

I cambiamenti climatici e gli impatti sull'acqua



Venerdì 27 ottobre
Sala delle Esposizioni
Palazzo Sacratì

Venerdì 27 ottobre 2023

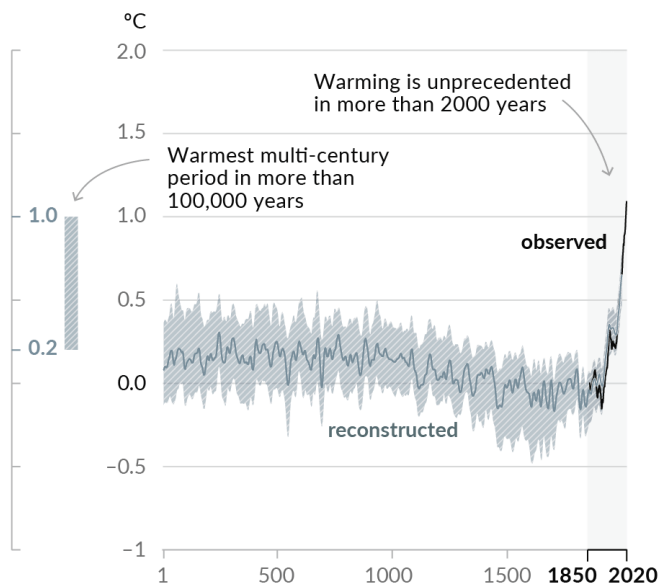
Gravità, Urgenza, Speranza

Temperatura media globale + 1,1° C rispetto a 1850/1900
terre emerse +1,59° oceani +0,88°

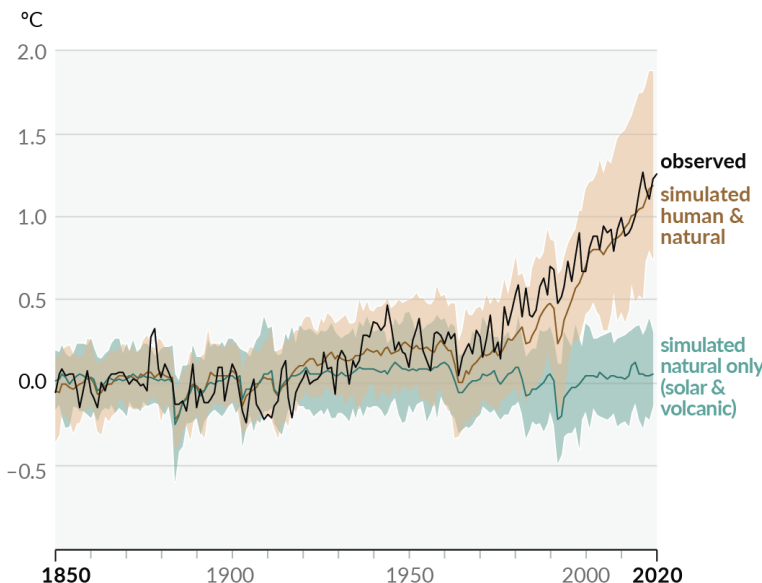
Human influence has warmed the climate at a rate that is unprecedented
in at least the last 2000 years

Changes in global surface temperature relative to 1850–1900

(a) Change in global surface temperature (decadal average)
as **reconstructed** (1–2000) and **observed** (1850–2020)



(b) Change in global surface temperature (annual average) as **observed** and
simulated using **human & natural** and **only natural** factors (both 1850–2020)

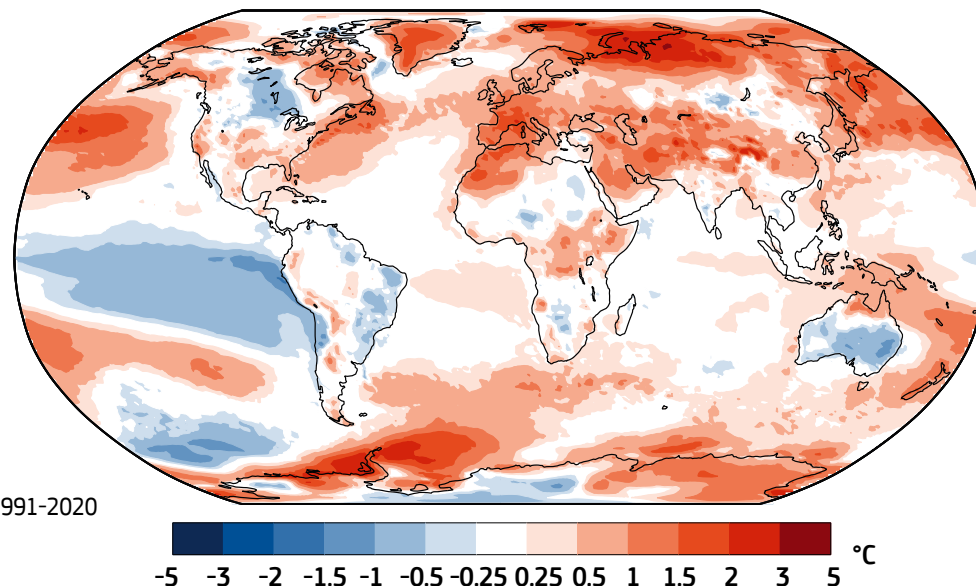


Temperature 2022

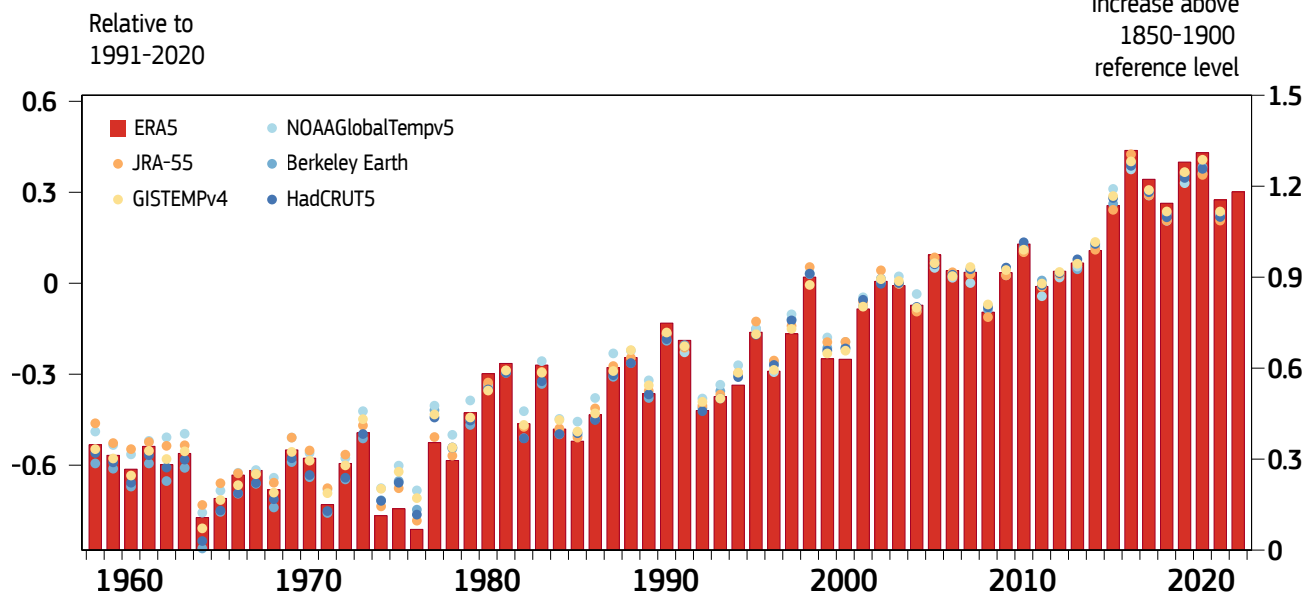
Source:

<https://climate.copernicus.eu/globe-2022-data-center>
(2022 Data Center)

2022 Surface air temperature anomaly



Annual global-average surface temperature (°C)

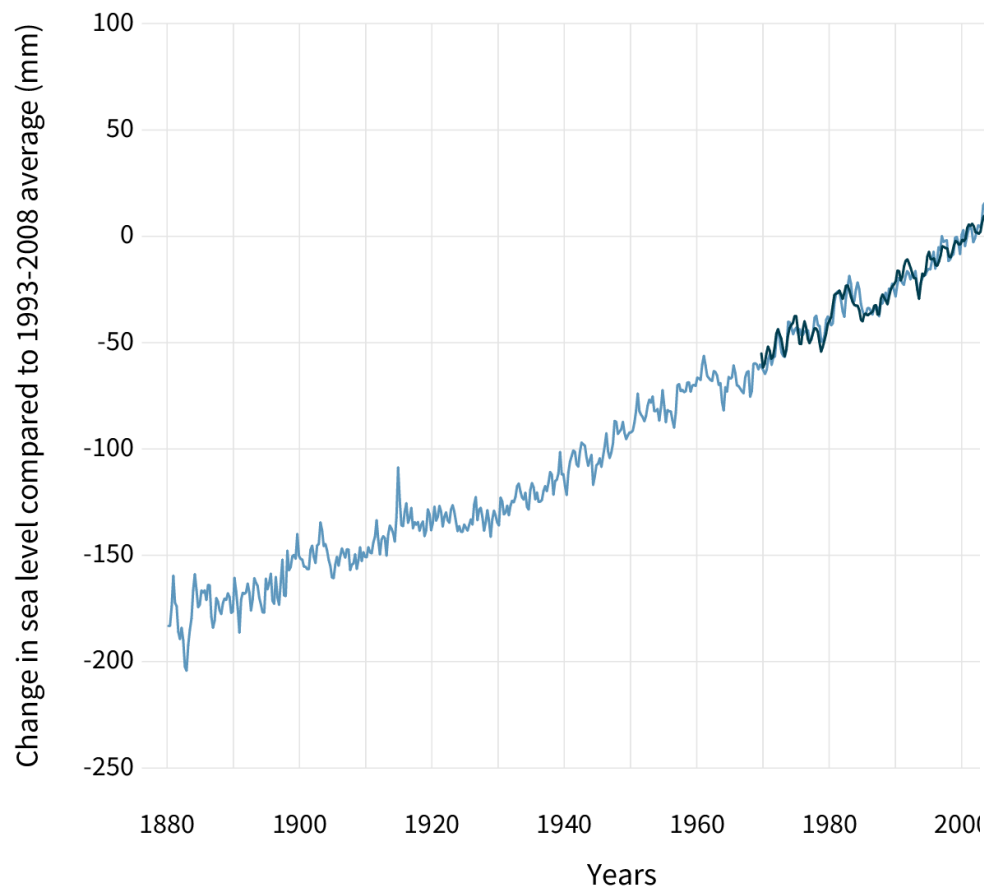


IMPLEMENTED BY
ECMWF



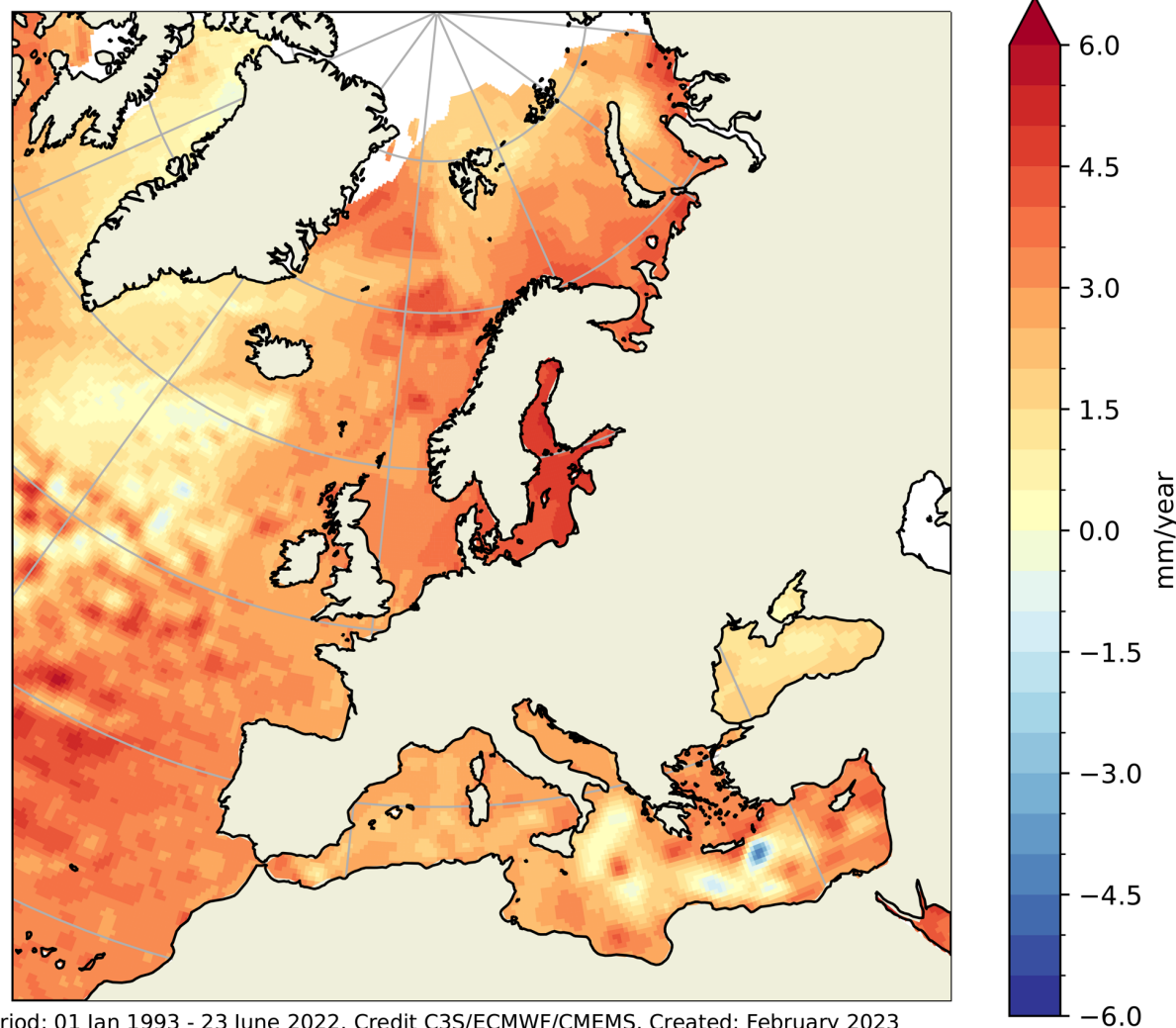
Climate Change Service

LIVELLO DEL MARE



GLOBAL: Seasonal (3-month) sea level estimates (light blue line) and University of Hawaii sea level data (dark blue), compared to the 1993-2008 average.

