

Joint workshop "drought and water deficiency: from research to policy making "

Monitoring water scarcity in Sicily

Ing. Giuseppe Geraci

Palazzo dei Normanni – Palermo, October 8-9, 2004

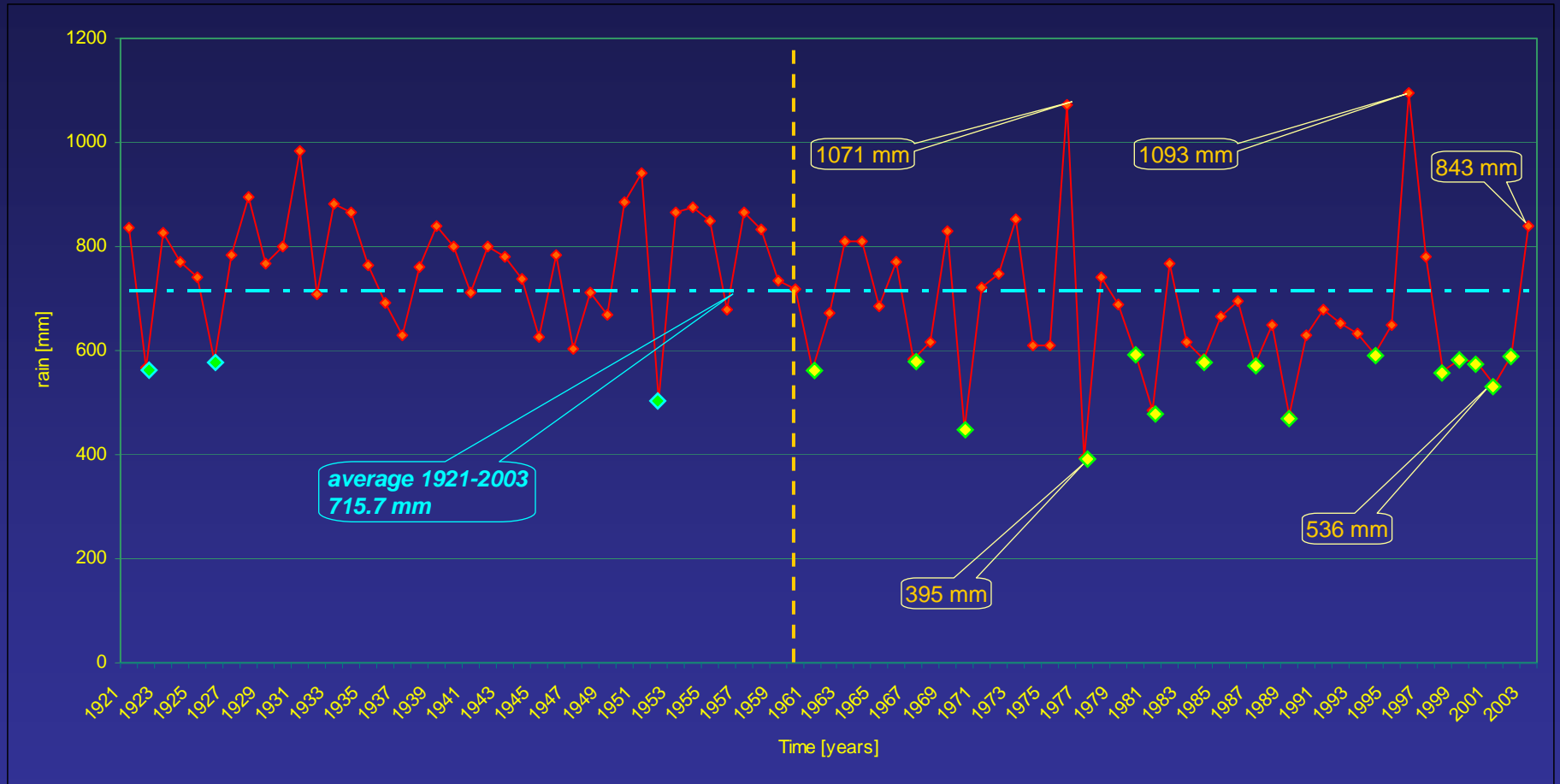
Observation and monitoring network

Among other institutional duties the regional hydrographic office is responsible for monitoring the most significant climatic parameters and in particular rainfall, temperature, hydrometric levels in water courses and freatic levels, all elements that concur to the knowledge of the water cycle. The observation network which has been working since the '20s is made by 300 measurement gauges. The first publication of Hydrologic reports in Sicily dates more than 80 years ago, 1920.

