



# Final Conference Daylighting Rivers 1-2 December 2020

**The climate crisis and its impacts on the territory. Economic and social effects**

Bernardo Gozzini  
Consorzio LaMMA



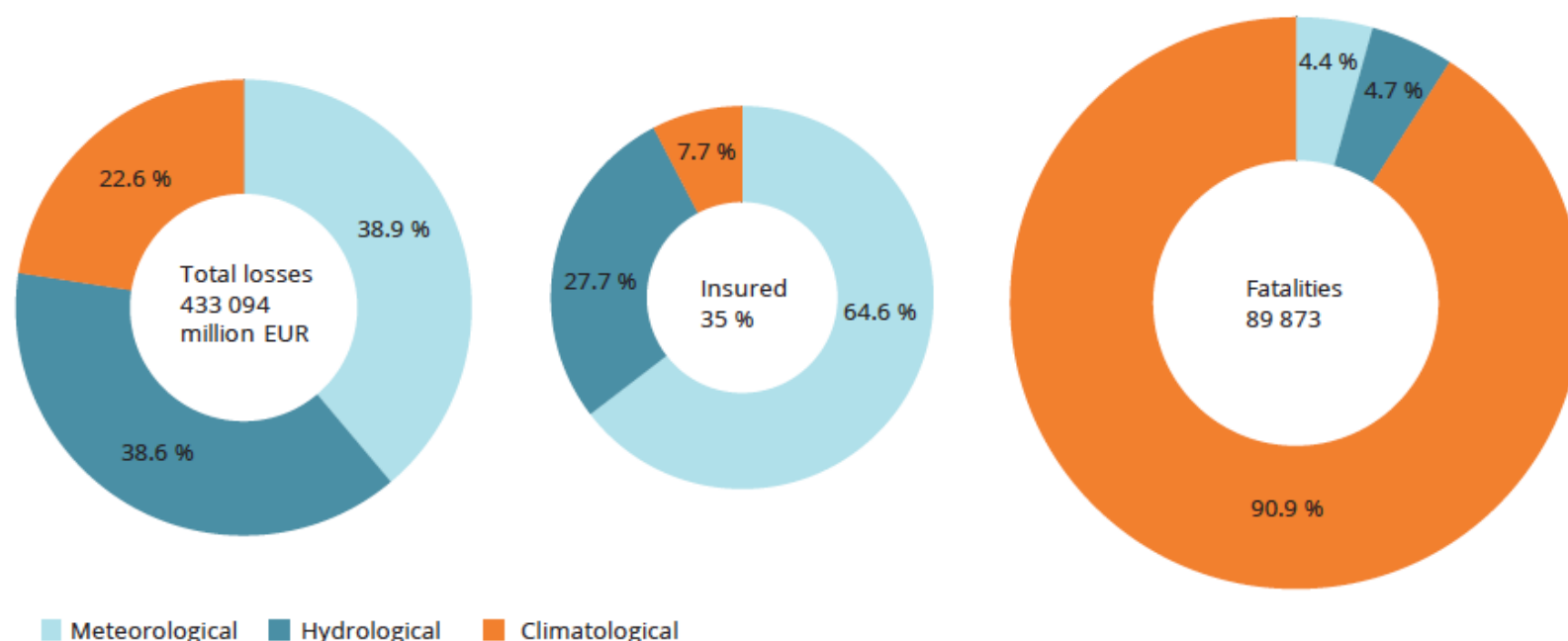
Climate change adaptation and disaster  
risk reduction in Europe

Enhancing coherence of the knowledge base, policies and practices

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**1980-2015 period**

Economic losses EEA members: 433 billion €  
Floods **34%**, Storm **25%**, Drought **10%**, Heat wave **6%**

**Figure 4.3 Total economic losses (left), insured losses (middle) and fatalities (right)**

**Note:** Diagrams show total economic losses (expressed in 2015 values), insured losses and fatalities in EEA member countries over the period 1980–2015. Hazard categories: meteorological events, hydrological events and climatological events.

# Climate change adaptation and disaster risk reduction in Europe

Enhancing coherence of the knowledge base, policies and practices

## 1980-2015 (Fatalities)

Impacts on human health: heat waves were the deadliest extreme climate event

**Table 4.1** Number of people killed per million due to four types of natural hazards, by European regions, for the period 1991-2015

|                 | Flood and wet mass movement <sup>(a)</sup> | Cold event | Heat wave | Storm | Wildfire |
|-----------------|--|------------|-----------|-------|----------|
| Eastern Europe  | 8.57                                       | 28.27      | 11.39     | 1.73  | 0.54     |
| Northern Europe | 0.99                                       | 1.67       | 11.17     | 2.48  | 0.01     |
| Southern Europe | 6.75                                       | 0.92       | 177.98    | 1.19  | 0.97     |
| Western Europe  | 2.09                                       | 0.89       | 191.58    | 2.79  | 0.04     |
| Europe          | 4.64                                       | 5.31       | 128.98    | 1.99  | 0.46     |

Extreme weather and climate-related events can also disrupt health and social care service delivery





**2019** economic losses from  
natural and man-made

## World Population

1950 2,5 billion

2020 7,8 billion

Estimate 2050 9 billion

55% lives in urban areas

80% in urban clusters

40% lives within 100 km of the coast

**2018** e

1

**2017** U

17+18

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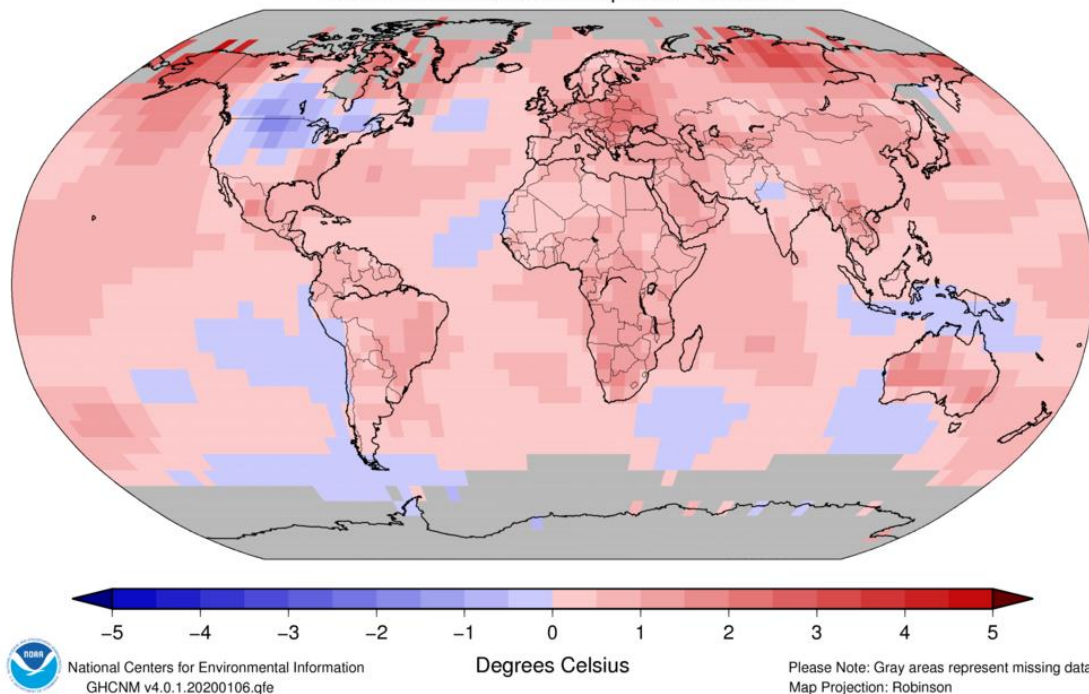
# Temperature on a global scale 2019

Fonte: NOAA (National Climatic Data Center)

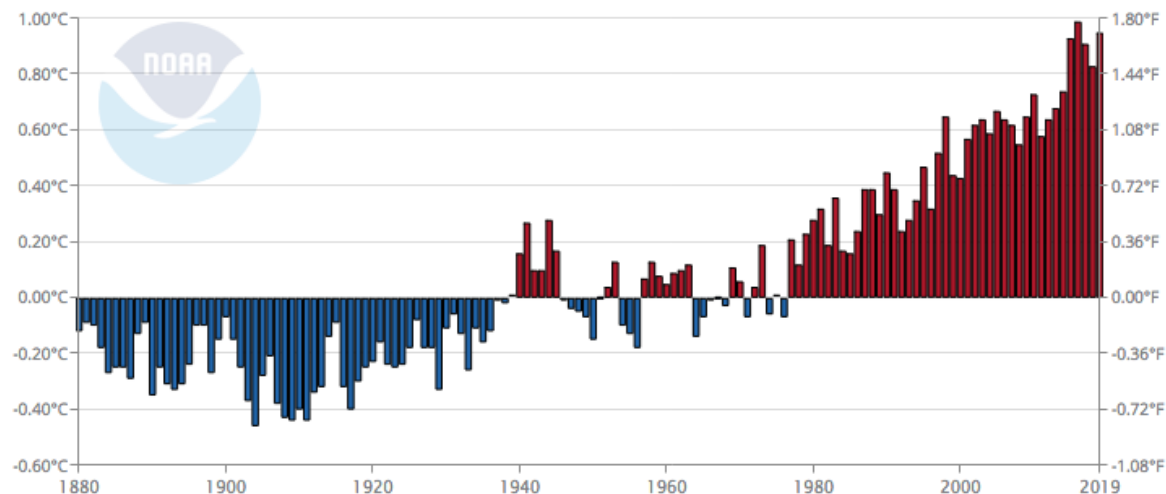
| RANK<br>1 = WARMEST<br>PERIOD OF RECORD: 1880–2019 | YEAR | ANOMALY °C |
|--|------|------------|
| 1  | 2016 | 0.99       |
| 2  | 2019 | 0.95       |
| 3  | 2015 | 0.93       |
| 4  | 2017 | 0.91       |
| 5  | 2018 | 0.83       |
| 6  | 2014 | 0.74       |
| 7  | 2010 | 0.72       |
| 8 (tied) 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

