



Gestione Sostenibile delle risorse idriche in Val di Cornia come laboratorio di soluzioni innovative

***IMPIANTI DI RICARICA DELLE FALDE IN CONDIZIONI CONTROLLATE
dalla progettazione alla realizzazione e ordinaria operatività***

20 febbraio 2020
Suvereto (LI)

Cambiamenti climatici: realtà della Regione Toscana

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Scuola Universitaria Superiore Pisa



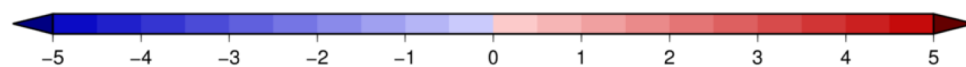
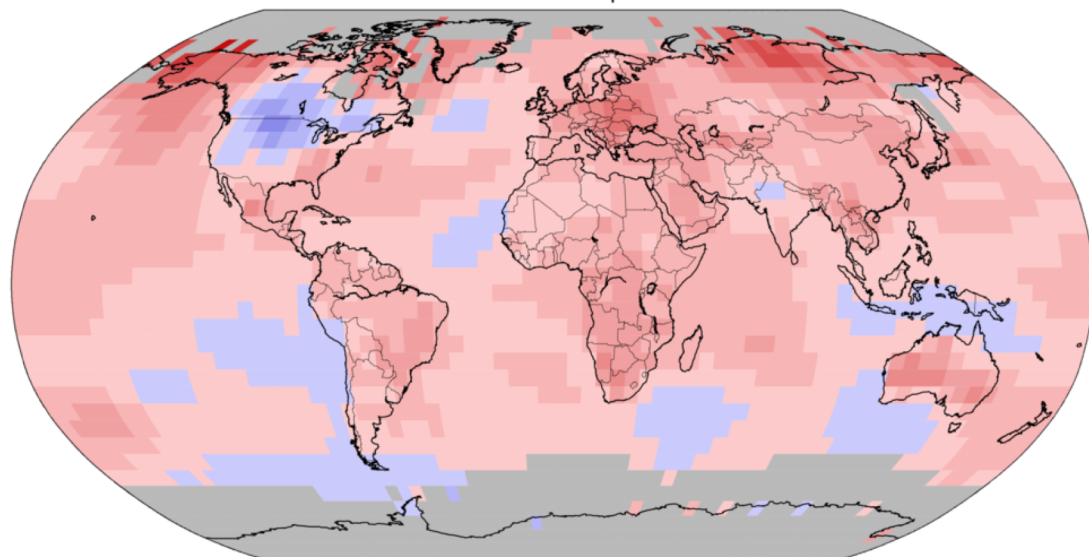
Temperatura scala globale 2019

Fonte: NOAA (National Climatic Data Center)

Land & Ocean Temperature Departure from Average Jan–Dec 2019

(with respect to a 1981–2010 base period)

Data Source: NOAAGlobalTemp v5.0.0–20200108

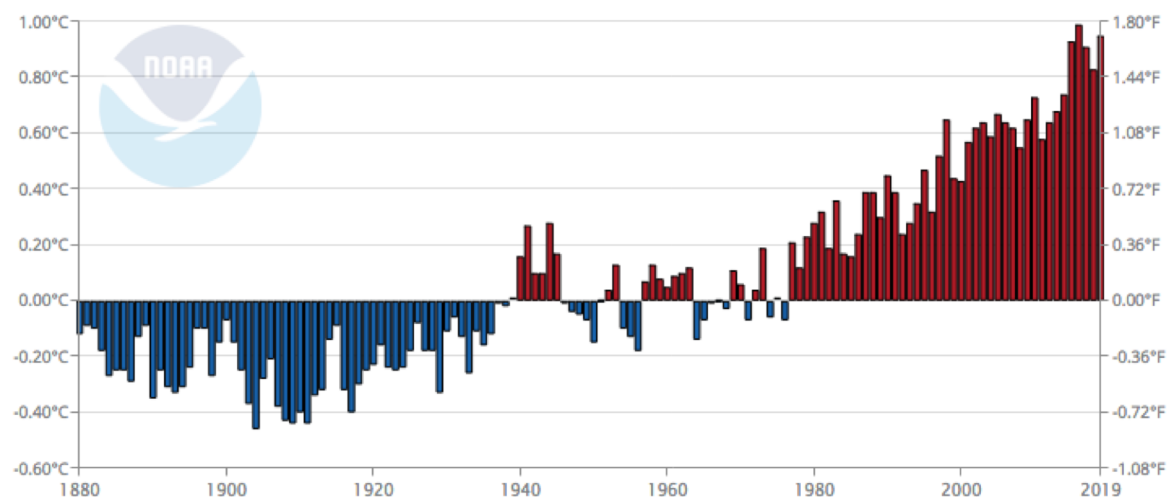


National Centers for Environmental Information
GHCNM v4.0.1.20200106.qfe

Degrees Celsius

Please Note: Gray areas represent missing data
Map Projection: Robinson

Global Land and Ocean
January–December Temperature Anomalies

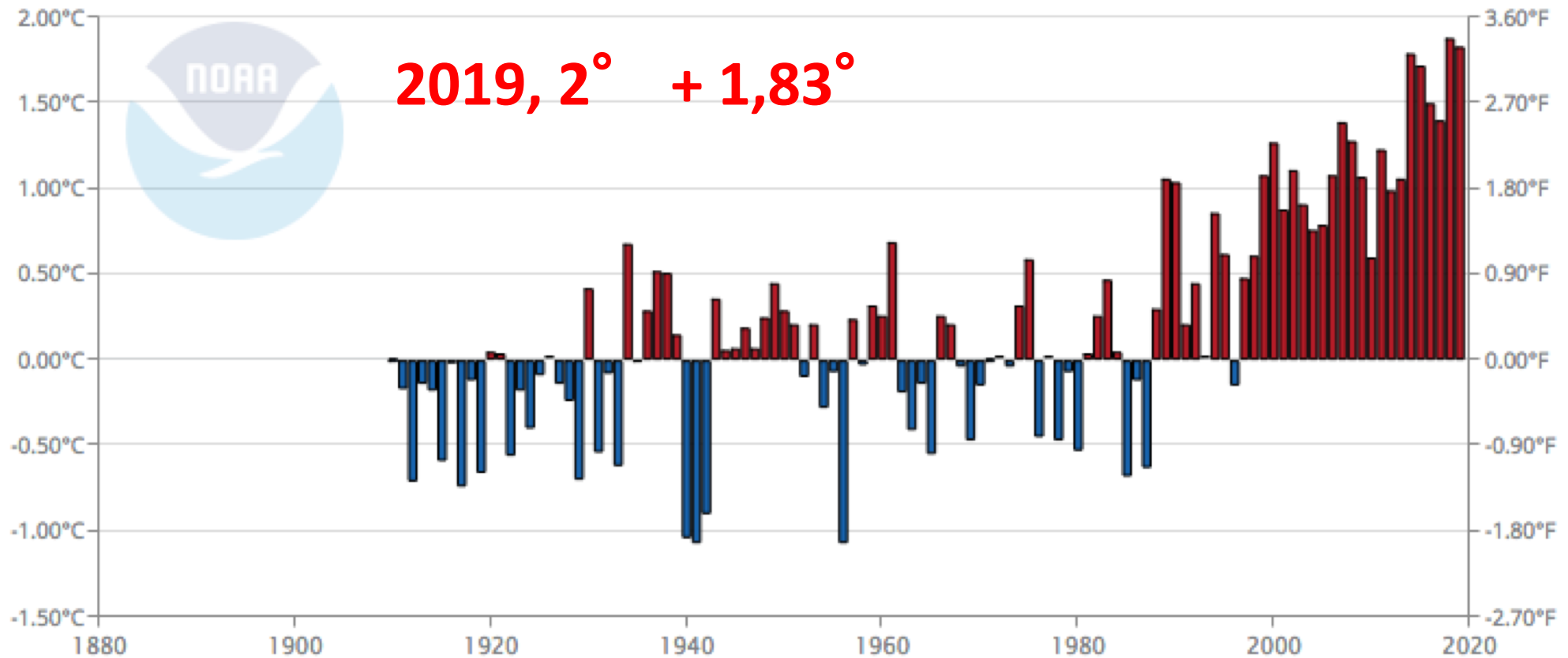


RANK 1 = WARMEST PERIOD OF RECORD: 1880–2019	YEAR	ANOMALY °C
1	2016	0.99
2	2019	0.95
3	2015	0.93
4	2017	0.91
5	2018	0.83
6	2014	0.74
7	2010	0.72
8 (tied)	2005	0.67
8 (tied)	2013	0.67
10	1998	0.65

