



IL CLIMA DELL'ITALIA

Come è cambiato

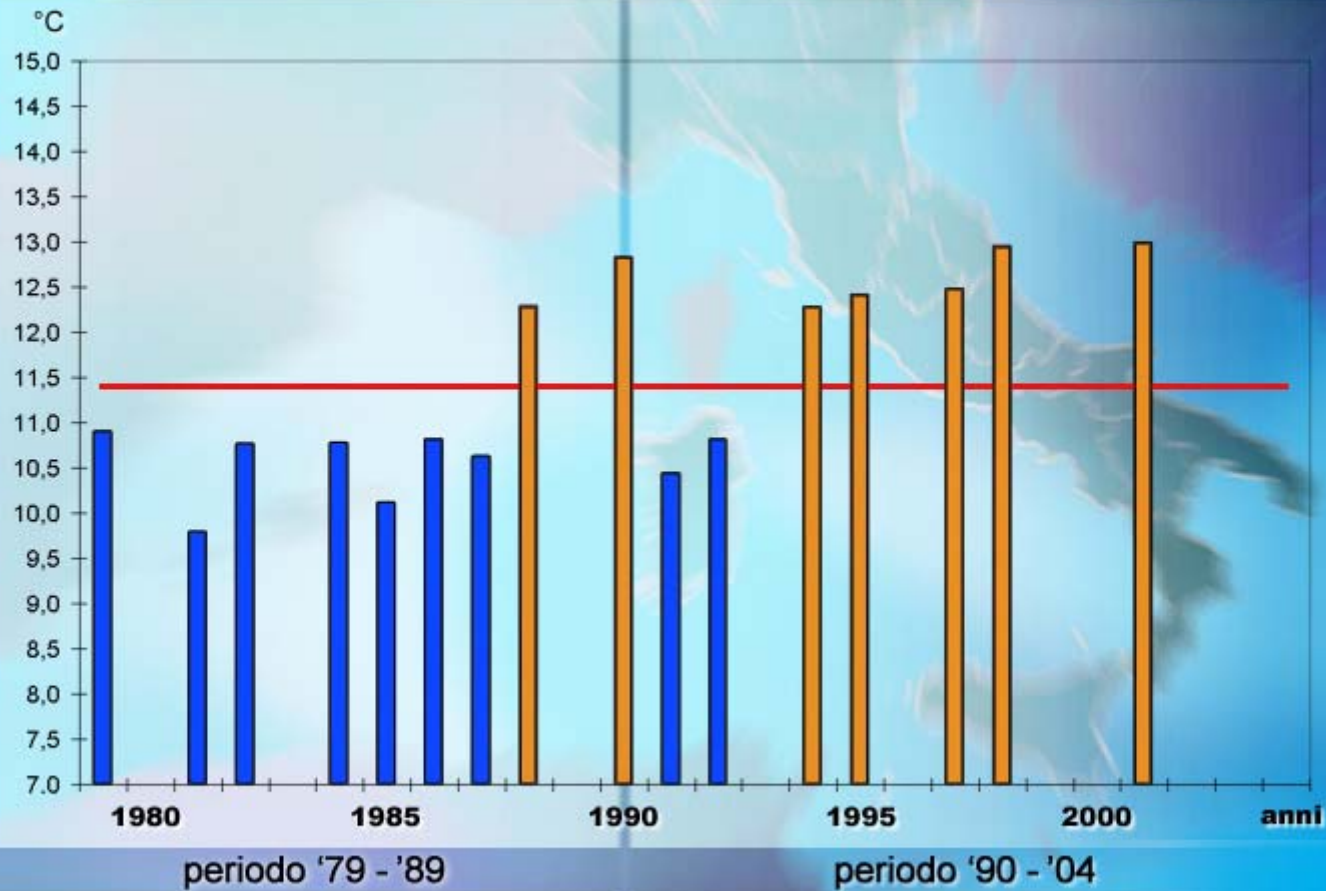
Col. Mario Giuliacci



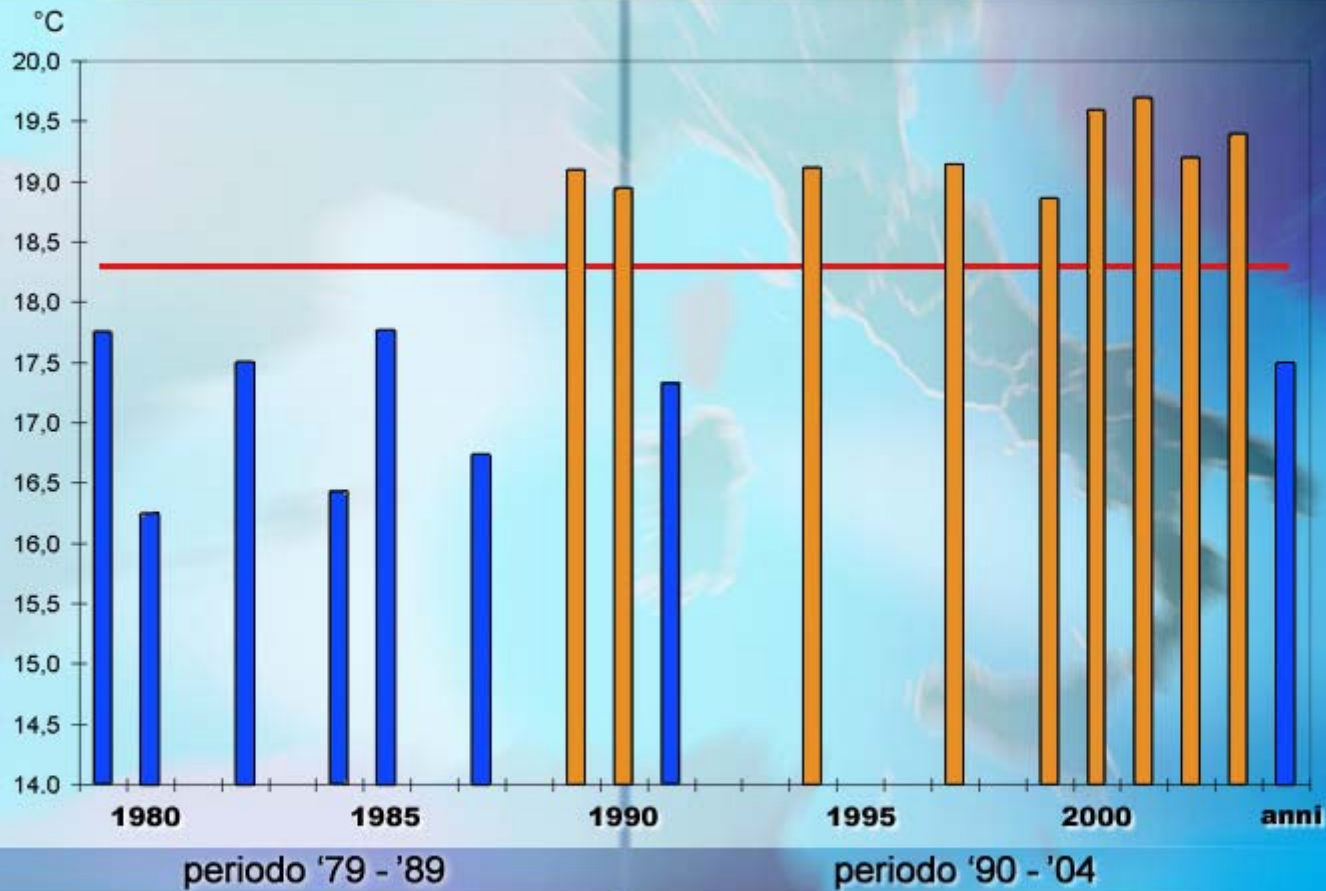
FA PIÙ CALDO



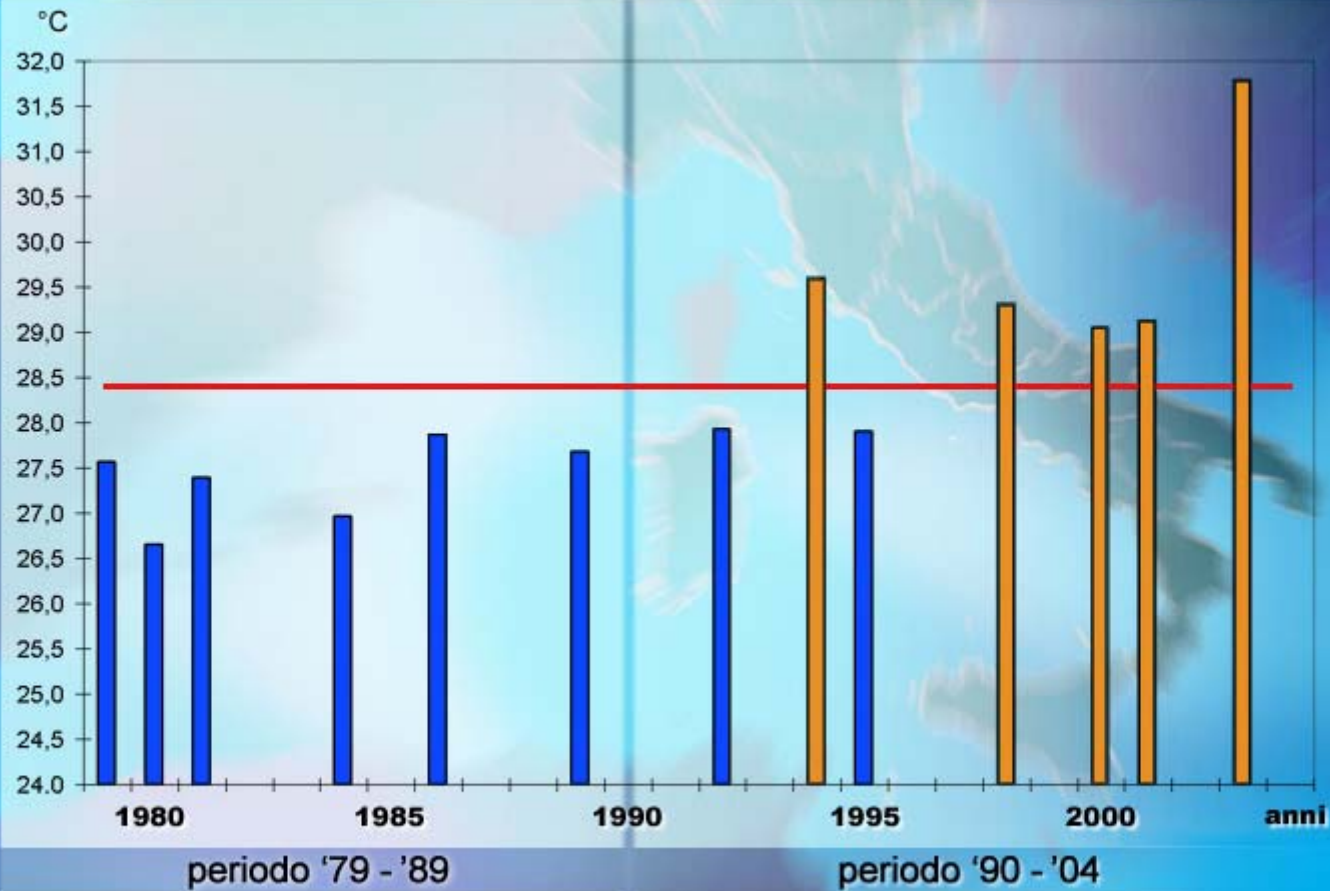
INVERNI "CALDI" O "FREDDI" DAL 1979 AL 2004 (+/- 0,5°)



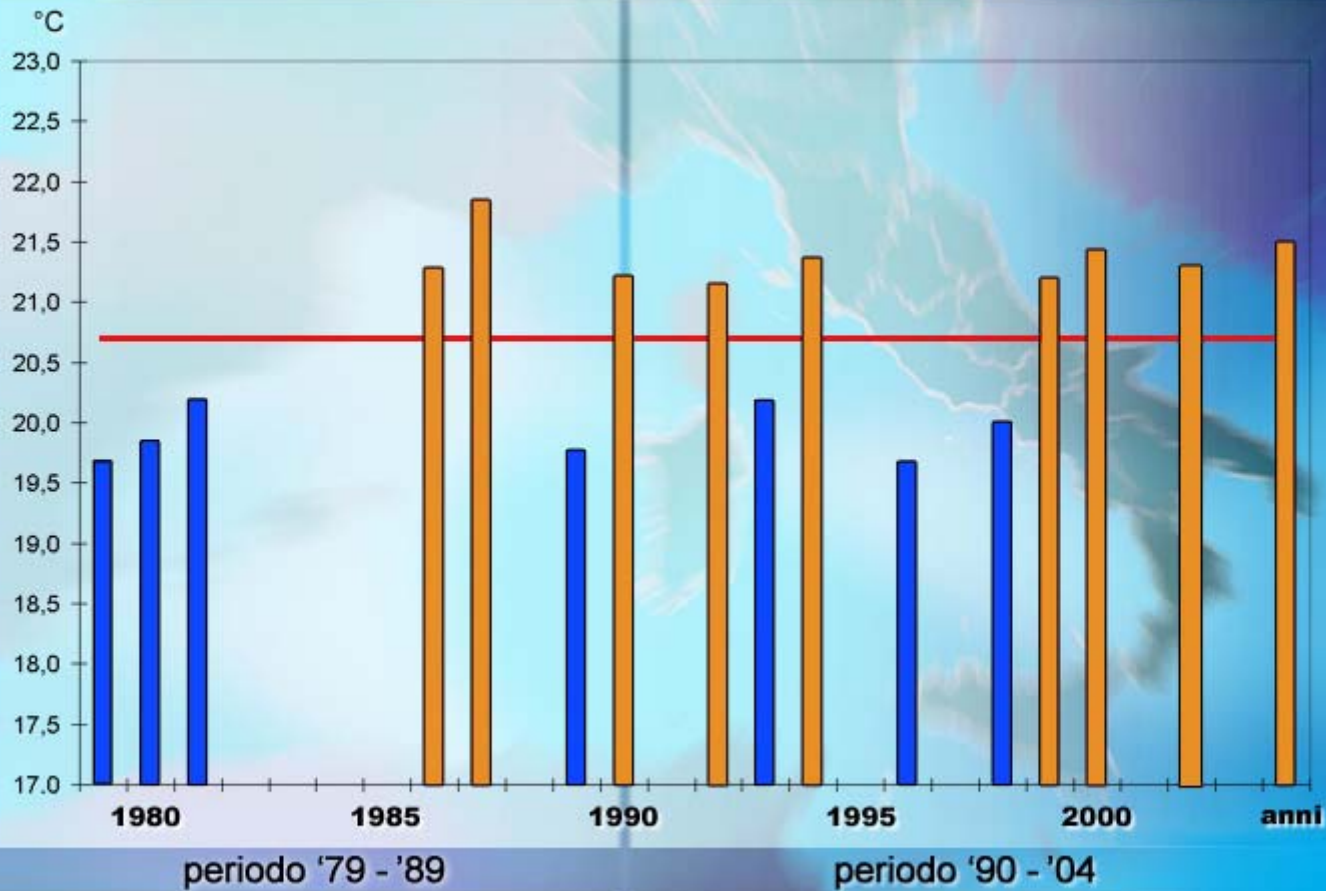
PRIMAVERE "CALDE" O "FREDDE" DAL 1979 AL 2004 (+/- 0,5°)