EUROPE: Sea level trends (mm/year) from satellite altimetry from January 1993 to June 2022



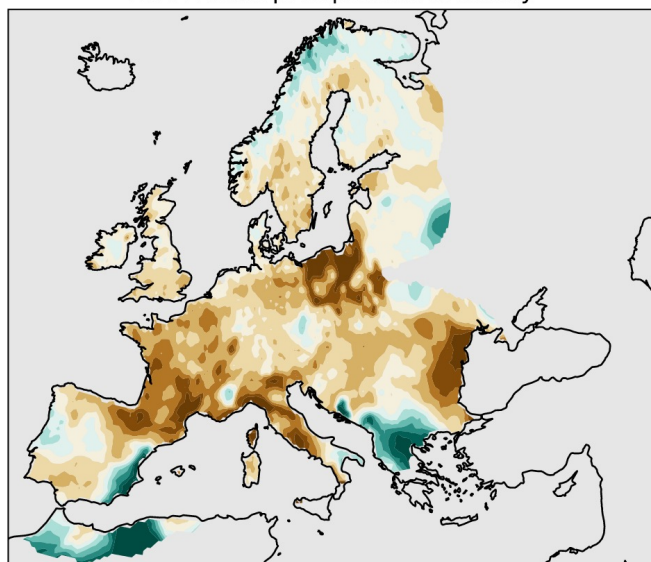
Period: 01 Jan 1993 - 23 June 2022, Credit C3S/ECMWF/CMEMS, Created: February 2023

EUROPEAN STATE OF THE CLIMATE SUMMARY 2022

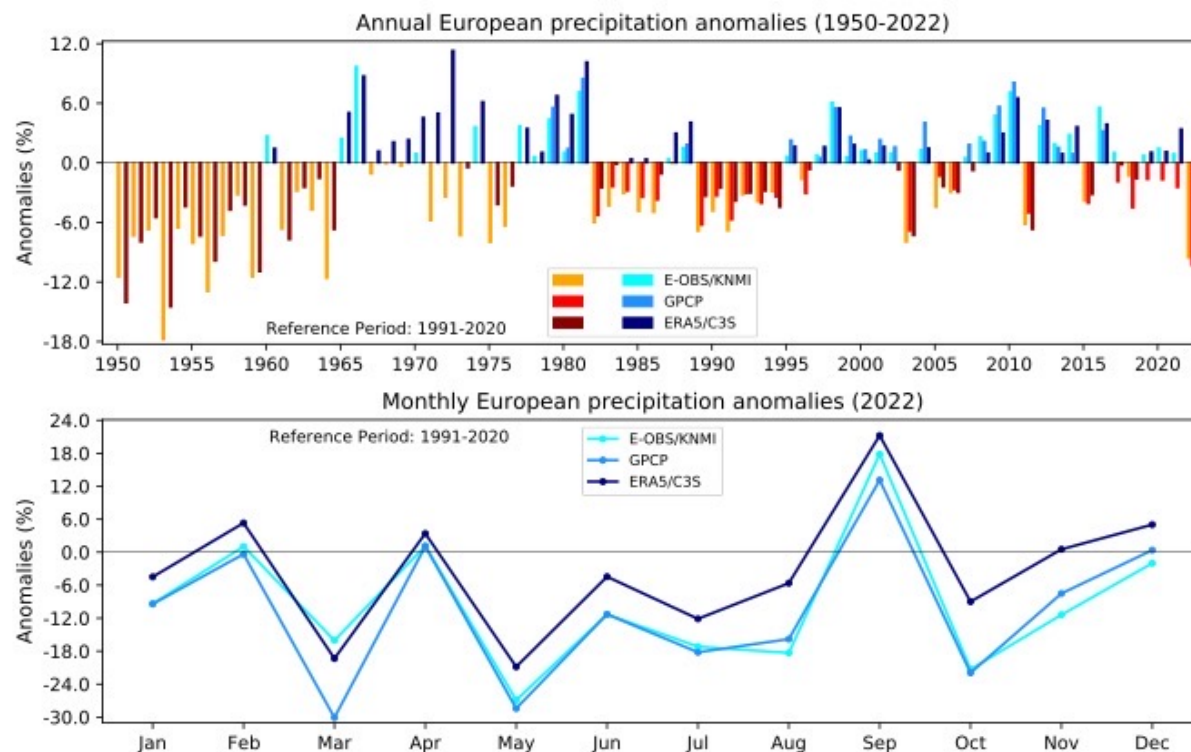
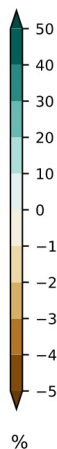


Annual precipitation in 2022 was below the average (1991–2020) from -4% to -10% in the three datasets 2 longest time series – E-OBS and ERA5 – show trends with regional differences, northern Europe becoming wetter and southern Europe becoming drier

2022 mean precipitation anomaly

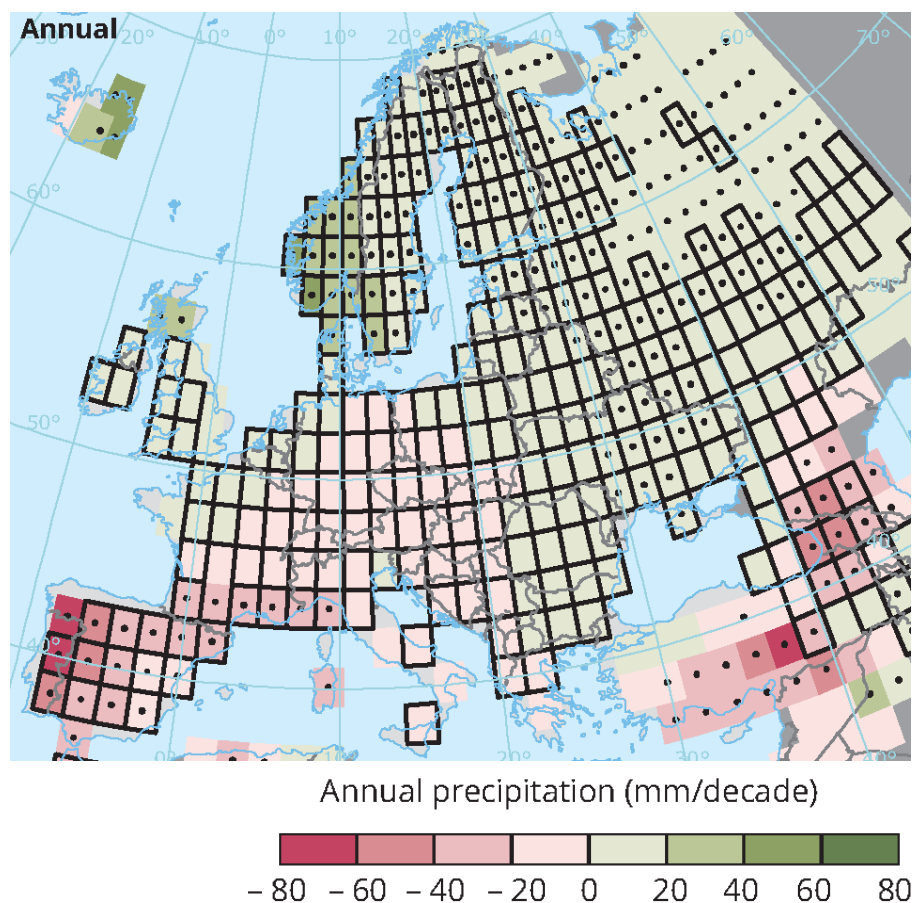


Data source: E-OBS Credit: C3S/KNMI Reference Period: 1991-2020



CAMBIAMENTI CLIMATICI 3

PRECIPITAZIONE EUROPA



Fonti: <https://www.eea.europa.eu/data-and-maps/indicators/european-precipitation-2/assessment>

<https://www.eea.europa.eu/publications/europes-changing-climate-hazards-1/wet-and-dry-1/wet-and-dry-mean-precipitation>

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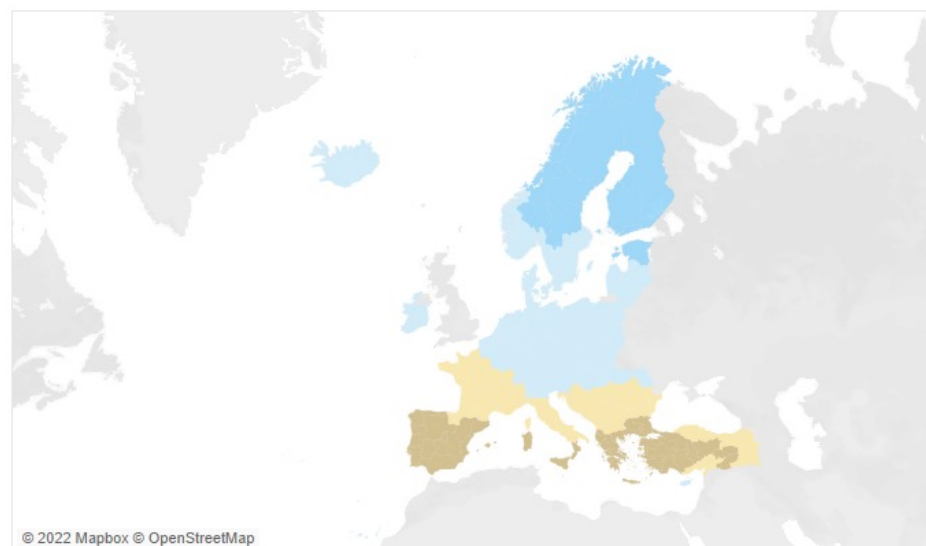
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Projected change in precipitation sum

