Un progetto di

Regione Emilia-Romagna

ART-ER
ATTRATTIVITÀ RICERCA TERRITORIO

Supporto alla progettazione delle misure di adattamento nelle città:

la piattaforma Saferplaces e la sua applicazione a Faenza e Rimini,

Stefano Bagli – GECOsistema srl
www.gecosistema.com

Nell'ambito del Forum regionale cambiamenti climatici:

cambiailclima
Strategia per il cambiamento climatico Regione Emilia-Romagna

I POMERIGGI DEL FORUM CAMBIAMENTI CLIMATICI PER GLI ENTI PUBBLICI E LE IMPRESE

Parte della rete

UNDER 2°

SaferPlaces Global Platform

AI-based Digital Twin Solution for
Flood Risk Intelligence in Urban Areas

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SaferPlaces

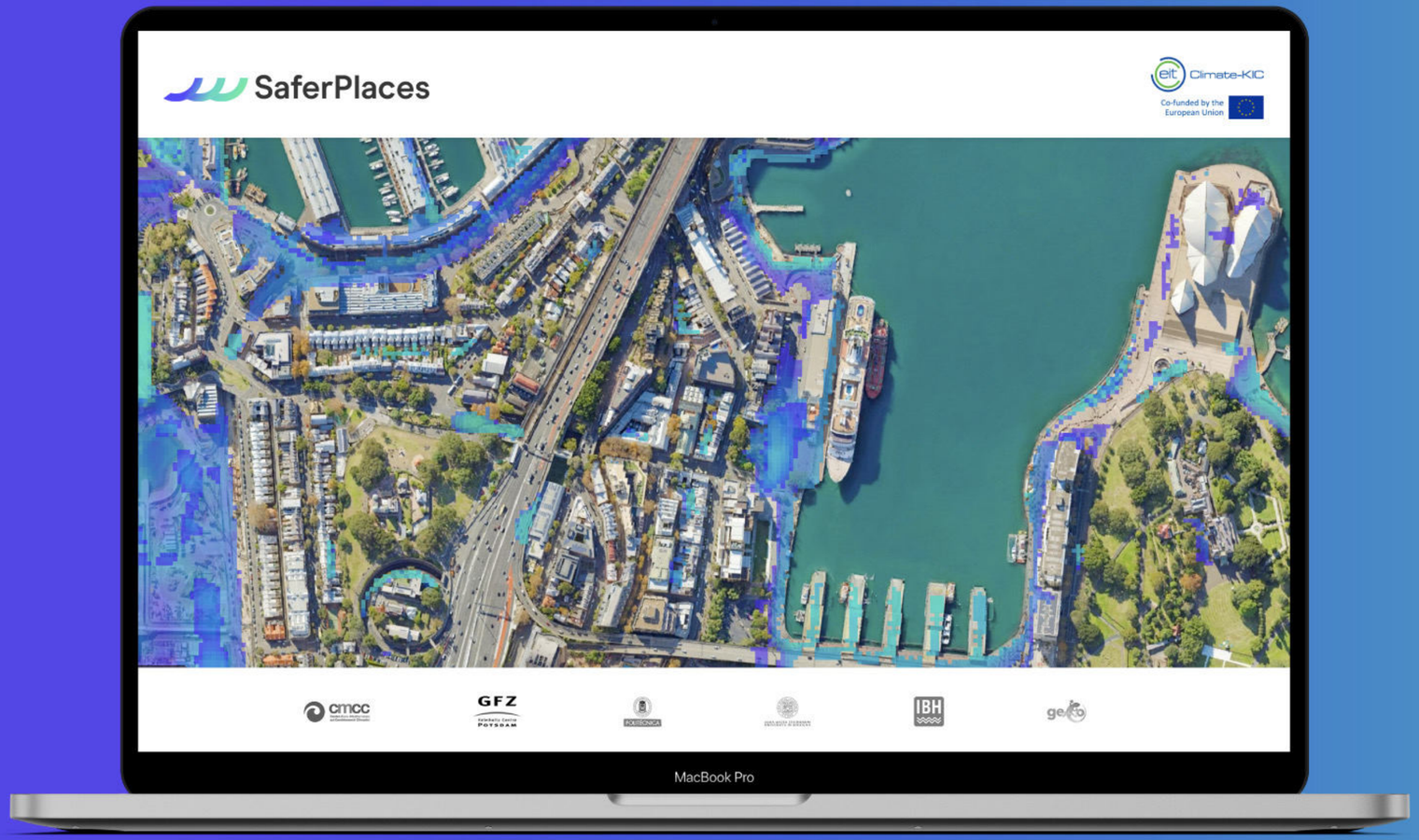
Are we ready to face the next flood event?

$651 B

Global economic losses (UNDDR)

The Solution

Digital Twin Solution



THE SOLUTION

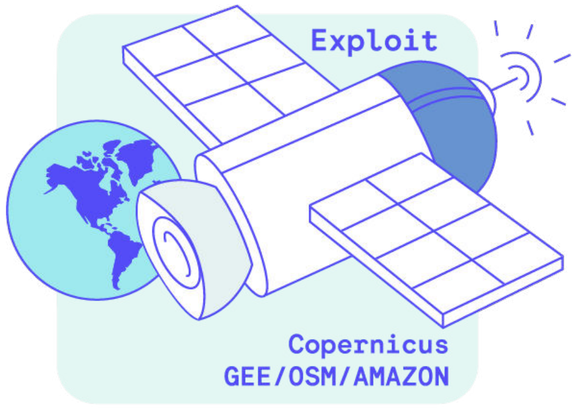
SaferPlaces

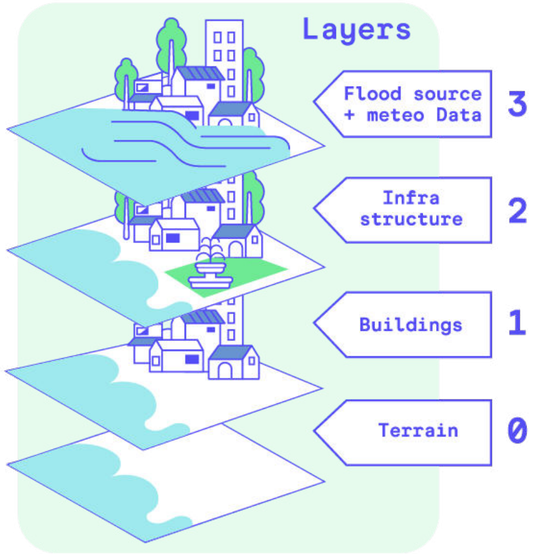
Global Flood Risk Intelligence at your fingertips

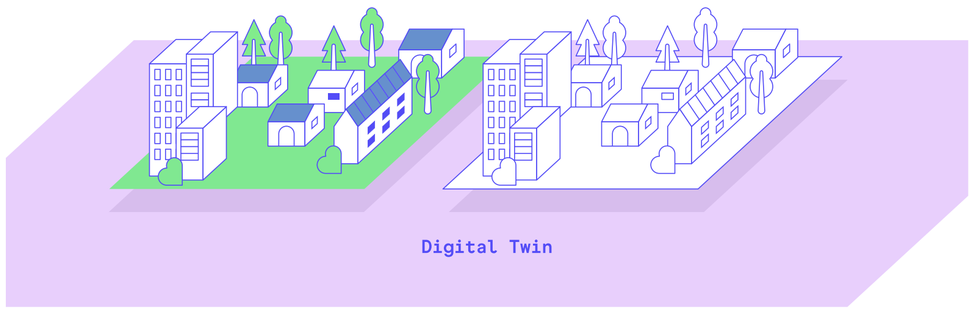
- YOU can activate the platform for every city worldwide in 5 easy steps and in less than 5 minutes

