

Introduction to climate change science

Why we are sure of climate change?

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Why should Parliamentarians care about Climate Change?

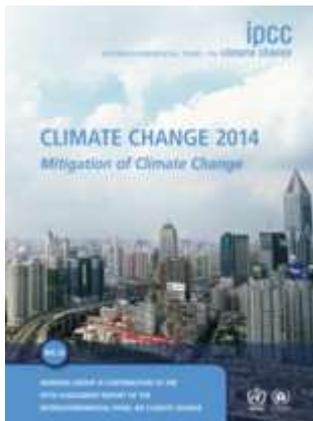
- Business/Industry has a stake.
- Involves citizens, **politicians**, **public policy experts** and advocates.
- Every sector of the **economy** affected.
- All aspects of our lives touched: environment, **jobs**, **health**, **politics**, **national security**, etc.



What is happening in the climate system?



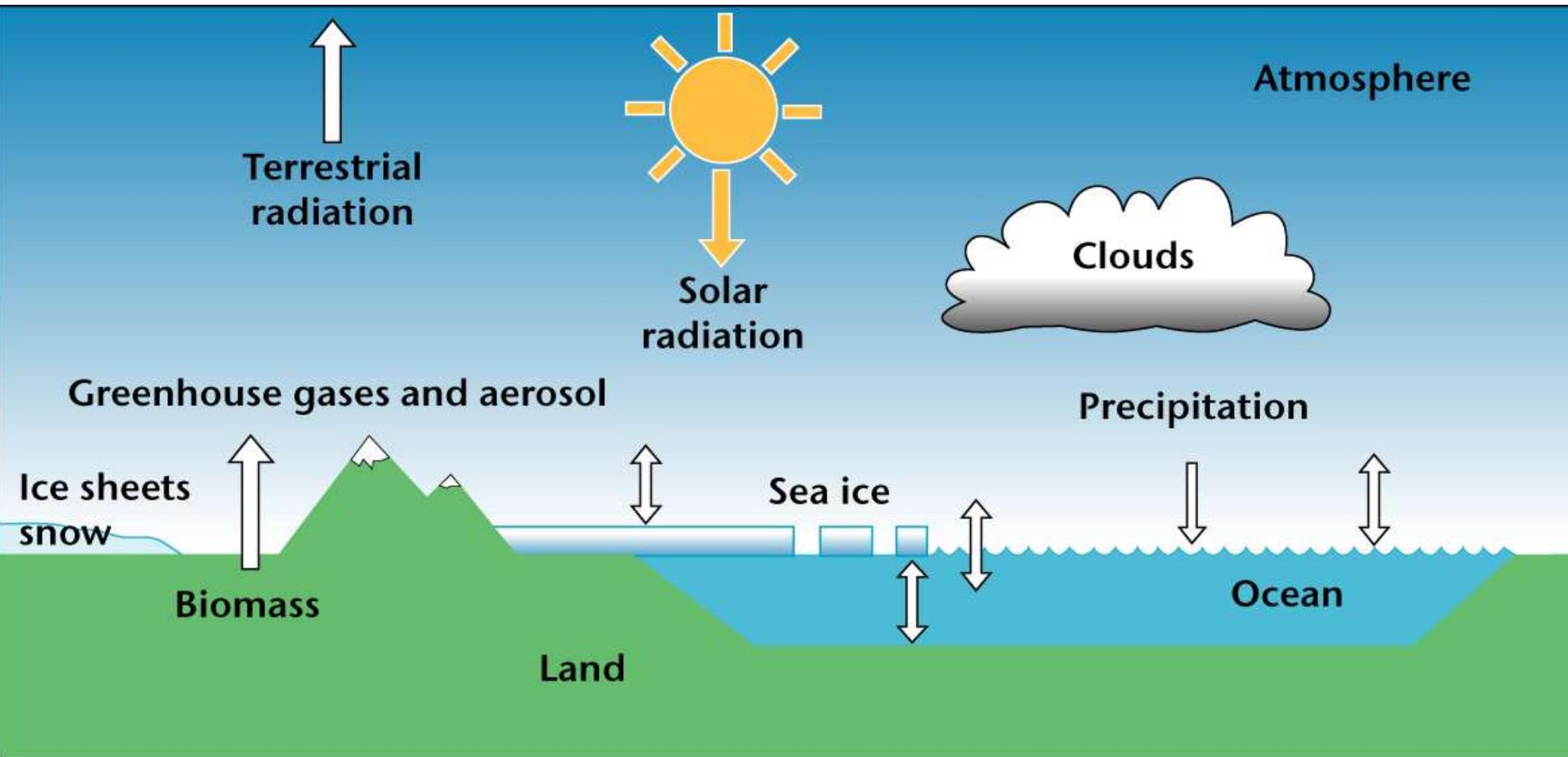
What are the risks?



