

IPCC Fifth Assessment Report, 2014

Chris Field & Katharine Mach

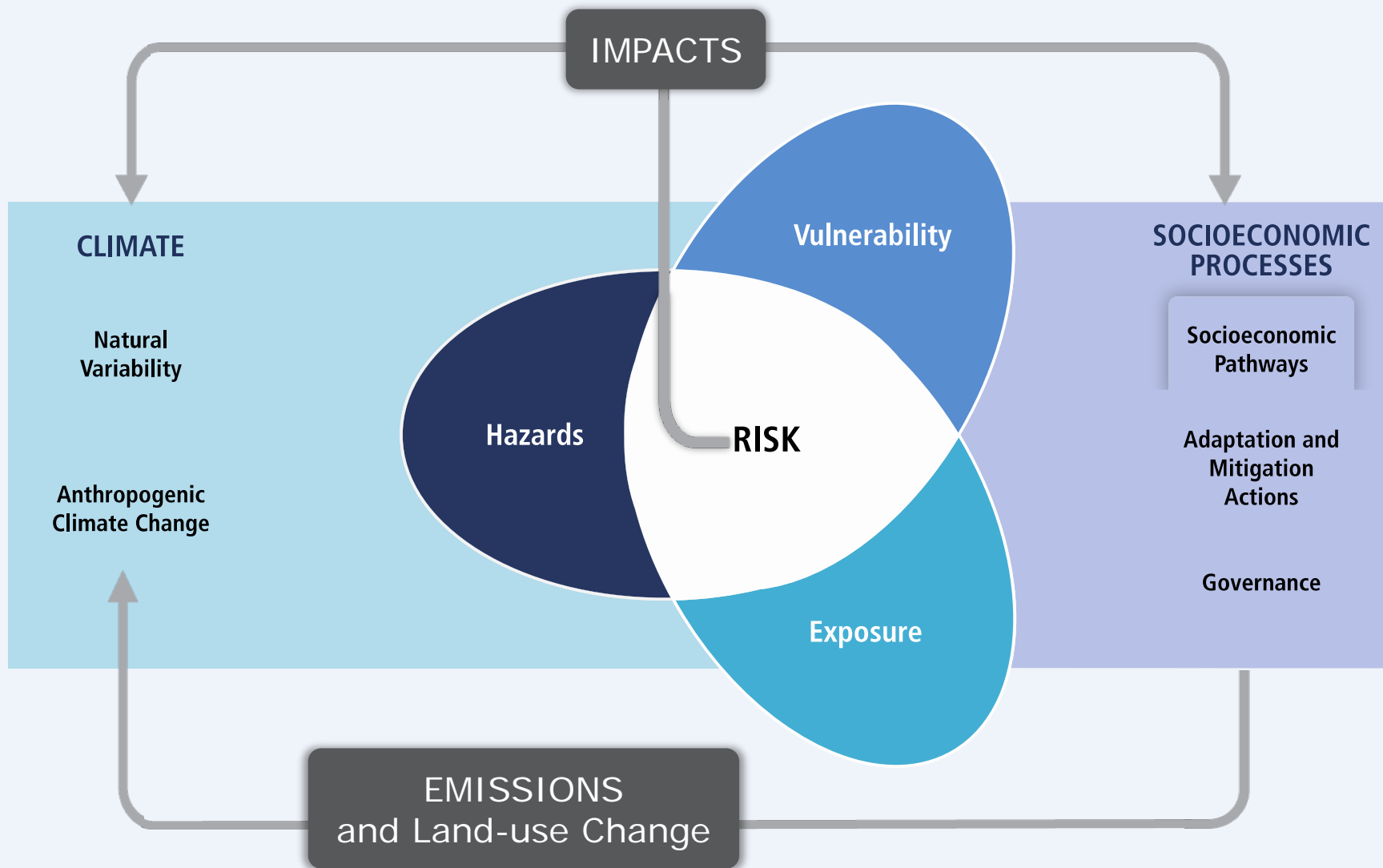
IPCC Working Group II





CLIMATE CHANGE

UNDERSTANDING,
MANAGING, &
REDUCING RISKS



Warming over the **past** century

Observed Temperature Change



Based on trend over
1901–2012 (°C over period)

