

# CLIMAAX Community of practice

## *River Flood Risk Assessment: Learning from regions*

**February 19, 2026**  
10:30-12 CET



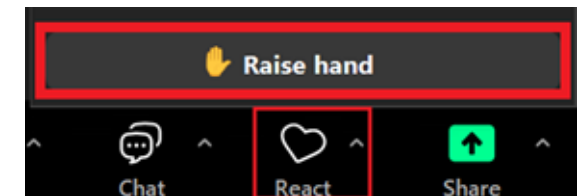
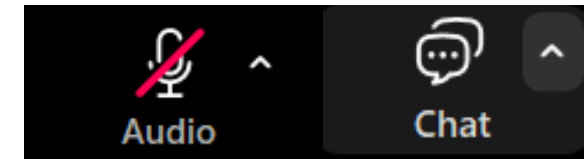
The CLIMAAX project is funded by the European Union under Grant agreement ID 101093864. This publication was funded by the European Union. Its contents are the sole responsibility of the author(s) and do not necessarily reflect the views of the European Union.



**CLIMAAX**  
climate ready regions

# HOUSEKEEPING

- Please note that the meeting is being **recorded**.
- Please, keep your **mic off**.
- Feel free to post your **questions in the chat** (bottom of the screen) or raise your hand to talk



# MEETING AGENDA

- ✓ 10:30-10:35 **Welcome & introduction to the webinar**
- ✓ 10:35-10:50 **Introduction to the *River flood map* and *River discharge* workflows**
  - Speaker: Natalia Aleksandrova (Deltares)
- ✓ 10:50-11:00 **Introduction to the *Building damage and exposed population* Workflow**
  - Speaker: Gloria Mozzi (CMCC)
- ✓ 11:00-11:25 **Regional experiences: Applying and adapting the workflow**
  - Regione Marche, Italy - Speakers: *Gaia Galassi* and *Francesca Sini* (Regione Marche)  
*“Risk assessment based on floods maps and future discharge scenarios for planning adaptation: the Pesaro case study”*
- ✓ 11:25-11:50 **Panel discussion and Q&A**
  - Moderators: Fulvio Biddau, Maria Katherina Dal Barco and Majid Njazkar (CMCC)
- ✓ 11:50-12:00 **Closing remarks**



# NEW HAZARD AND WORKFLOW-FOCUSED SERIES





## Moving forward in CLIMAAX CoP from:

- **Thematic webinars** and workshops connecting science, policy and practice to support CRAs using the CLIMAAX Framework and Toolbox
- **Demo & co-design sessions** for refining and fostering usability of CLIMAAX outcomes

The CLIMAAX project is funded by the European Union under grant agreement No. 101093864.

This work was funded by the European Union. Its contents are the sole responsibility of the authors and do not necessarily reflect the views of the European Union.



# COP NEW PHASE: CONSOLIDATING LEGACY AND IMPACT

- **Regional showcase webinars and dialogues**

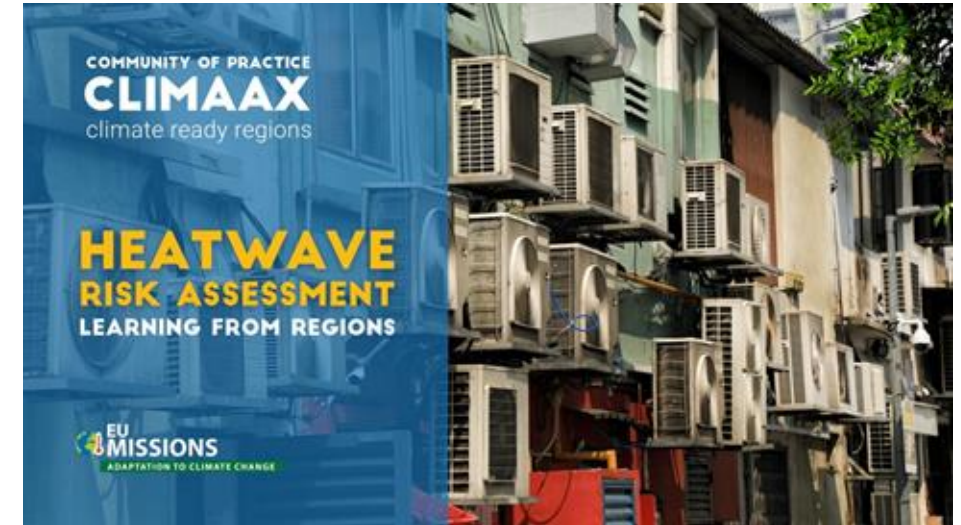
Connecting toolbox developers and regional practitioners to exchange lessons learned from regional CRAs

- **Dedicated online community forum**

A new space for P2P exchange and knowledge sharing

- **Promote exchange across climate service communities**

To foster awareness, collaboration, and uptake of solutions for climate resilience in Europe.



Move beyond traditional developer-end user model



Empowering local practitioners to take ownership and an active role in the use, extension and adaptation of CLIMAAX resources



Facilitate the uptake and continuous improvement of CLIMAAX tools and framework





# **INTRODUCTION TO RIVER FLOOD MAP AND RIVER DISCHARGE WORKFLOWS**

**Natalia Aleksandrova**  
(Deltares)



# River flood workflows

## Introduction

*Presented by Natalia Aleksandrova (Deltares)*



The CLIMAAX project is funded by the European Union under Grant agreement ID 101093864. This publication was funded by the European Union. Its contents are the sole responsibility of the author(s) and do not necessarily reflect the views of the European Union.



**CLIMAAX**  
climate ready regions

# River floods workflows in CLIMAAX

## CLIMAAX Handbook:

<https://handbook.climaax.eu/>

## Workflows repository on GitHub:

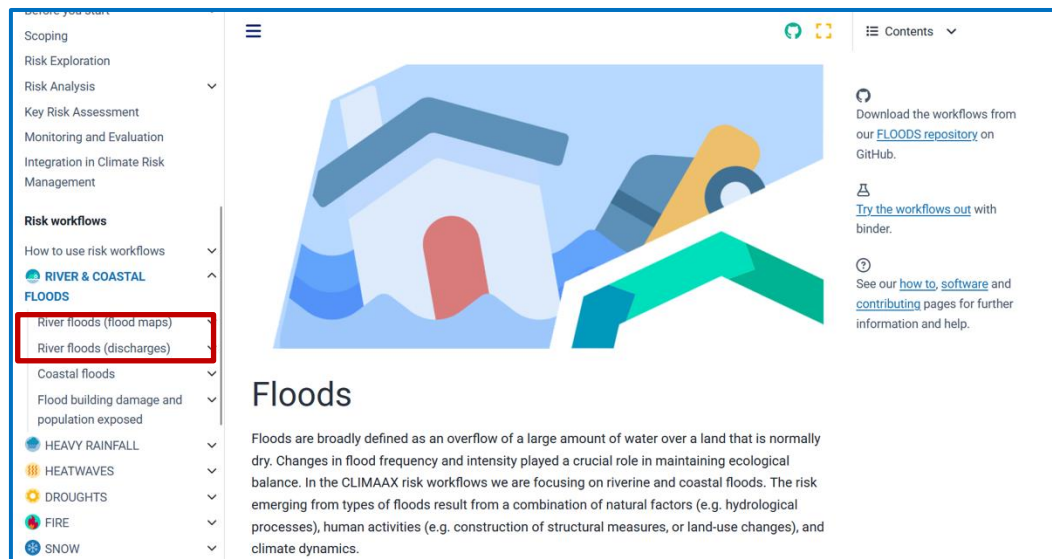
<https://github.com/CLIMAAX/FLOODS>

## Two river hazard & risk workflows:

- River flood risk based on **flood maps**
- River flood risk based on **river discharges**

## Other flood workflows:

- Flood building damage and population exposed
- Coastal floods



Before you start

- Scoping
- Risk Exploration
- Risk Analysis
- Key Risk Assessment
- Monitoring and Evaluation
- Integration in Climate Risk Management

**Risk workflows**

- How to use risk workflows
- RIVER & COASTAL FLOODS**
- River floods (flood maps)**
- River floods (discharges)**
- Coastal floods
- Flood building damage and population exposed
- HEAVY RAINFALL
- HEATWAVES
- DROUGHTS
- FIRE
- SNOW

Download the workflows from our [FLOODS repository](#) on GitHub.

[Try the workflows out](#) with binder.

See our [how to, software](#) and [contributing](#) pages for further information and help.

## Floods

Floods are broadly defined as an overflow of a large amount of water over a land that is normally dry. Changes in flood frequency and intensity played a crucial role in maintaining ecological balance. In the CLIMAAX risk workflows we are focusing on riverine and coastal floods. The risk emerging from types of floods result from a combination of natural factors (e.g. hydrological processes), human activities (e.g. construction of structural measures, or land-use changes), and climate dynamics.

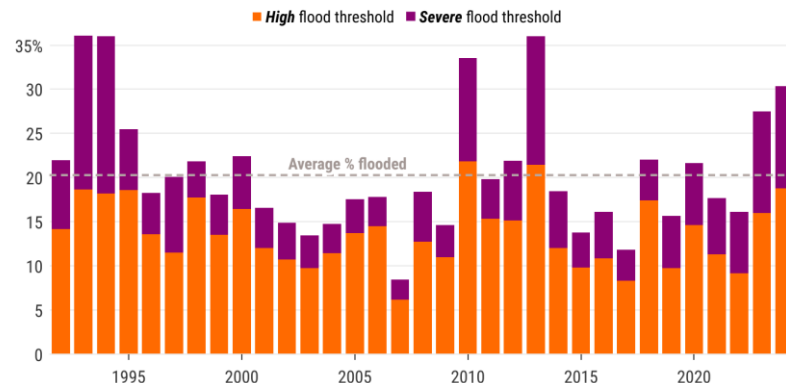


# River flooding under climate change

- Climate change causes changes in the water cycle (precipitation, snow melt)
- Damages and exposed population projected to increase sharply
- Damages can be avoided by timely protection of people and infrastructure

## Almost a third of the European river network experienced flooding in 2024

Annual percentage of the European river network experiencing flooding



Data: EFAS • Credit: CEMS/C3S/ECMWF



## Widespread flooding in 2024

According to the Intergovernmental Panel on Climate Change, Europe is one of the regions with the largest projected increase in flood risk.

— River network — 'High' flood threshold — 'Severe' flood threshold

### Valencia, Spain

From 28 October to 4 November, the national records for total rainfall in one, six and 12 hours were all broken.

The maximum 24-hour total reached 771.8 mm – the second highest amount on record for Spain.

The rainfall and flooding had devastating impacts, with at least 232 people killed in the province of Valencia and fatalities in three other provinces.

The percentage of the river network that flooded during the year was the **fifth-largest in a 32-year record** and the **largest since 2013**.

**12%**  
of the river network  
exceeded the **'severe'**  
flood threshold

**30%**  
of the river network  
exceeded at least  
the **'high'** flood threshold

*\*Notable flood events occurred throughout the year. See the ESOTC 'Flooding' section and the interactive 'Key events map' for more details.*

Data: EFAS • Credit: CEMS/C3S/ECMWF

EUROPEAN  
STATE OF THE  
CLIMATE  
REPORT 2024



PROGRAMME OF  
THE EUROPEAN UNION



IMPLEMENED BY



WORLD  
METEOROLOGICAL  
ORGANIZATION



The CLIMAXX project is funded by the European Union under Grant agreement ID 101093864. This publication was funded by the European Union. Its contents are the sole responsibility of the author(s) and do not necessarily reflect the views of the European Union.



