



Co-funded by  
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LIFE21-IPC-IT-LIFE CLIMAX PO-101069928

# LIFE CLIMAX PO

## The project on climate change adaptation

Francesco Tornatore - Autorità di Bacino Distrettuale del fiume Po

Parma, 19 May 2025



## Climate Change in the Mediterranean area



## Climate Change in the Mediterranean Basin

LIFE21-IPC-IT-LIFE CLIMAX PO-101069928

**The Mediterranean  
a climate change  
hotspot where  
vulnerabilities  
are exacerbated**

**SOED**  
2020  
State of the Environment and  
Development in the Mediterranean

**Already  
0.4°C**

increase in seawater temperature  
(up to +3.5°C by 2100)



**+1.54°C**

increase in air temperature:  
above the global average  
(projection in 2040: +2.2°C  
versus +1.5°C global level)



Low-lying coastal  
cultural heritage sites  
are threatened by  
flooding and erosion



**A decrease of  
-0.1**

in the pH of the ocean since  
the pre-industrial period, and  
a forecast of -0.4 by 2100



**Warming  
20%**

faster than global average



**-30%**

of rainfall in spring/summer  
by 2080 and +10/20% of heavy  
rainfall events outside of summer

Increased fire risk  
through a longer  
fire season, increasing  
heatwaves and drought



**Sea level rise**

between 0.43 and 2.5 m by 2100, depending on  
scenarios and projections. Increased risk for the  
20 million people living below 5m of current sea level



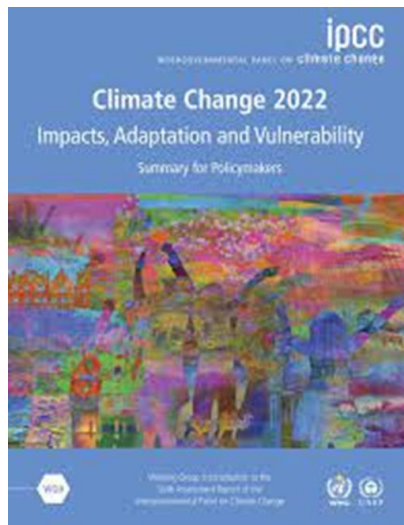
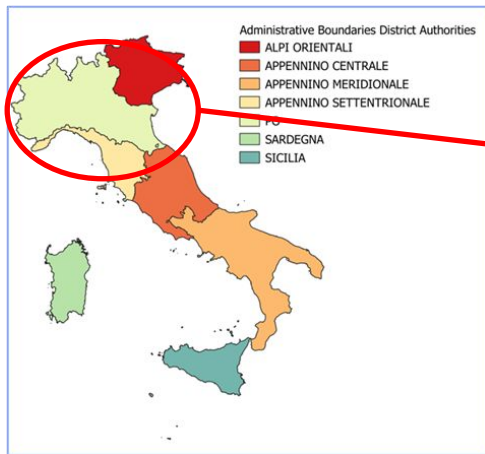
**Consequences**

- heat waves
- coastal erosion
- fires
- invasive species
- acidification of the sea
- floods
- modification of migrations and risk of extinction of certain species
- quality aquaculture fishing
- agriculture production



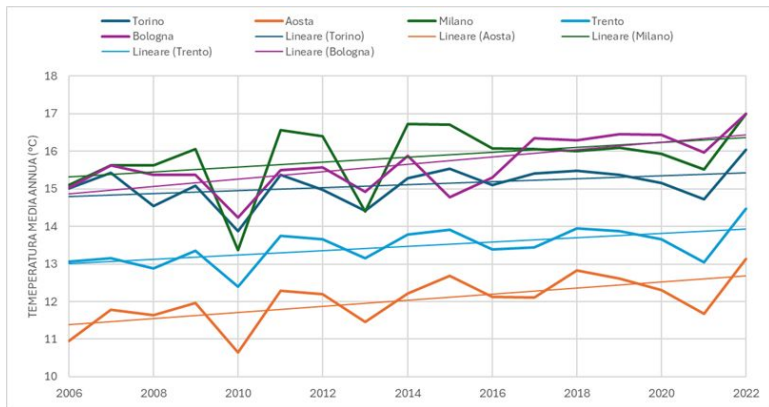
#SustainableMED

To consult the N. II report on the State of the Environment and Development in the Mediterranean and its information sources: [www.planbleu.org/ncsd2020](http://www.planbleu.org/ncsd2020)



Based on global and regional climate prediction models, the **Po River District** is in the climate transition zone between the Mediterranean and Northern Europe, where uncertainty about future climate is higher than in other European areas.

## Climate indicators for some of the main cities in the Po River District



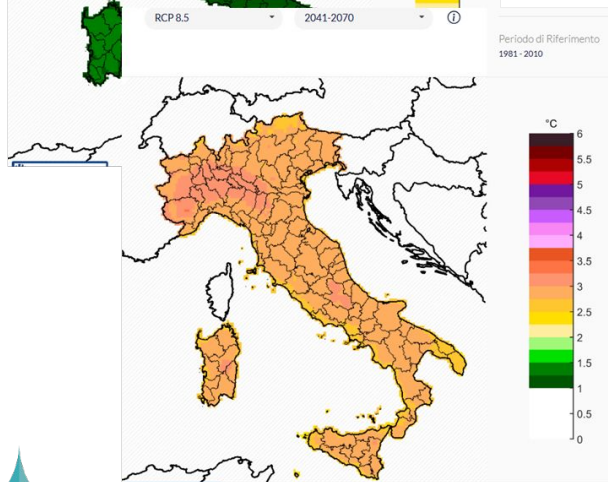
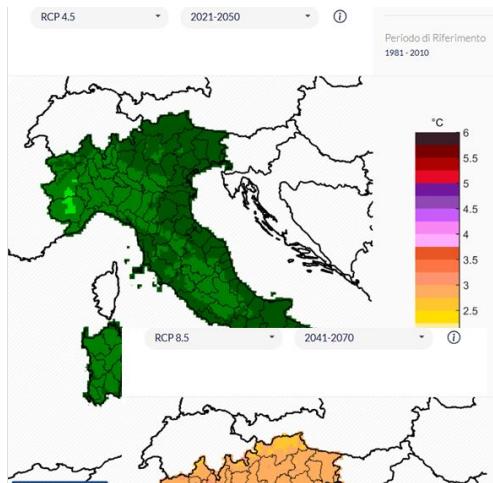
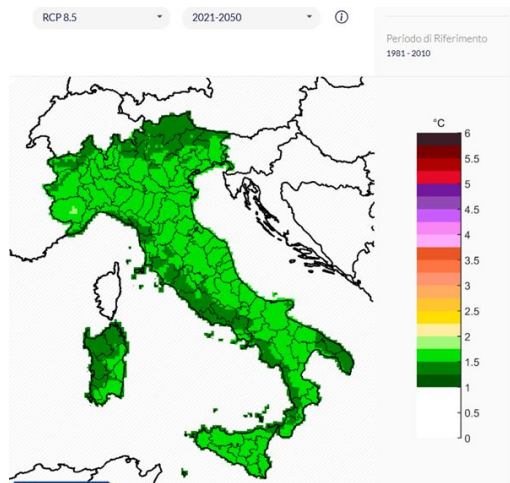
Minimum and maximum temperature