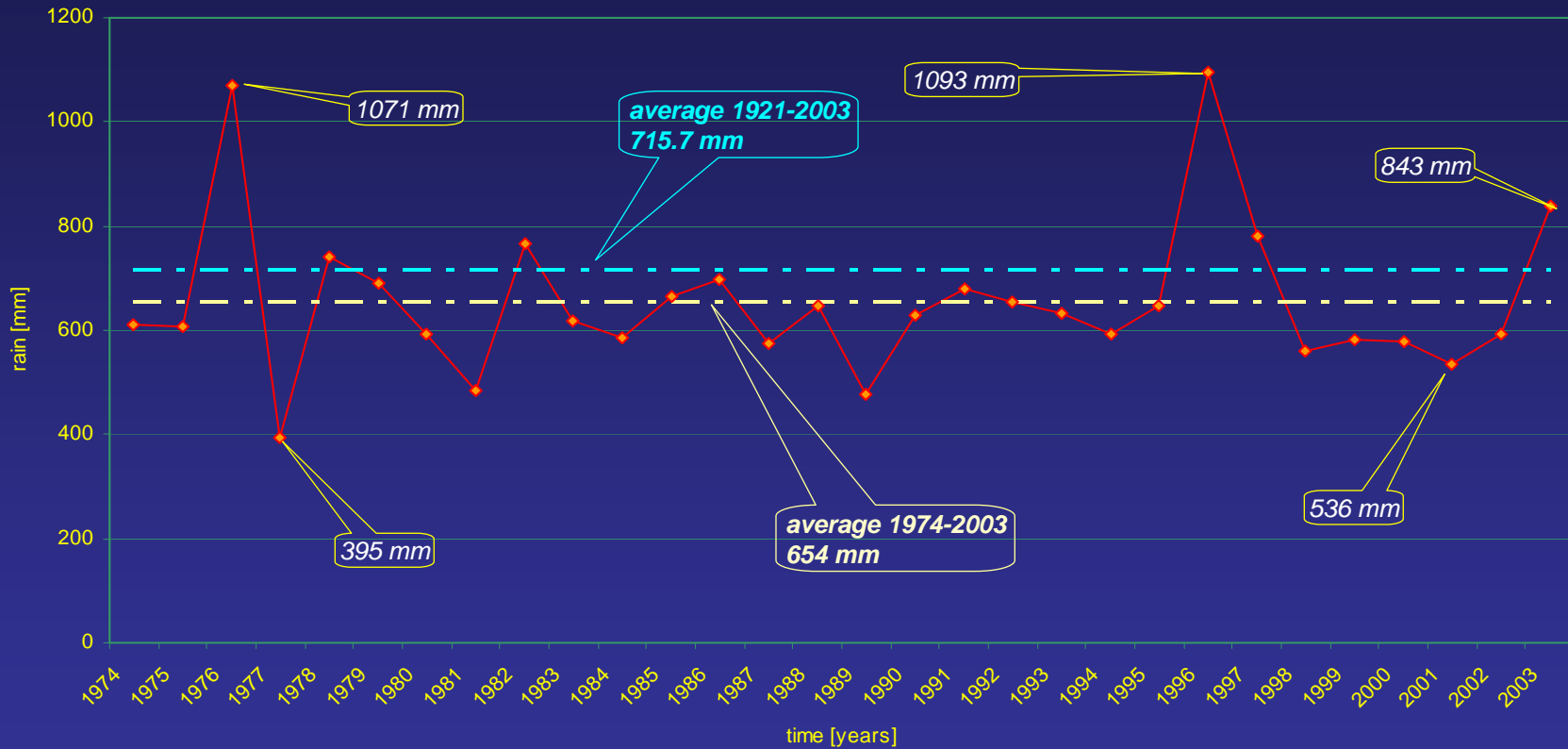
Mean annual rainfall, equal to 716 mm, lowered to 689 mm during last fifty years, lowered to 654 mm during last thirty years and to 652 during last twenty years.

Rainfall reduction and the increase of the mean temperature and, more generally, the variation of climate in the Mediterranean basin area forced the Presidency of the Sicilian Region to study the issue and to research solutions in order to mitigate the effects due to recurrent water shortage.