## Available river flood workflows

### River flood risk based on flood maps

Mapping hazard and risk in space

Risk calculation based on flood-damage curves  
(monetary value)

Requires flood maps as input

Challenging to address climate scenarios

### River flood risk based on river discharges

Estimating flood hazard based on river flows

Qualitative risk assessment  
Provides input to local hydrological / **hydraulic** /  
**flood** assessments

Validation with historical data possible

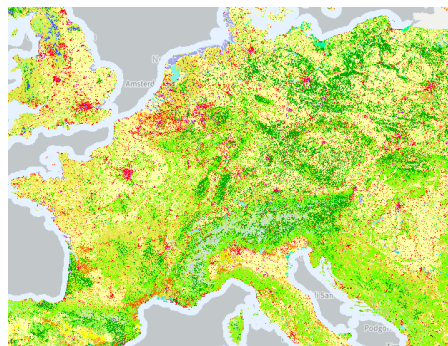
Climate scenarios explicitly integrated in the river  
discharge dataset



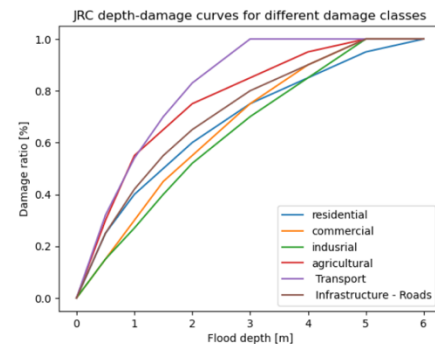
# Assessing flood risk based on existing flood maps



Hazard data - flood maps  
Extreme events, e.g. once in 100 years



Exposure – land use  
Land cover maps



Vulnerability curves  
Economic damage per type of land use

Maps of potential economic damage  
under rare extreme conditions (return periods)  
for identifying hotspots and most vulnerable areas

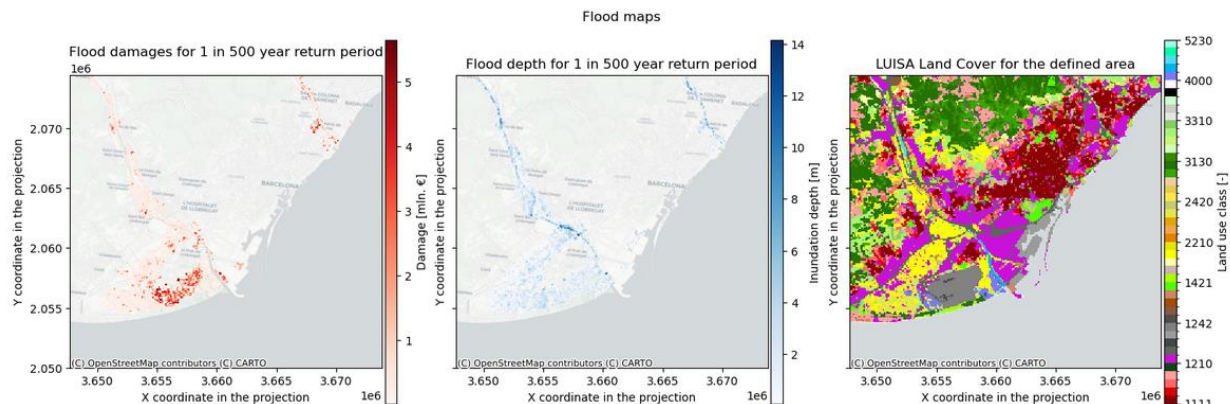


# Assessing flood risk based on existing flood maps



Flood maps are key to an accurate assessment.

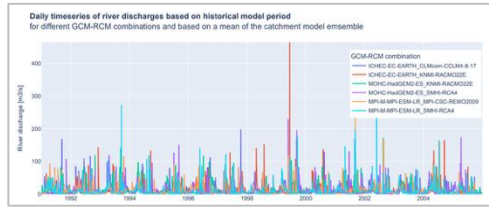
- EU-wide flood maps available (JRC), but often not representative for smaller rivers.
- Can be available locally (e.g. EU Flood Directive or other dedicated studies).
- Estimating effect of climate change requires flood maps under different climate scenarios or qualitative assessments based on hydrological indicators.



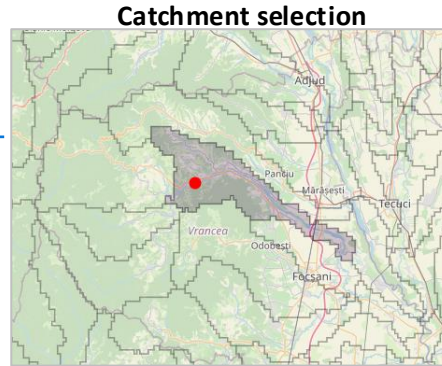
Example workflow output with European flood maps from JRC & LUISA land cover data



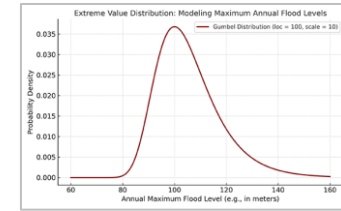
# Assessing flood risk based on river discharges



**Discharge timeseries for a selected catchment**  
Modelled with a Europe-wide hydrological model for past and future climates

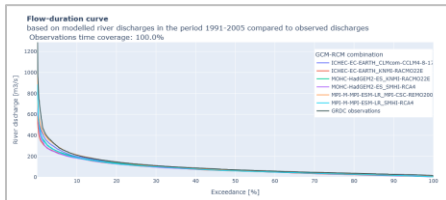


**Catchment selection**

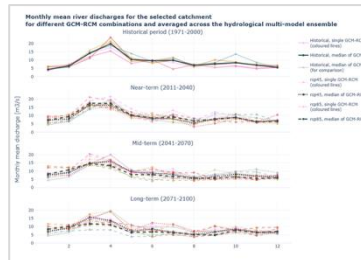


**Flood recurrence – extreme values**  
Return values calculated based on timeseries, for 2, 5, 10, 50 years

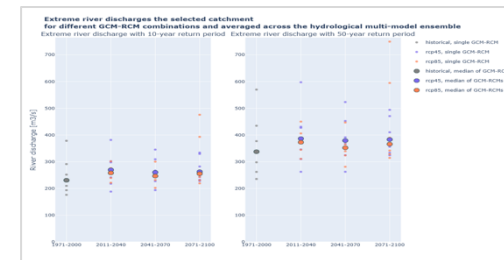
**Validation - comparing to local discharge measurements**



**Estimate changes in seasonal discharge statistics caused by climate change**



**Estimate changes in seasonal discharge statistics caused by climate change**

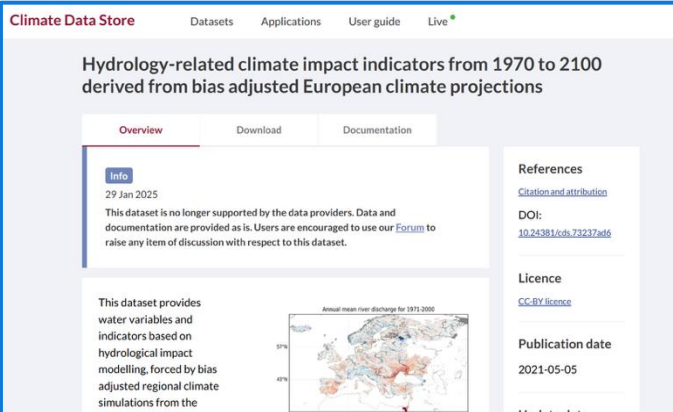


# Assessing flood risk based on river discharges

## Input data

Hydrological climate impact indicators 1970-2100 available on CDS and produced by SMHI based on the E-HYPE3 model

- Catchment-level river discharge data
  - Daily & monthly values
  - Extreme values (e.g. once in 50 years discharge)
- Effect of climate change
  - 7 climate models (GCM-RCM combinations)
  - 3 climate scenarios (RCP2.6, RCP4.5, RCP8.5)
  - 4 time periods (spanning 1971-2100)



Climate Data Store Datasets Applications User guide Live

### Hydrology-related climate impact indicators from 1970 to 2100 derived from bias adjusted European climate projections

Overview Download Documentation

**Info**  
29 Jan 2025  
This dataset is no longer supported by the data providers. Data and documentation are provided as is. Users are encouraged to use our [Forum](#) to raise any item of discussion with respect to this dataset.

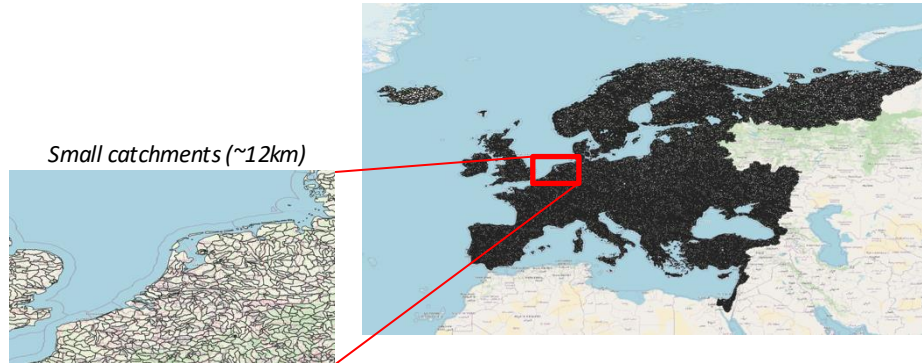
This dataset provides water variables and indicators based on hydrological impact modelling, forced by bias adjusted regional climate simulations from the

References  
[Citation and attribution](#)  
DOI:  
[10.24381/cds.73237a66](https://doi.org/10.24381/cds.73237a66)

Licence  
[CC-BY licence](#)

Publication date  
2021-05-05

Annual mean river discharge for 1971-2000



# Assessing flood risk based on river discharges

## Statistical analysis

Based on timeseries of modelled river discharges we assess:

1. Seasonal statistics → indication of changes in the water cycle
2. Extreme statistics → proxy for flood hazard



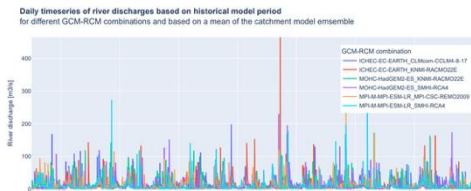
# Assessing flood risk based on river discharges

## Statistical analysis

Based on timeseries of modelled river discharges we assess:

1. **Seasonal statistics** → indication of changes in the water cycle

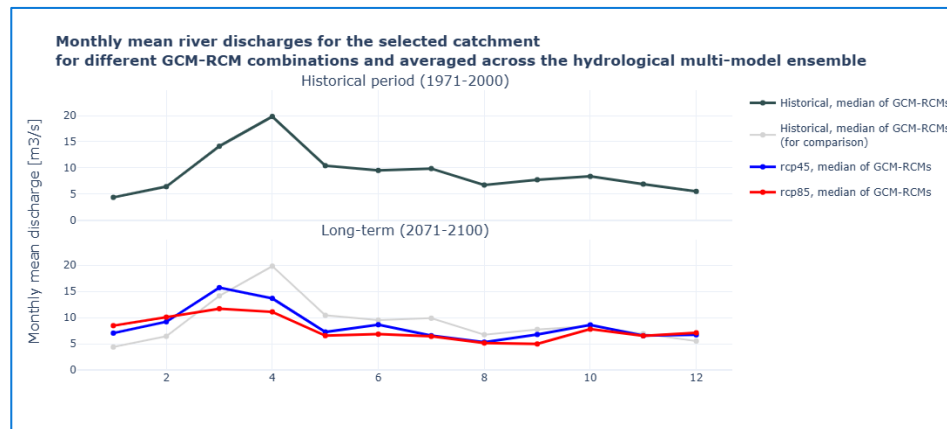
2. Extreme statistics → proxy for flood hazard



Compute monthly means over 30-year periods



- Is there a general trend towards a wetter or drier climate?
- Is there a significant change in discharge magnitudes?
- How does the discharge peak shift in time?