Number of summer days

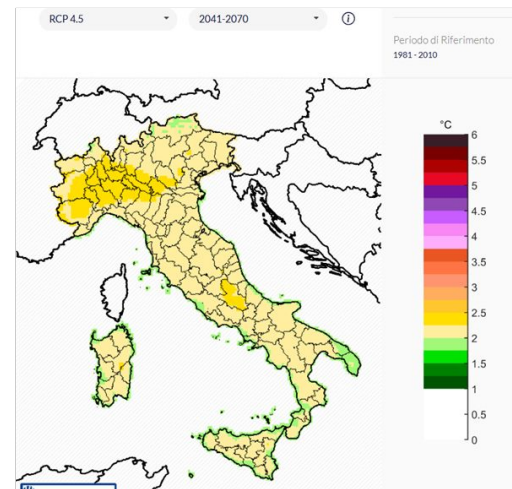
Number of tropical nights

COMUNI	Minimo delle temperature minime (°C)			Massimo delle temperature massime (°C)			Giorni estivi (T>25°C)			Notti tropicali (T>30°C)		
	2022	differenza 2022 dal valore medio 2006-2015	valore medio 2006-2015	2022	differenza 2022 dal valore medio 2006-2015	valore medio 2006-2015	2022	differenza 2022 dal valore medio 2006-2015	valore medio 2006-2015	2022	differenza 2022 dal valore medio 2006-2015	valore medio 2006-2015
Torino	-2.7	+1.8	-4,5	+36.9	+1.3	+35,6	124	+9.1	115	76	+35.2	41
Aosta	-12.1	-1.0	-11,1	+36.8	+2.3	+34,5	121	+29.3	92	2	+0.6	1
Milano	-0.7	+2.1	-2,8	+37.1	+0.5	+36,6	131	+16.3	115	101	+43.5	58
Trento	-4.8	+1.3	-6,1	+37.4	+1.8	+35,6	121	+24.3	97	19	+7.7	11
Bologna	-2.1	+2.5	-4,6	+38.9	+1.7	+37,2	143	+27.8	115	95	+46.8	48

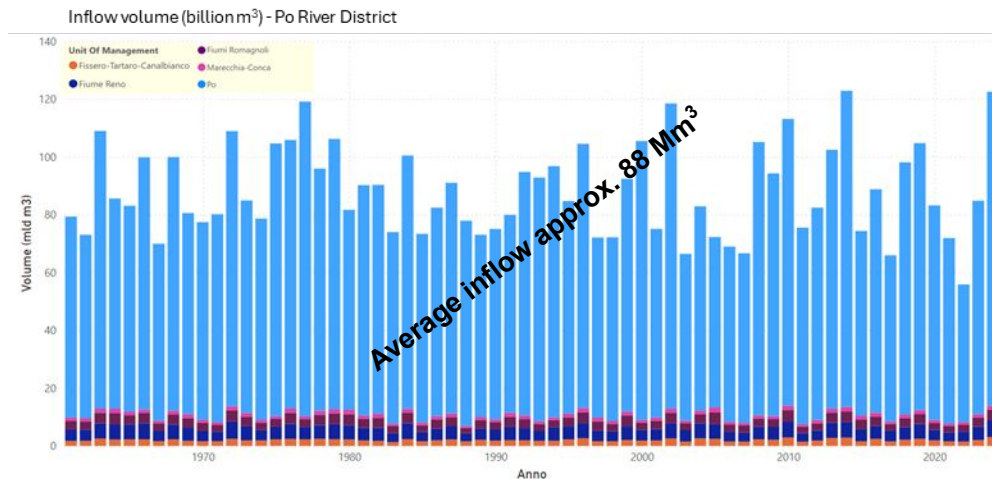


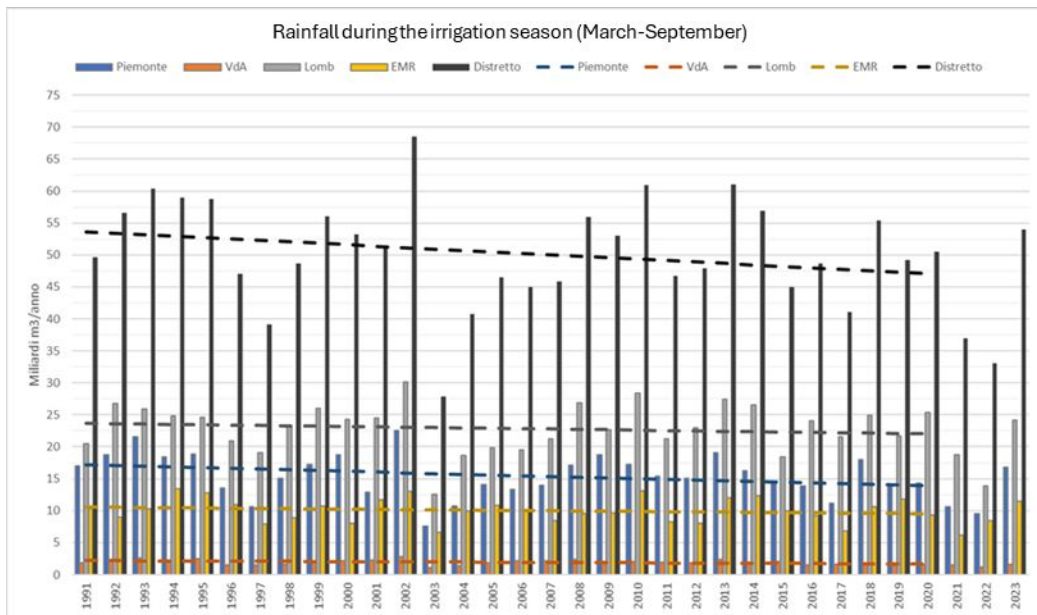


Expected daily average  
temperature based on RCP  
climate models 4.5 and 8.5



The Po River District has always been characterised by marked inter-annual meteorological and hydrological variability, but **since 2000 there have been no less than 7 years in which the hydro-climatic balance was negative** (i.e. the difference between rainfall and evapotranspiration) and **7 in which it was positive or very positive**.