ANNUAL PRECIPITATIONS IN SICILY 1921 - 2003

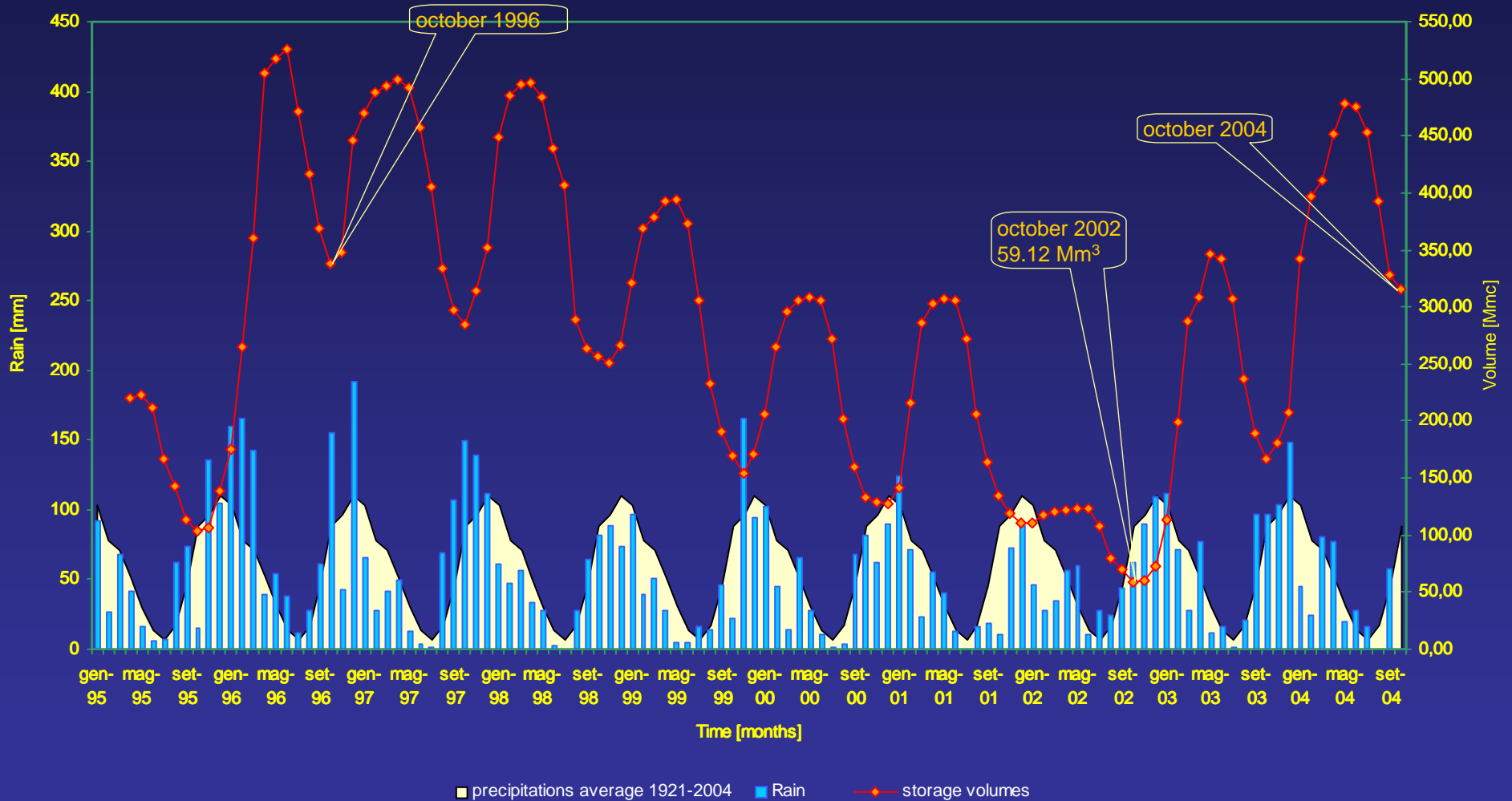


ANNUAL PRECIPITATIONS IN SICILY 1974 - 2003

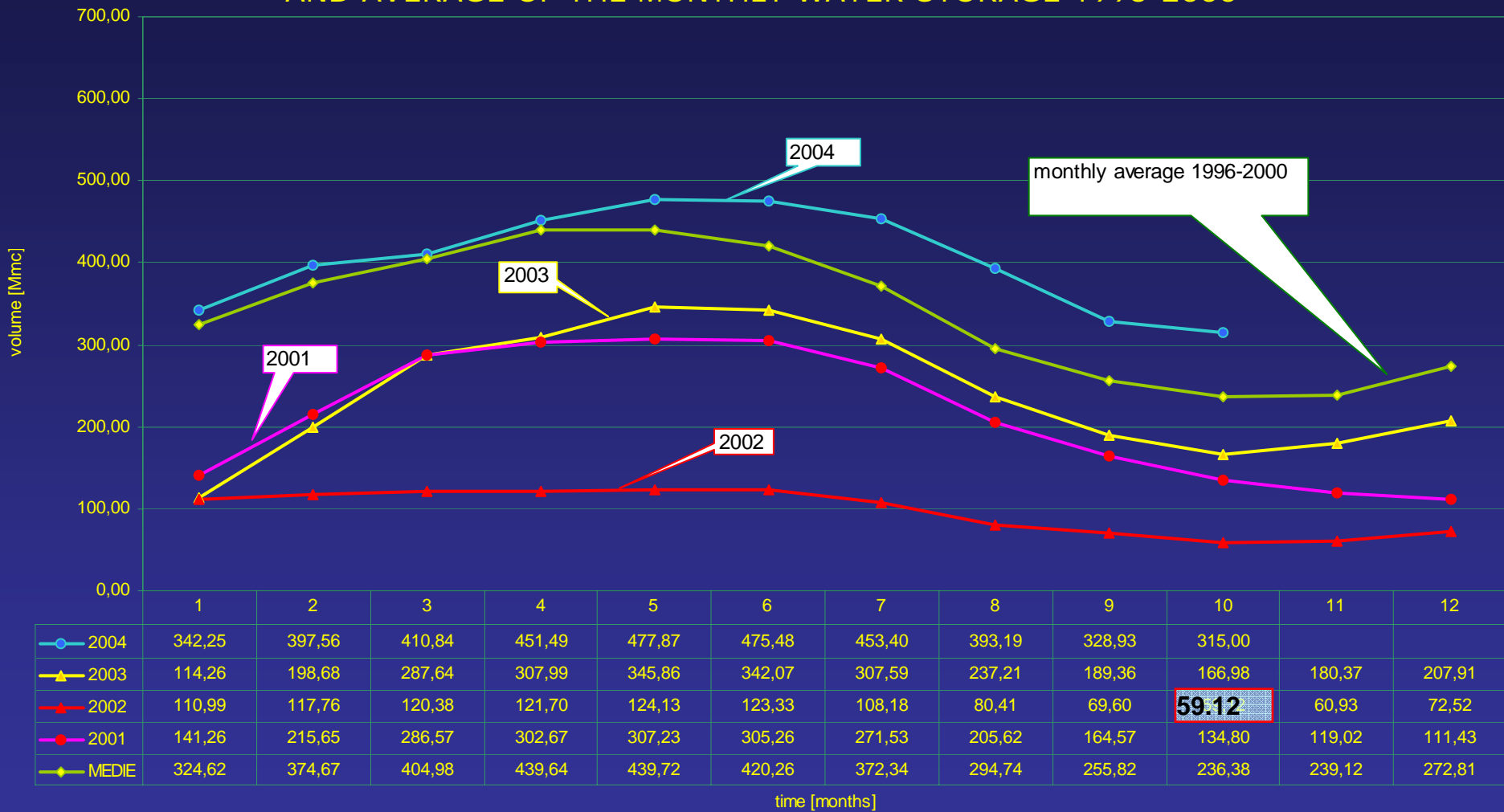


—◆— Annual precipitations in Sicily from 1974 to 2003 — — — Mean of period 1974-2003* - - - Mean of period 1921-2003

Volumes in the main Sicilian reservoirs related with the average monthly rainfall rate and comparison with the annual average rainfall rate during 1921-2004 period