# Assessing flood risk based on river discharges

## Statistical analysis

Based on timeseries of modelled river discharges we assess:

1. Seasonal statistics → indication of changes in the water cycle

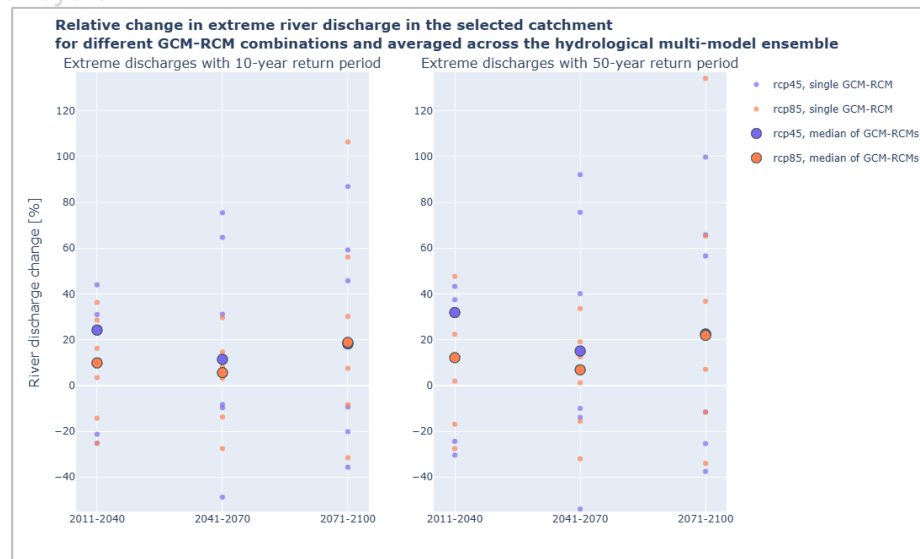
2. Extreme statistics → proxy for flood hazard

### Flood recurrence – extreme values

Return values calculated based on timeseries, for 2, 5, 10, 50 years



- Are extreme discharges generally projected to increase?
- How do different climate scenarios compare?
- How large is the uncertainty range across climate models?



# Assessing flood risk based on river discharges

## Validation

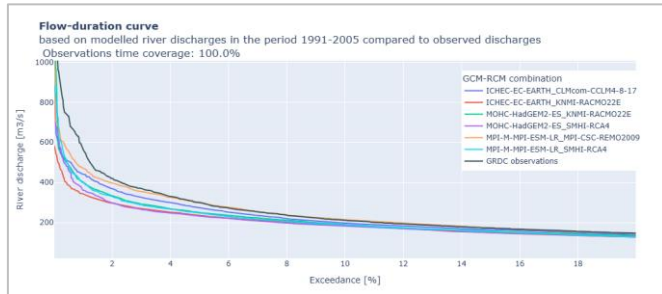
The performance of a hydrological model will vary across catchments, depending on, for example:

- Size and complexity of the catchment.
- Presence of water management infrastructure.

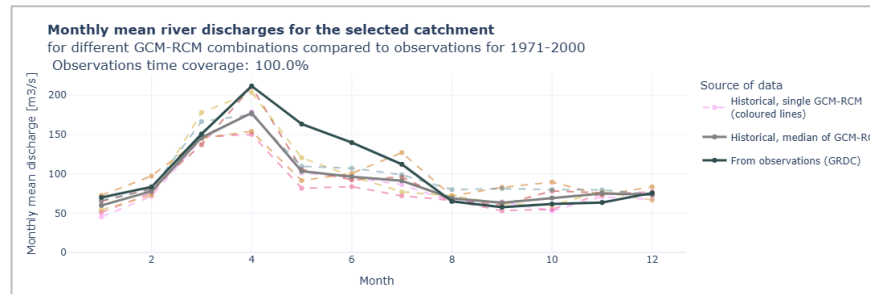
We can check the performance of the model against **local measurements**, focusing on **long-term statistics**.

The screenshot shows the GRDC Data Download interface. It includes a search bar, filters for station name, water body, and region, and a map of the region with station locations marked. A detailed list of station information is visible on the right, including station name, coordinates, and data availability.

Flow-duration curve



Seasonal and monthly statistics



# Flood risk assessment – synergy between workflows

A more complete picture of flood risk can be obtained by:

- Applying the workflows based on global or Europe-wide data → **first estimate**
- Gathering available local information and data and consulting local experts → **system understanding**
  - E.g. flood maps, river discharge measurements, past flood events, their causes and impacts)
- Refining the climate risk assessment through, for example: → **in-depth exploration**
  - Integrating local data into the flood workflows (flood maps, discharge measurements)
  - Applying local hydrological and flood models (using projected extreme discharge change)
  - Risk assessment based on impact-based thresholds of river discharges
  - Qualitative assessment of how the frequency of extremes will shift under climate change – based on discharge workflow



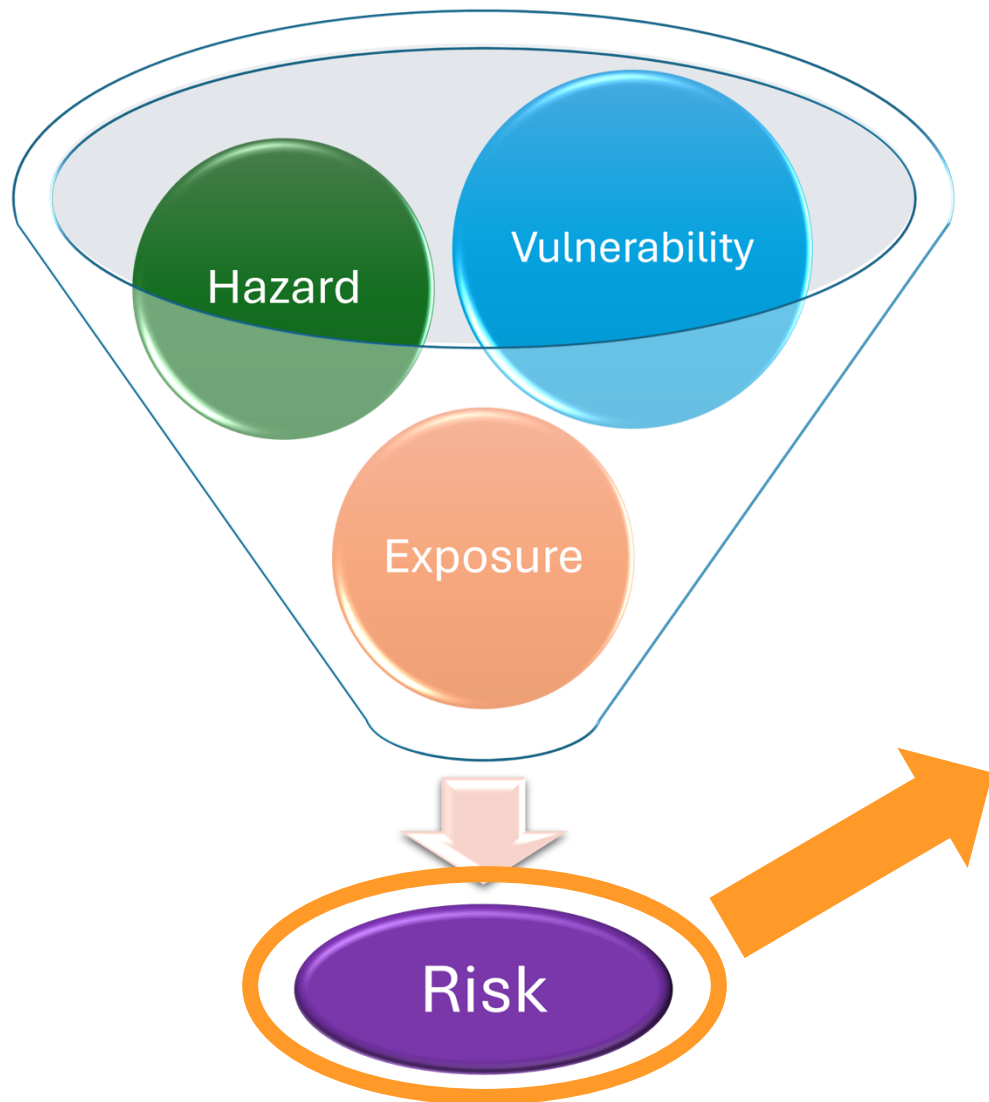
# INTRODUCTION TO THE BUILDING DAMAGE AND EXPOSED POPULATION WORKFLOW



**Gloria Mozzi**  
(CMCC)



# RIVER FLOOD RISK & IMPACT ASSESSMENT



## 1. ECONOMIC DAMAGE TO ASSETS

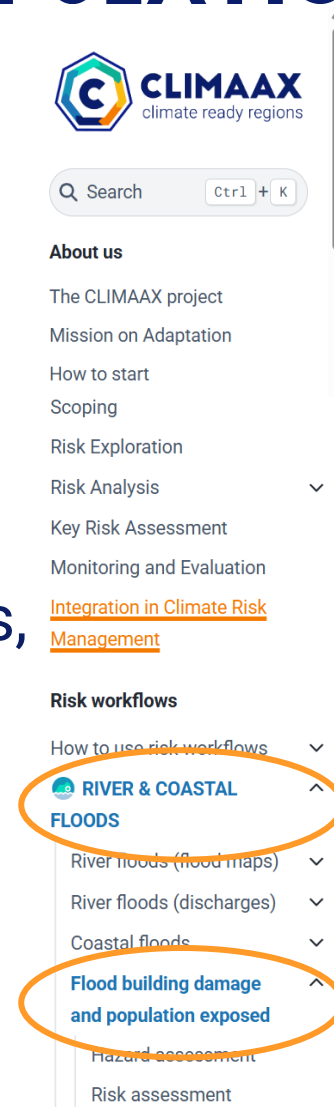


## 2. POPULATION EXPOSED

# BUILDING DAMAGE AND POPULATION EXPOSED

## INPUT DATASETS:

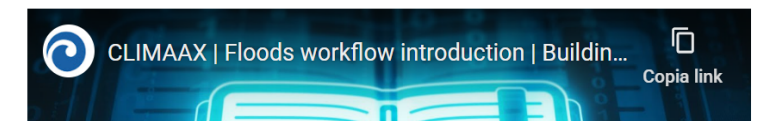
- **Flood maps:** flood water depths over return periods 10, 20, 50, 100, 200, and 500, at a resolution of 3 arc sec created by the Copernicus Emergency Management Service
- **Building datasets:** from OpenStreetMaps, collecting geometry and classification
- **Population density:** GHS-POP R2023A population estimates (1975-2030, 5-year intervals), published by JRC, with a resolution of 3 arc seconds and a global coverage



Flood building damage and population exposed

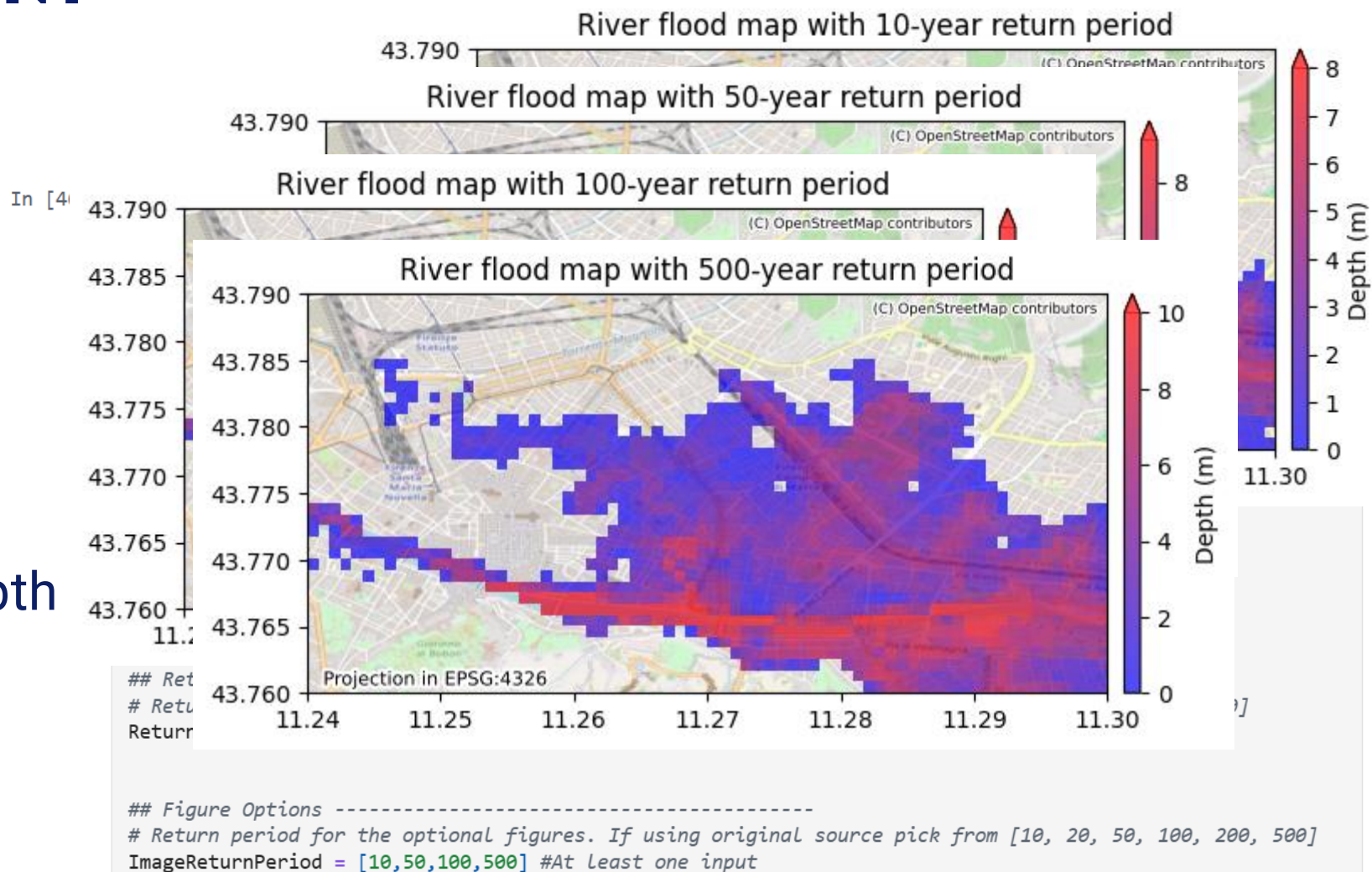
Workflow for risk assessment based on flood maps #