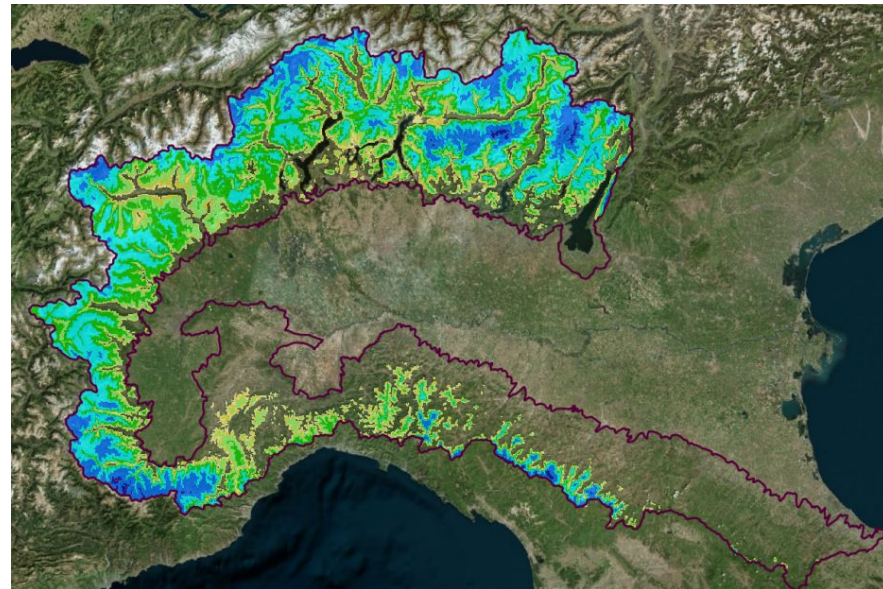
Over the period 1991-2022, no statistically significant changes in the average volume of rainfall are observed, but if we refer to the irrigation season alone, then the downward trend in rainfall is much more evident.

**Overall reduction in the number of total events and increase in the intensity of individual rainfall events!**

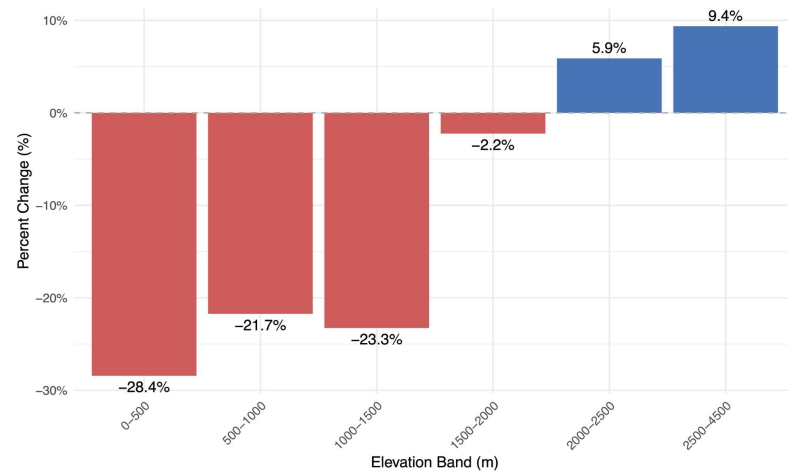
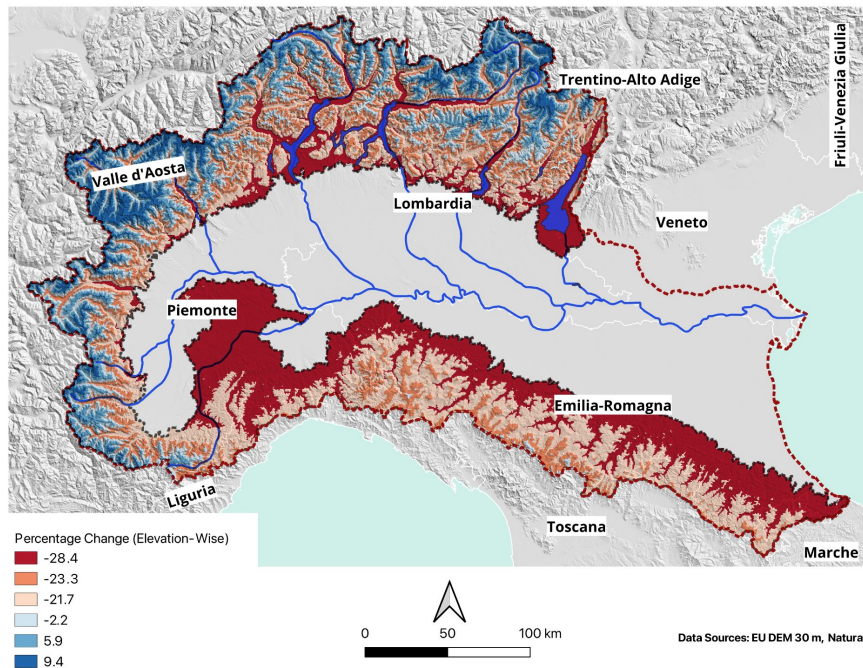
ADBPO recently conducted a study on the spatial distribution of the Snow Water Equivalent (SWE) calculated on a daily scale for the years 1991 to 2021.

An initial analysis of the data shows that the trend towards **winters with little snow** seems to be consolidating mainly in the areas of the District located **below 1300 meters above sea level**.

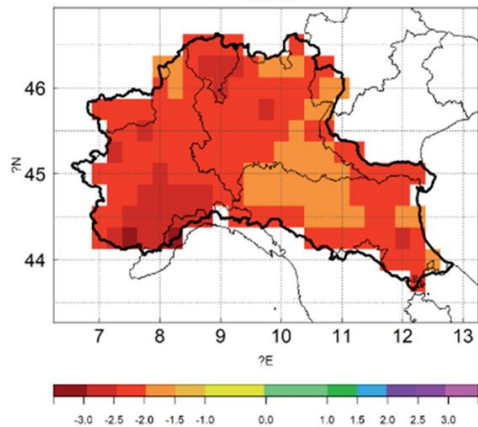
Above 2,000 metres, on the other hand, snow depths in the middle of winter (December to February) do not show a clear trend, although most of the measuring stations show a **clear decrease in the number of days with snow on the ground**, which is attributable to an earlier snowmelt in spring and the late appearance of snow in autumn, especially at the stations located at lower altitudes.



