

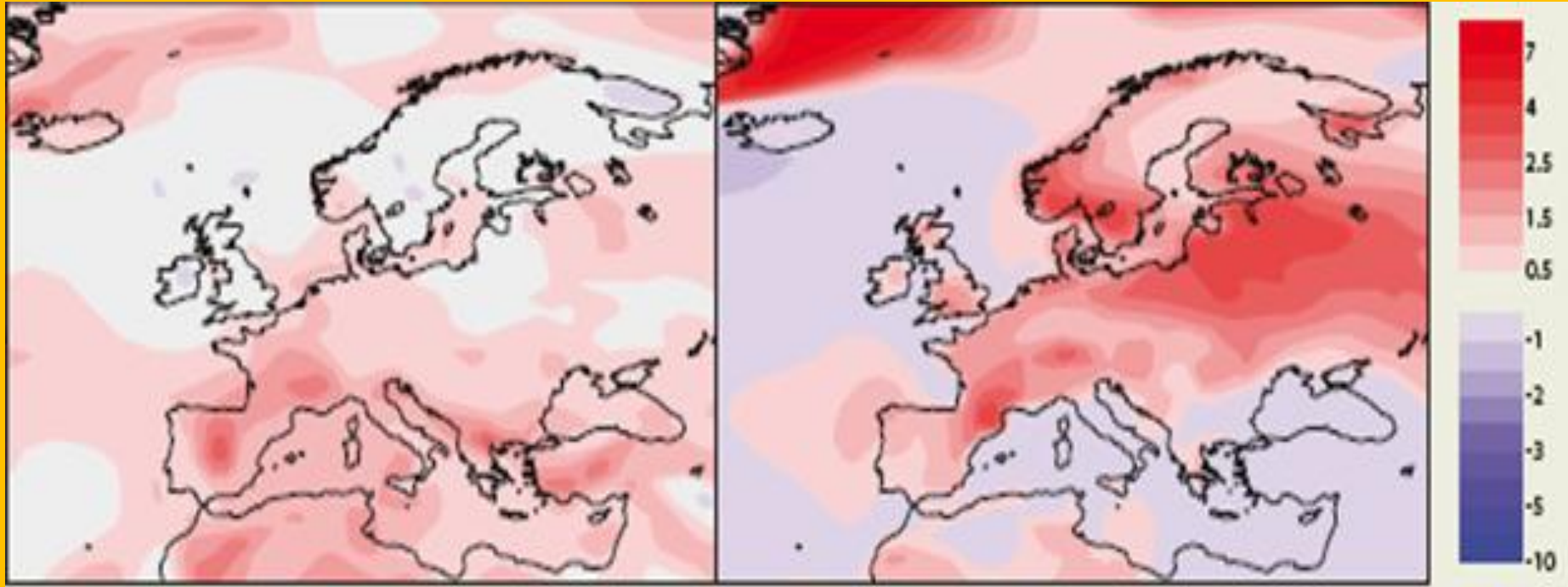
# Mitigation and adaptation to climate change in Mediterranean region: international experience

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# Climate change is a real thing!

