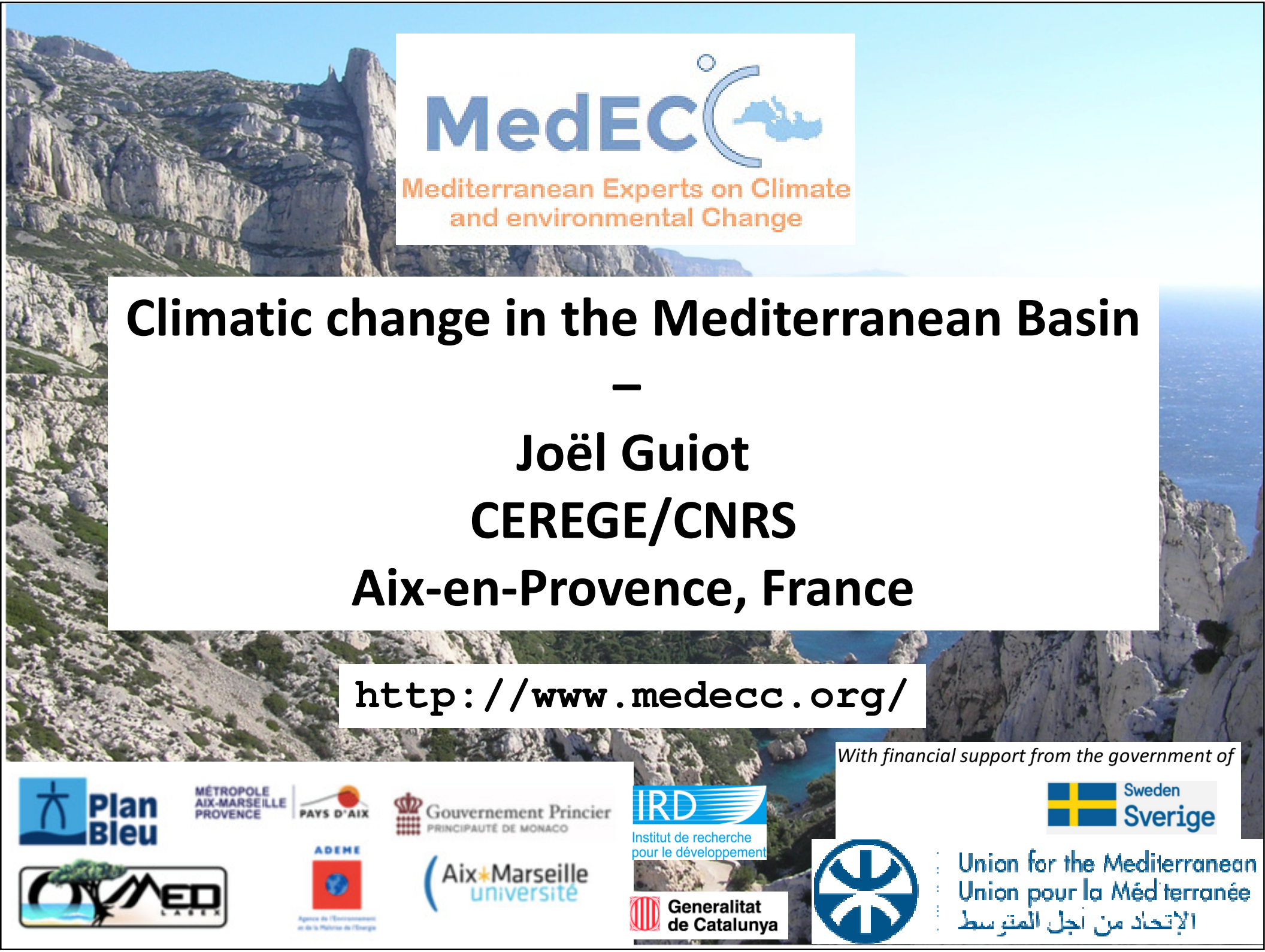

MedECC

Mediterranean Experts on Climate and environmental Change

# Climatic change in the Mediterranean Basin

–


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## CEREGE/CNRS

## Aix-en-Provence, France


http://www.medecc.org/


*With financial support from the government of*


Plan Bleu

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MED LABEX

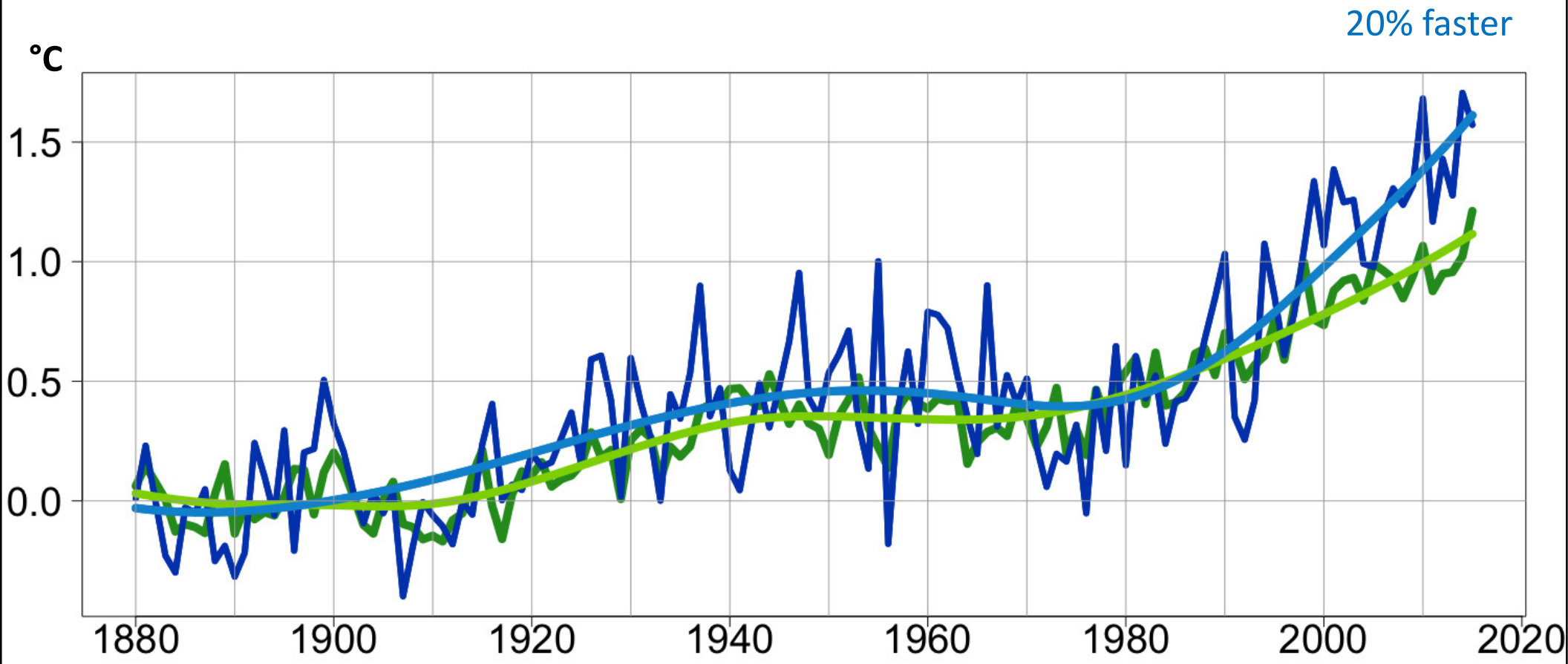
ADEME

Aix*Marseille université

Generalitat de Catalunya

Union for the Mediterranean
Union pour la Méditerranée