Flooding, whether coastal, fluvial, or pluvial, is a major hazard to humans. This workflow aims at assessing how this hazard affects built-up areas by looking at economic damage represented by building damage, impact on critical infrastructures (such as hospitals, water tower, etc.), as well as the impact on the population by estimating the number of people exposed to the food hazard and the number of people displaced by it.



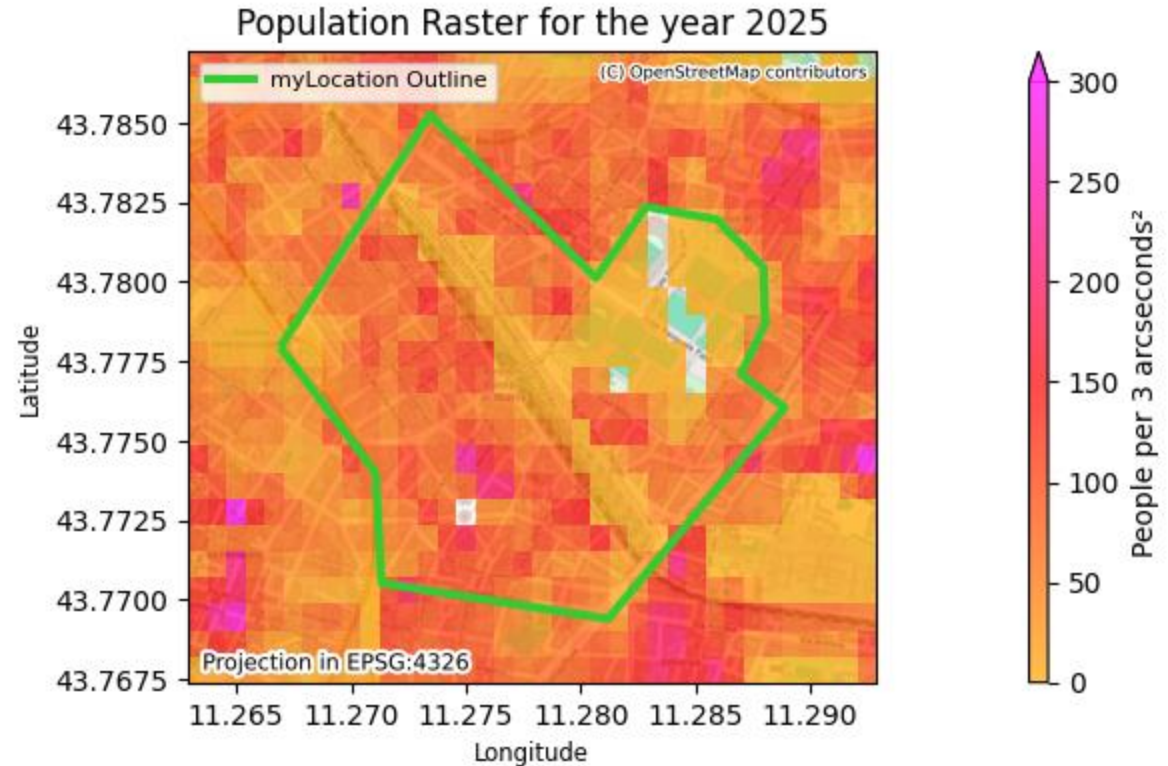
# HAZARD ASSESSMENT

1. Define the geographical boundaries of the area under study
2. Select the output of interest
3. Download river flood depth maps



# RISK ASSESSMENT – POPULATION EXPOSED

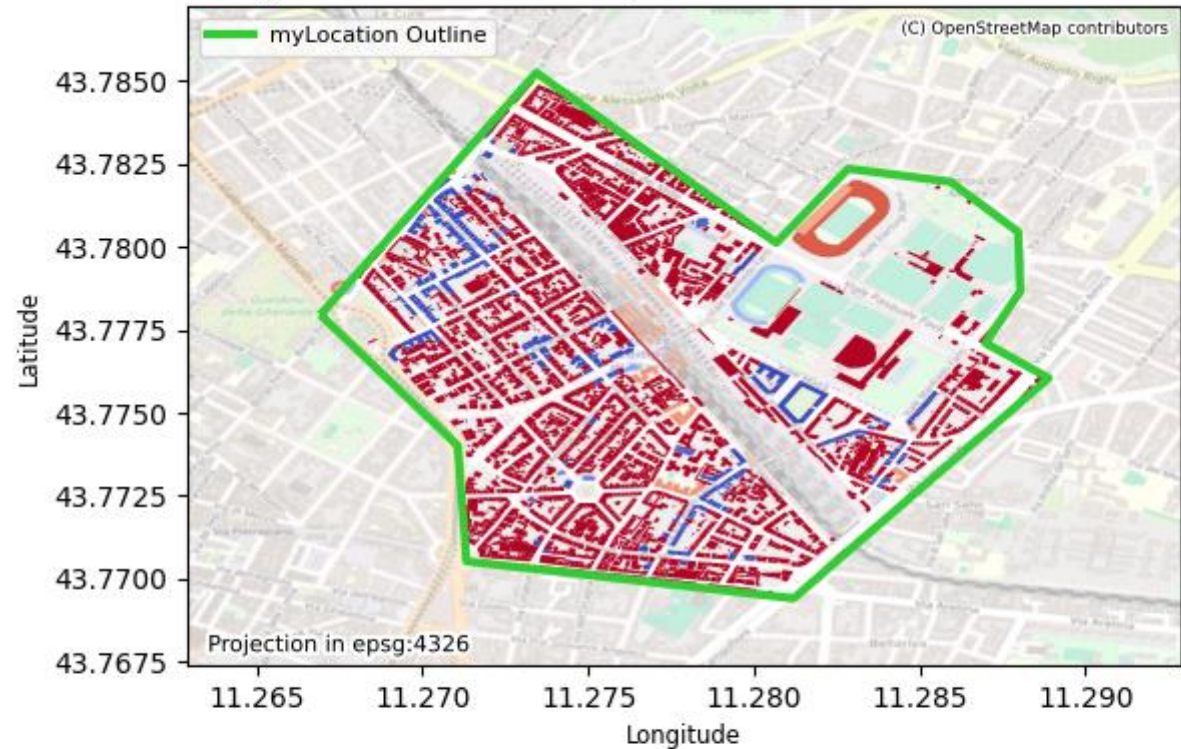
1. Select the return period of interest
2. Download population density datasets
3. Select the year of interest (1975-2030)
4. Compute the **number of people affected**:
  - Exposed: 0 to 1m
  - Displaced: >1m



# RISK ASSESSMENT – ECONOMIC DAMAGE

1. Download building layers with geometry and classification

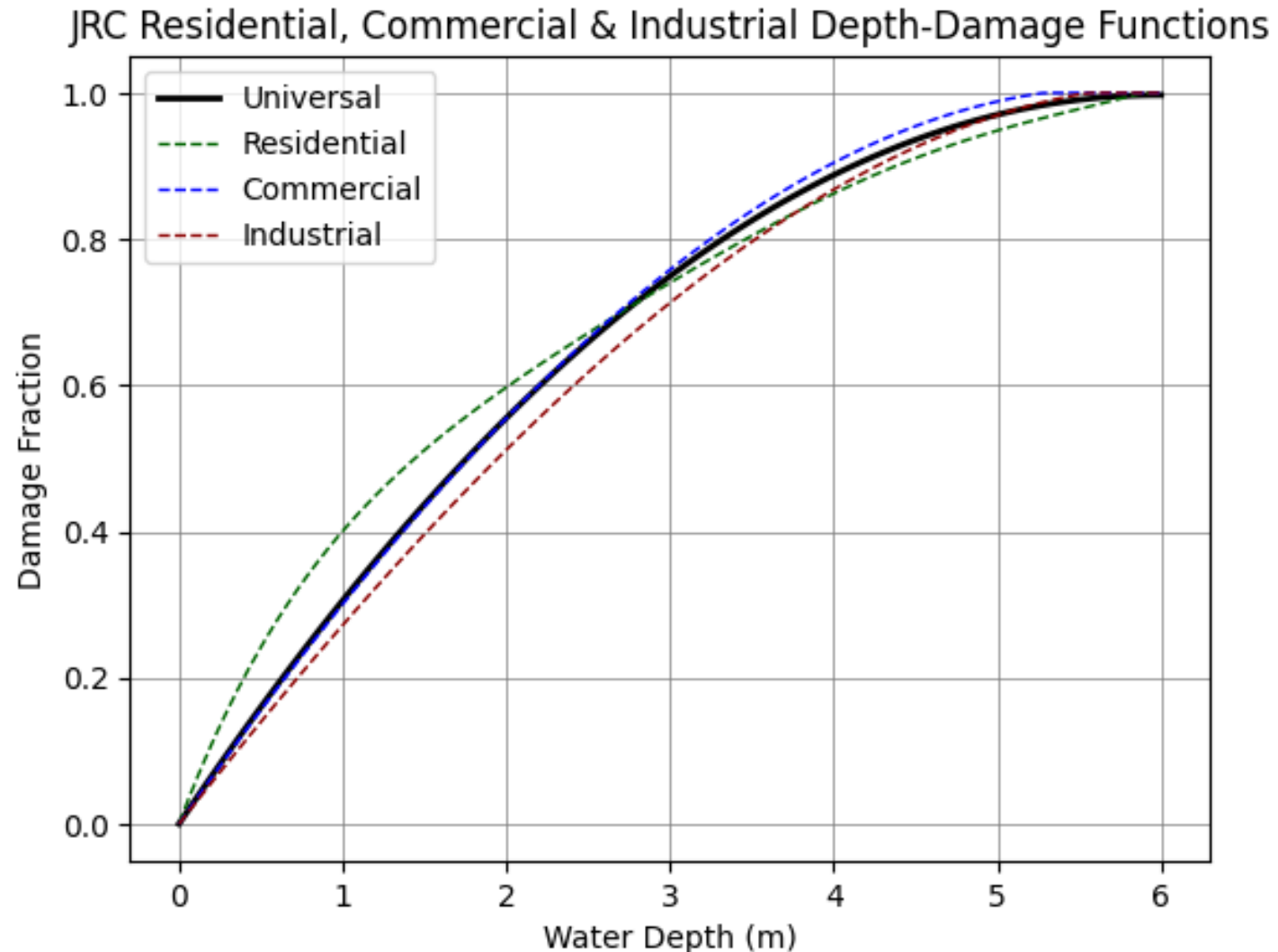
OSM Buildings: Prior to residential, commercial and industrial classification