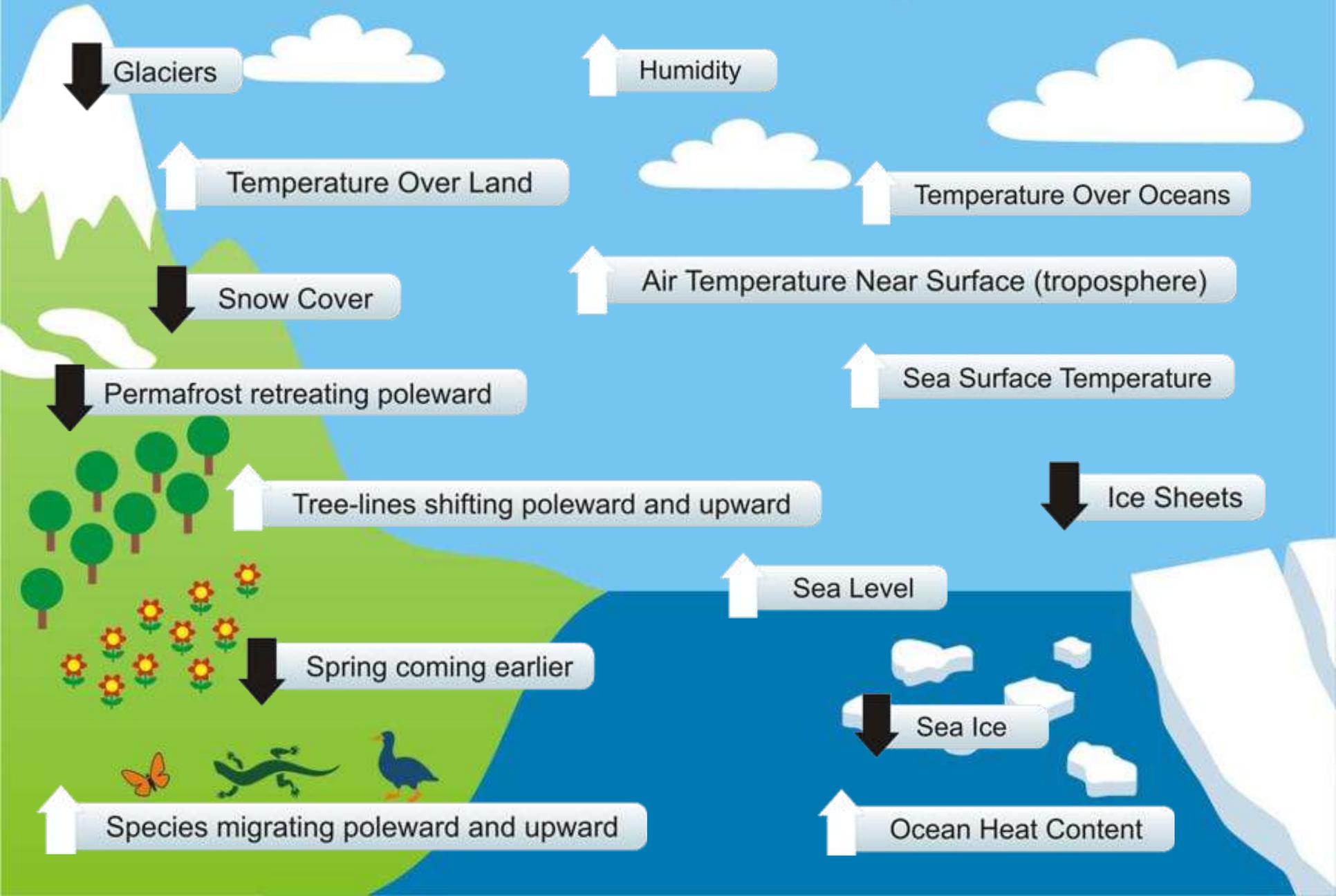
What can be done?

Climate system

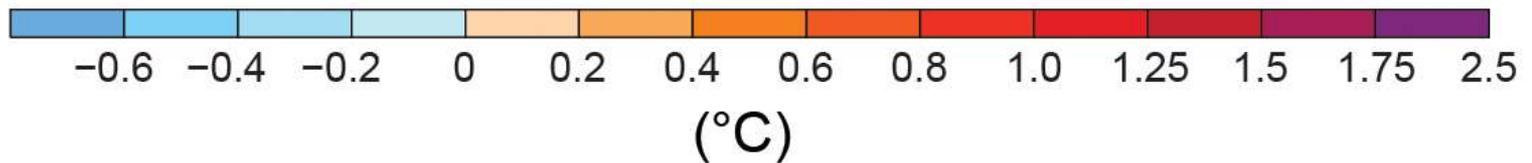
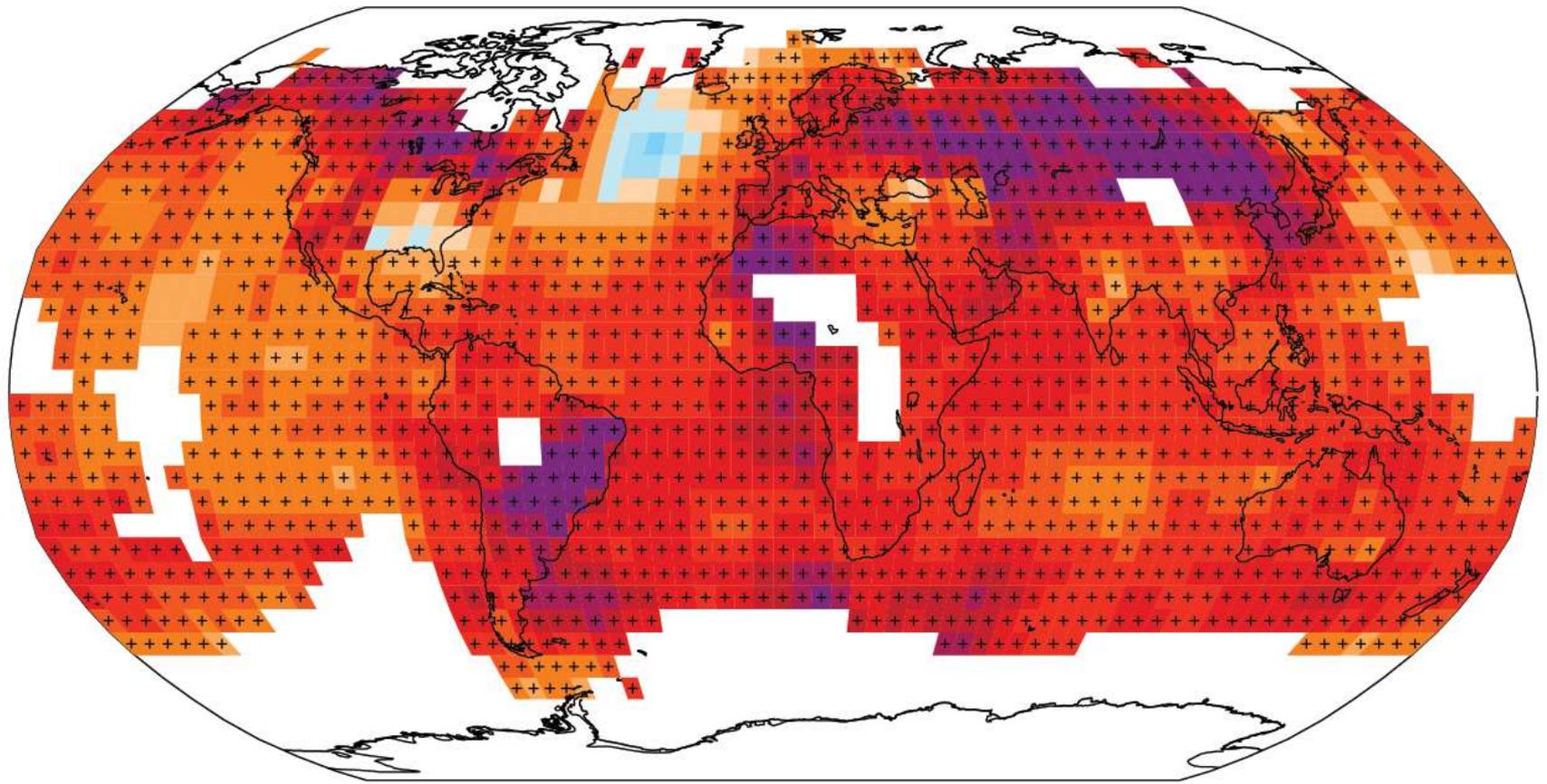
Main components: the atmosphere, hydrosphere, cryosphere, land surface and biosphere and the interactions between them