COMPARISONS BETWEEN VOLUMES IN RESERVOIRS DURING 2001, 2002, 2003 UNITL 01/10/2004 AND AVERAGE OF THE MONTHLY WATER STORAGE 1996-2000



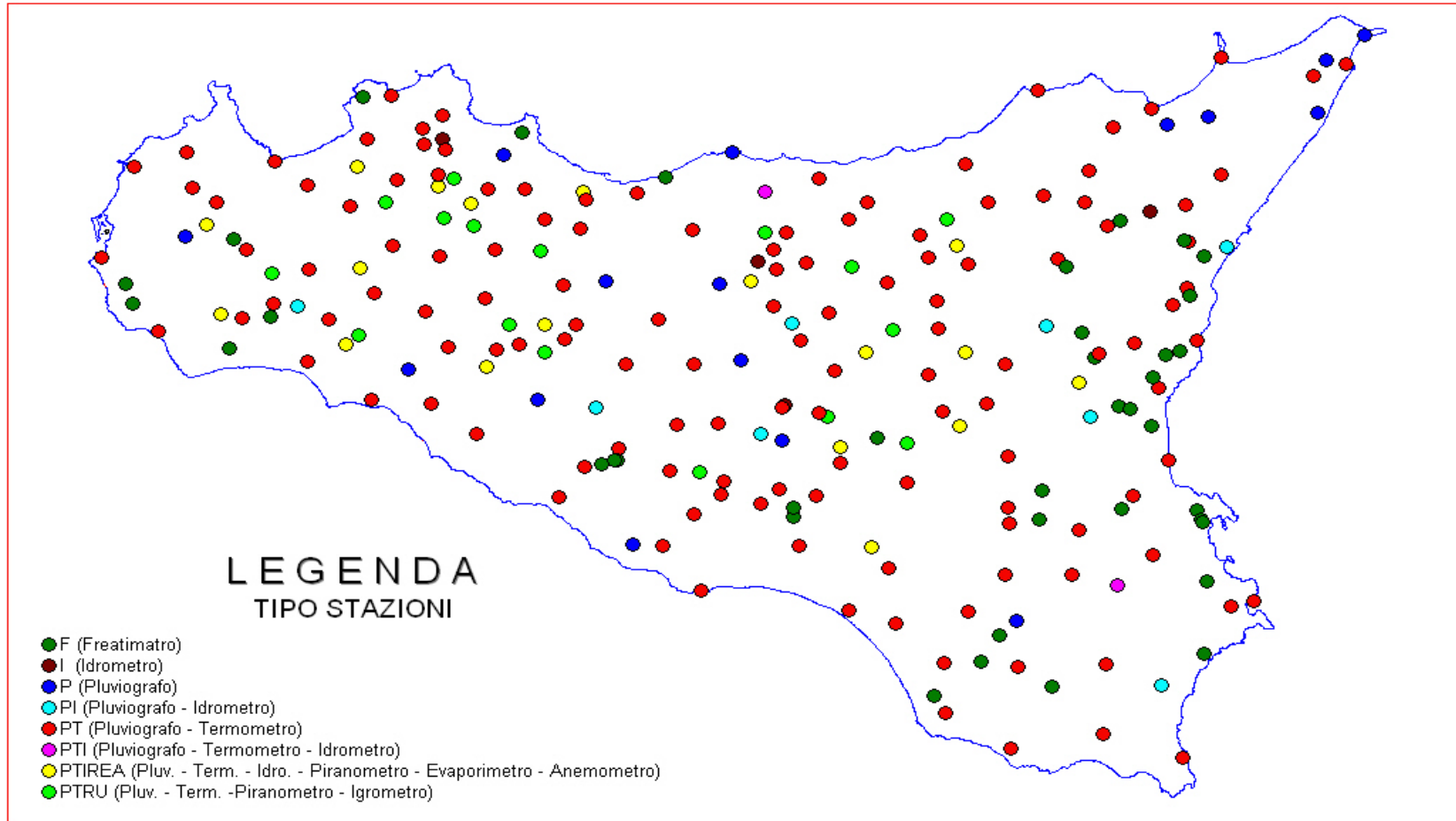
Initiatives since 1999:

- ✓ New network (remotely sensed) built to monitor hydrogeological risk (Law 267/98);
- ✓ Integrated network built to face drought crises (PIC INTERREG II C Program “Territory Asset and fight against drought”) connected and integrated with the above mentioned surveillance network.