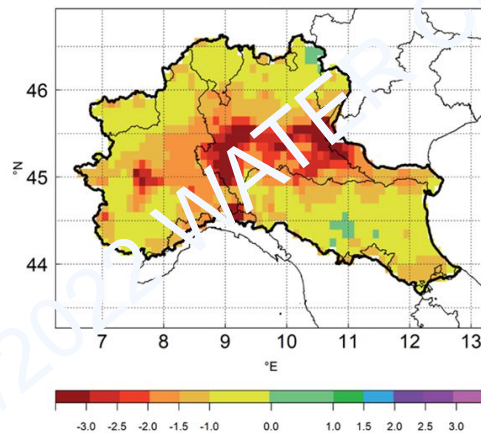




STI – July 2022

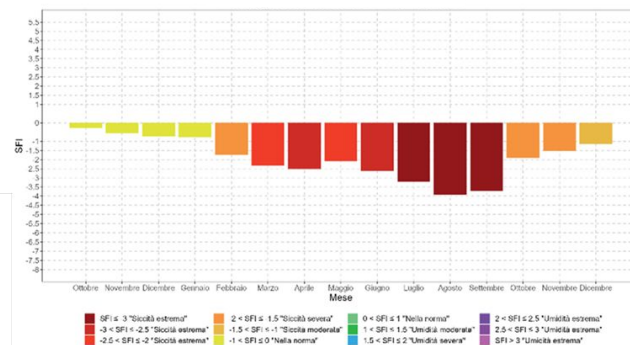


SPI – June 2022

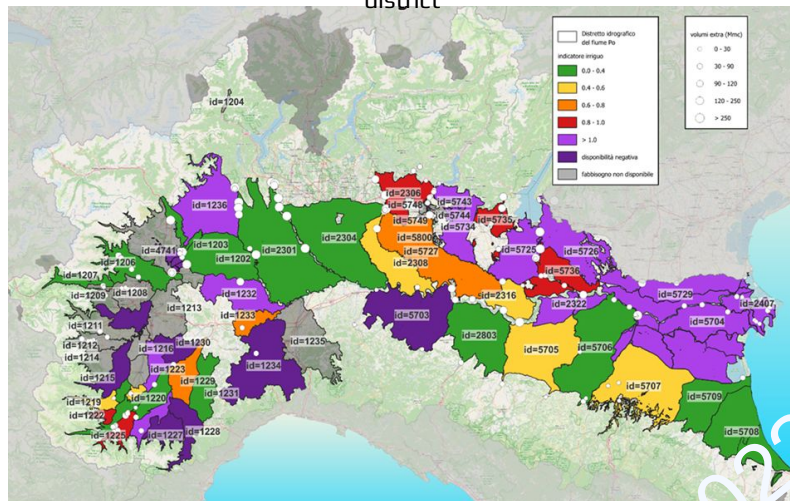


**2022**  
**-35% inflows compared**  
**to the long-term**  
**average**

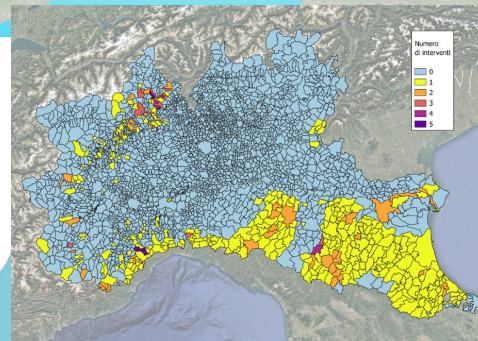
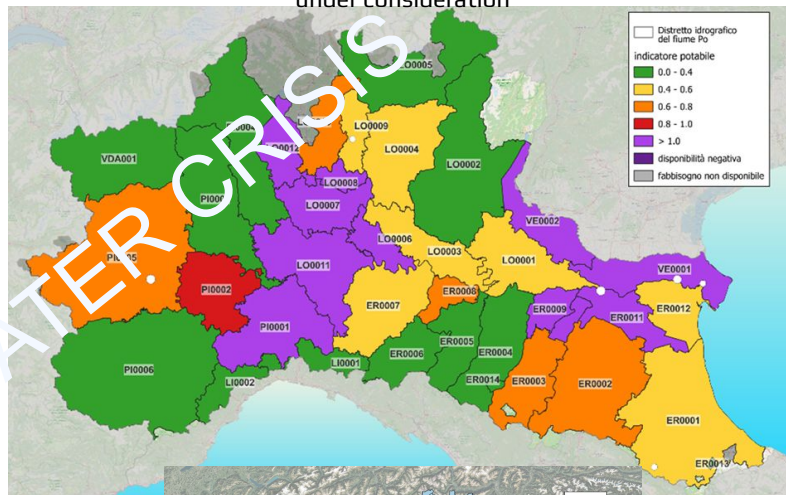
Pontelagoscuro Oct. 2021 – Dic. 2022



Ratio of irrigation use to water availability in 2022 for each irrigation district

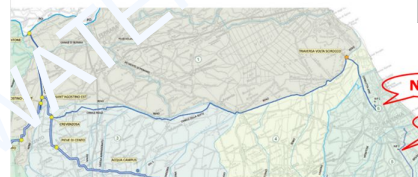
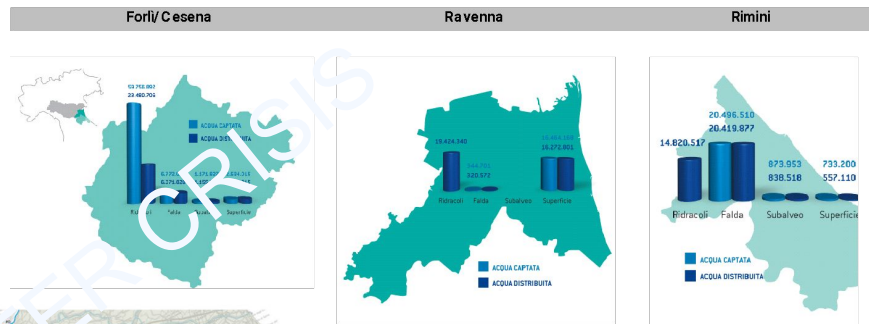
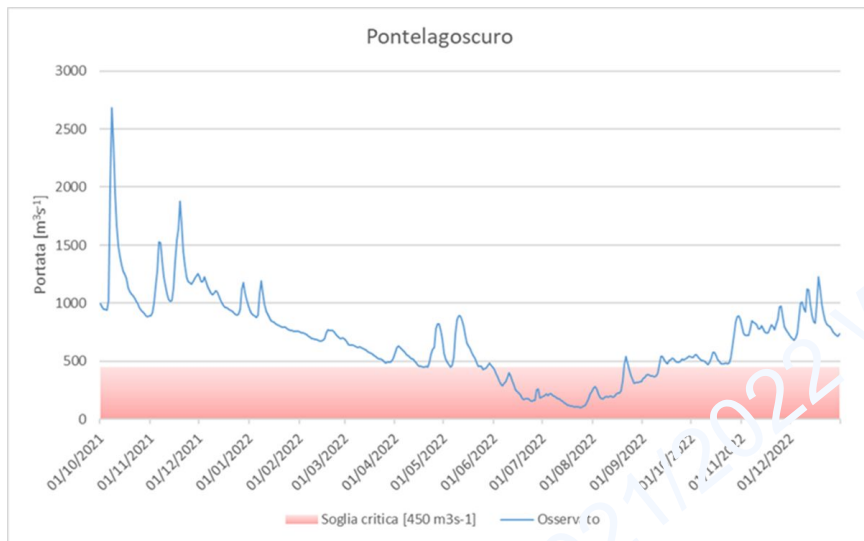