Time Period
2041-2070

Season
Annual

Scenario
RCP8.5



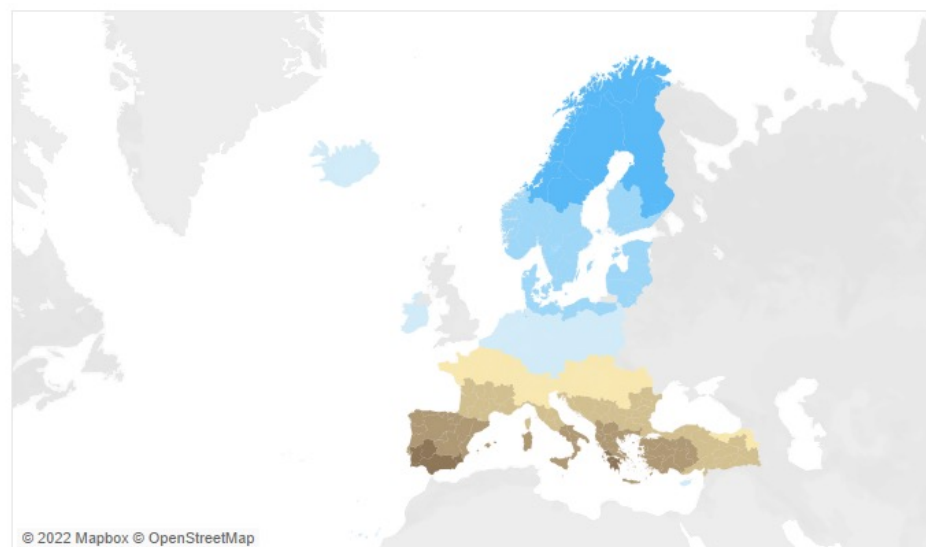
% change

Projected change in precipitation sum

Time Period
2071-2099

Season
Annual

Scenario
RCP8.5

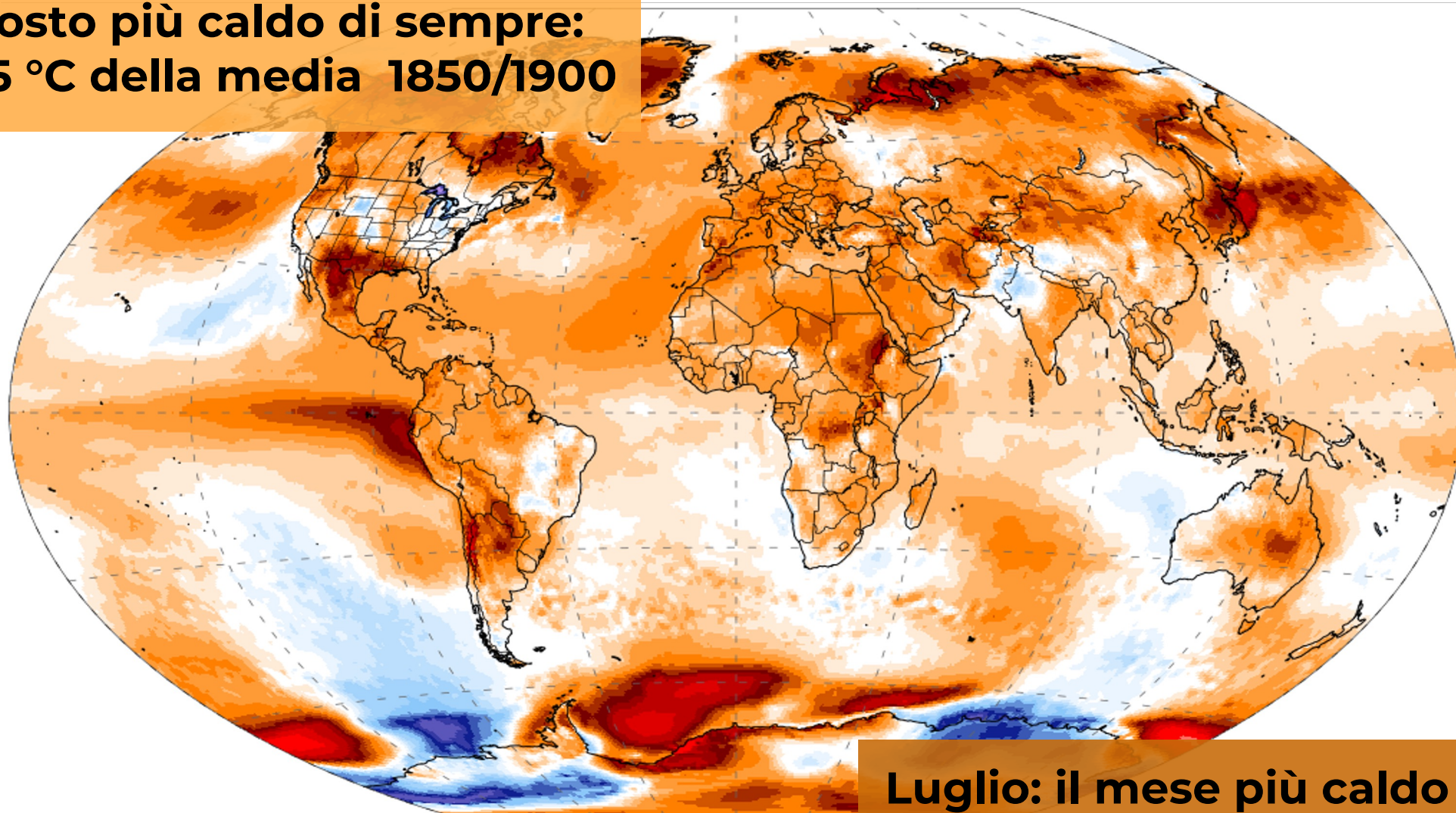


% change



ESTATE 2023: la più calda mai osservata

**Agosto più caldo di sempre:
+1.5 °C della media 1850/1900**



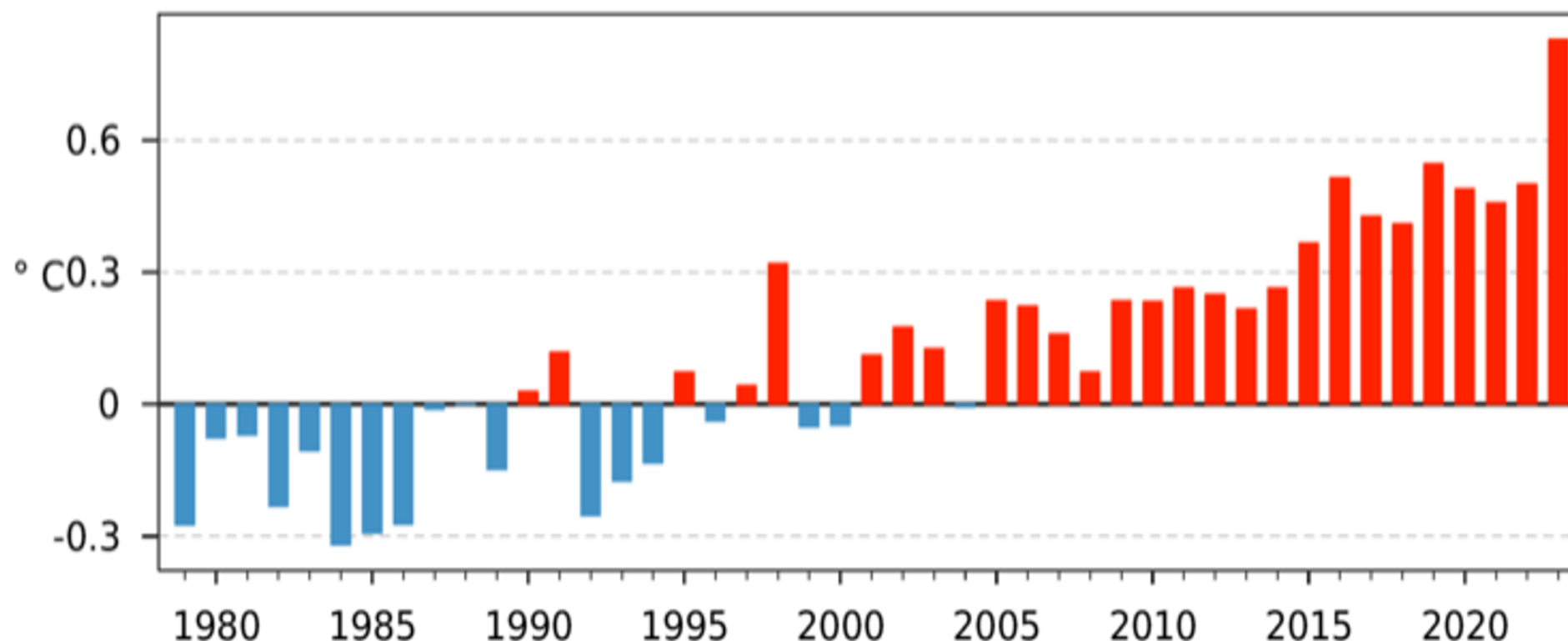
**Luglio: il mese più caldo
mai registrato**

6 luglio 2023: 17.23 °C

L'ESTATE PIÙ CALDA MAI OSSERVATA a livello GLOBALE

Ag
+1.

Summer (JJA) global surface air temperature anomalies

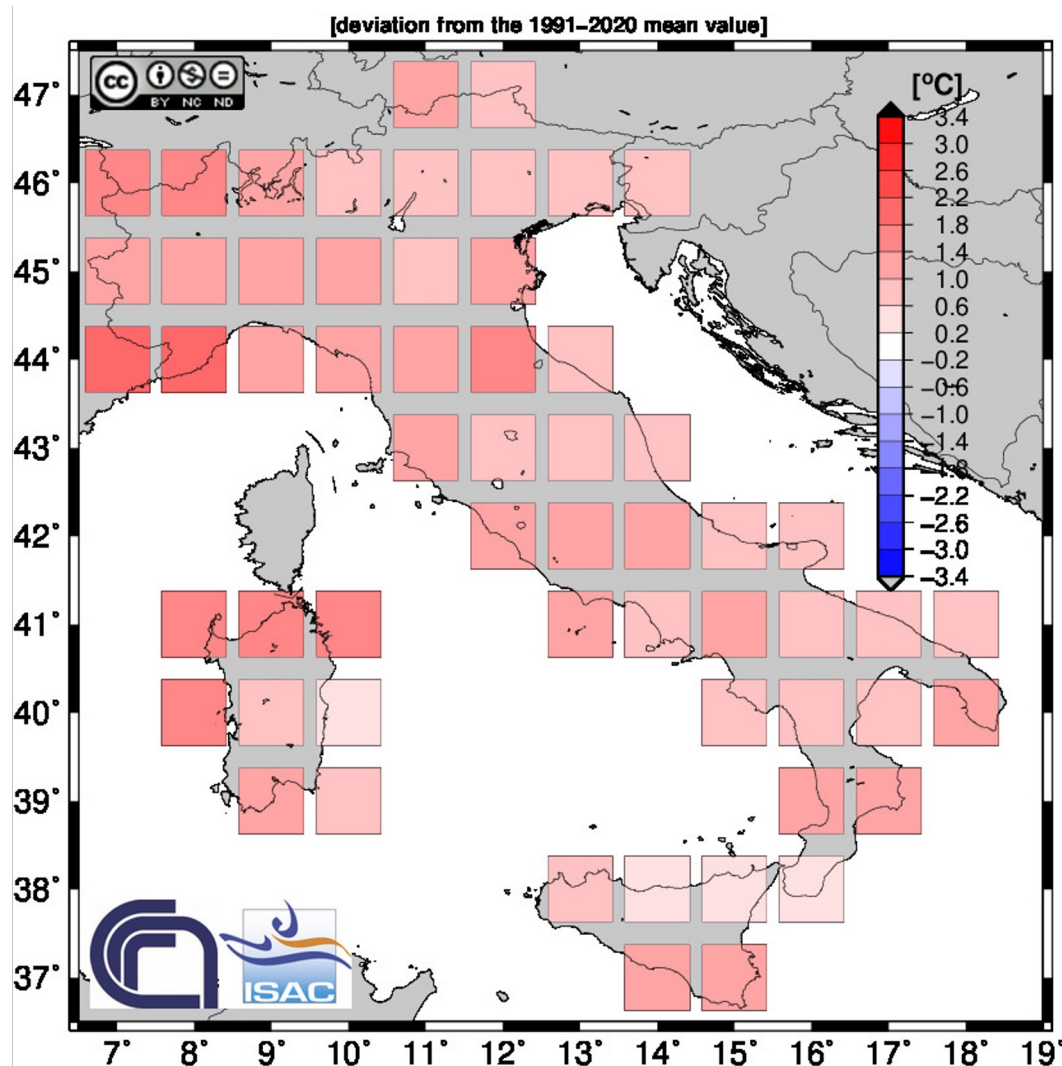


6 luglio 2023: 17.23 °C

**Luglio: il mese più caldo
mai registrato**

Venerdì 27 ottobre 2023

In ITALIA è stata l' 8° estate più calda dal 1800



+1.04 °C

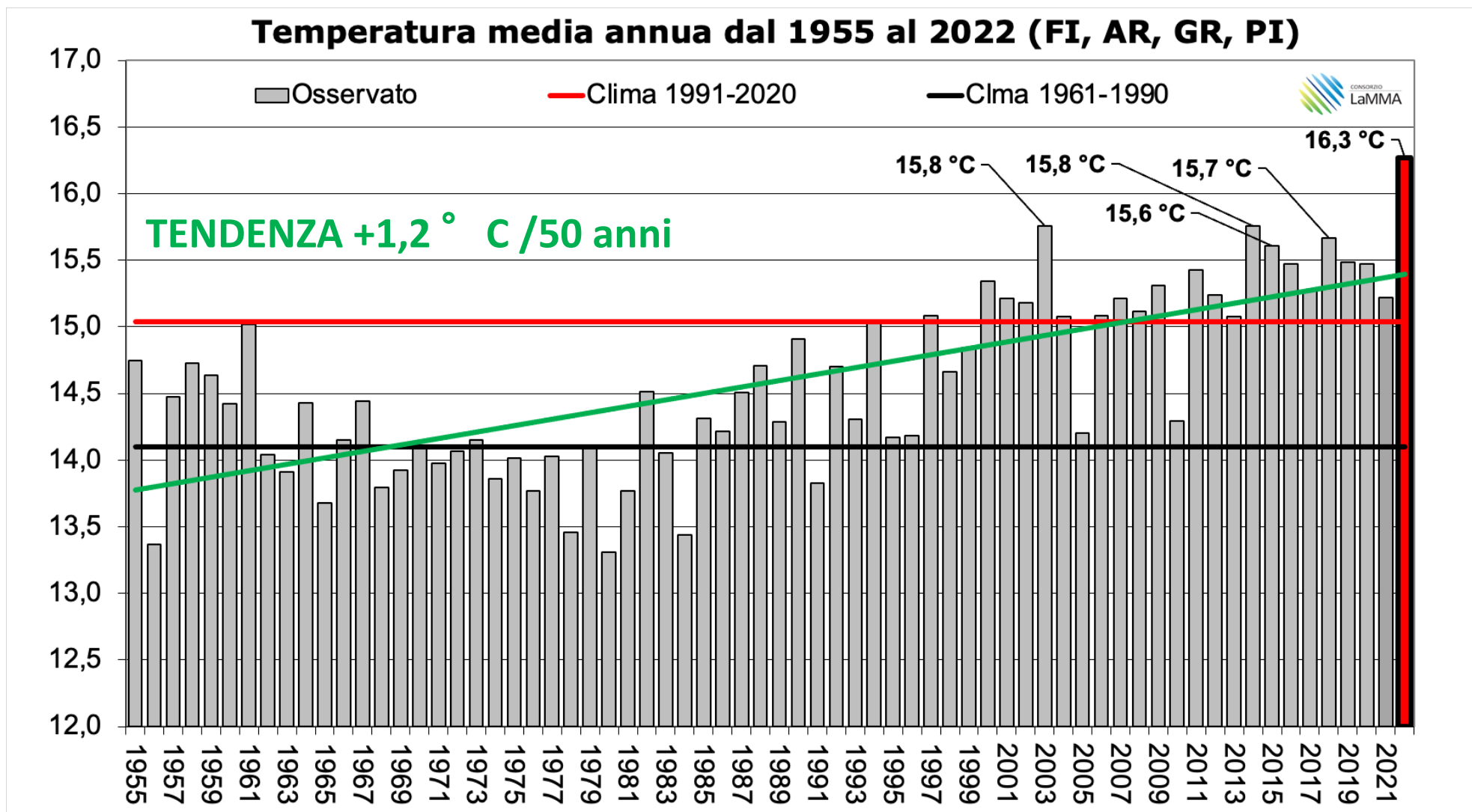
rispetto al 1991-2020

NORD: +1.09 °C (6°)
CENTRO: +1.11 °C (8°)
SUD: +0.98 °C (7°)

