



GOBIERNO DE ESPAÑA

MINISTERIO DE AGRICULTURA, ALIMENTACIÓN Y MEDIO AMBIENTE

CONFEDERACIÓN HIDROGRÁFICA DEL GUADALQUIVIR



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Roma, 23/10/2017
Great Rivers of the world
International Summit



The case of the Guadalquivir River Basin in Spain

- *The Guadalquivir basin*
- *Trends in climate*
- *Networks & Monitoring*
- *Agreements: national & international level*

Guadalquivir basin

The more meridional of european great basins, spreads on 57.600 km²





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chg

From the higher peaks of West Europe outside the Alps (3.481 m)





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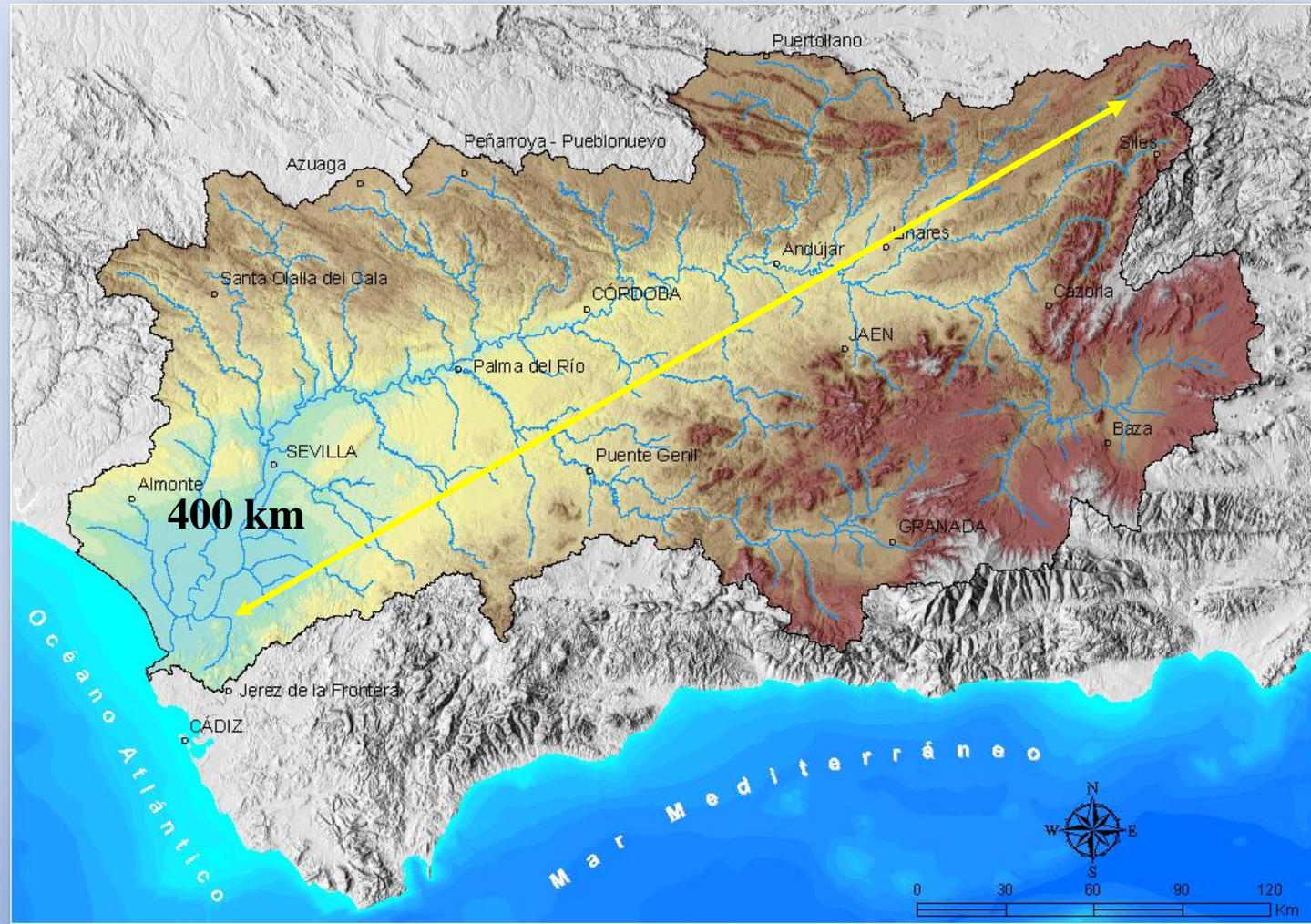