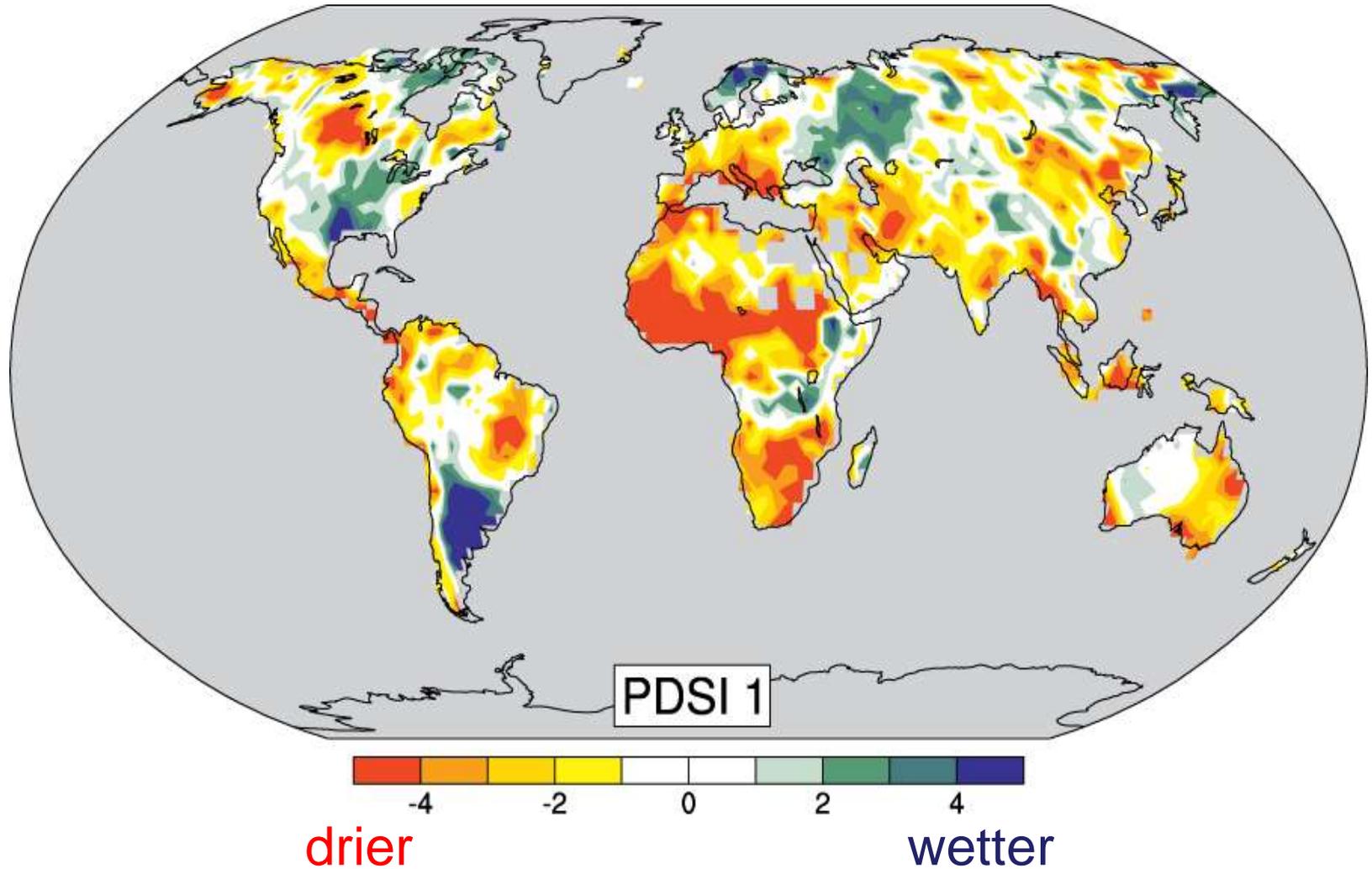
Indicators of a Warming World



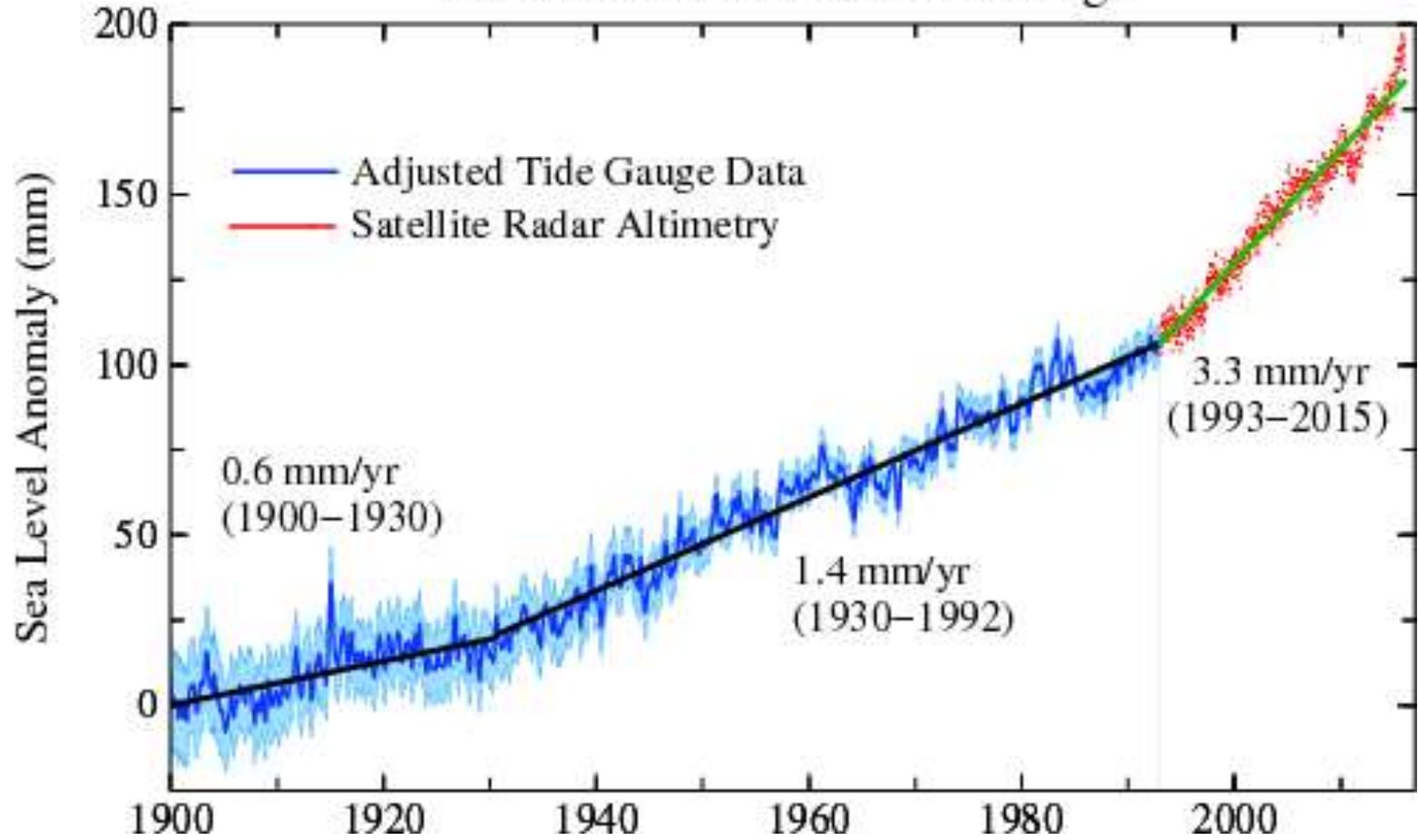