Land & Ocean Temperature Departure from Average Jan–Dec 2019  
(with respect to a 1981–2010 base period)

Data Source: NOAAGlobalTemp v5.0.0–20200108



Global Land and Ocean  
January–December Temperature Anomalies



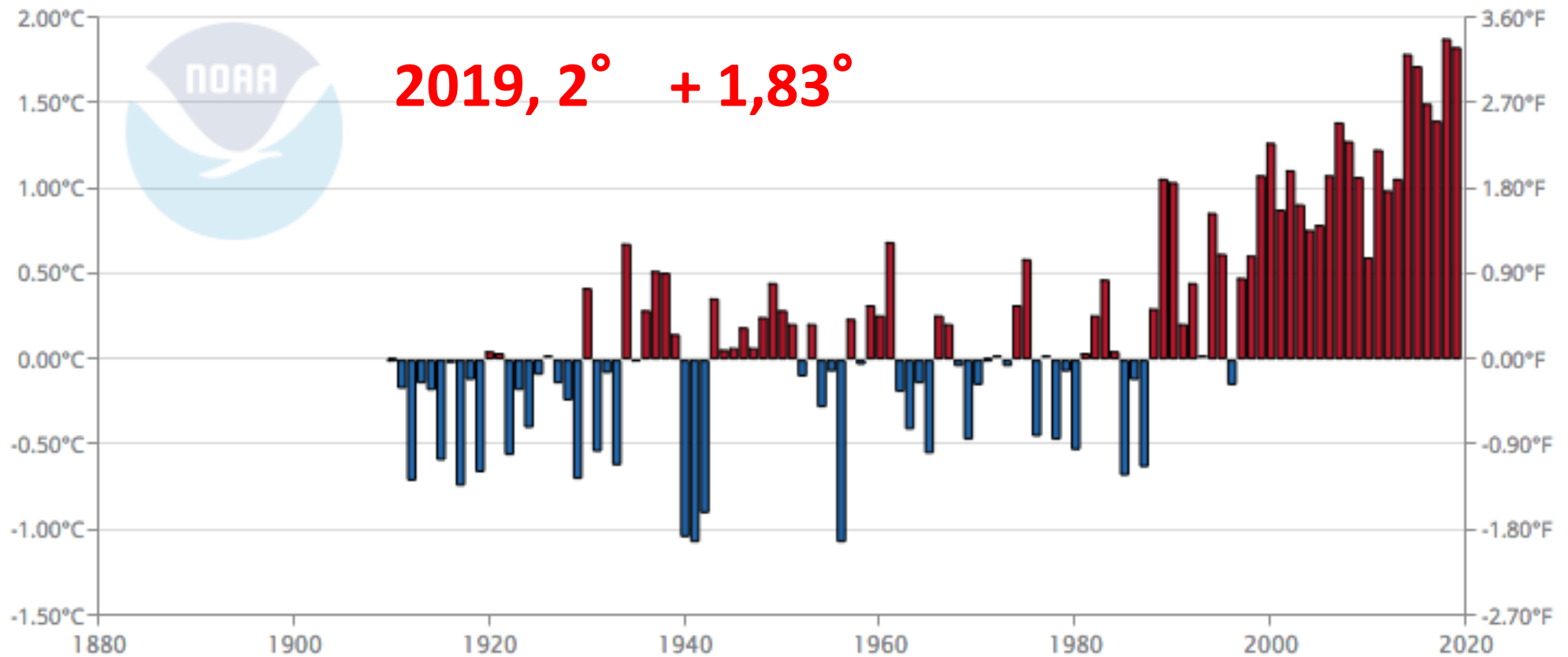
Browser: State of climate NOAA

# Climate change in Europe

## Temperature anomalies from 1910

### Europe

#### January–December Temperature Anomalies

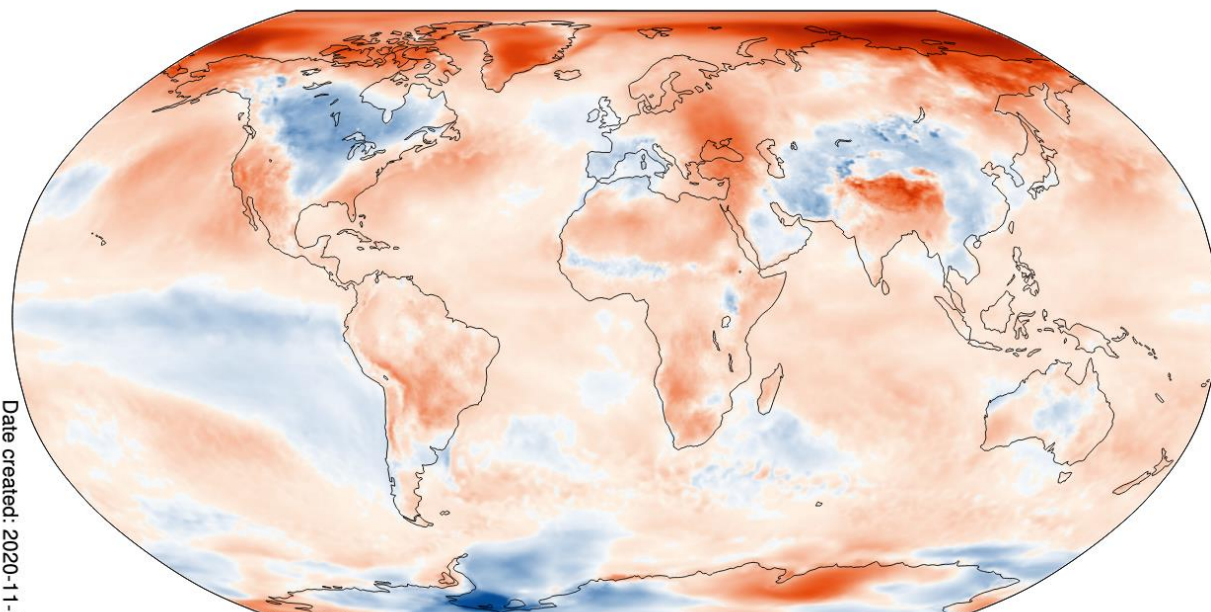




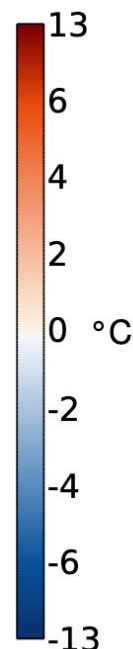
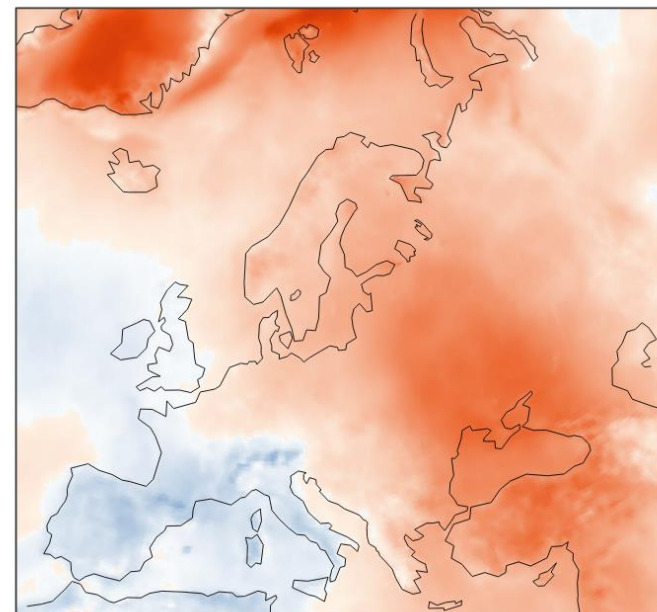
# COPERNICUS CLIMATE CHANGE SERVICES

