



## Workshop for Media and Students Basic issues in climate science

**SAUDI ARABIA**

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# Climate Change is Broad Issue

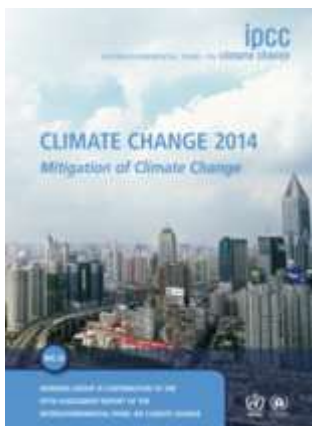
- Majority of the sciences and engineering disciplines are involved.
- Social sciences are interested.
- Business/Industry has a stake in.
- Involves citizens, politicians, public policy experts, and advocates.
- **Every sector of the economy is affected.**
- All aspects of our lives touched: environment, jobs, health, politics, national security, arts, religion, etc.



**What is happening in the climate system?**



**What are the risks?**



**What can be done?**

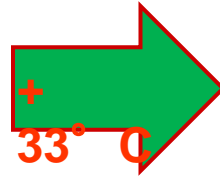
**If the world had no atmosphere, it would  
be very cold**

**-18°C**

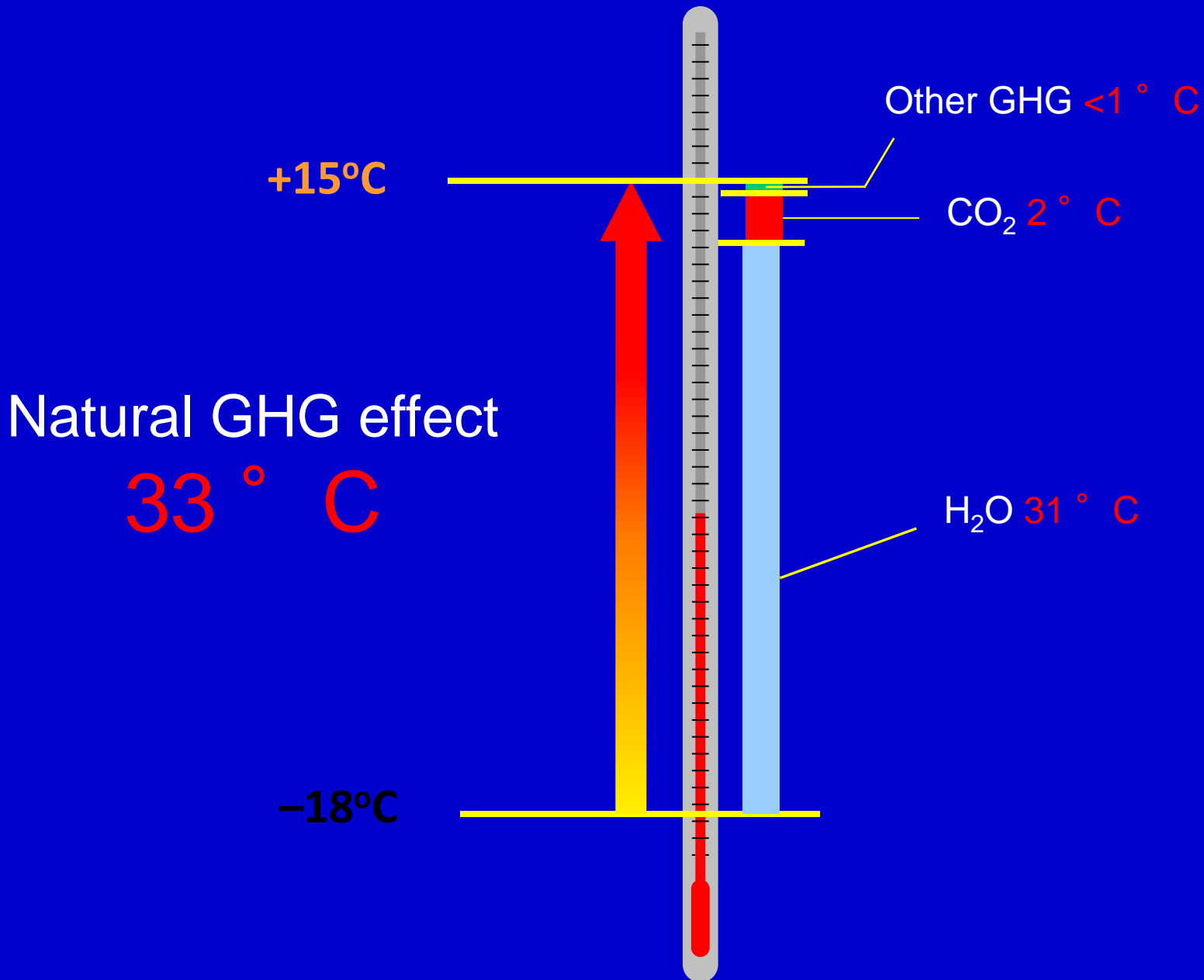
**+15°C**



**Earth without air**

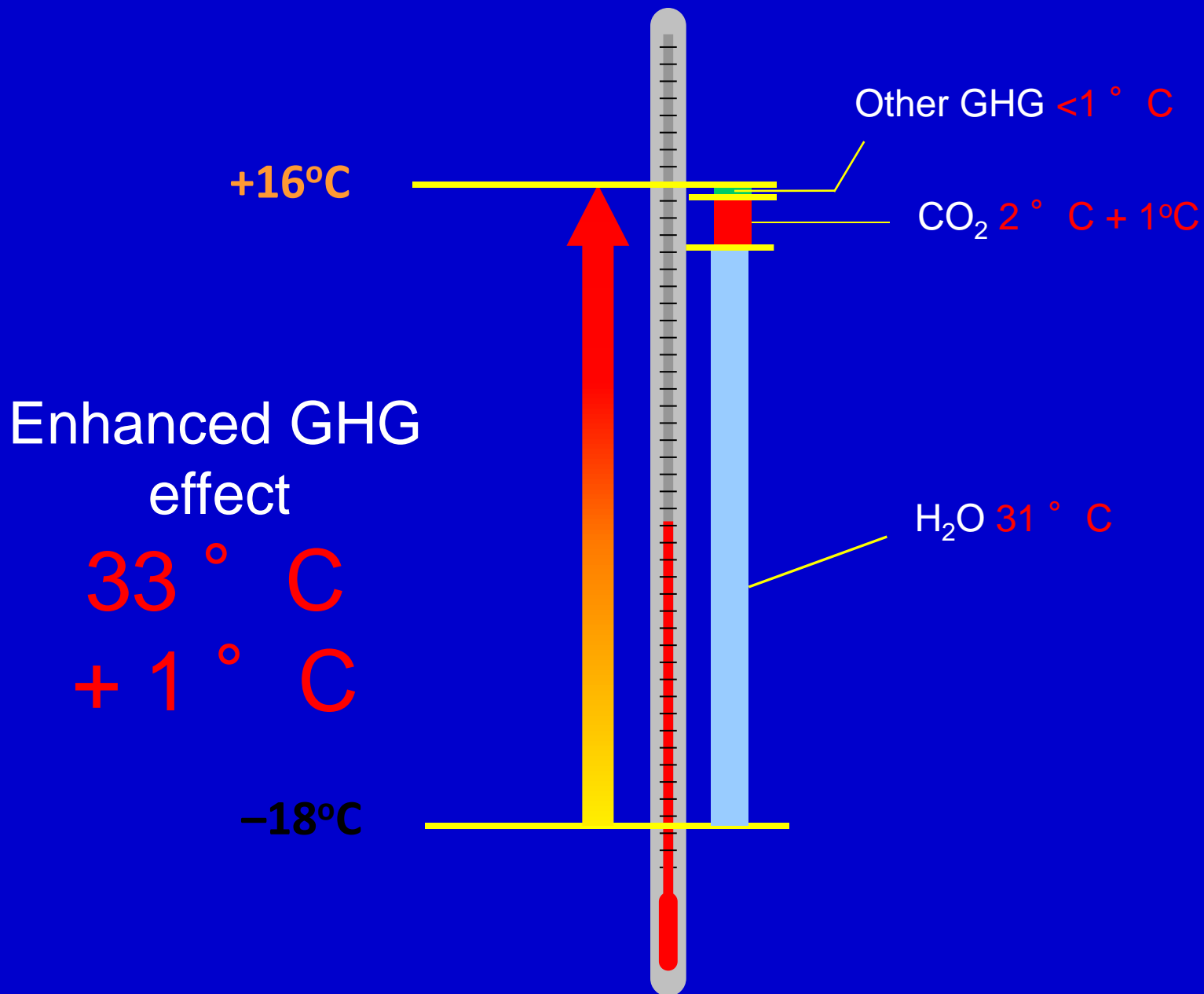


**Our planet**



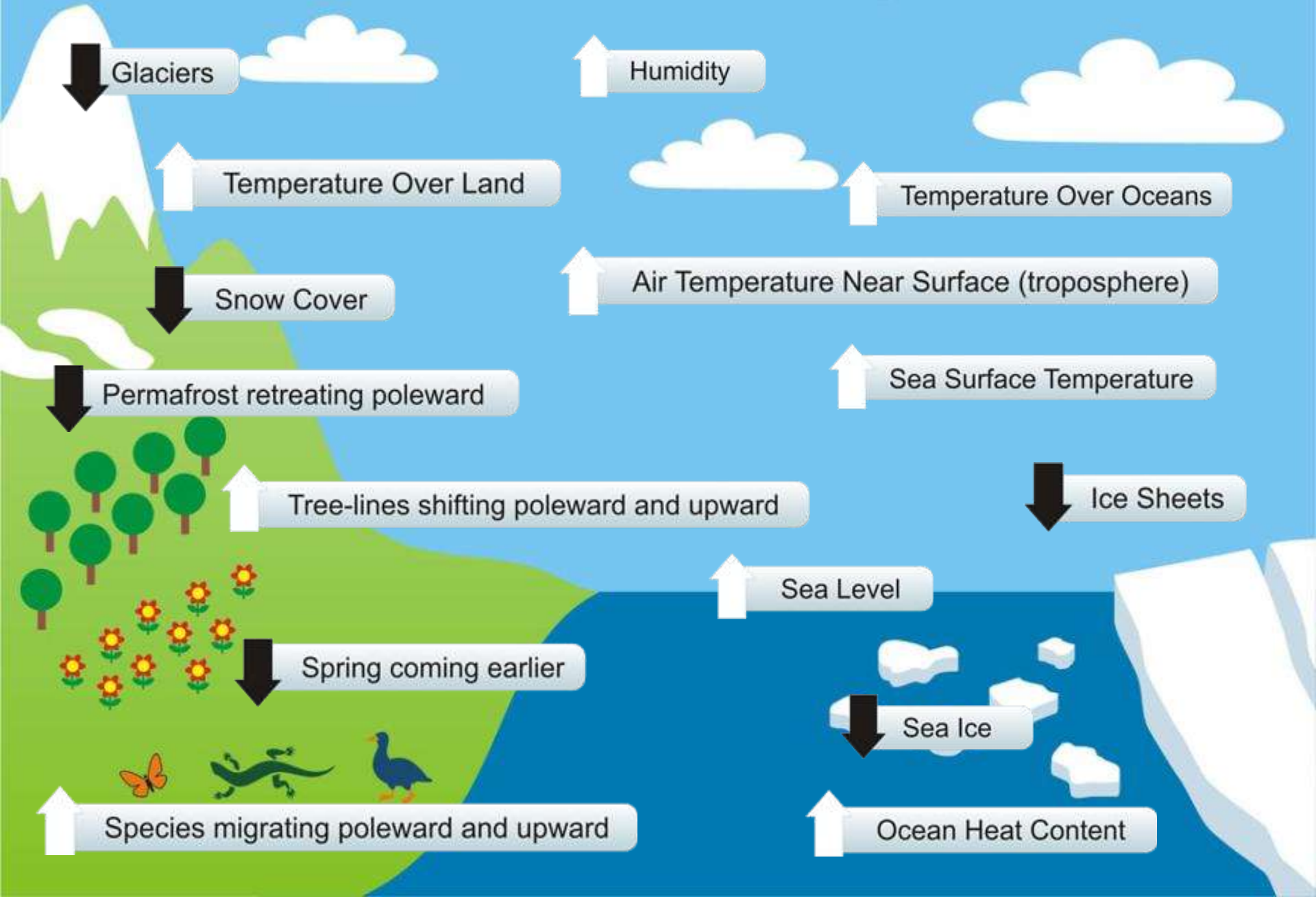
BUT THE COMPOSITION OF  
**AIR IS CHANGING RAPIDLY**  
due to human activities:

- more GHG ( $\text{CO}_2$ ,  $\text{CH}_4$ ,  $\text{NO}_x$ ...)
- more aerosol (air pollution)





# Indicators of a Warming World





# Impacts are already underway

- **Tropics to the poles**
- **On all continents and in the ocean**
- **Affecting rich and poor countries (but the poor are more vulnerable everywhere)**



# Global temperature rise

+2°

## PROBLEMATIC

- 1 - 2 billion additional people with water stress
- Impacts on cereal productivity at low latitudes
- Increased coastal flooding and storms
- Greater depth of seasonal permafrost thaw

+4°

## DISASTROUS

- A 16 °C increase in the Arctic
- 1.1 - 3.2 billion additional people with water stress
- Widespread coral mortality; risk of major extinctions around the globe
- Substantial global impact on major crops
- Long-term prospect of sea level rise

# Facing the dangers from climate change...

...there are only **three** options:

Mitigation, meaning measures to reduce the pace & magnitude of the changes in global climate being caused by human activities.

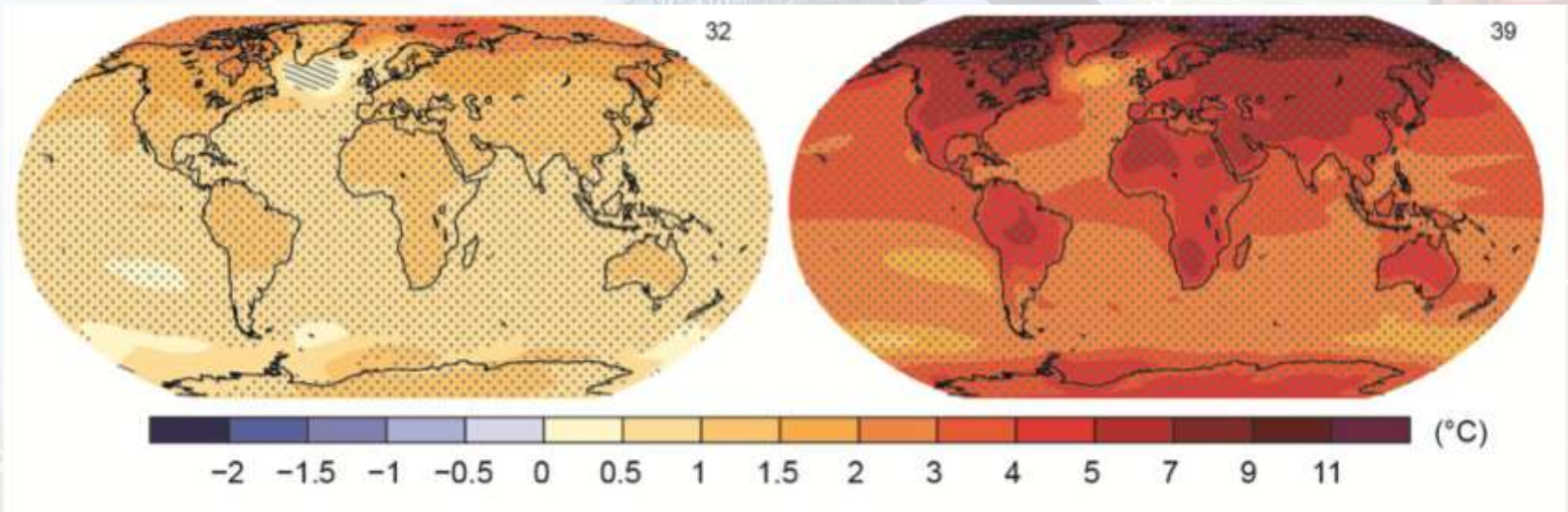
Adaptation, meaning measures to reduce the adverse impacts on human well-being resulting from the changes in climate that do occur.