Warming rate K/100 y



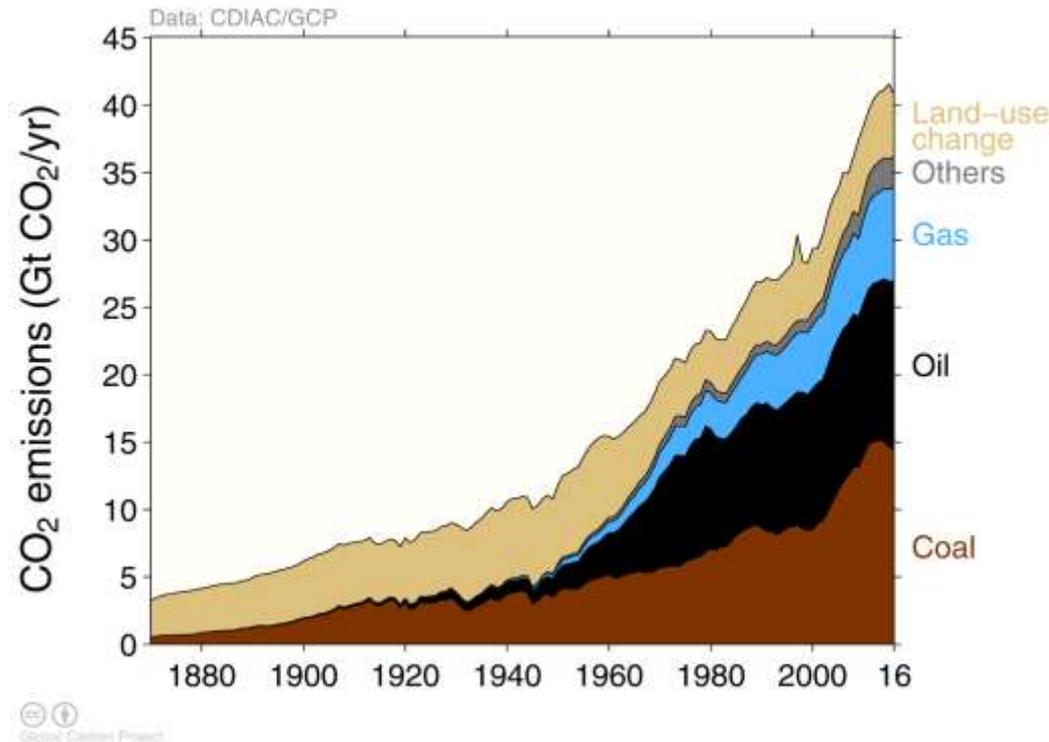
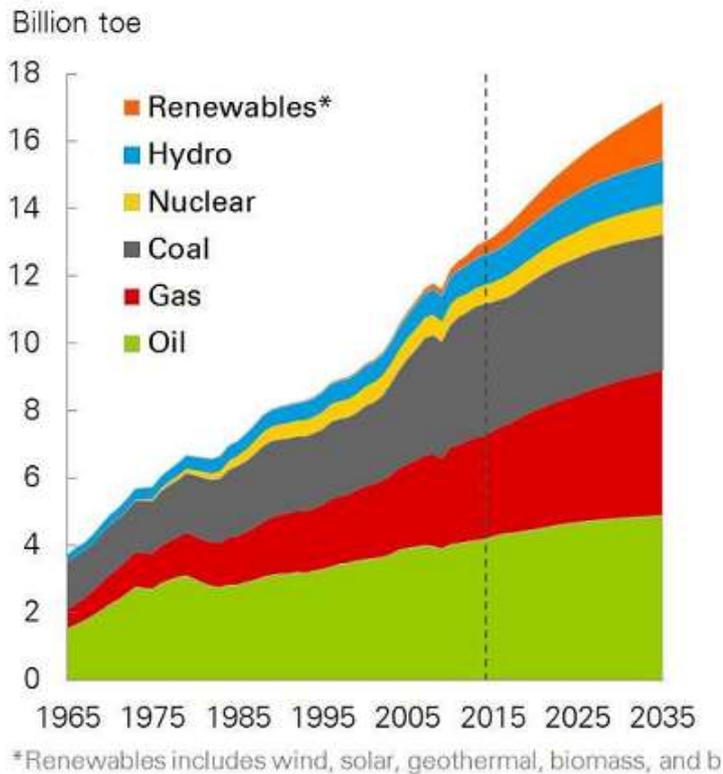
Changes in water cycle