ESTATI "CALDE" O "FREDDE" DAL 1979 AL 2004 (+/- 0,5°)



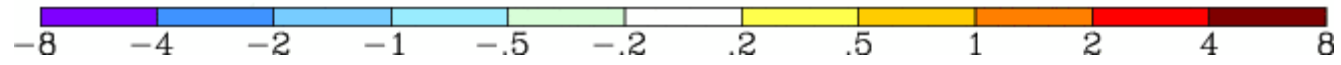
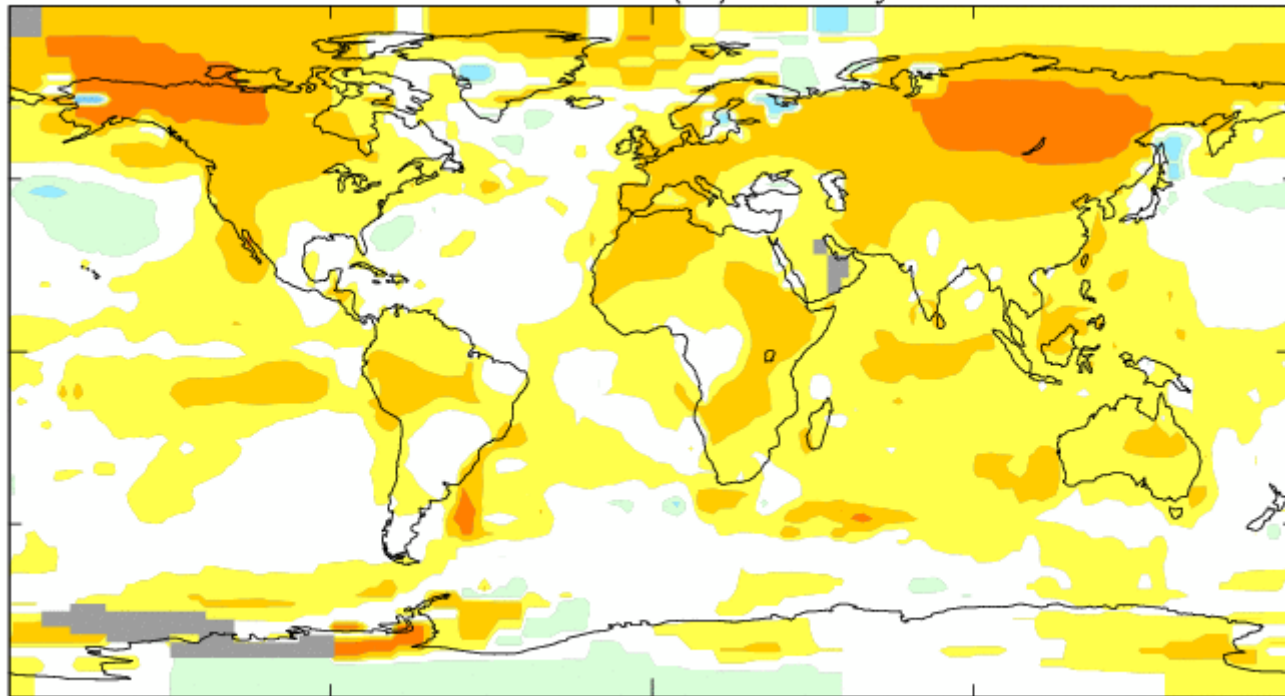
AUTUNNI "CALDI" O "FREDDI" DAL 1979 AL 2004 (+/- 0,5°)



Annual J-D 1980-2005

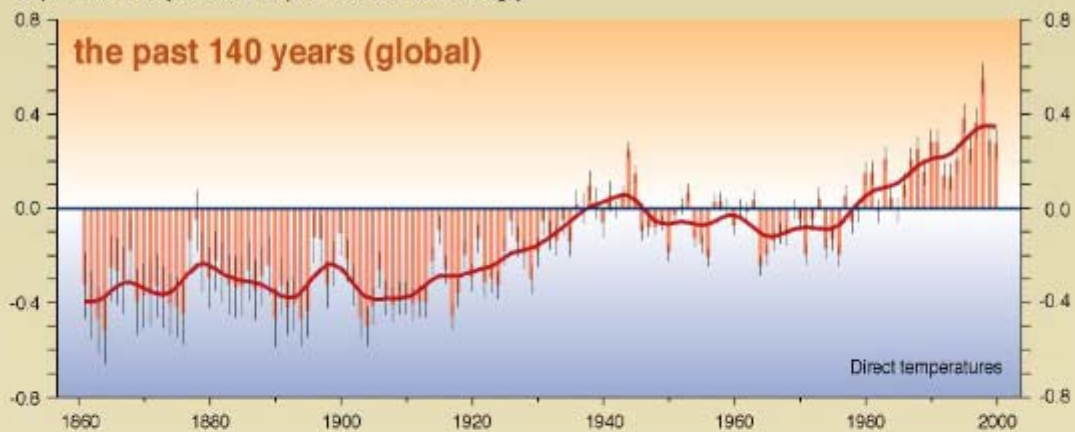
L-OTI(°C) Anomaly vs 1951-1979

.29

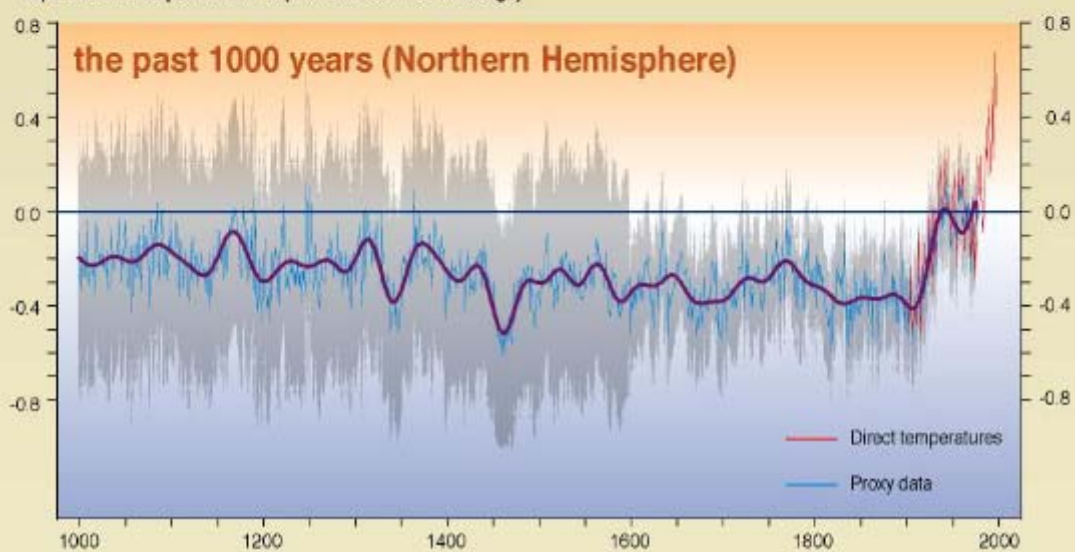


Variations of the Earth's surface temperature for...

Departures in temperature in °C (from the 1961-1990 average)



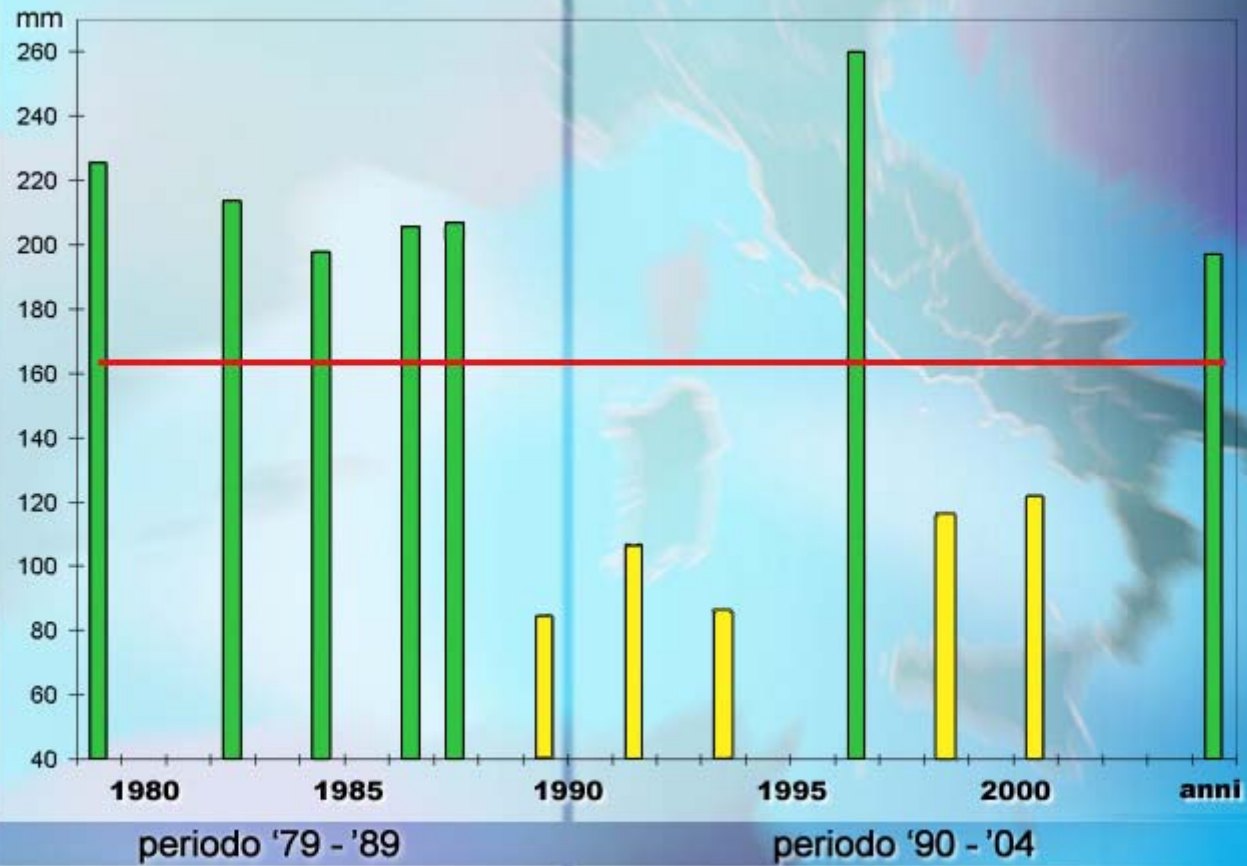
Departures in temperature in °C (from the 1961-1990 average)