To sea level, at the wetlands of Doñana National Park

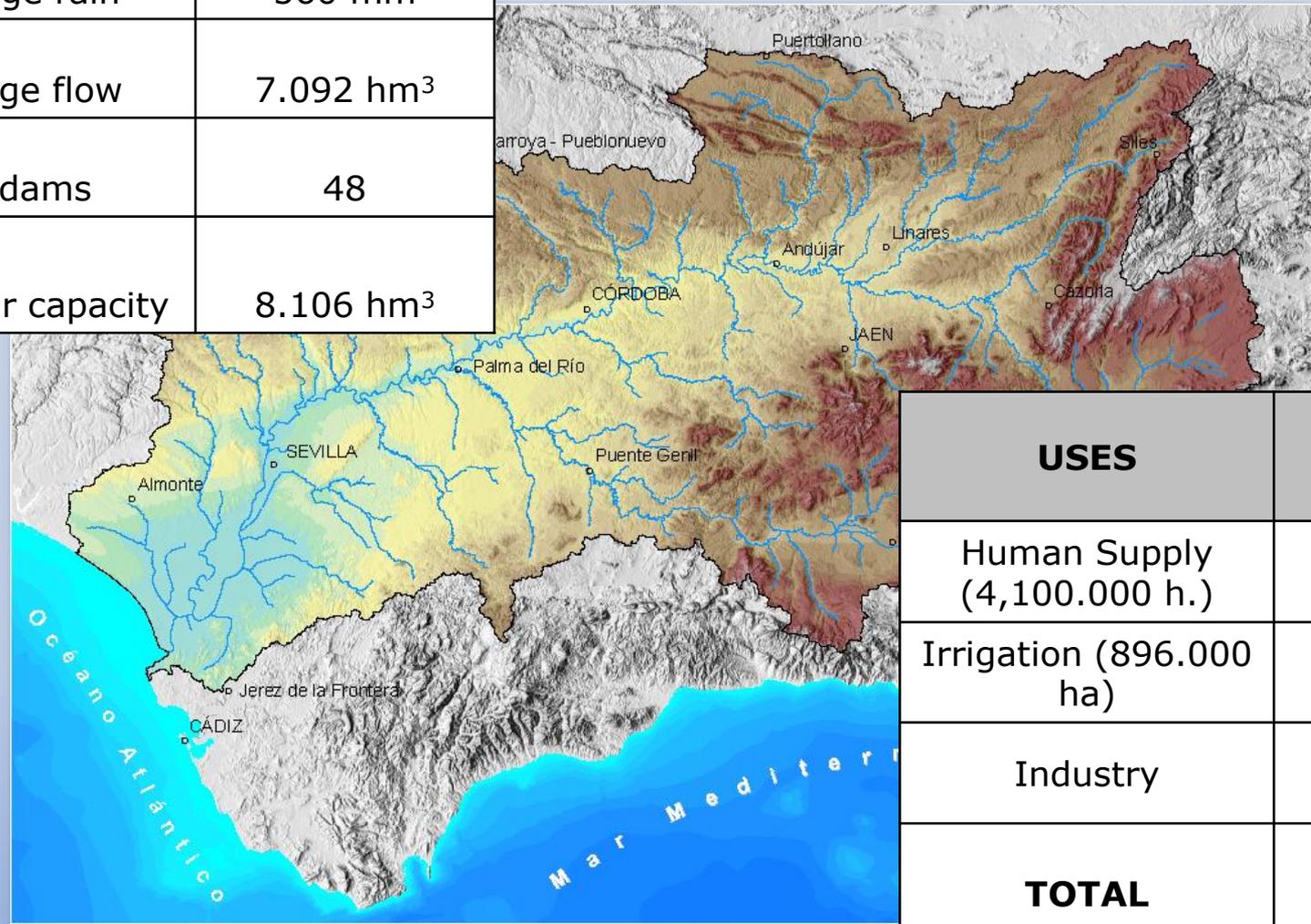


Introducción

Mediterranean climate, long, dry summers. High variability: Floods and droughts.



FEATURE	Total
Average rain	560 mm
Average flow	7.092 hm ³
Big dams	48
Reservoir capacity	8.106 hm ³

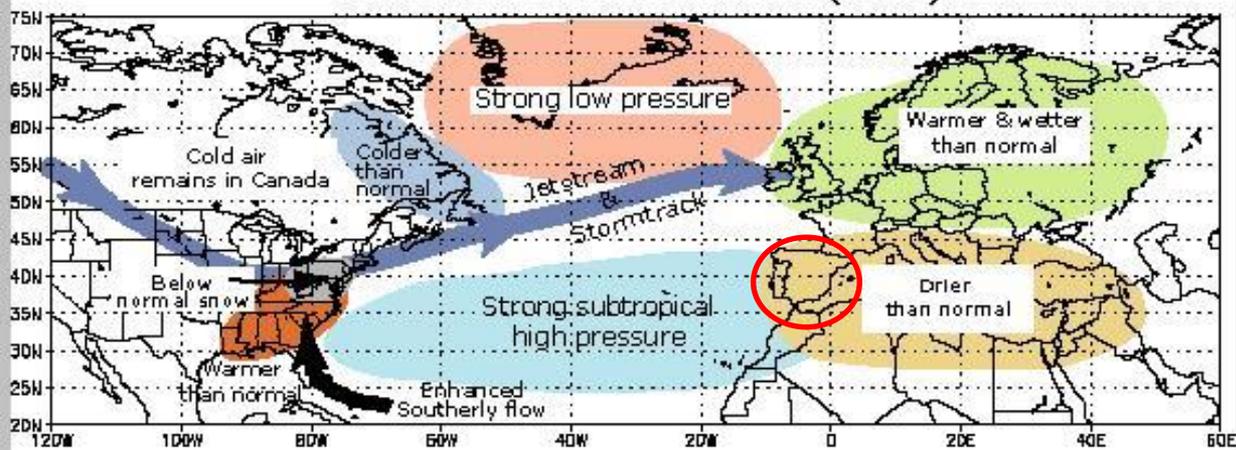


USES	Total
Human Supply (4,100.000 h.)	380 hm ³
Irrigation (896.000 ha)	3.342 hm ³
Industry	80 hm ³
TOTAL	3.802 (956 subterr.)

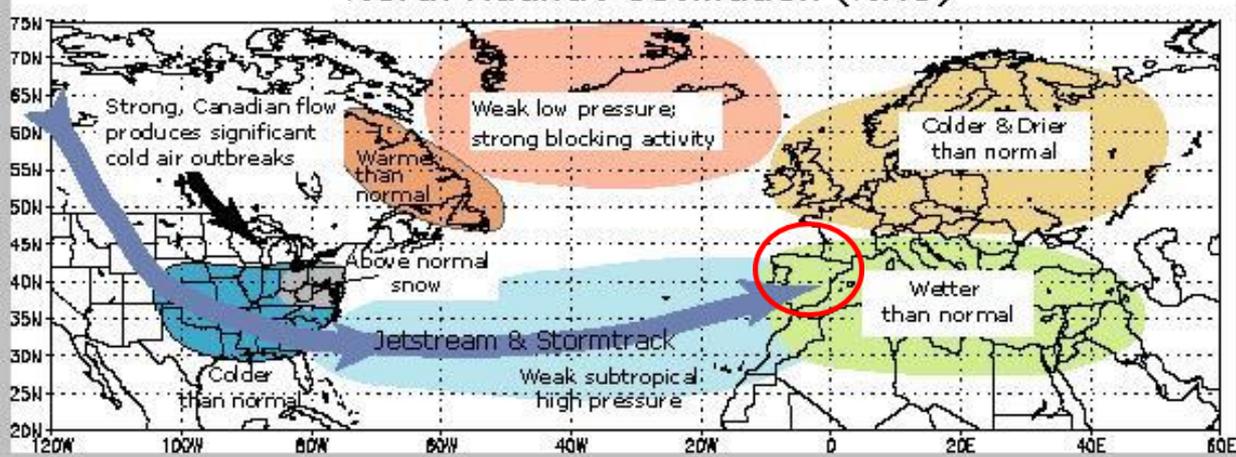
Introducción

La cuenca del Guadalquivir

Positive Phase of the Wintertime North Atlantic Oscillation (NAO)