Ratio of drinking water use to water availability in 2022 for each EGATO/GSII without the contribution of volumes outside the area under consideration



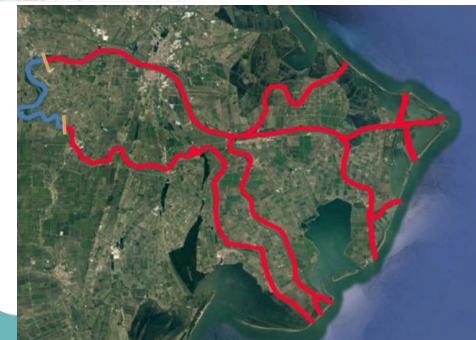


**On 24 July 2022, the lowest flow rate ever recorded was 114 m<sup>3</sup>/s at Pontelagoscuro!**



**270.000 inhabitants served**

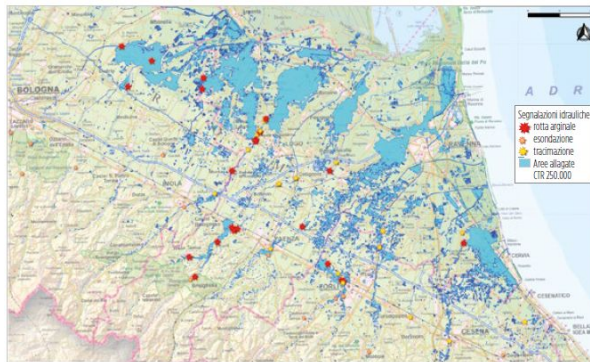
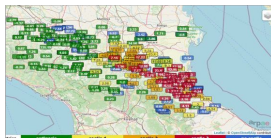
**25.000 non-irrigable hectares**



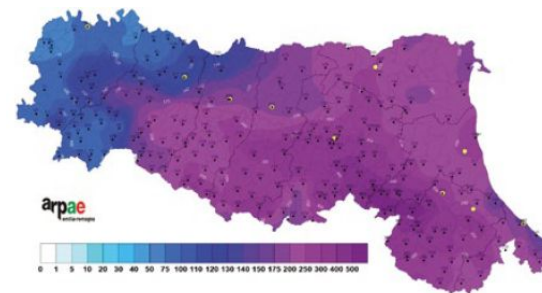


The rainfall events of 1-3 May and 16-17 May together accounted for 50 per cent of the average annual precipitation in the Emilia-Romagna region.

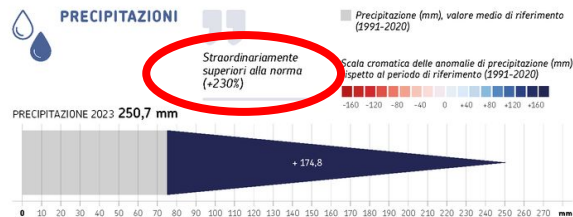
The rainfall event affected the entire hydrographic district, both natural and artificial, causing the flooding of 19 rivers. Flooding was recorded throughout the territory between Bologna and Rimini, bank breaches and widespread slope landslides throughout the hill-mountainous



