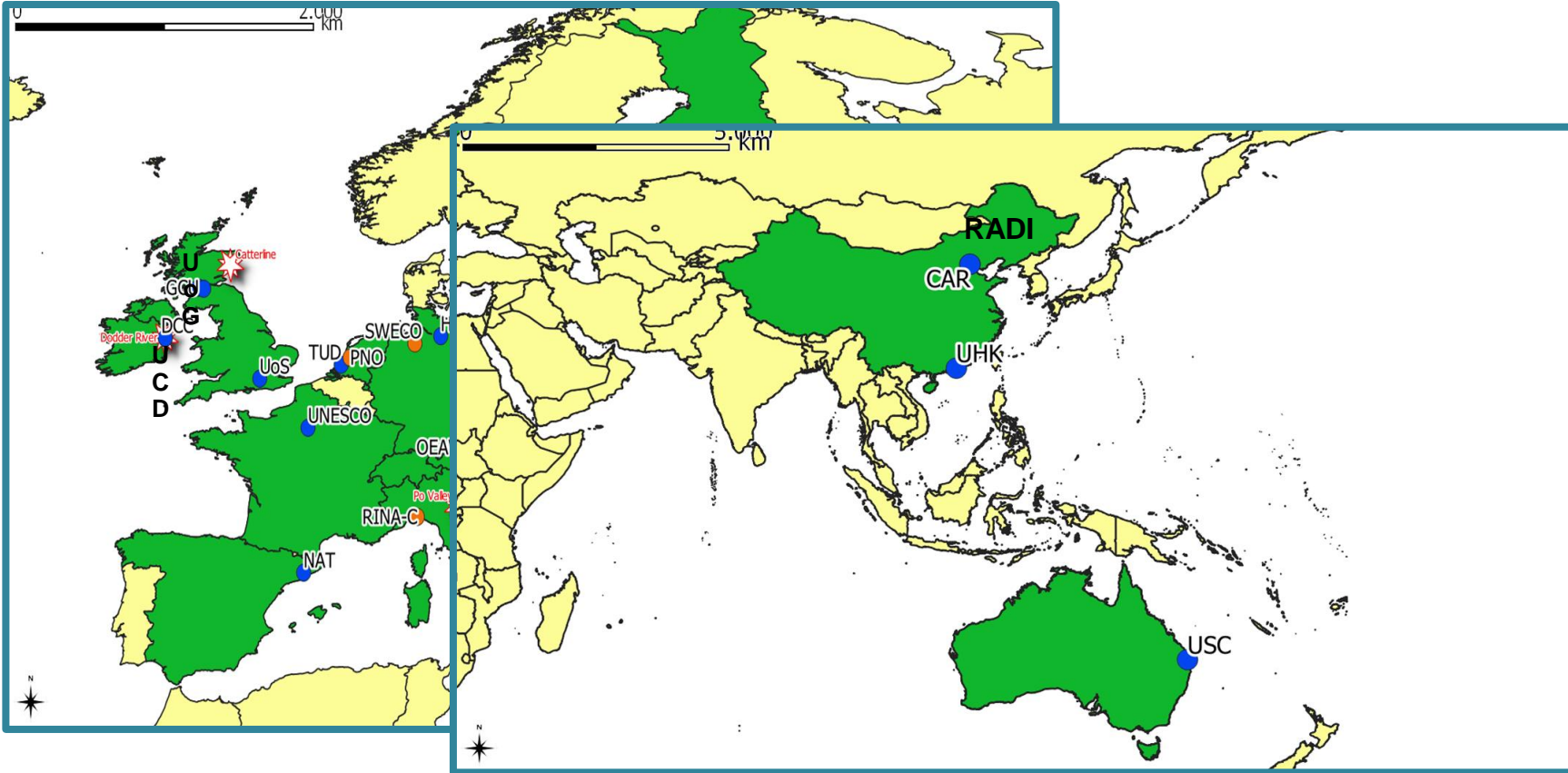
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## OPERANDUM

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# Grazie per l'attenzione

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