## October 2020

Surface air temperature anomaly for October 2020



Date created: 2020-11-03



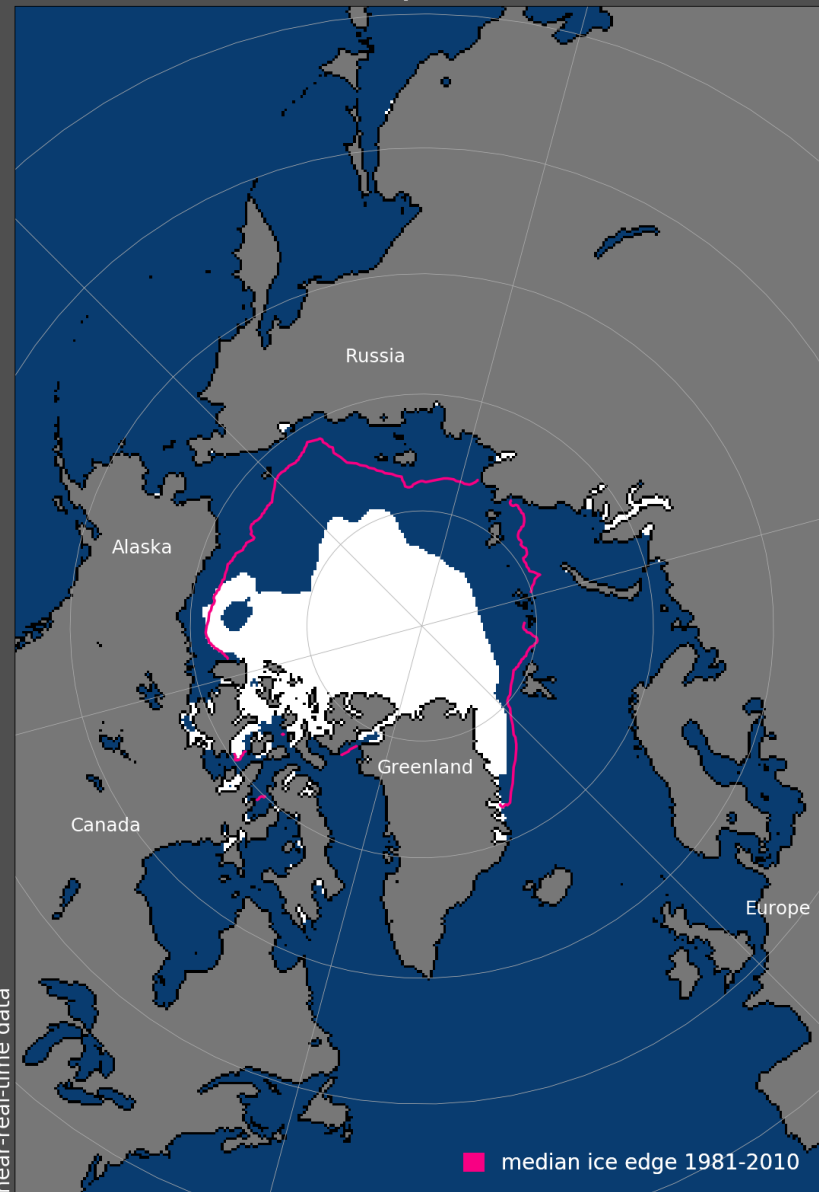
### At European level:

- 2019 is the second hottest year after 2016 for very little (0.04° C)
- the last 5 years are in the top 5 places in the ranking of the hottest years
- 2010-2019 is the hottest decade ever recorded
- the average temperature of the last 5 years was between 1,1° and 1,2°C higher than the pre-industrial level defined by the IPCC.