THE SOLUTION

High Resolution Digital Twin of the City







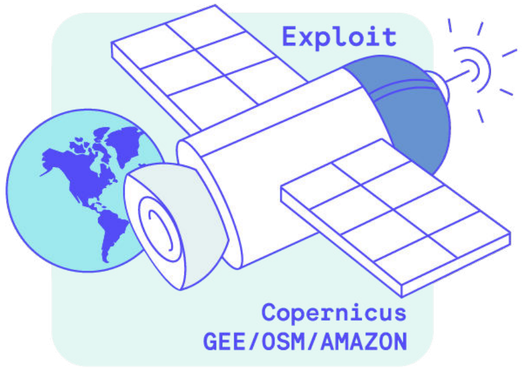
SaferPlaces

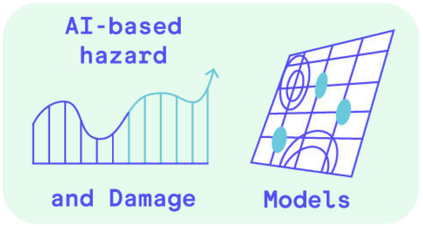
- High resolution geospatial, satellite and climate open data
  - Copernicus CDS
  - Sentinel
  - ESA
  - GEE,
  - OSM,
  - AMAZON,
  - Capella Space
- Both commercial and public satellite constellations
- Worldwide coverage
  - 90% US at 1 m
  - 100% US at 10m

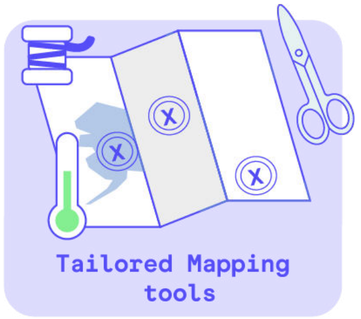
THE SOLUTION

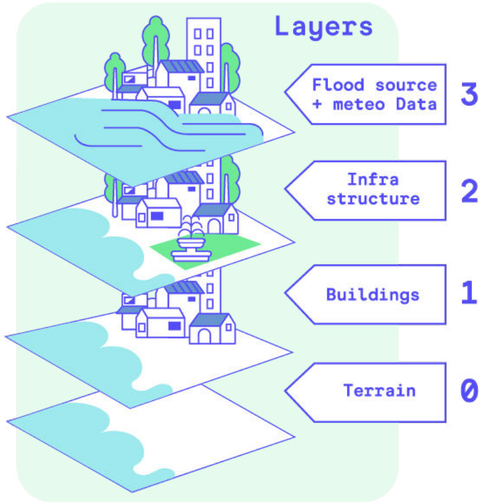
SaferPlaces

AI-based Flood hazard and damage Models



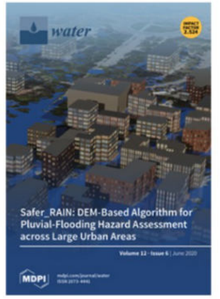






- Proprietary Innovative AI and physical-based flood hazard and damage models tailored for urban areas

- FULL LIST OF PUBLICATIONS



water

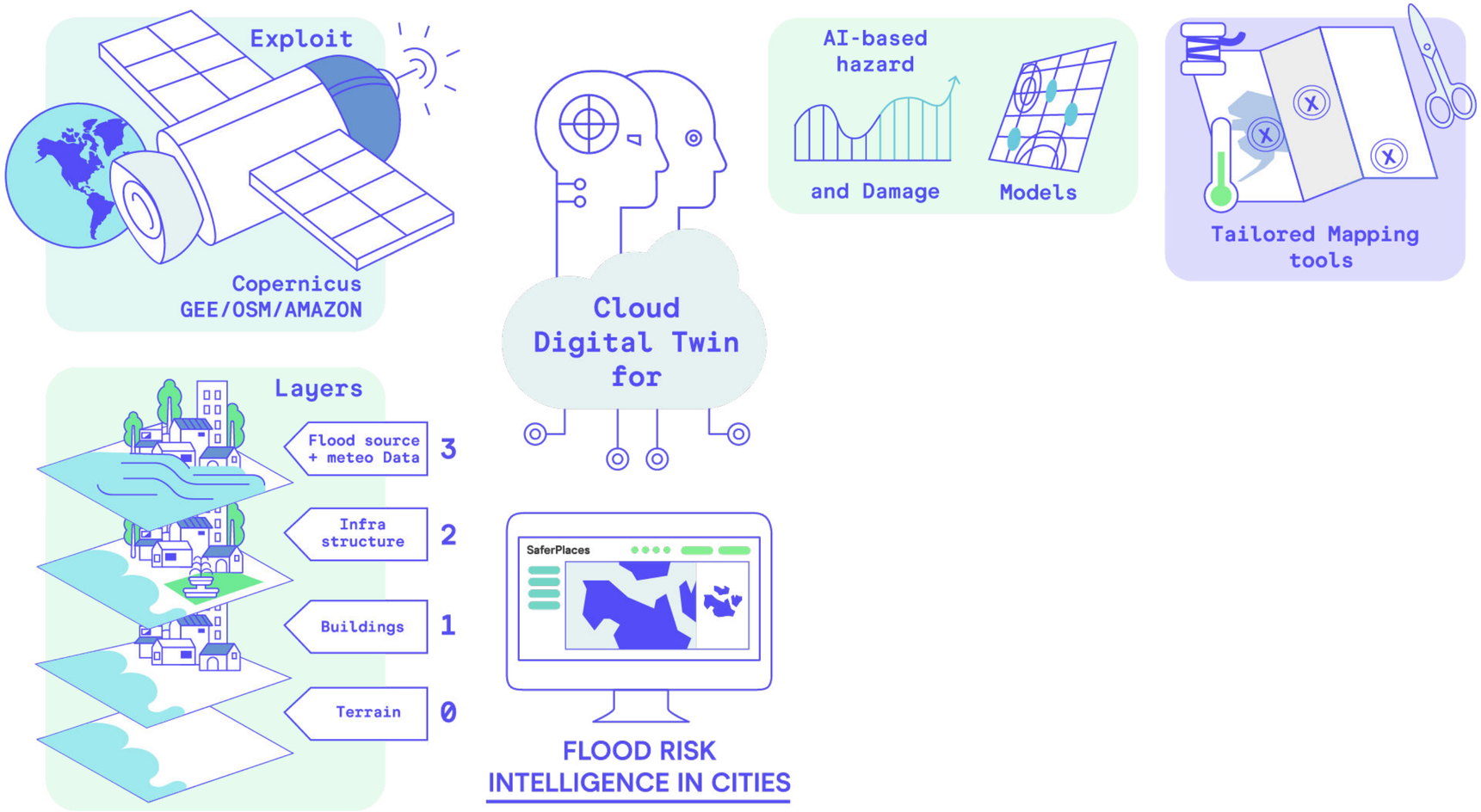
Safer_RAIN: A DEM-Based Hierarchical Filling-&-Spilling Algorithm for Pluvial Flood Hazard Assessment and Mapping across Large Urban Areas

Water, Volume 12, Issue 6 (June 2020)

THE SOLUTION

SaferPlaces

Scalable Powerful Cloud Computing



- **Cloud Based** Digital Twin for flood risk intelligence

THE SOLUTION

Multiple flood and climate scenarios

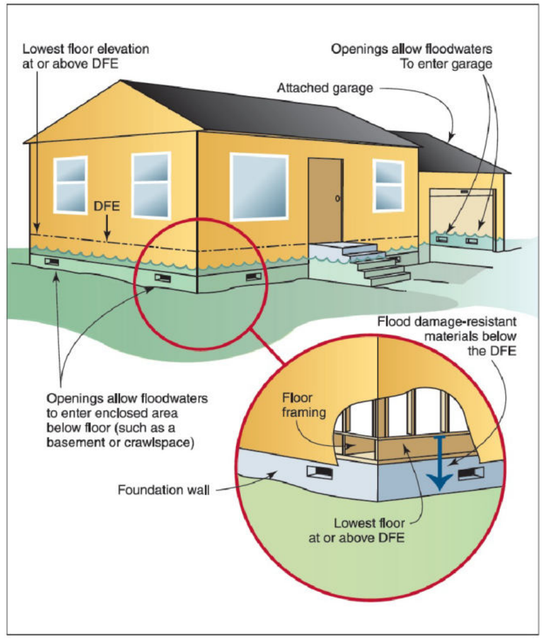
SaferPlaces

What can SaferPlaces do?