Summer

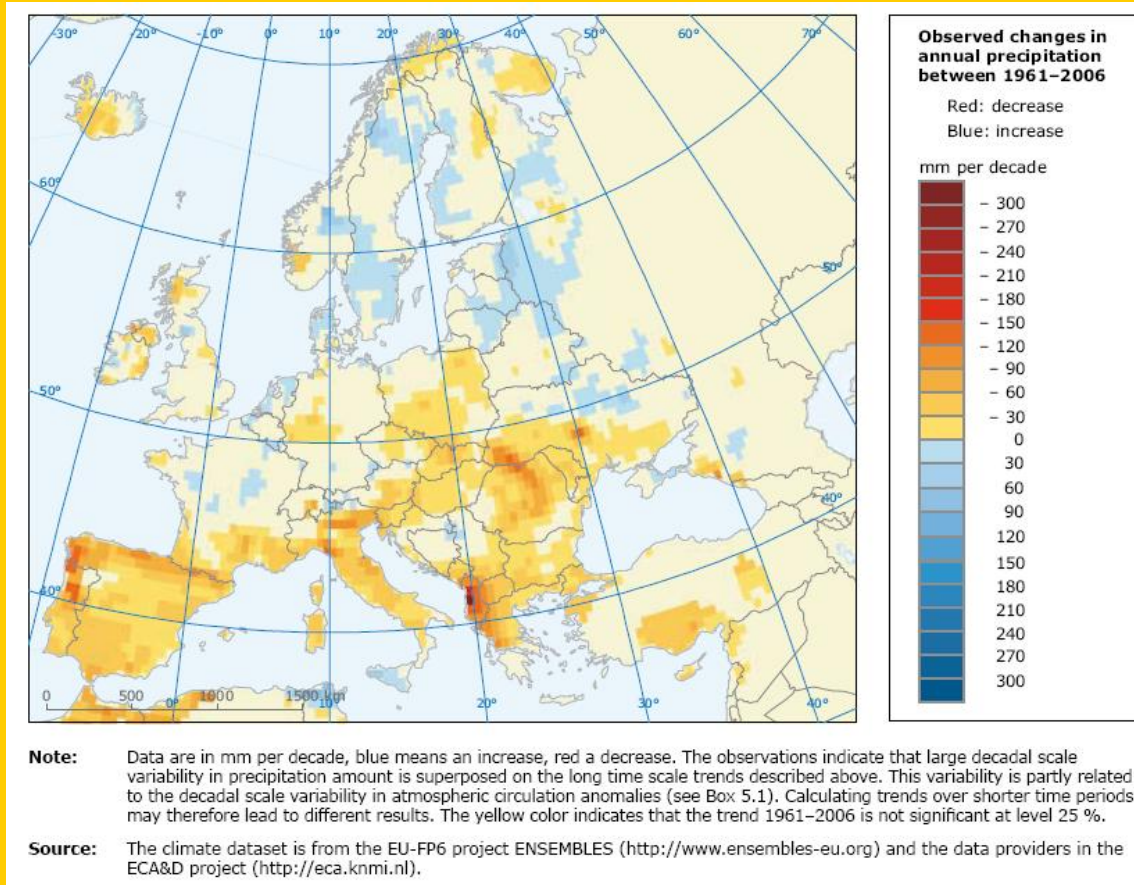
Winter



Linear temperature trend ( $^{\circ}\text{C}/50$  years) in 1958-2001  
according to ERA-40 ECMWF reanalysis

*For Mediterranean, the hottest season becomes hotter.*

# Annual precipitation change



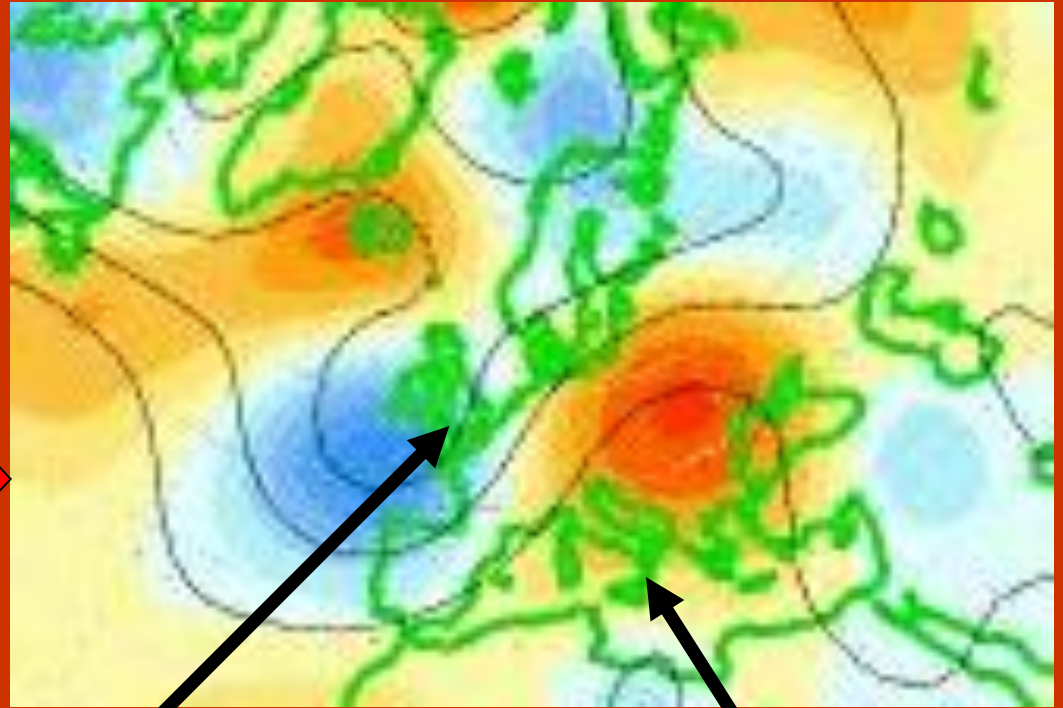
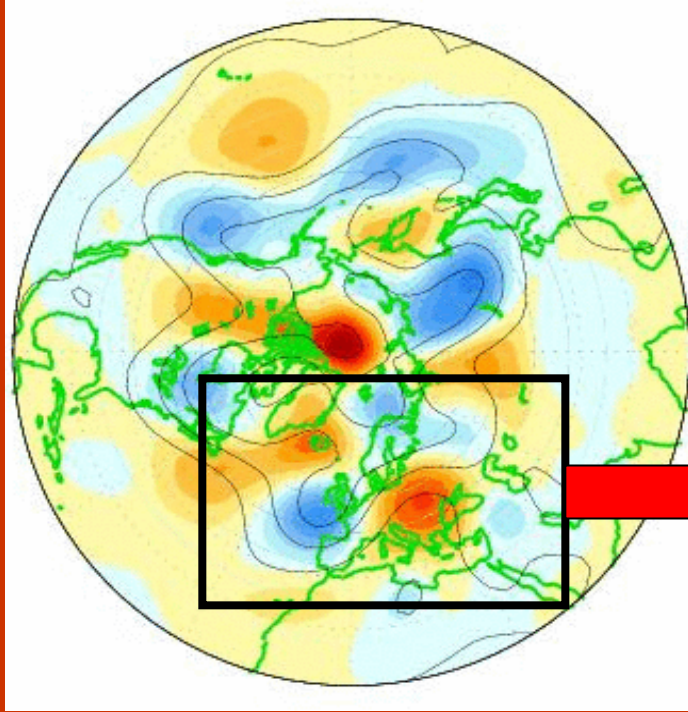
*Generally, in Mediterranean precipitation decreases, but possibility of heavy rains might be high (IPCC, 2007).*