# RISK ASSESSMENT – ECONOMIC DAMAGE

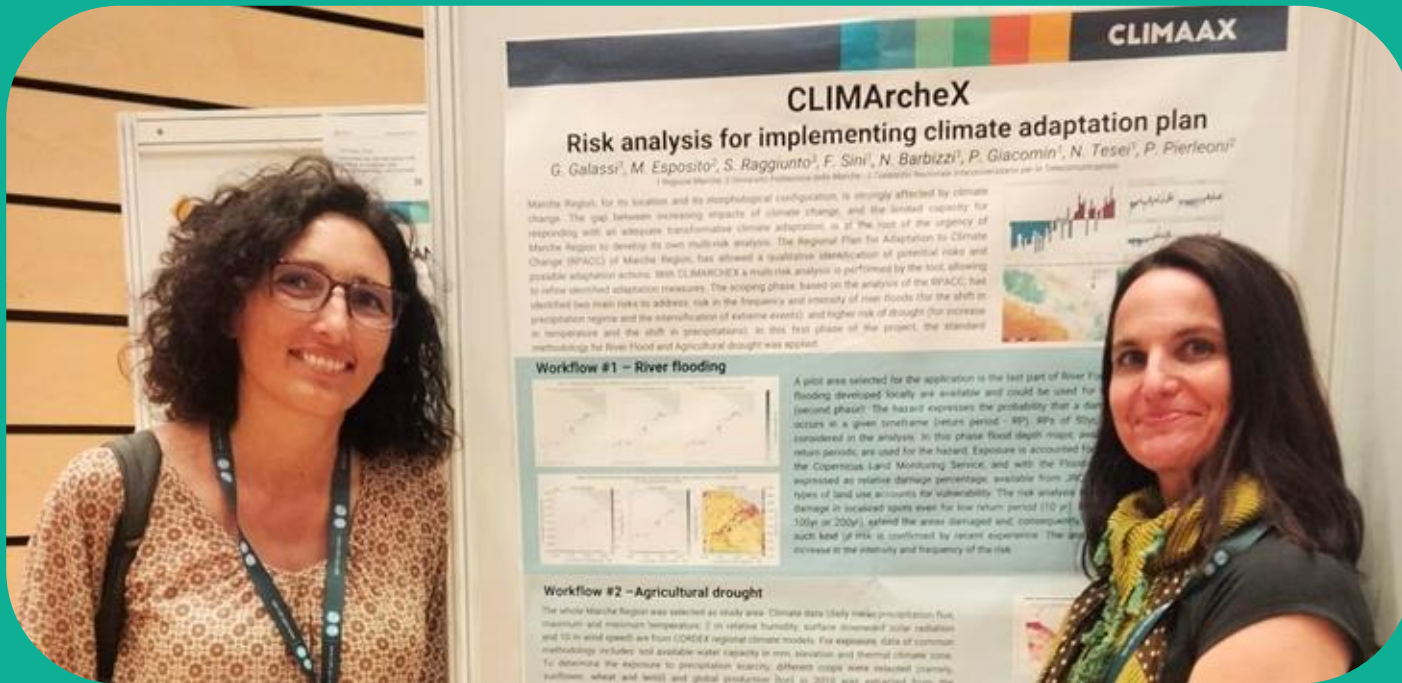
1. Download building layers with geometry and classification
2. Set total costs of buildings
3. Define depth-damage functions
4. Compute **total costs**

```
# Define arrays for damage values based on 2010 est
CPI2010 = 100 # 2010 CPI
CPI2022 = 121.8 # 2022 CPI
CPI_Frac = CPI2022 / CPI2010
MaxDmgRES = np.array([480, 240]) * CPI_Frac # EU Residential
MaxDmgCOM = np.array([502, 502]) * CPI_Frac # EU Commercial
MaxDmgIND = np.array([328, 492]) * CPI_Frac # EU Industrial
MaxDmgAGR = np.array([0.23, 0.46]) * CPI_Frac # Int'l Agriculture
MaxDmgCUL = MaxDmgCOM # EU Cultural
MaxDmgTRS = MaxDmgIND # Int'l Transport
MaxDmgUNI = (MaxDmgRES+MaxDmgCOM+MaxDmgIND) / 3 # Universal
```



# REGIONAL EXPERIENCES

## SPEAKERS



**Gaia Galassi and  
Francesca Sini**  
(Regione Marche)

# Risk assessment based on floods maps and future discharge scenarios for planning adaptation

## The Pesaro (IT) case study

Gaia Galassi, Environmental Department, Regione Marche  
Francesca Sini, Civil protection Department, Regione Marche

Regione Marche  
19 February 2026



The CLIMAAX project is funded by the European Union under Grant agreement ID 101093864. This publication was funded by the European Union. Its contents are the sole responsibility of the author(s) and do not necessarily reflect the views of the European Union.



**CLIMAAX**  
climate ready regions

## Project team

*Marche regional administration*

- Economic Development Department
- Environmental Department
  - ✓ Environmental Assessment Office
  - ✓ Energy and waste Office
- Civil Protection Department

*University Polytechnical of Marche Region*

## Background

Management of sectoral policy relate to climate change

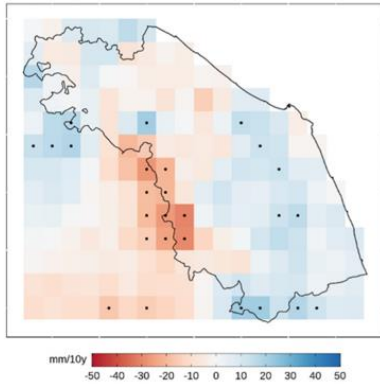
Risk management and climate monitoring

From 2022, activation of policy on climate change adaptation

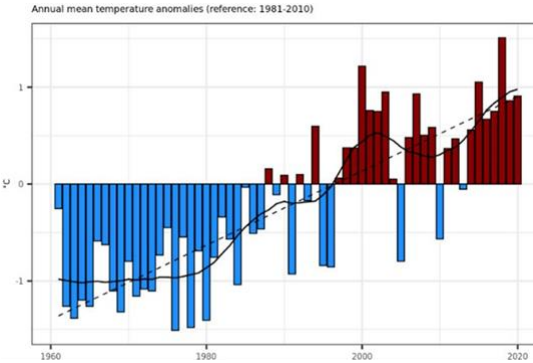


# Regional Profile and Context

- **Central Italy**, facing the Adriatic Sea.
- **Area:** 9,694 km<sup>2</sup> (with a coastline of 173 km).
- **Population:** 1.484.298 inhabitants.



*Regional distribution of heavy rain*



*Temperature anomalies (1961 - 2020)*

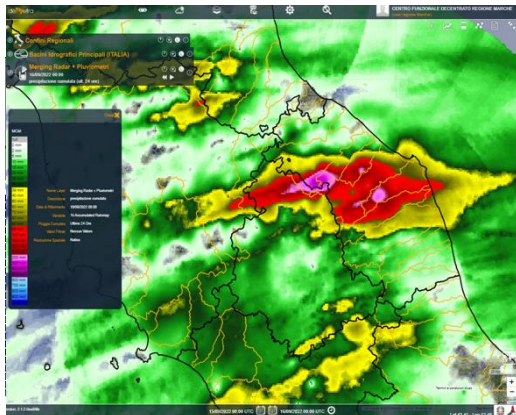


Climate projections, compared with historical trend, show:










- ✓ an **increment** of temperature both in terms of average temperature, **summer days** and **heat waves**,
- ✓ an **increase in dry periods**
- ✓ an intensification of **extreme events**, including flooding and storm surge.















## Example of extreme event (15-16 Sept. 2022)



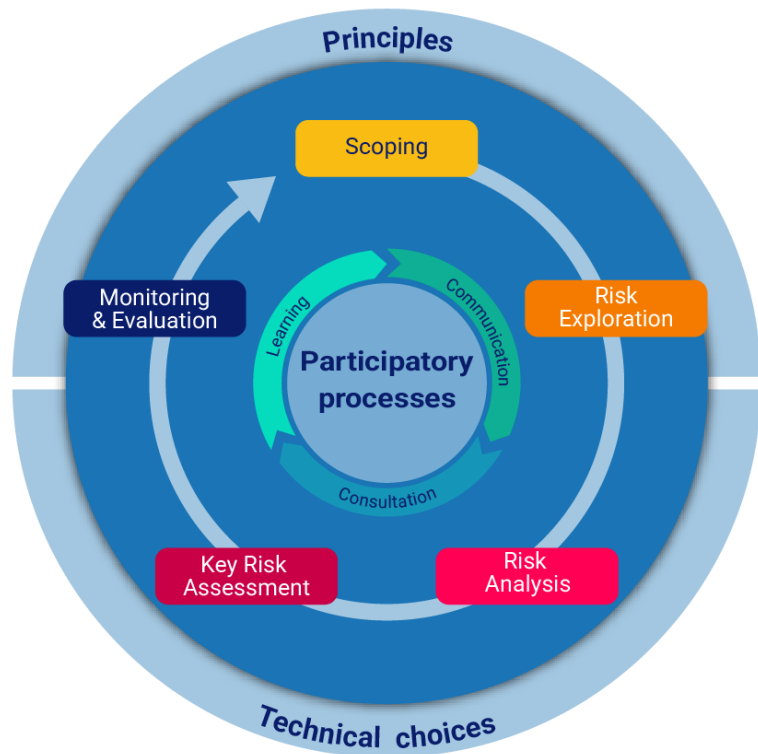
## From the Regional Plan for Adaptation to Climate Change (RPACC)

Climate hazards of Marche RPACC		
 Floods	 Droughts	 Extreme heat
 Temperature increase	 Storm	 Sea level rise
 Precipitation (regime shift)	 Height wave & storm surge	 All-hazard

Key systems (KS) of Marche RPACC			
 water management (options A, B)	 soil management (option C)	 Ecosystems & NbS (options D, E)	 Coastal management (option F)
 Risk management (option G)	 Land use (option H)	 Agriculture management (option I)	 Tourism management (option J)
 Fishing management (option K)	 Energy management (option L)	 Health & well-being (option M)	 Cross-KS



# Climate Risk Assessment Framework experience



## Risk exploration

Revision of risk analysis performed in the RPACC

Involvement of stakeholder for the selection of main risks to focus on with CLIMAAX toolbox



Connection with P2R project: **river floods** emerged as key risk in the consultation with municipalities and local communities

## *Governance for risk management*

Defined in the RPACC, linked to competences of selected adaptation measures

Regional administration → Local administration



# Overview of adaptation measure for flooding from the RPACC

## *Prevent/Reduce hydraulic and hydrogeological risk*

G.01 Updating the **mapping of river flood** areas required by Directive 2007/60, taking into account the effects of climate change on the triggering event dynamics (precipitation, runoff, river flow rates)

G.05 Promoting **Cost-Benefit Analysis** for structures and infrastructures located in high or very high-risk areas in order to assess the convenience of relocation

G.06 Activation of pilot cases to simplify **relocation** processes in PAI areas

## *Increase awareness regarding risks*

G.09 Strengthening public **training** on how to respond to alerts

## *Increase climate change resilience of urban and territorial settlements and infrastructures*

H.04 Strengthening tools for **hydraulic compatibility assessment**, also considering climate change in areas not regulated by PAI and PGRA

H.03 Initiating processes to assess the climate **resilience of urban planning** measures, aimed at reducing and not increasing climate-related risks

H.06 Defining regional-scale methodologies to increase the resilience of infrastructure projects within environmental assessment processes (climate proofing)