# FLOODS 2023

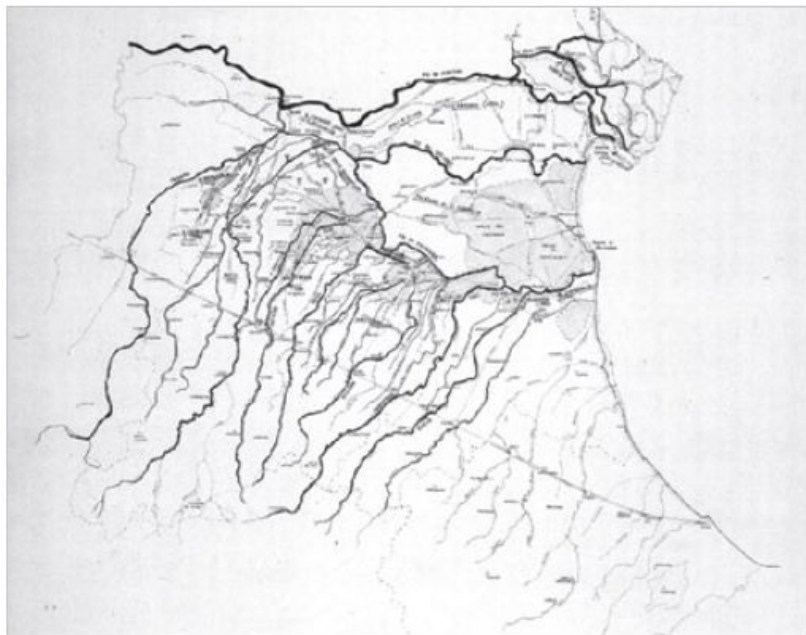


## Maggio 2023

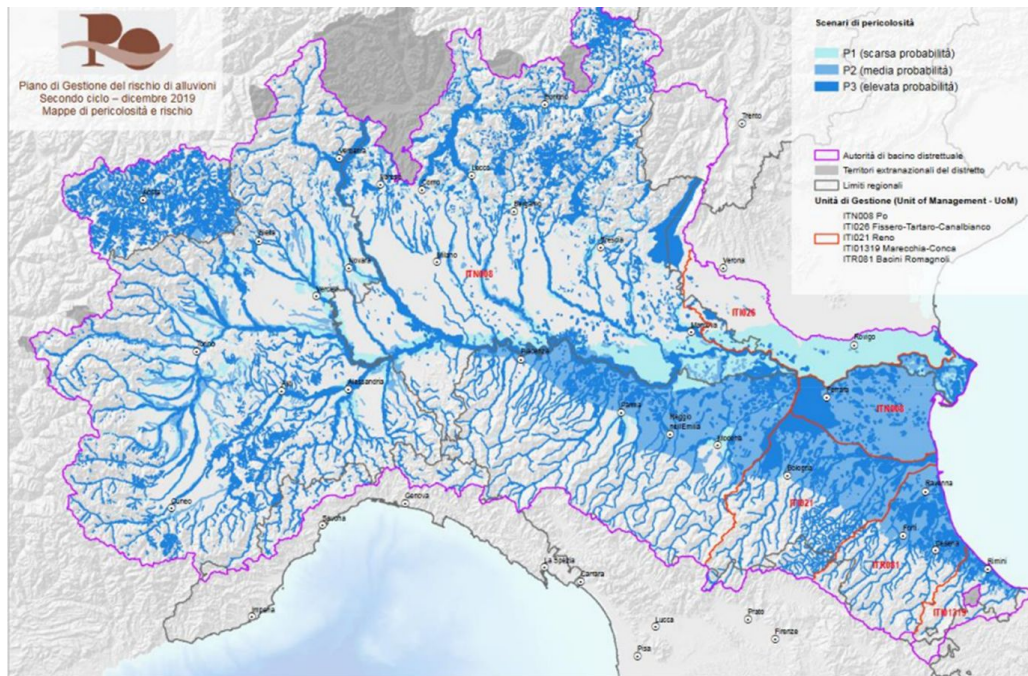


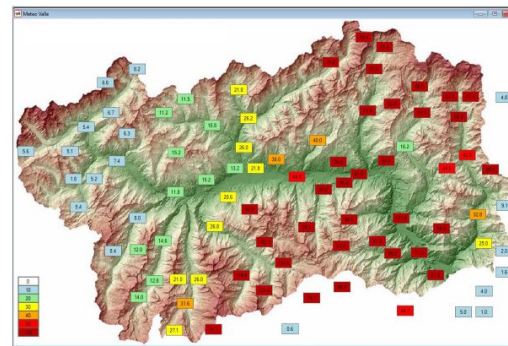
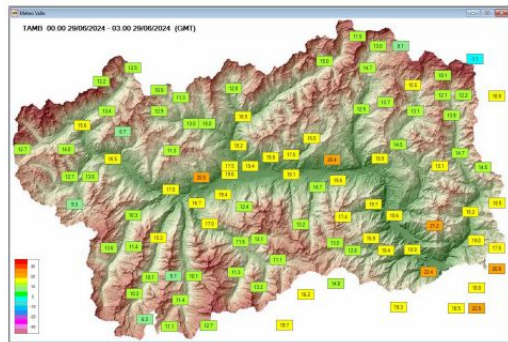


# FLOODS 2023



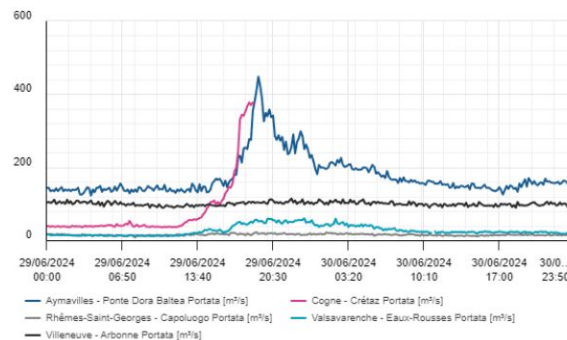
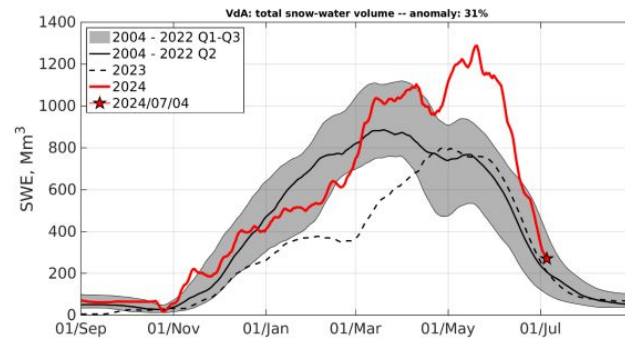
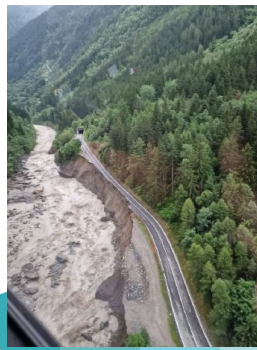
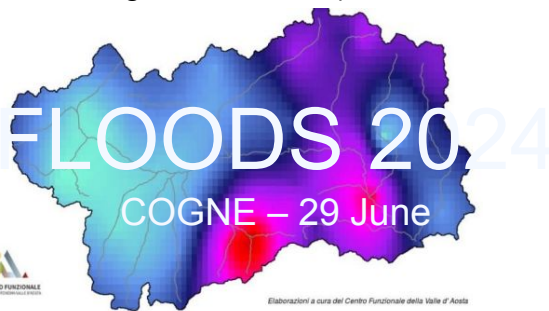
Po Valley of Bologna, Ravenna and Forlì between the 15th and 17th centuries





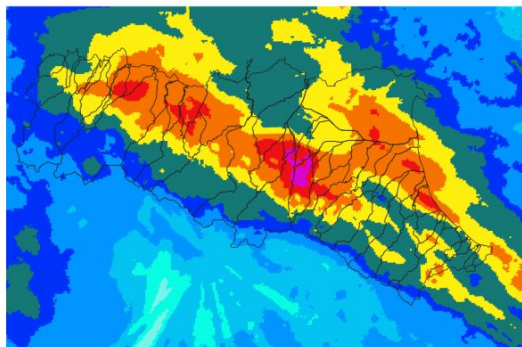
27/06 - 4.455 m<sup>3</sup>/s in Pontelagoscuro

At the beginning of the event, about 700M<sup>3</sup> of water had already changed from the solid state (snow) to the liquid state (about 200 mm of average equivalent precipitation over the Aosta Valley in the month preceding the event, resulting from the melt).