Massime: + 0,92°C. (8°)
Minime: + 1,13°C. (4°)

Temperatura media annuale 1955-2022

Toscana (AR, FI, GR, PI)

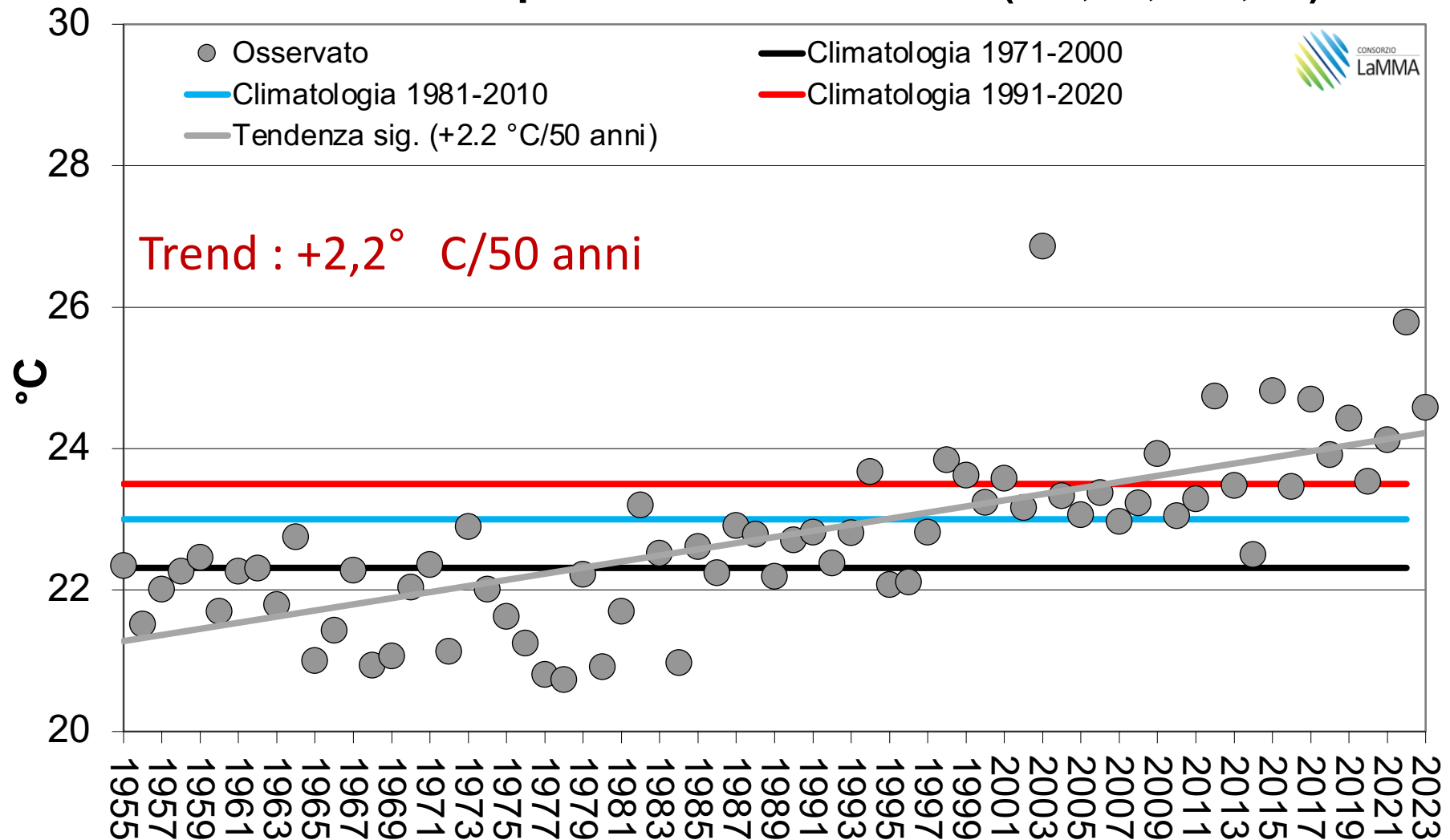


Trend (50 anni): Media +1,2° , Massime +1,5° , Minime +0,9°

ESTATE Temperatura media 1955-2023

Toscana (AR, FI, GR, PI)

Temperatura media estate (AR, FI, GR, PI)



+ evapotraspirazione, + combustibile per incendi (selvicoltura)

GLI IMPATTI DEI CAMBIAMENTI SULLE ACQUE SOTTERRANEE

Venerdì 27 ottobre

Giorni molto caldi

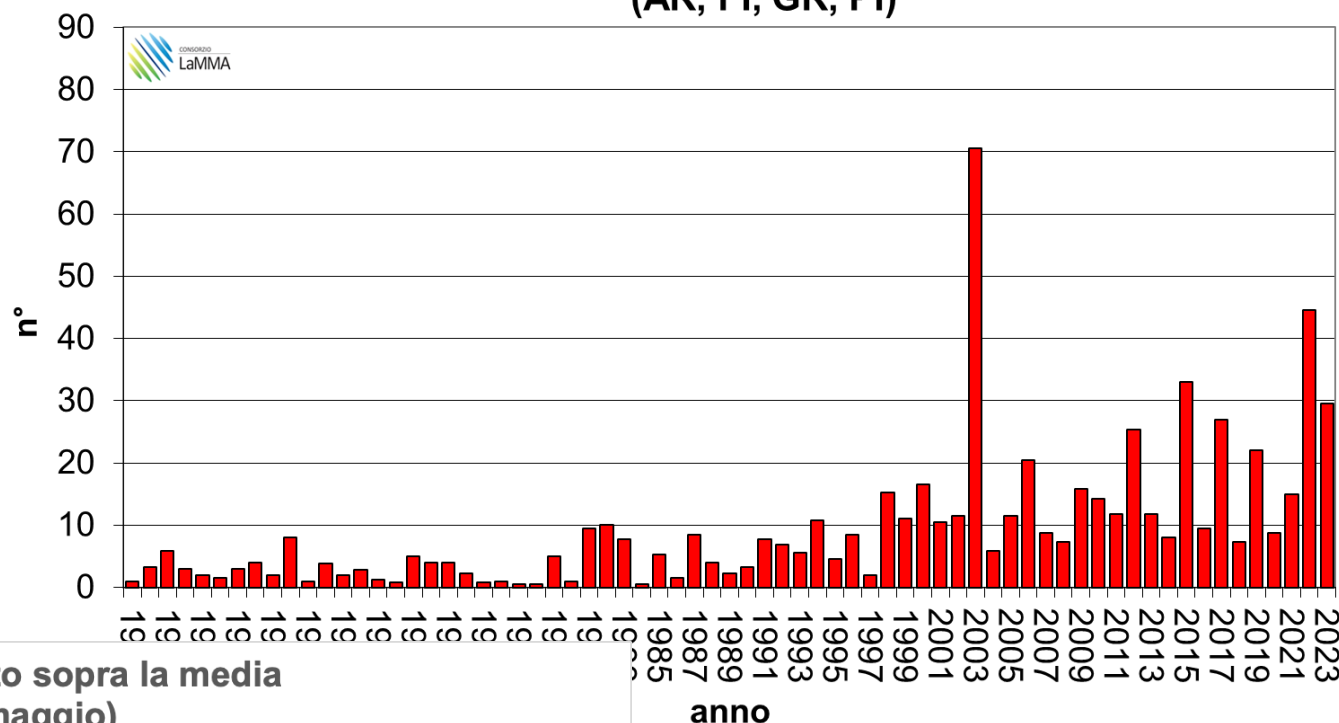
ESTATE

1 giugno-31 agosto

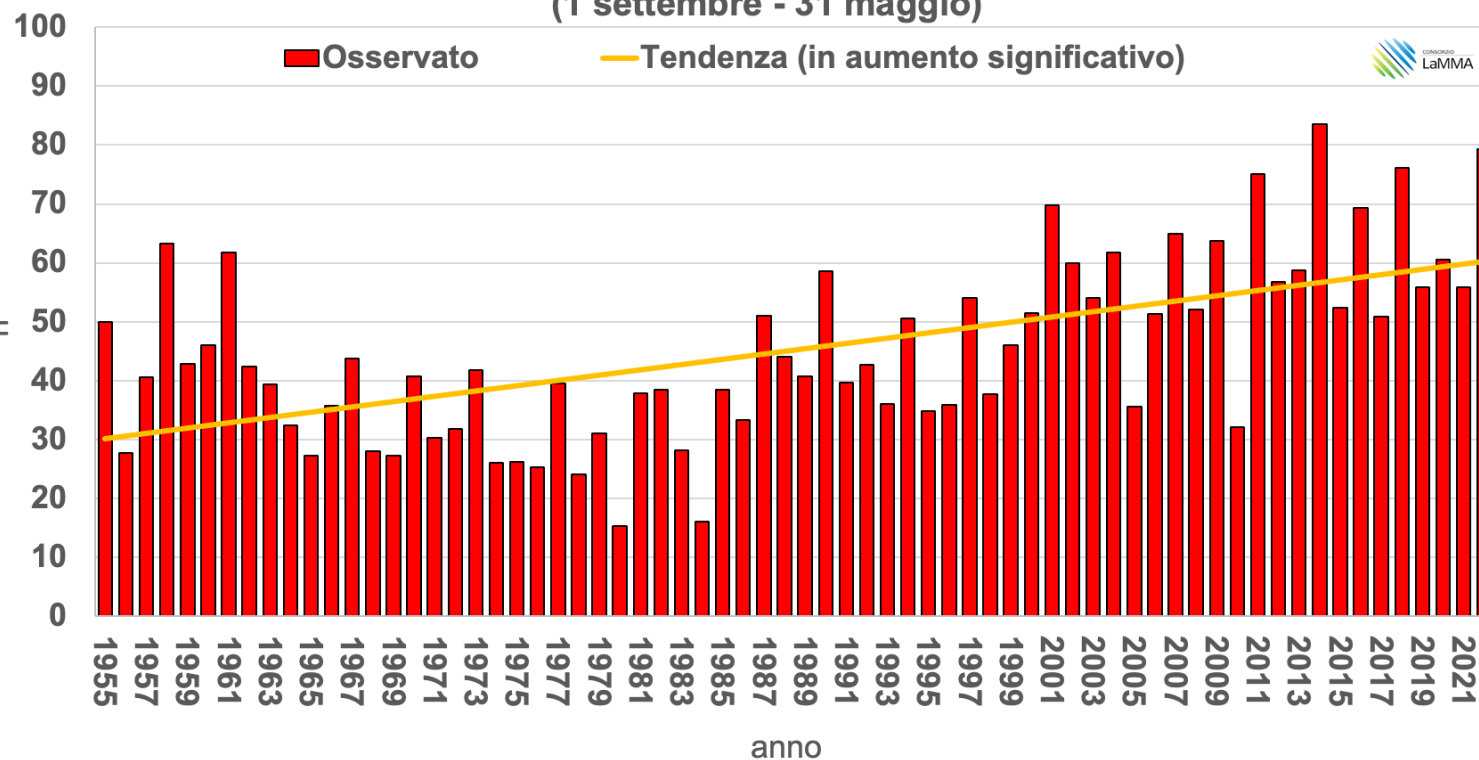
RESTO DELL'ANNO

1 settembre-31 maggio

Numero di giorni critici di caldo in estate
(AR, FI, GR, PI)



Giorni con temperatura molto sopra la media
(1 settembre - 31 maggio)