الإتحاد من أجل المتوسط

# Mediterranean annual warming trend (MedECC)

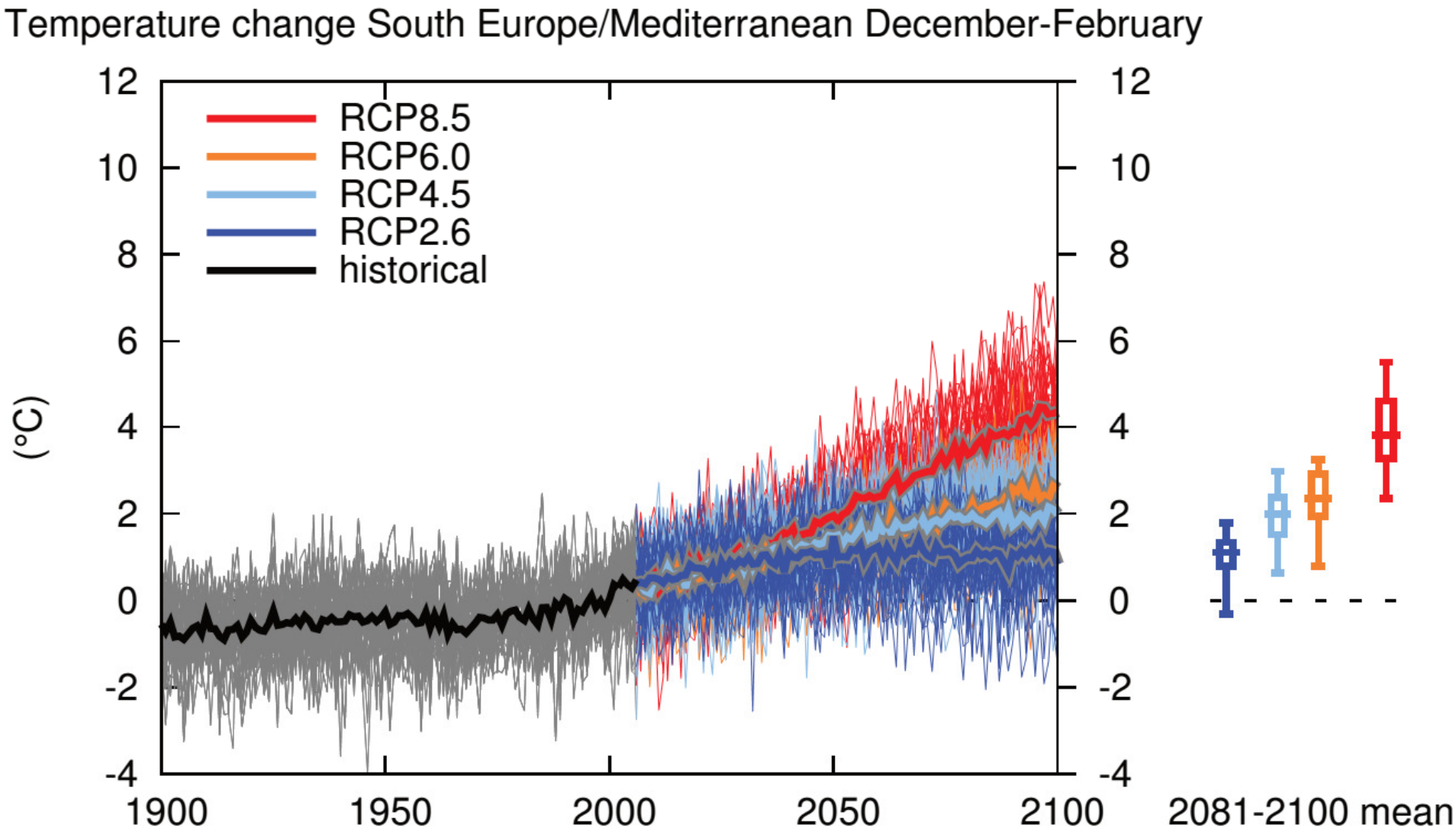



**global mean temperature**

**regional mean temperature (Mediterranean)**

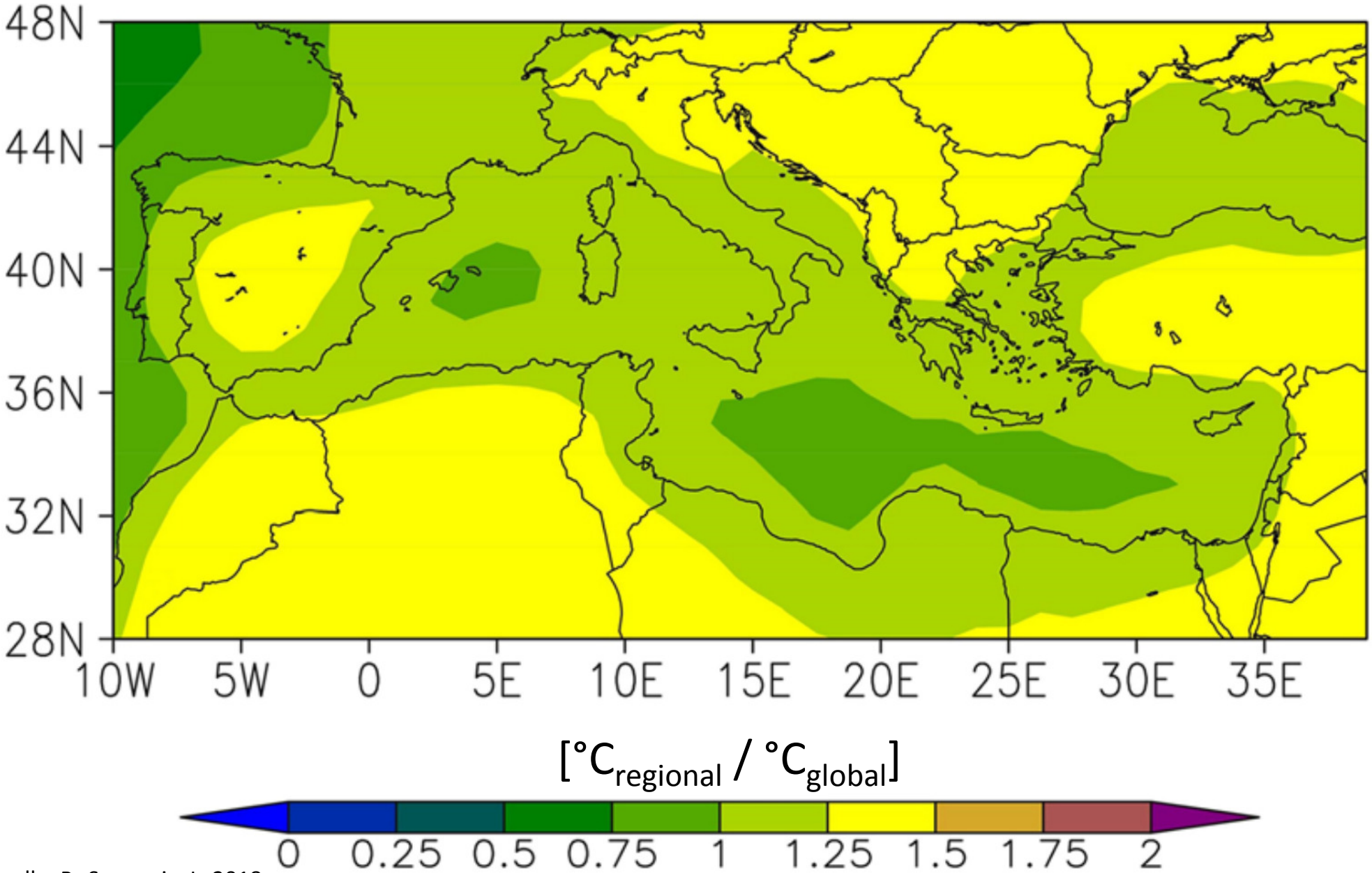
Cramer et al., 2018 (data analysis: A. Toreti, JRC)

# Mediterranean warming Dec-Feb for different scenarios (IPCC AR5)




IPCC, 2013: Annex I: Atlas of Global and Regional Climate Projections [van Oldenborgh, G.J., M. Collins, J. Arblaster, J.H. Christensen, J. Marotzke, S.B. Power, M. Rummukainen and T. Zhou (eds.)].