Global Mean Sea Level Change

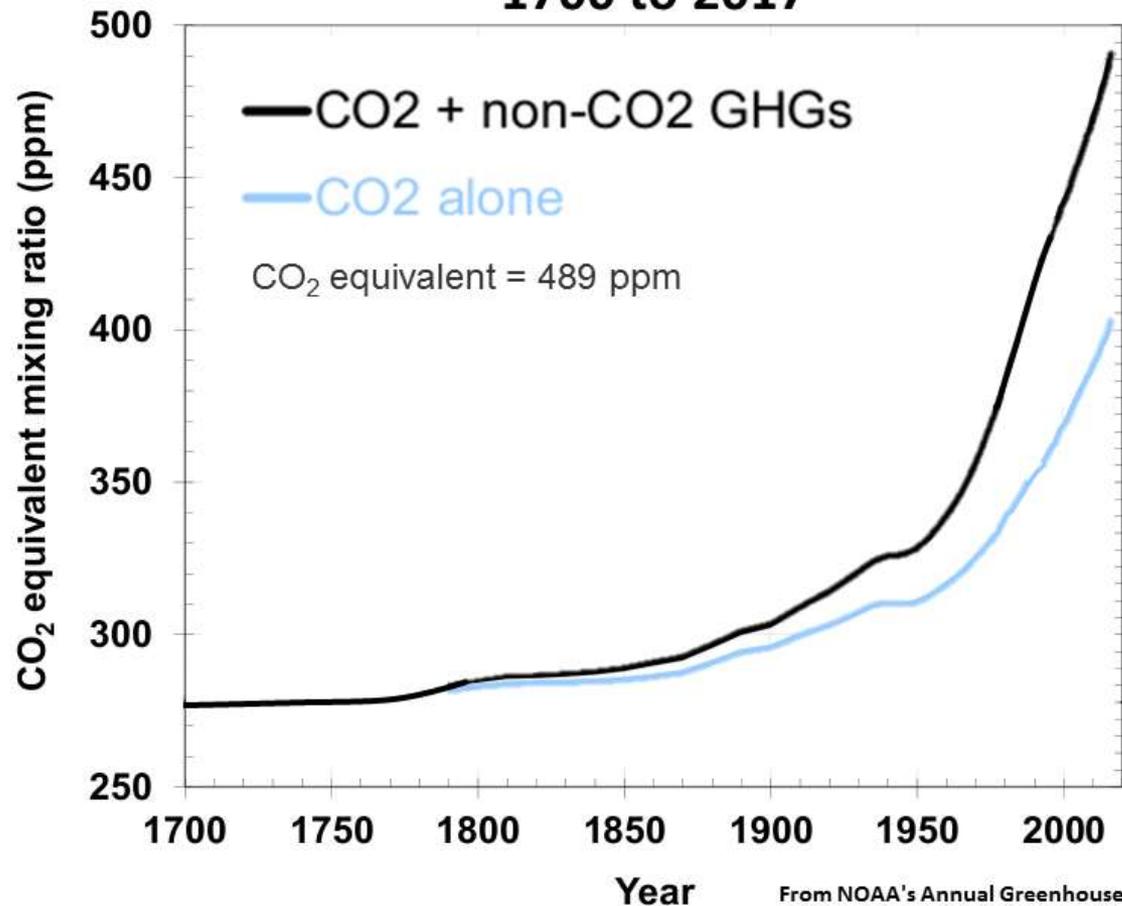


Primary energy consumption and total global emissions are increasing



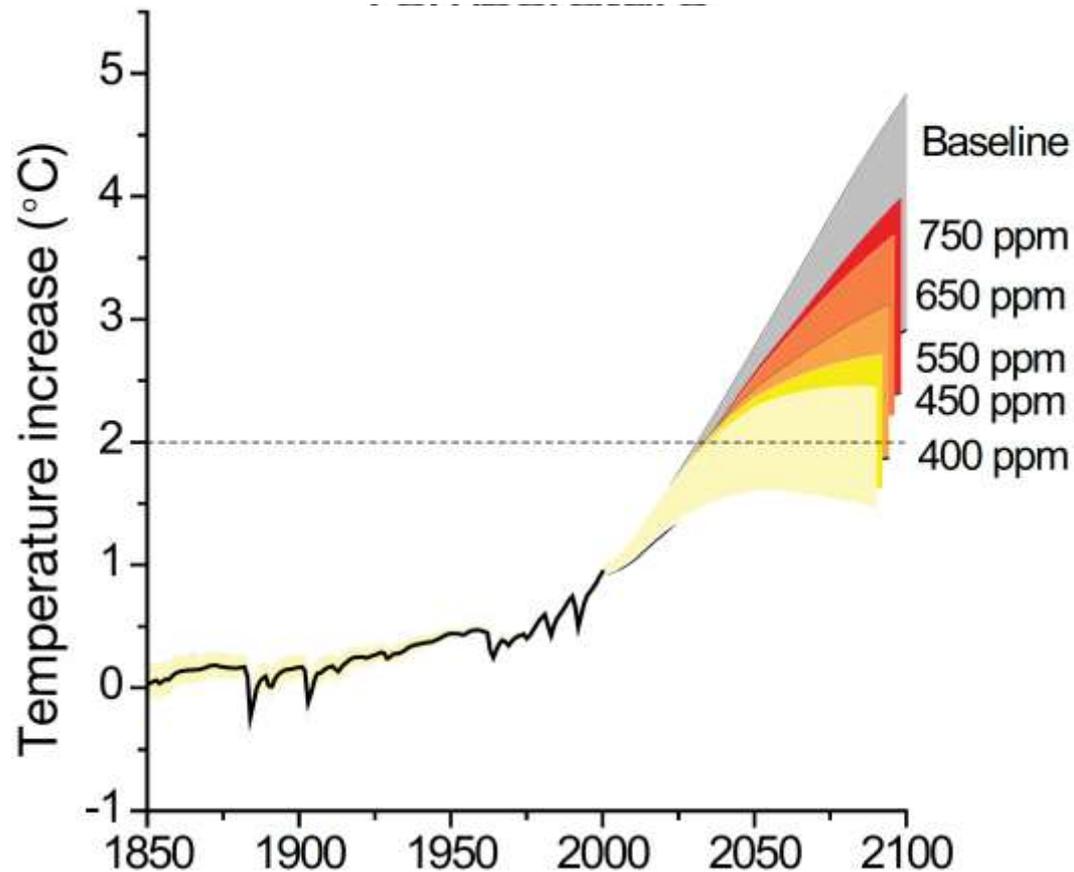
The atmospheric concentrations of CO₂, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years.

**Atmospheric Concentrations of CO₂ and CO₂ Equivalent
1700 to 2017**



From NOAA's Annual Greenhouse Gas Index Spring 2017

Peter Carter Climate Emergency Institute



Climate models have improved in the last decade. Models reproduce observed surface temperature patterns and trends over many decades and **are used for climate projections**.