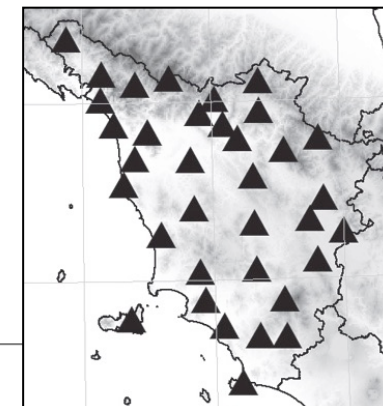
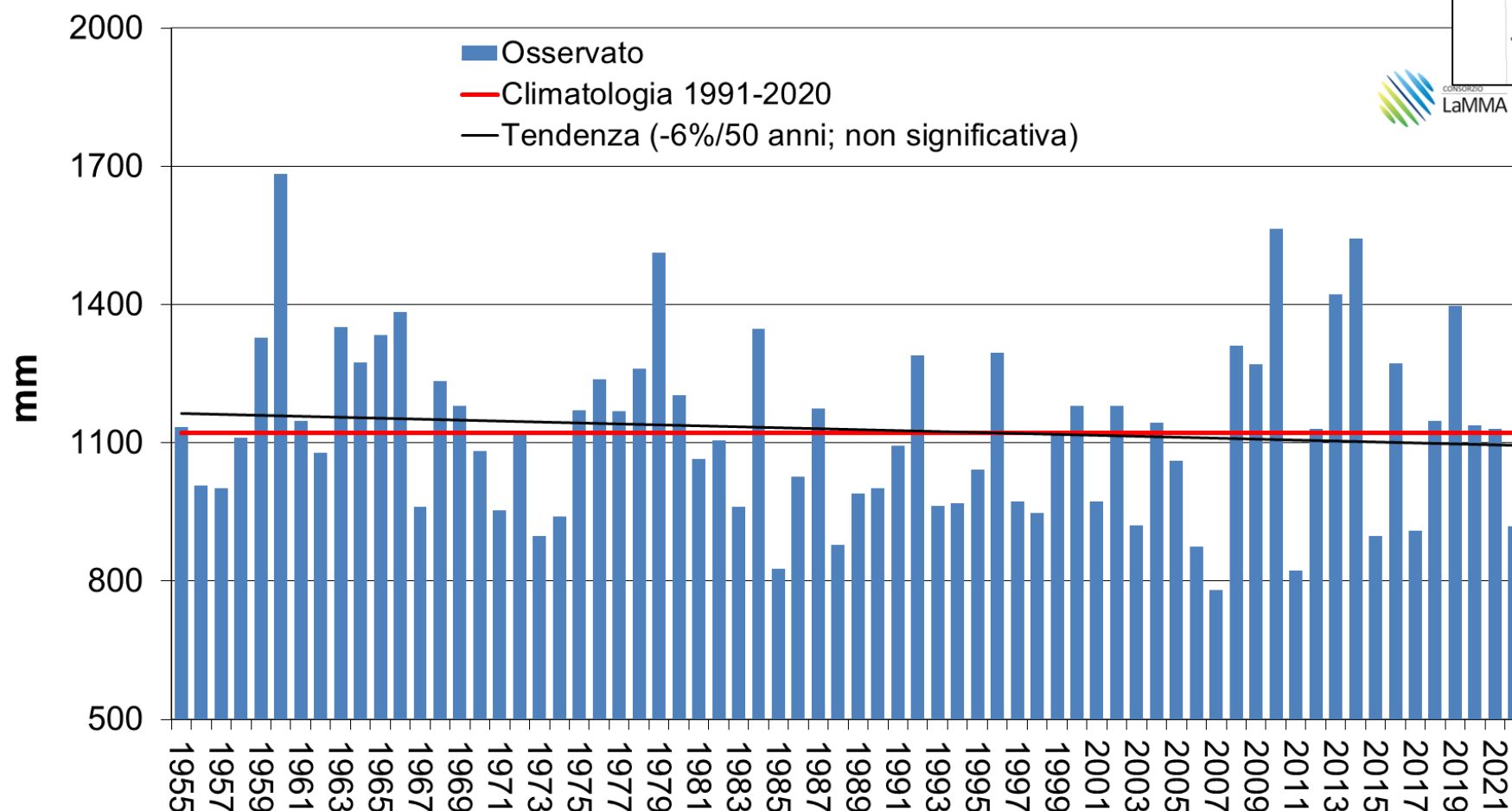


- Variazioni nelle fasi fenologiche
- Impatto sui cicli stagionali delle specie animali
- Riduzione risorsa idrica per evapotraspirazione
- nuovi impianti
- paesaggio

Venerdì 27 ottobre 2023

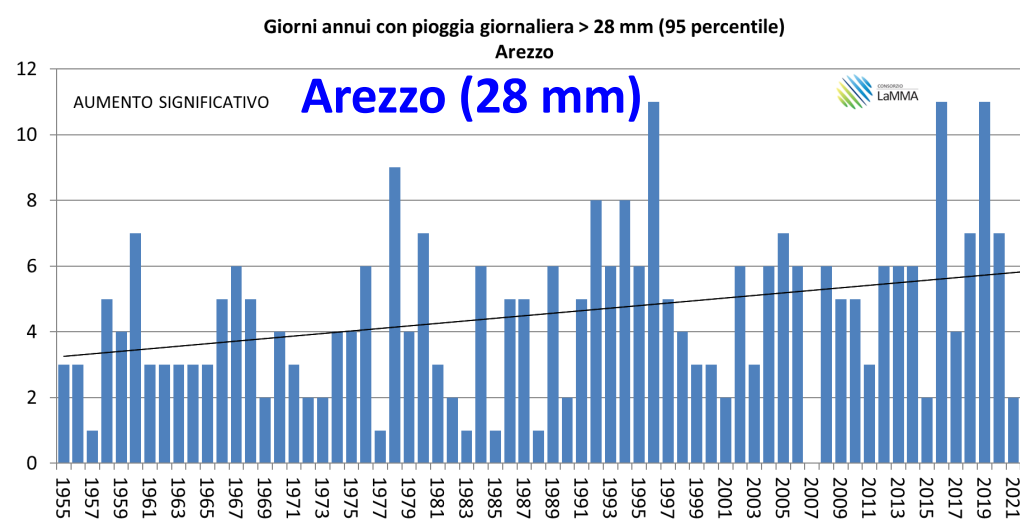
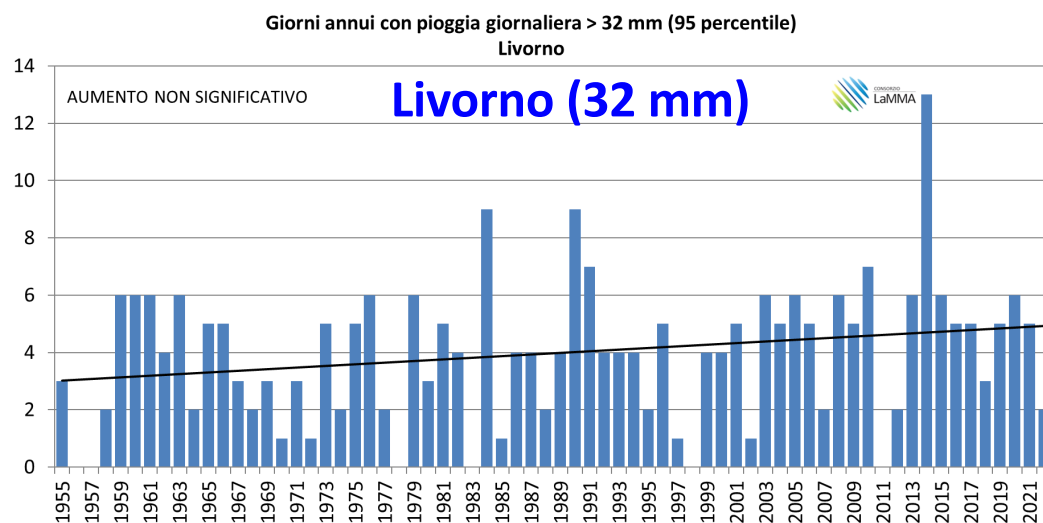
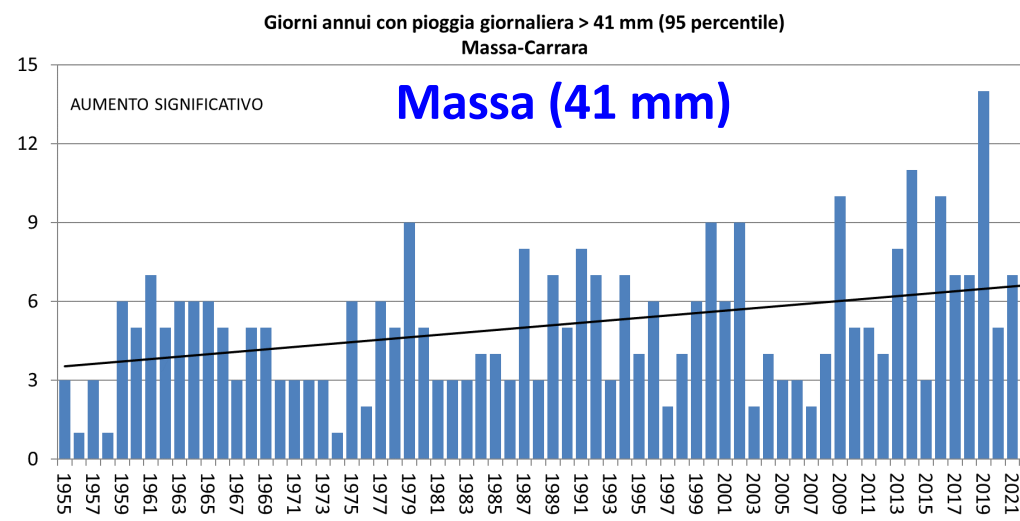
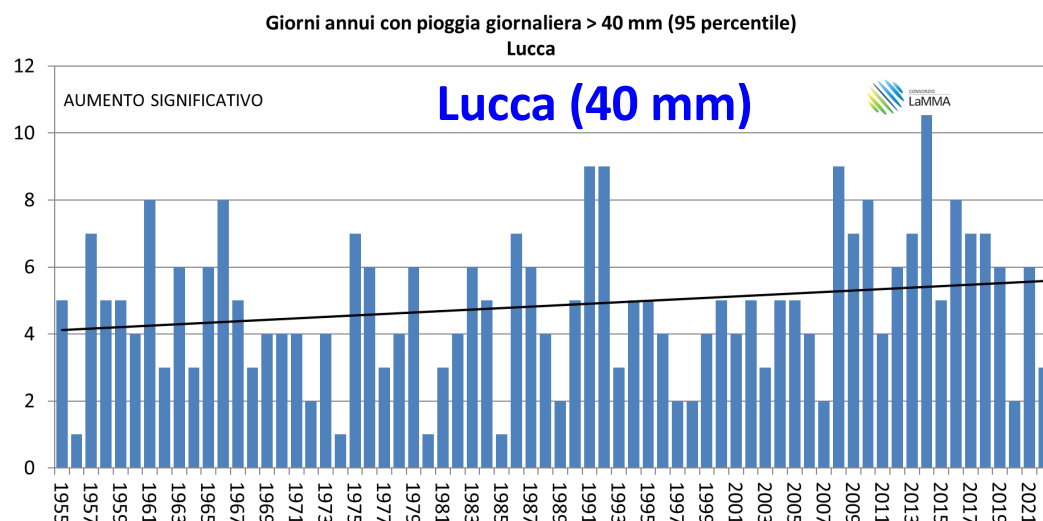
CAMBIAMENTI CLIMATICI PIOGGIA CUMULATA ANNUALE

Pioggia annuale



CONSORZIO
LaMMA

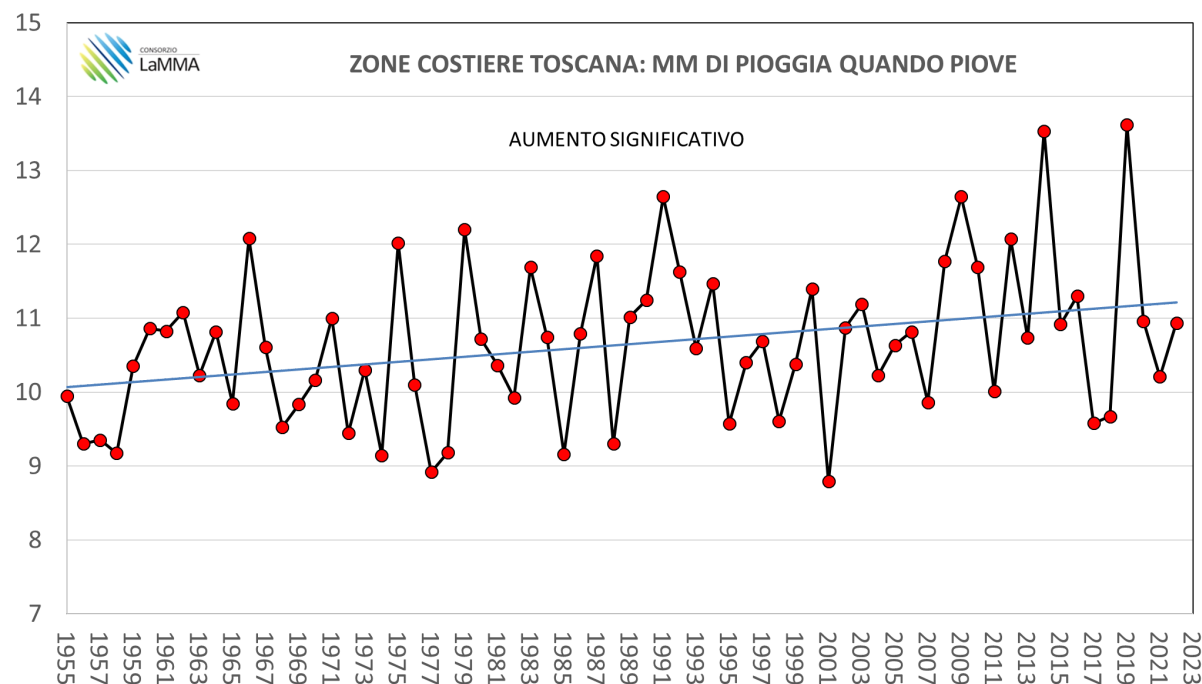
Numero di giorni con precipitazione maggiore del 95° percentile 1955-2021