**Think in terms of prevention, starting from urban planning**



# Risk Analysis

Need of accurate data



Pilot selection



**Foglia river mouth, city of Pesaro**

*Reasons for the selection:*

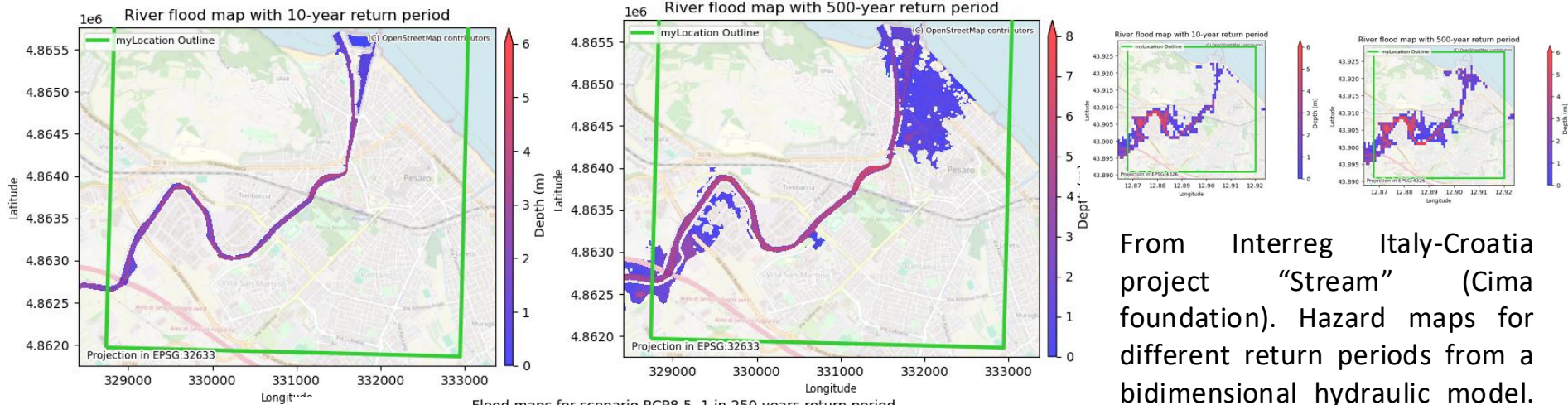
- River mouth in the centre of the city
- Accurate floods map available
- Not critical problems in recent years



Workflow building and population exposed  
.....and future discharge scenarios applied

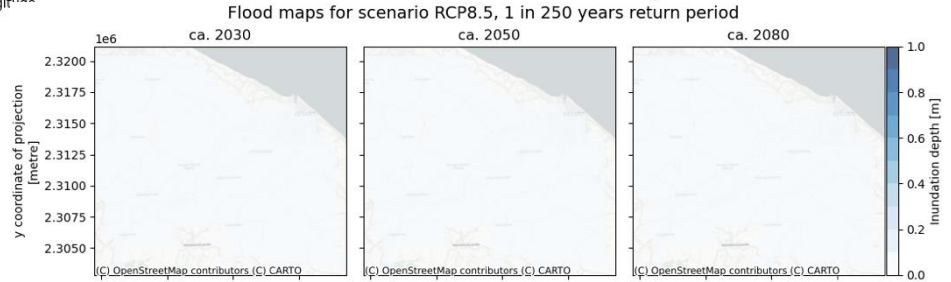


# Risk analysis using the CLIMAX Toolbox



From Interreg Italy-Croatia project “Stream” (Cima foundation). Hazard maps for different return periods from a bidimensional hydraulic model. Buildings, bridge, embankments and perimeter walls have been checked to test permeability and their influence on the dynamic of simulations.

Aqueduct dataset of poor resolution



No pre-processing on exposure and vulnerability data (a comparison with regional data to test coherence)



# DISCHARGE work flow for Foglia outlet

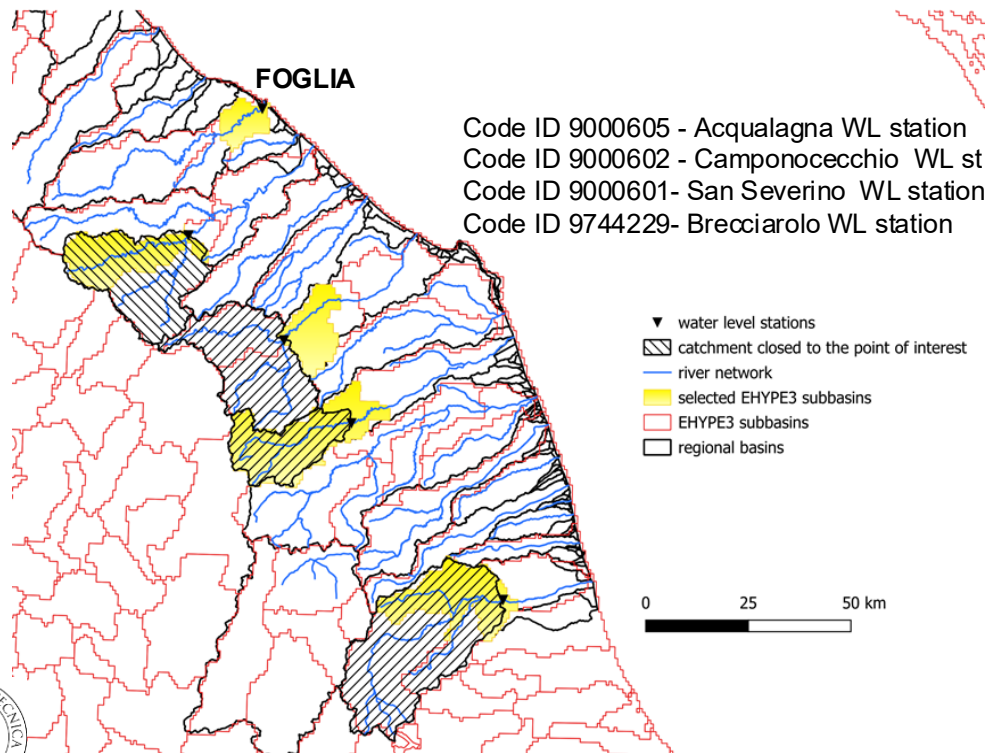
## LIMITS:

- Differences between "real" and EHYPE3 subbasins
- Longer flow data series available only on different river outlet and on different periods

*Work flow daily time series for 1991-2005 and monthly means of river discharges for 1971-2000*

For Acqualagna site, daily flow data are available from year 1923 to 1979 and from 2007 to 2025, for Camponocecchio, and Brecciarolo from 2005 to 2025, for San Severino from 2010 to 2025.

Tested the robustness of the methodology on 4 sections in order to evaluate future scenarios



# DISCHARGE work flow

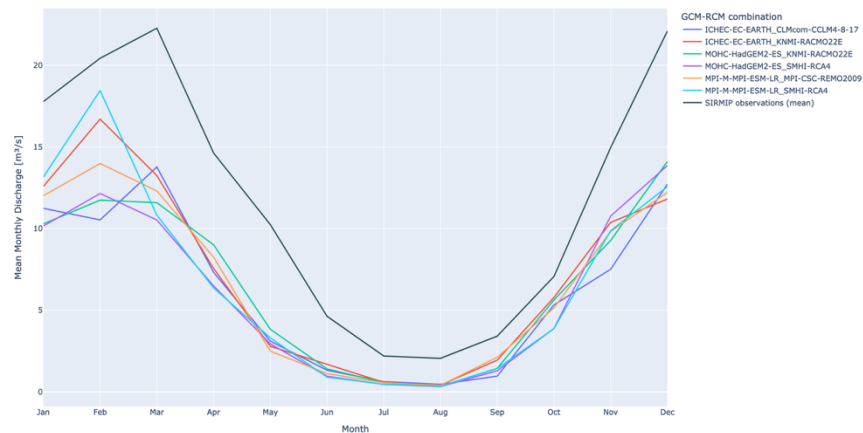


Code ID 9000605 - Acqualagna WL station n. 1185

## DATA VALIDATION

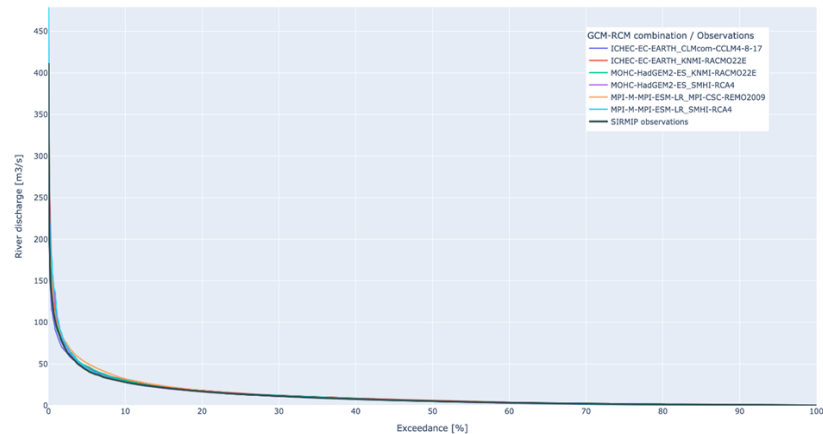
merged data from year 1923 to 1979 and from 2007 to 2025

River Discharge — Model vs Observations



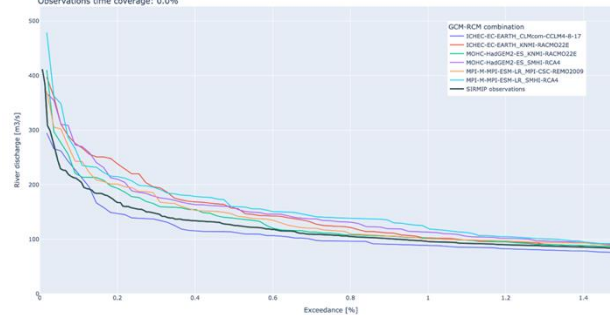
Flow-duration curve

Based on modelled river discharges in the period 1991-2005 compared to observed discharges at Acqualagna 106 and 3196



Flow-duration curve (Zoomed: 0-1.5% Exceedance)

High-flow detail for the period 1991-2005  
Observations time coverage: 0.0%



The CLIMAXX project is funded by the European Union under Grant agreement ID 101093864. This publication was funded by the European Union. Its contents are the sole responsibility of the author(s) and do not necessarily reflect the views of the European Union.



# DISCHARGE work flow

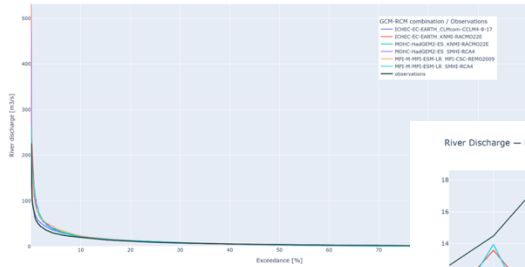


Code ID 9000602 - Camponocchie WL station n. 1016

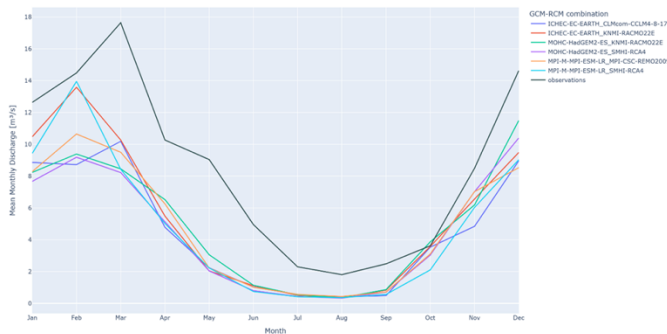
Code ID 9000601- San Severino WL station n. 1032

Code ID 9744229- Brecciarolo WL station n. 1108

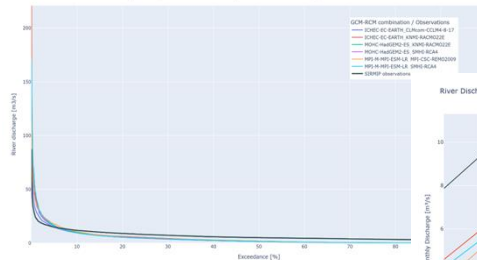
**Flow-duration curve**  
based on modelled river discharges in the period 1991-2005 compared to observed discharges at Camponocchie



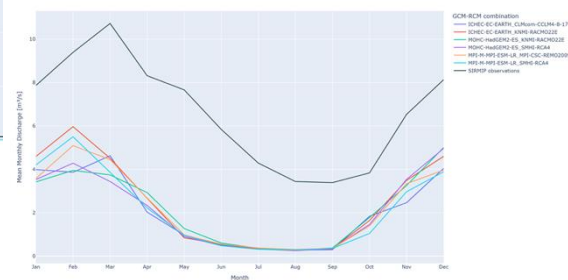
**River Discharge – Model vs Observations**