Anomalie Temperatura dal 1910- Terre emerse - **EUROPA**

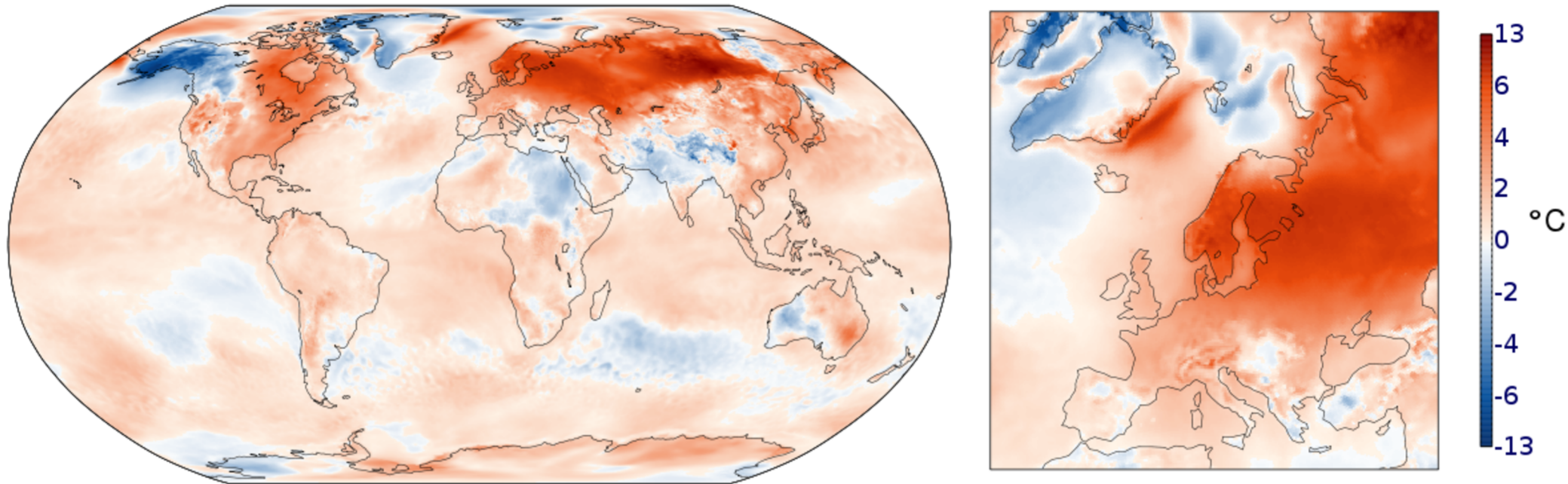
Europe

January–December Temperature Anomalies



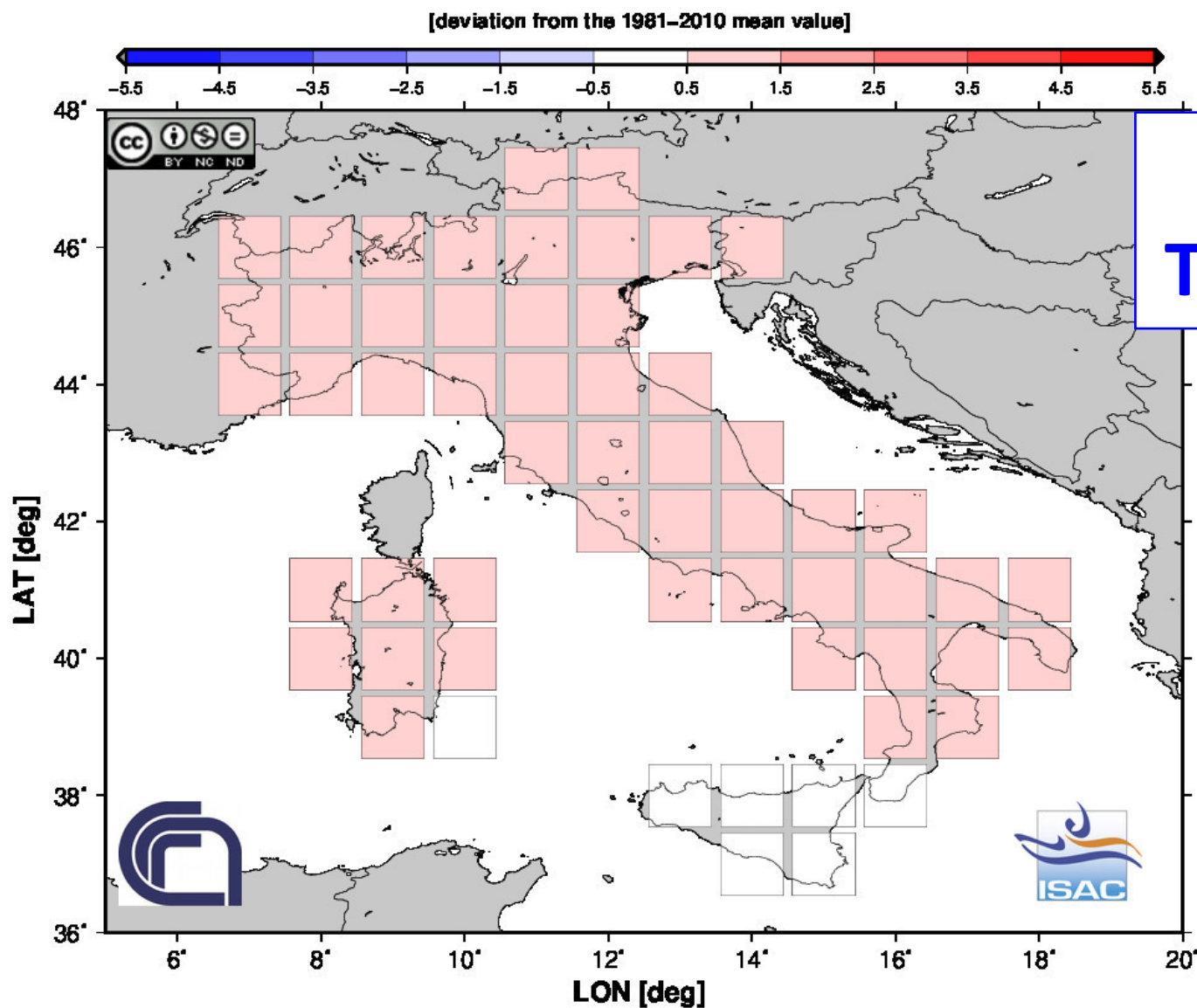
TEMPERATURA GLOBALE DA COPERNICUS ECMWF EUROPE GENNAIO 2020

Surface air temperature anomaly for January 2020 relative to 1981-2010



**Il gennaio più caldo mai registrato a livello mondiale ed europeo
In Europa +3,1° rispetto alla media 1981-2010**

<https://climate.copernicus.eu/surface-air-temperature-october-2019>



ITALIA 2019 TEMPERATURA

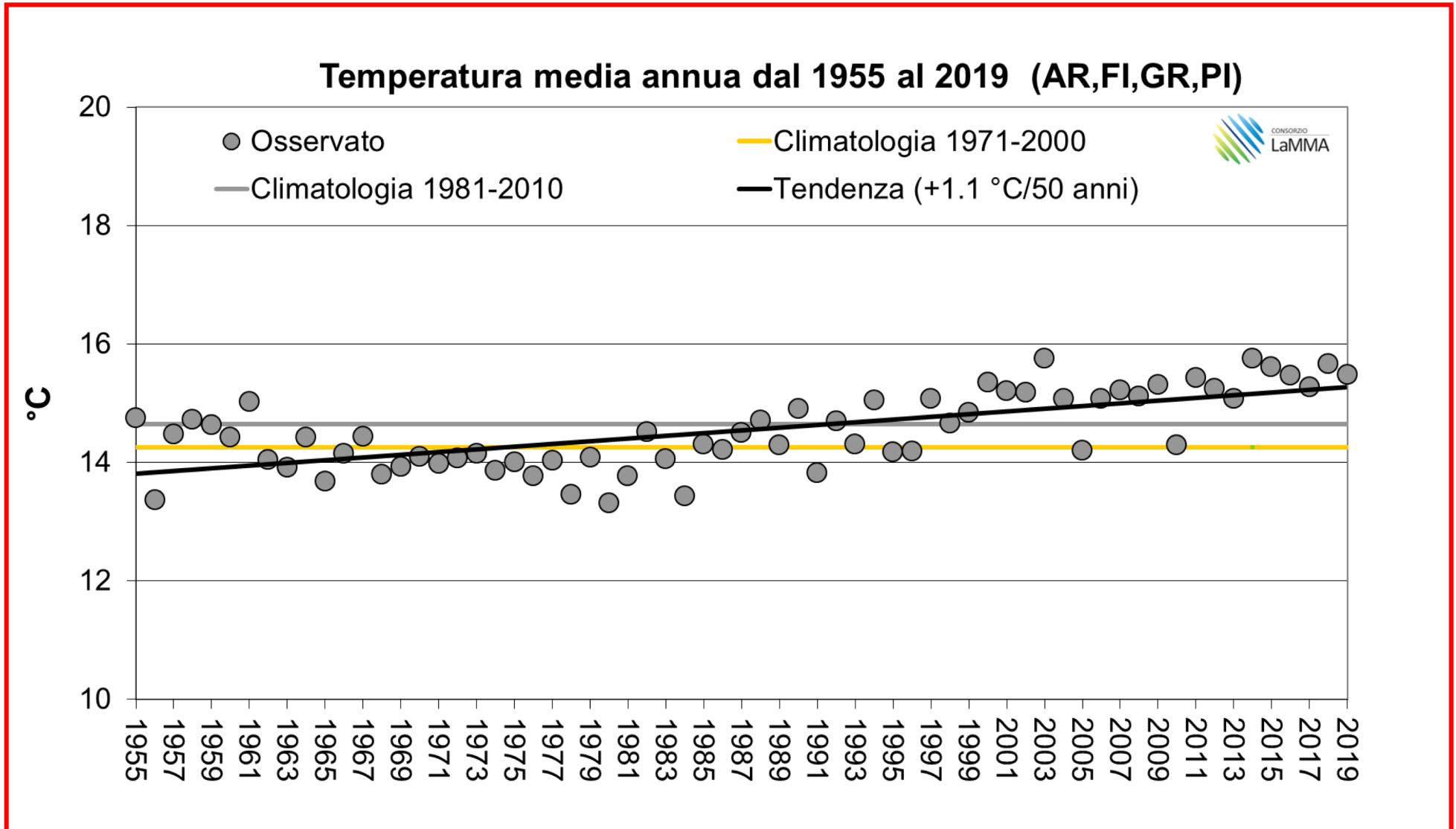
2019 4° più caldo + 0,96°

2018 1° più caldo + 1,17°

Rif. (media 1971-2000)

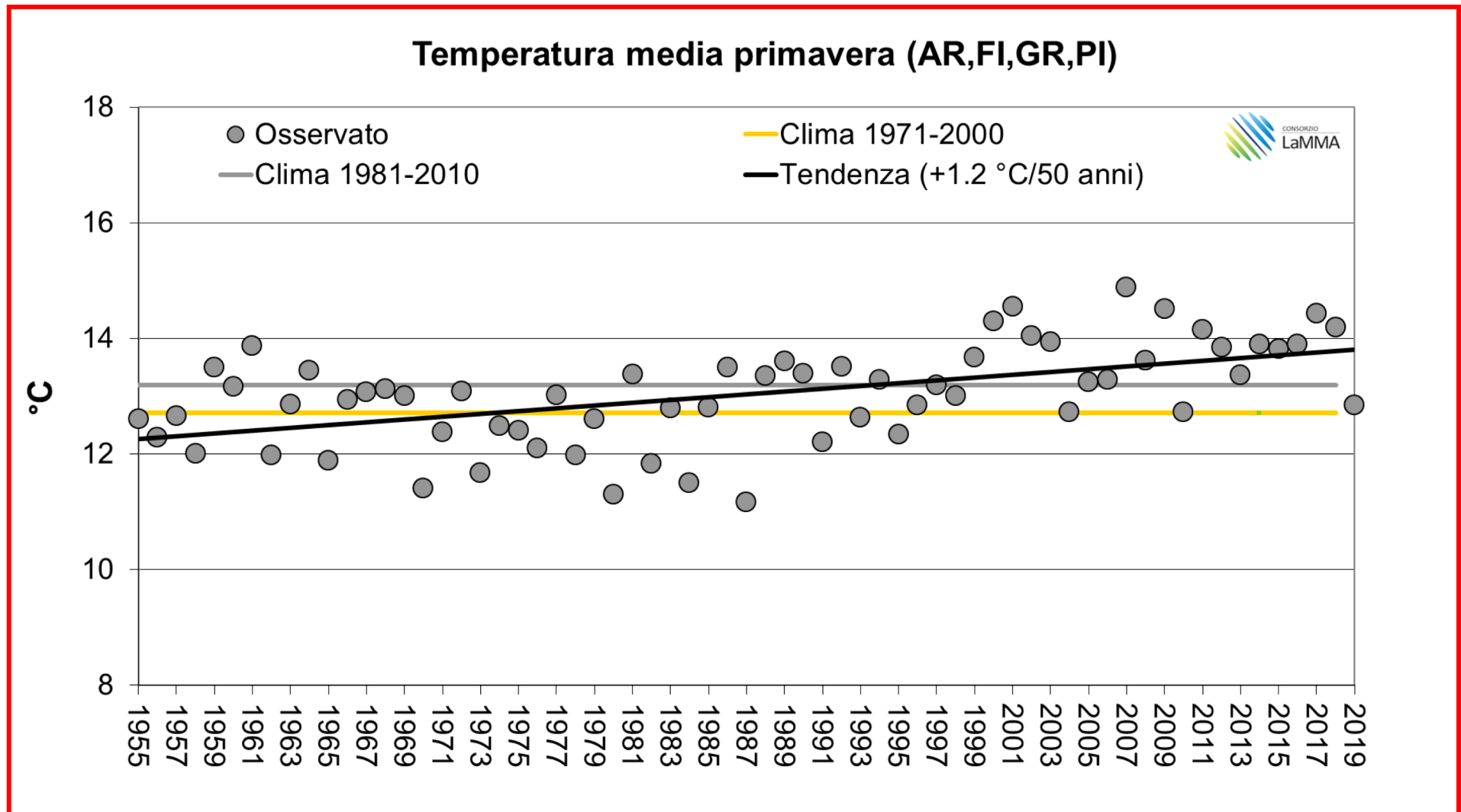
Toscana (1955-2019 media 4 capoluoghi)