*Mediterranean is different from most of Europe and other regions in terms of on-going climate change.*

**However, uncertainties remain...**



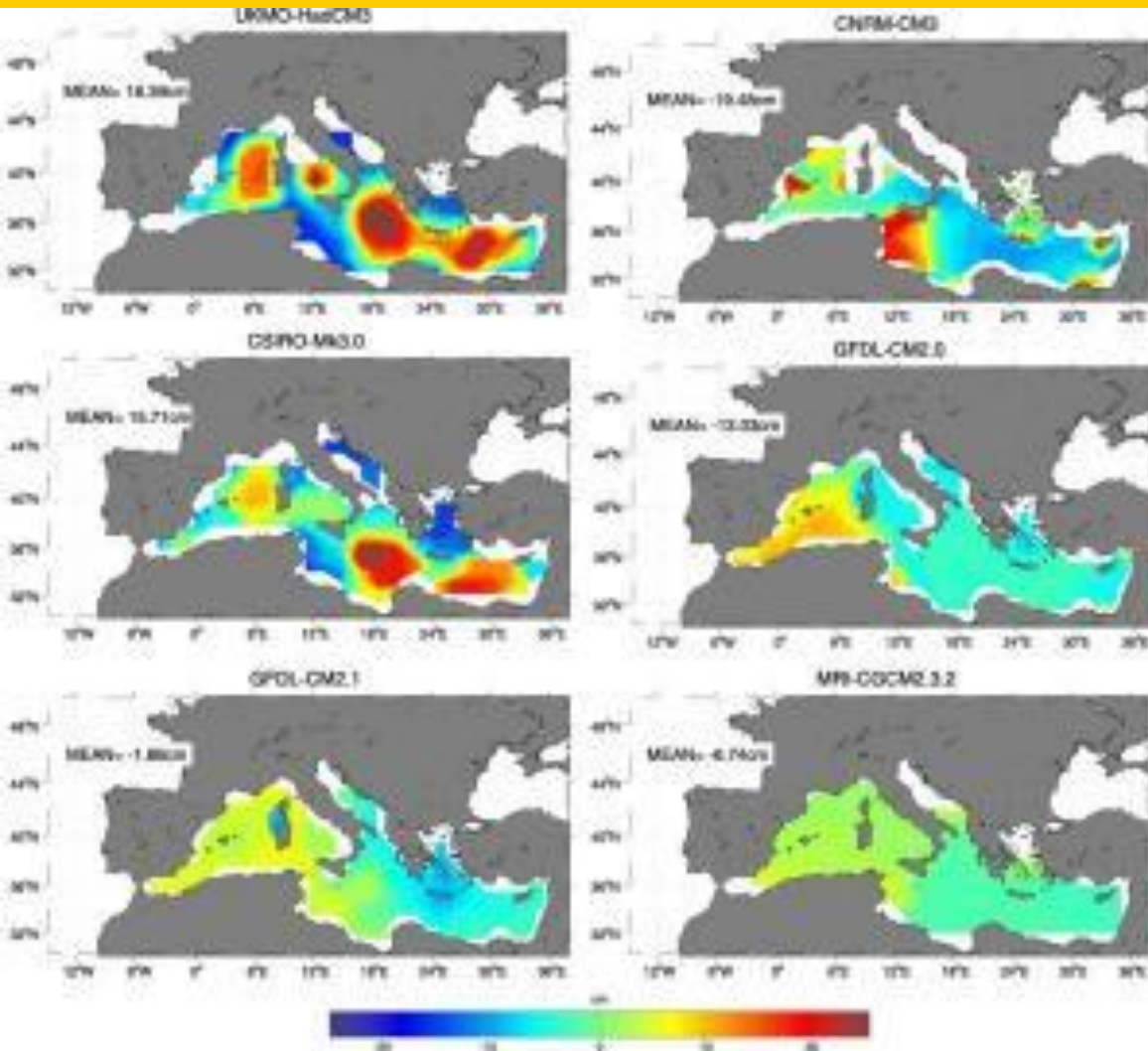
**July 2007: floods in England and forest fires in Mediterranean:  
*result of blocking anticyclone***