<https://climate.copernicus.eu/surface-air-temperature-october-2020>

# ARCTIC REGION – Sea ice Extent

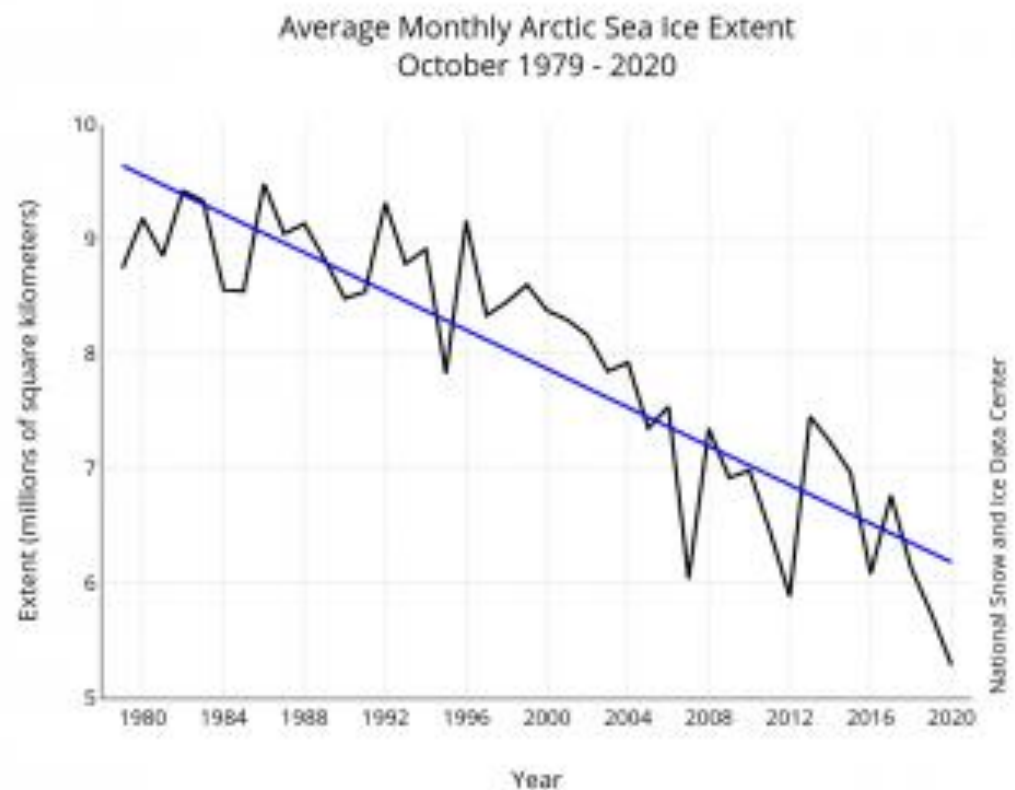
Sea Ice Extent, Sep 2020



Total extent = 3.9 million sq km

National Snow and Ice Data Center, University of Colorado Boulder

**Summer 2020 the hottest**  
**September 2020 the**  
**second lowest (2012 1st)**  
**October 2020 the lowest**



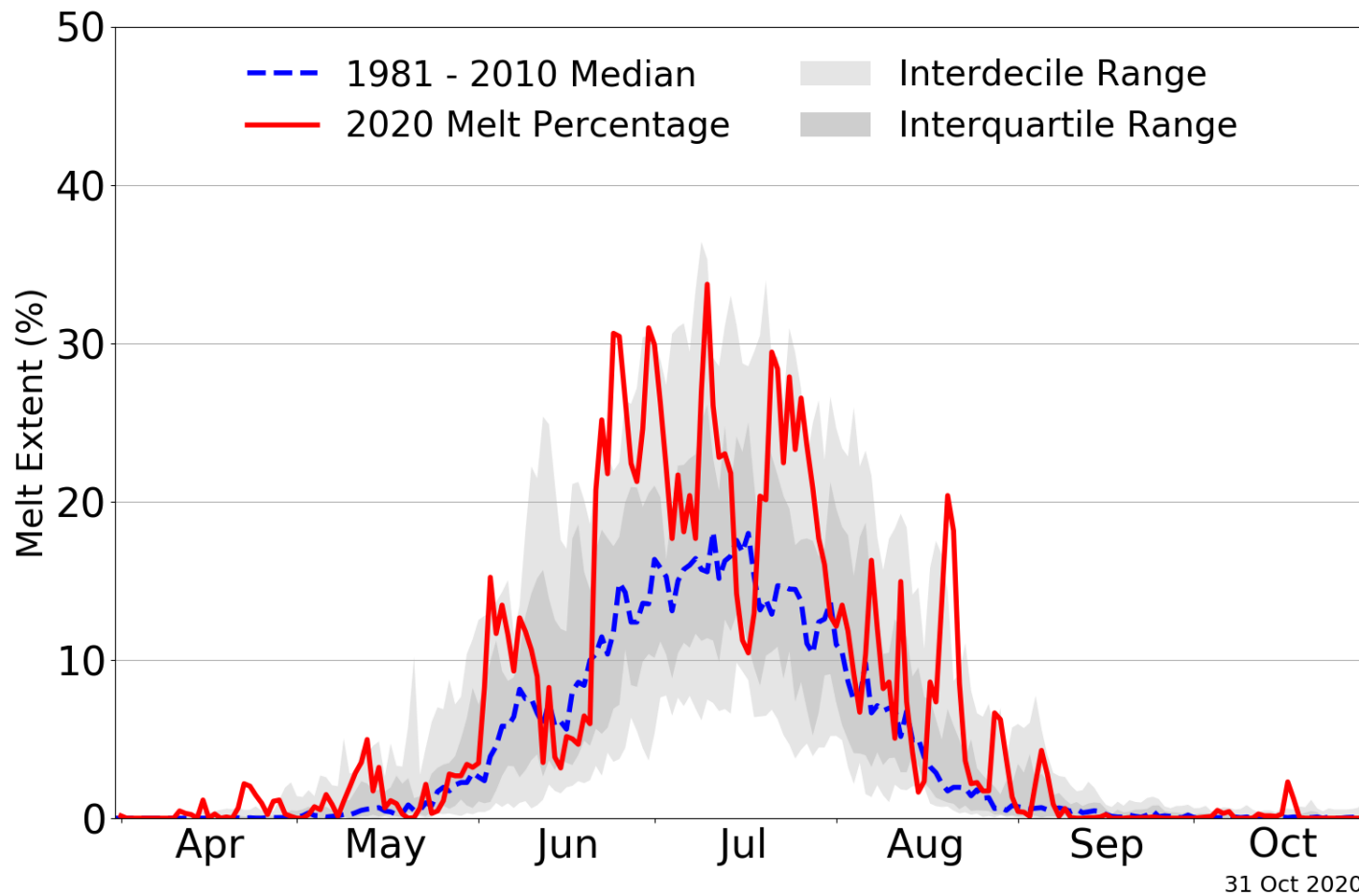


# Arctic Permafrost

## Greenland



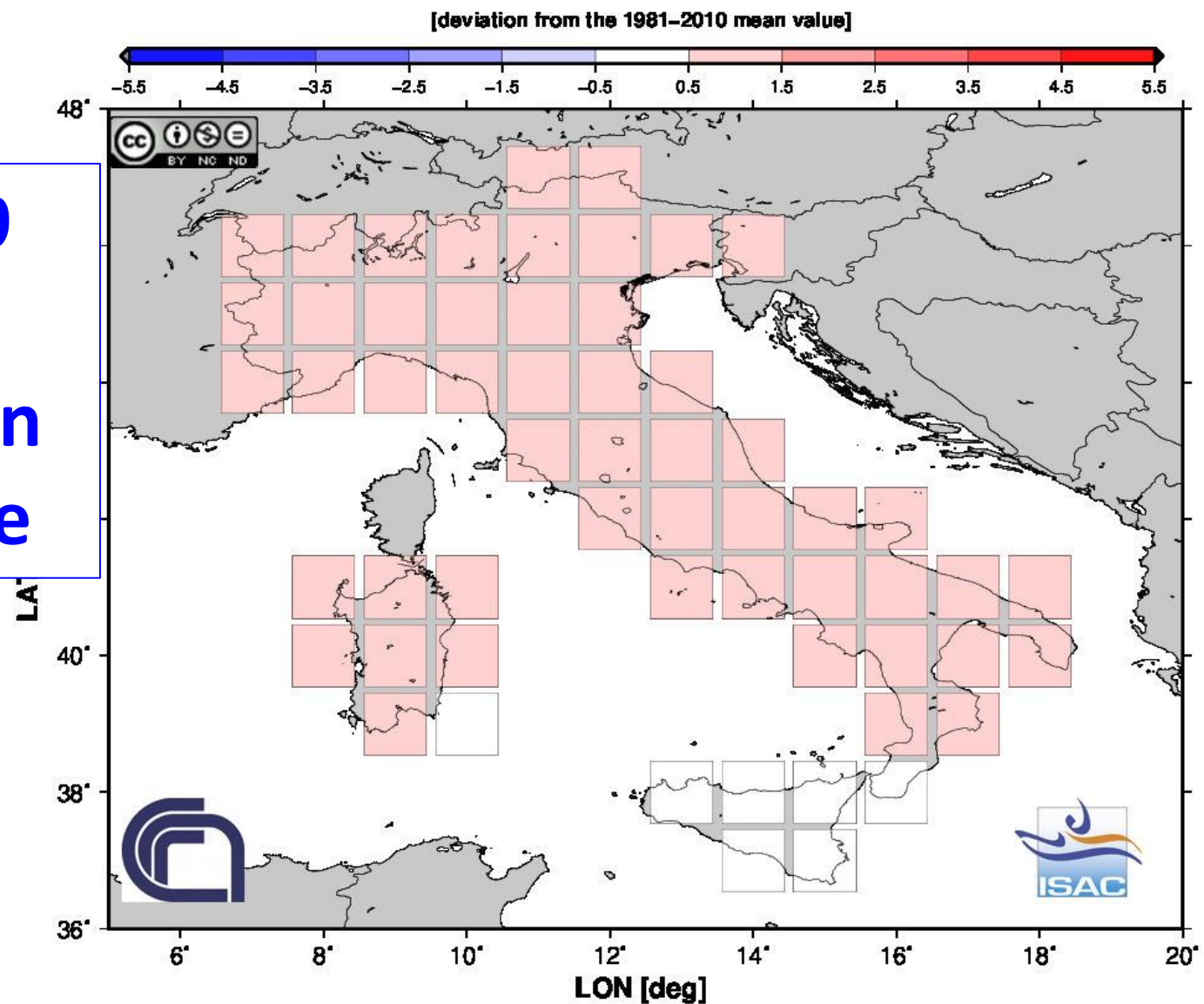
Greenland Melt Extent 2020



NSIDC / Thomas Mote, University of Georgia

# ITALIA 2019

## Annual Mean Temperature



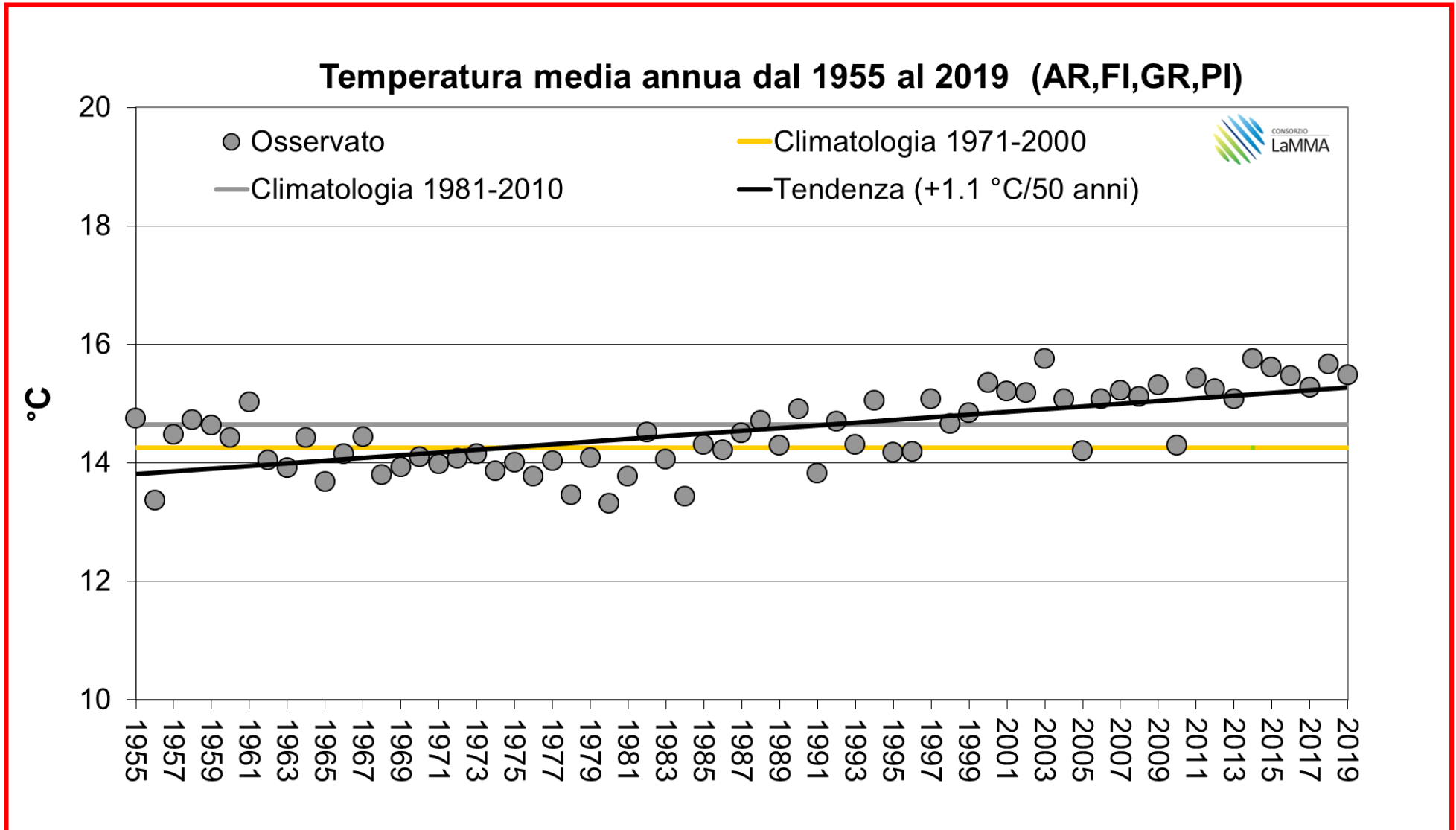
**2019** 4° in the ranking + 0,96°

**2018** 1° hottest + 1,17°

Rif. (media 1971-2000)

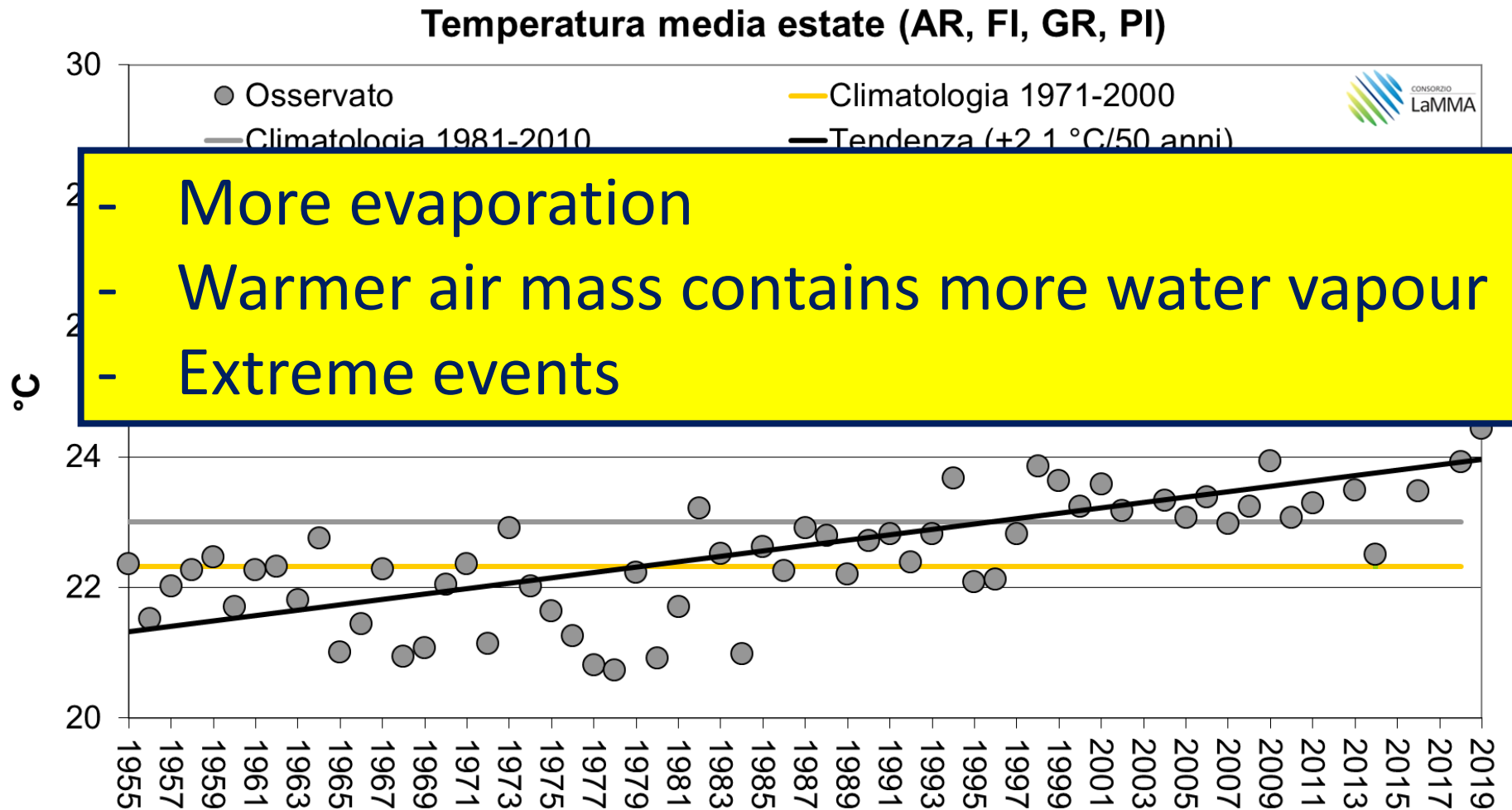
# Toscana (1955-2019 avg 4 cities)