Temperature medie



Toscana (1955-2019 media 4 capoluoghi)

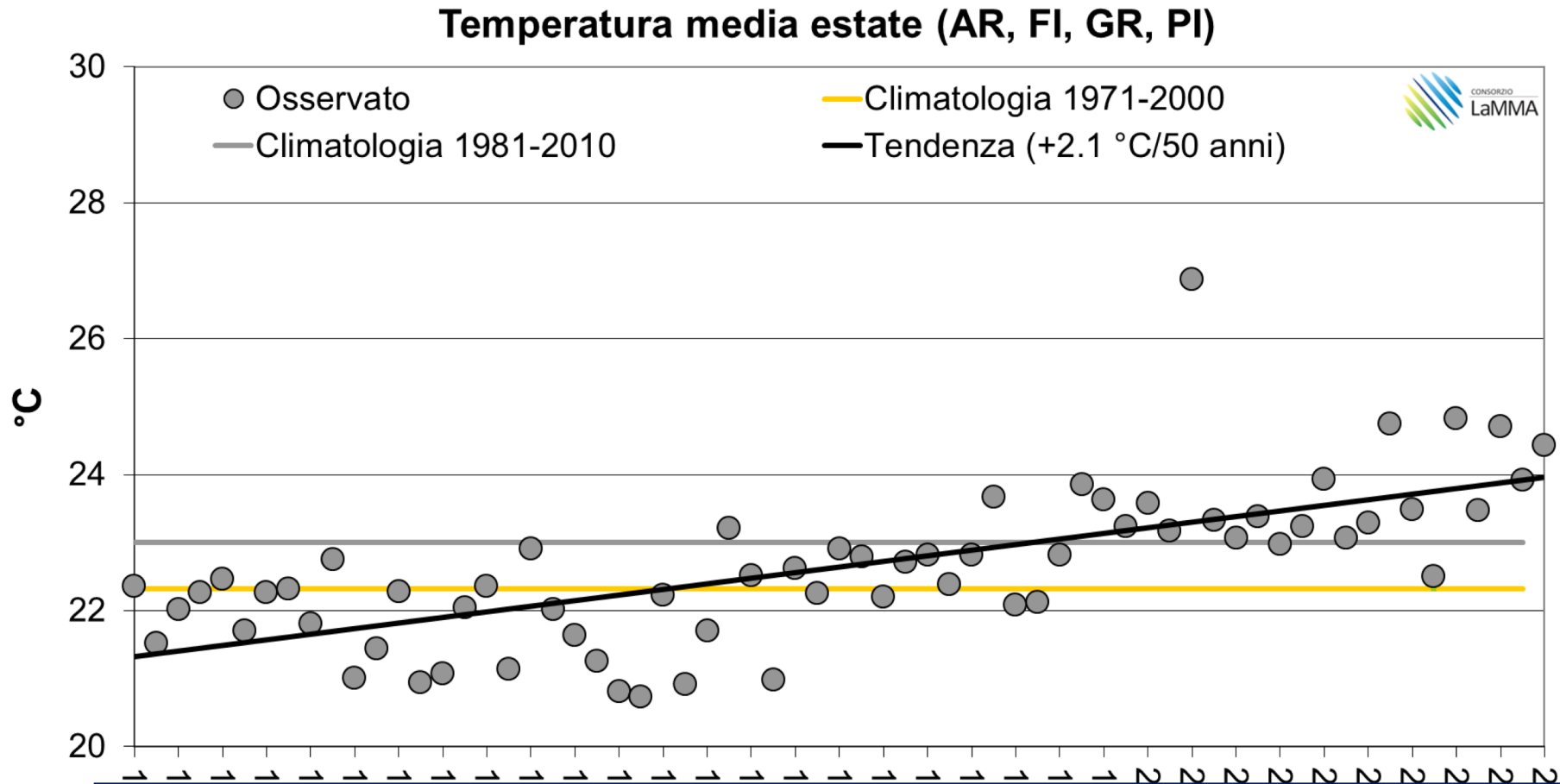
Temperature media PRIMAVERA





Toscana (1955-2019 media 4 capoluoghi)

Temperature media ESTATE

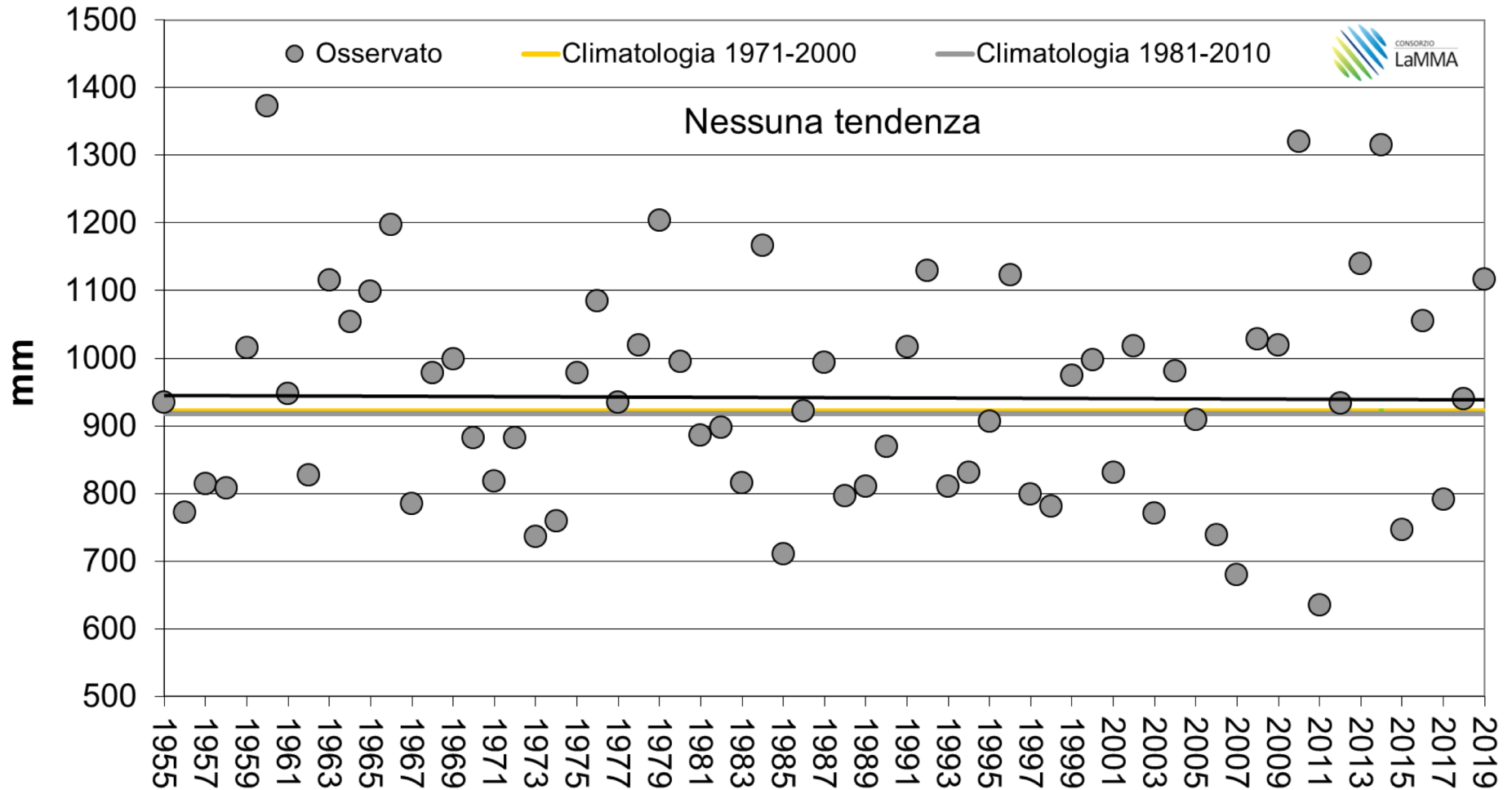


- Maggiore evaporazione
- Massa aria + calda contiene + umidità
- Impatti

Toscana (1955-2019)

Pioggia cumulata annuale (mm)

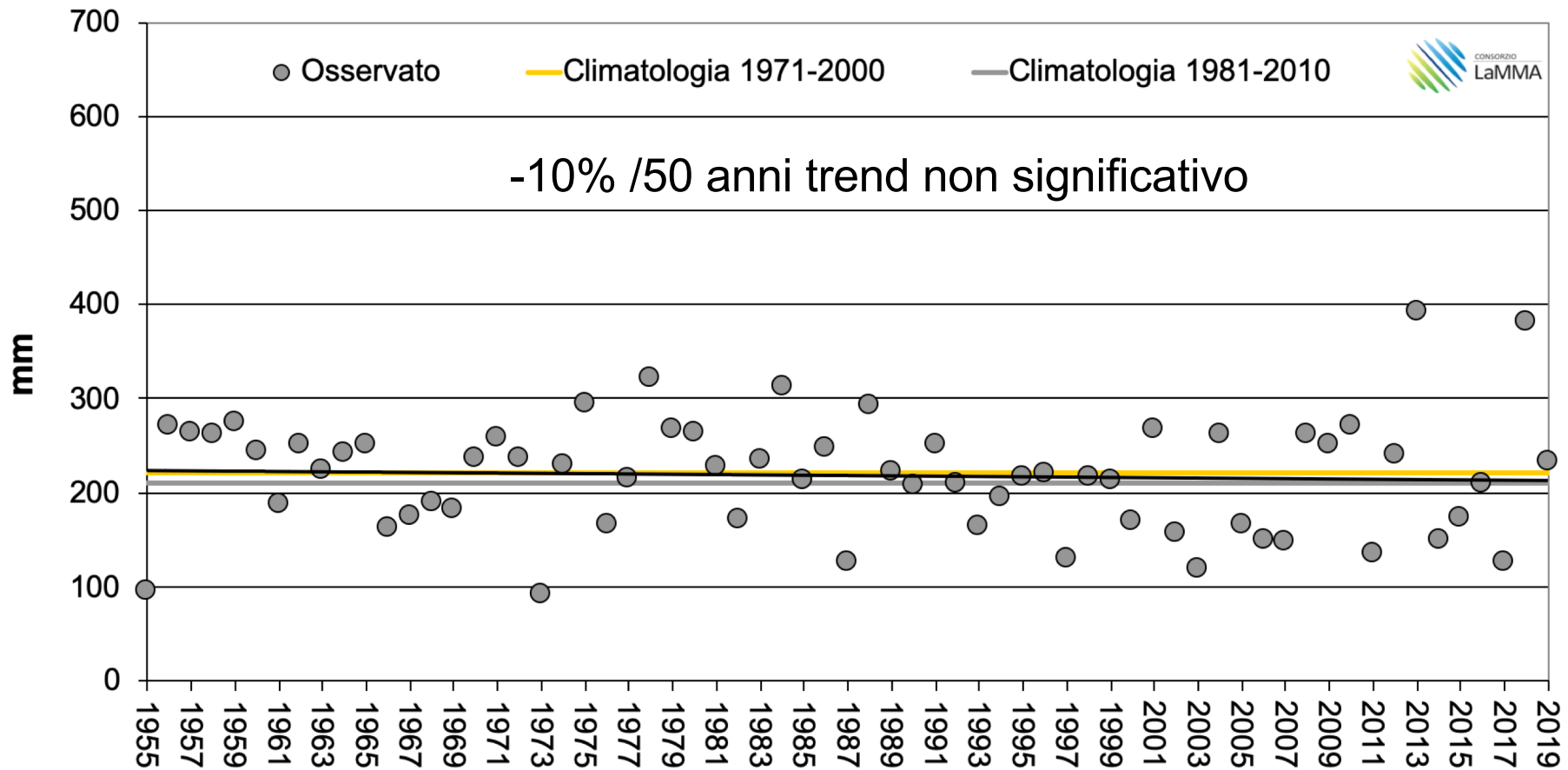
Pioggia annuale (media capoluoghi)