- Deploy cost-effective flood risk data **at parcel level with global coverage**
- Support Design of **adaptation and mitigation strategies** for a resilient city (add water barriers and tanks, change soil permeability)
- Support flood risk **early warning**

SaferPlaces

Flood Adapation Models - SaferADAPT



SaferADAPT

Flood Hazard Protection

- Barriers (artificial dunes, levee)
- Sustainable (urban) drainage systems (SuDS)
- Infiltration ponds, green areas, permeable paving
- Green roof

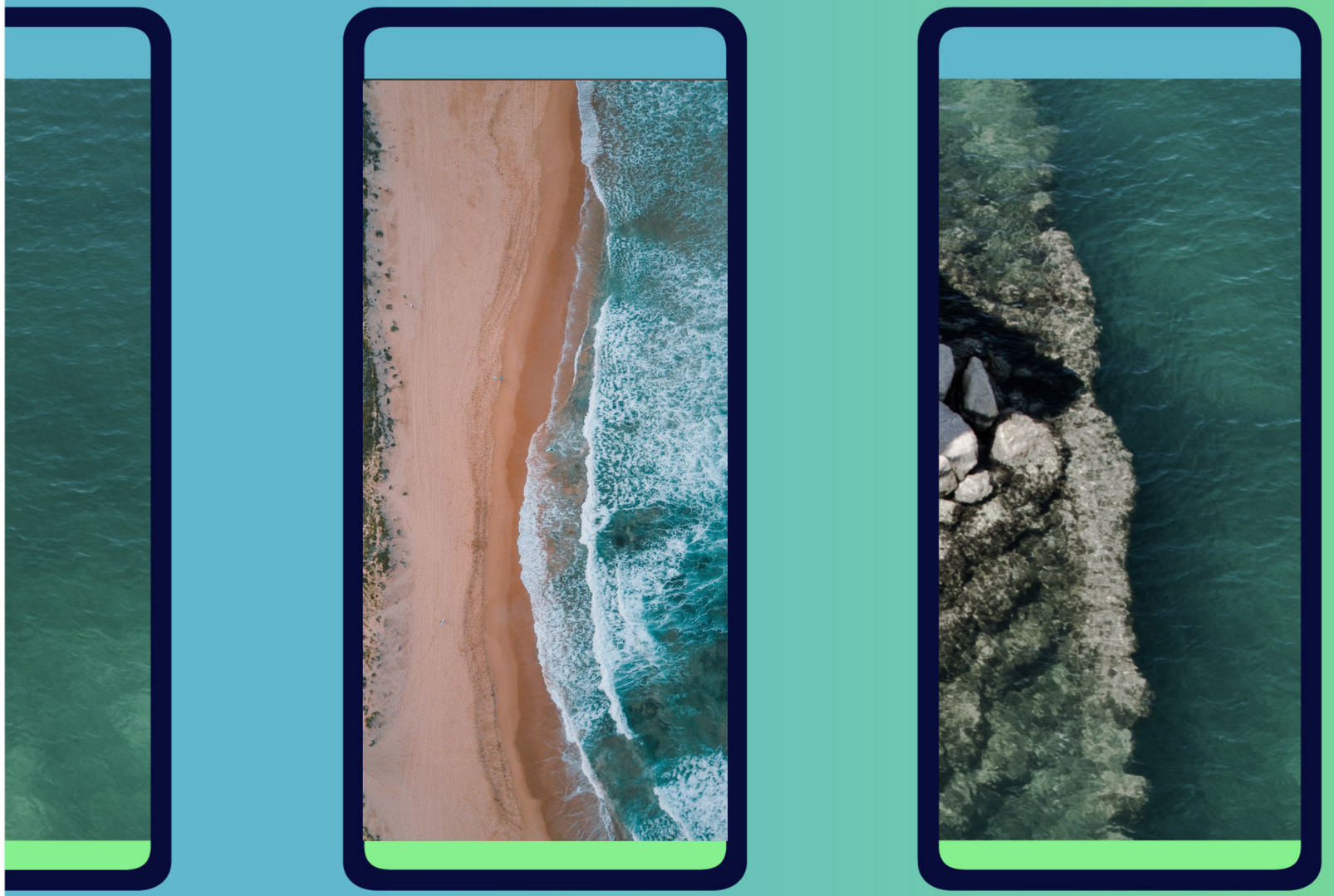
Building Flood Damage Protection

- Building dry/wet-proofing
- Building Flood barrier
- Adapted use of ground floor
- Vertical evacuation of assets
- Elevating the building

Case Studies

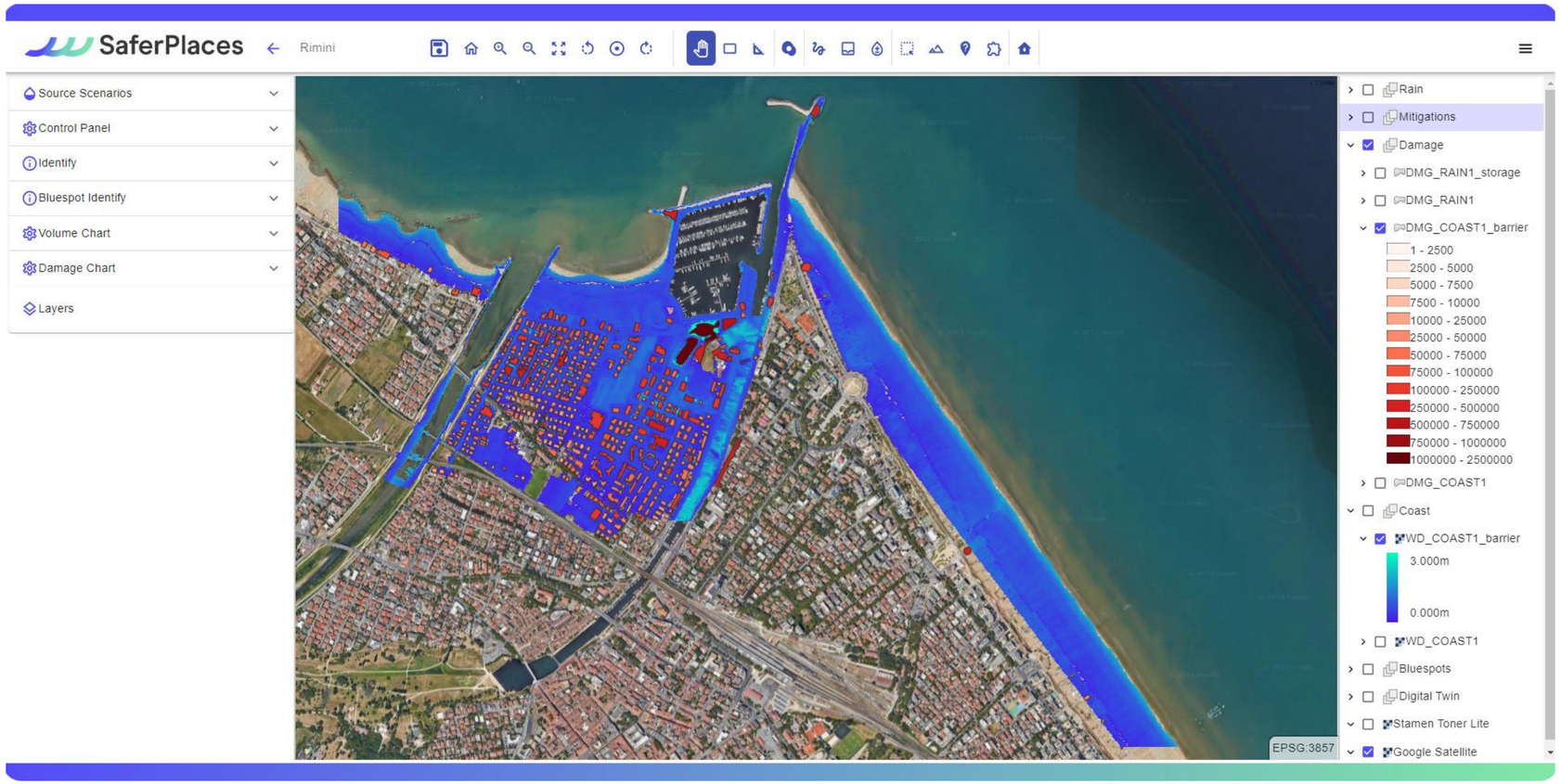
Rimini

Parco del Mare (Rimini)