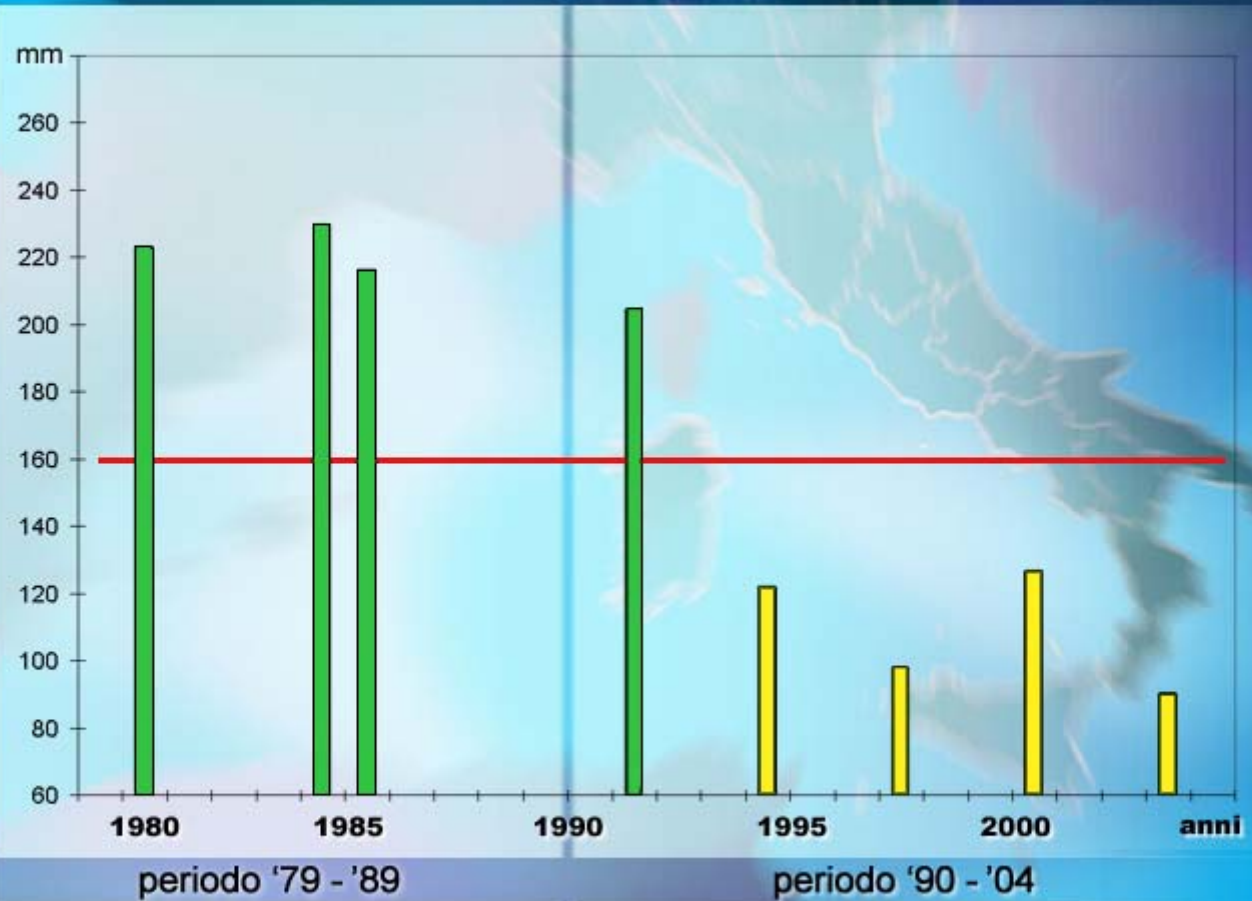
PIOVE DI MENO



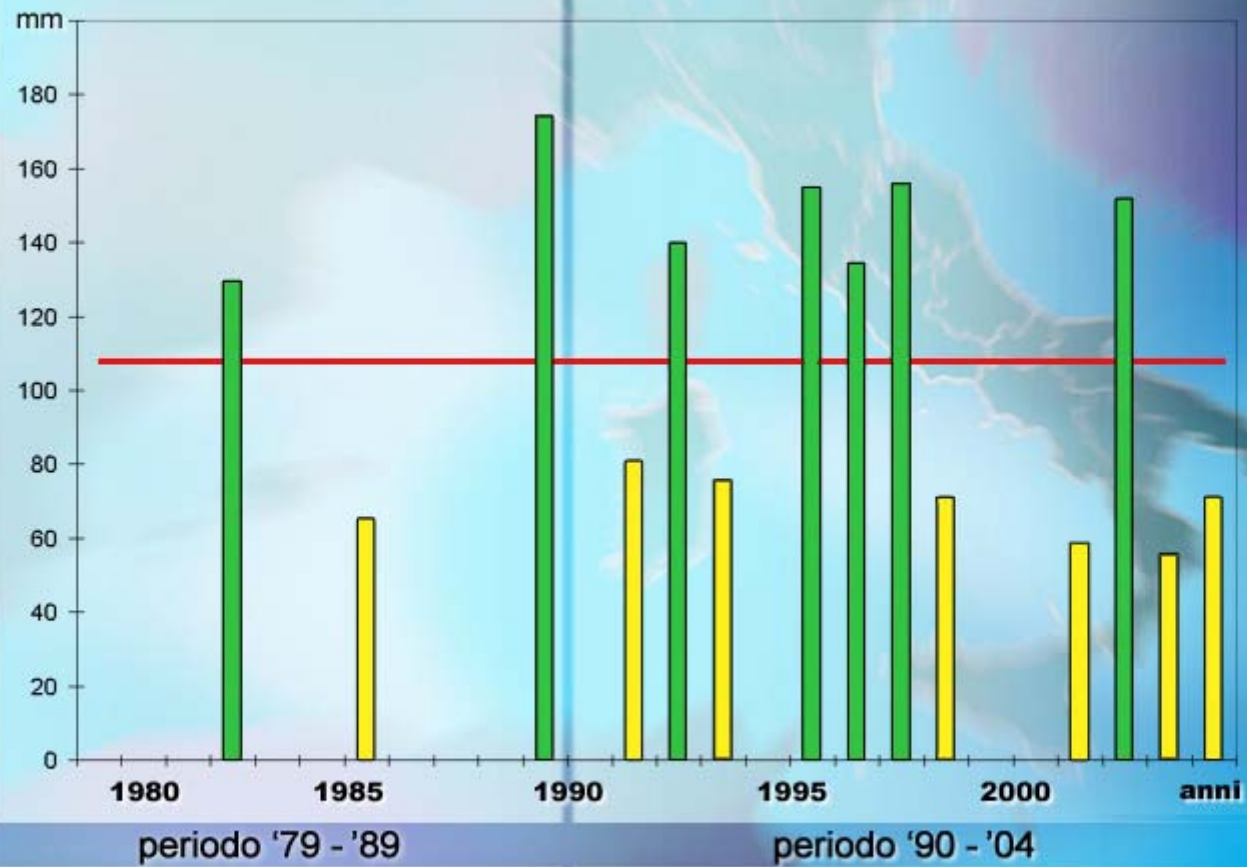
INVERNI "SICCITOSI" O "PIOVOSI" DAL 1979 AL 2004 (+/- 20%)



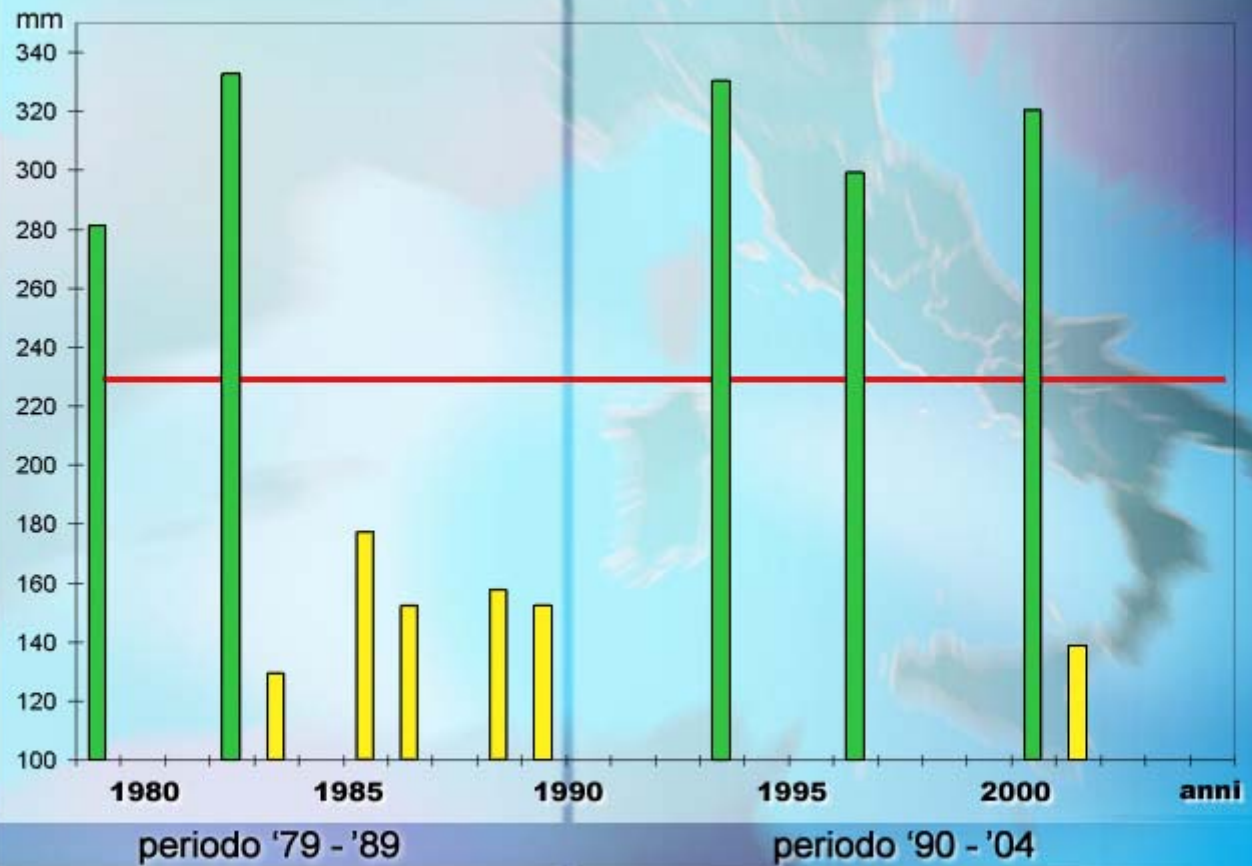
PRIMAVERE "SICCITOSE" O "PIOVOSE" DAL 1979 AL 2004 (+/- 20%)

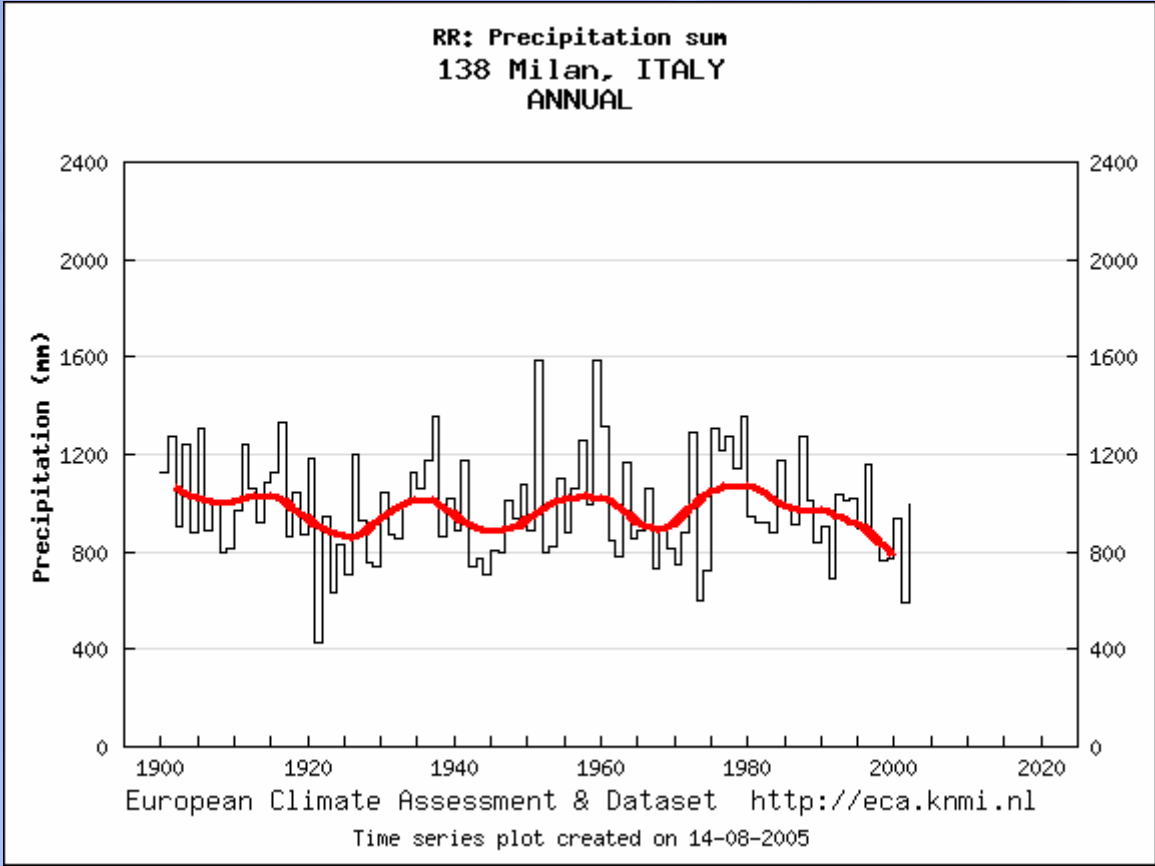


ESTATI "SICCITOSE" O "PIOVOSE" DAL 1979 AL 2004 (+/- 20%)

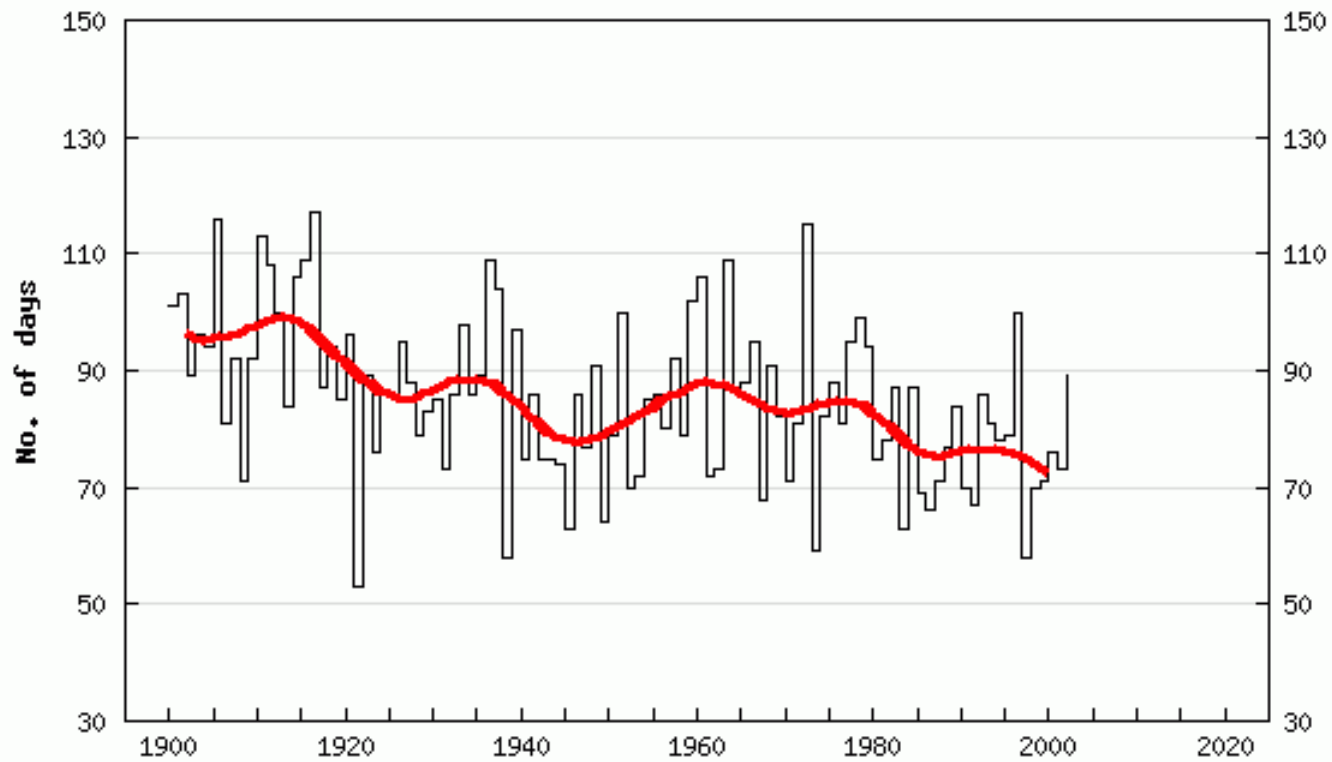


AUTUNNI "SICCITOSI" O "PIOVOSI" DAL 1979 AL 2004 (+/- 20%)