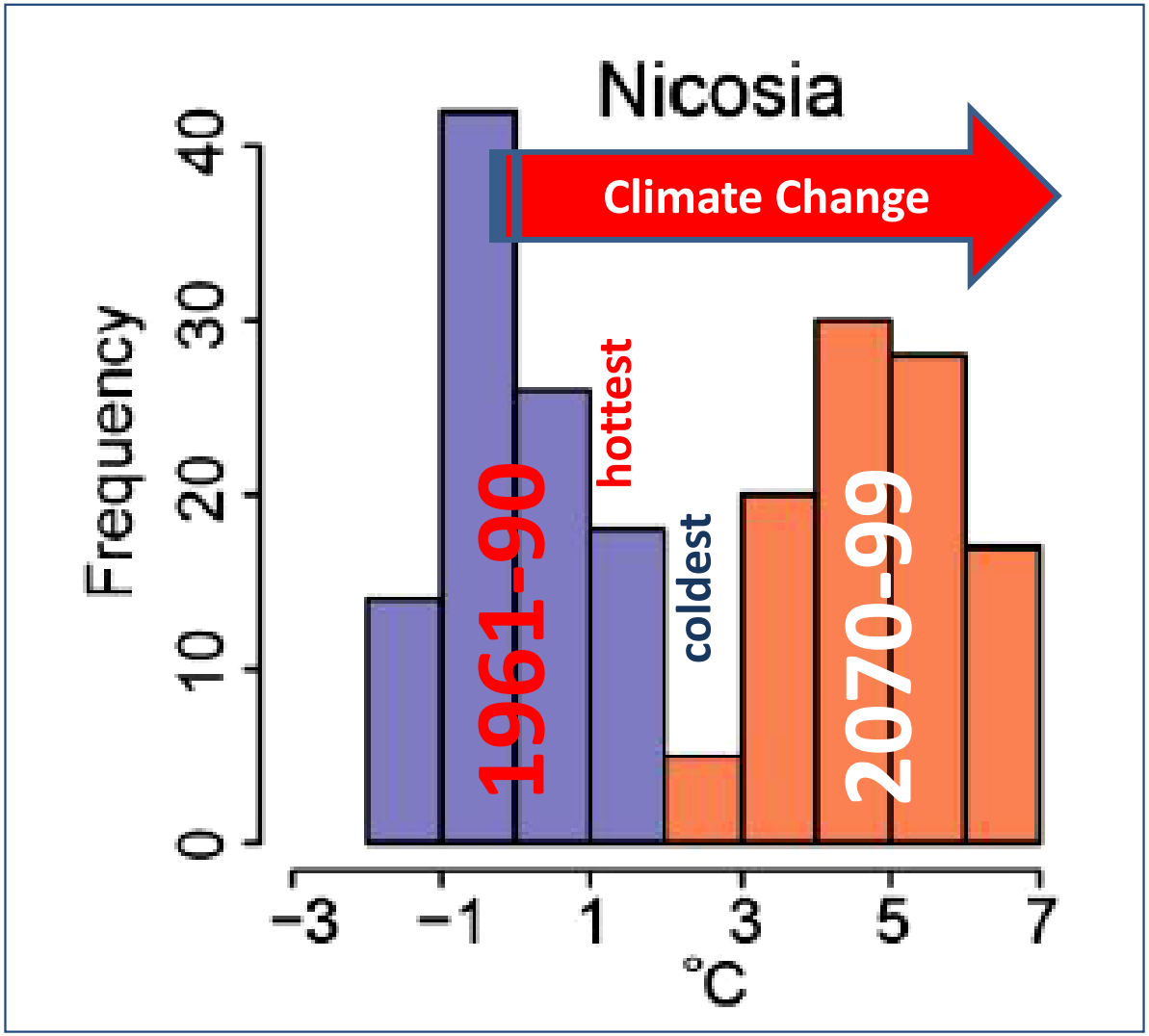
# Mediterranean annual warming trend, relative to global (MedECC)




Lionello, P., Scarascia, L. 2018,
Regional Environmental Change

# Urban warming in the Eastern Mediterranean

**Climate models project particularly severe warming in large cities in the Eastern Mediterranean**



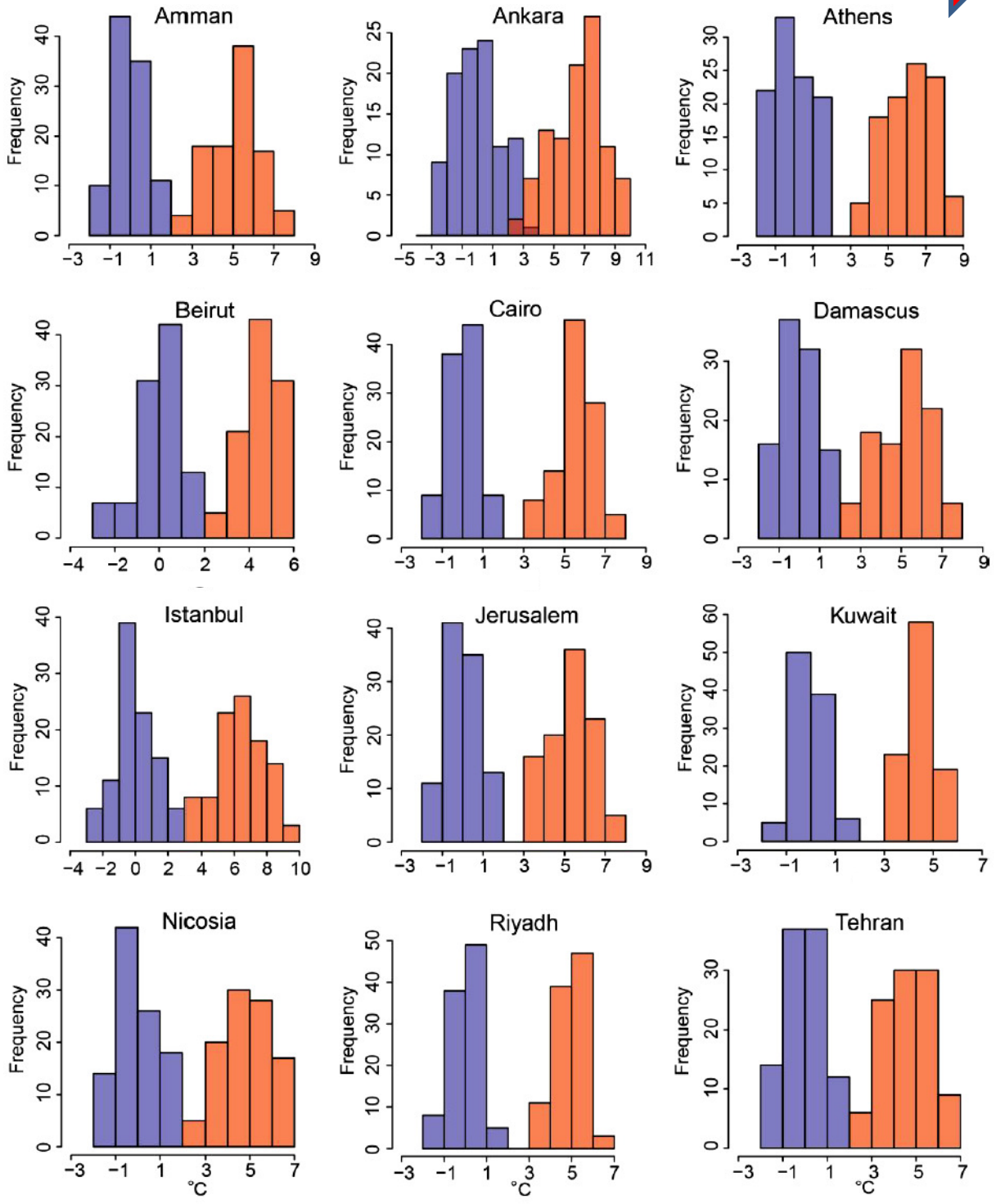

Recent and end-of-century temperature anomalies. Model calculated frequency histograms (%) of **summer (JJA) daytime maximum temperature** (TX) anomalies relative to the period 1961-1990, based on the A1B scenario. Blue is for the period 1961-1990 (hence cantered around 0°C) and red for the period 2070-2099

Lelieveld et al. 2014, Regional Environmental Change

# Urban warming in the Eastern Mediterranean

Climate Change

**For most of the large cities in the MENA Region ⇨ coldest summer month in the future will be warmer than today's hottest month**