Projected Temperature Change



Difference from 1986–2005 mean (°C)

Solid Color

Very strong agreement

White Dots

Strong agreement

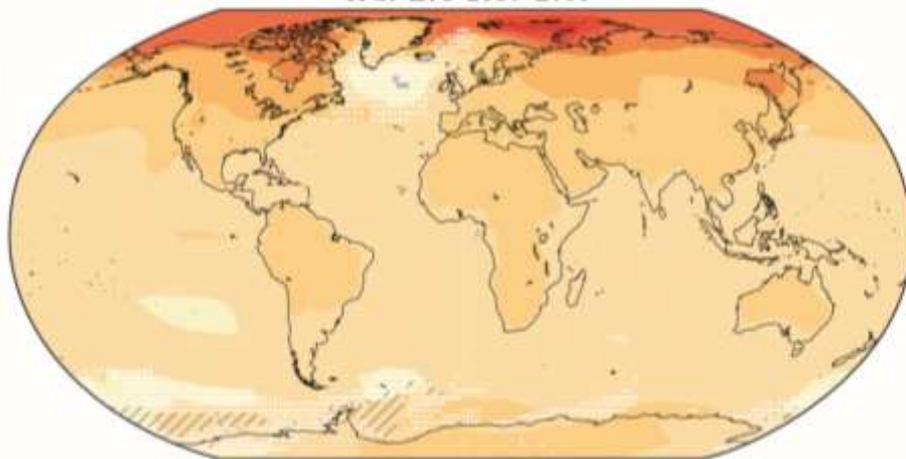
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Divergent changes

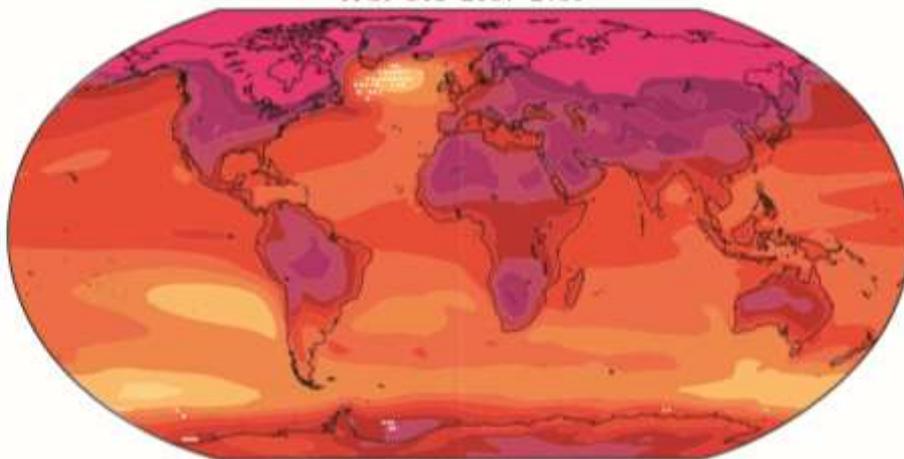
Diagonal Lines

Little or no change

RCP2.6 2081–2100



RCP8.5 2081–2100



Projected Precipitation Change



Difference from 1986–2005 mean (%)

Solid Color

Very strong agreement

White Dots

Strong agreement

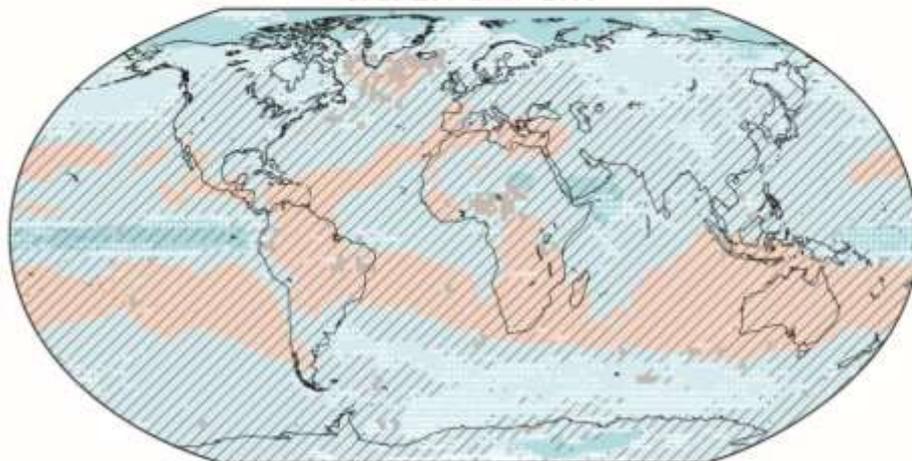
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Divergent changes