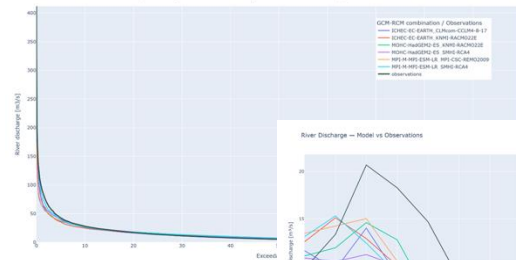
**Flow-duration curve**  
based on modelled river discharges in the period 1991-2005 compared to observed discharges at San Severino



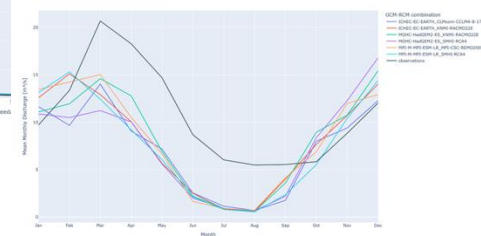
**River Discharge – Model vs Observations**



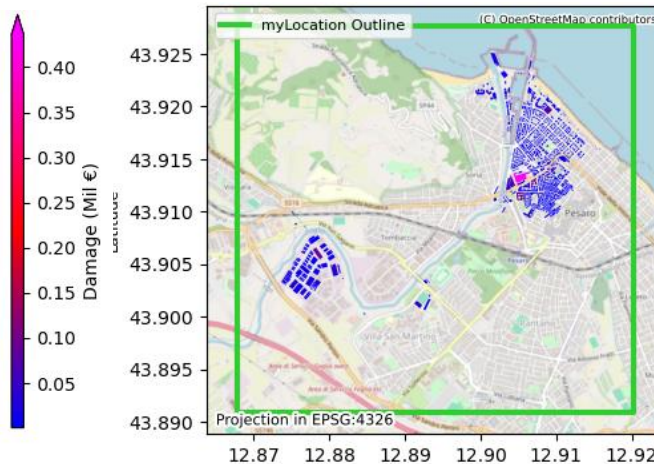
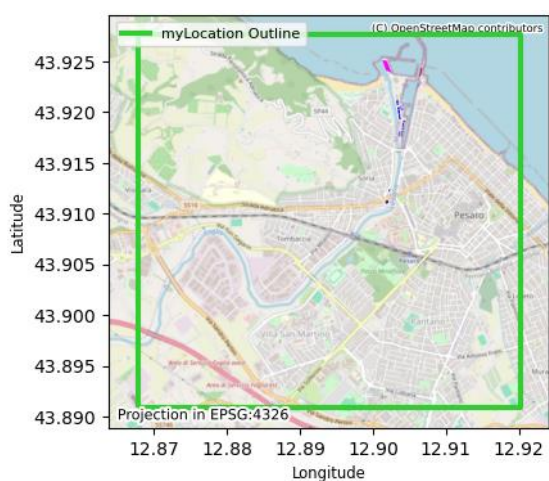
**Flow-duration curve**  
based on modelled river discharges in the period 1991-2005 compared to observed discharges at Brecciarolo



**River Discharge – Model vs Observations**



# Our CRA results *Damage to buildings by mean flood depth based on flood map with 10 yr and 500 yr RP*



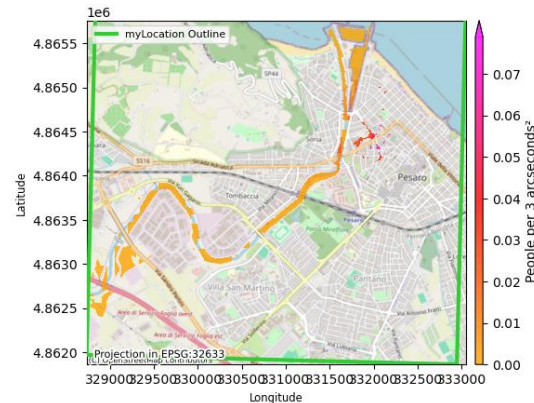
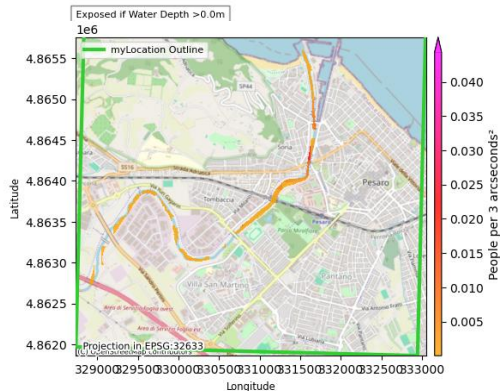
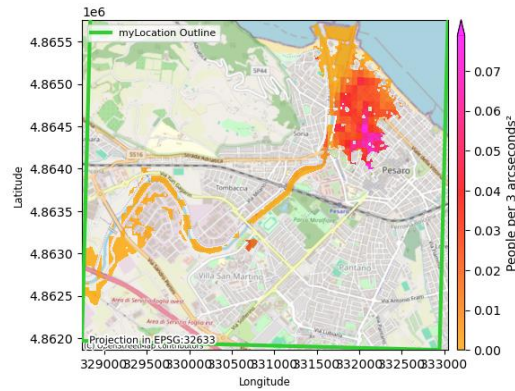
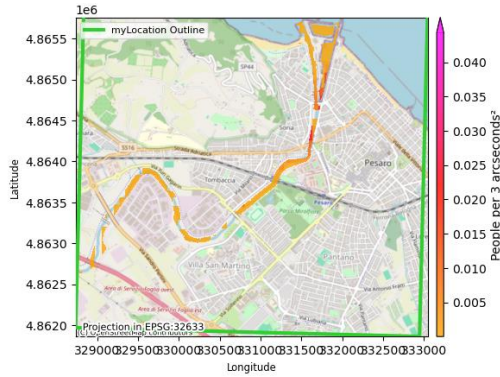
Return period	Local floods maps	JRC floods maps
RP=10	1.130.206 €	72.127.617 €
RP=50	13.538.419 €	94.066.685 €
RP=100	36.452.708 €	100.100.947 €
RP=500	74.027.491 €	117.137.149 €



The CLIMAX project is funded by the European Union under Grant agreement ID 101093864. This publication was funded by the European Union. Its contents are the sole responsibility of the author(s) and do not necessarily reflect the views of the European Union.



# Exposed population for the river flood event with 10 yr and 500 yr return period



Return period	Population exposed	Population displaced
RP=10	3365	150
RP=50	3858	299
RP=100	3863	475
RP=500	4196	1383

Exposed if Water Depth >0.0m

Displaced if flood depth >1.0m



The CLIMAX project is funded by the European Union under Grant agreement ID 101093864. This publication was funded by the European Union. Its contents are the sole responsibility of the author(s) and do not necessarily reflect the views of the European Union.



# DISCHARGE work flow

## Acqualagna

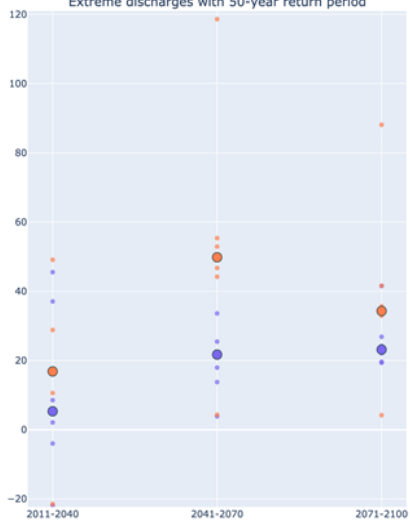
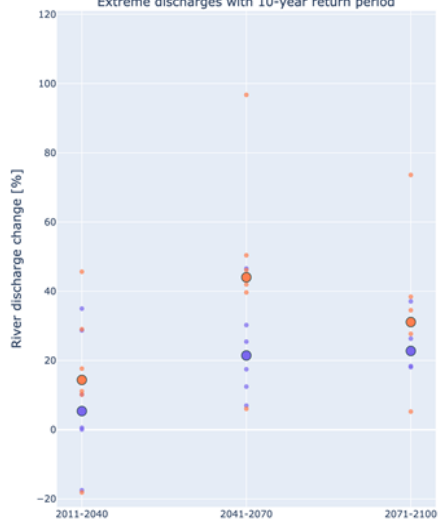
### Extreme river discharge



Relative change in extreme river discharge in the selected catchment for different GCM-RCM combinations and averaged across the hydrological multi-model ensemble

Extreme discharges with 10-year return period

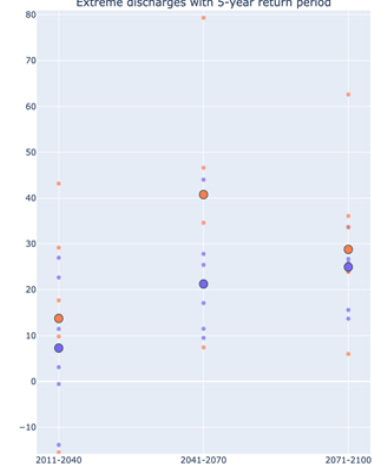
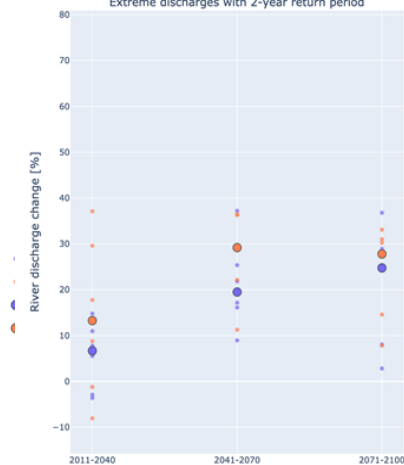
Extreme discharges with 50-year return period



Relative change in extreme river discharge in the selected catchment for different GCM-RCM combinations and averaged across the hydrological multi-model ensemble

Extreme discharges with 2-year return period

Extreme discharges with 5-year return period

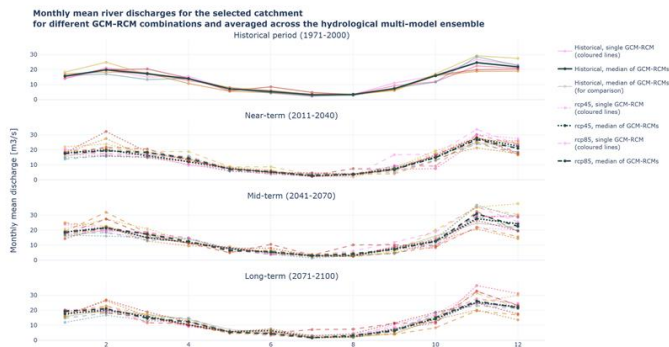


- rcp45, single GCM-RCM
- rcp85, single GCM-RCM
- rcp45, median of GCM-RCMs
- rcp85, median of GCM-RCMs



# DISCHARGE work flow

## Acqualagna



Monthly mean river discharges

Monthly discharge trends for all months



NEW PLOT!!!