## Annual Mean Temperature



# Toscana (1955-2019)

## Summer mean temperature

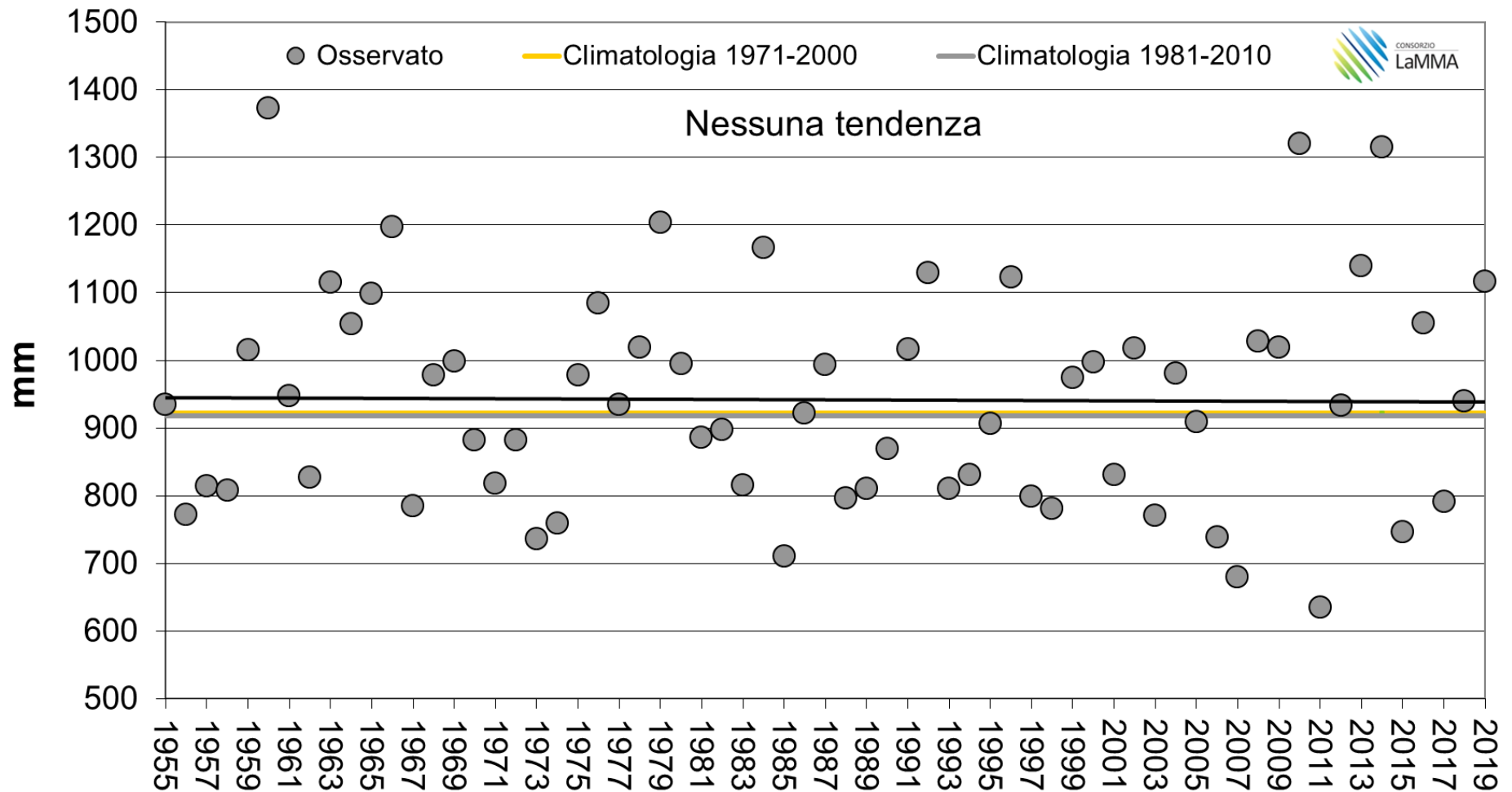




# Toscana (1955-2019)

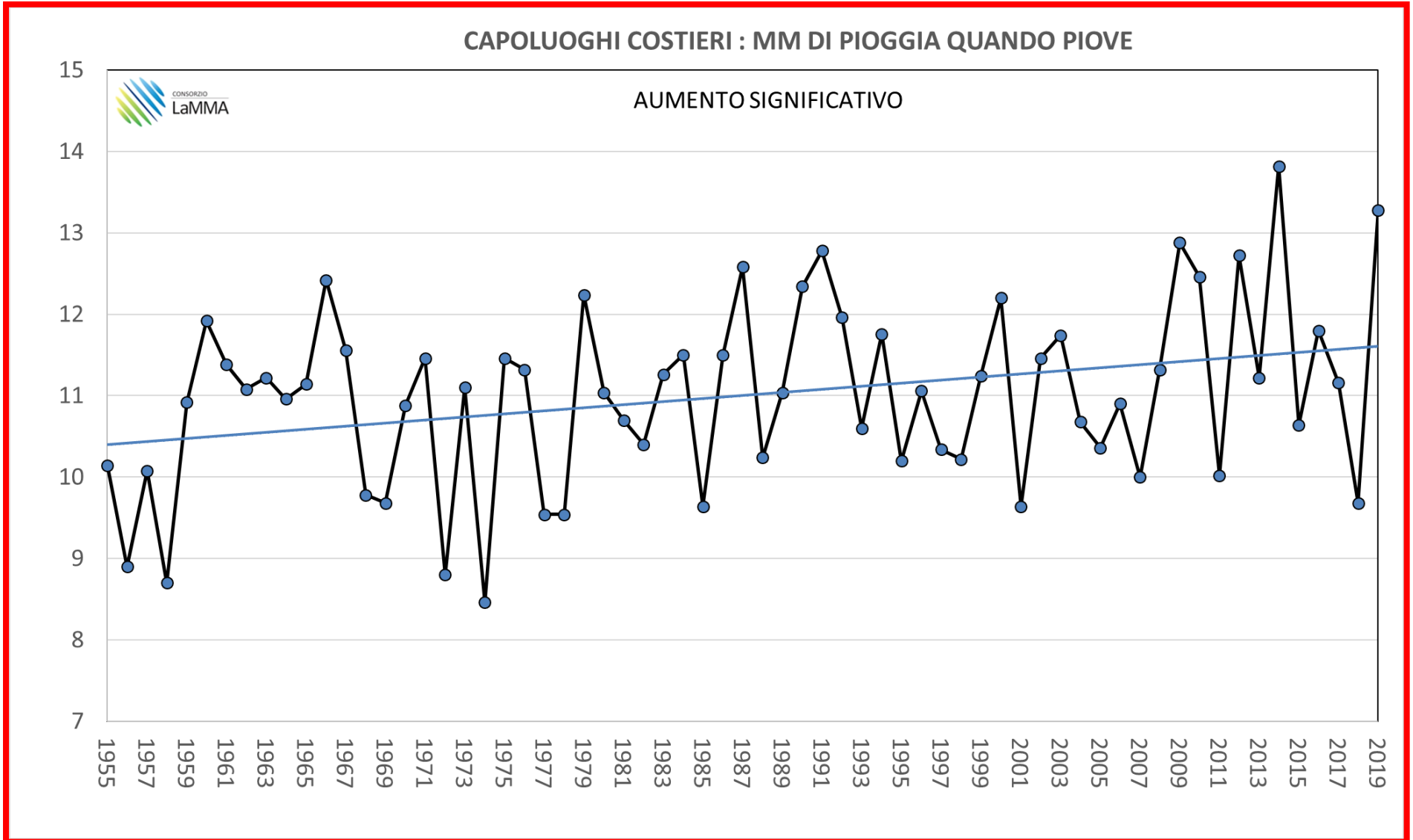
## Annual cumulated rainfall (mm)

Pioggia annuale (media capoluoghi)