Suffering the adverse impacts that are not avoided by either mitigation or adaptation.

# The Choices We Make Will Create Different Outcomes

With substantial  
mitigation

Without  
additional  
mitigation



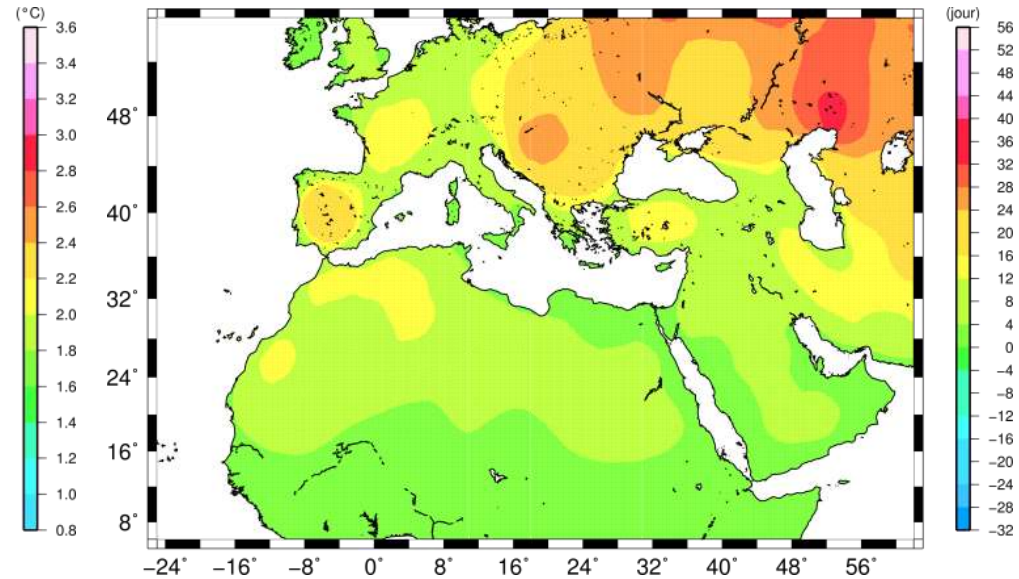
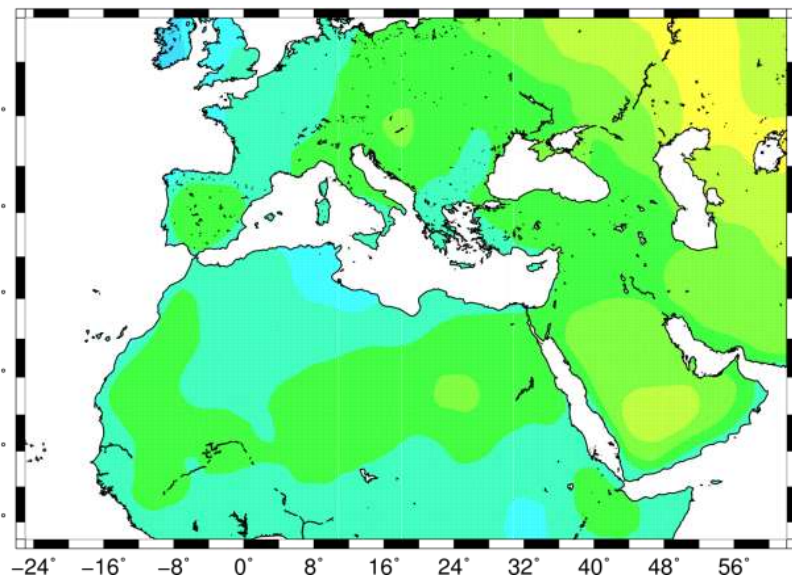
Change in average surface temperature (1986–2005 to 2081–2100)

AR5 WGI SPM



a)