**Geopotential height at 500 hPa  
(NCEP)**



## Another potential threat: sea level rise (but regional uncertainty is high)



*Variations over the 21st century in steric sea levels caused by changes in temperature and salinity for different models against the backdrop of climate change. (SINC)*



# Some possible measures on mitigation

## 1. Renewable energy installations development

For Mediterranean: wind energy, solar energy, and wave energy are most promising technologies for power generation; biofuels can be used for transport and other economy sectors.

**For now, the efforts are scattered,  
no coordinated policy**



Andasol: 100-MW concentrated solar power (CSP) station in Spain



Photovoltaic "tree" in  
Gleisdorf, Austria



Wind power generators at  
Kaliakra Cape in Bulgaria

Pelamis wave energy  
converter on  
preparation in  
Portugal





## 2. Energy efficiency and conservation

More ecologically-friendly types of fuel, better energy saving (incl. building design), electric or hydrogen-fuelled cars, etc.

*Switzerland: next to Mediterranean*



Zermatt: town of electric cars only



Solar energy directly from the roof



### 3. Reforestation: making the planet greener

Reforestation  
in Israel



A plant in Aqaba, Jordan, will combine two technologies -- seawater greenhouses and concentrated solar power -- to grow crops, produce carbon neutral energy and desalinate seawater. Planned for 2012.

# Adaptation to climate change: application to Mediterranean

## General principles for adaptation policy:

- *The impacts of climate change may vary by seasons, regions, demographic groups, etc.*
- *The effects of climate change can result in multiple risks and opportunities*
- *Adaptive responses come at a cost and vary in effectiveness*
- *Maladaptation can result in negative effects as serious as the climate-induced effects that are being avoided*
- *Different options for adaptation make sense*



## Precipitation decrease: impacts and possible solutions

- *Water deficit, droughts (desalinization of sea water, drilling deep wells)*
- *Forest fires (firefighter service, cuttings, introduction of less fire-prone species)*
- *Crop productivity decline (new crops, aquaculture instead of agriculture)*
- *Hydropower production decline (alternative energy sources)*
- *Poverty spreading (reasonable tax policy, job market promoting)*
- *Ecosystem shrinkage (appropriate preservation policy)*
- *Restructuring or decline of tourism (promoting new possibilities like spring/autumn seasons)*

***Detailed international cooperation is needed, including research of the relevant subjects***

# Occasional view at Poros island, Greece



*But not ready to promote tourism in June...*

Forest fire protection measures



Aquaculture

...traditional irrigation system is abandoned







Capri



Tossa-del-Mar



Beer-Sheva



Thank you!

Poros