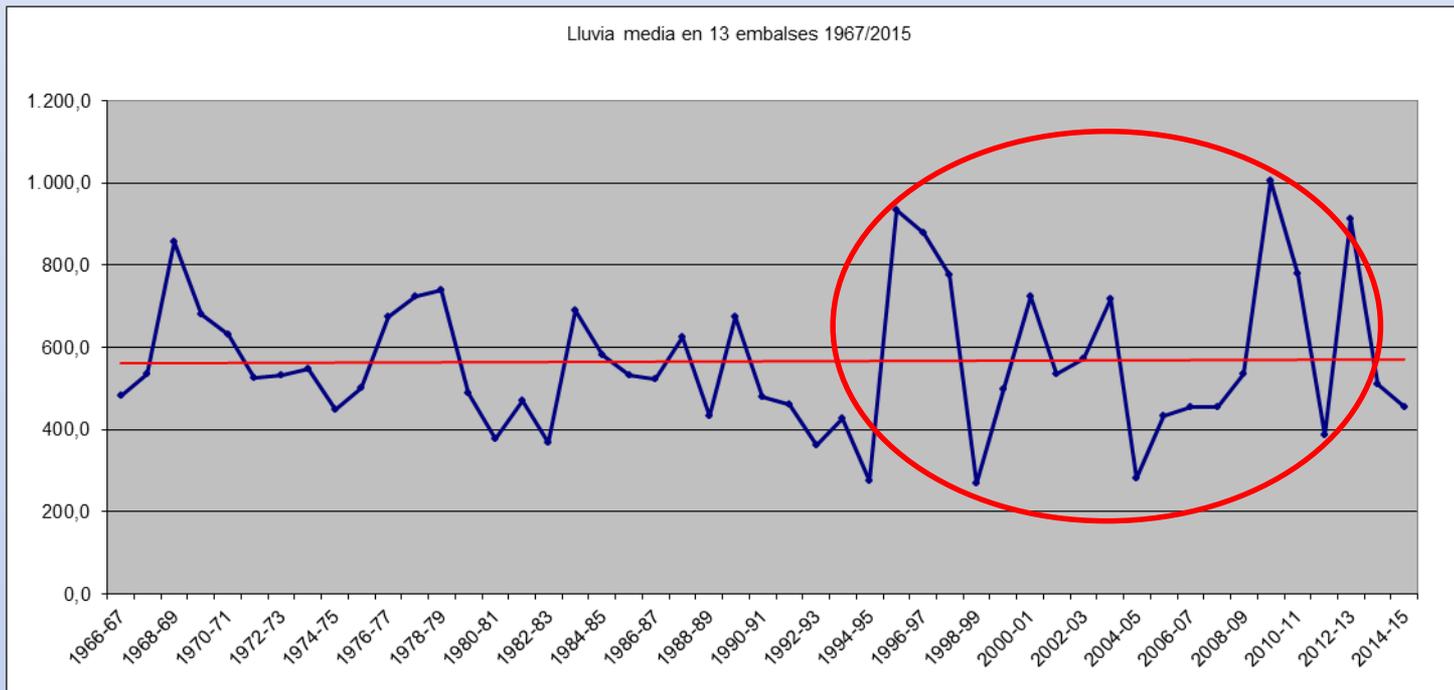
Negative Phase of the Wintertime North Atlantic Oscillation (NAO)



Given its geographic location, the Guadalquivir basin is very vulnerable to changes in atmospheric circulation.

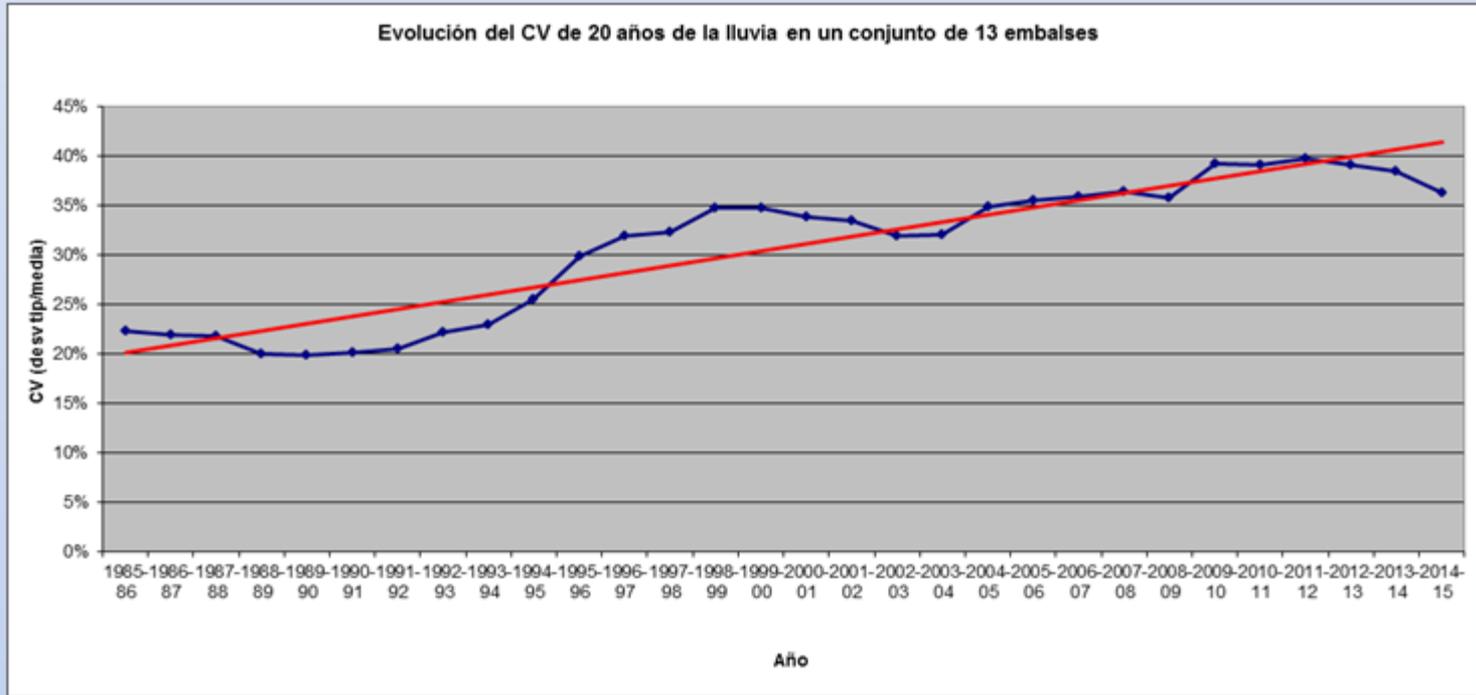
In the last decades some changes have been observed in basin rainfall

Trends in last fifty years: rain (13 reservoirs, distributed along the whole basin)