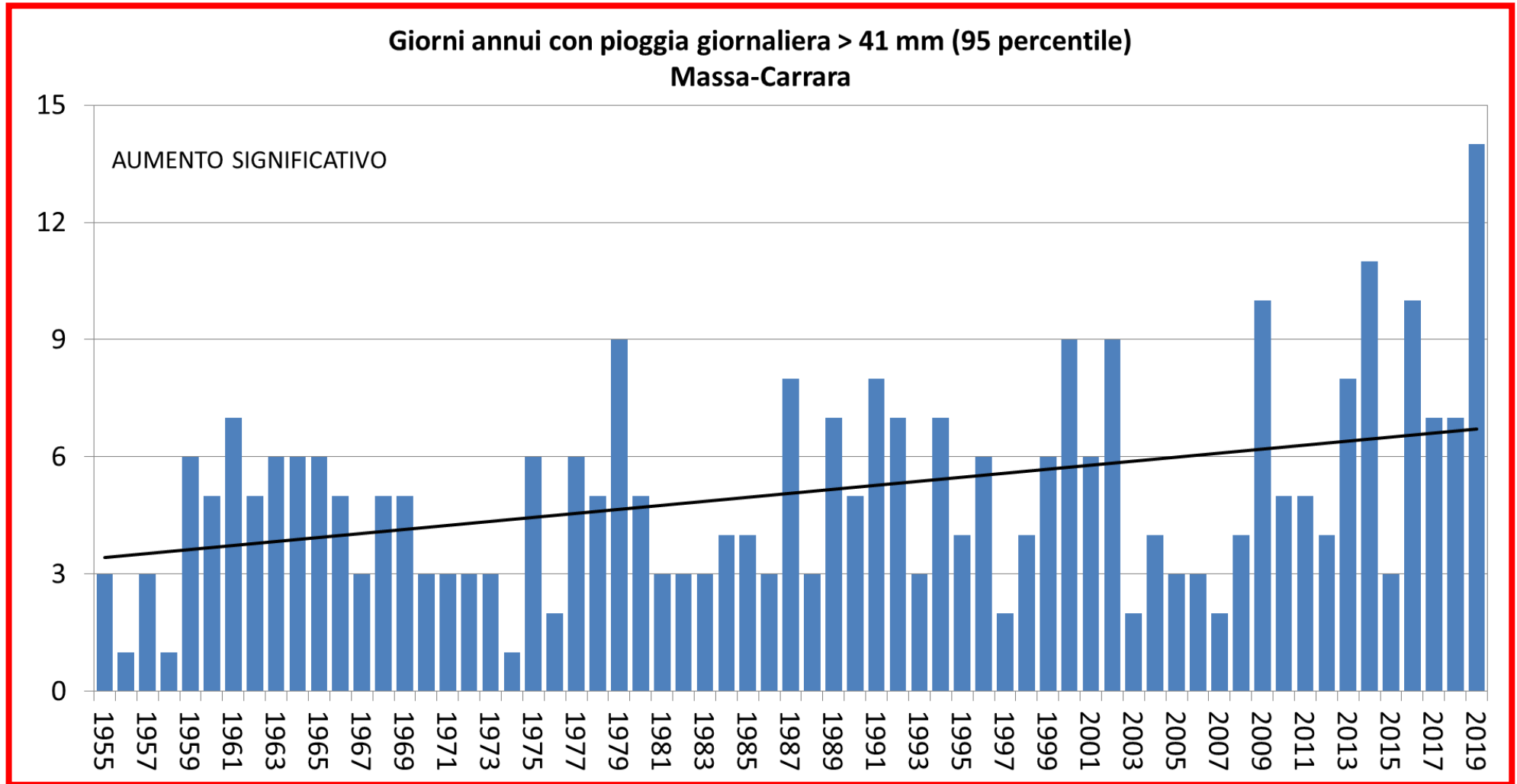
# COASTAL STATIONS (1955-2019)

## How much rain on average in 1 day

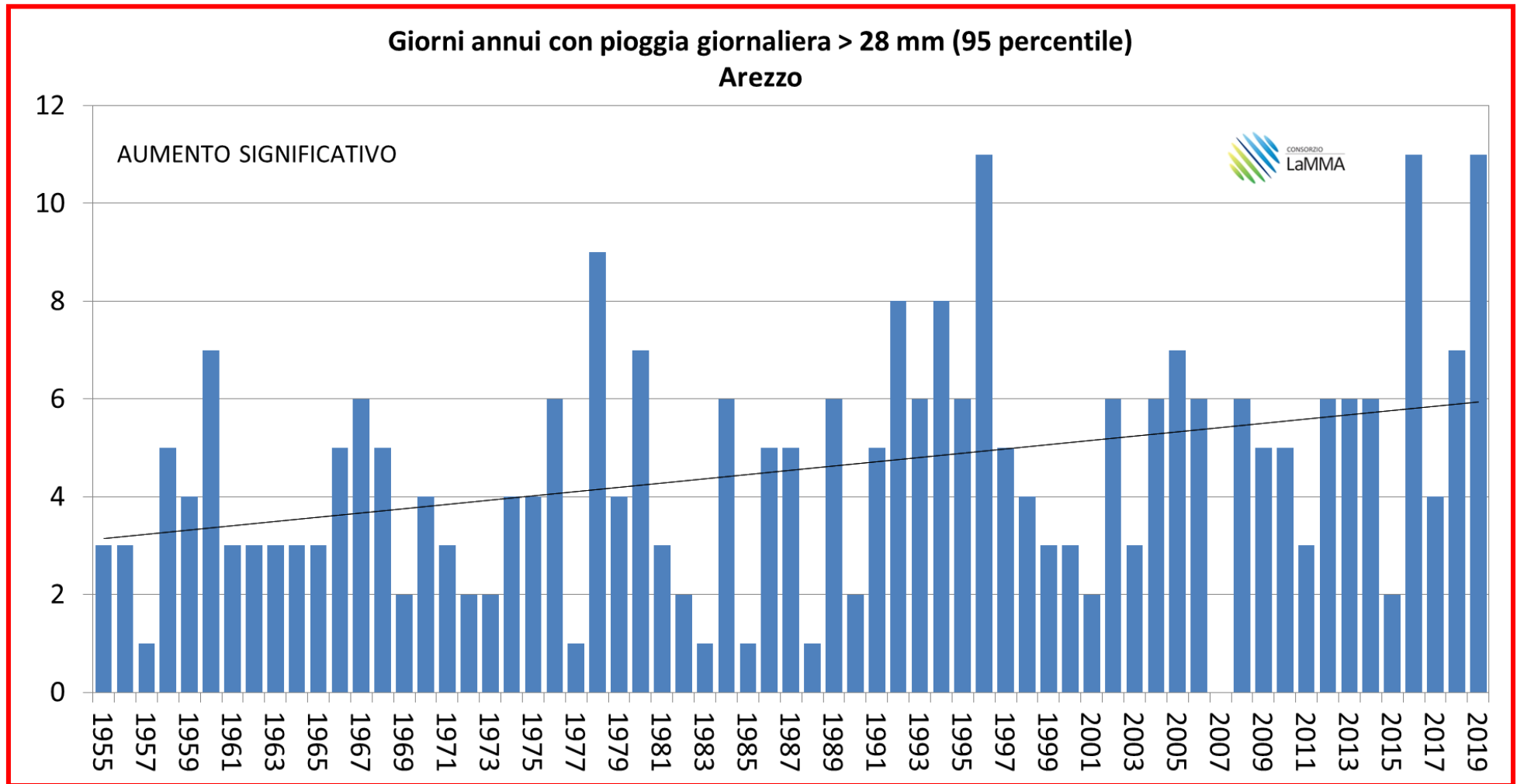


Total yearly precipitation divided by rainy days (at least 1 mm)