Toscana (1955-2019)

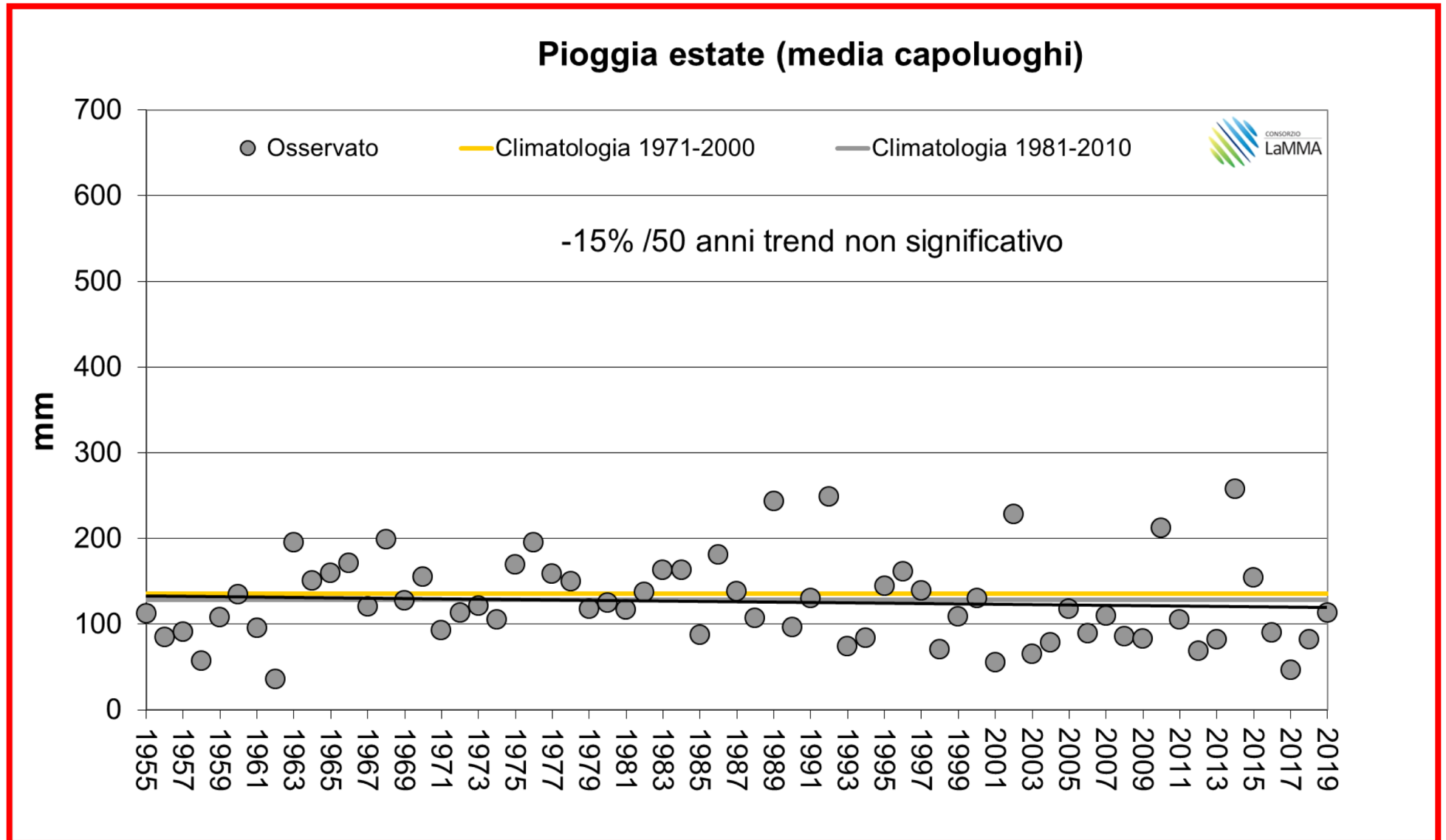
Pioggia primavera

Pioggia primavera (media capoluoghi)



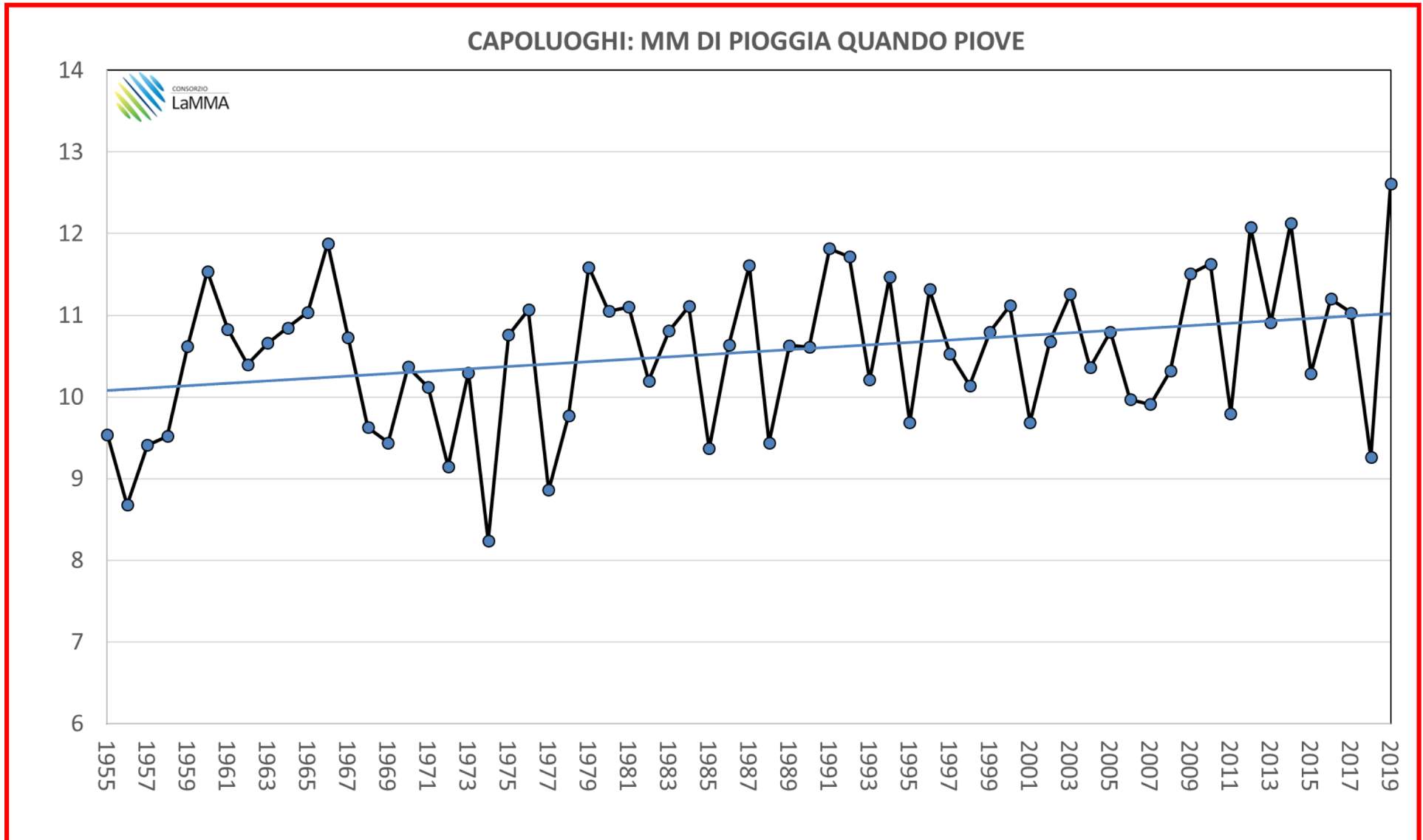
Toscana (1955-2019)

Pioggia ESTATE



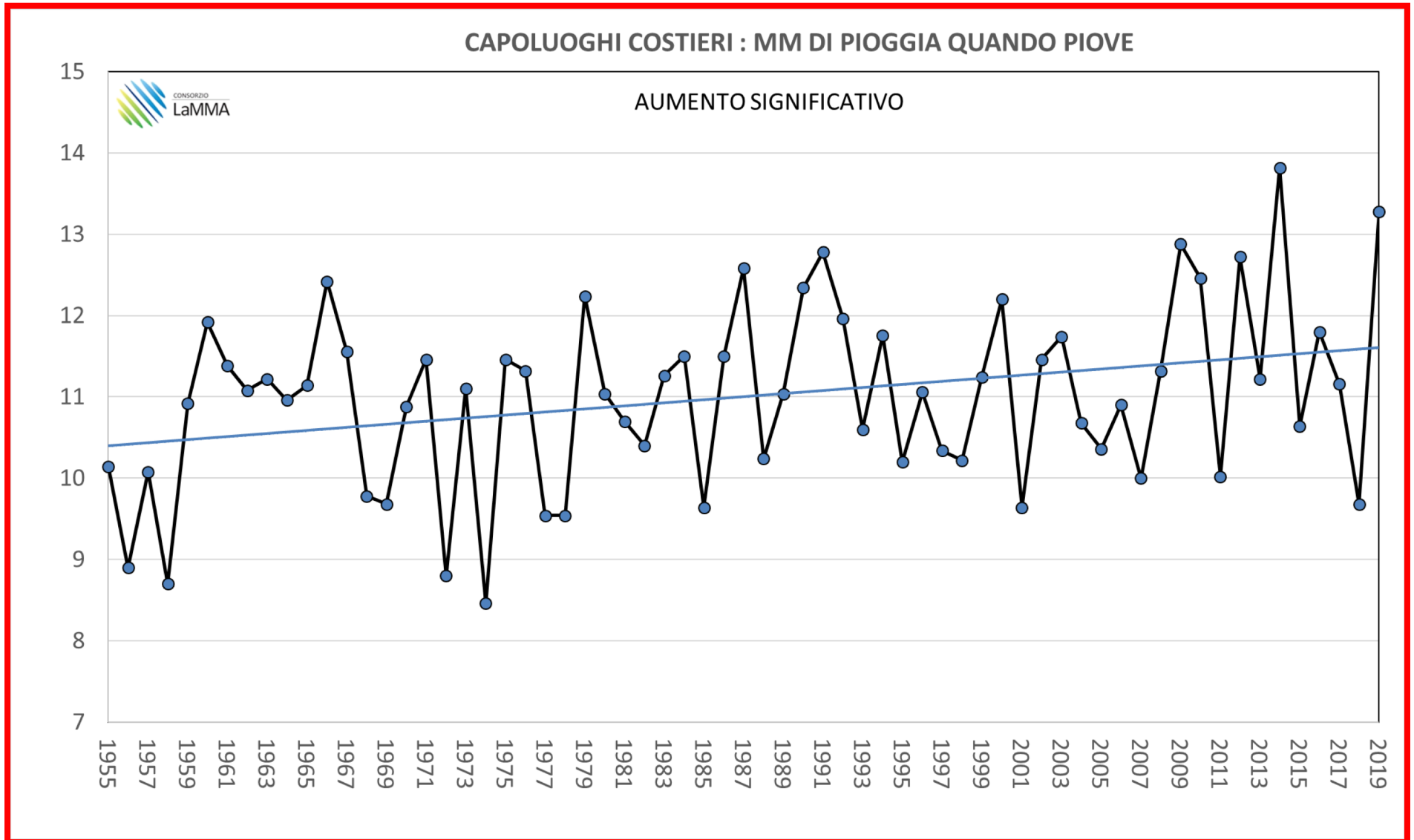
TOSCANA (1955-2019)