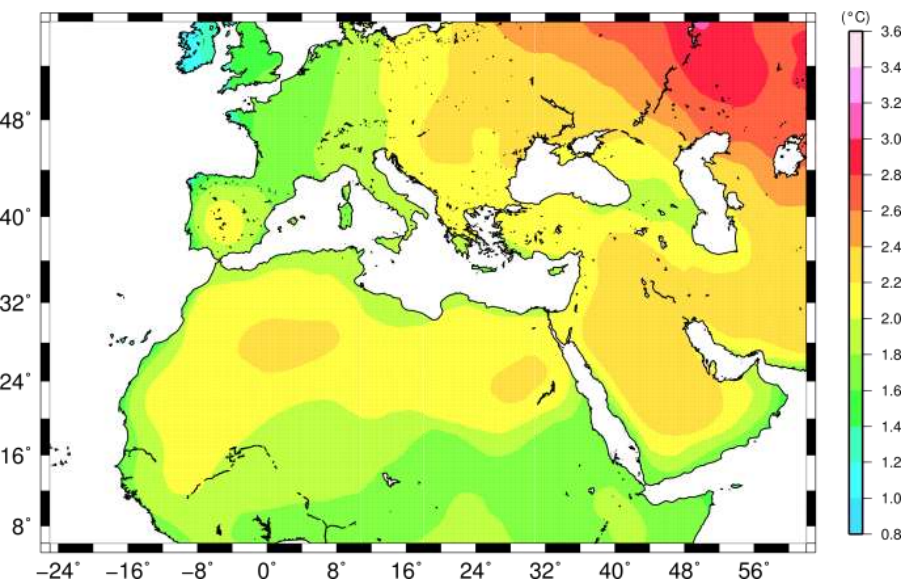
b)



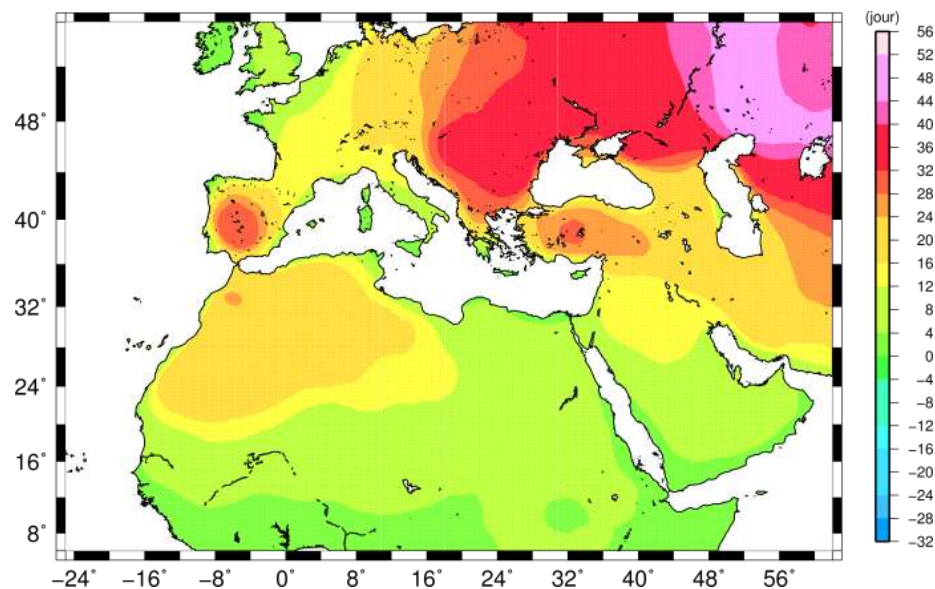
Future changes issued from ALADIN-Climate, under  
the emission scenario **RCP4.5**, for:  
a) annual mean temperature, b) heat wave duration  
index. 2036-2065 /1971-2000

F. Driouech et K. El Rhaz

a)