CASE STUDY

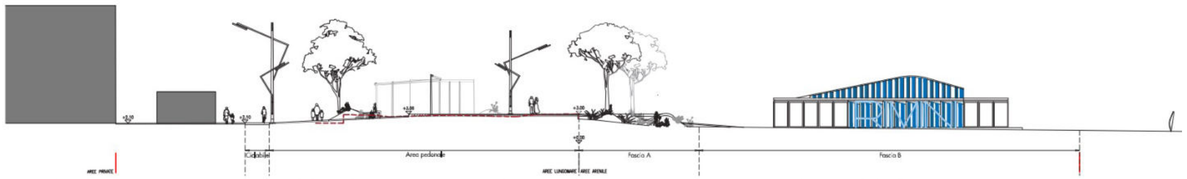
Case Study: Parco del Mare Rimini (Italy)

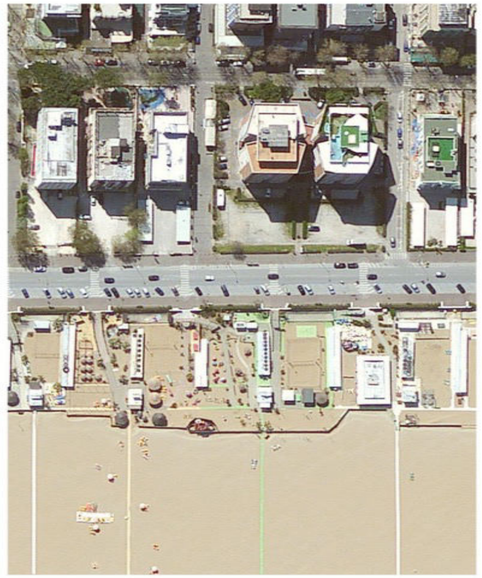


CASE STUDY

Case Study: Parco del Mare Rimini (Italy)

TRATTO 4





USE CASES

Parco del Mare Rimini (Italy)

Year 2050
Coastal Flooding
Extension &
Associated Damages

Without Parco del Mare (left) and with “Parco del Mare” (right)

SaferPlaces

“Thanks to the SaferPlaces platform the urban planning unit of Rimini Municipality can now easily assess climate hazards and identify the best adaptation and mitigation strategies.”