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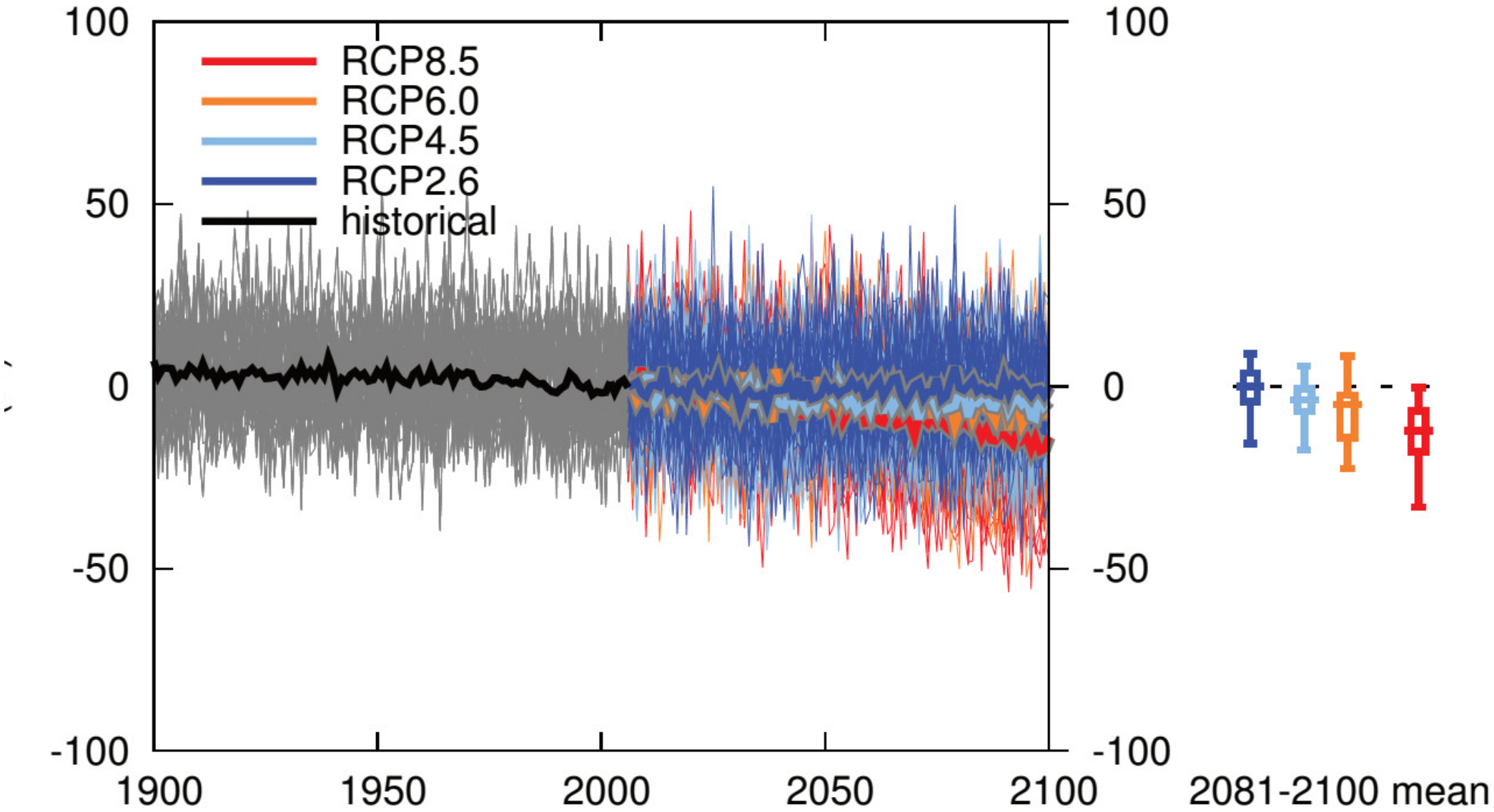
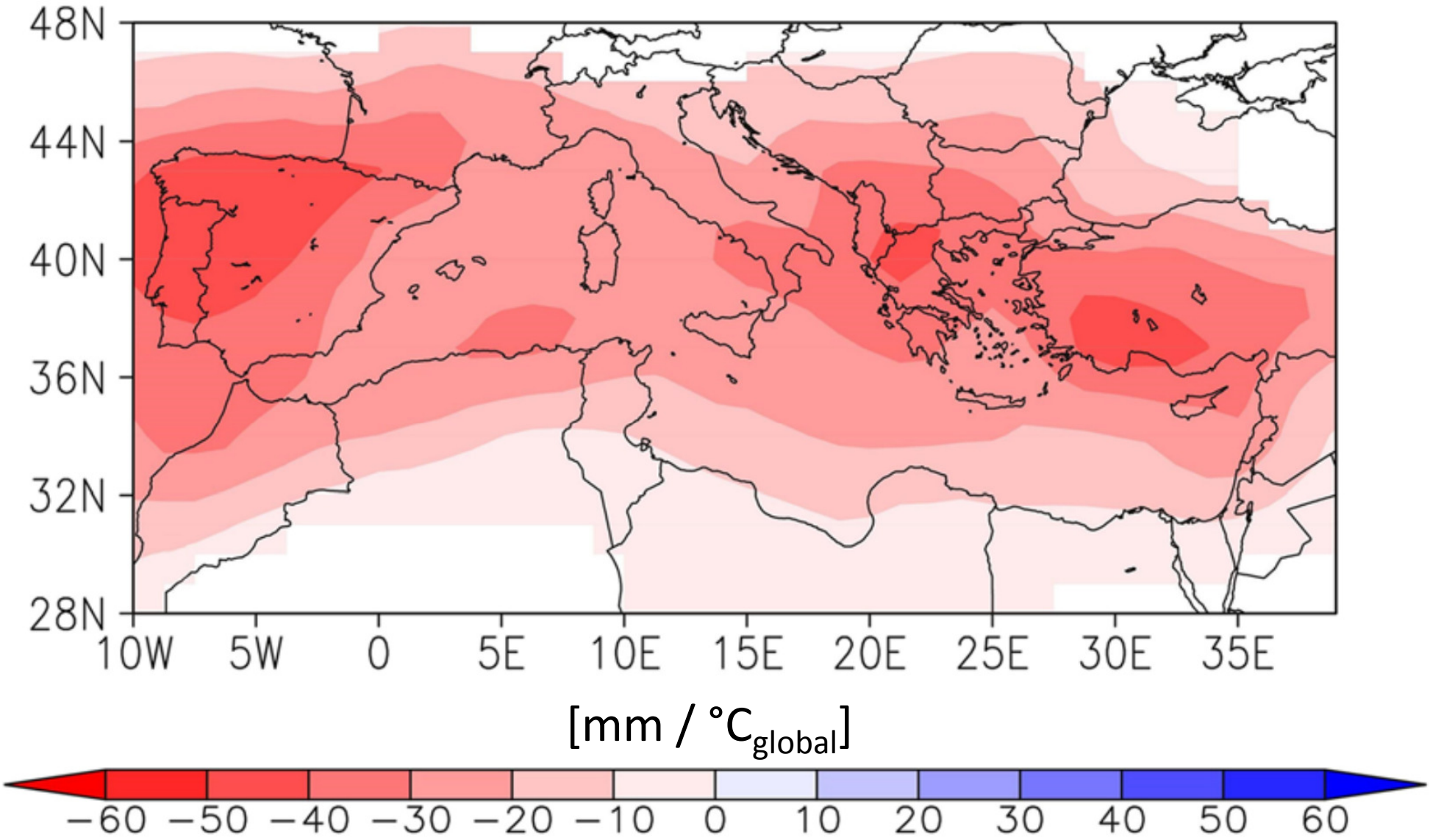
Lelieveld et al. 2014, Regional Environmental Change