Quanto piove mediamente in 1 giorno

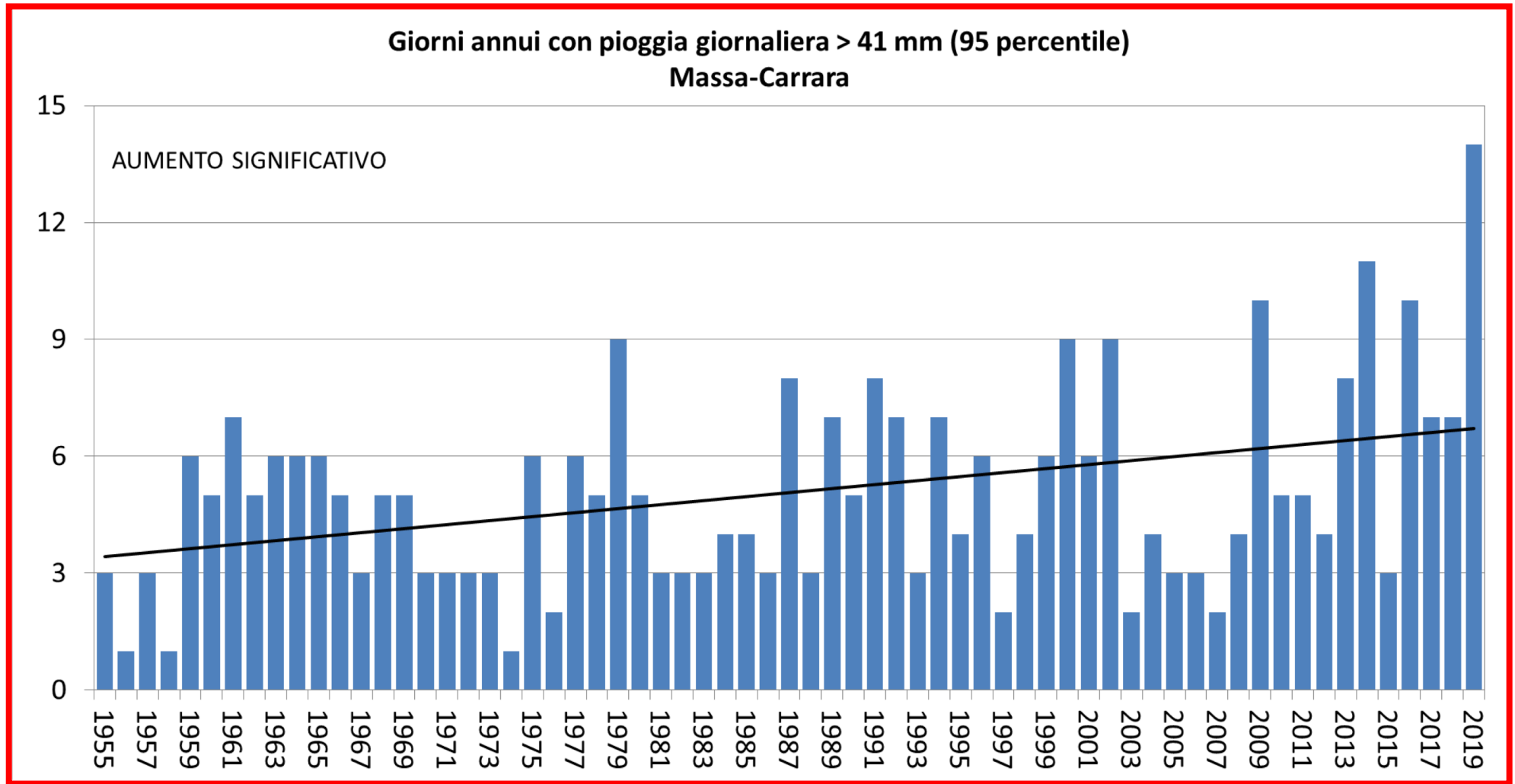


CAPOLUOGHI COSTIERI (1955-2019)

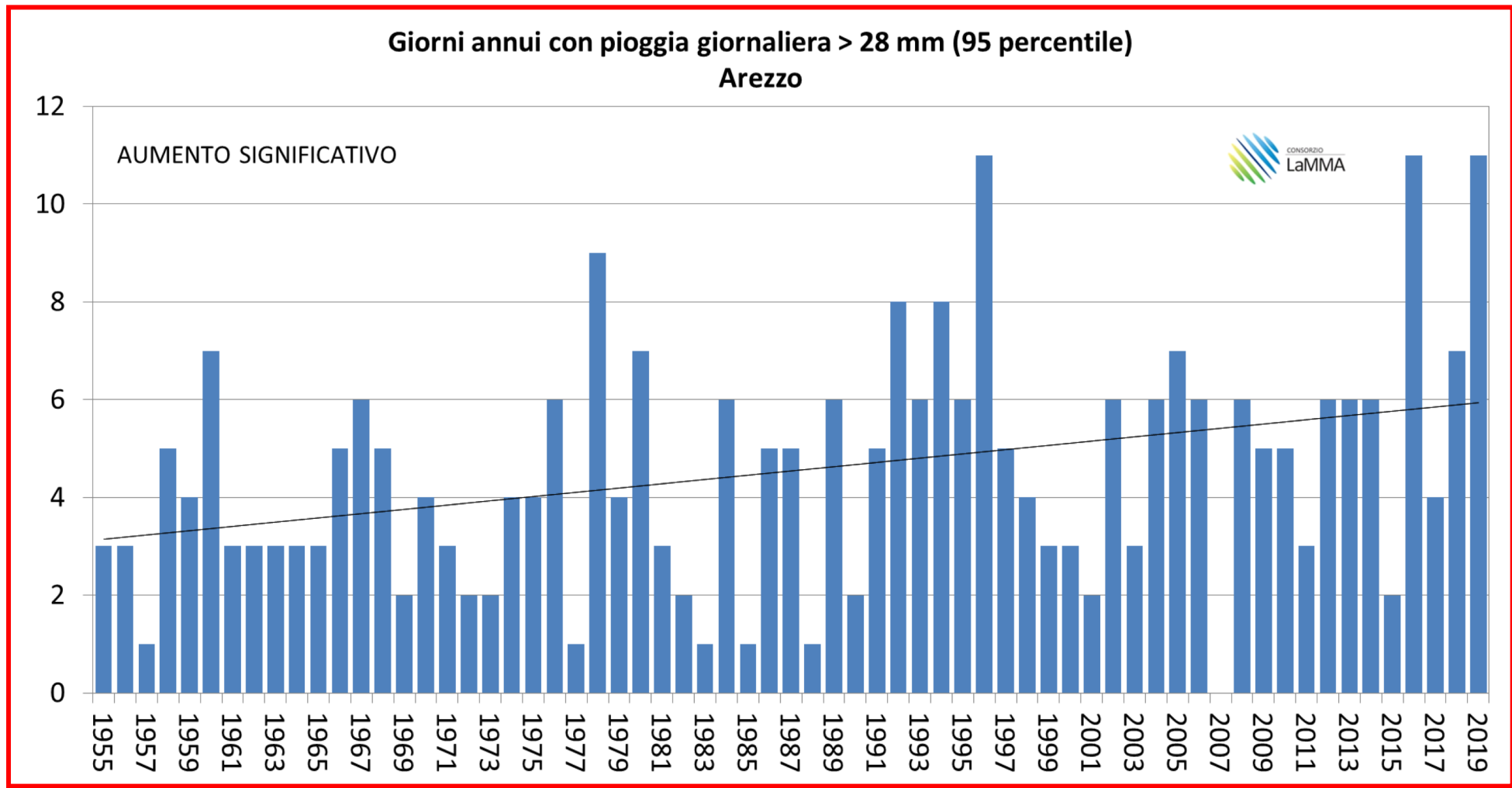
Quanto piove mediamente in 1 giorno



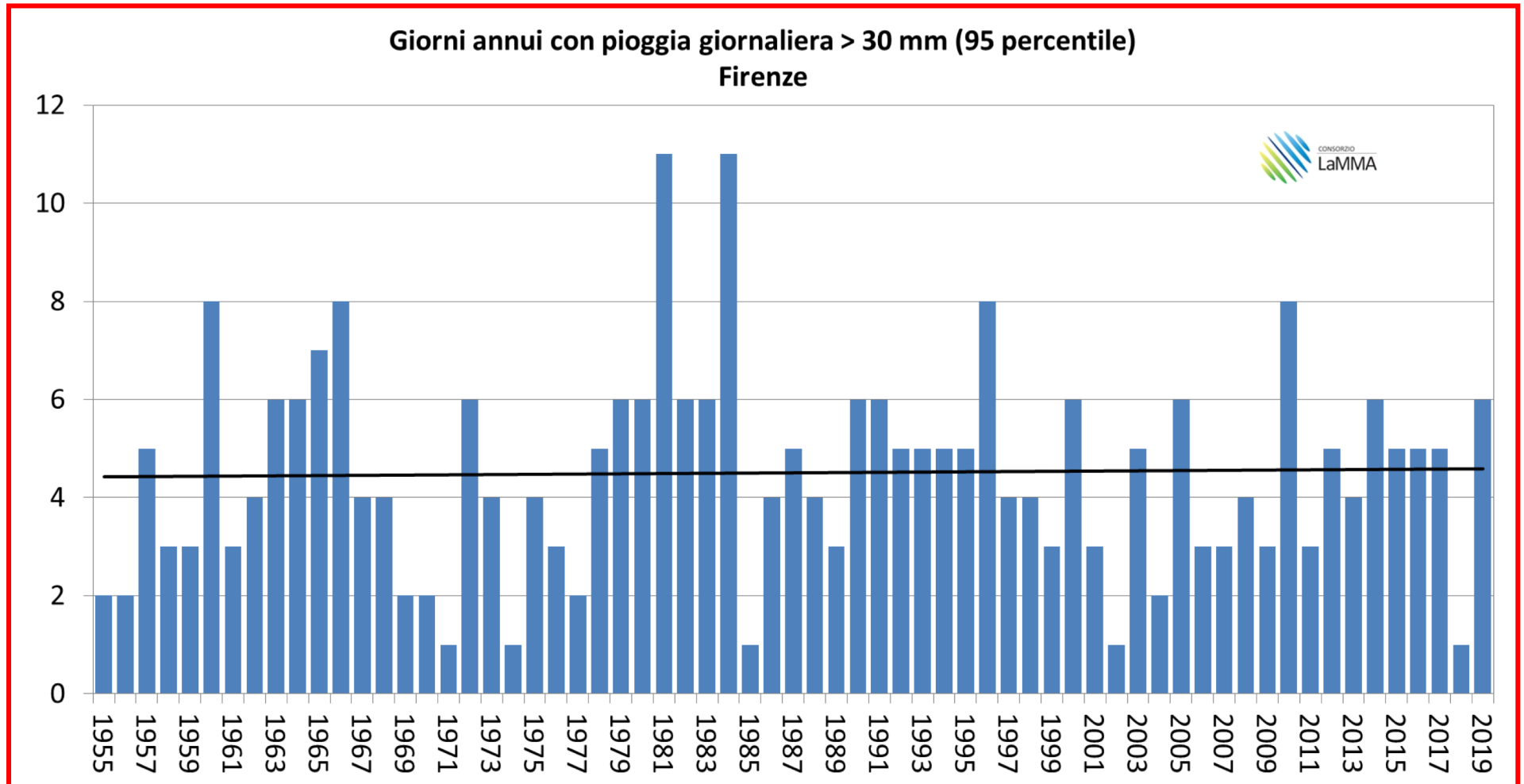
n. giorni con pioggia > 41 mm (95 perc.)