— Giada Vignali,
Municipality of Rimini

SaferPlaces

without Parco del Mare

with Parco del Mare

CASE STUDY

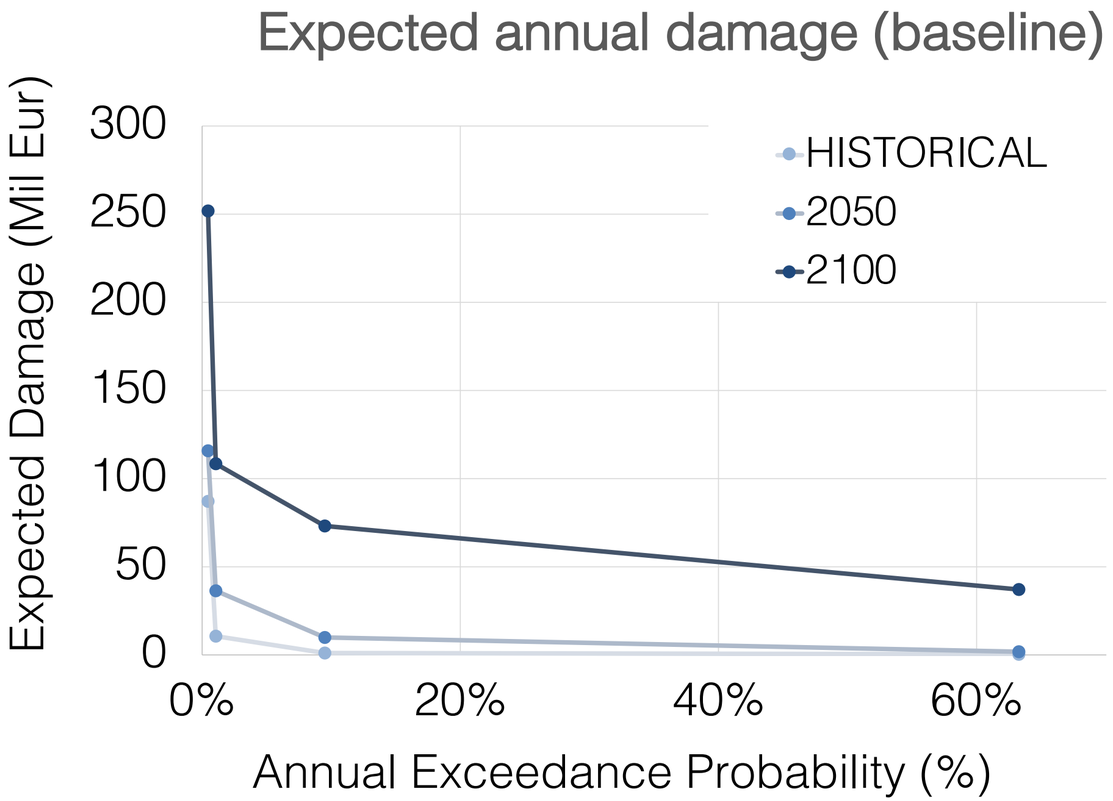
SaferPlaces

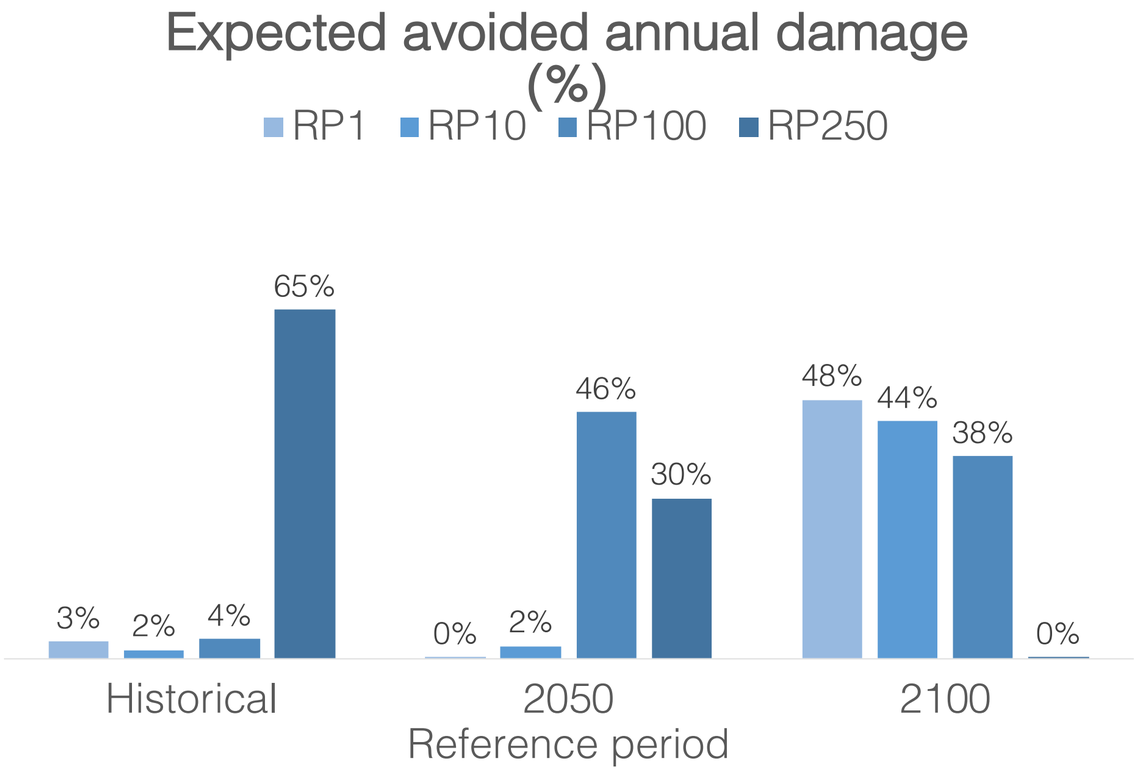
Rimini with Parco del Mare

CASE STUDY

SaferPlaces

Rimini with Parco del Mare





Case Studies

Rimini

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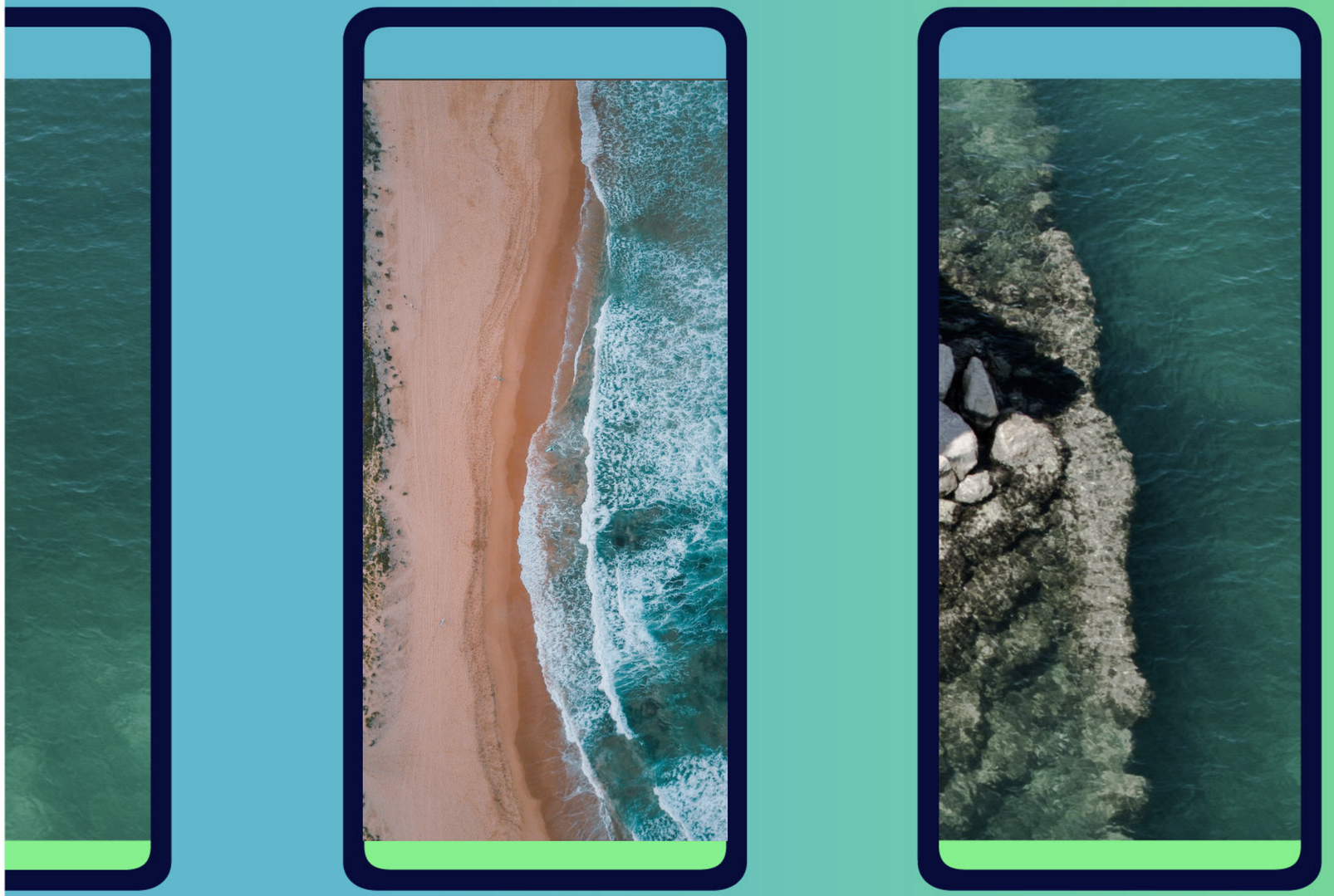
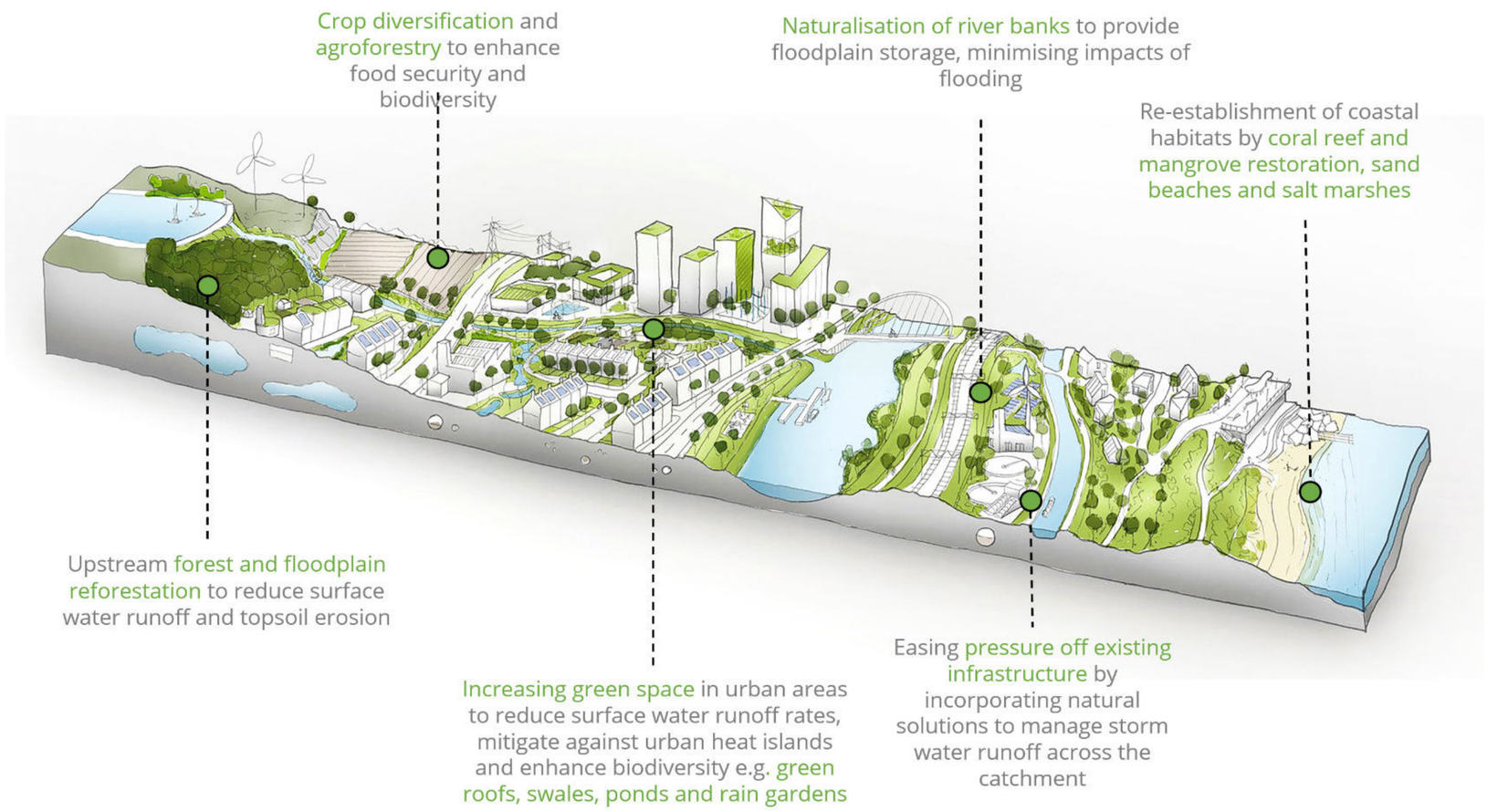