# Mediterranean rainfall Oct-Mar for different scenarios (IPCC AR5)



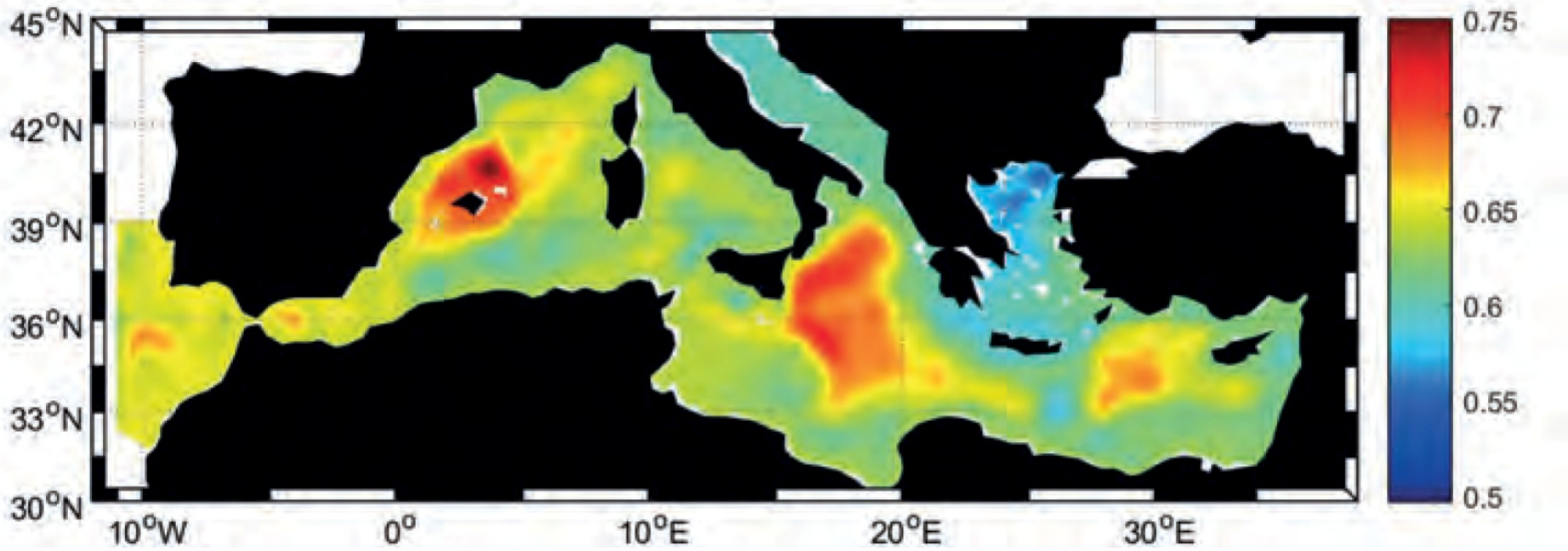

IPCC, 2013: Annex I: Atlas of Global and Regional Climate Projections [van Oldenborgh, G.J., M. Collins, J. Arblaster, J.H. Christensen, J. Marotzke, S.B. Power, M. Rummukainen and T. Zhou (eds.)].

# Mediterranean annual rainfall trend, relative to global temperatures (MedECC)



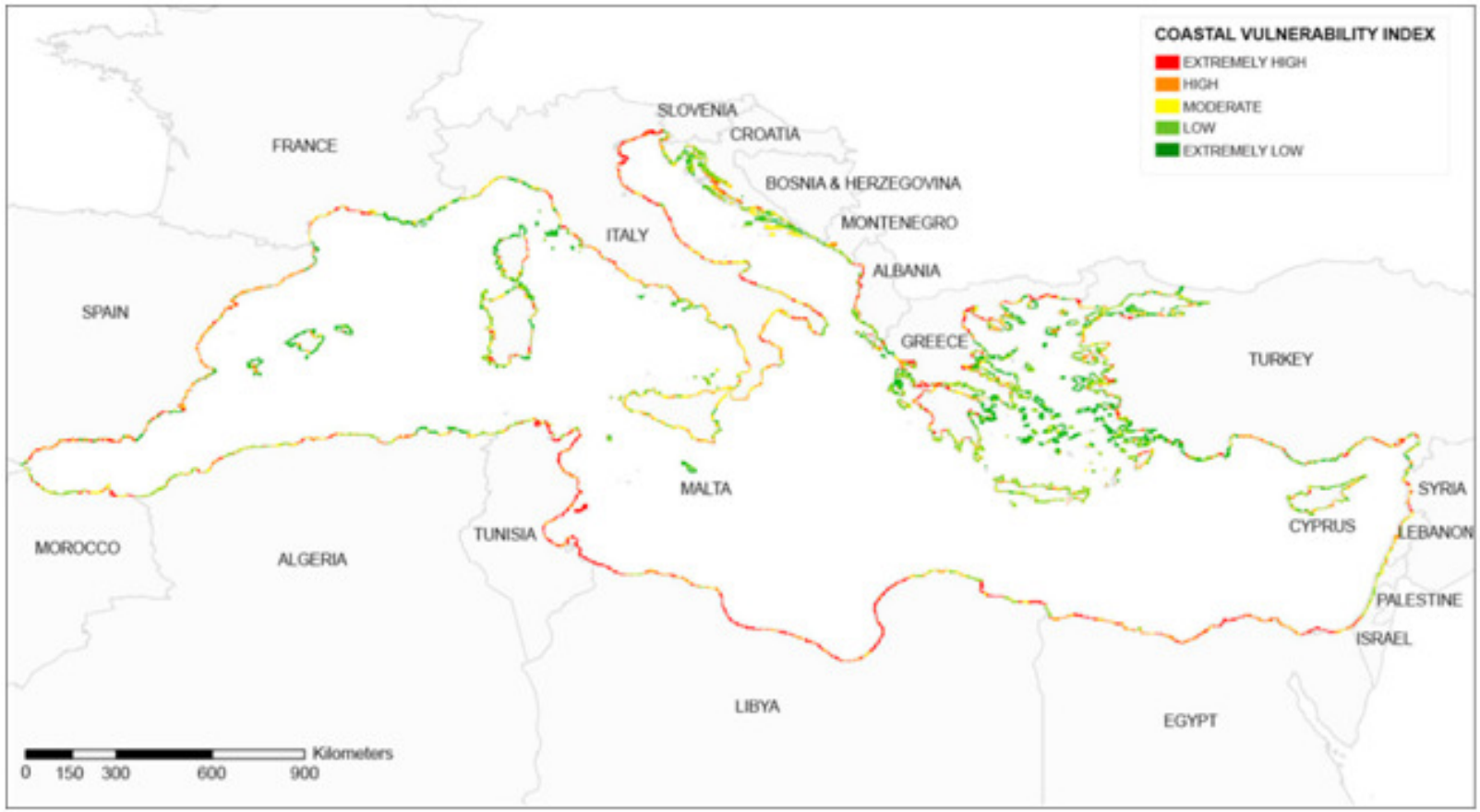

Lionello, P., Scarascia, L. 2018,
Regional Environmental Change

# Mediterranean sea level rise




Projection of sea level change for the period 2080-2100 with respect to the period 1980-2000.The result is the combination of outputs of an ensemble of regional climate models combined with the CMIP5 projections for the Atlantic changes all run under moderate GHG emission scenarios (A1b and RCP6.0). From Somot et al, 2016

# Mediterranean coastal vulnerability index




Coastal risks and vulnerabilities associated with the physical and socio-economic impacts of climate change in all Mediterranean coastal zones (CRI-Med)

Satta et al. (2017)