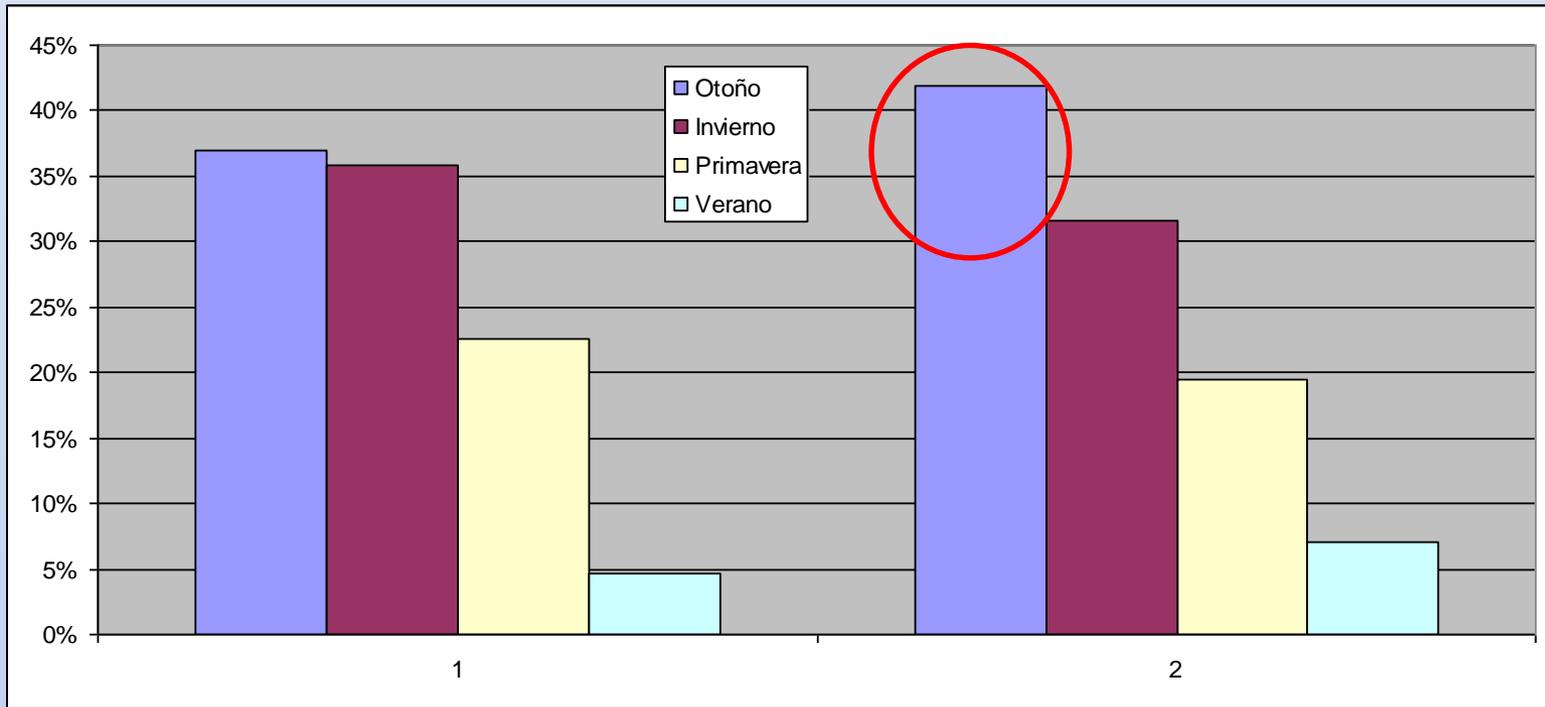
In the last 50 years the average rainfall hasn't changed very much, but not-average years are more frequent

Trends in last fifty years: rain (13 reservoirs, distributed along the whole basin)



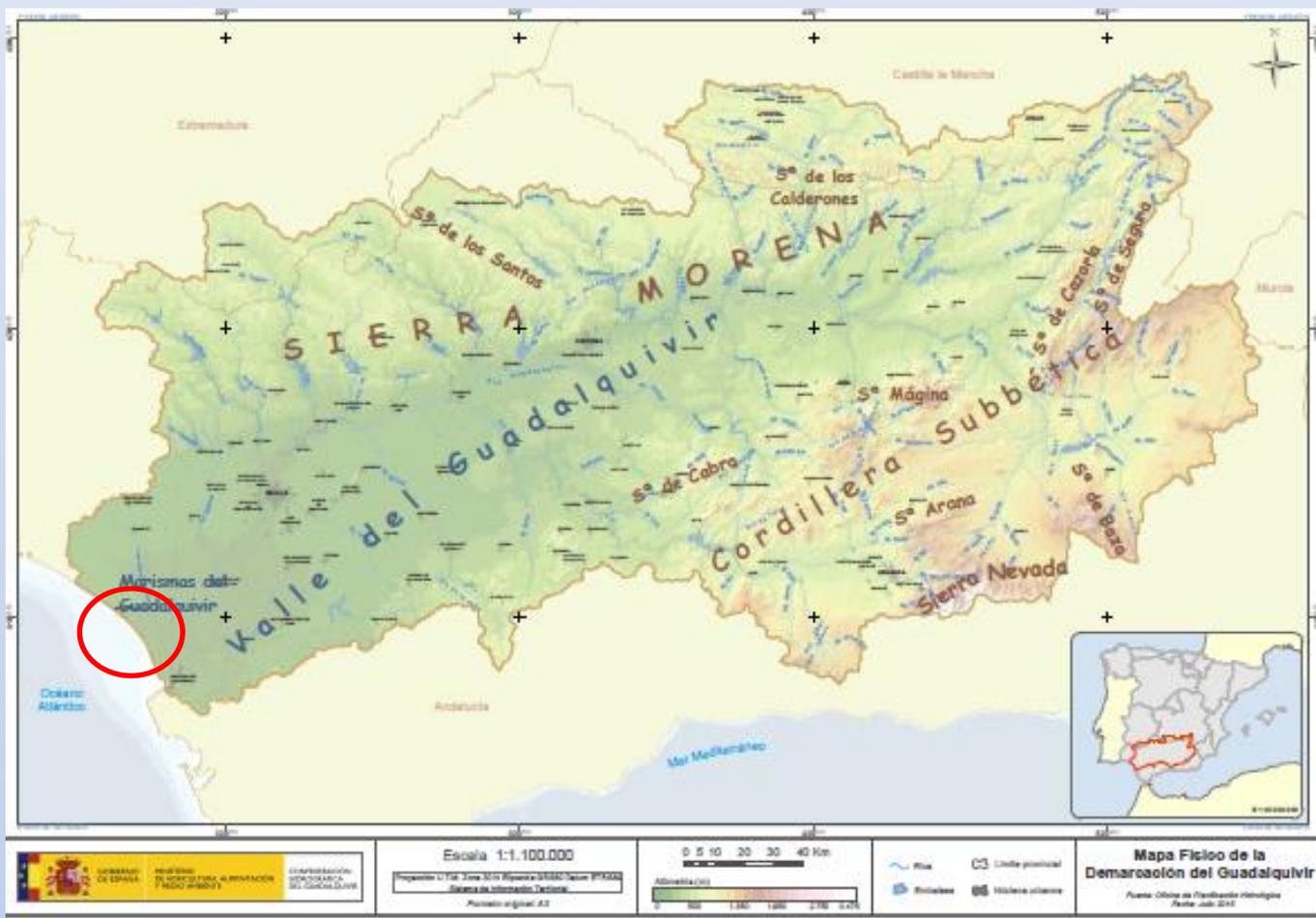
In the last 50 years the average rainfall hasn't changed very much, but not-average years are more frequent

Rainfall year distribution: 1967/1992 vs 1993/2017



- Also the yearly distribution is changing, becoming more “mediterranean” and less “atlantic”; more rainfall in autumn and less in winter.