The system is now working since year 2002. In addition the Office is working on the following:

- ✓ *“Freatimetric integrated network and Hydrologic Information System”* within the EU P.O.R. Sicily 2000-2006 Axis I.
- ✓ *SEDEMED Program (Sécheresse et Désertification dans le bassin Méditerranée)* within the INTERREG III B – MEDOCC Axis 4 – with the aim to organize a Regional Hydrologic Laboratory to fight water shortages and desertification”.

HYDRO-METEO-PLUVIOMETRIC REMOTELY SENSED NETWORK





Carcaci



Ziriò – Caserma forestale



Serradifalco



*Diga Arancio – Stazione PTIREA: Pluviometro
Termometro Idrometro (piezometro) Piranometro
Evaporimetro Anemometro*



Diga Arancio

HYDRO-METEO-PLUVIOMETRIC REMOTELY SENSED NETWORK L. 267/98

Sensor configuration for each kind of station of acquisition	Number of stations
P T	92
P	17
P I	8
I	5
P T I	2
P T I R A	1
Total number of Stations	125

Legend

*P = Pluviometer; T = Thermometer; I = Hydrometer;
A = Anemometer (Direction and speed); E = Evaporimeter;
R = Measurer of Solar Irradiation; U = Relative Humidity Measurement;
F = Freatimeter*

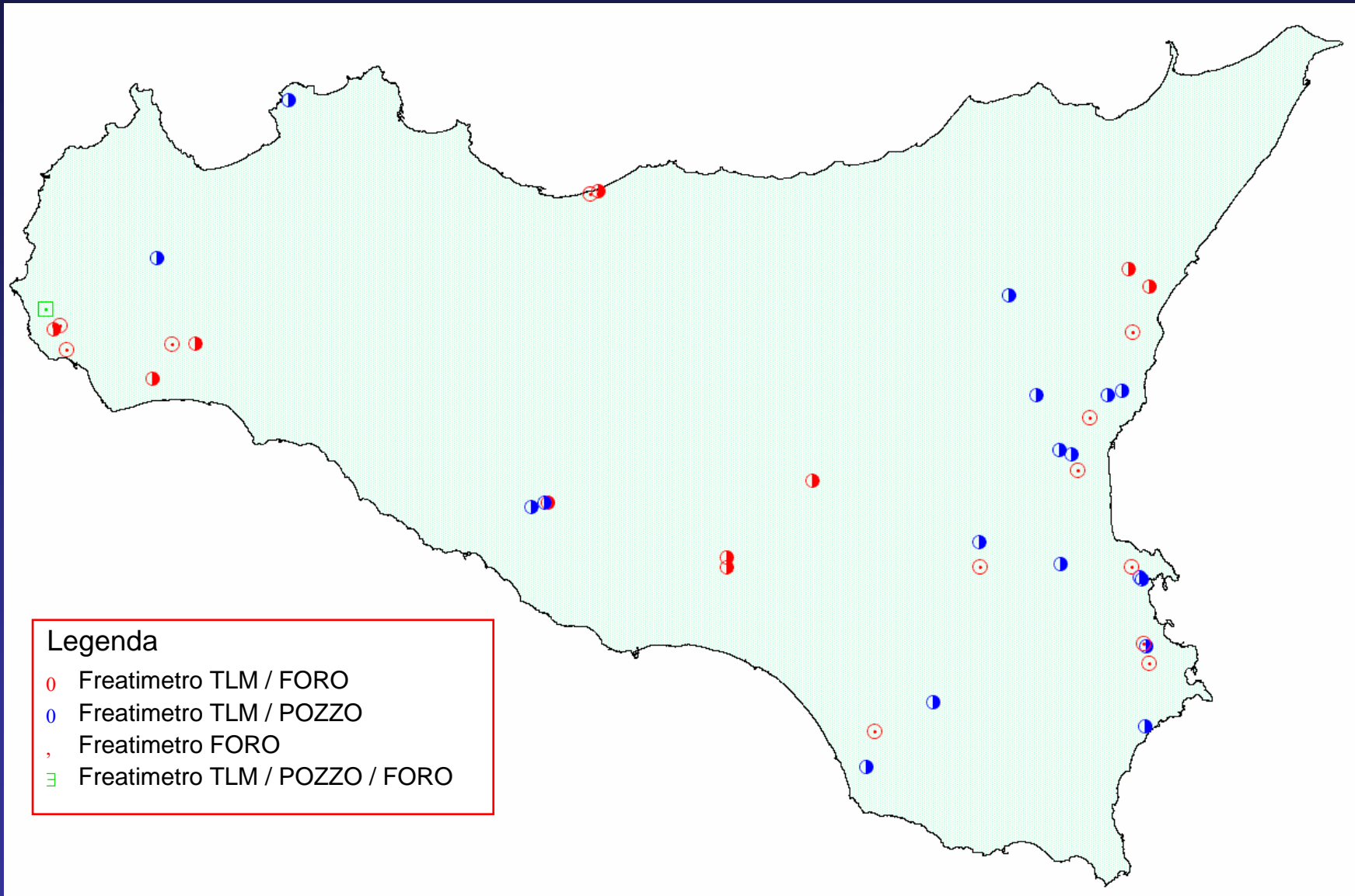
HYDRO-METEO-PLUVIOMETRIC REMOTELY SENSED NETWORK INTERREG II C

Sensor configuration for each kind of station of acquisition	Number of stations
P T	47
P T R U	21
P T R E A	22
F	40
Total number of Stations	130