# Water resources

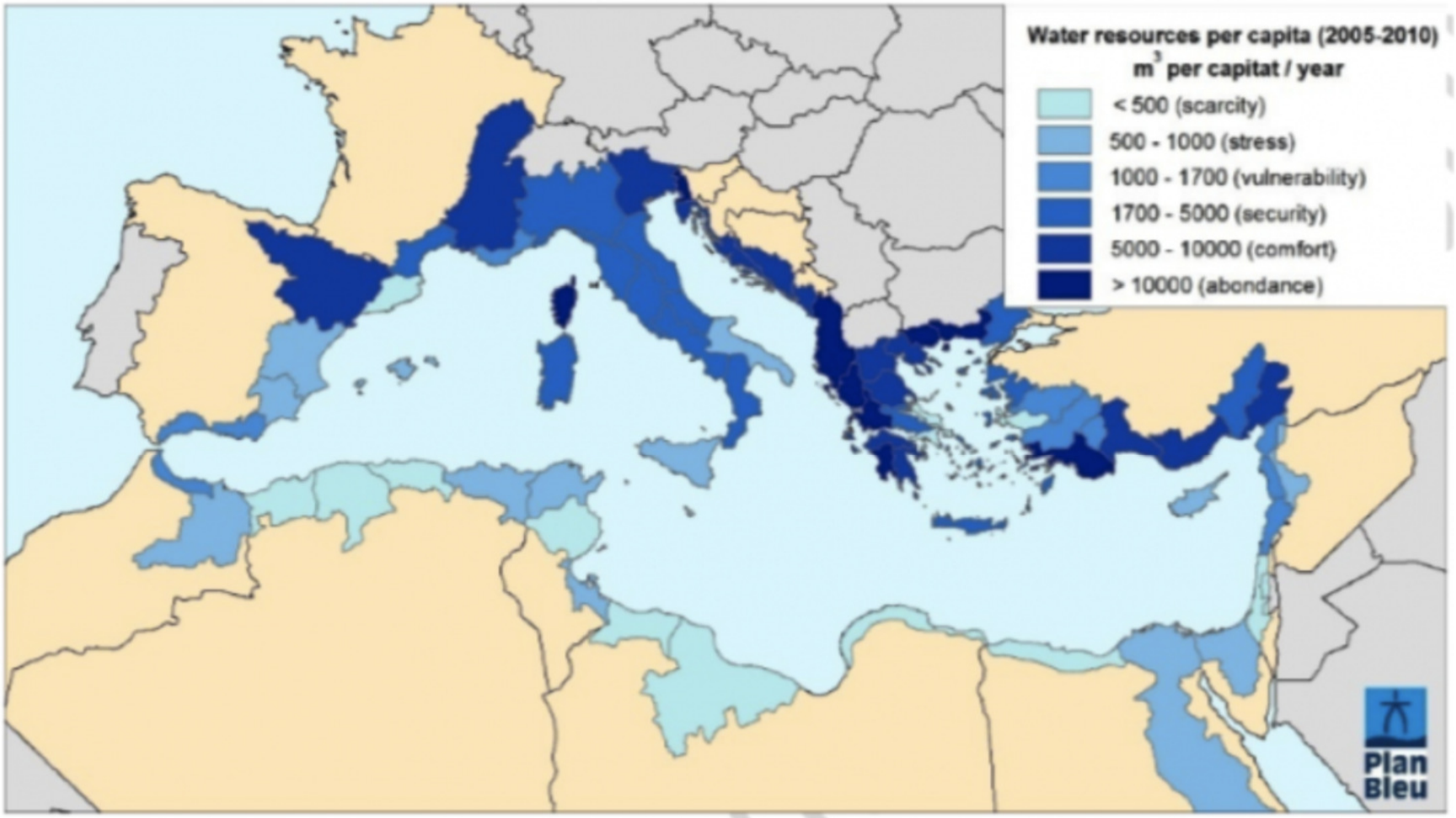
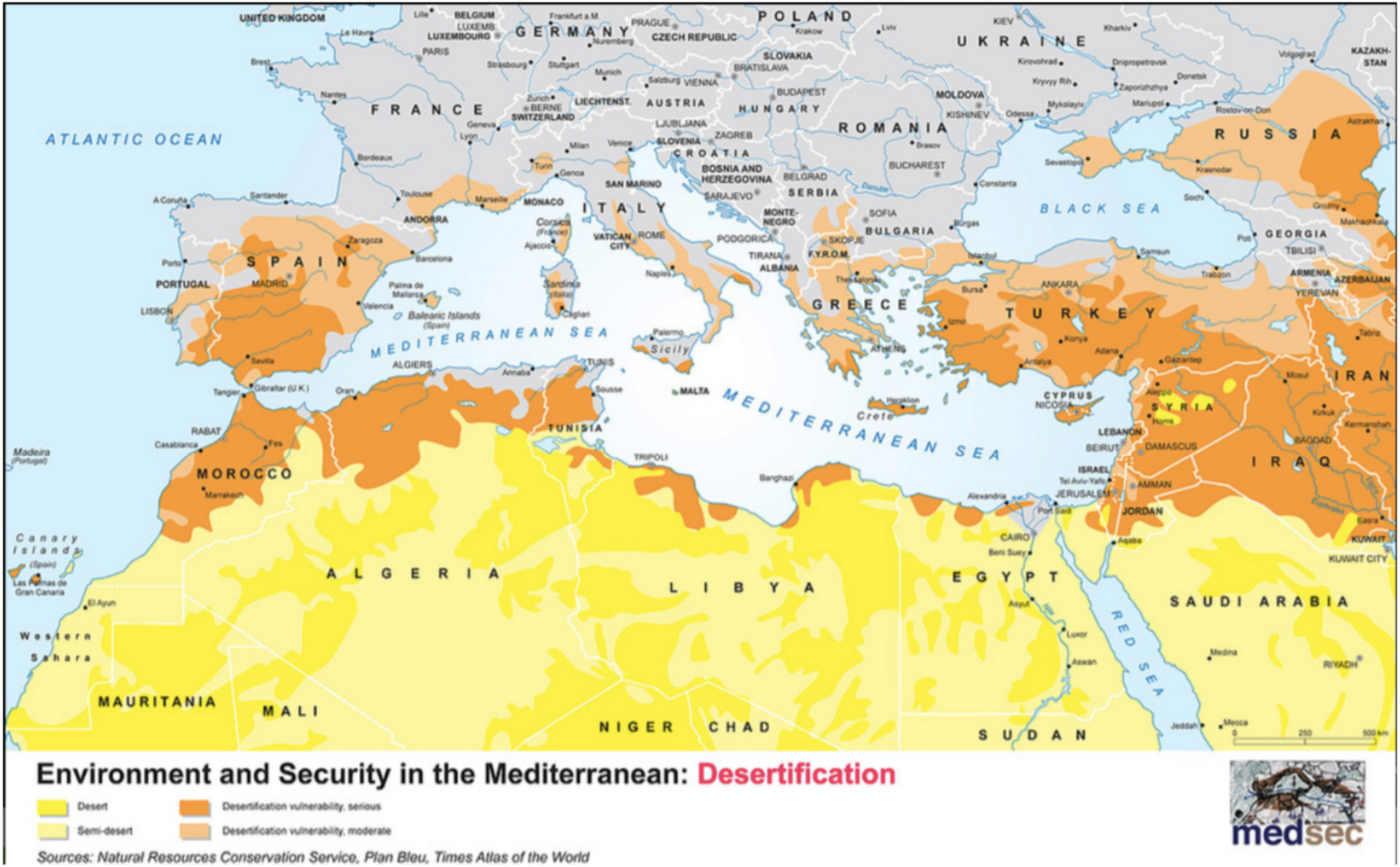


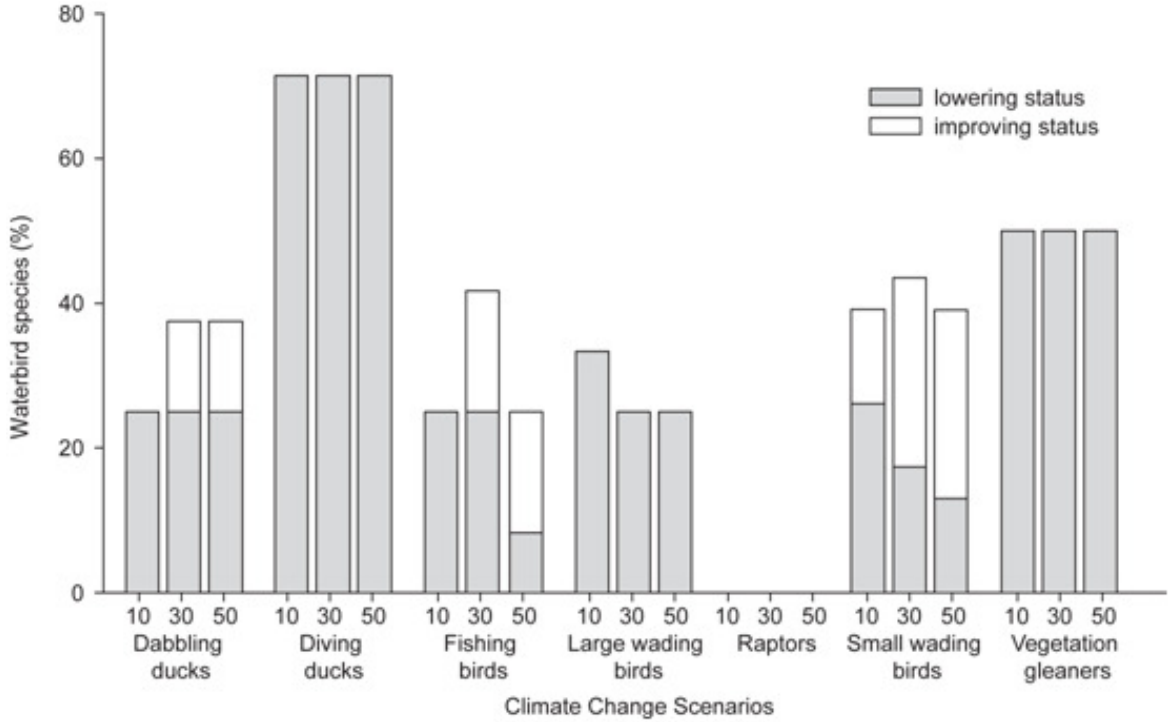

**Fig. 5. Annual natural renewable water resources per capita in the main Mediterranean watersheds, expressed as levels of shortage for human use[35]**