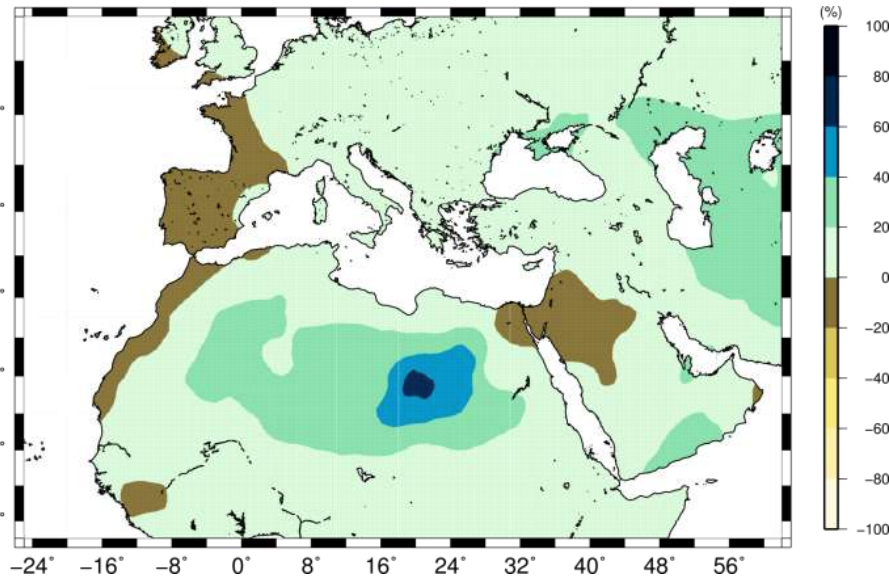
b)



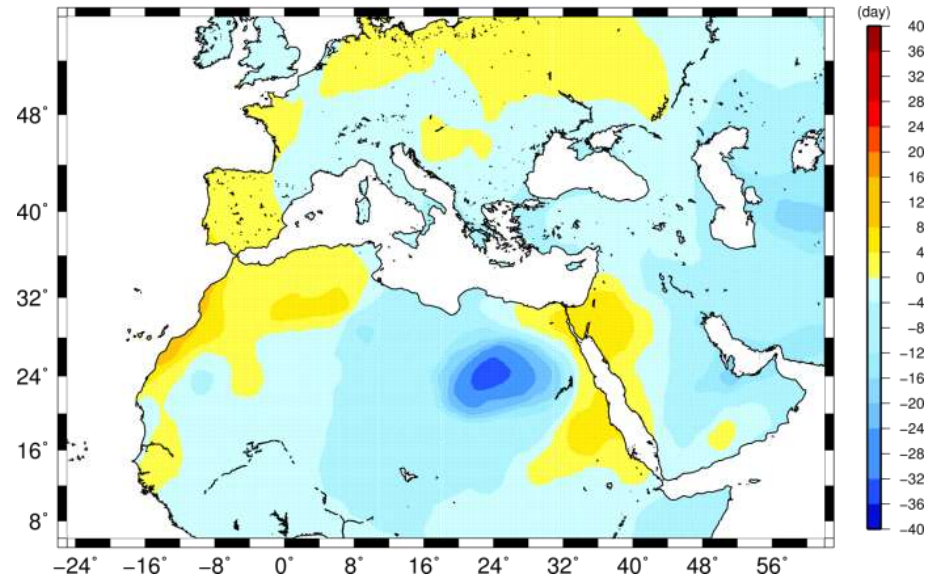
Future changes issued from ALADIN-Climate, under  
the emission scenario **RCP8.5**, for:  
a) annual mean temperature, b) heat wave duration  
index. 2036-2065 /1971-2000



c)



d)



Future changes issued from ALADIN-Climate, under  
the emission scenario **RCP4.5**, for:  
c) the annual total rainfall amounts and d) the annual  
number of maximum consecutive dry days.  
2036-2065 / 1971-2000

- A generalized warming over the entire region is expected to vary from 1 to 2.4° C depending on the scenarios and sub-regions.
- The warming will also manifests in terms of increase in the heat wave durations.
- The western part (mainly in Morocco) and at northern Arabian Peninsula should register a decrease in annual total rainfall amounts.
- The extreme droughts are expected to be more persistent in the north western part of the region (Morocco and Algeria).



# IPCC Fifth Assessment Report

IPCC AR5 Synthesis Report

**ipcc**  
INTERGOVERNMENTAL PANEL ON climate change