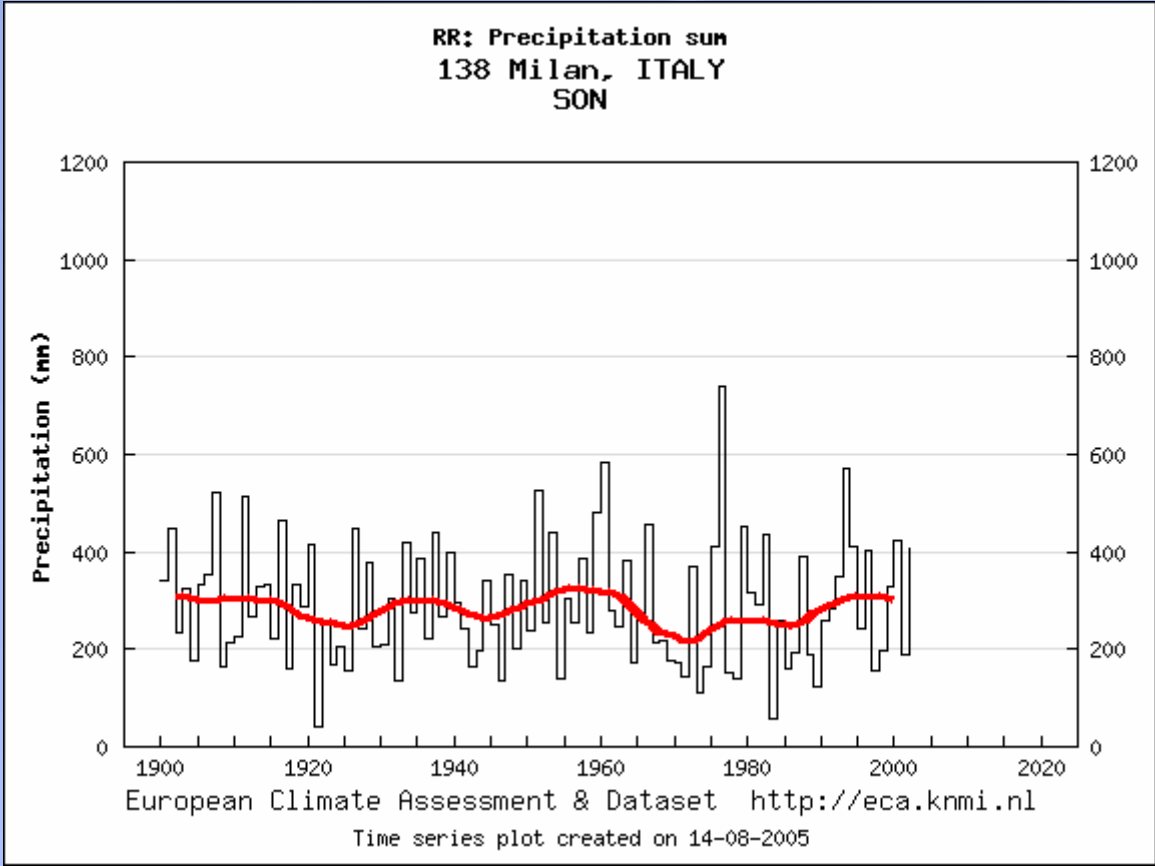


RR1: Wet days (RR ≥ 1 mm)
138 Milan, ITALY
ANNUAL



European Climate Assessment & Dataset <http://eca.knmi.nl>

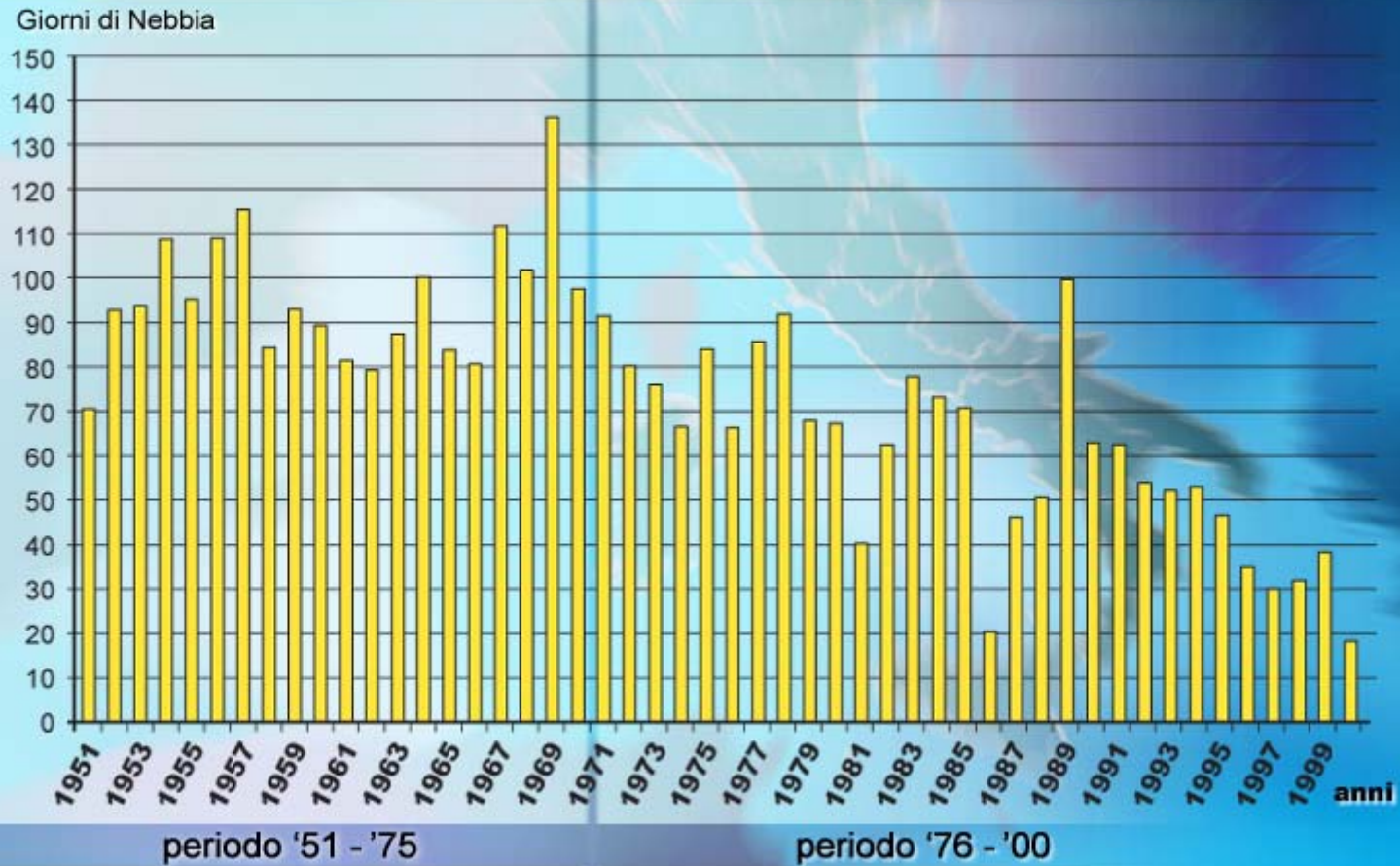
Time series plot created on 17-09-2005



VI È MENO NEBBIA

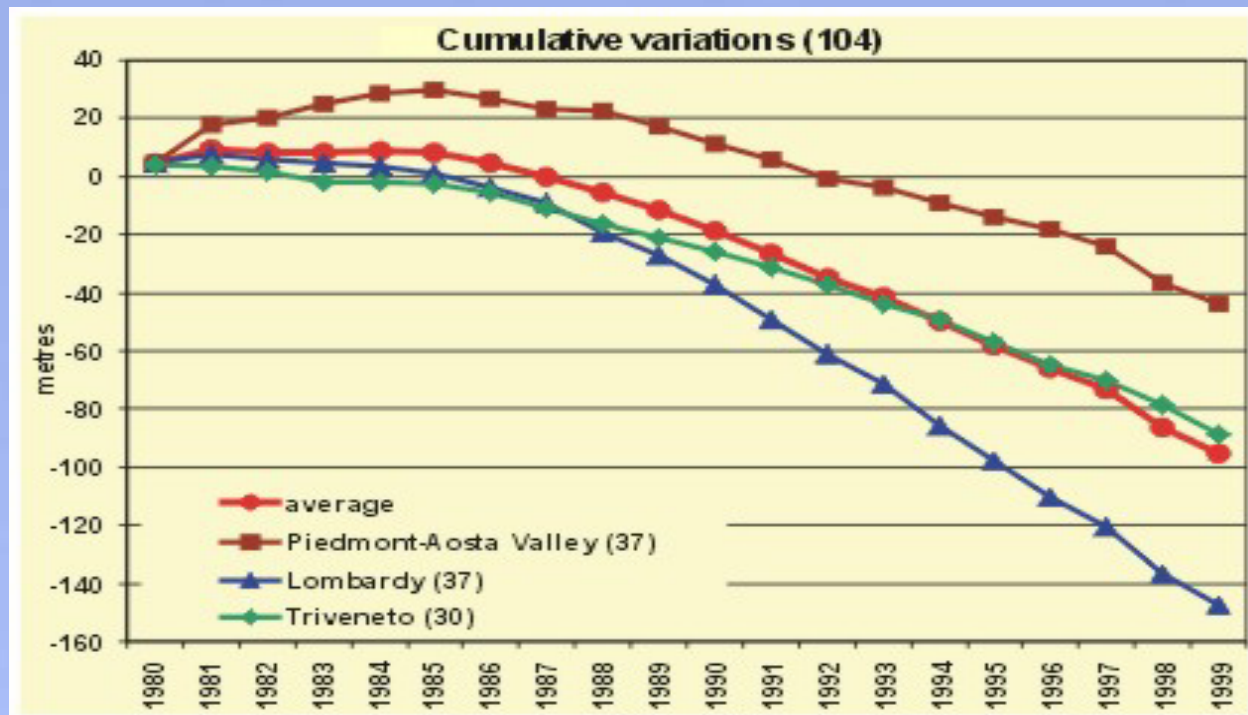


N° GIORNI CON NEBBIA per anno alle ore 06 UTC per la stazione di Milano



FUSIONE DEI GHIACCI ALPINI

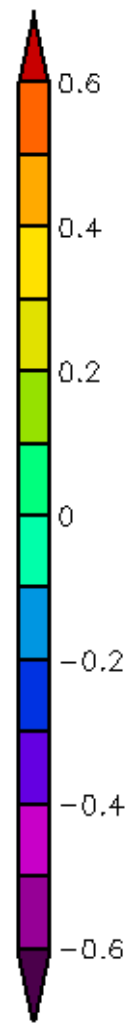
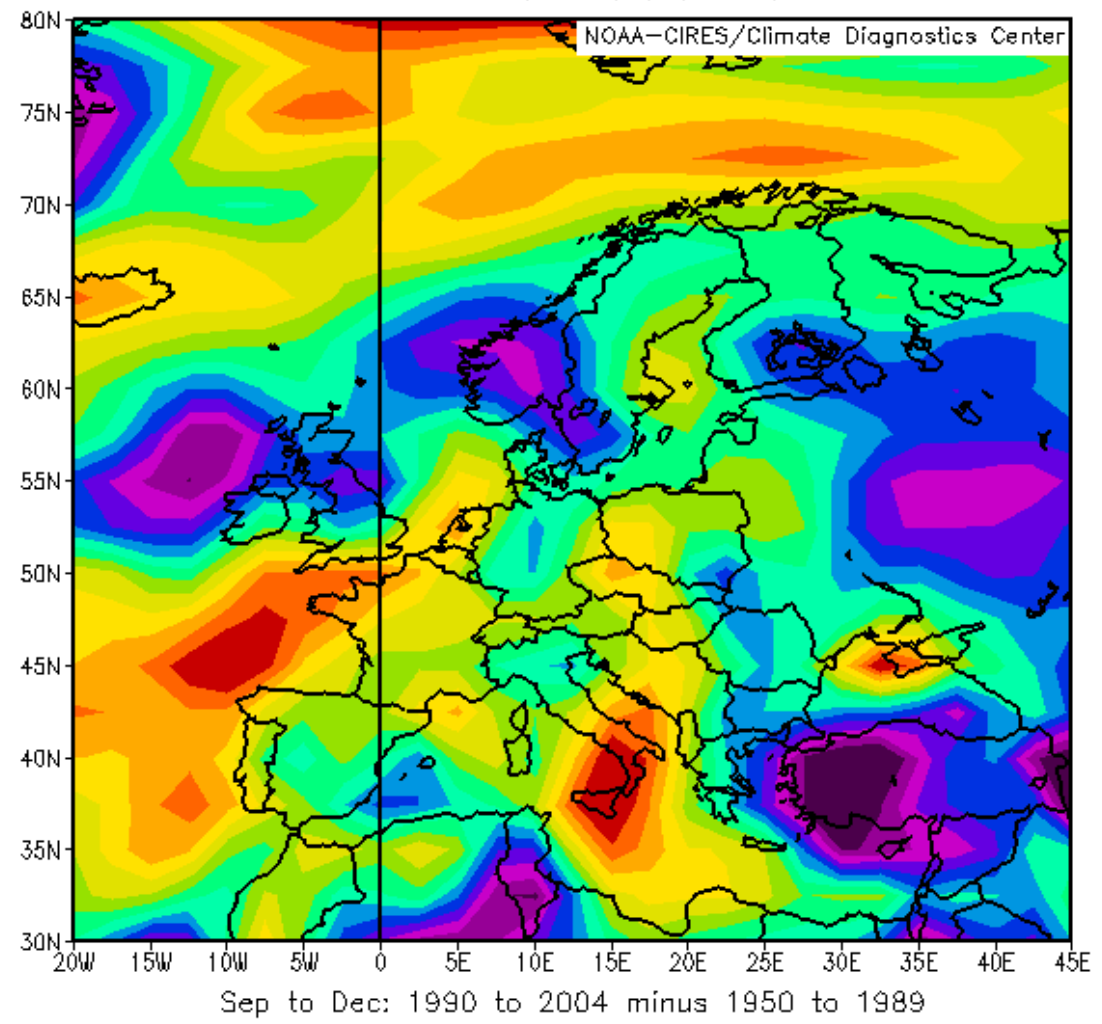




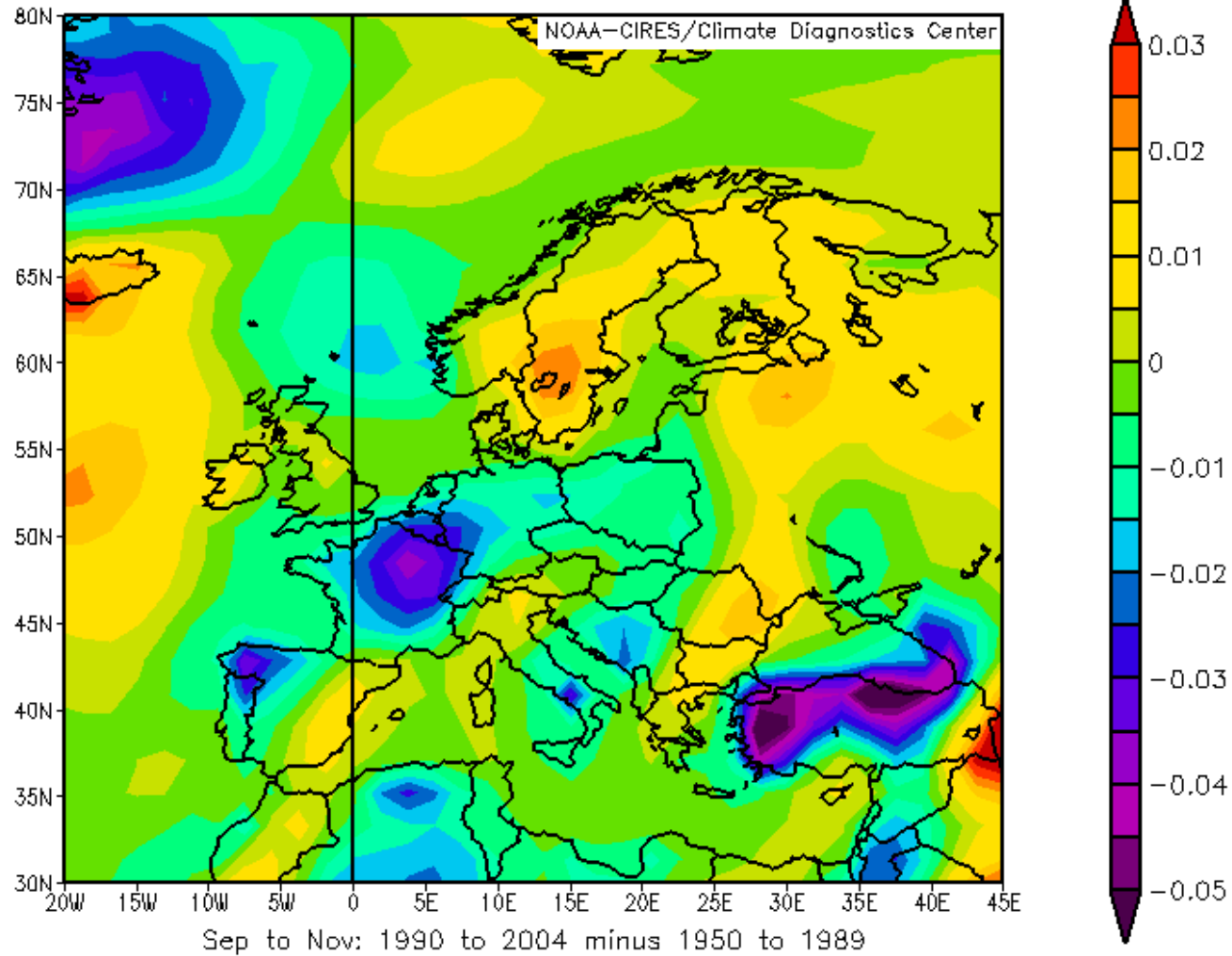
VENTI PIÙ FORTI IN AUTUNNO-PRIMO INVERNO