USE CASES

Nature Based Solution – NBS

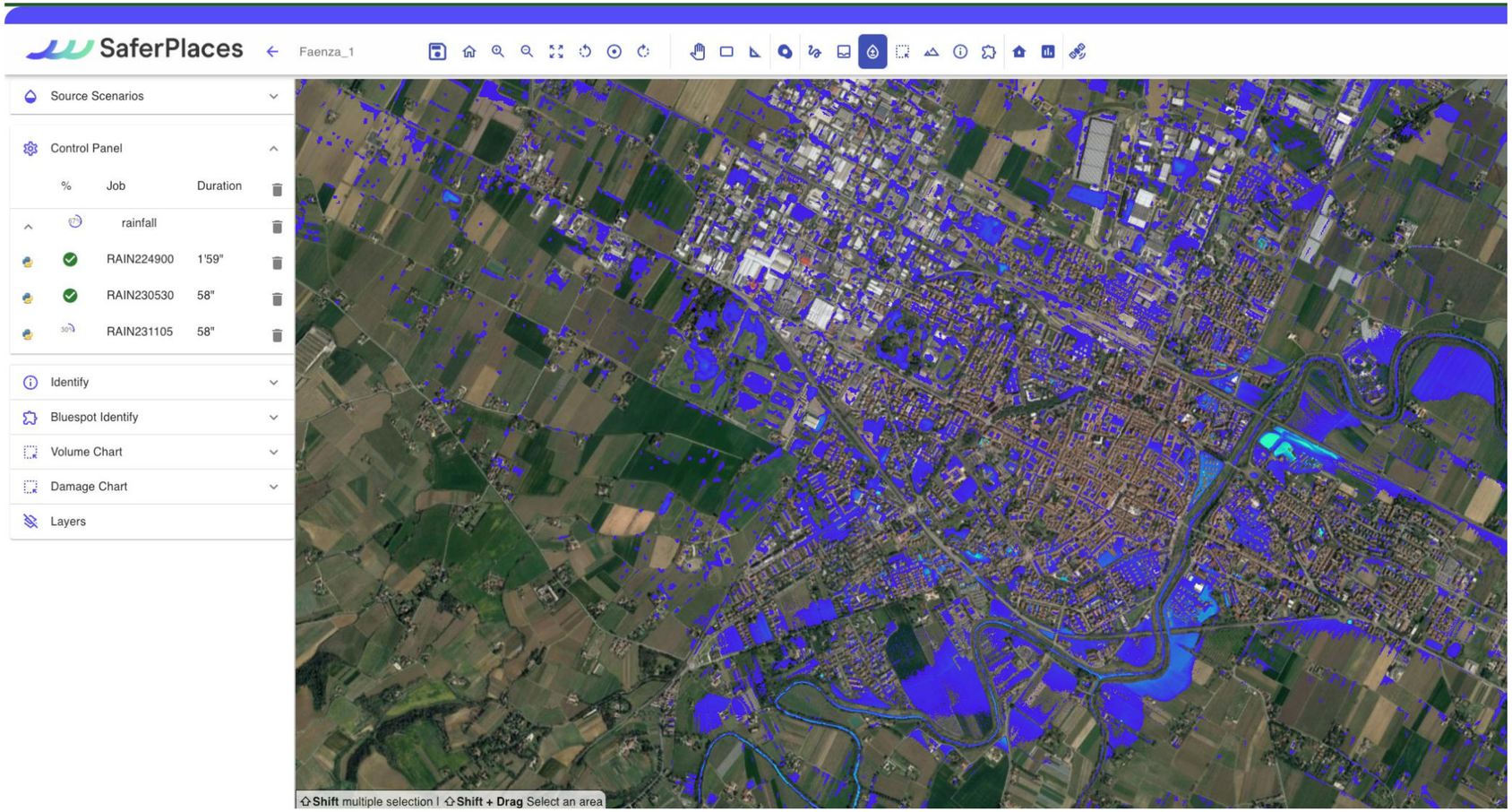


- Comparison between the high probability flooding areas predicted by SaferPlaces and the actual flooded areas in Faenza Municipality.

- The first days of May the region was hit by heavy rains that locally exceeded 150 mm in just 24 hours.

USE CASES

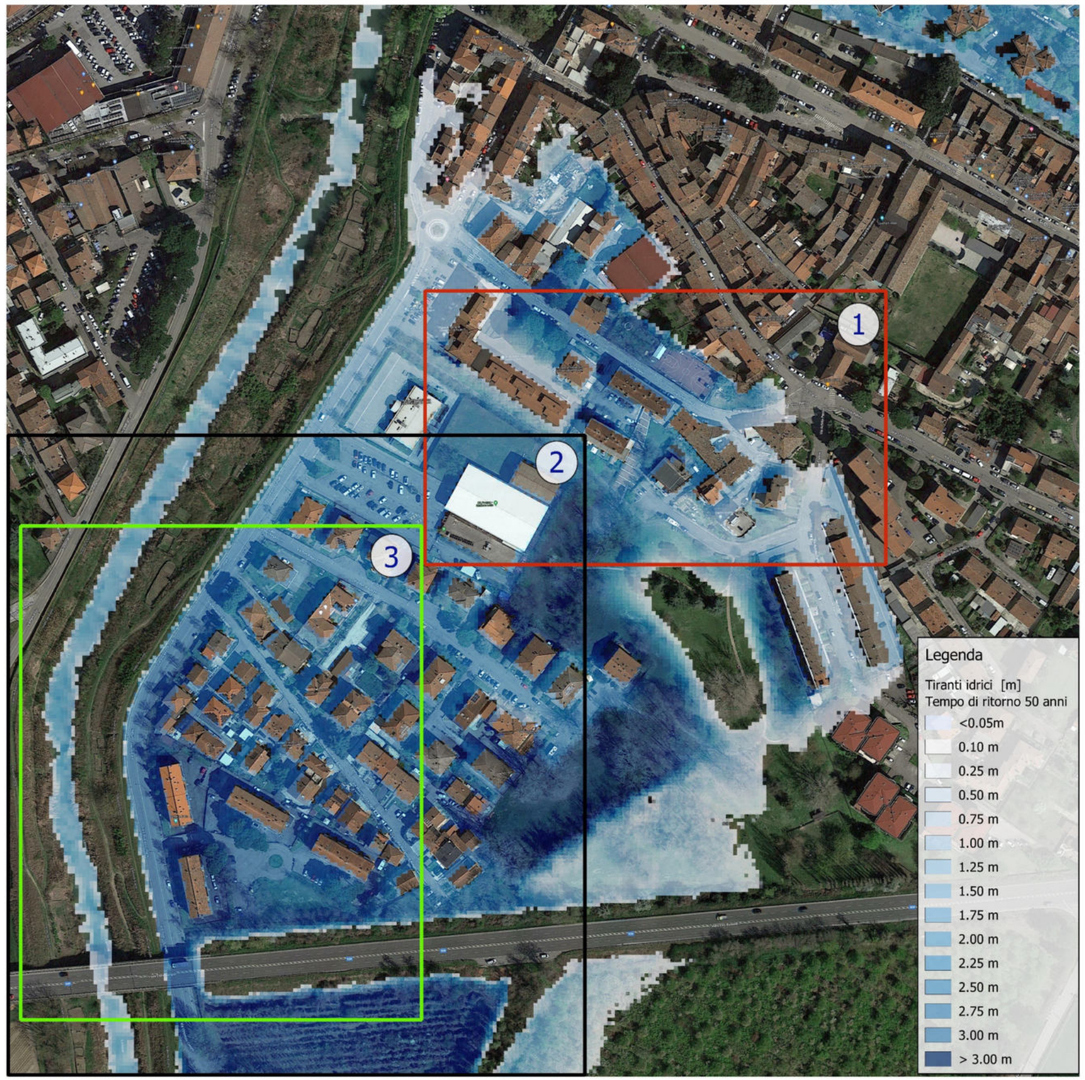
Nature Based Solution – NBS



- Pluvial Flooding Faenza Municipality.
- Rainfall Event 100 mm in 3 h

USE CASES

Supporting Early-Waring for Emilia-Romagna Civil Protection



SaferPlaces

Alluvione del 3 maggio 2023 a Faenza
località Borgo Durbecco

Confronto tra aree allagate da ripresa aerea e mappe dei tiranti idrici (tempo di ritorno 50 anni) prodotte dalla piattaforma SaferPlaces

SaferPlaces

- Comparison between the high probability flooding areas predicted by SaferPlaces and the actual flooded areas in Faenza Municipality.