Temperature

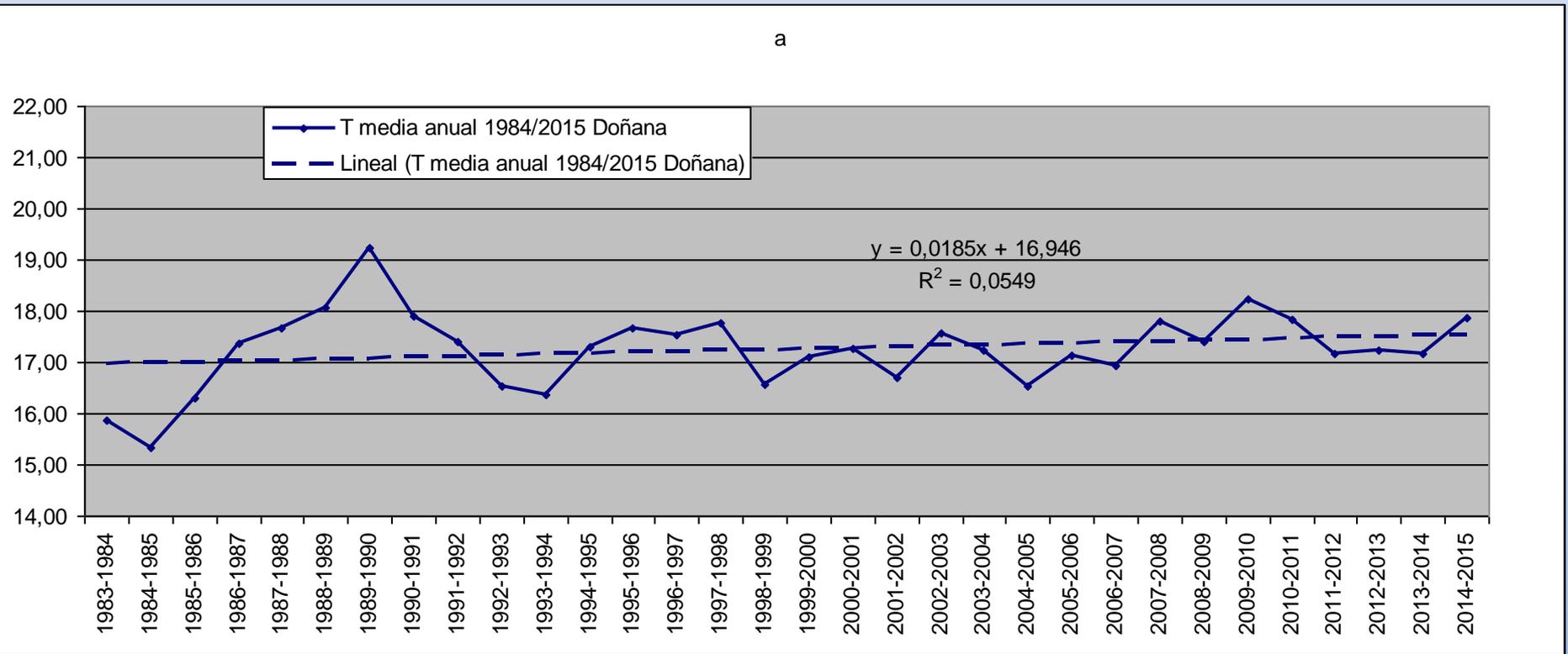


What about temperature?

Let's see what's happening at the atlantic coast.

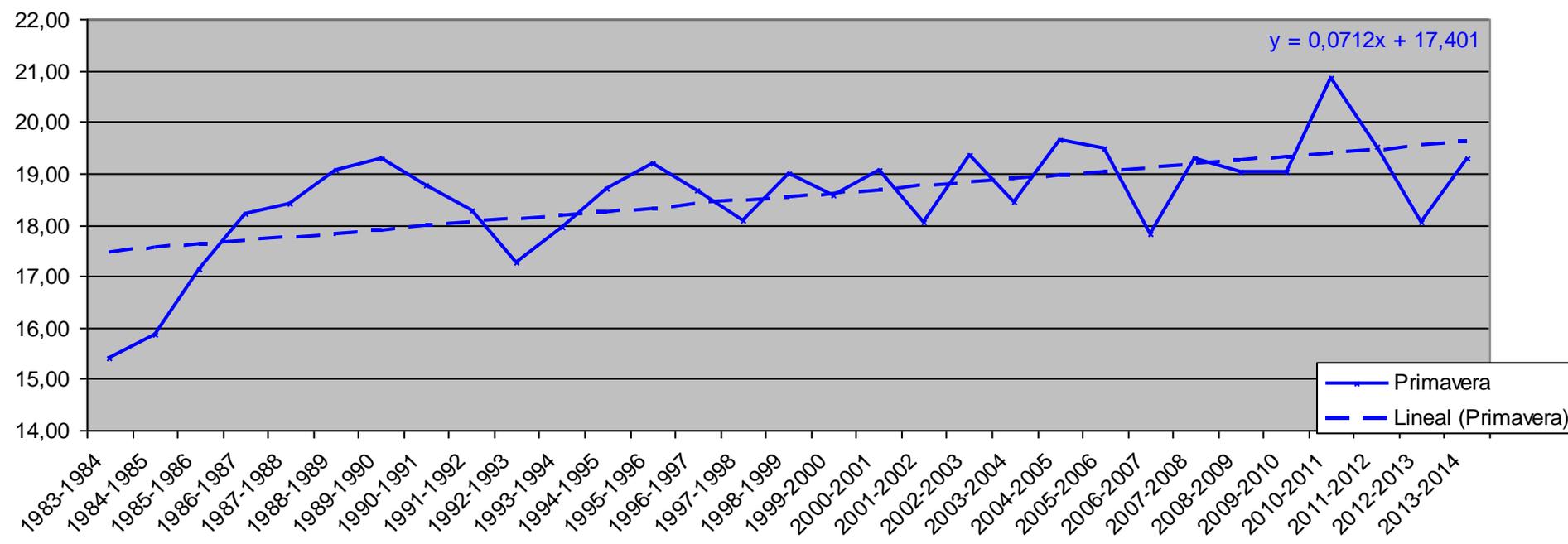
We are going to compare the 1984/1999 and 2000/2015 periods

Average increasing is not big: average 2000/2015 year is “only” 0,2°C hotter than the 1984/1999 one



But spring is a different story: average spring 2000/2015 temperature has arisen 1°C respect the 1984/1999 period: summer are earlier & longer