Legend

*P = Pluviometer; T = Thermometer; I = Hydrometer;
A = Anemometer (Direction and speed); E = Evaporimeter;
R = Measurer of Solar Irradiation; U = Relative Humidity Measurement;
F = Freatimeter*

FREATIMETRIC NETWORK

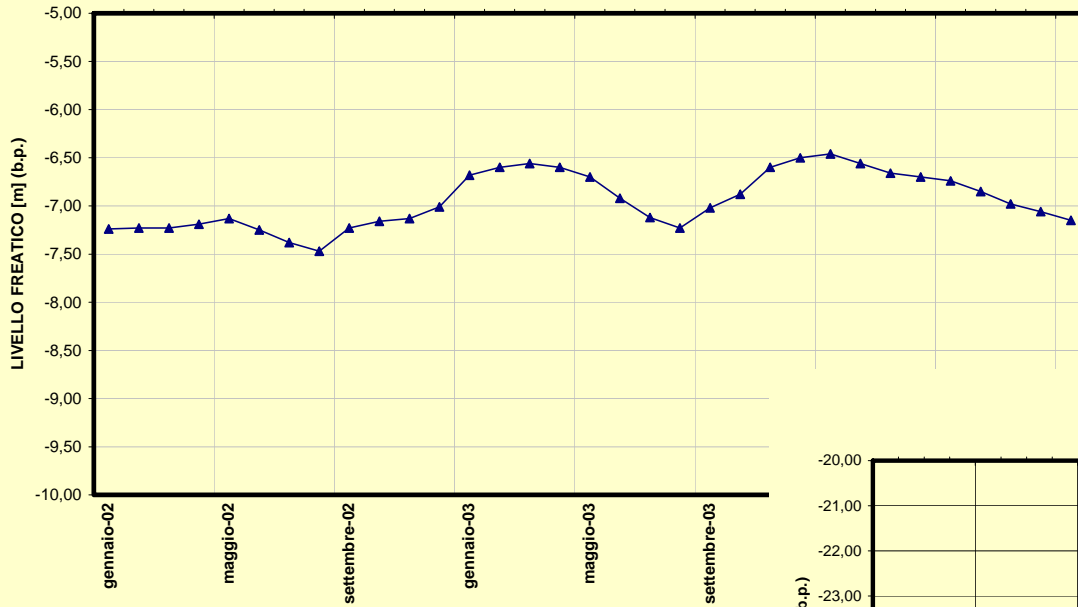


Legenda

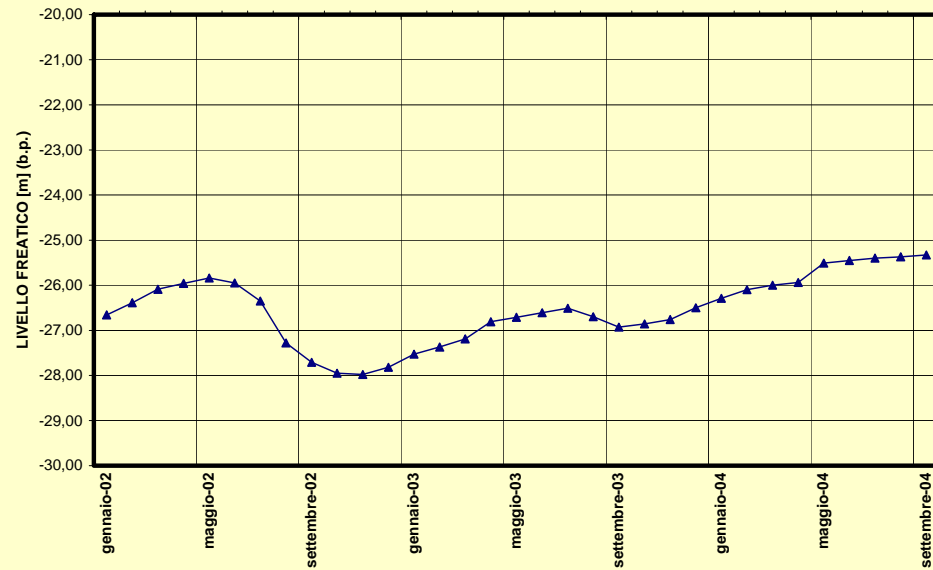
- Freatimetro TLM / FORO
- Freatimetro TLM / POZZO
- Freatimetro FORO
- ☒ Freatimetro TLM / POZZO / FORO

FREATIMETRIC NETWORK

POZZO PISTAVECCHIA 2 - CAMPOFELICE DI ROCCELLA



POZZO CALAMITELLA (Foro) - RACALMUTO



This observation network is part of an organized structure useful to monitor in real time meteo-hydro-climatic parameters in order to forecast extreme events and to prevent risks linked to these phenomena.