NCEP/NCAR Reanalysis
Surface Scalar Wind Speed (m/s) Composite Mean



NCEP/NCAR Reanalysis
Surface Meridional Momentum Flux (v_{flx}) Composite Mean

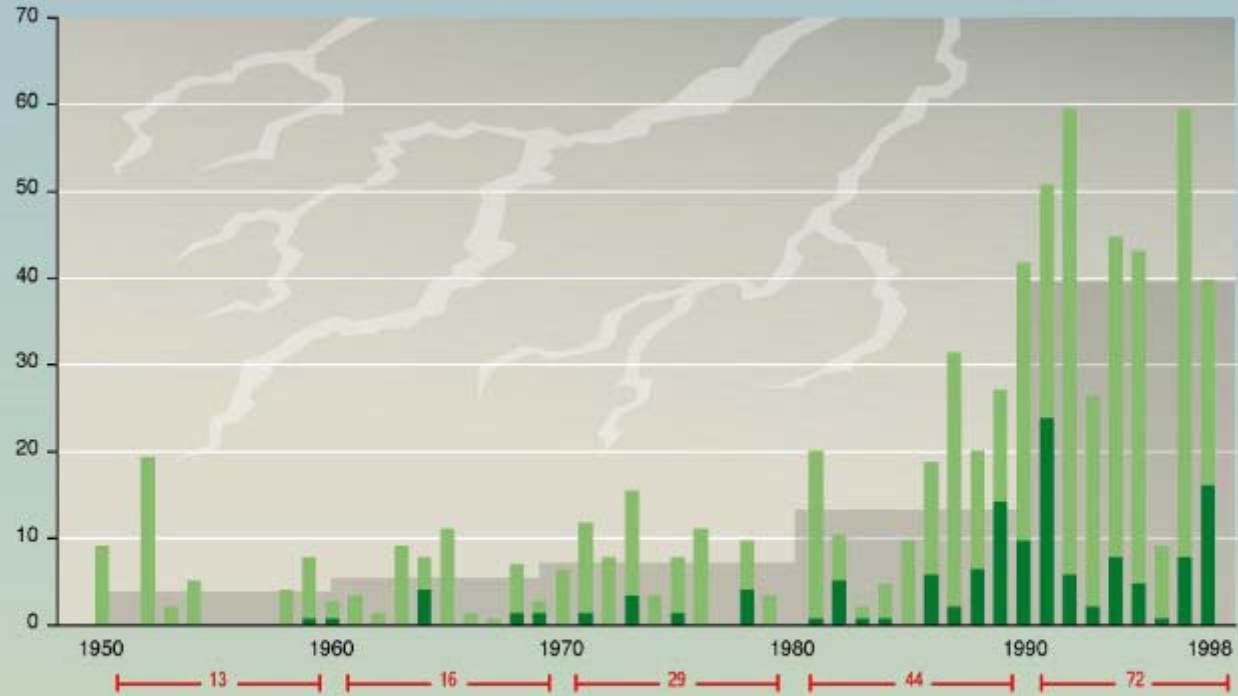


SONO AUMENTATI I FENOMENI ESTREMI:

- Alluvioni autunnali
- Ondate di caldo
- Nubifragi
- Episodi di prolungata siccità
- Acqua alta a Venezia
- Tempeste di vento
- Trombe d'aria

Global costs of extreme weather events (inflation-adjusted)

Annual losses, in thousand million U.S. dollars



Total economic losses

Number of events

Insured losses

Decadal average

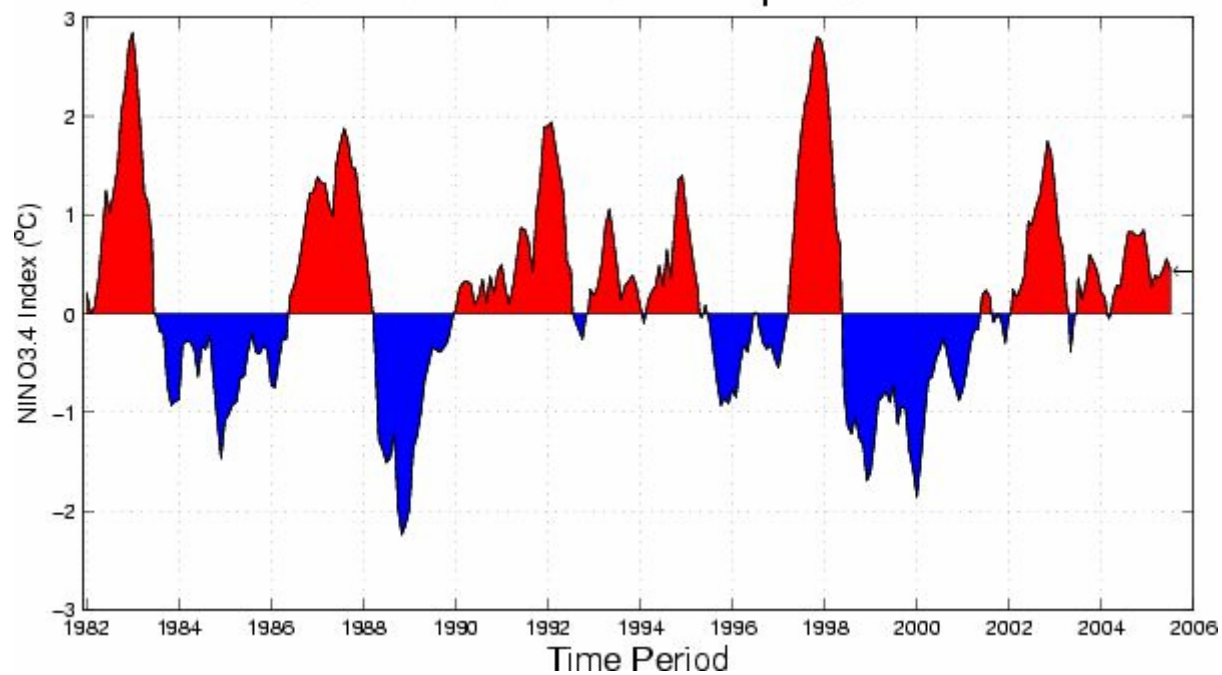
ESTATI CON ONDATE DI CALDO INTENSE E/O NUMEROSE E/O DI LUNGA DURATA:

- 1952 1957
- 1965
- 1971 1974
- 1983 1988
- 1994 1995 1998 2003

L'aumento di 1 °C nella media delle temperature massime estive aumenta di 2-4 volte la probabilità che si verifichino $T_{max} > 33-34 °C$

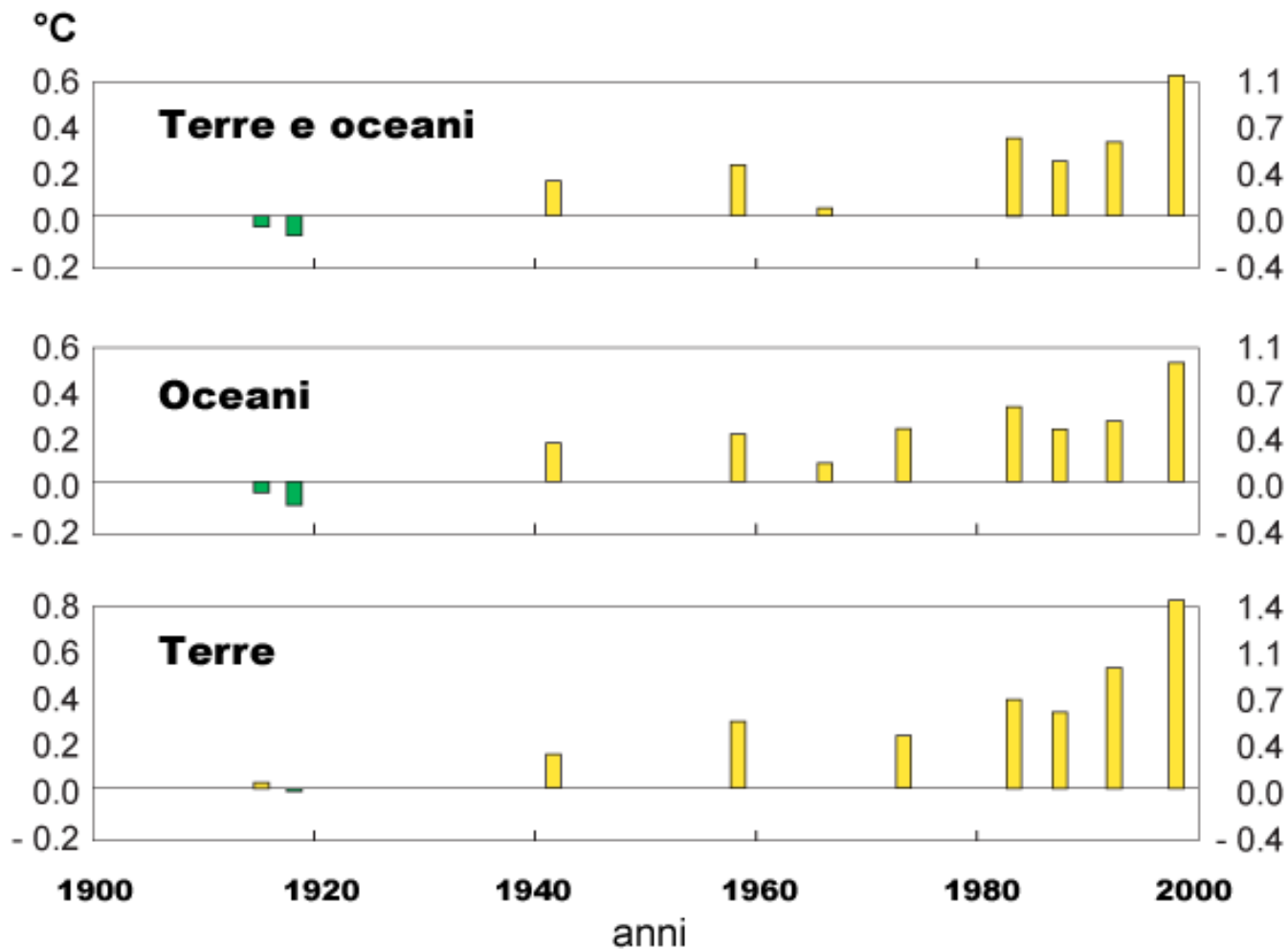
Soglia termica in °C	Probabilità (%) superamento della soglia nel caso media Tmax = 27.5 °C	Probabilità (%) superamento della soglia nel caso media Tmax = 28.4 °C	Aumento di probabilità (%)
29	23	36	56%
30	11	20	89%
31	4	9	120%
32	1.2	3.2	162%
33	0.3	0.9	210%
34	0.06	0.22	266%