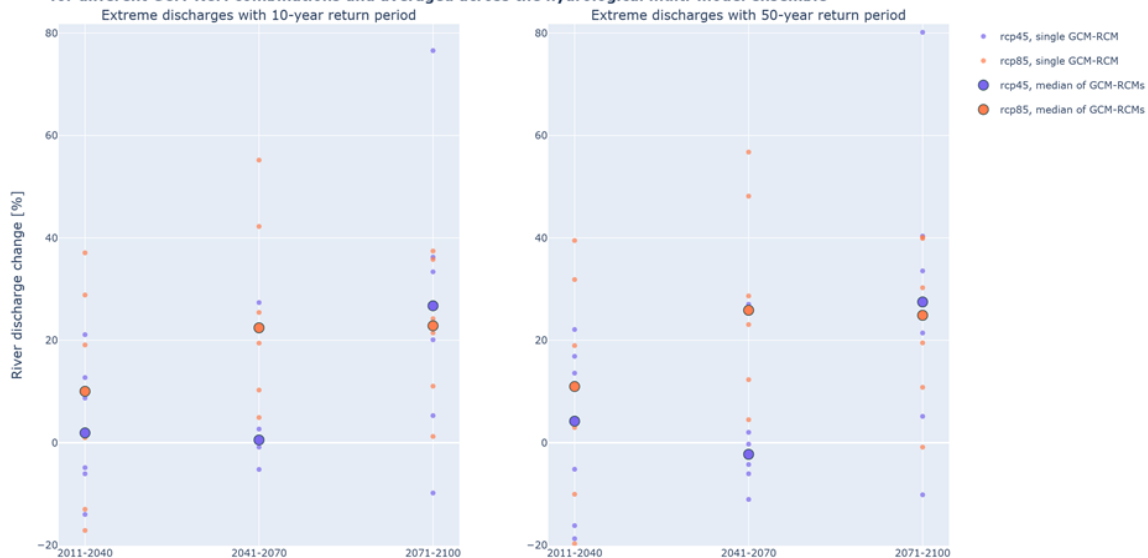
# DISCHARGE work flow

## Foglia

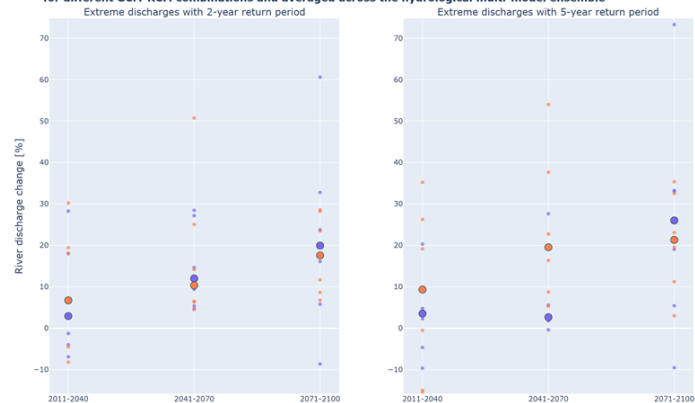
### Extreme river discharge



Relative change in extreme river discharge in the selected catchment for different GCM-RCM combinations and averaged across the hydrological multi-model ensemble



Relative change in extreme river discharge in the selected catchment for different GCM-RCM combinations and averaged across the hydrological multi-model ensemble



# DISCHARGE work flow

## Foglia

Monthly mean river discharges for the selected catchment for different GCM-RCM combinations and averaged across the hydrological multi-model ensemble  
Historical period (1971-2000)



Near-term (2011-2040)



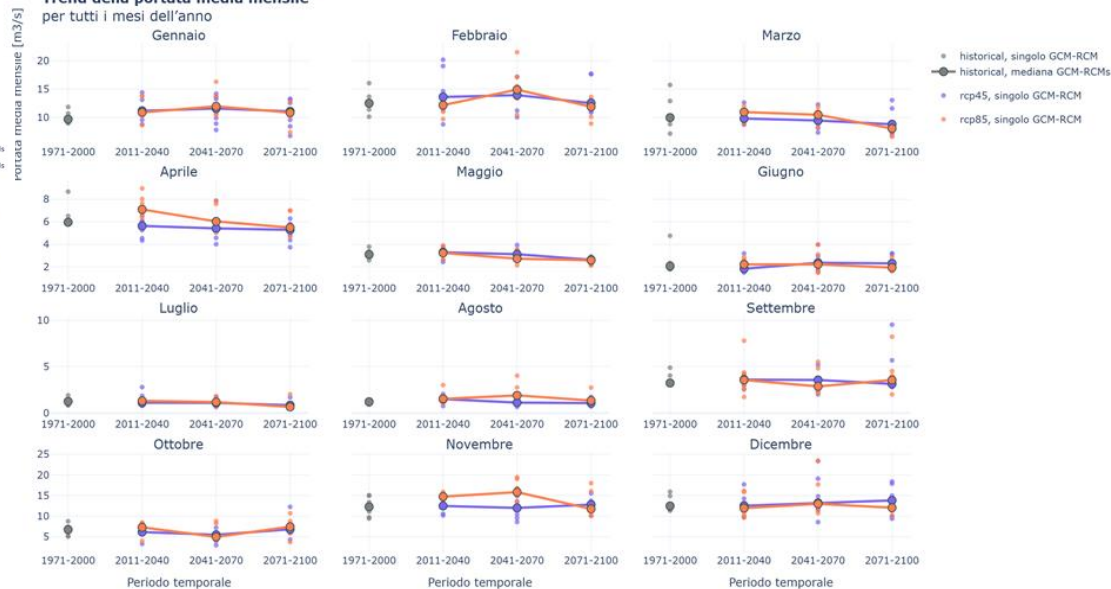
Mid-term (2041-2070)



Long-term (2071-2100)



Trend della portata media mensile per tutti i mesi dell'anno



Monthly mean river discharges

NEW PLOT!!!



The CLIMAX project is funded by the European Union under Grant agreement ID 101093864. This publication was funded by the European Union. Its contents are the sole responsibility of the author(s) and do not necessarily reflect the views of the European Union.



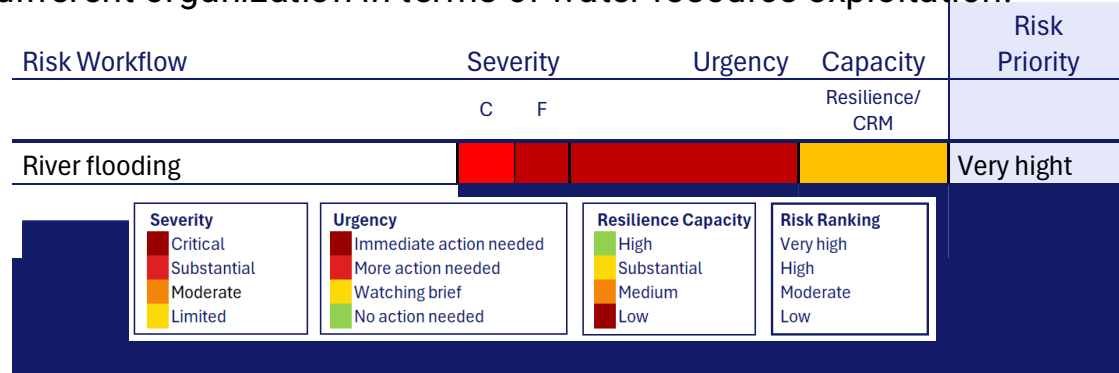
# Risk evaluation and management

The **discharge workflow** confirms a future increase in extreme events and so a potential increase of flooded areas on Foglia territories, but at the same time a different distribution of the monthly discharge during the year, that must be thinking to a different organization in terms of water resource exploitation.

*Severity:* Substantial for the current situation and critical in the future

*Urgency:* immediate actions required

*Adaptation capacity:* some actions are already in place (as the emergency system of civil protection), but a homogeneous application of adaptation measures for the increase of resilience (as delocalization, deurbanization, etc) is still lacking. This is also due to the lack of precise information to motivate the decisions (as local floods maps, not available for all the basins).



# Reflections on using CLIMAAX toolbox

## Strengths

- Spatialization of risks and identification of priorities
- “Vision” of the need to act (important tool for communicating with policy makers)

## Limitations

- Need of accurate information to obtain accurate results... but results are not accurate enough (i.e. if we talk about displacement)
- Lack of information for future scenarios



## Next steps

- Based on results obtained for the pilot of Foglia river, consultation with Pesaro Municipality and stakeholders to understand how the knowledge of risks could be included in urban planning
- Activation of an internal task force (with responsible of urban policies) to identify regulatory tools to apply in similar situation

To transform risk information into actual prevention tools for the entire regional territory





**CLIMAAX**  
climate ready regions

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

*Thanks*



The CLIMAAX project is funded by the European Union under Grant agreement ID 101093864. This publication was funded by the European Union. Its contents are the sole responsibility of the author(s) and do not necessarily reflect the views of the European Union.

# Q&A AND DISCUSSION

**Gaia Galassi**  
(Regione Marche)



**Francesca Sini**  
(Regione Marche)



**Natalia Aleksandrova**  
(Deltares)



**Gloria Mozzi**  
(Euro-Mediterranean  
Centre on Climate  
Change, CMCC)

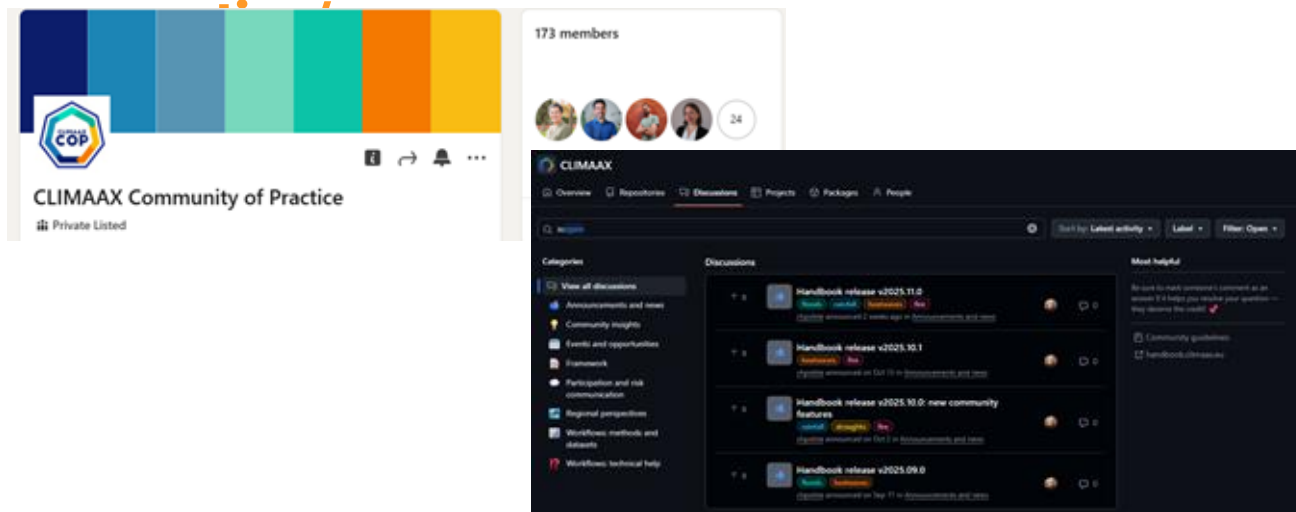
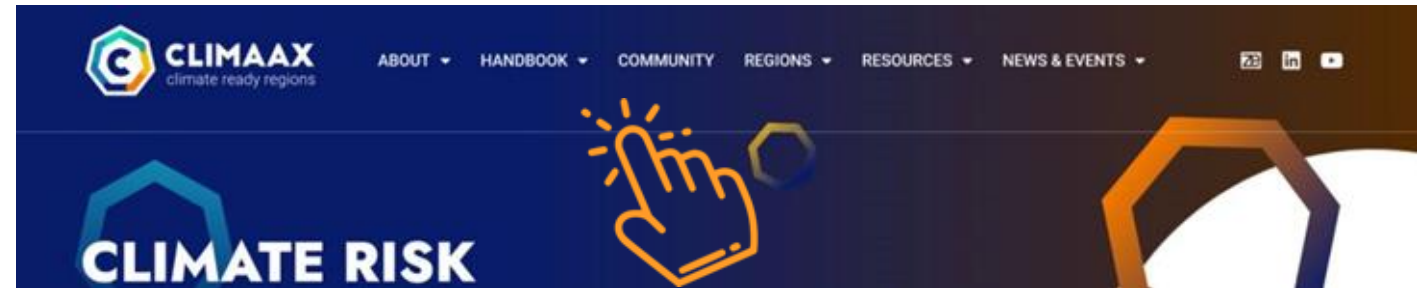
# UPCOMING EVENTS

- **16 April 2026 10.30 CET**  
*Agricultural droughts*



# HOW TO ENGAGE IN THE COMMUNITY OF PRACTICE

- Join our LinkedIn group and community forum
- Take our surveys
- Subscribe to the CoP to receive communication of further updates  
<https://www.climaax.eu/community-of-practice/>



!! Scan this





**CLIMAAX**  
climate ready regions

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

Thank you and see you  
next time!

[cop@climaax.eu](mailto:cop@climaax.eu)



The CLIMAAX project is funded by the European Union under Grant agreement ID 101093864. This publication was funded by the European Union. Its contents are the sole responsibility of the author(s) and do not necessarily reflect the views of the European Union.