Evolucion de la Te media en primavera (Abril-Junio) en Almonte



Monitoring networks

SAIH

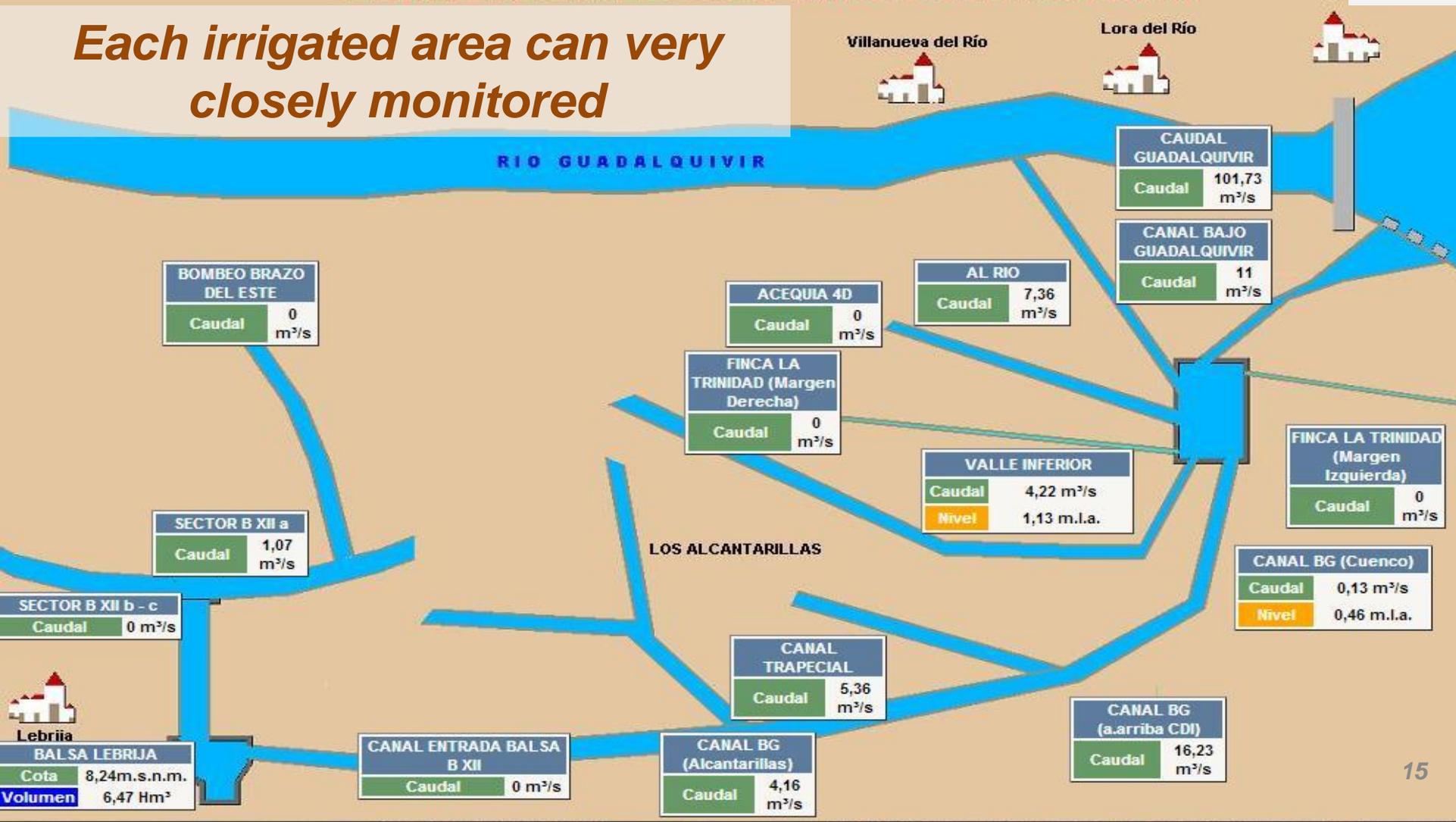


Real time management of irrigation supply

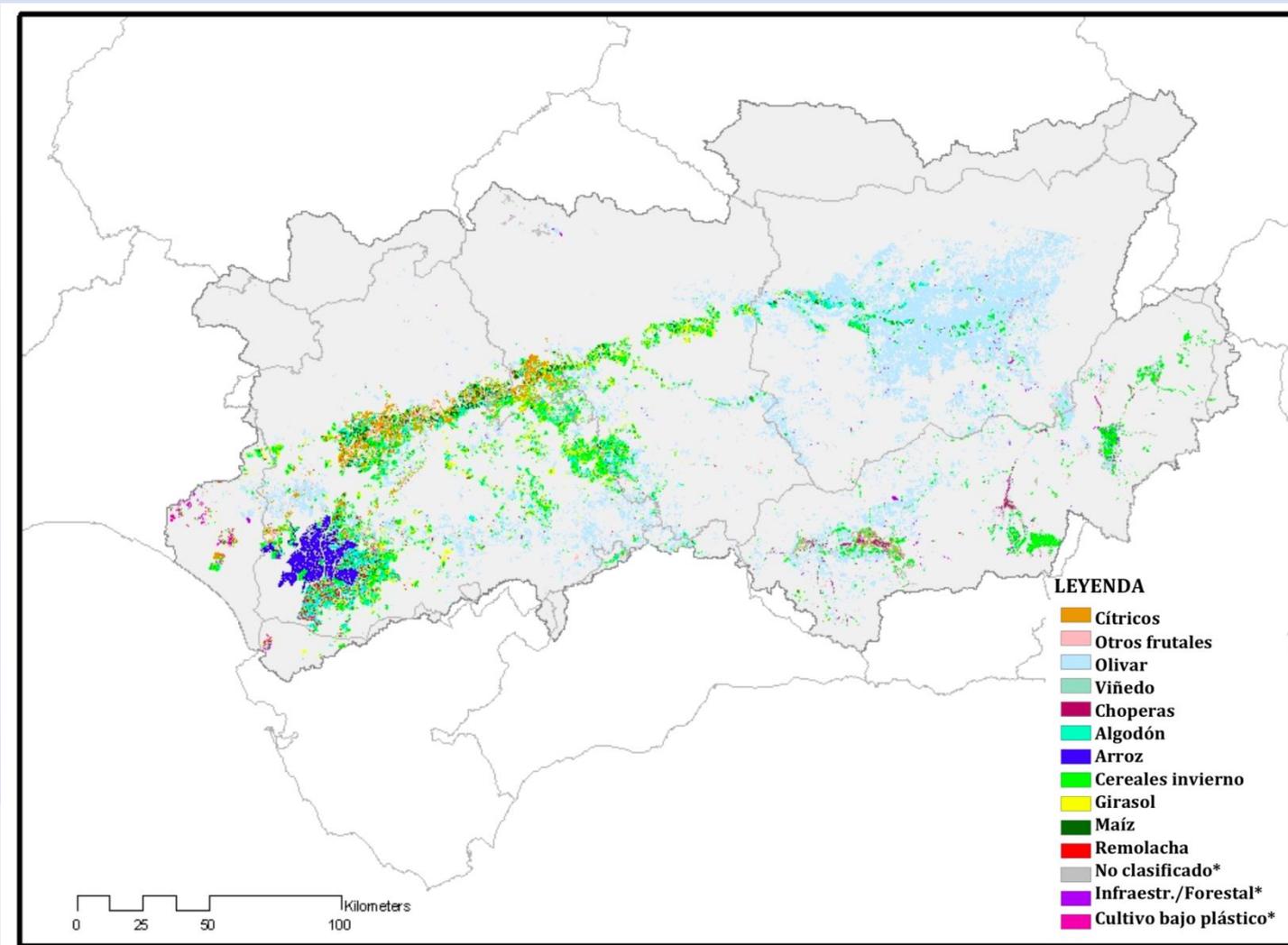