Plan Bleu 2010



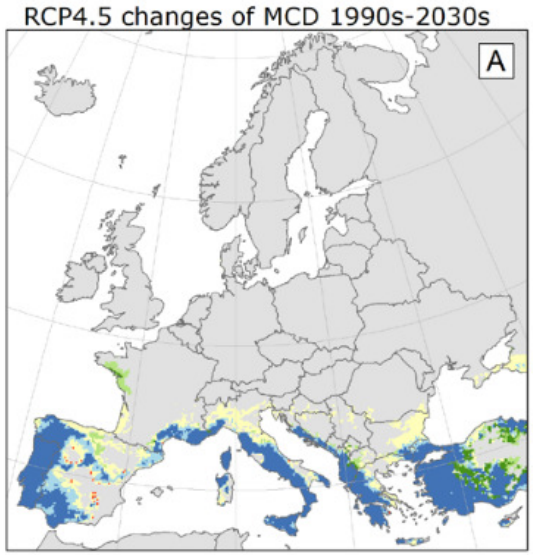

ig 6. The vulnerability of the Mediterranean region to desertification[71]

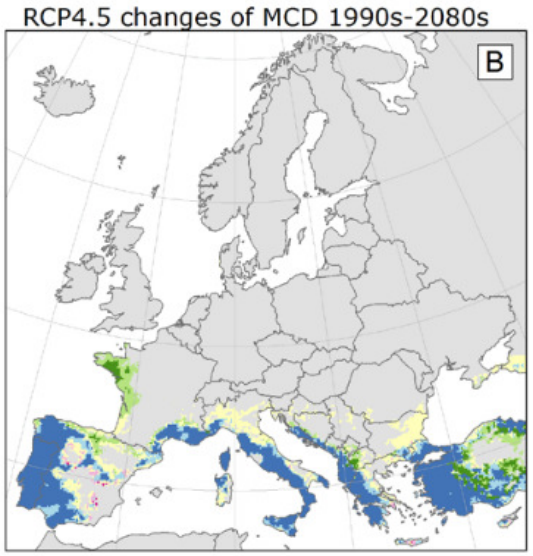
# Vulnerability of wetland species in SW Spain

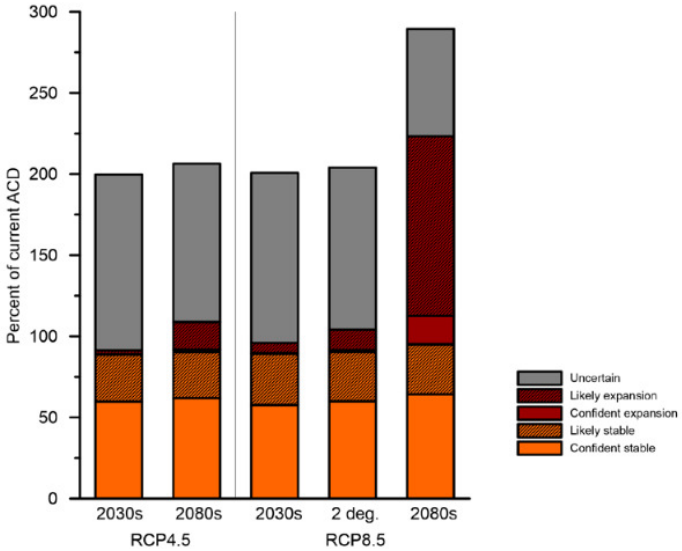


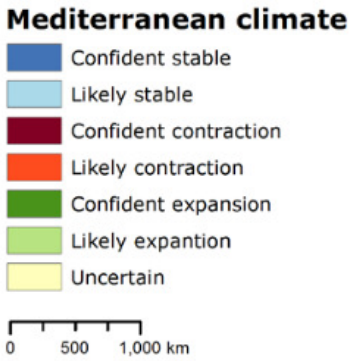

Percentage of species per guild whose conservation status may change; i.e. non-endangered species that will be negatively impacted by predicted environmental changes and endangered species that may benefit from the new Climate Change scenarios (CC); three scenarios are analysed (10% to 50%)V (Ramírez et al., 2018)

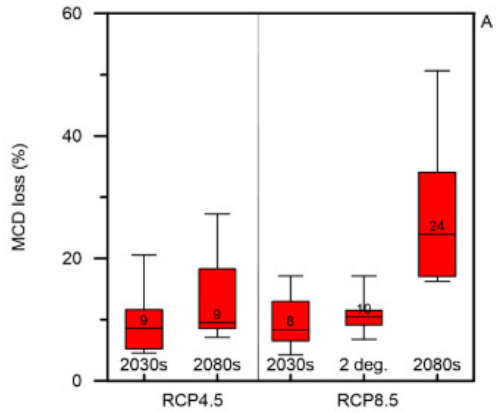
# Mediterranean climate domain (MCD) changes for several scenarios