Historical Sea Surface Temperature Index

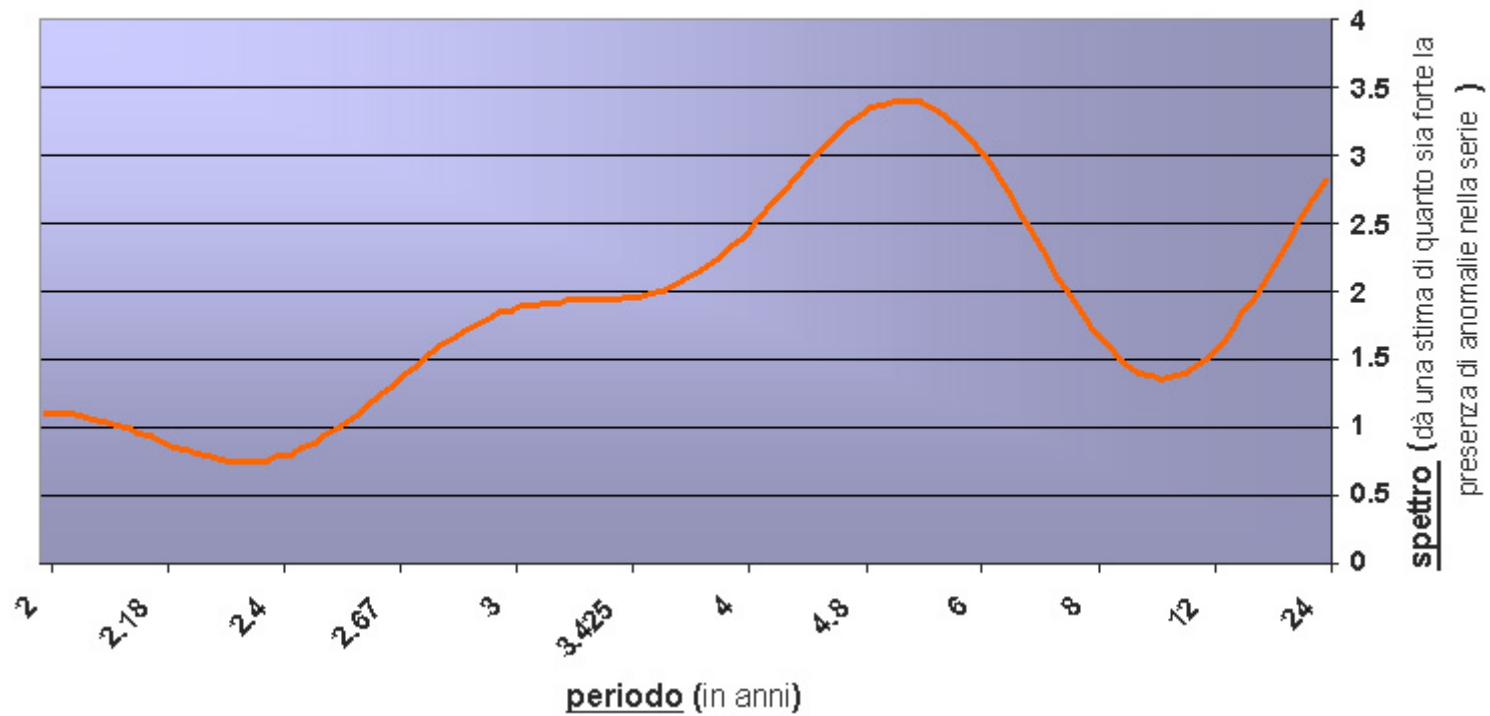


EVENTI DI "EL NINO": TOP TEN

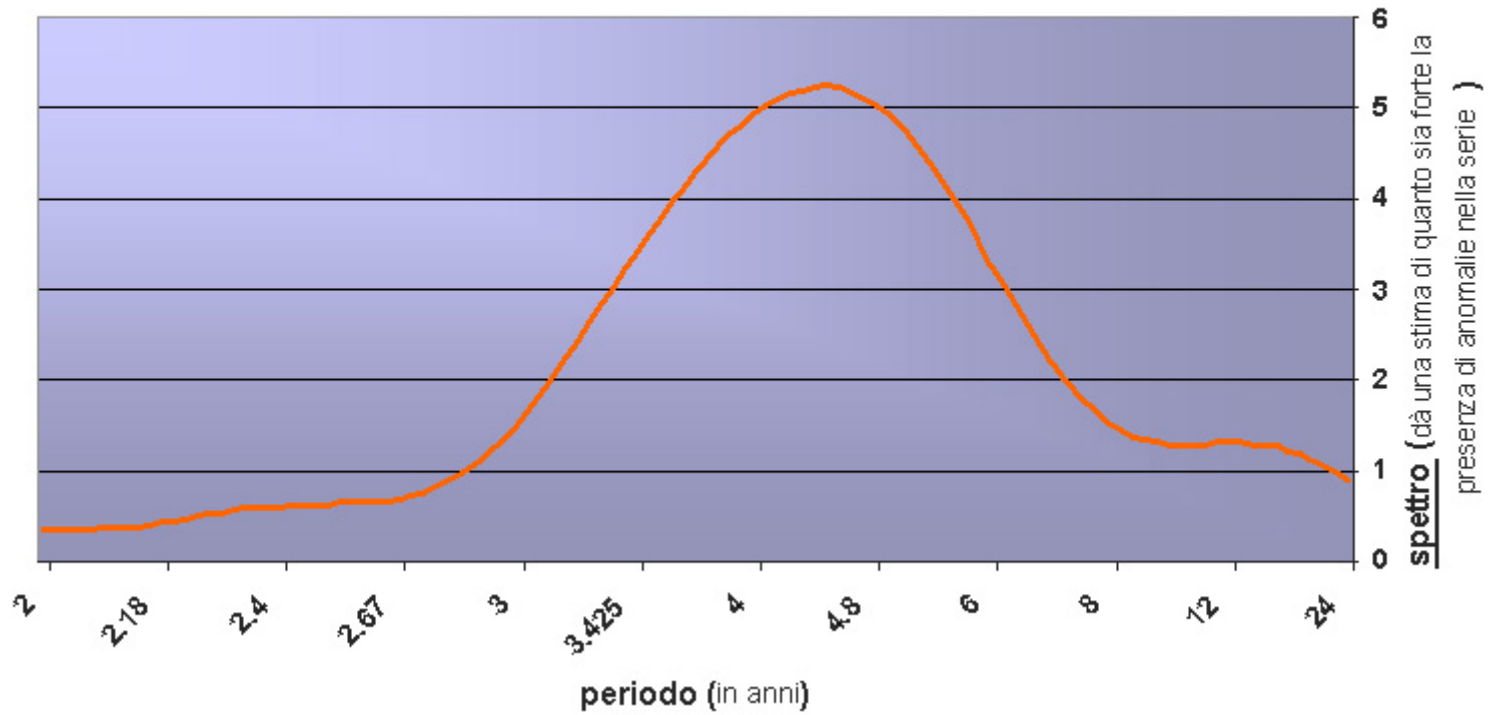
Anomalia della temperatura media superficiale



Tmax estive Italia - Analisi spettro della frequenza



MEI - Analisi spettro della frequenza



LE PIÙ GRANDI ALLUVIONI DEGLI ULTIMI 55 ANNI IN ITALIA:

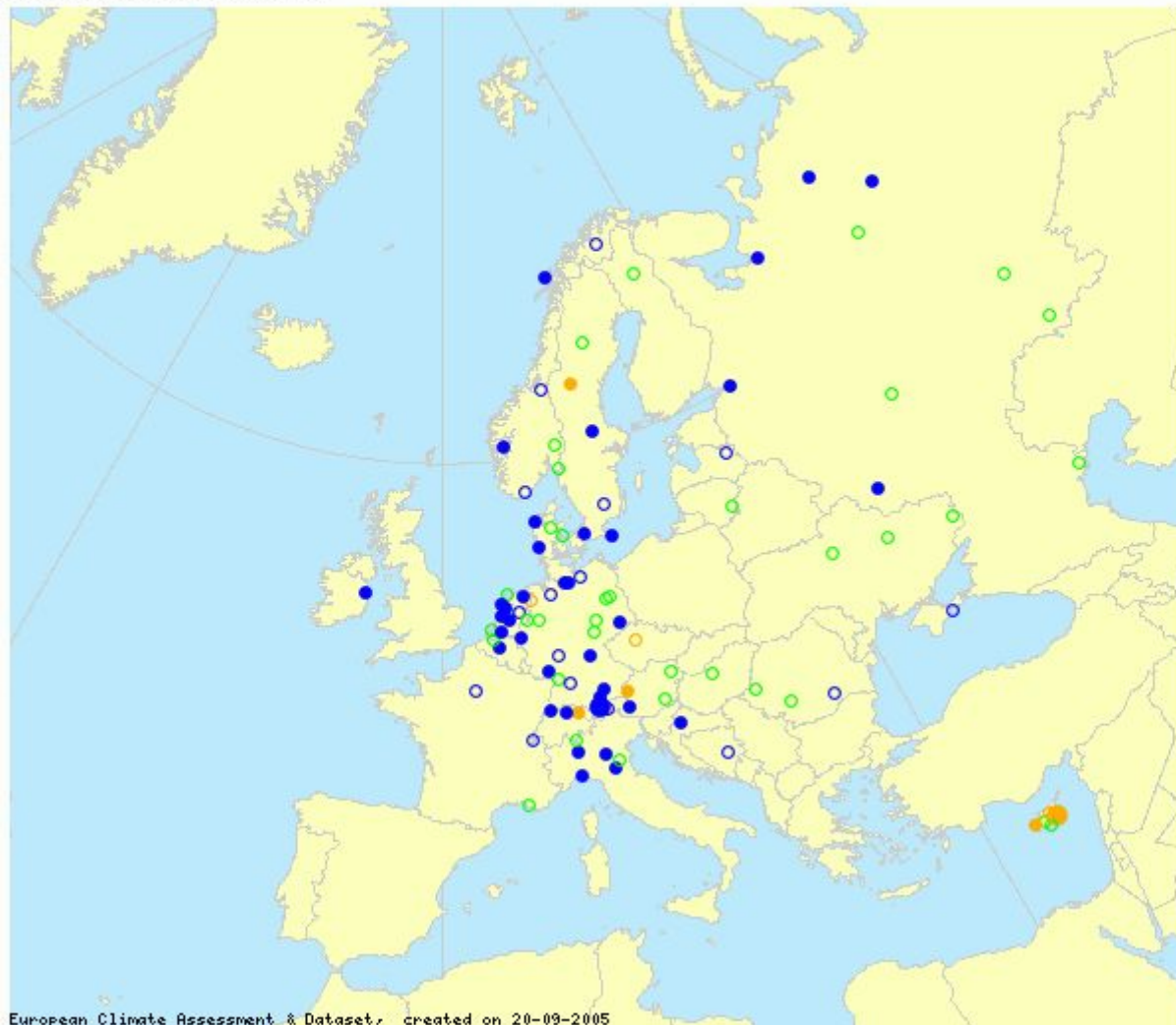
- 1951 – Storica piena del Po
- 1966 – Alluvione a Firenze
- 1993 – Alluvione in Liguria
- 1994 – Alluvione in Piemonte
- 2000 – Alluvione in Piemonte/Val d'Aosta
- 2002 – Alluvione in Lombardia

AUMENTO NUBIFRAGI IN ALCUNE CITTA'

- Milano +380%
- Bari +250%
- Napoli +220%
- Roma +200%
- Bologna +190%
- Torino +190%

SDII: Simple daily intensity index

Trends 1901-1999 ANNUAL



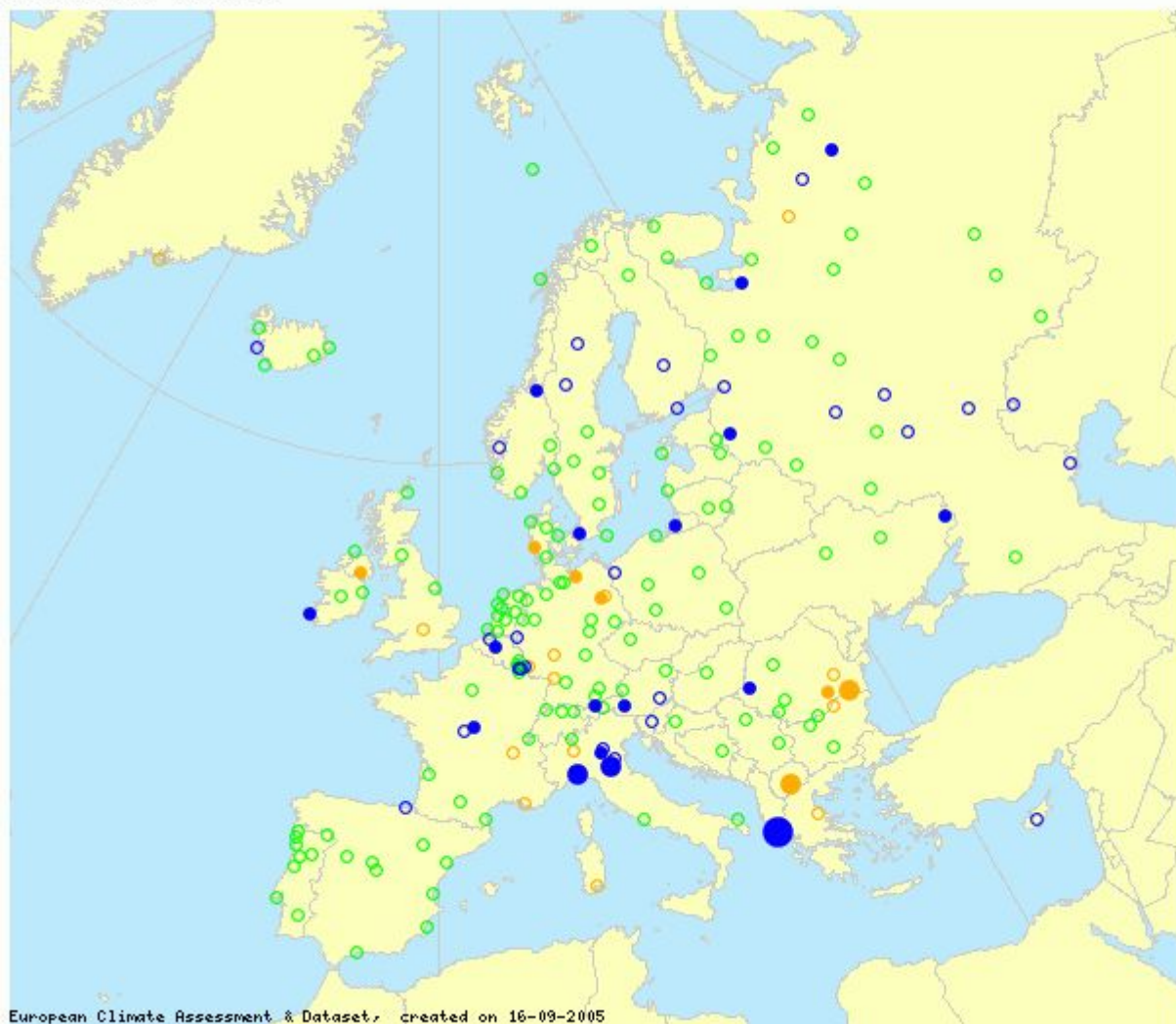
mm/wet day/decade

- > 0,6
- 0,4 - 0,6
- 0,2 - 0,4
- 0 - 0,2
- pos. but n.s. at 5%
- n.s. at 25%
- neg. but n.s. at 5%
- 0 - -0,2
- -0,2 - -0,4
- -0,4 - -0,6
- < -0,6

European Climate Assessment & Dataset, created on 20-09-2005

SDII: Simple daily intensity index

Trends 1946-2004 JJA



mm/wet day/decade

- > 1.5
- 1 - 1.5
- 0.5 - 1
- 0 - 0.5
- pos. but n.s. at 5%
- n.s. at 25%
- neg. but n.s. at 5%
- 0 - -0.5
- -0.5 - -1
- -1 - -1.5
- < -1.5

European Climate Assessment & Dataset, created on 16-09-2005

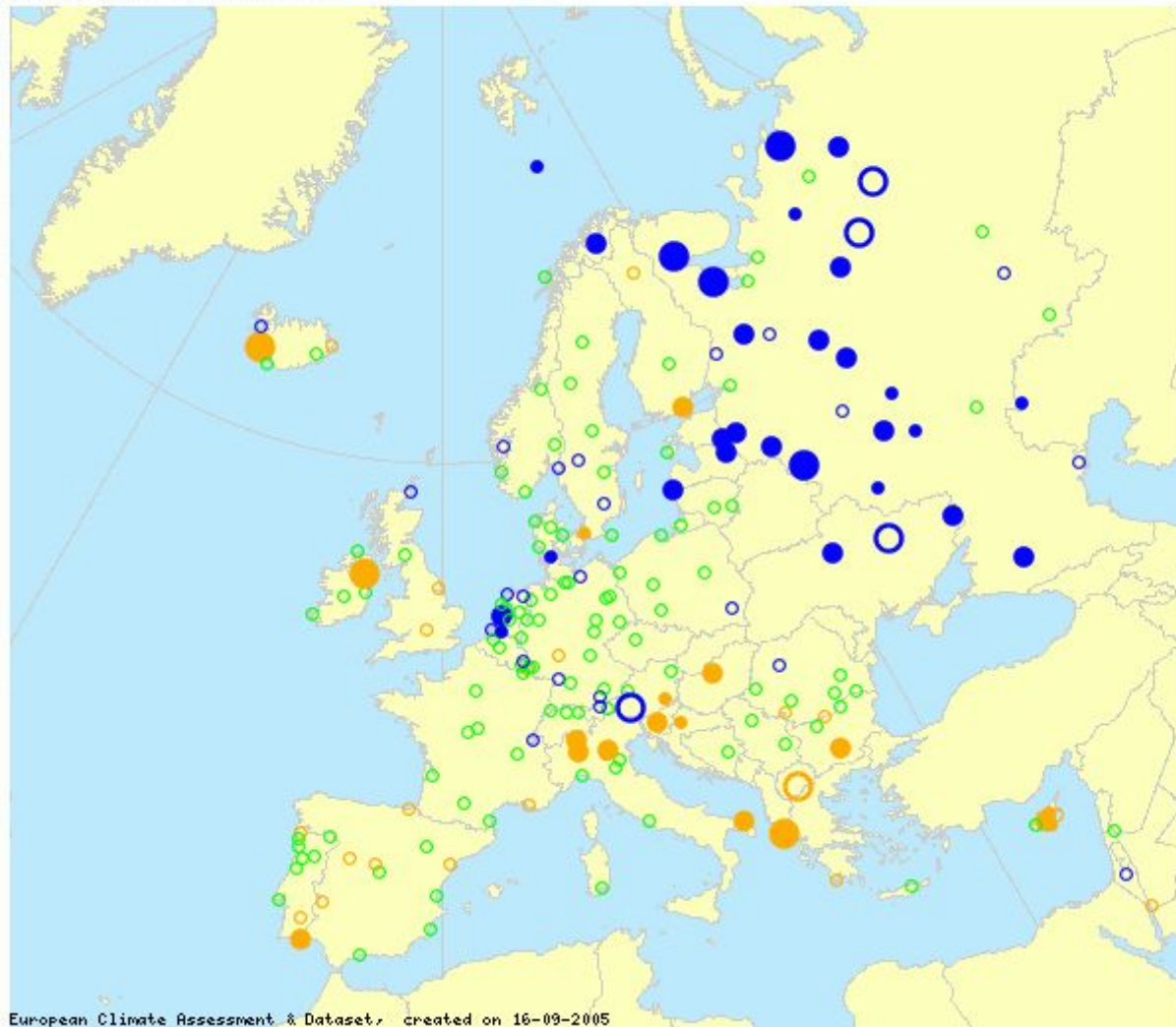
CASI FORTE SICCIÀ

(deficit idrico >40/50% in 8-9 mesi)