ZONAS REGABLES DEL BAJO GUADALQUIVIR

Each irrigated area can very closely monitored

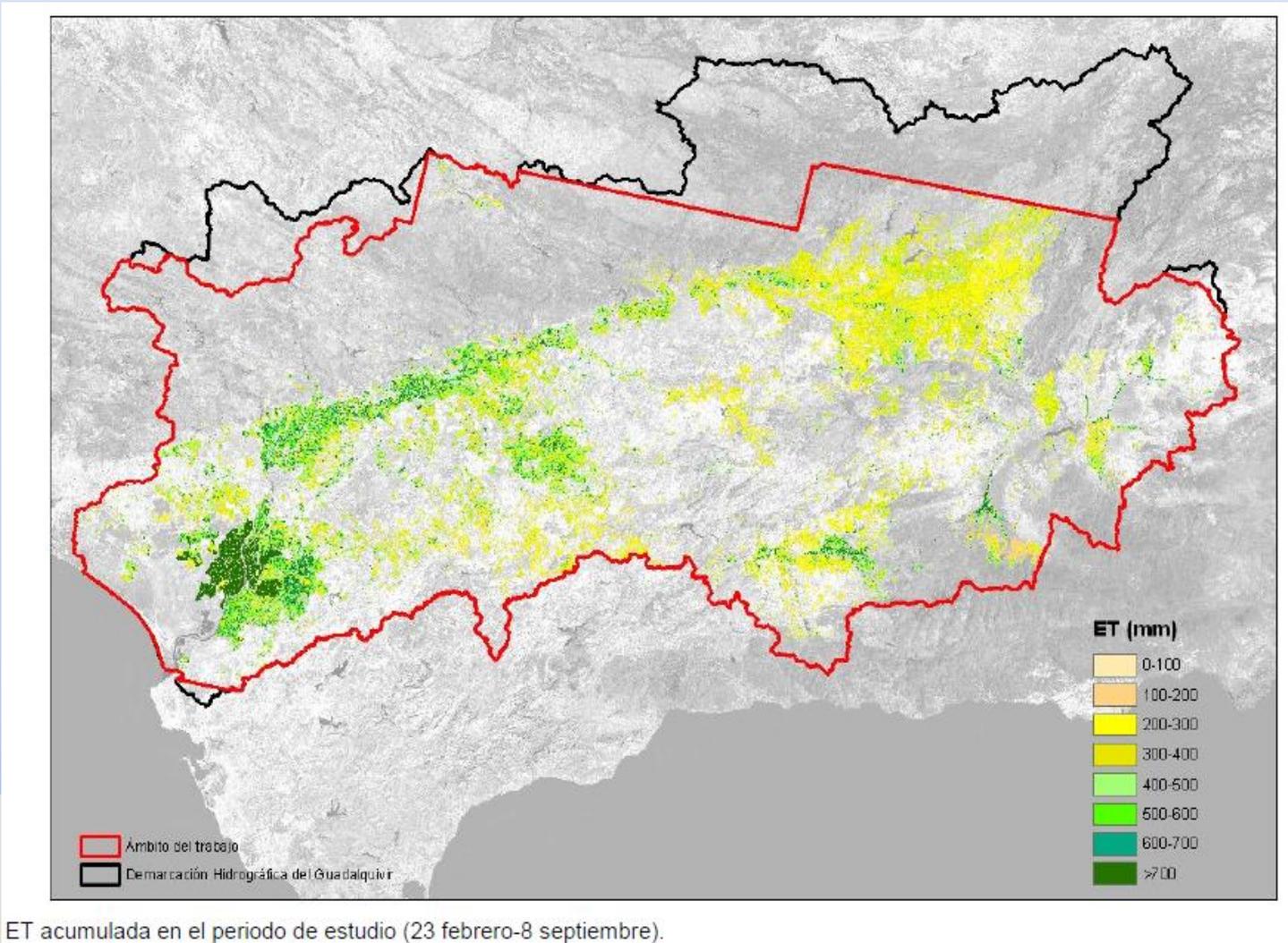
Pe SAIH



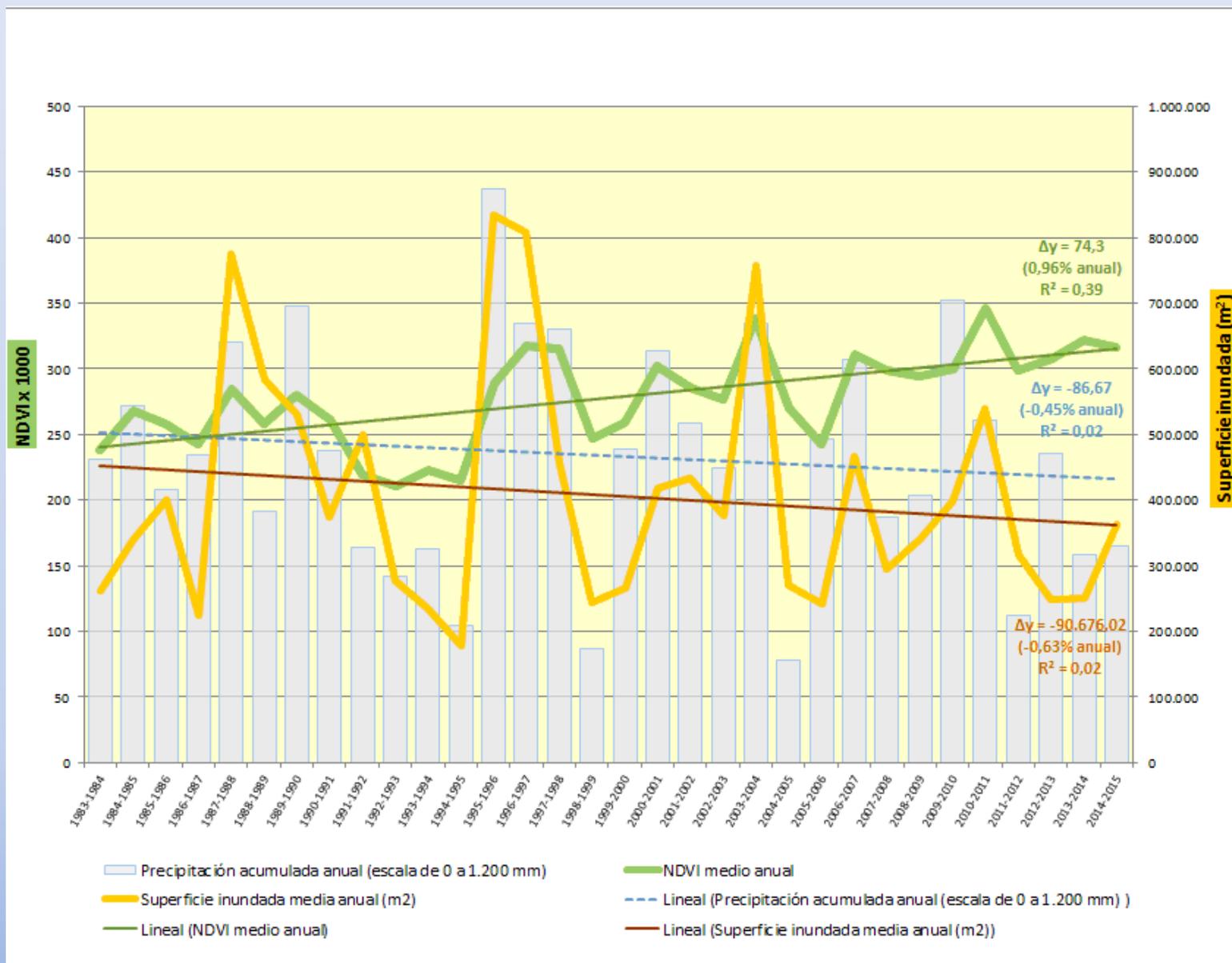
Monitoring networks: remote sensing. Crops