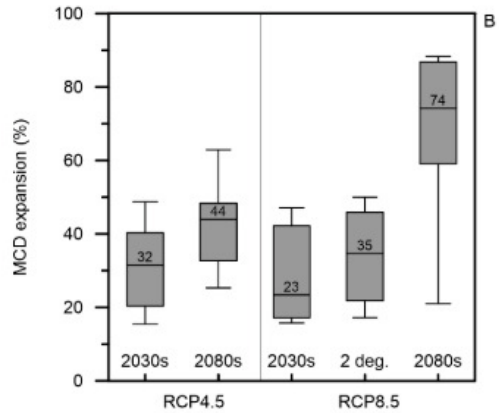



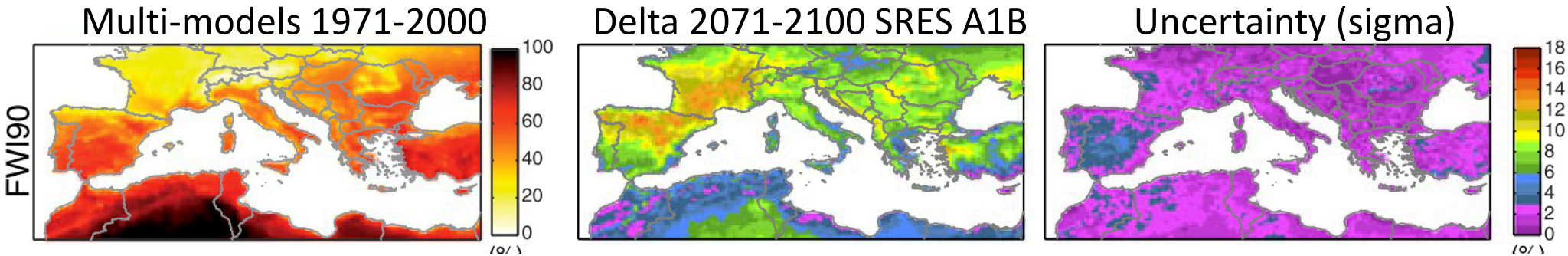

A) MCD loss



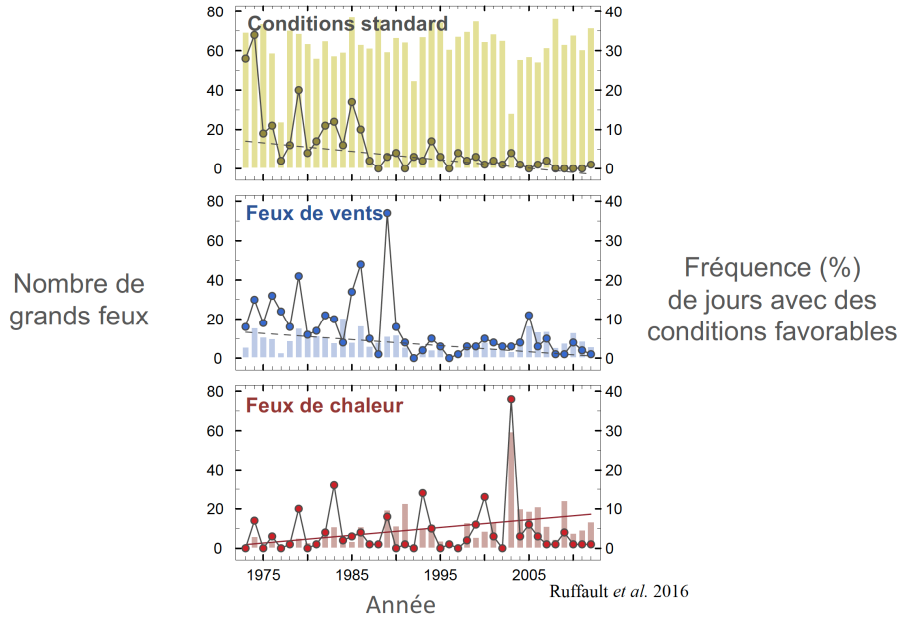

B) Shifts of the MCD in other climatic domains

Barredo et al, 2017

# Projection of the fire weather index (FWI, 90th percentile)




Une augmentation de la fréquence des conditions pour les « feux de chaleur » ( type 2003)




- Mediterranean forests are already with high risk of fires, especially in South
- With the intermediate scenario A1B, increase of 5-15%
- In S France, the high fires have tendency to decrease but not those related to heat waves

# 2. Developing a scientific assessment for decision makers

The MedECC ambition is to develop

- a scientifically robust assessment and synthesis of environmental change and its impacts in the Mediterranean Basin, based on published research.
- a regional science-policy interface on climate and environmental change in the Mediterranean, approved by policy makers.

400 scientists from 35 countries in MedECC have so far committed their contributions, on the condition that good interaction with policymakers can be ensured.

Milan, authors meeting, March 2019

# **The MedECC First Assessment Report – outline (MAR1)** planned for early 2020

Summary for Policymakers — *stakeholder dialogue*

1. Introduction
2. Drivers of the environmental impacts (physical and human drivers)
   a. Climate
   b. Pollution
   c. Land/sea use and management
   d. Invasive species
3. Challenges
   a. Water, food, energy (WG1)
   b. Ecosystems and ecosystem services (WG2)
   c. Development, health and human security (WG3)

*current main focus*

4. Managing future risks and building resilience
   a. Best practices and policies for adaptation, mitigation and sustainable devel.
   b. Knowledge gaps and needs for research and observations
   c. Mediterranean cooperation and networking for building resilience
   d. Training and capacity building

*second phase*

**Summary for policymakers to be submitted for approval by decision makers, planned for 2020**

# Preliminary works (1)

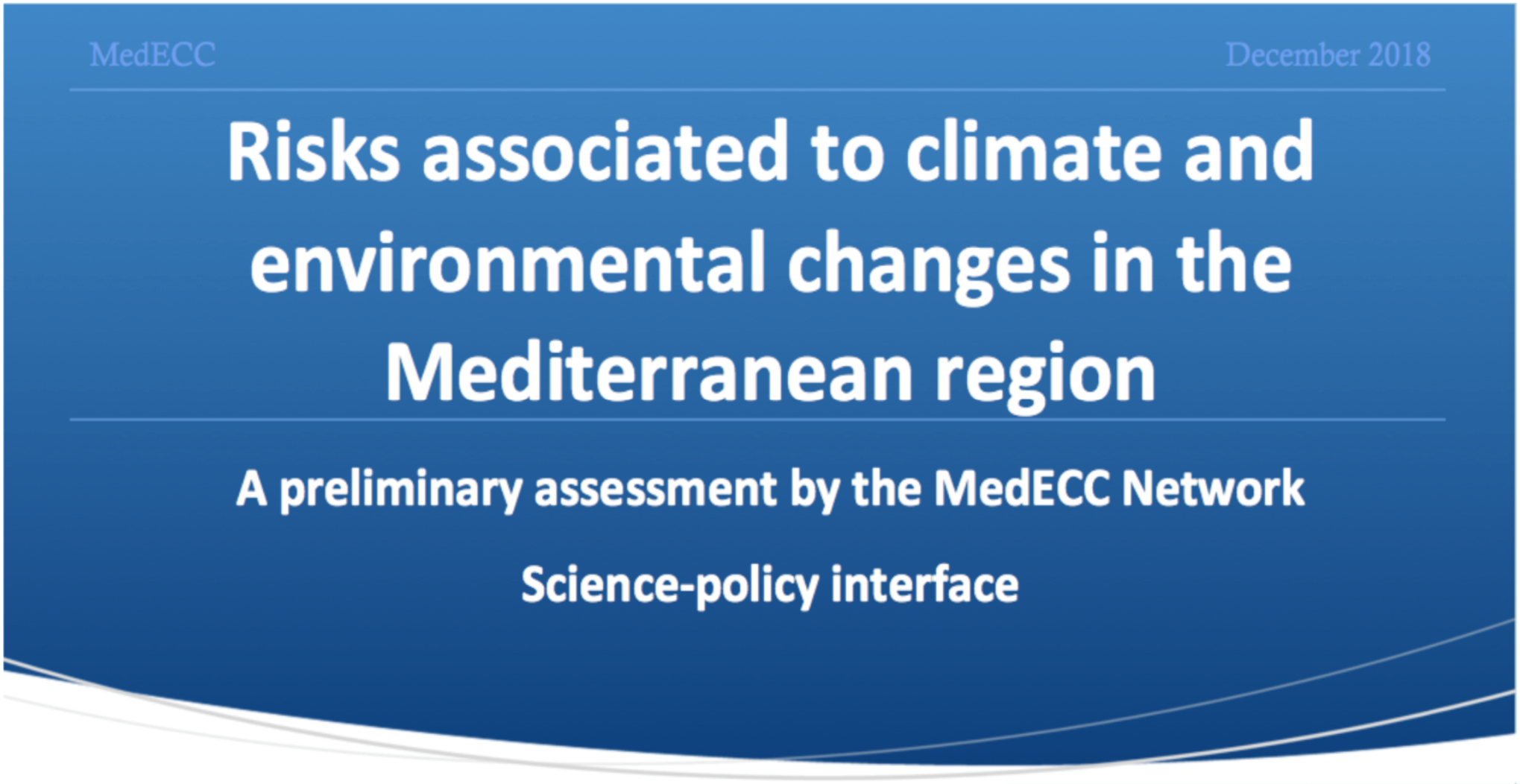
REVIEW ARTICLE
https://doi.org/10.1038/s41558-018-0299-2
2018
nature climate change

## Climate change and interconnected risks to sustainable development in the Mediterranean

Wolfgang Cramer[1*], Joël Guiot[2], Marianela Fader[3], Joaquim Garrabou[4,5], Jean-Pierre Gattuso[6,7], Ana Iglesias[8], Manfred A. Lange[9], Piero Lionello[10,11], Maria Carmen Llasat[12], Shlomit Paz[13], Josep Peñuelas[14,15], Maria Snoussi[16], Andrea Toreti[17], Michael N. Tsimplis[18] and Elena Xoplaki[19]

**Recent accelerated climate change has exacerbated existing environmental problems in the Mediterranean Basin that are caused by the combination of changes in land use, increasing pollution and declining biodiversity. For five broad and interconnected impact domains (water, ecosystems, food, health and security), current change and future scenarios consistently point to significant and increasing risks during the coming decades. Policies for the sustainable development of Mediterranean countries need to mitigate these risks and consider adaptation options, but currently lack adequate information — particularly for the most vulnerable southern Mediterranean societies, where fewer systematic observations schemes and impact models are based. A dedicated effort to synthesize existing scientific knowledge across disciplines is underway and aims to provide a better understanding of the combined risks posed.**

# Preliminary works (2)




A booklet available on http://www.medecc.org/