n. giorni con pioggia > 28 mm (95 perc.)



n. giorni con pioggia > 30 mm (95 perc.)



Aumenti significativi: Lucca, Livorno, Massa-Carrara, Arezzo

Aumenti NON signi.: Siena, Pisa

No trend: Grosseto, Prato, Pistoia, Firenze

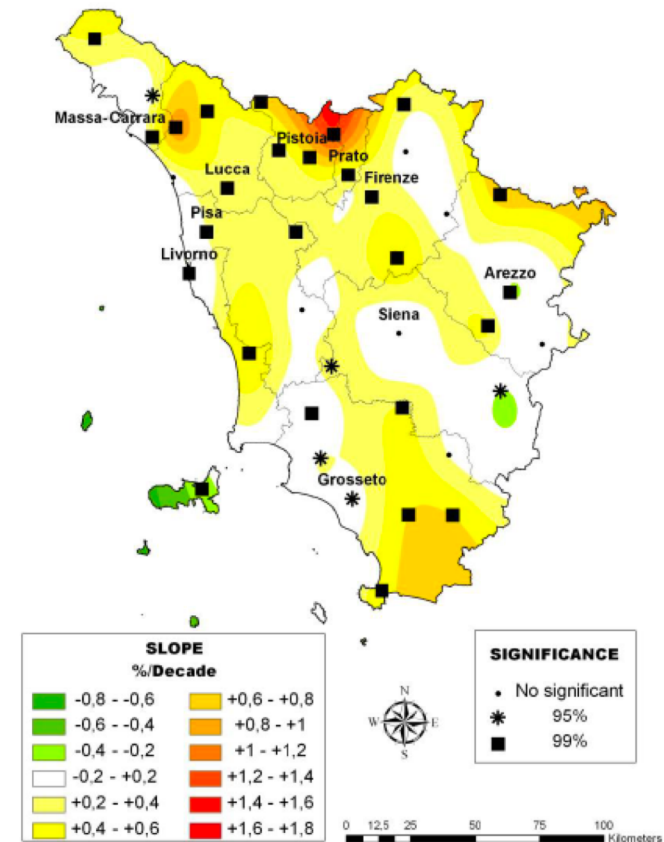
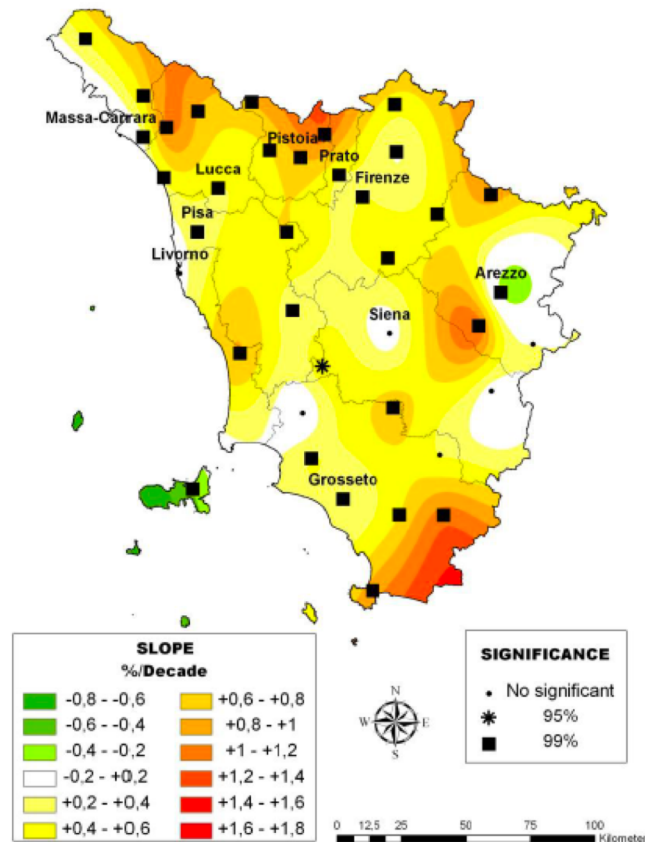
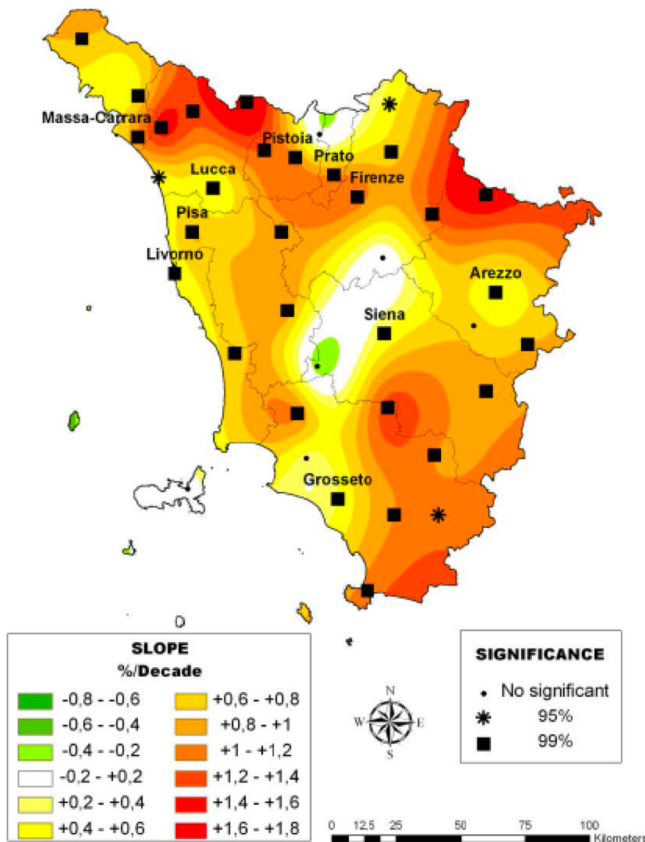
Siccità: trend giorni secchi annuali (1, 5 e 10 mm)