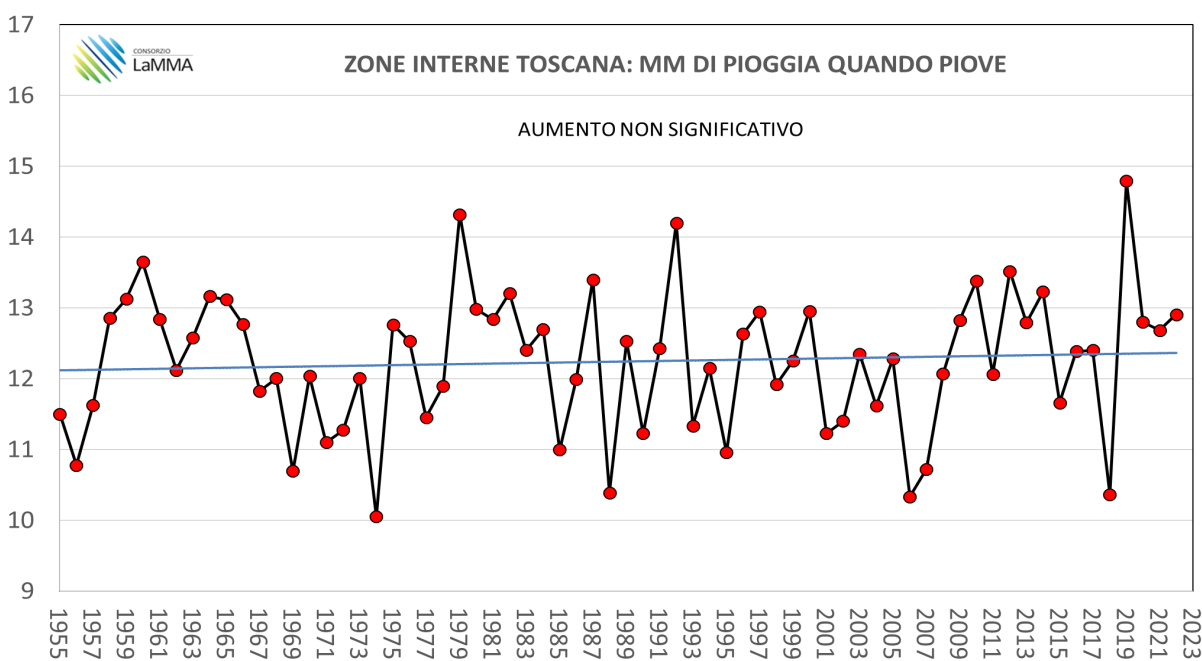
SEGNALI DI UNA MAGGIORE INTENSITÀ DELLE PIOGGE

Quanto piove quando piove!

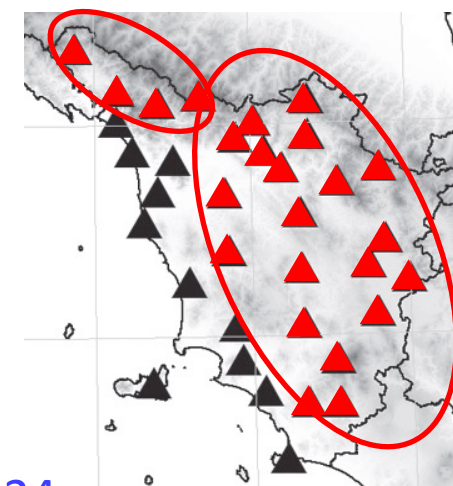
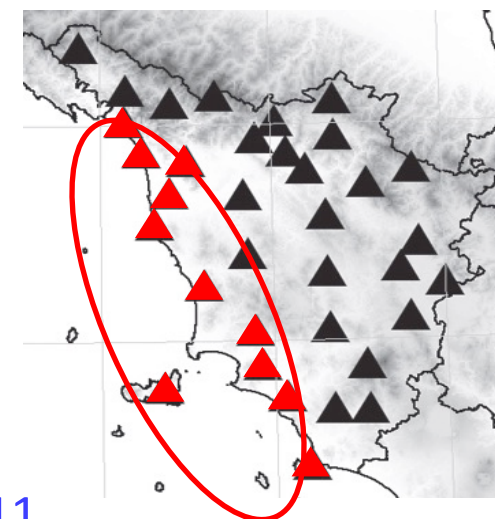
Quanto piove in media in un giorno piovoso (1955-2022)



Costa 11



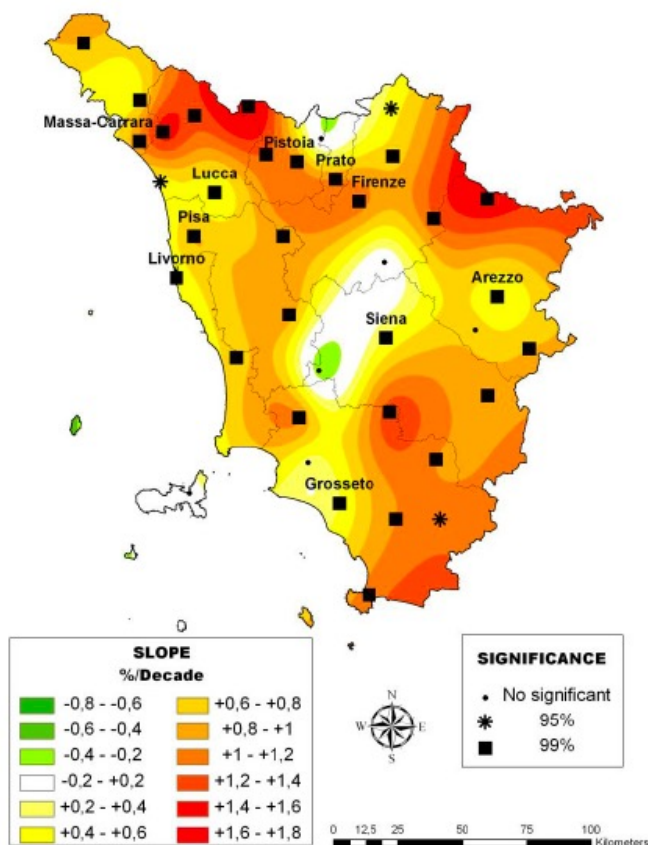
Interno 24



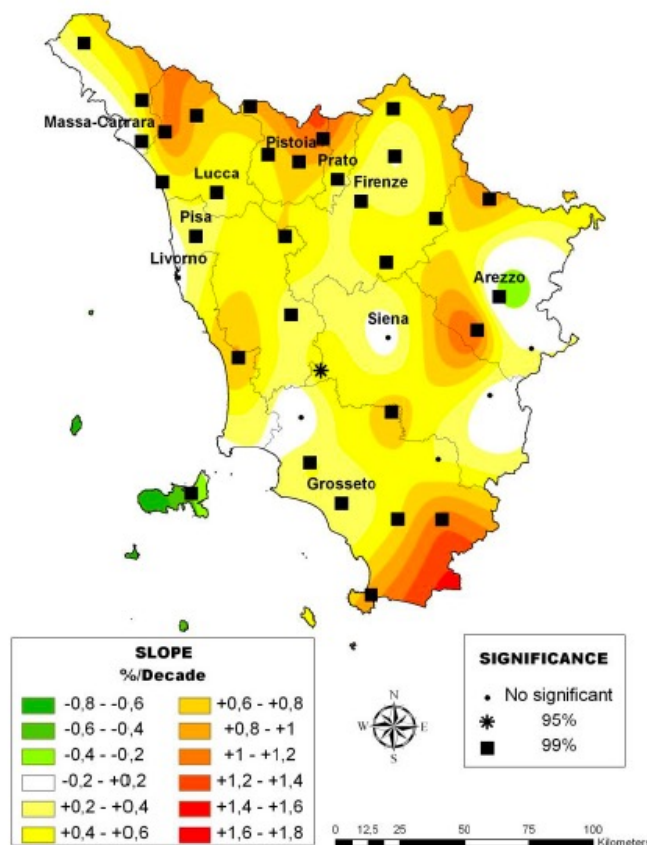
ANDAMENTO GIORNI SECCHI ANNUALI (Soglia 1, 5 e 10 mm)