## Number of days with > 41 mm rainfall (95 perc.)



## Number of days with > 28 mm rainfall (95 perc.)



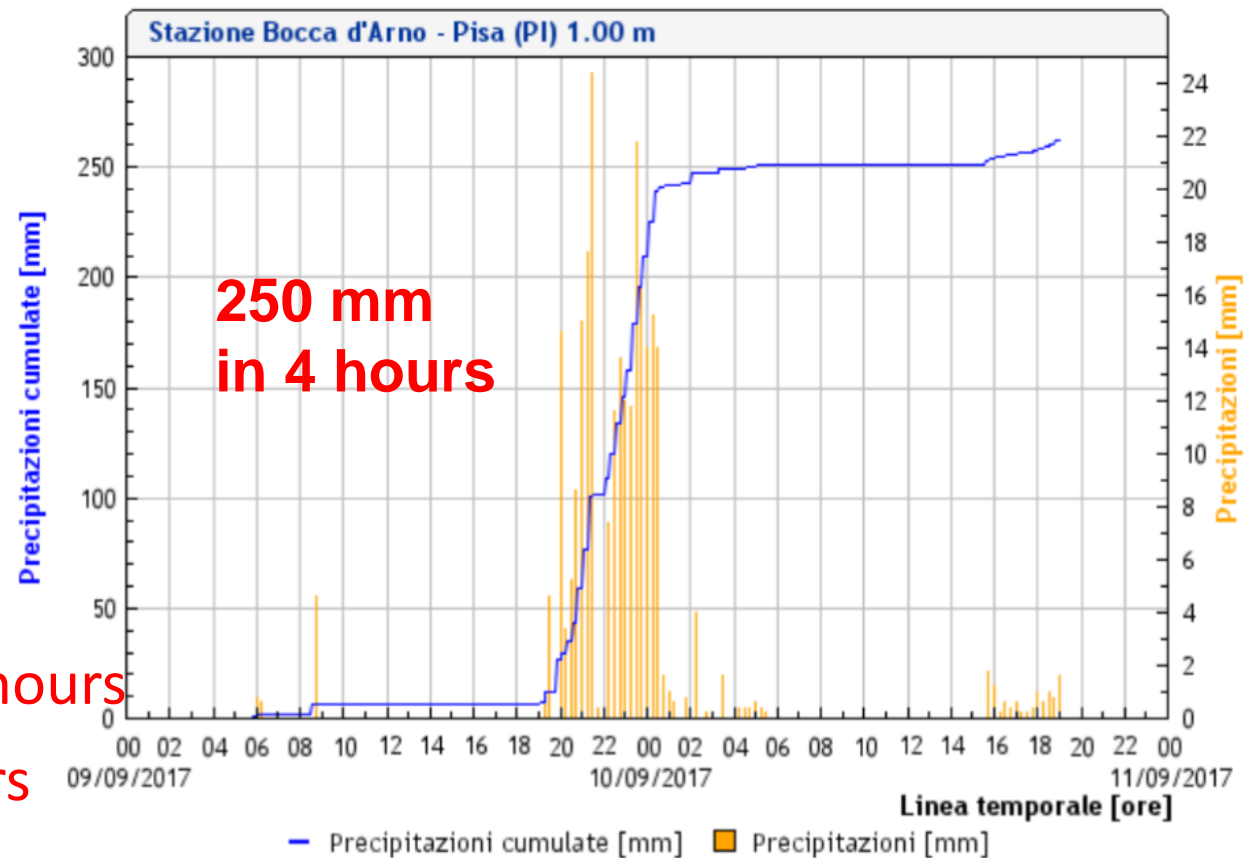
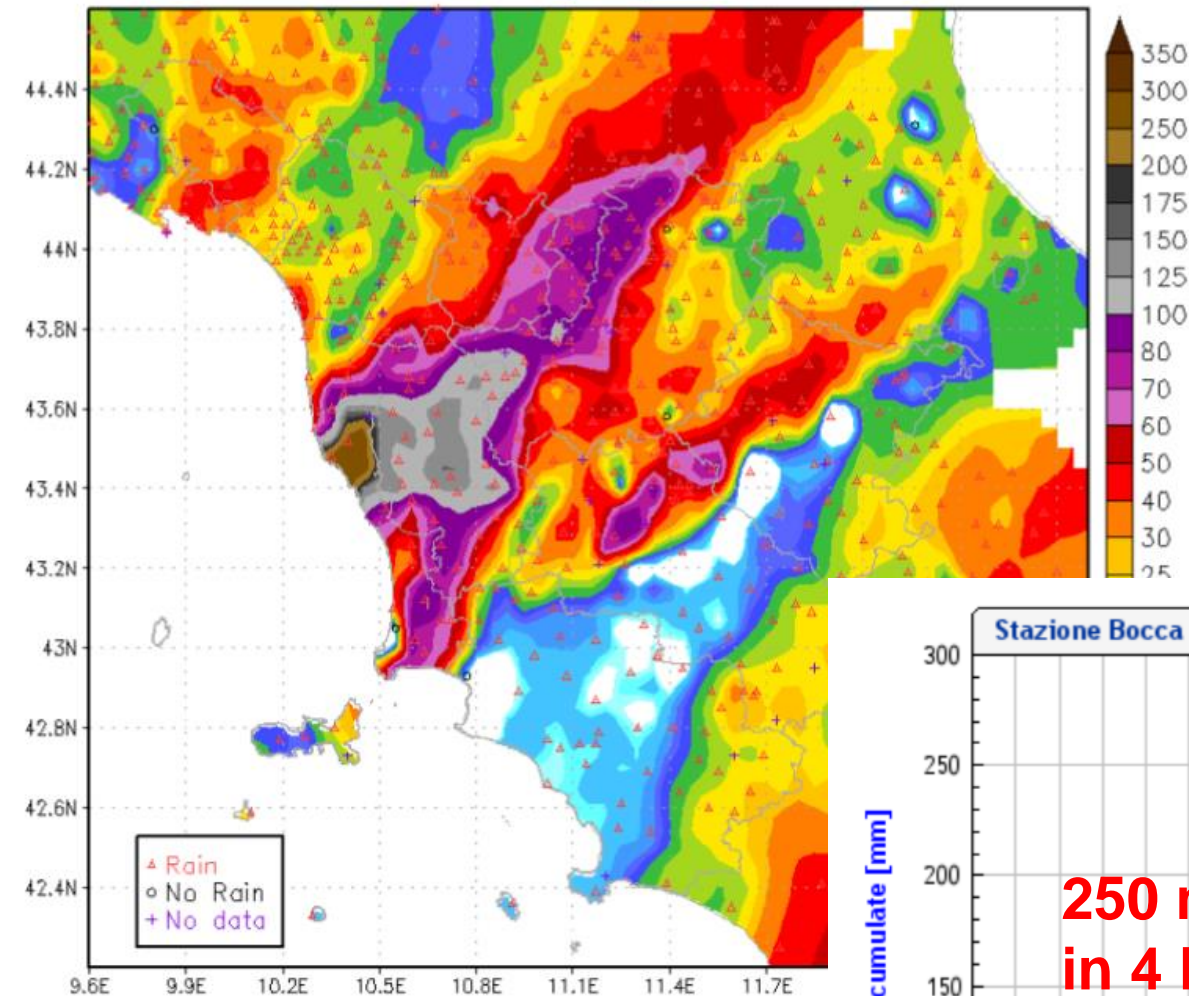