**Trend
Annual Dry Days**

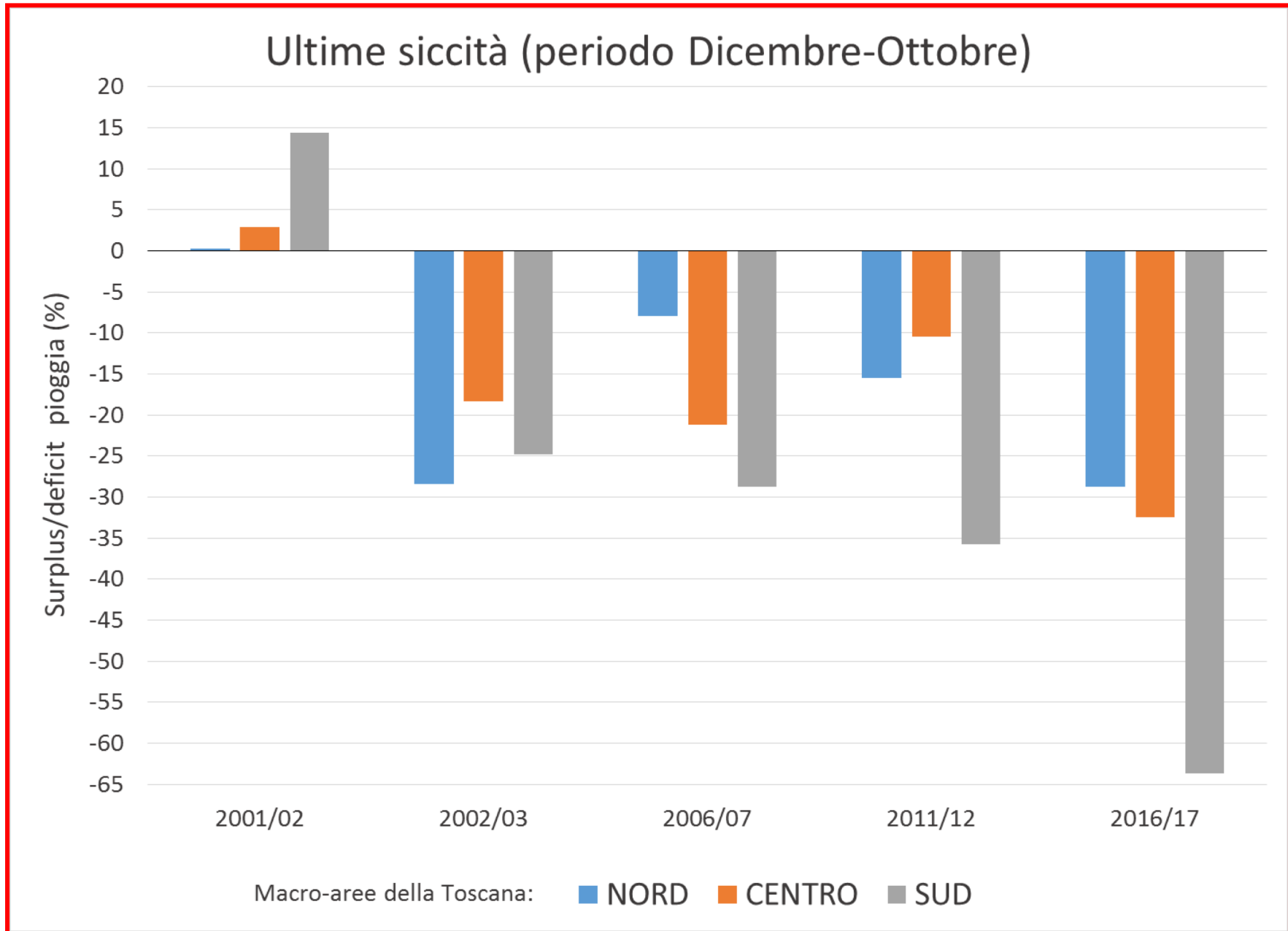
CLIM_DD_TREND_A_1

CLIM_DD_TREND_A_5

CLIM_DD_TREND_A_10



Episodi di siccità dal 2000 in Toscana

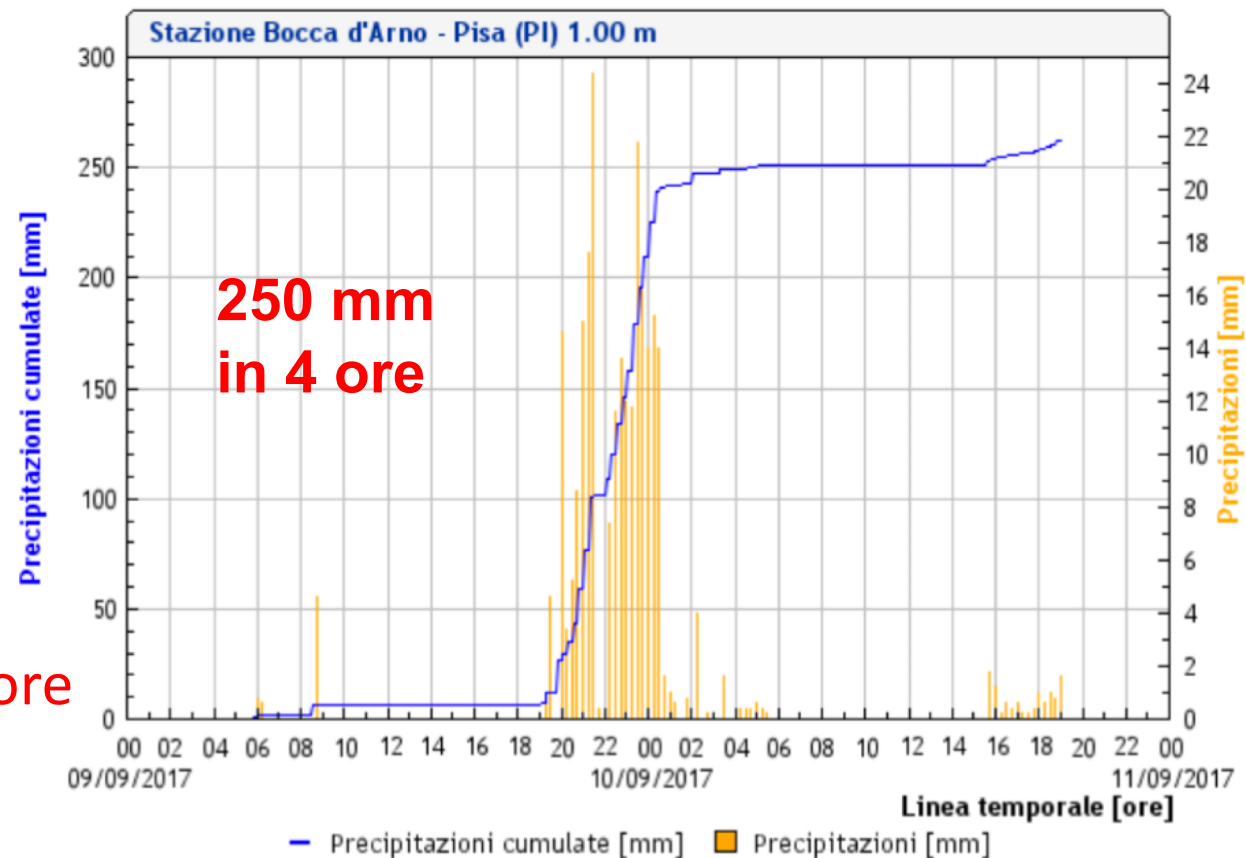
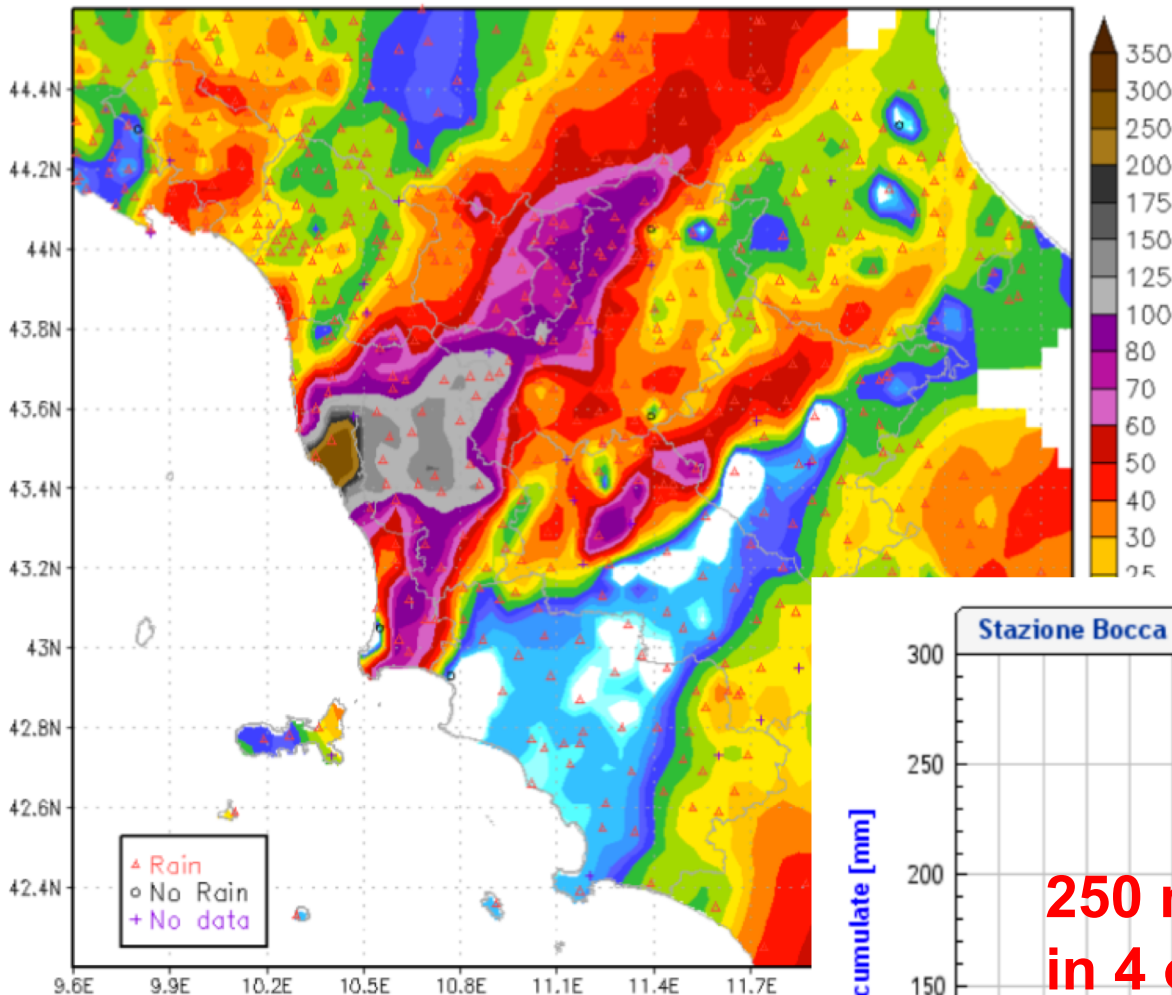