- The first days of May the region was hit by heavy rains that locally exceeded 150 mm in just 24 hours.

USE CASES

Supporting Early-Waring for Emilia-Romagna Civil Protection

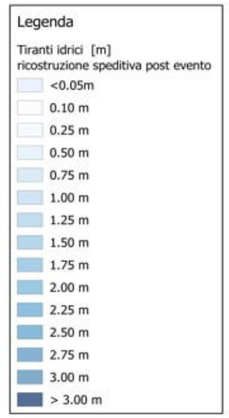
- Comparison between the high probability flooding areas predicted by SaferPlaces and the actual flooded areas in Cesena Municipality.

- During May 2023, in just under 20 days, as much rain as is usually seen in a year has fallen in Emilia-Romagna, originating floodings of unprecedented magnitude, within two weeks from each other.

SaferPlaces

Alluvione del 16-17 maggio 2023 a Cesena
Quartiere Oltresavio

Ricostruzione speditiva post evento

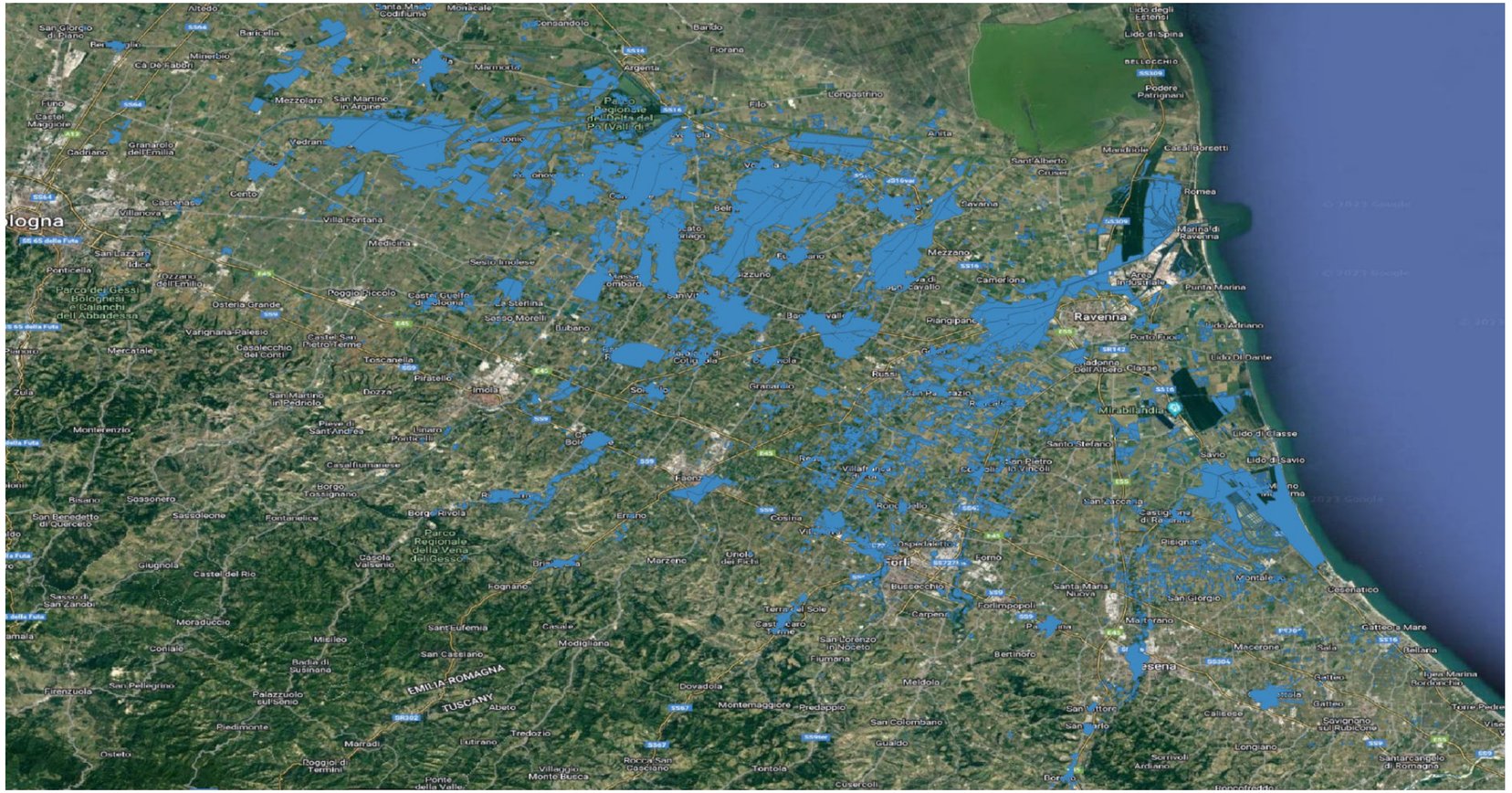


USE CASES

SaferPlaces

Supporting Post-Event Analysis for Emilia-Romagna Civil Protection

— From Satellite and On-Site Survey Flooded Areas to Water Depth and Damage Assessment