Activities:

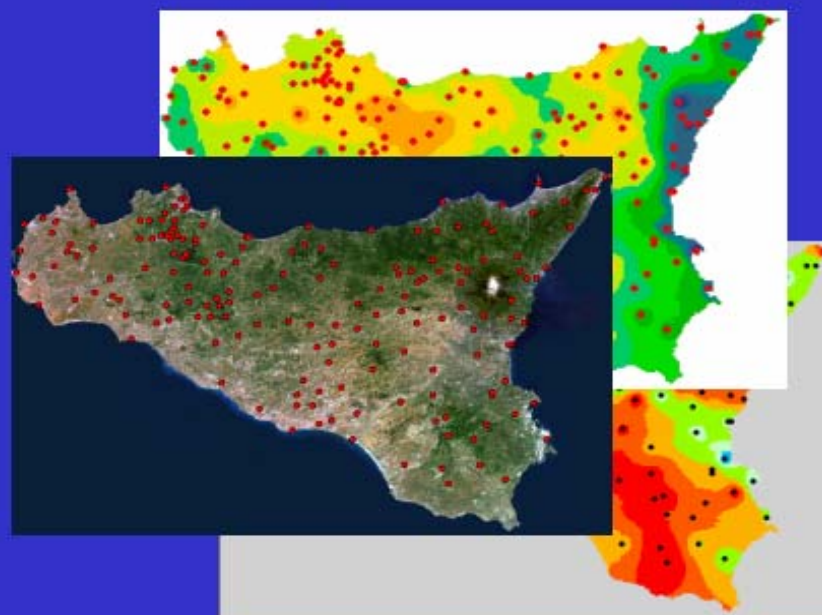
- Continuous monitoring;
- Flood forecast;
- Water shortage events monitoring and forecast.



**Dipartimento di Ingegneria Idraulica
ed Applicazioni Ambientali**



**Ufficio Idrografico
Regionale**



Sistema Informativo Regionale Idrologico

Prodotto realizzato dal Dipartimento di Ingegneria Idraulica ed Applicazioni Ambientali. L'utilizzazione è riservata all'Ufficio Idrografico Regionale.

Hydrologic Laboratory

components

Remotely

sensed
data



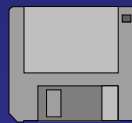
Gauges



Local
measurements



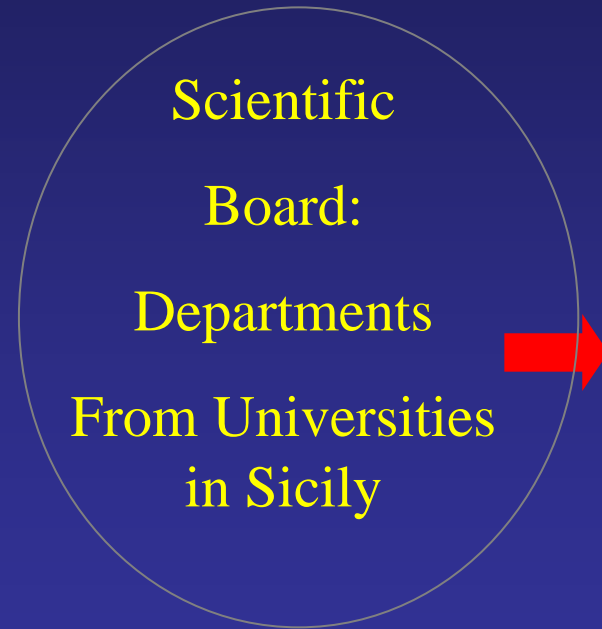
alphanumeric
data-base



Software



*Hydrographic
Offices*



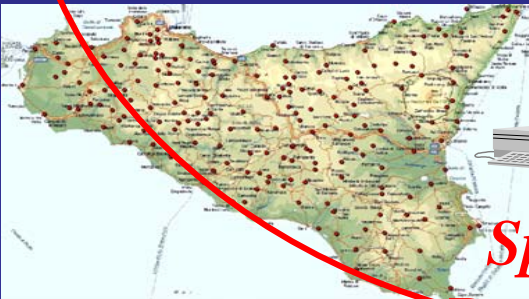
Scientific
Board:

Departments

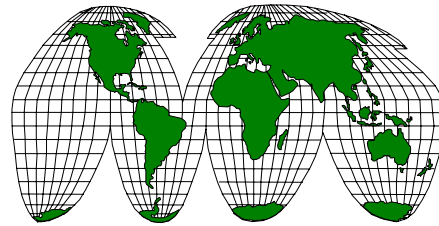
From Universities

in Sicily

*Spatial
Data Base*



Scientific
Board

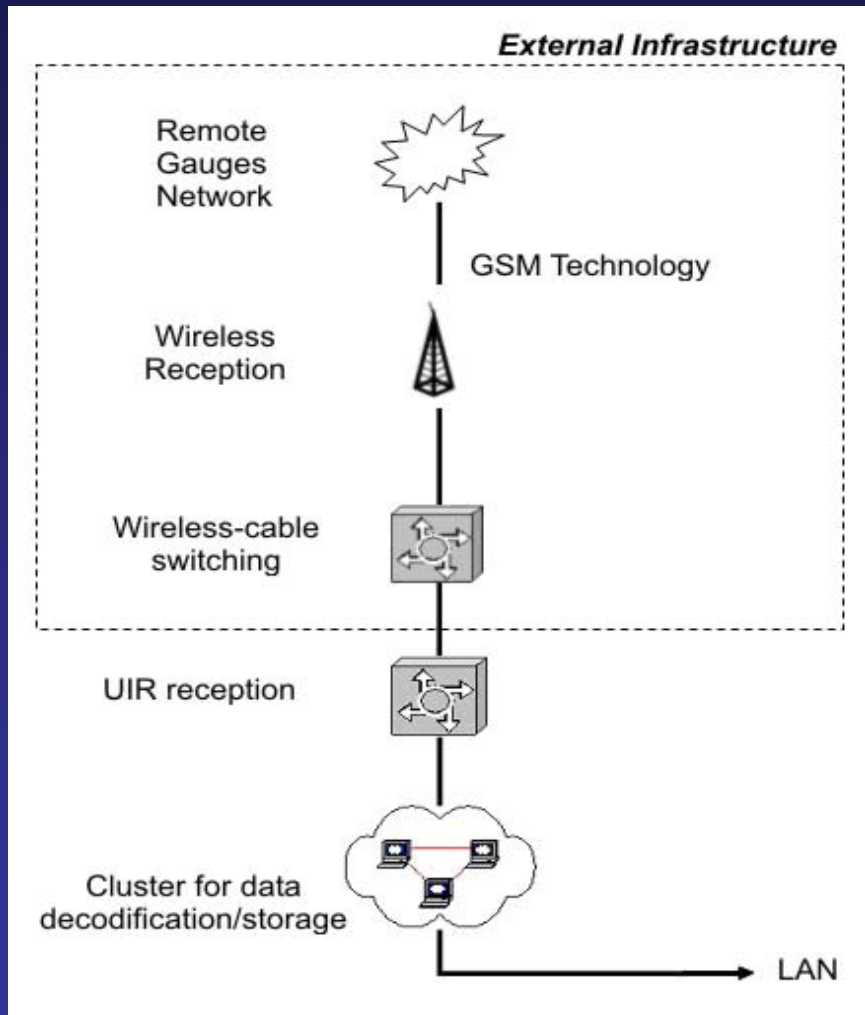


Spatial model

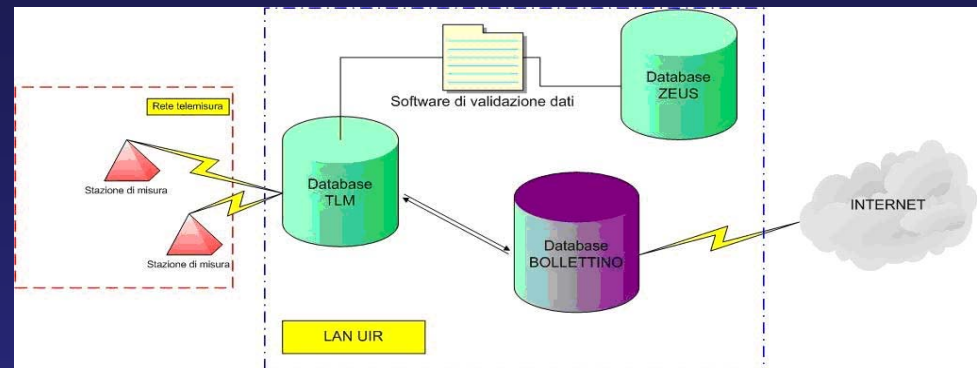


Results and decisions

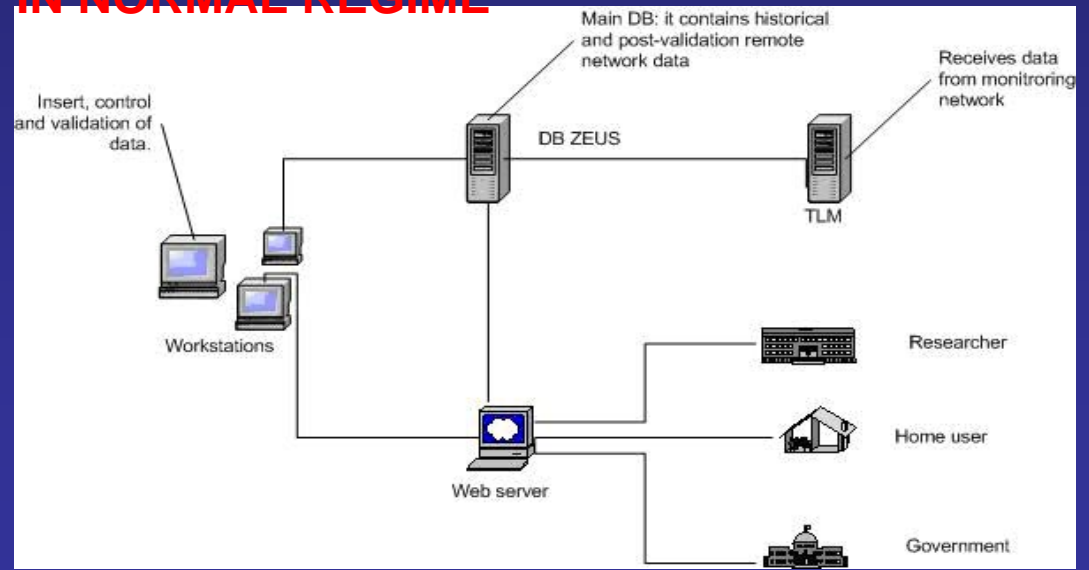
NETWORKS CONNECTIONS SUPPORT TO UPDATE THE DROUGHT BULLETIN



CURRENT



IN NORMAL REGIME



SPATIAL DISTRIBUTION OF THE FIELD OF THE ANNUAL RAINFALL AVERAGES