Total Precipitation [mm] cumulated on
Sun, 10/09/2017

9 - 10 Settembre 2017

Pisa - Livorno

8 morti e danni ingenti



175 mm a Pisa – 6 ore

165 mm a Livorno – 6 ore

245 mm a Valle Benedetta - 3 ore

215 mm a Quercianella- 4 ore



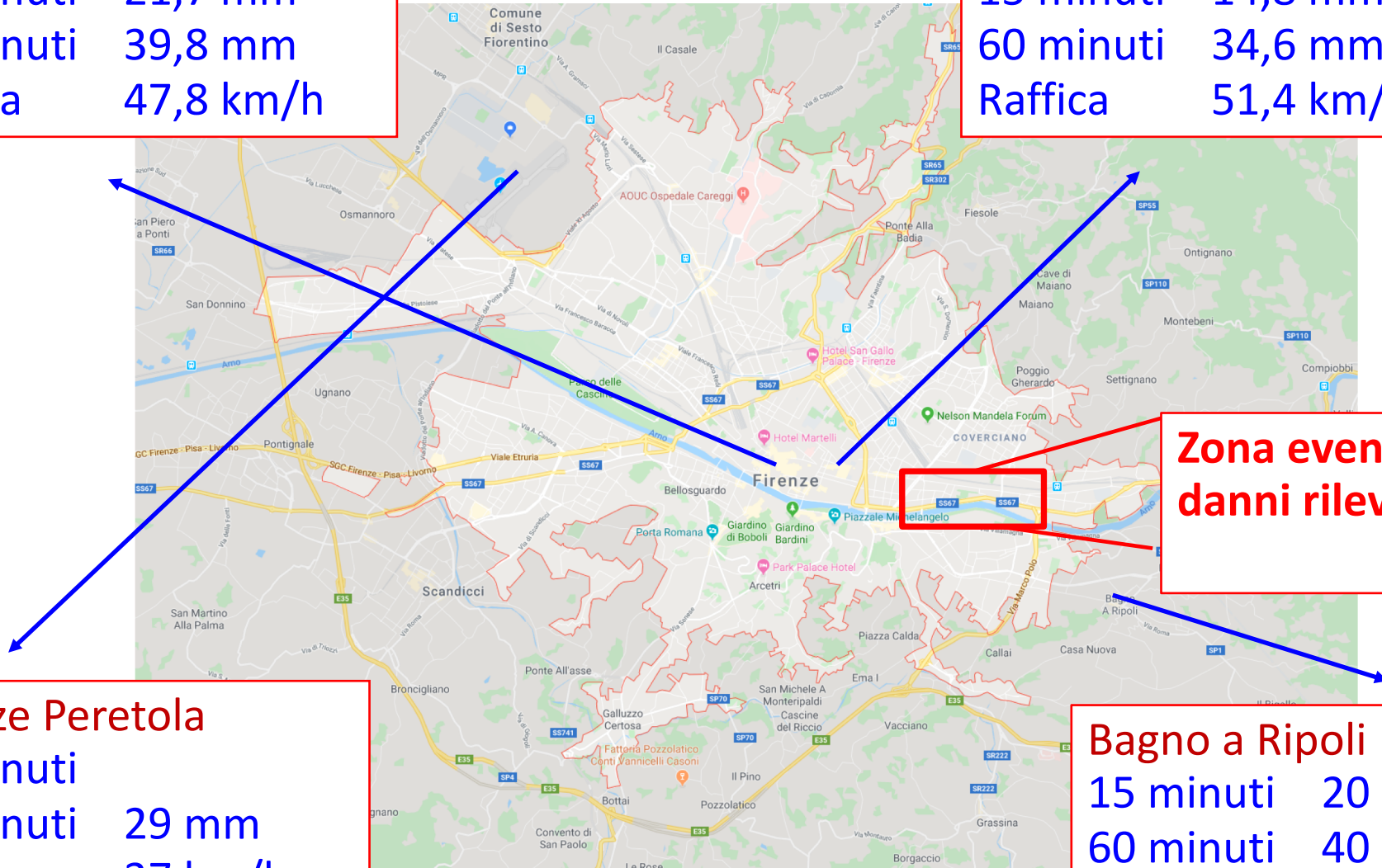
Firenze 1 AGOSTO 2015

Firenze Genio Civile

15 minuti 21,7 mm
60 minuti 39,8 mm
Raffica 47,8 km/h

Firenze Università

15 minuti 14,8 mm
60 minuti 34,6 mm
Raffica 51,4 km/h



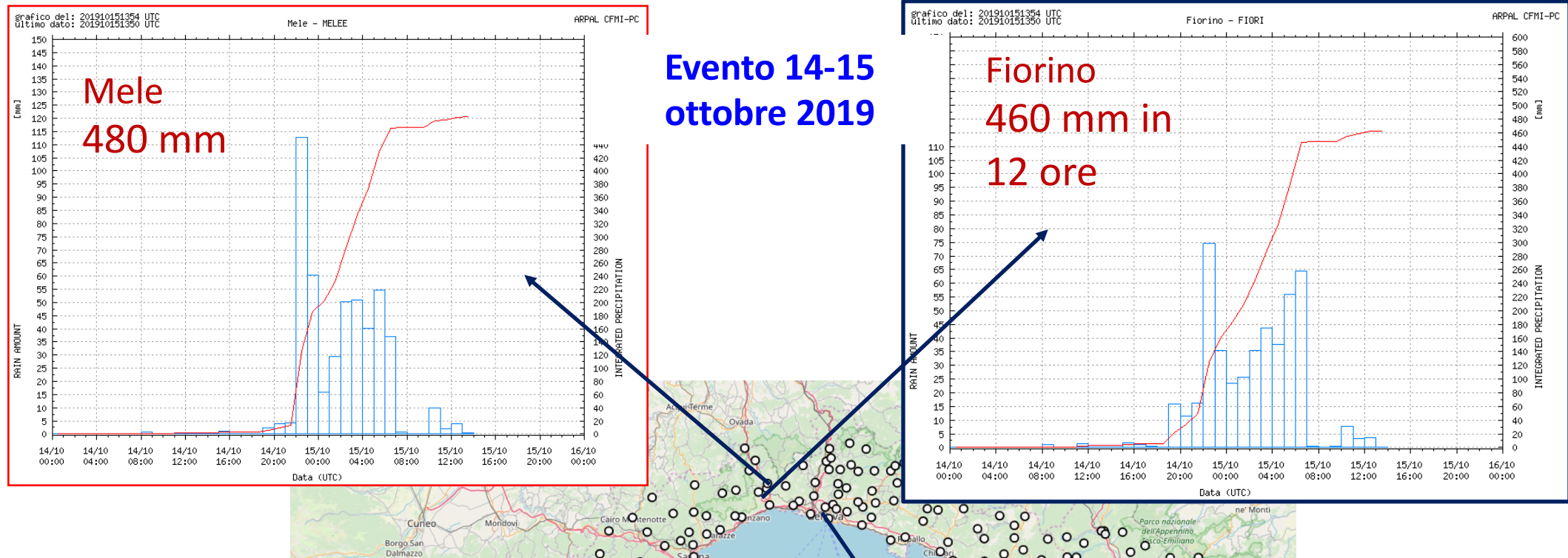
**Zona evento con
danni rilevanti**

Firenze Peretola

15 minuti
60 minuti 29 mm
Raffica 37 km/h

Bagno a Ripoli

15 minuti 20 mm
60 minuti 40 mm
Raffica 54 km/h



Liguria

Dal 1 ottobre al 22 novembre a Mele 1.724 mm di pioggia
(media storica annuale tra 1.700-1.800)

Val Bormida a novembre sono caduti oltre 1.200 mm
pioggia, quando ne cadono solitamente 1.700 in un anno

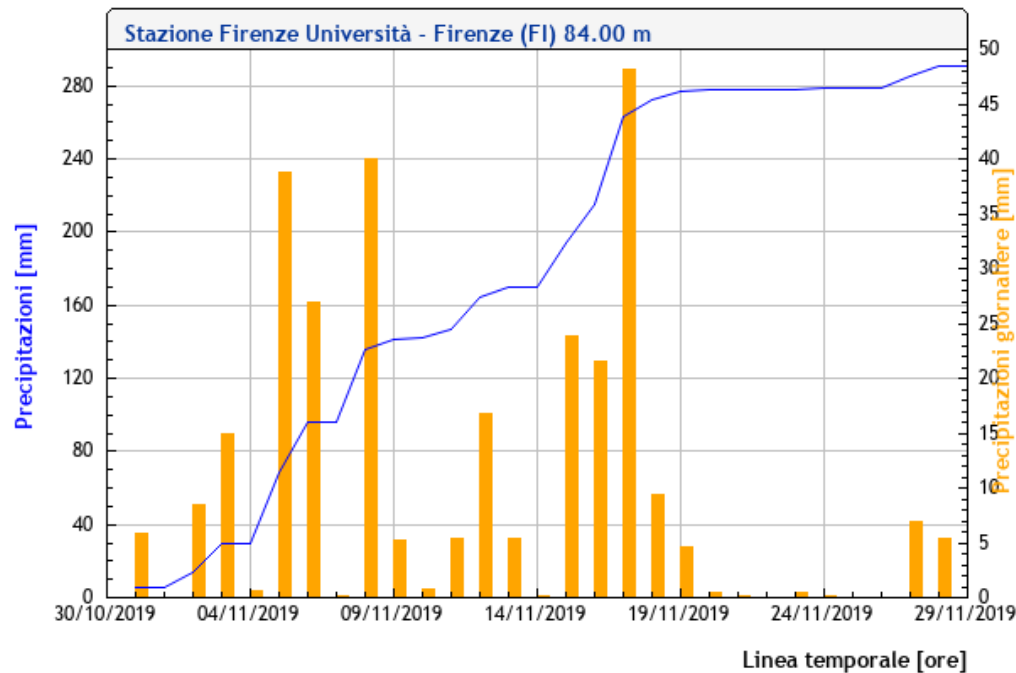


Toscana

Novembre 2019

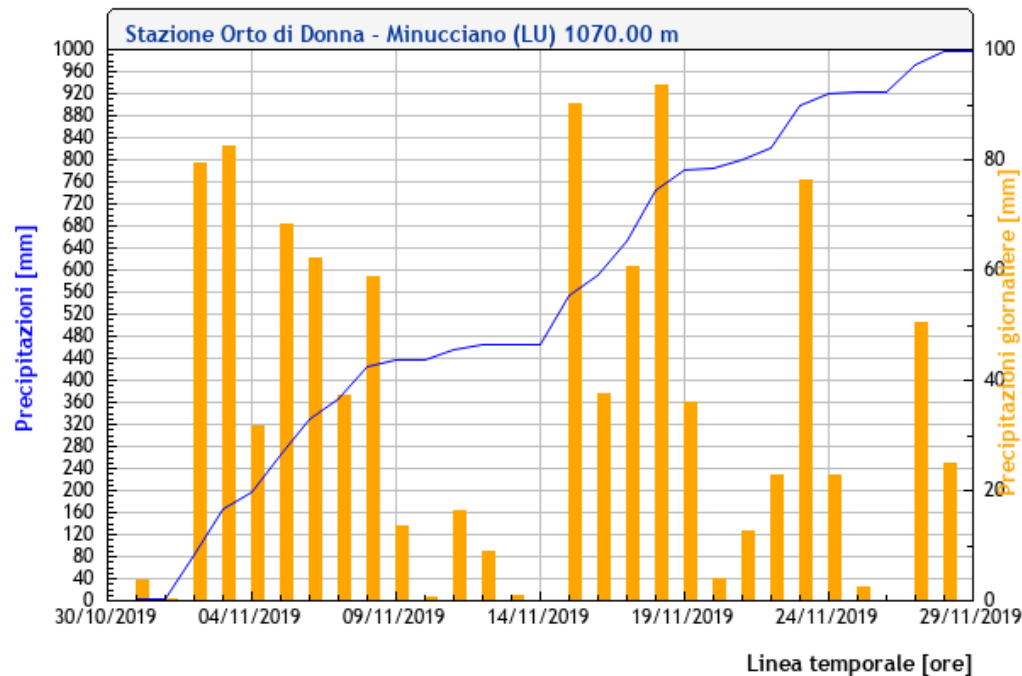
Firenze Università 304,8 mm

Firenze Max 310 mm 1966

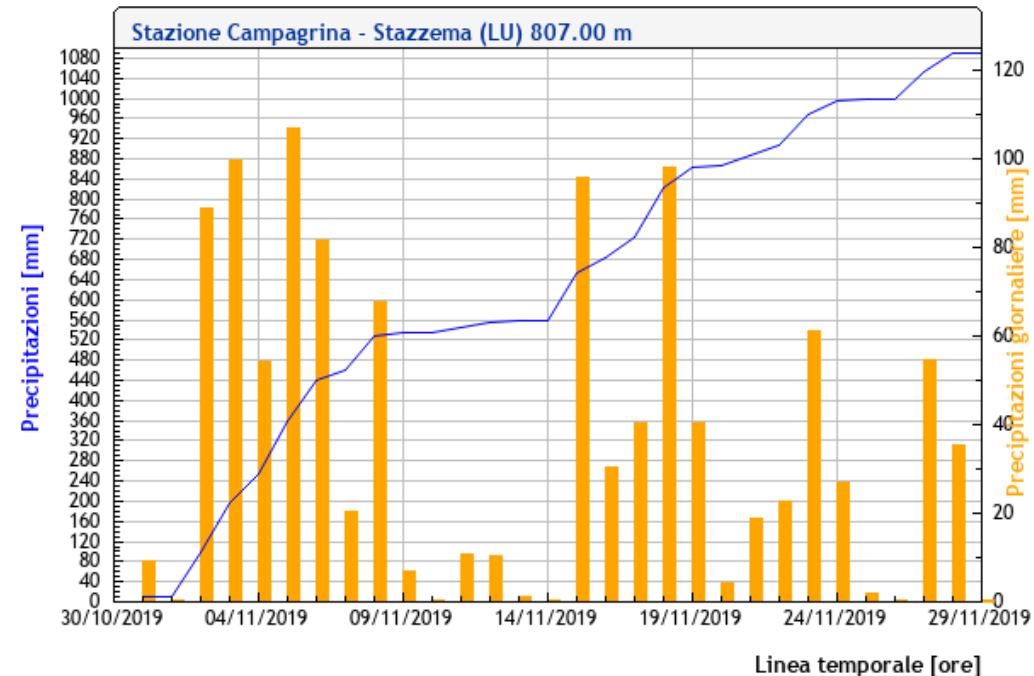


— Precipitazioni cumulate [mm] — Precipitazioni [mm]

Centro Funzionale Regione Toscana <http://www.cfr.toscana.it>



— Precipitazioni cumulate [mm] — Precipitazioni [mm]



— Precipitazioni cumulate [mm] — Precipitazioni [mm]

GRAZIE PER L'ATTENZIONE