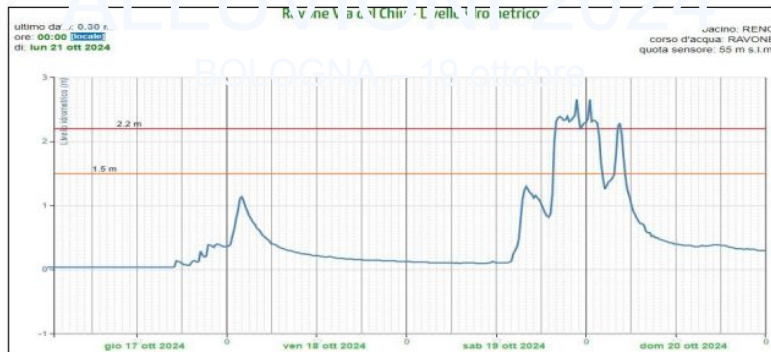


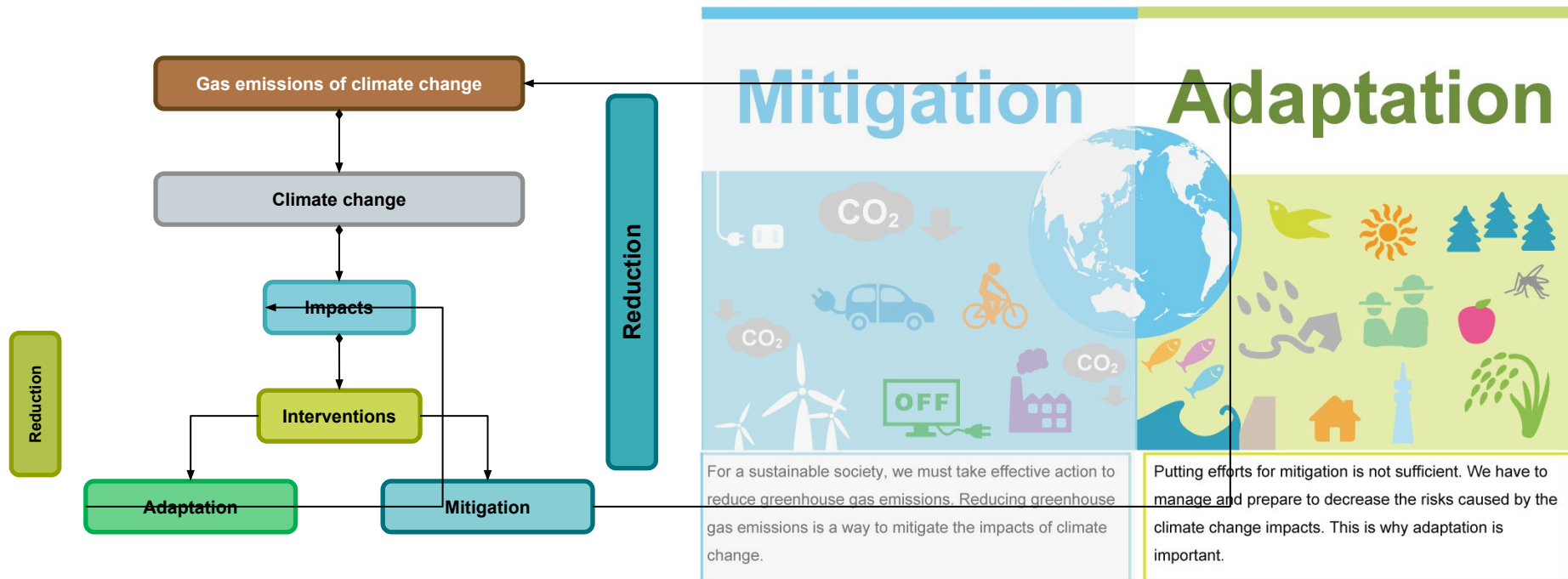
Applying flow regionalisation, the estimated flood discharge of the Dora Baltea carried out at Cogne - Cretaz was estimated to have a **return time a is 1000 years!**





The average rainfall over the Bologna municipality on 19 October 2024 (> 150 mm) represents the absolute **record for daily rainfall since 1961!**





Reference 18 A-PLAT (climate change adaptation platform) portal site, National Institute for Environmental Studies



**The EU Strategy on adaptation to climate change**

**Strengthening Europe's resilience to the impacts of climate change**

The EU Strategy on adaptation to climate change, adopted by the European Commission in April 2013, sets out a Framework and mechanisms for taking the EU's preparedness for current and future climate impacts to a new level.

To avoid the most serious risks of climate change, particularly large-scale irreversible impacts, the international community has agreed that global warming must be kept below 2°C compared to the pre-industrial temperature. International action to reduce greenhouse gas emissions will therefore be needed for decades to come. But however successful these mitigation efforts prove to be, the impact of climate change will increase in the coming decades due to the delayed impacts of past and current greenhouse gas emissions.

Europe and other parts of the world therefore have no choice but to take adaptation measures to deal with the unavoidable climate impacts and their economic, environmental and social costs. By prioritising coherent, flexible and participatory approaches, it will be much cheaper to take early, planned adaptation action than to pay the price of not adapting to climate change.

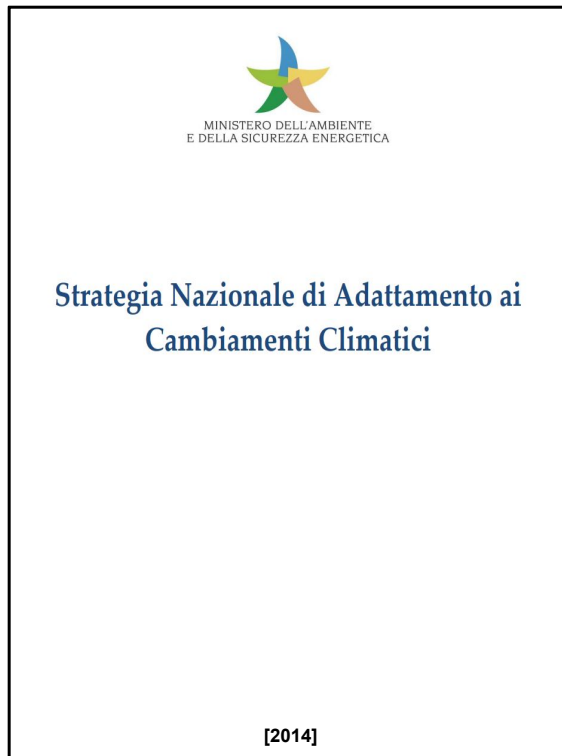
**The EU Adaptation Strategy has three objectives.**

**1. Promoting action by Member States:**

The Commission encourages all Member States to adopt comprehensive adaptation strategies (AS) by the end of 2013 and will provide guidance and funding to help them build up their adaptation capacities and take action. The Commission will also support adaptation in cities by launching a voluntary commitment based on the Covenant of Mayors initiative.

**2. Promoting better informed decision-making** by addressing gaps in knowledge about adaptation and further developing the European Climate Adaptation Platform (Climate-ADAPT) as the 'one-stop shop' for adaptation information in Europe.

**2013**



**MINISTERO DELL'AMBIENTE  
E DELLA SICUREZZA ENERGETICA**

**Strategia Nazionale di Adattamento ai  
Cambiamenti Climatici**

**[2014]**



**MINISTERO DELL'AMBIENTE  
E DELLA SICUREZZA ENERGETICA**

**Piano Nazionale  
di Adattamento ai Cambiamenti Climatici**

**MASE approved the National  
Climate Change Adaptation  
Plan (NACC, Decree No. 434 of  
21 December 2023) to NAS  
implementation.**

**DICEMBRE 2023**





## CLIMate Adaptation for the PO river basin district



### General aim

Promote adaptation to climate change  
through smart water management.