Monitoring networks: remote sensing. Water $ET = Kc \times ETo$



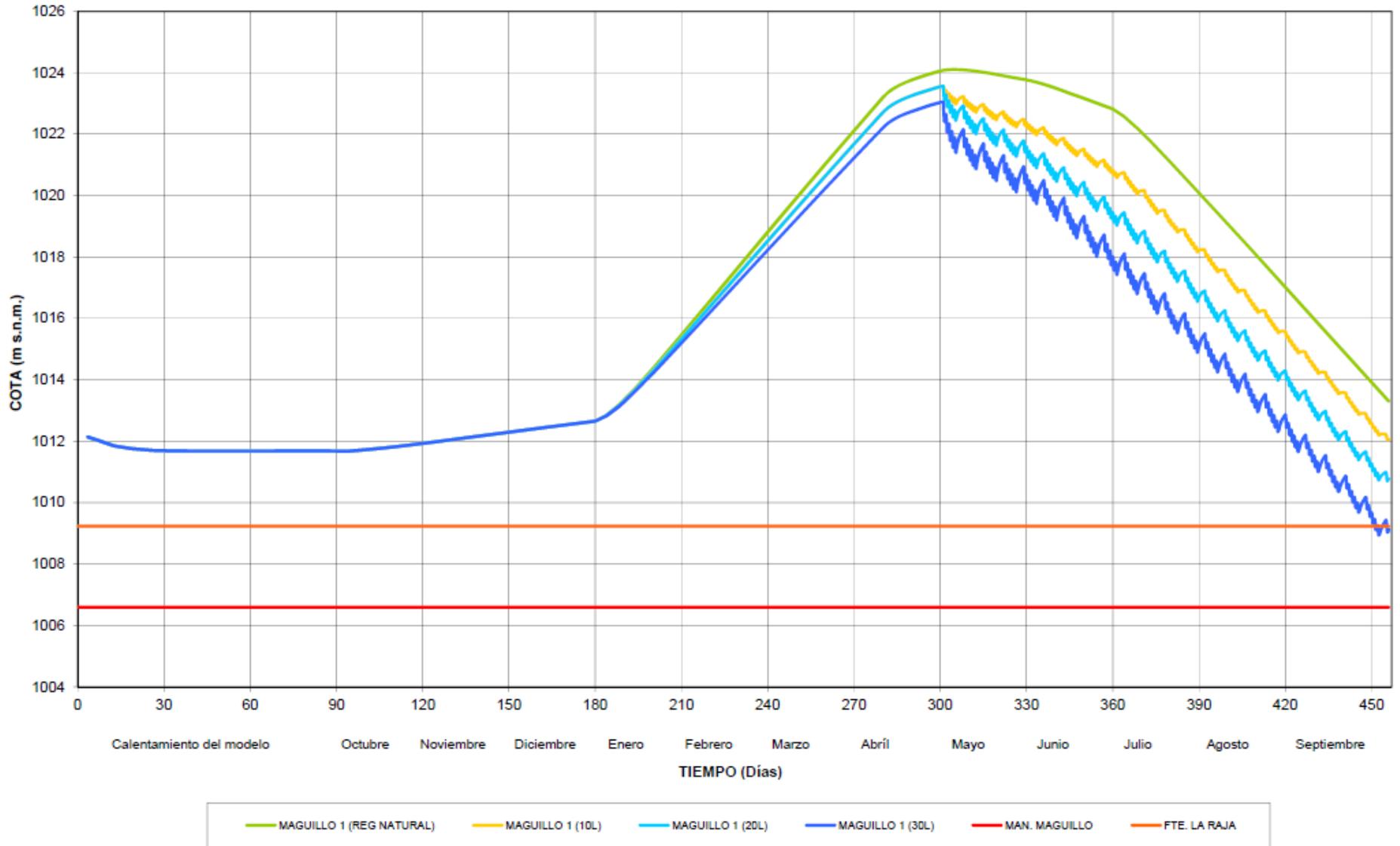
Monitoring networks: remote sensing. Waterbodies



Agreements with other corporations

CHG have specific agreements with several scientific and academic institutions in order to improve water management in a changing scenario

We can highlight the design & use of hydrogeological models



International Agreements for dealing with climate change.

The spanish water administration is present in several specific agreements related with climate change.

Among them we could highlight:

LifeWatch is a European e-Science distributed Infrastructure focused on how to measure the impact of **Global (particularly Climate) Change** issues on Earth **Biodiversity and Ecosystem Research**. **Headquartes are located at Sevilla**

Ecosystems



Species



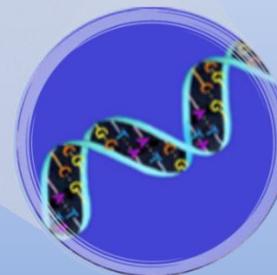
Time and evolution



Scale



**DNA,
proteins
and genes**



What ?, Who ?



- A Spanish-Algerian initiative, in the main frame of the 5 + 5 dialogue.
- **The Action Plan was endorsed** in Marrakech on 16 December 2016 by Ministers of the 5+5 Dialogue: Algeria, France, Italy, Libya, Malta, Mauritania, Morocco, Portugal, Spain, and Tunisia.
- Spain will hold the Presidency in 2017-2018
- With presence and collaboration:



European Commission



Union of the Arab Maghreb



Union for the Mediterranean

MENBO (Technical Secretariat)



FAO, SEMIDE, IME...

What ?, Who ?



- WSWM is a **guiding document** with orientations and objectives, agreed by Western Mediterranean countries (5+5).
- Objectives**: climate change monitoring and mitigation, preserve water quality, access to water for all, cooperation, exchange of knowledge, etc
- Structure: **13 priorities** issues (/ 3 blocks).
- The **Action Plan** compiles proposals from 5+5 members and partners.



Córdoba. $Q = 2.000 \text{ m}^3/\text{s}$

***Thank you
for your
attention***