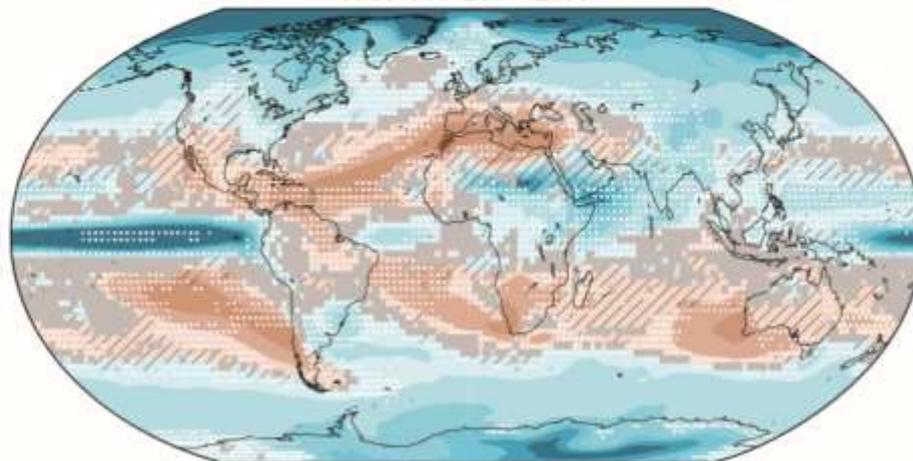
Diagonal Lines

Little or no change

RCP2.6 2081–2100



RCP8.5 2081–2100



Projections Europe (RCP4.5) 2081-2100 versus 1986-2005

Temperature (°C)

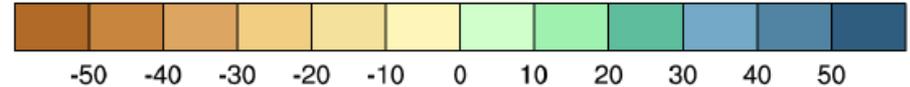
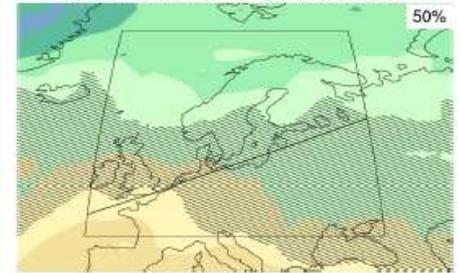
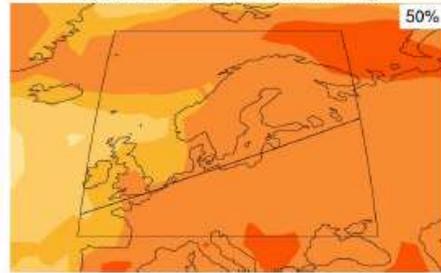
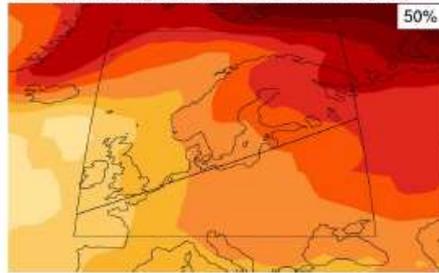
Precipitation (%)