**Trend
Annual Dry Days**

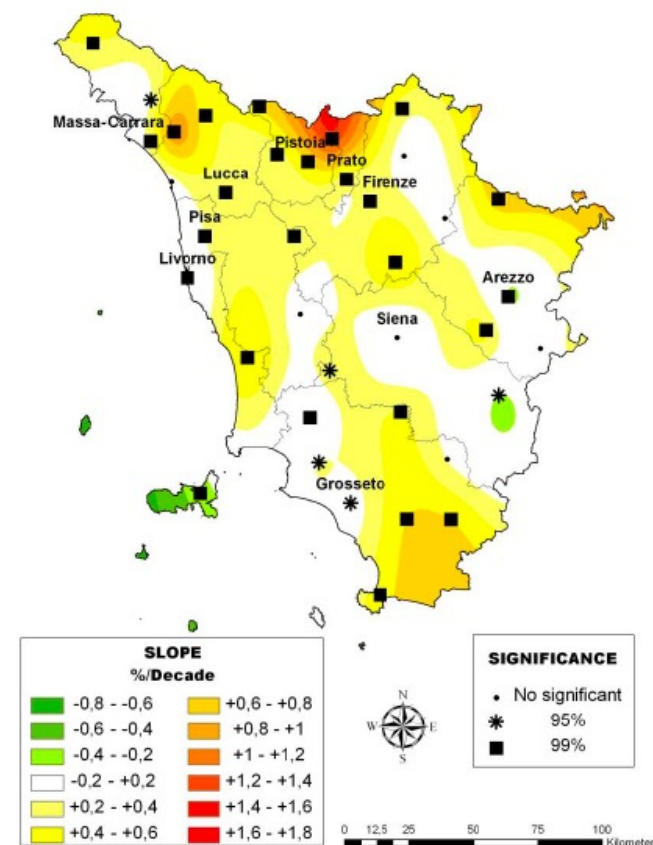
CLIM_DD_TREND_A_1

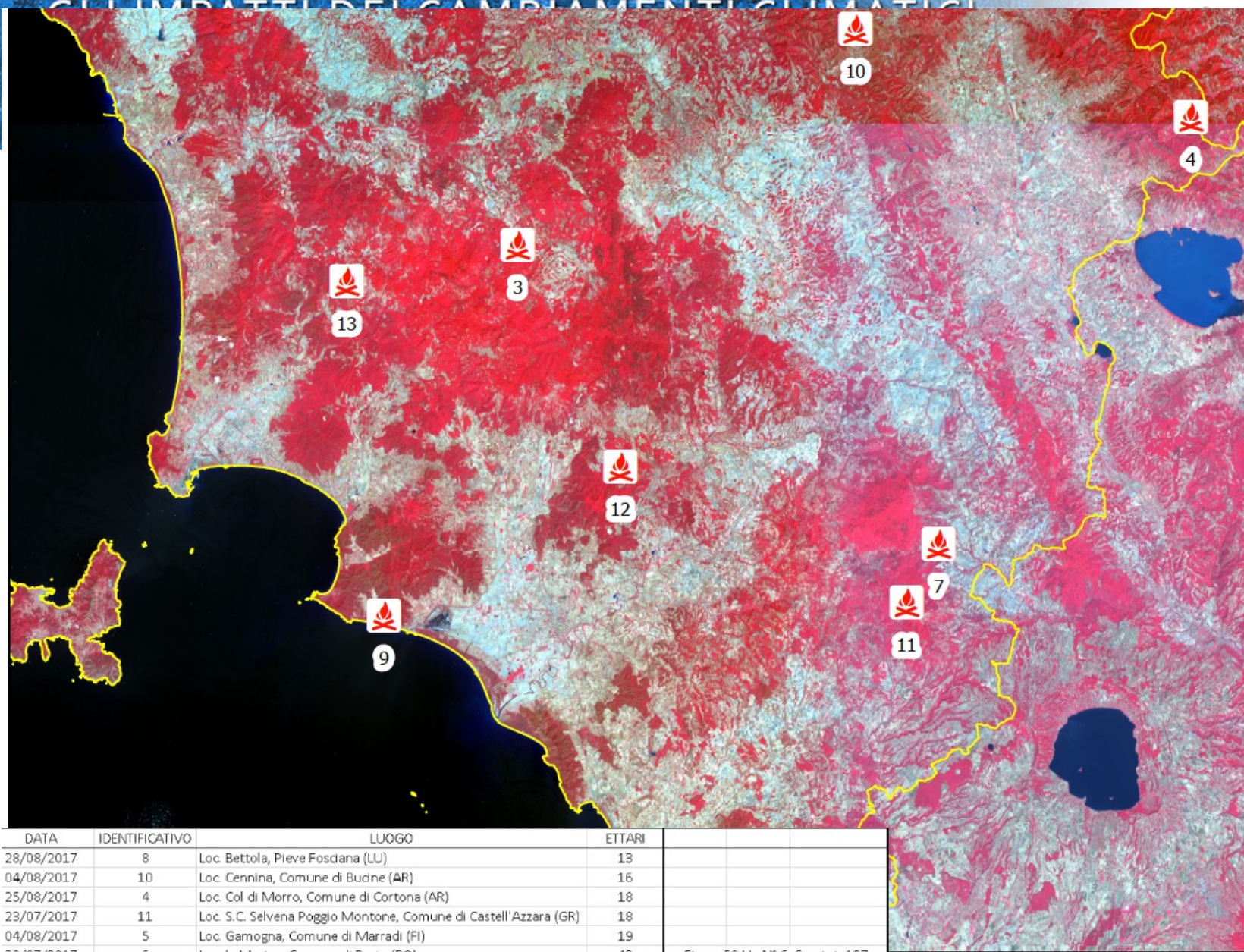


CLIM_DD_TREND_A_5



CLIM_DD_TREND_A_10





**Incendi
boschivi
nel 2022**

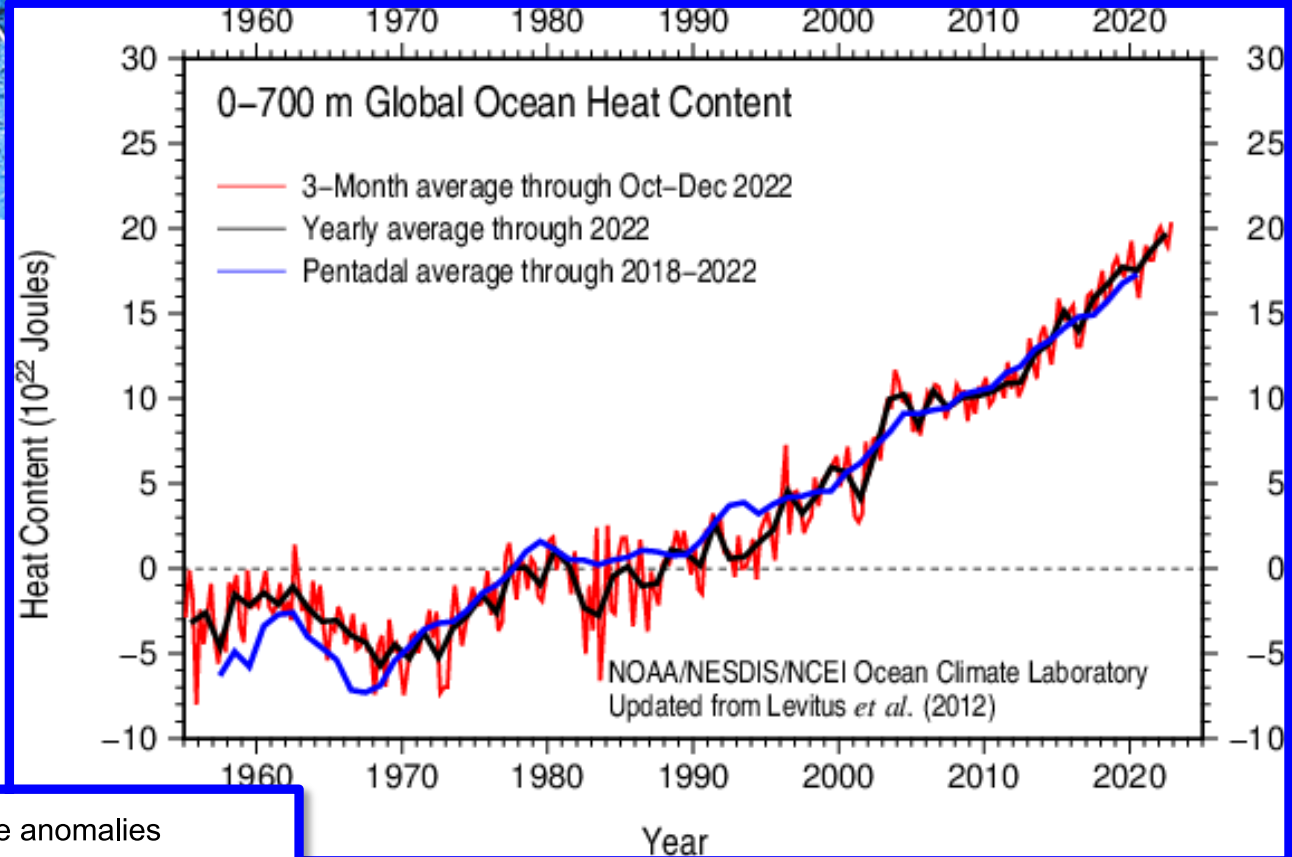
**Numeri:
591 incendi
2247 ettari
3,5 ettari per
evento
(media 2015-
2021 era di 2,1)**

DATA	IDENTIFICATIVO	LUOGO	ETTARI			
28/08/2017	8	Loc. Bettola, Pieve Fossdana (LU)	13			
04/08/2017	10	Loc. Cennina, Comune di Budine (AR)	16			
25/08/2017	4	Loc. Col di Morro, Comune di Cortona (AR)	18			
23/07/2017	11	Loc. S.C. Selvina Poggio Montone, Comune di Castell'Azzara (GR)	18			
04/08/2017	5	Loc. Gamogna, Comune di Marradi (FI)	19			
20/07/2017	6	Loc. le Macine, Comune di Prato (PO)	43	Fino a 50 Ha N° 6; Sup tot. 127		
18/07/2017	12	Loc. Pietratonda, Com. di Civitella Paganico (GR)	65			
06/08/2017	3	Loc. Borgo Sordo, Comune di Radicondoli (SI)	78			
25/08/2017	2	Loc. Baronto, Comune di Serravalle Pistoiese (PT)	82	Da 50 Ha a 100 Ha N° 3; Sup tot. 224		
04/07/2017	9	Loc. Poggio Staffo, Comune Castiglione della Pescaia (GR)	104			
03/08/2017	13	Loc. Quercenne, Comune di Pomarance (PI)	120			
on comunicata	1	Monte Prano, Comune di Camaiore	178			
15/07/2017	14	Loc. Tobbiana, Comune di Montale (PT)	286			
09/07/2017	7	Loc. Asca Alta, Comune di Piancastagnolo (SI)	428	Oltre 100 Ha N° 5; Sup tot. 1117		
				Superficie Totale: 1469		

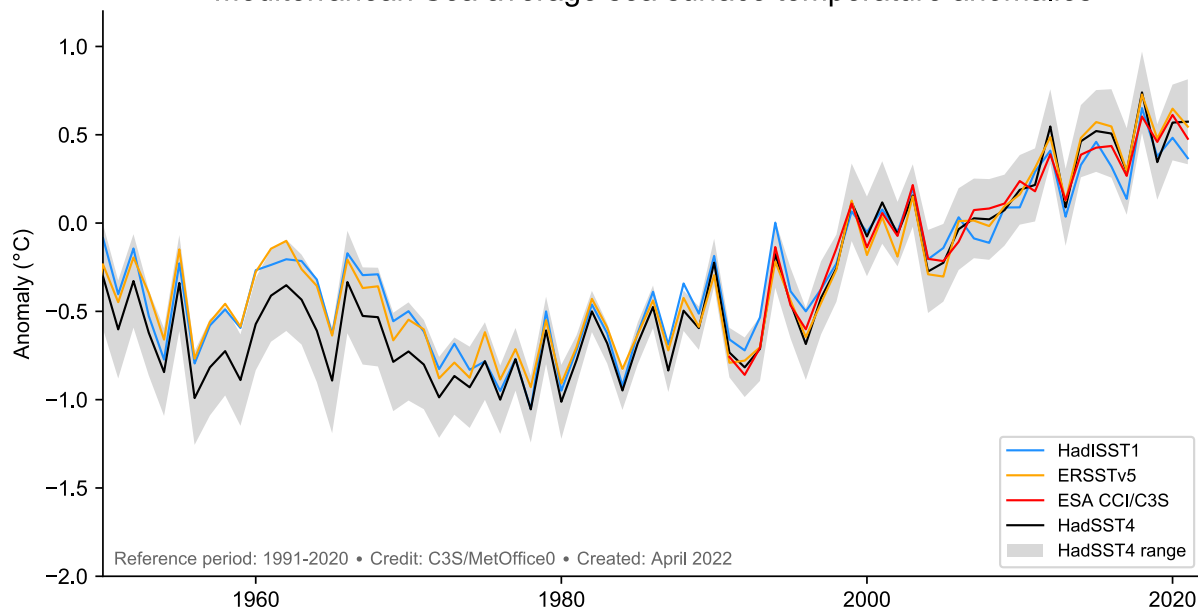
Temperatura superficiale del mare

Oceano

Assorbe circa il 93% calore in eccesso

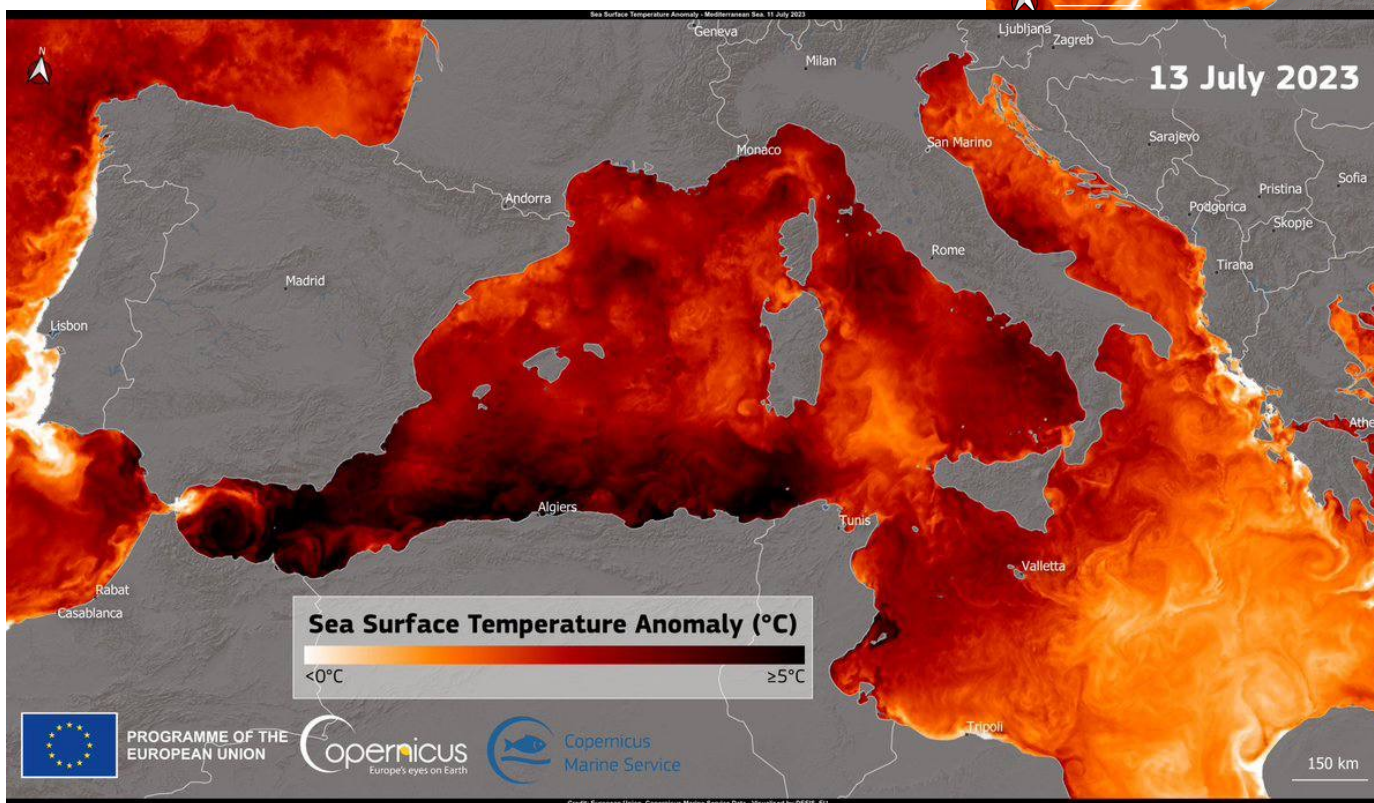
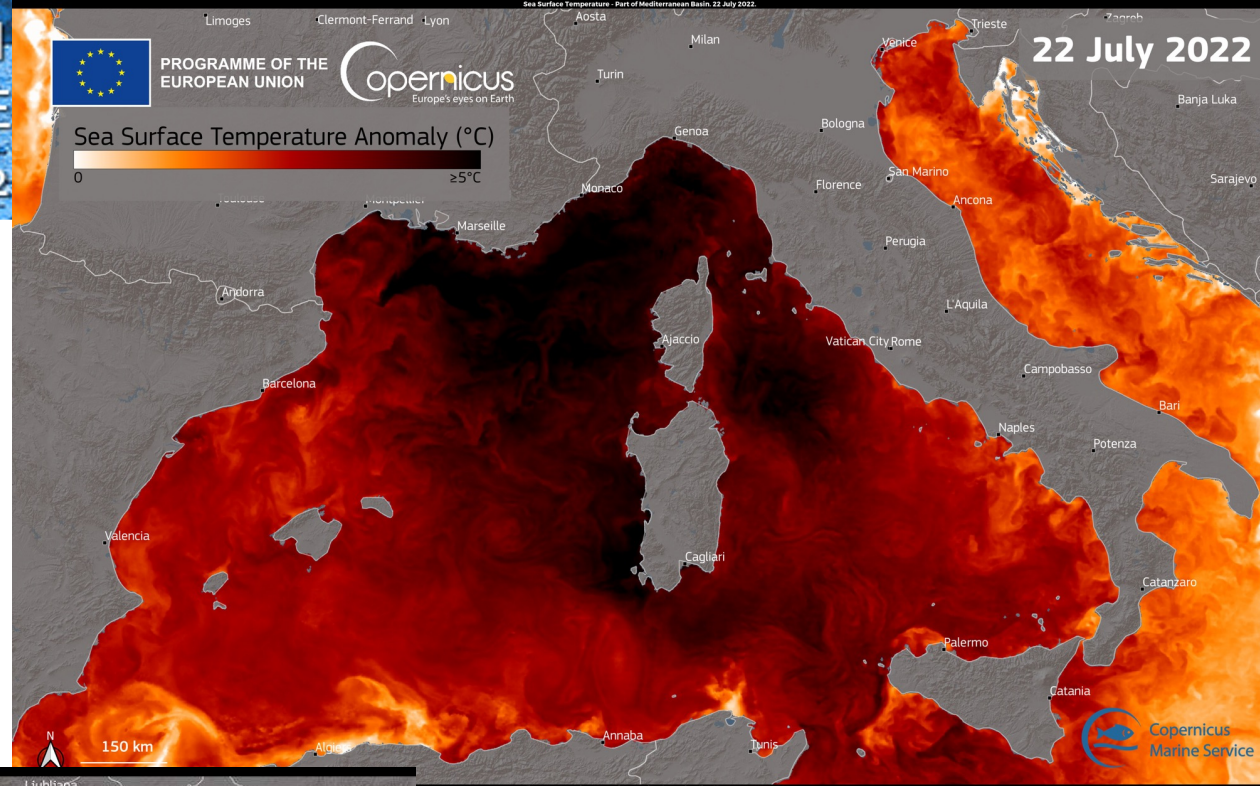