Governance



Shared climatic  
knowledge



Cooperation  
and integration



Water security and  
climate resilience



Climate Adaptation for the  
Po River District



## CLIMate Adaptation for the PO river basin district

Programme: LIFE SIP

Study area: Po River District

Time: 9 years

Budget: 17,890,937 €

UE Co-funding: 10,734,562 € (60%)

Partner: 21 + 4 associated





## More than 200 Stakeholder

also from organisations and institutions operating abroad and in territories not belonging to the Po River District





River café (e.g. Casalmaggiore photo of 7 September 2024)



PA training (e.g. 26 March in Pavia and 3 April in Comacchio)



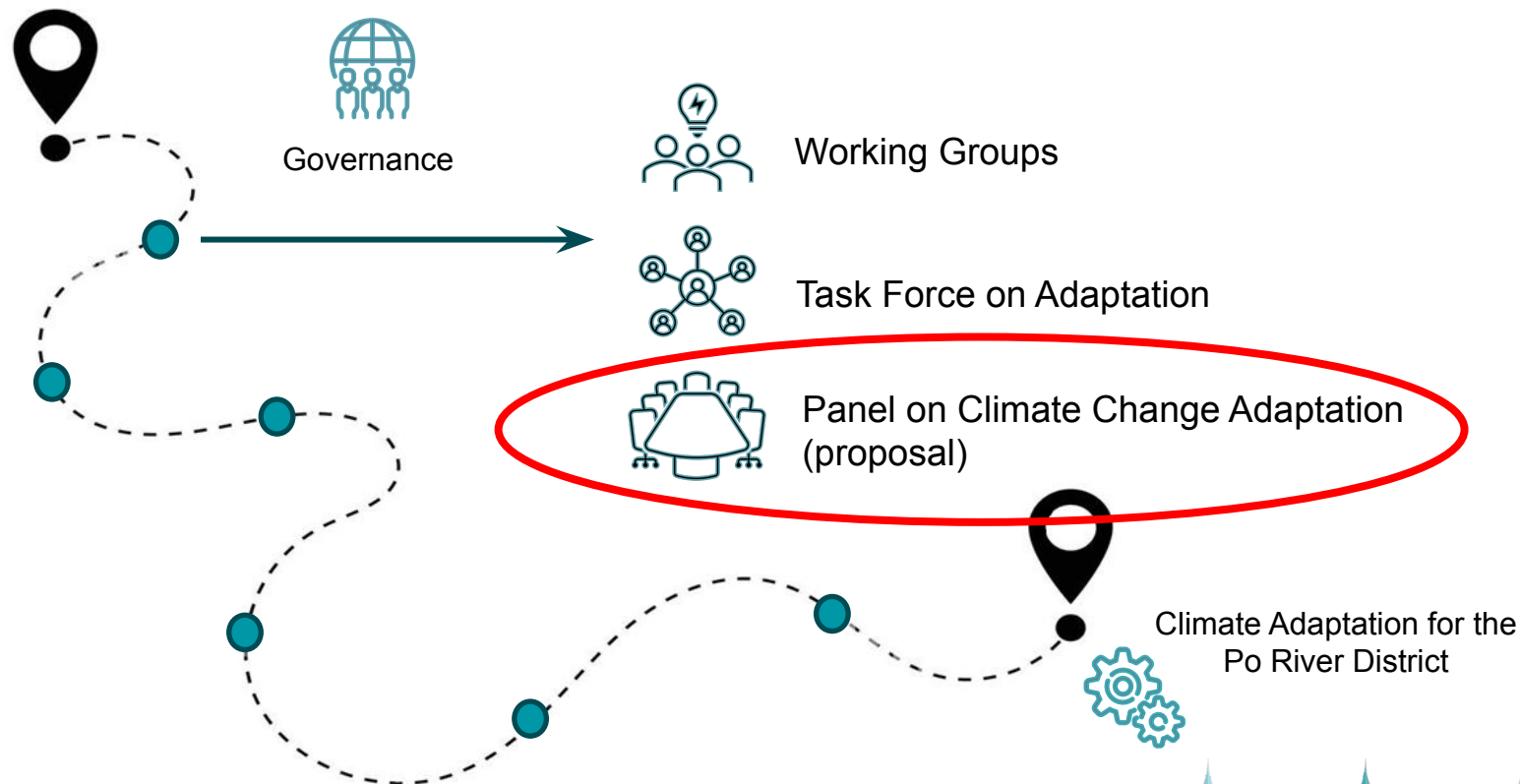
Po River Blue Fest

16 e 17 May in Bologna and Ravenna

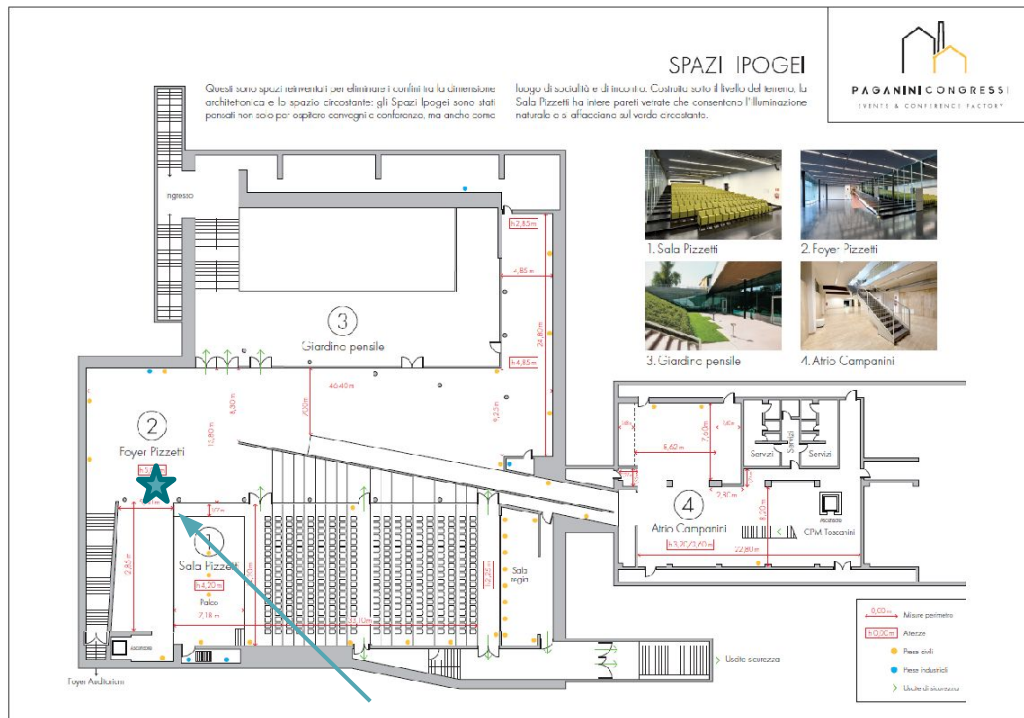


Thematic, Regional and District Board





LIFE CLIMAX PO project - Let's keep in touch!



## You can find us here

*“It is not the strongest or the most intelligent species that survives,  
but the one that adapts best to change.”*

«Lessons from Europe for American Business»  
Leon C. Megginson, US university professor and essayist.  
(1963)



<https://www.lifeclimaxpo.adbpo.it/> | [climaxpo@adbpo.it](mailto:climaxpo@adbpo.it)

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