Temperature change RCP4.5 in 2081-2100: December-February

Temperature change RCP4.5 in 2081-2100: June-August

Precipitation change RCP4.5 in 2081-2100: October-March

Precipitation change RCP4.5 in 2081-2100: April-September



winter

summer

winter half

summer half

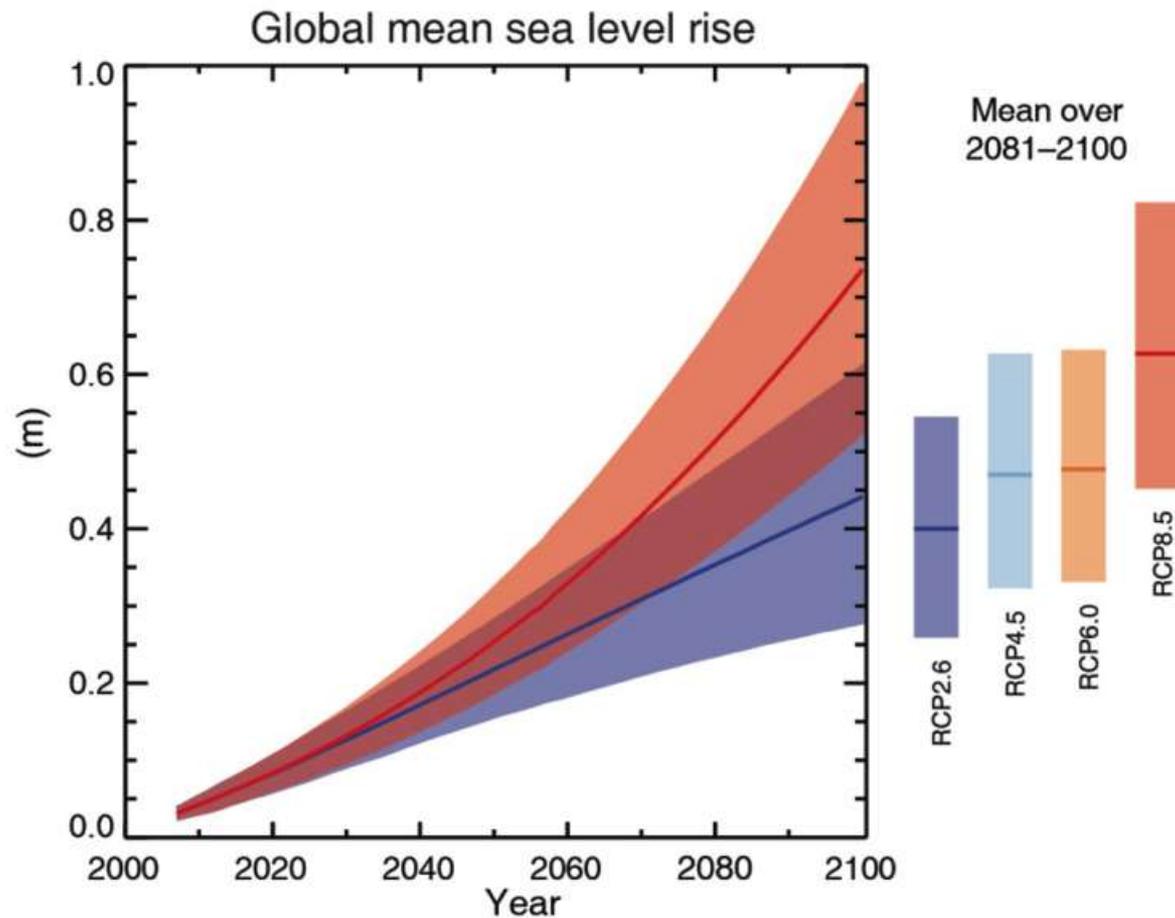


Fig. SPM.9

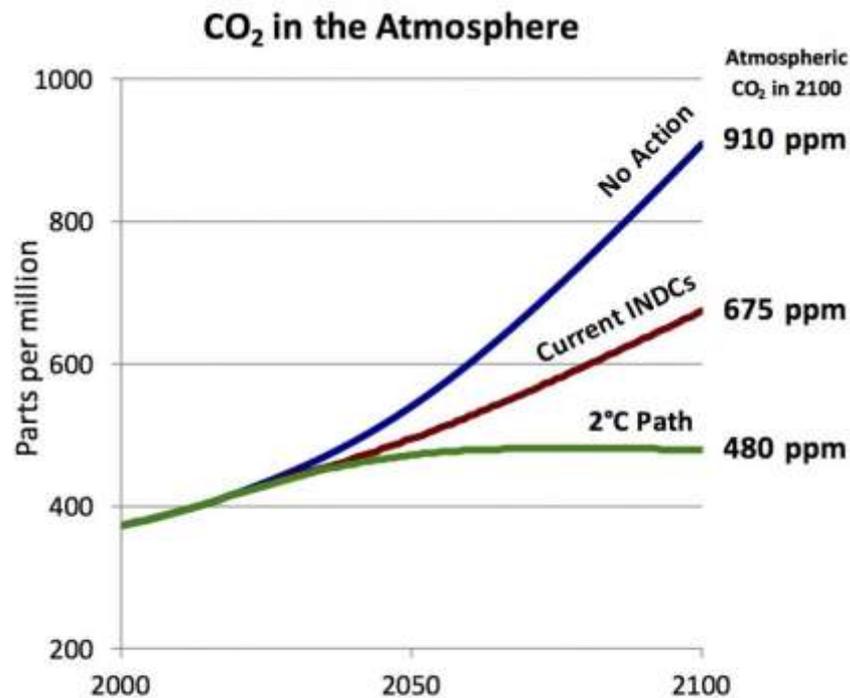
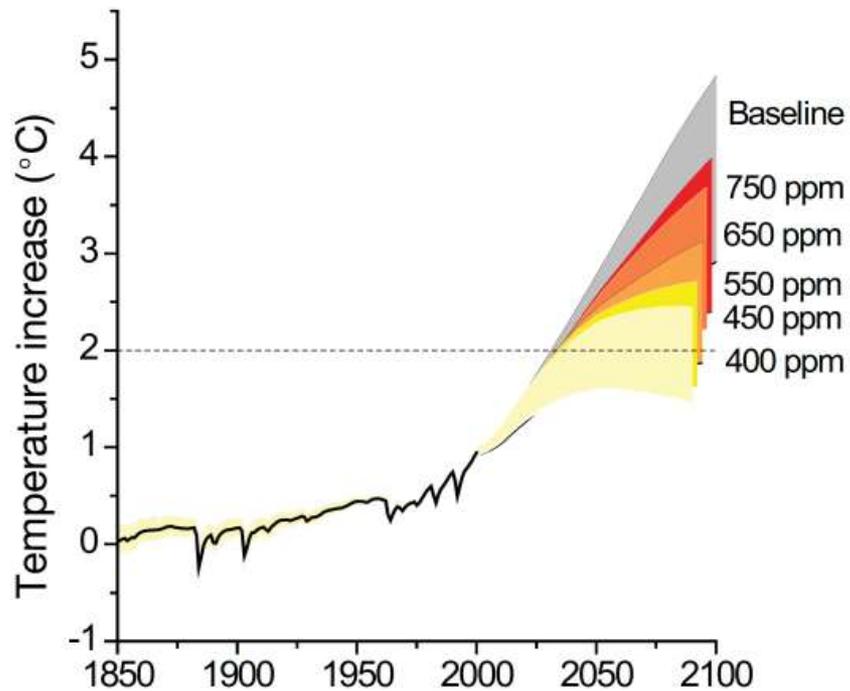
RCP2.6 (2081-2100), *likely* range: 26 to 55 cm

RCP8.5 (2081-2100), *likely* range: 45 to 82 cm

Paris agreement takes effect in 2020

But the world IS NOT on track

- Intended Nationally Determined Contributions (INDCs) would lead to will lead to a warming of 2.8 °C, current government policies still lead to a warming of **3.6°C**
- INDCs are totally incompatible with 2°C objective
- 1.5°C temperature increase could be reached even before 2025



Climate Interactive for ClimateProgress, 2015 | ClimateScoreboard.org

Concluding thoughts



- Human influence on the climate system is clear.
- Continued emissions of GHG will cause further warming and changes in the climate system.
- **We can still limit climate change by substantial and sustained reductions of GHG emissions.**
- Should we care? **YES**
 - The costs of climate change are already being felt today and will increase in the future.
 - Human health is at risk from the impacts of a changing climate, which are decreasing food security and increasing the risks of disease and heat stress.
 - Climate change is likely to exacerbate the risk of large-scale migration and civil unrest.