- INVERNO-PRIMAVERA-ESTATE **1961-1993-2000-2001-2003-2005**
- PRIMAVERA-ESTATE-AUTUNNO **1983**
- ESTATE-AUTUNNO-INVERNO **2001**
- AUTUNNO-INVERNO-PRIMAVERA **nessun caso**

RR1: Wet days (RR \geq 1 mm)

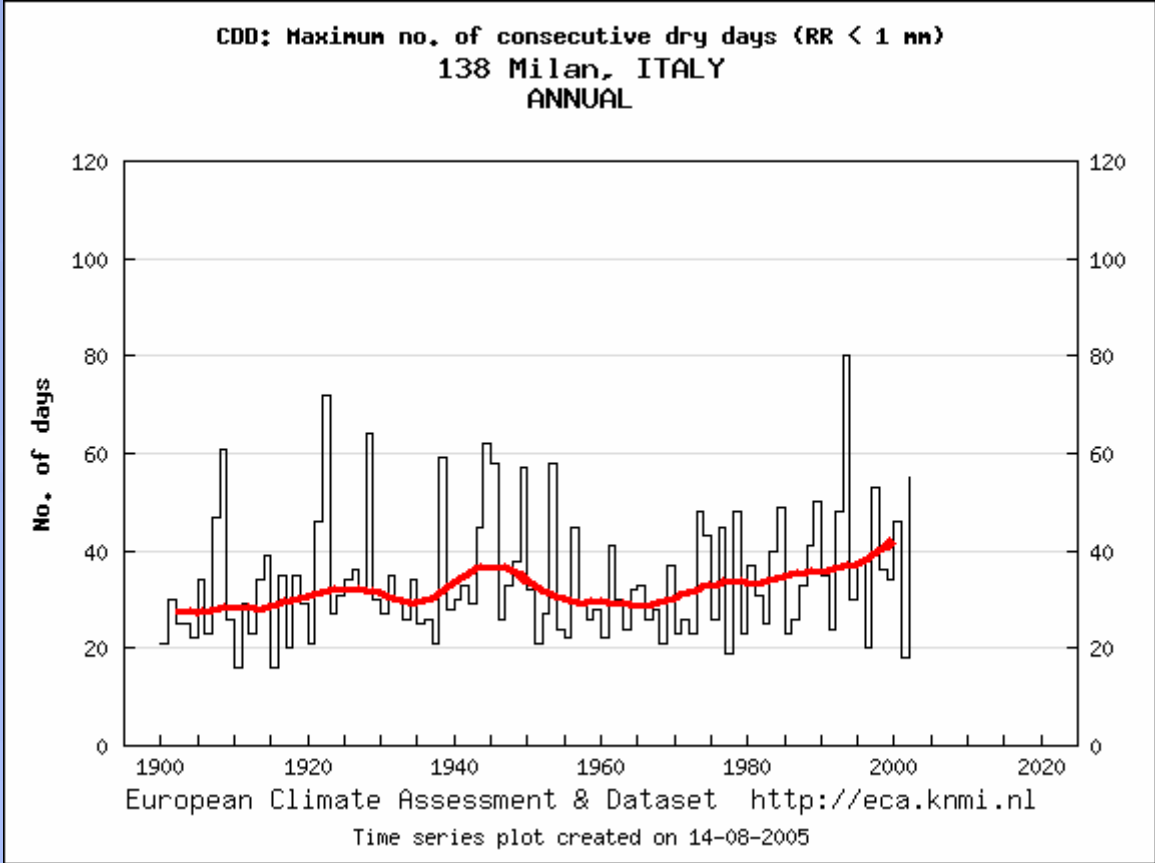
Trends 1946-2004 ANNUAL



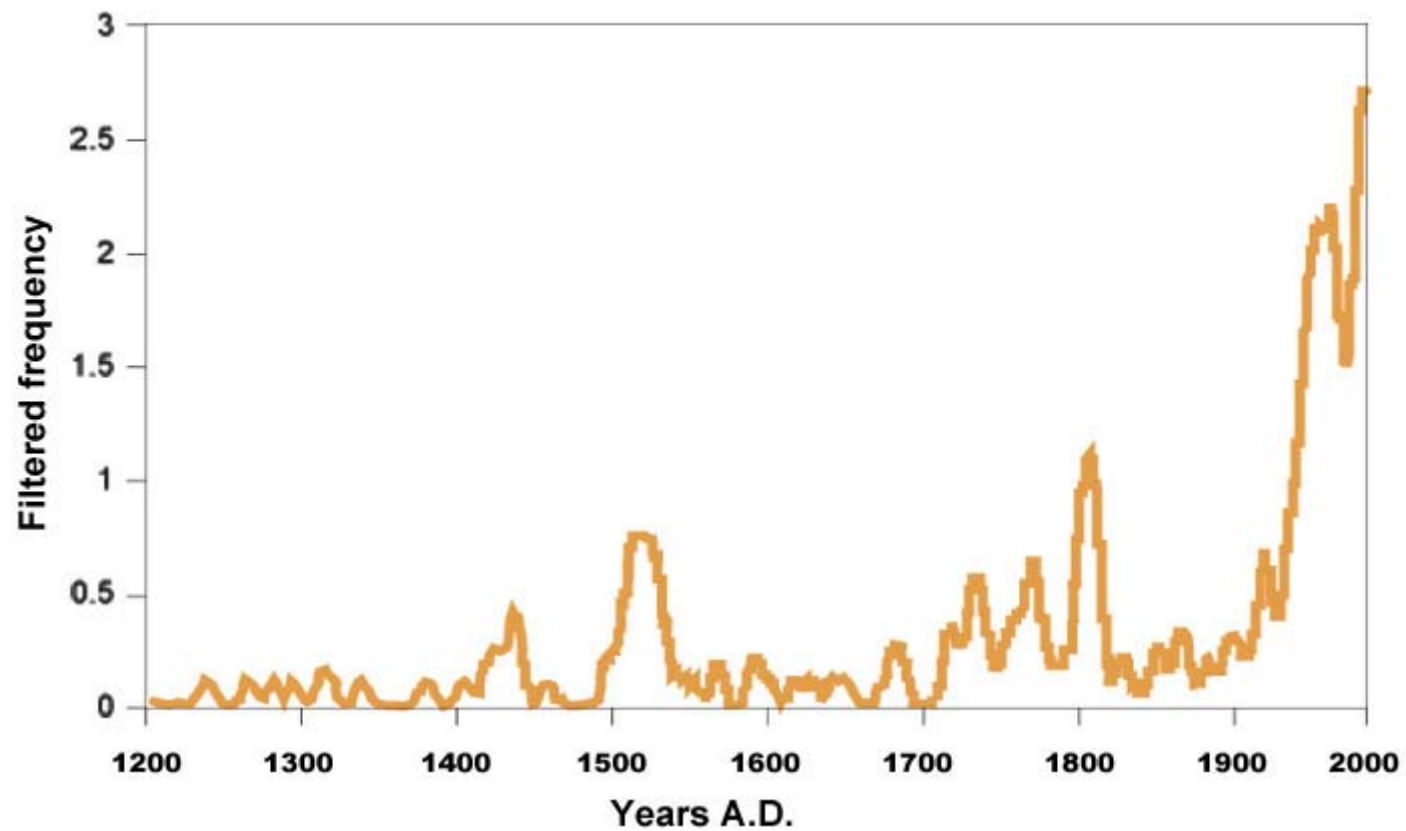
European Climate Assessment & Dataset, created on 16-09-2005







EPISODI DI ACQUA ALTA A VENEZIA



Camuffo et Alias

TEMPESTE DI VENTO SULL'EUROPA

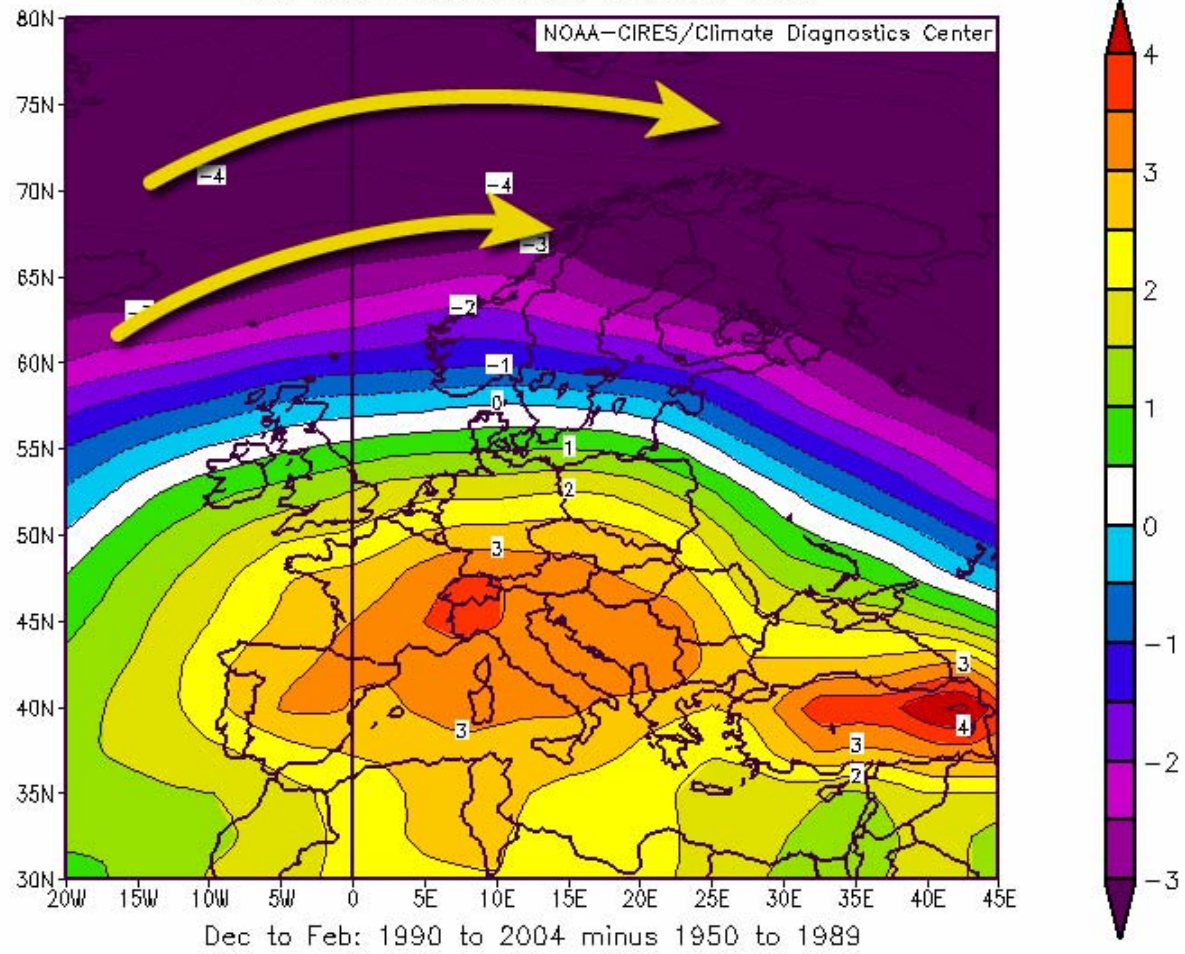
Top ten dal 1500 ad oggi

Anno - mese	nome	Storm Severe Index
1999 - dic	Lothar	> 20.000
1986 - dic	-	~ 20.000
1792 - dic	-	~ 12.000
1825 - feb	-	~ 12.000
1694 - ott	-	~ 10.000
1703 - dic	-	~ 9.000
1634 - ott	-	~ 8.000
1839 - gen	-	~ 8.000
1987 - ott	-	~ 8.000
1886 - ott	-	~ 7.000