Mediterranean Sea average sea surface temperature anomalies



Mediterraneo

TEMPERATURA SUPERFICIALE DEL MARE MEDITERRANEO 2022 - 2023



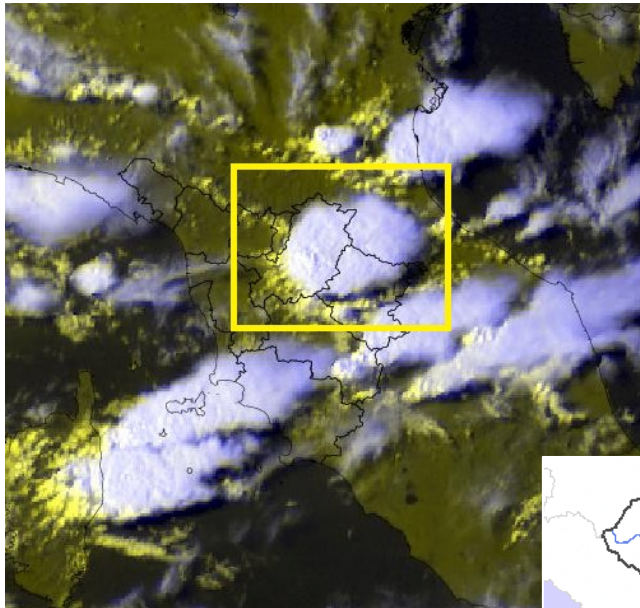
+ evaporazione,
+ energia,
+ umidità

GLI IMPATTI DEI CAMBIAMENTI CLIMATICI SULLE ACQUE SOTTERRANEE E SUPERFICIALI

Venerdì 27 ottobre 2023

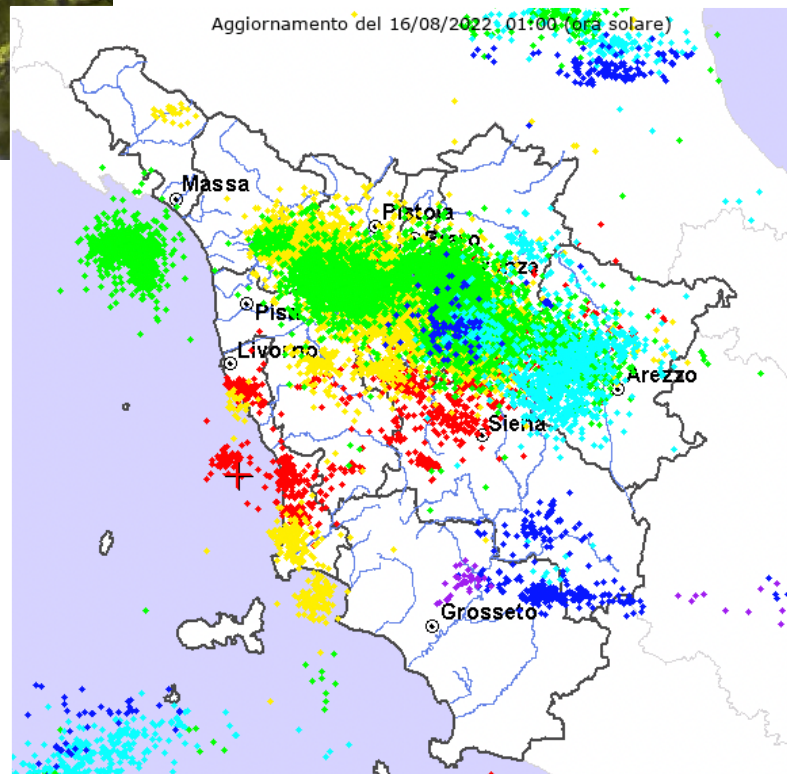
situazione ore 17:30

15 AGOSTO 2022

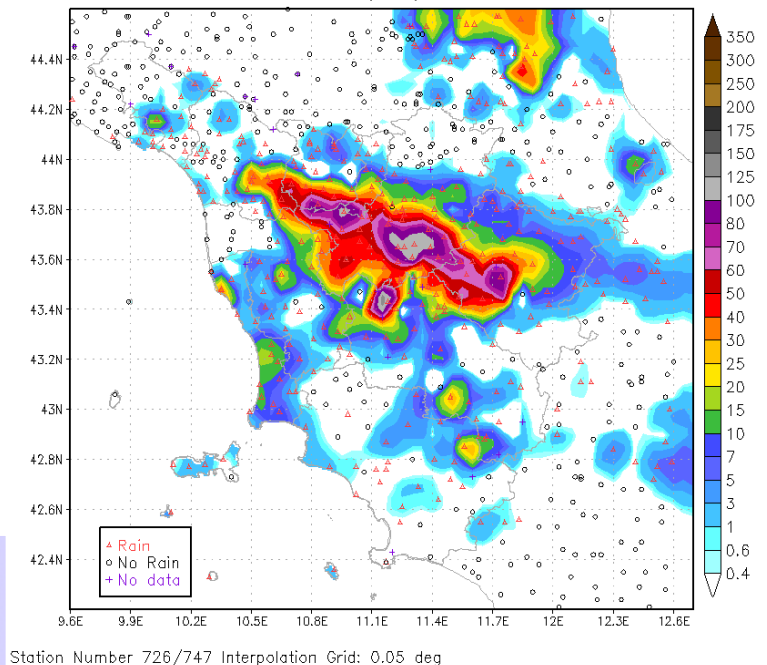


17.000 fulmini

Aggiornamento del 16/08/2022 01:00 (ora solare)



Total Precipitation [mm] cumulated on
Mon, 15/08/2022



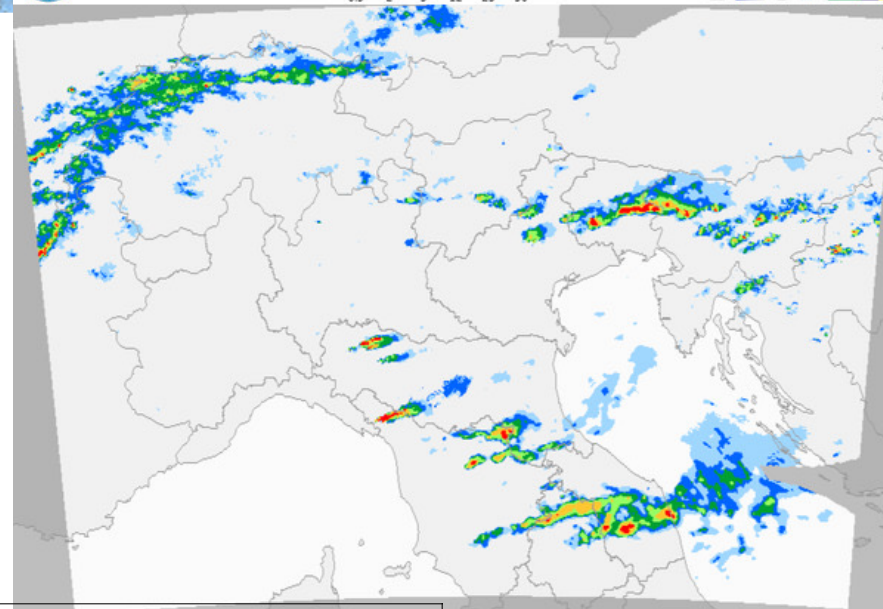
Precipitazioni 15 agosto
Cumulati fino a 150-170 mm
Intensità orarie fino a 50
mm/h

GLI IMPATTI DEI CAMBIAMENTI CLIMATICI SULLE ACQUE SOTTERRANEE E SUPERFICIALI

Venerdì 27 ottobre 2023



Italia 15-09-2022 15:00 UTC - Radar SRI mm/h



15 settembre 2022

Aggiornamento del 15/09/2022 23:59 (ora solare)

ultimo evento

15/09/2022

23:49:52 ora solare

Sono disponibili le
fulminazioni per:

area

Italia

periodo

Personalizza

dal

15/09/2022 00:00

al

15/09/2022 23:59

distribuzione

Punti

polarità

Tutte

intensità

Tutte

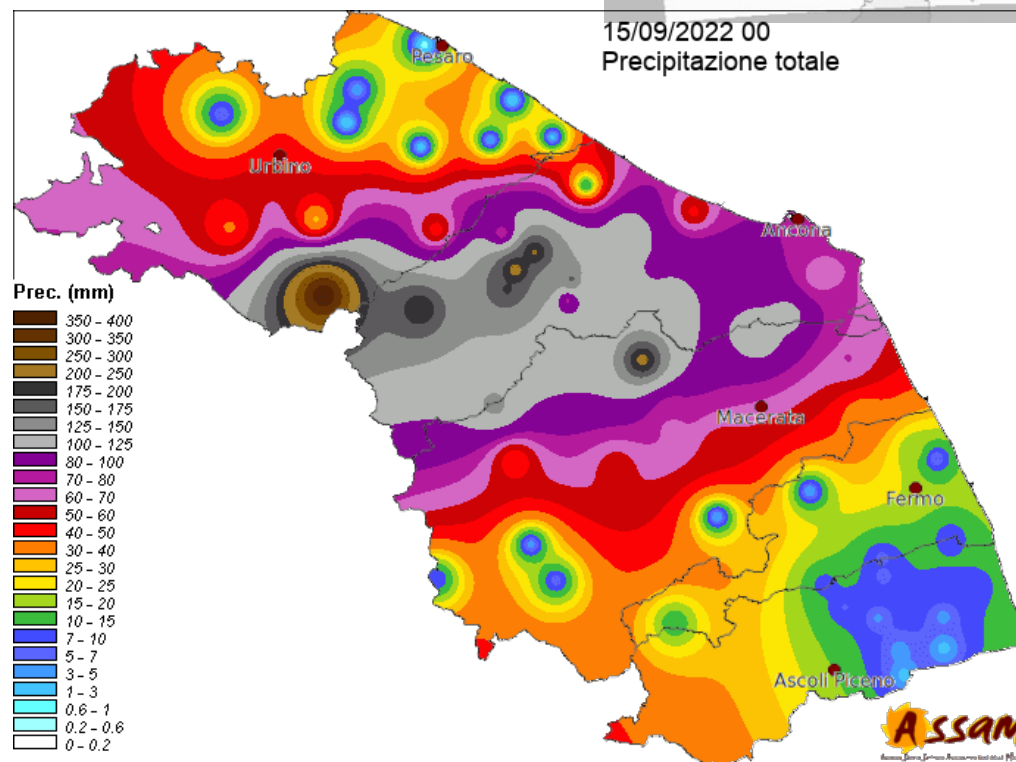
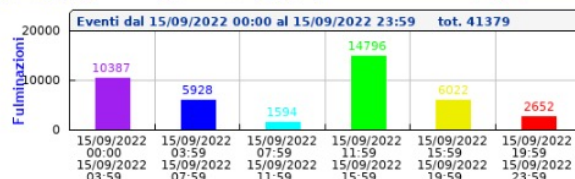
archivio

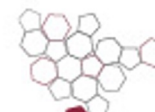
Usam

Visualizza

auto refresh

Audio off





CAMBIAMENTI CLIMATICI TOSCANA

- **TEMPERATURE:** aumento evidente
- **PRECIPITAZIONI:** aumento intensità delle piogge
- **SICCITA':** aumento giorni secchi, siccità persistenti ricorrenti
- **INCENDI:** stress idrico e termico combustibile idoneo
- **EVENTI ESTREMI:** flash flood, alluvioni, ondate di calore....

Alcuni impatti sulle acque superficiali e sotterranee

- Inquinamento corpi idrici per deflusso e contaminazione da nutrienti (azoto,..)
- Aumento formazione fioriture algali nocive determinato da nutrienti e temperature
- Riduzione ossigeno disciolto
- Aumento temperatura laghi e fiumi
- Incendi perdita di vegetazione, deflusso di metalli e altre tossine (ritardanti per spegnere incendi) quando piove