USE CASES

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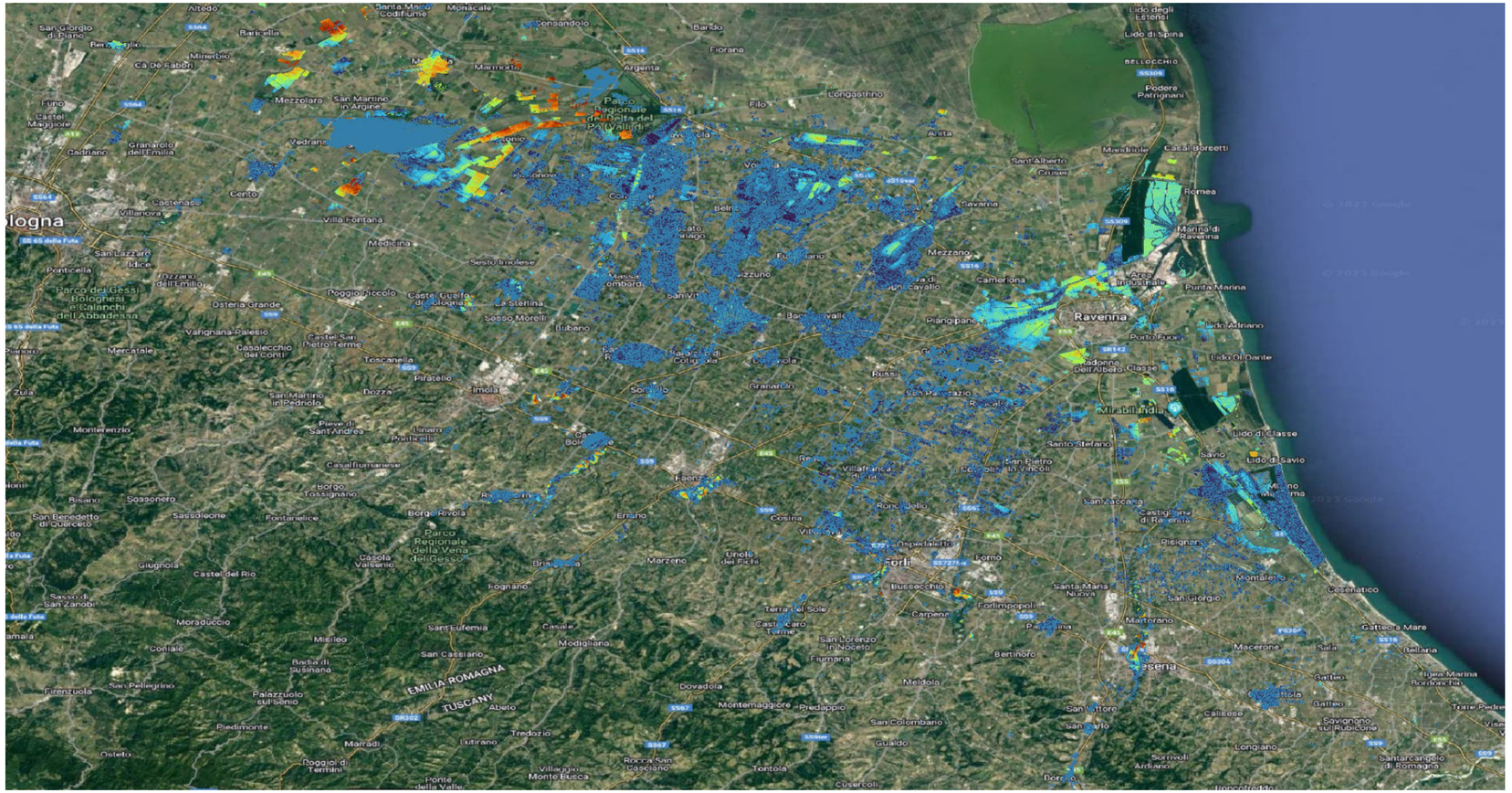
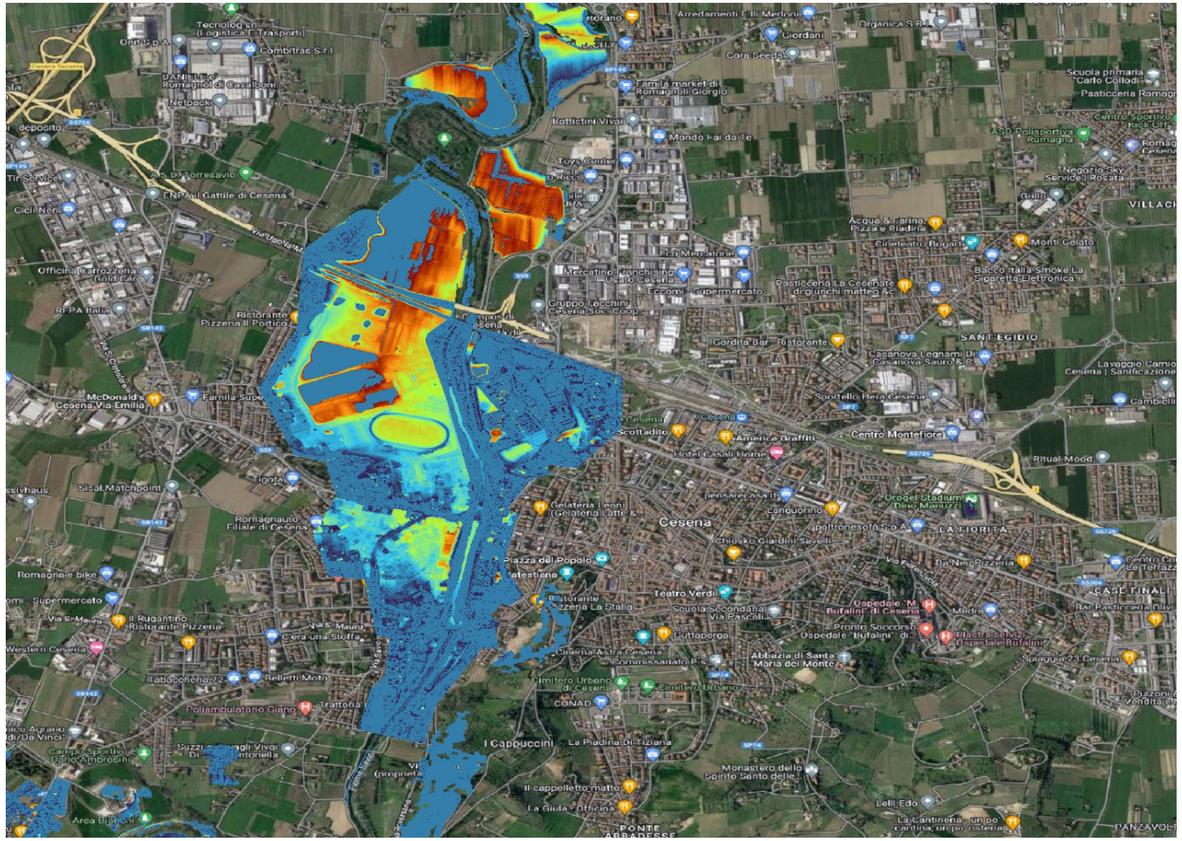
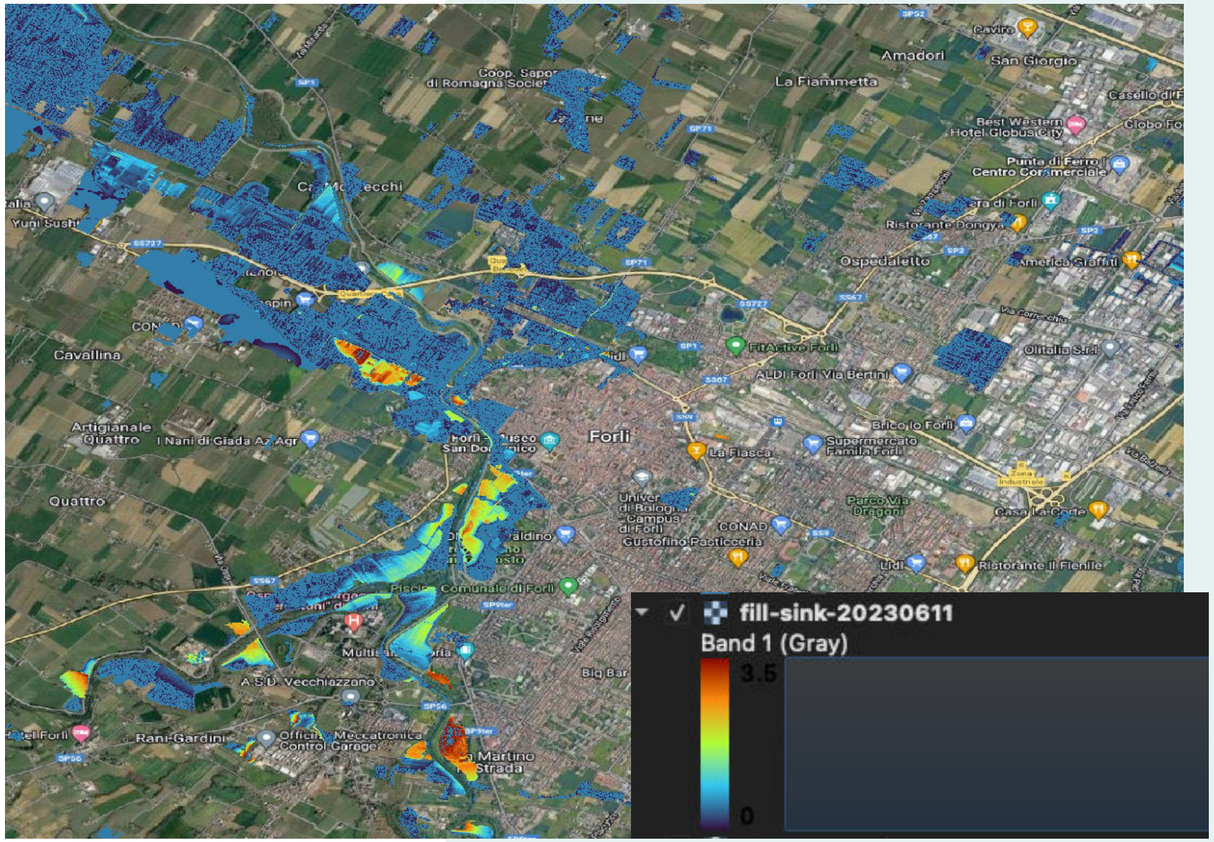


USE CASES

SaferPlaces

Supporting Post-Event Analysis for Emilia-Romagna Civil Protection





USE CASES

SaferPlaces

SaferPlaces is one of ESA's Applications for Observing the Earth in the aftermath of the Emilia-Romagna floods

https://www.esa.int/Applications/Observing_the_Earth/Satellites_map_aftermath_of_Emilia-Romagna_floods

USE CASES

SaferPlaces

SaferPlaces as Digital Twin Application for ESA Space and Civil Security Program

Grazie

stefano.bagli@gecosistema.com