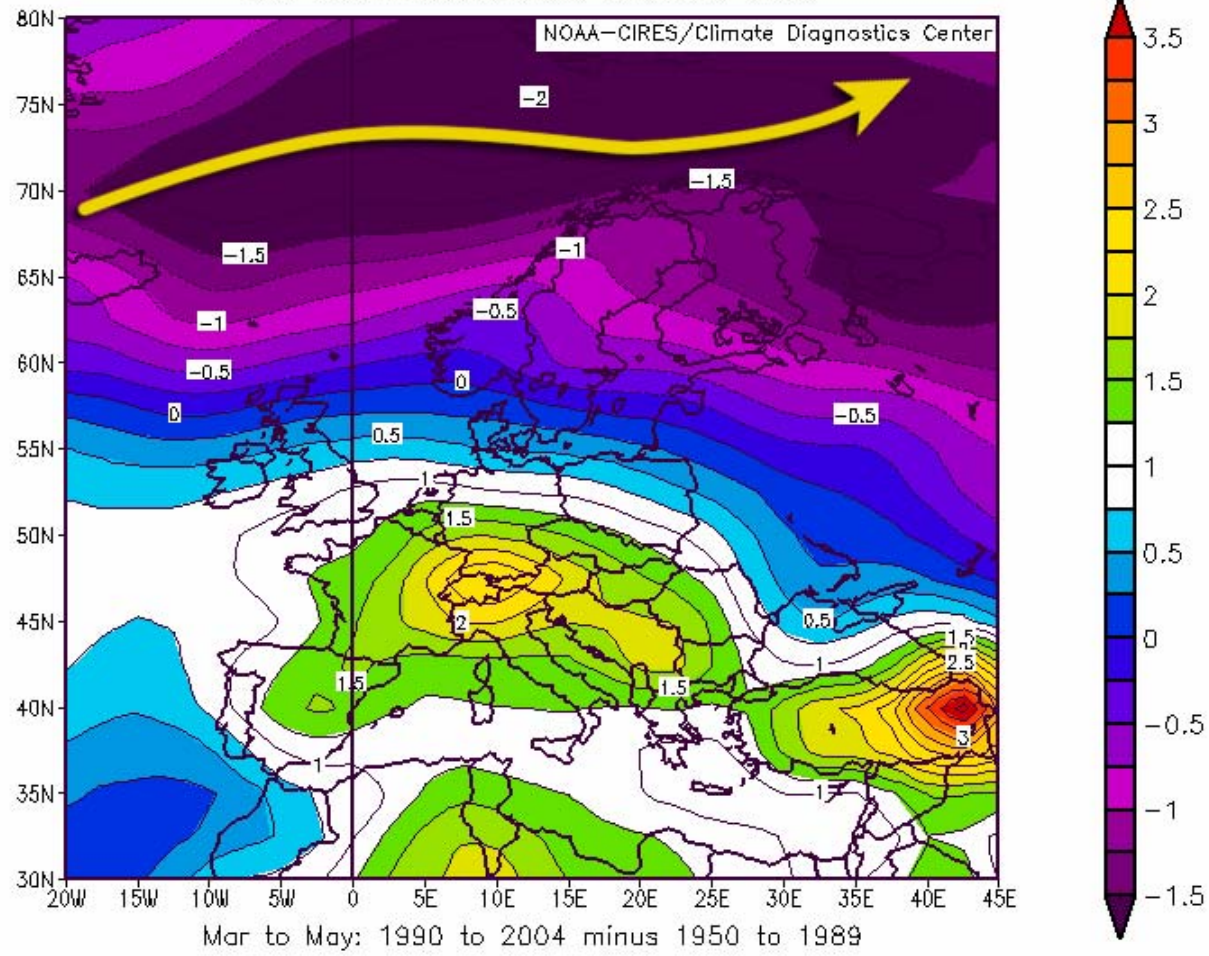
COME È CAMBIATA LA CIRCOLAZIONE ATMOSFERICA NELL'AREA EURO-MEDITERRANEA



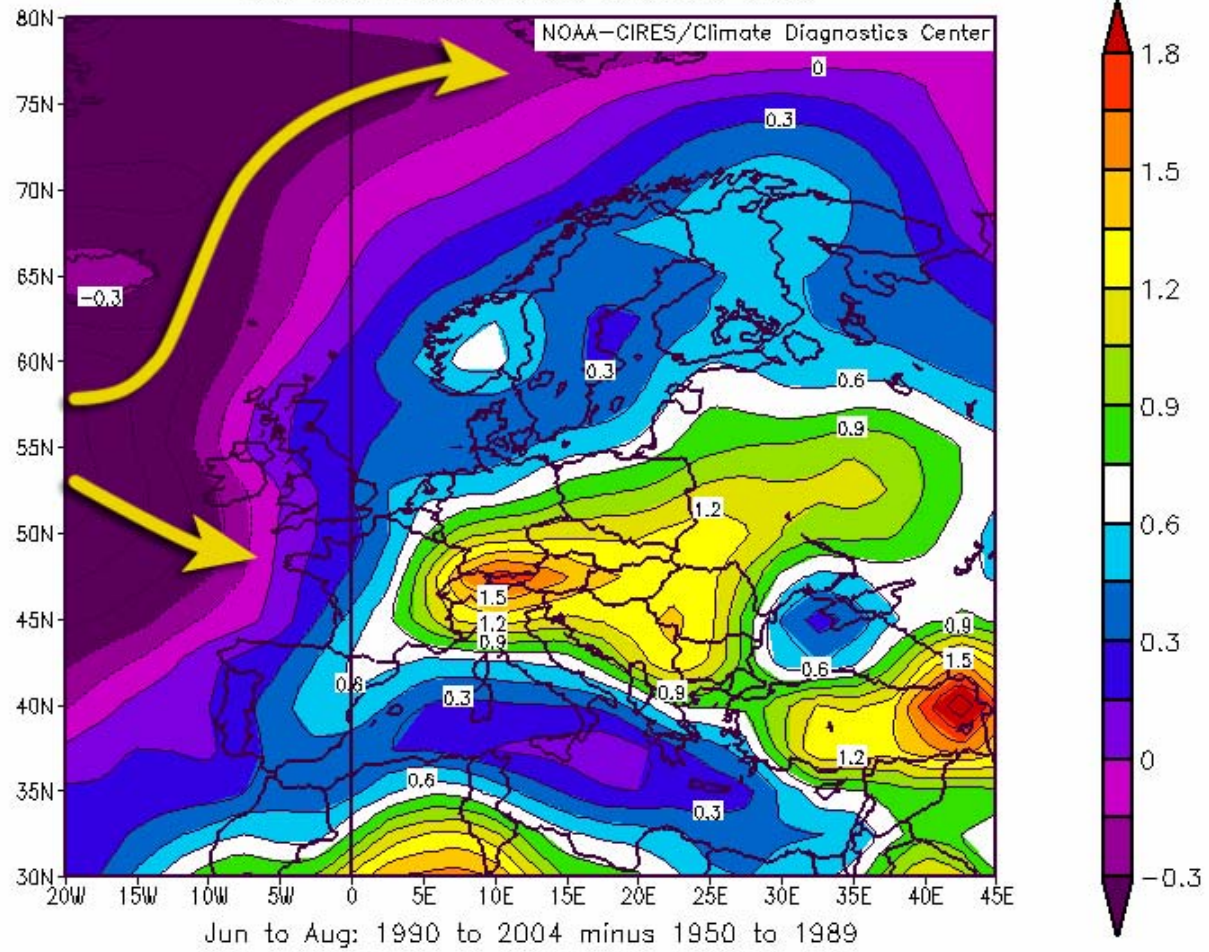
NCEP/NCAR Reanalysis
Sea Level Pressure (mb) Composite Mean



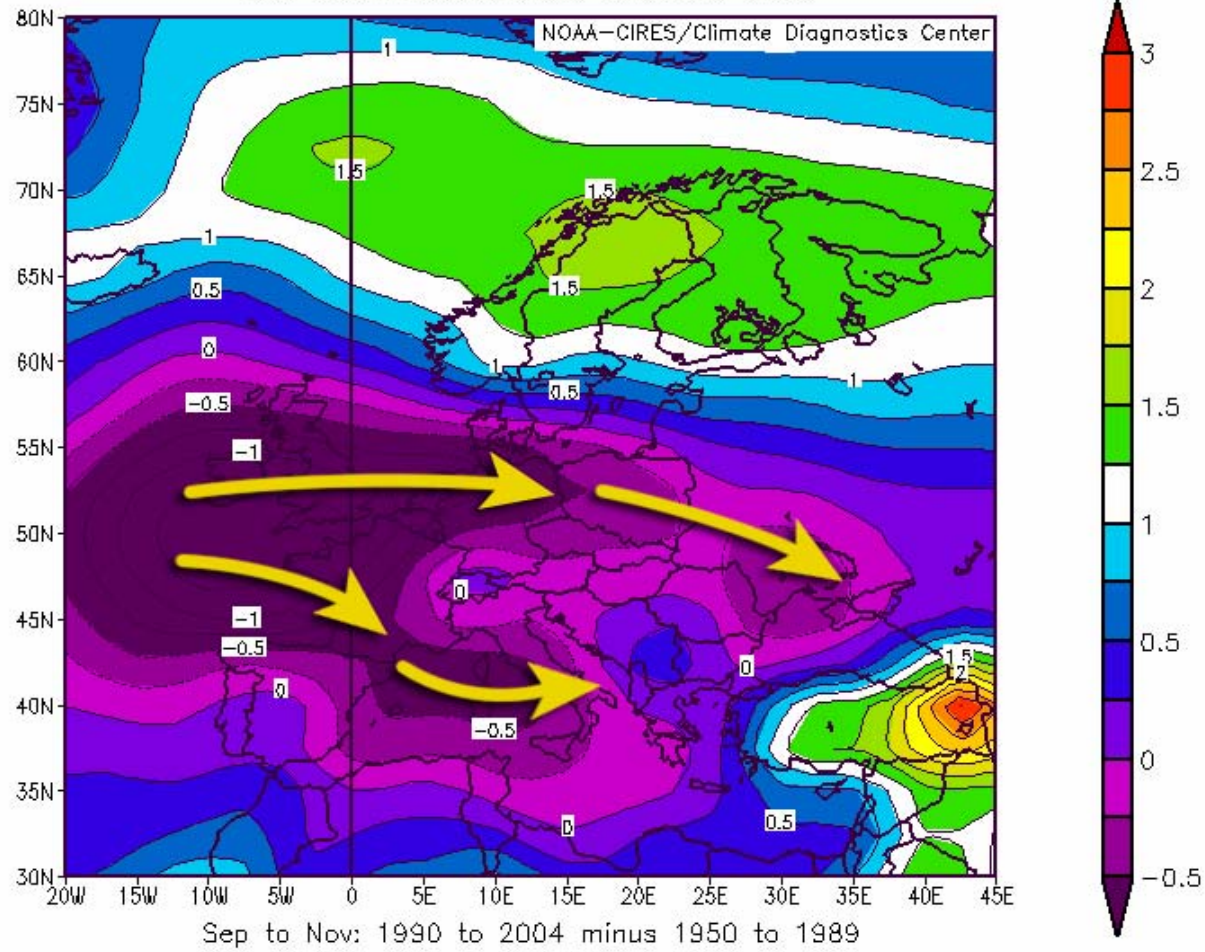
NCEP/NCAR Reanalysis
Sea Level Pressure (mb) Composite Mean



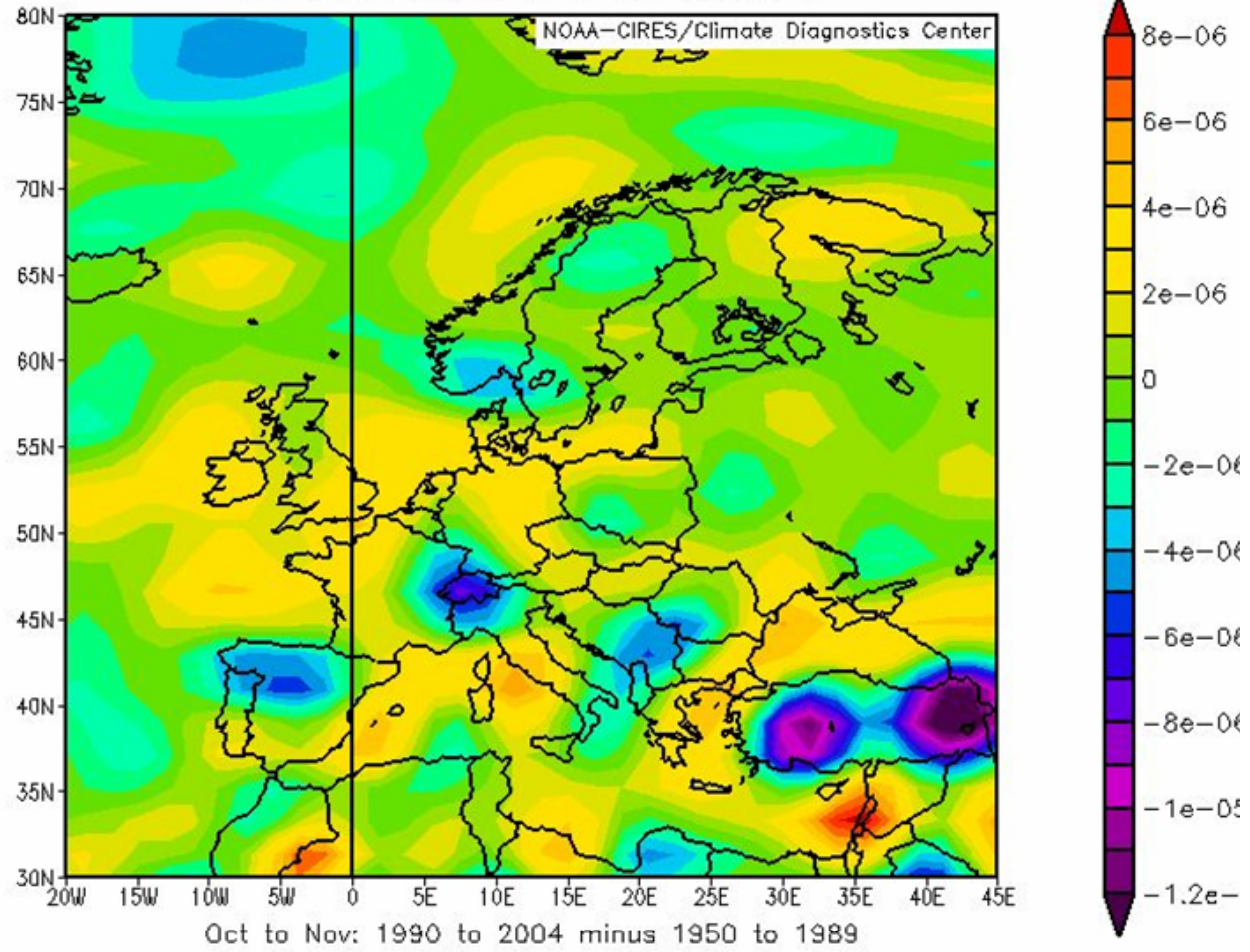
NCEP/NCAR Reanalysis
Sea Level Pressure (mb) Composite Mean



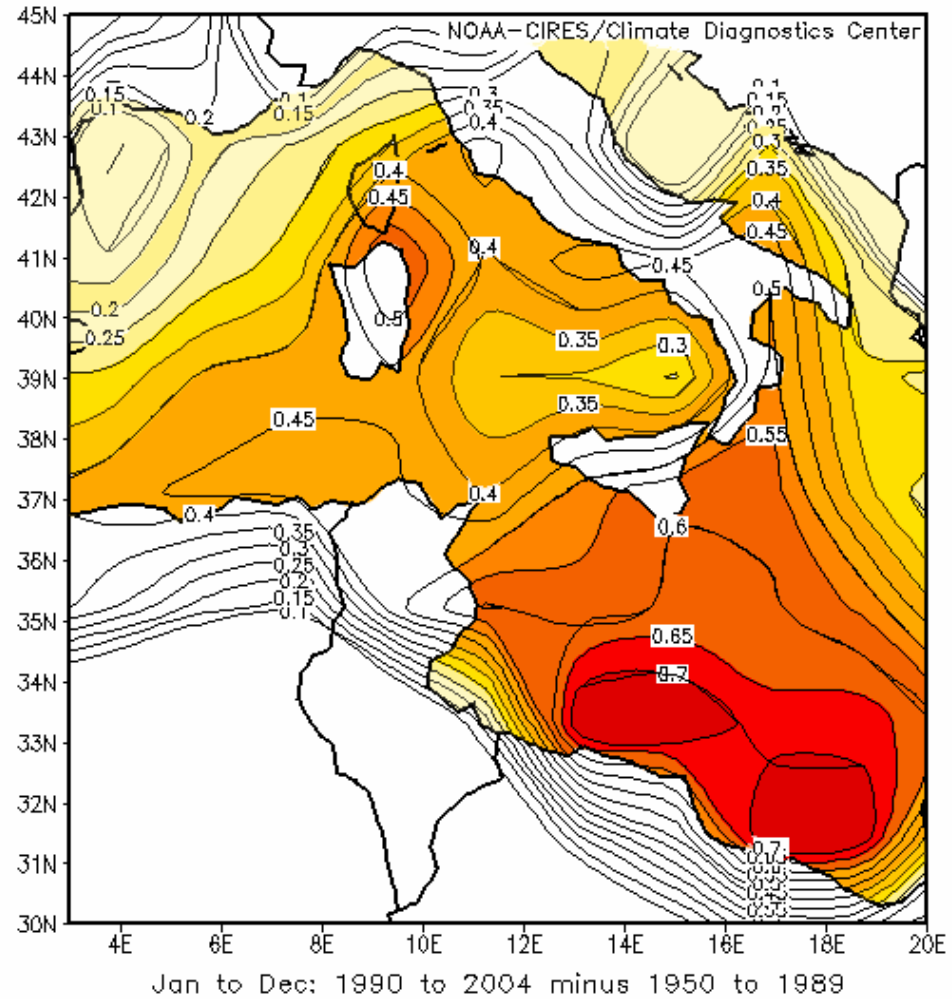
NCEP/NCAR Reanalysis
Sea Level Pressure (mb) Composite Mean



NCEP/NCAR Reanalysis
.995 sigma Vorticity (s⁻¹) Composite Mean



NCEP/NCAR Reanalysis
Surface Skin Temperature(SST) (C) Composite Mean





FINE