Total Precipitation [mm] cumulated on  
Sun, 10/09/2017

9 - 10 September 2017

## Pisa - Livorno

9 deaths and extensive  
damages



175 mm a Pisa – 6 hours

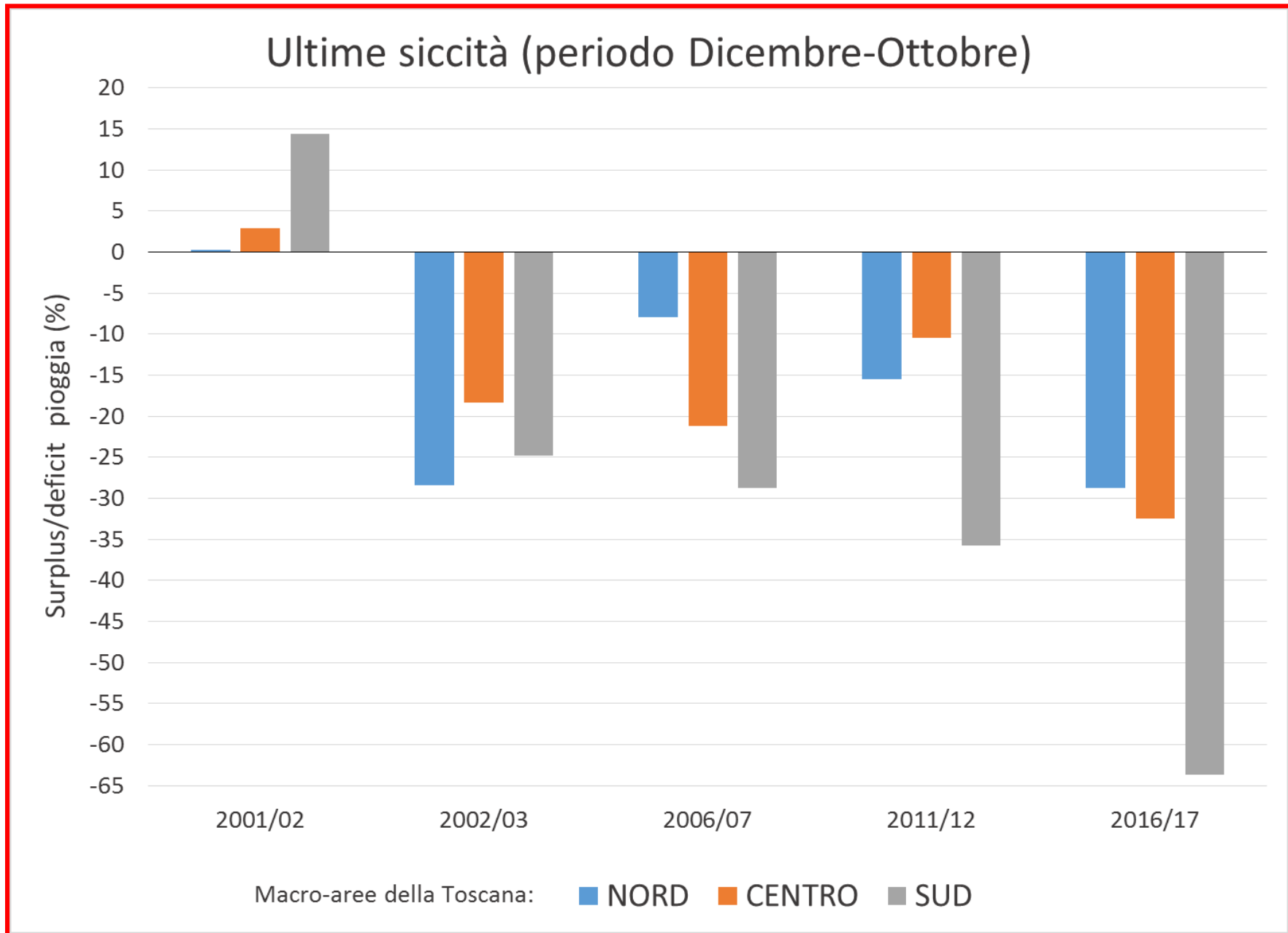
165 mm a Livorno – 6 hours

245 mm a Valle Benedetta - 3 hours

215 mm a Quercianella- 4 hours



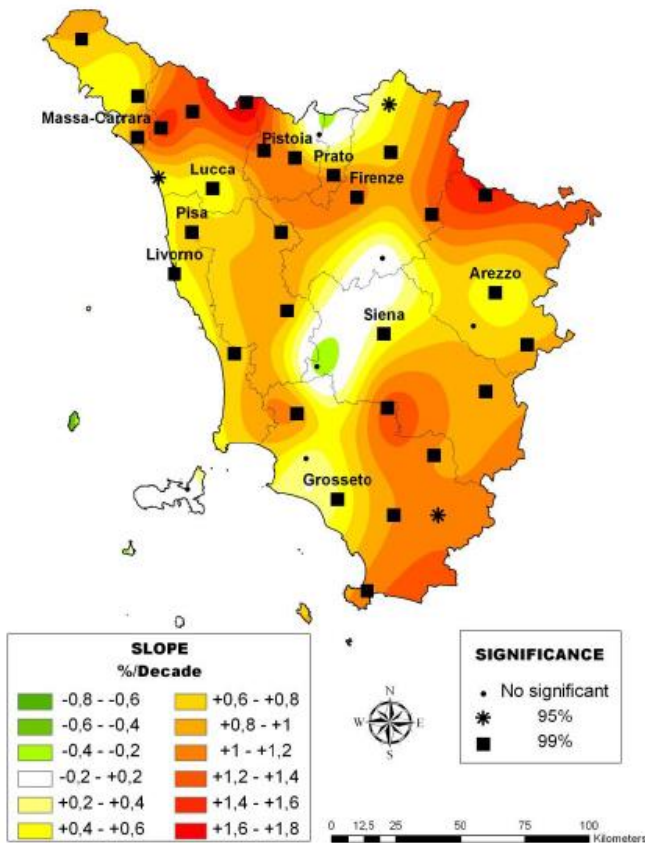
# Droughts events from 2000 in Toscana



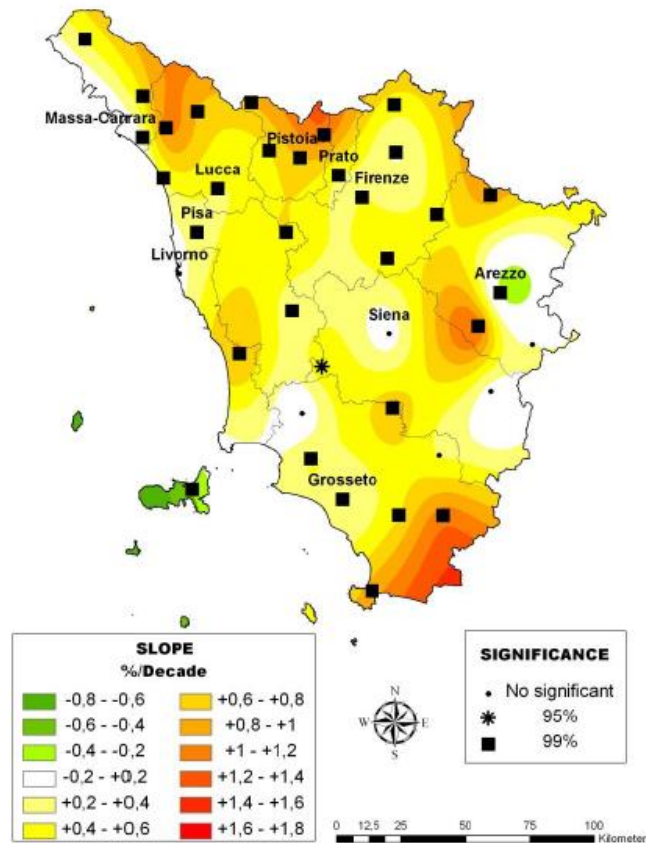
# Droughts: annual dry days trend (1, 5 e 10 mm)

**Trend**  
**Annual Dry Days**

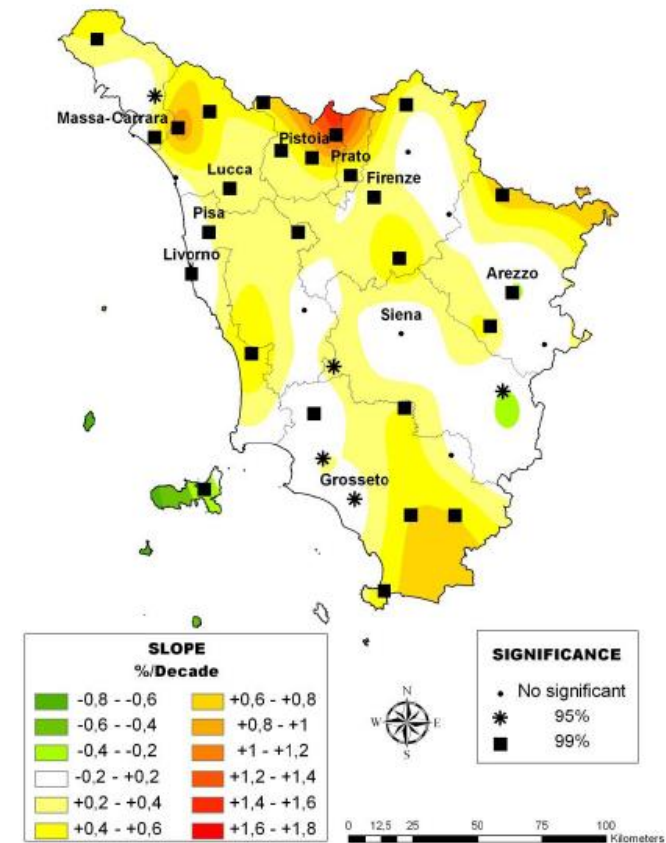
**CLIM\_DD\_TREND\_A\_1**

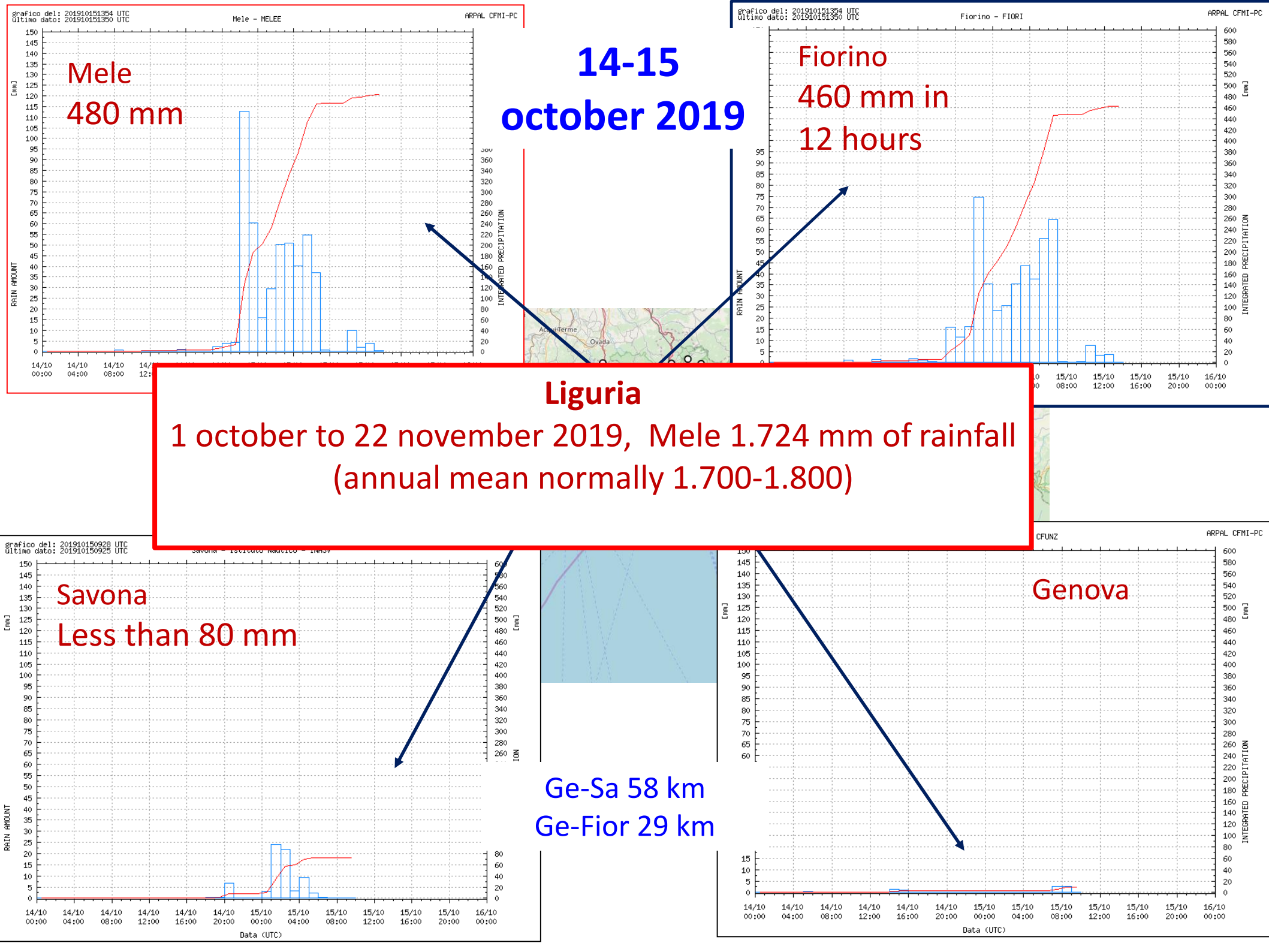


**CLIM\_DD\_TREND\_A\_5**



**CLIM\_DD\_TREND\_A\_10**









# THANK YOU FOR YOUR ATTENTION