Solid Color

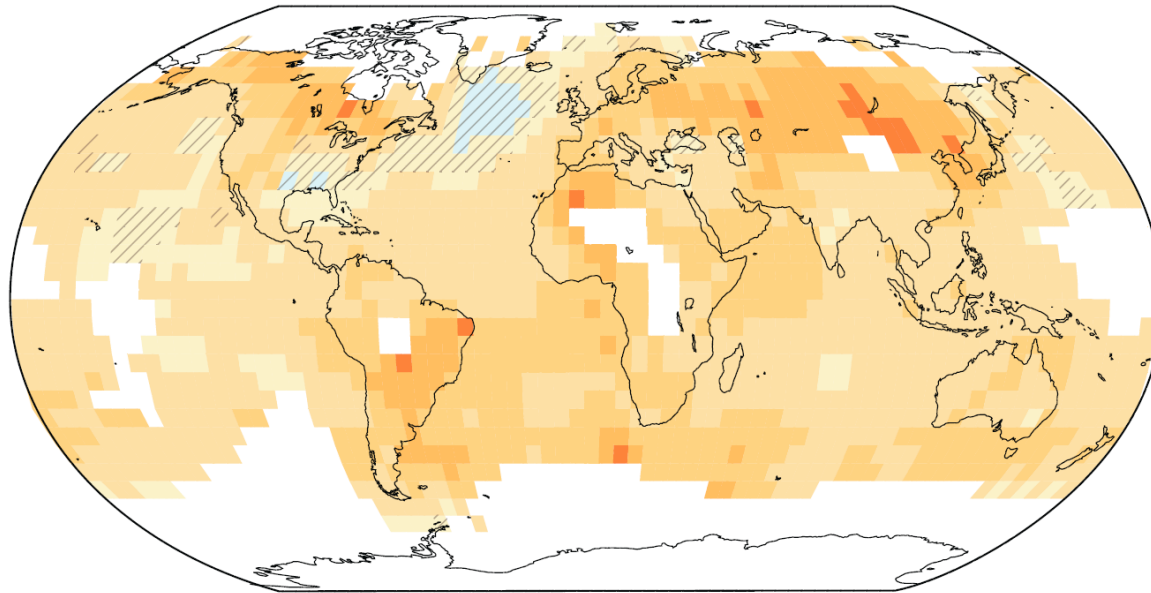
Significant
trend

Diagonal Lines

Trend not
statistically
significant

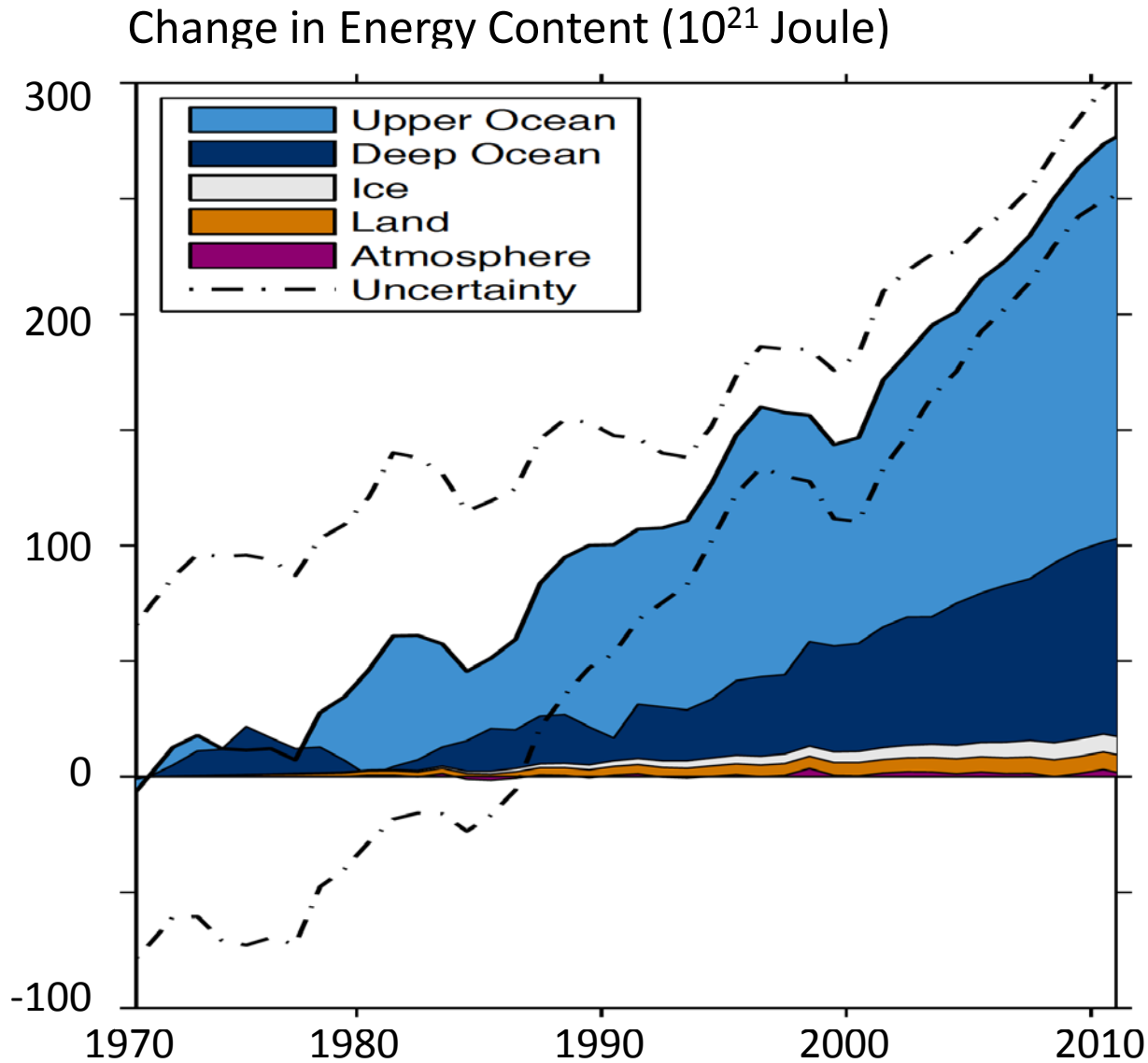
White

Insufficient
data



Based on WGII Figure SPM 4

Warming since 1970



Worldwide Effects

atmosphere, land, ocean

extreme events

water cycle

sea ice, glaciers, ice sheets

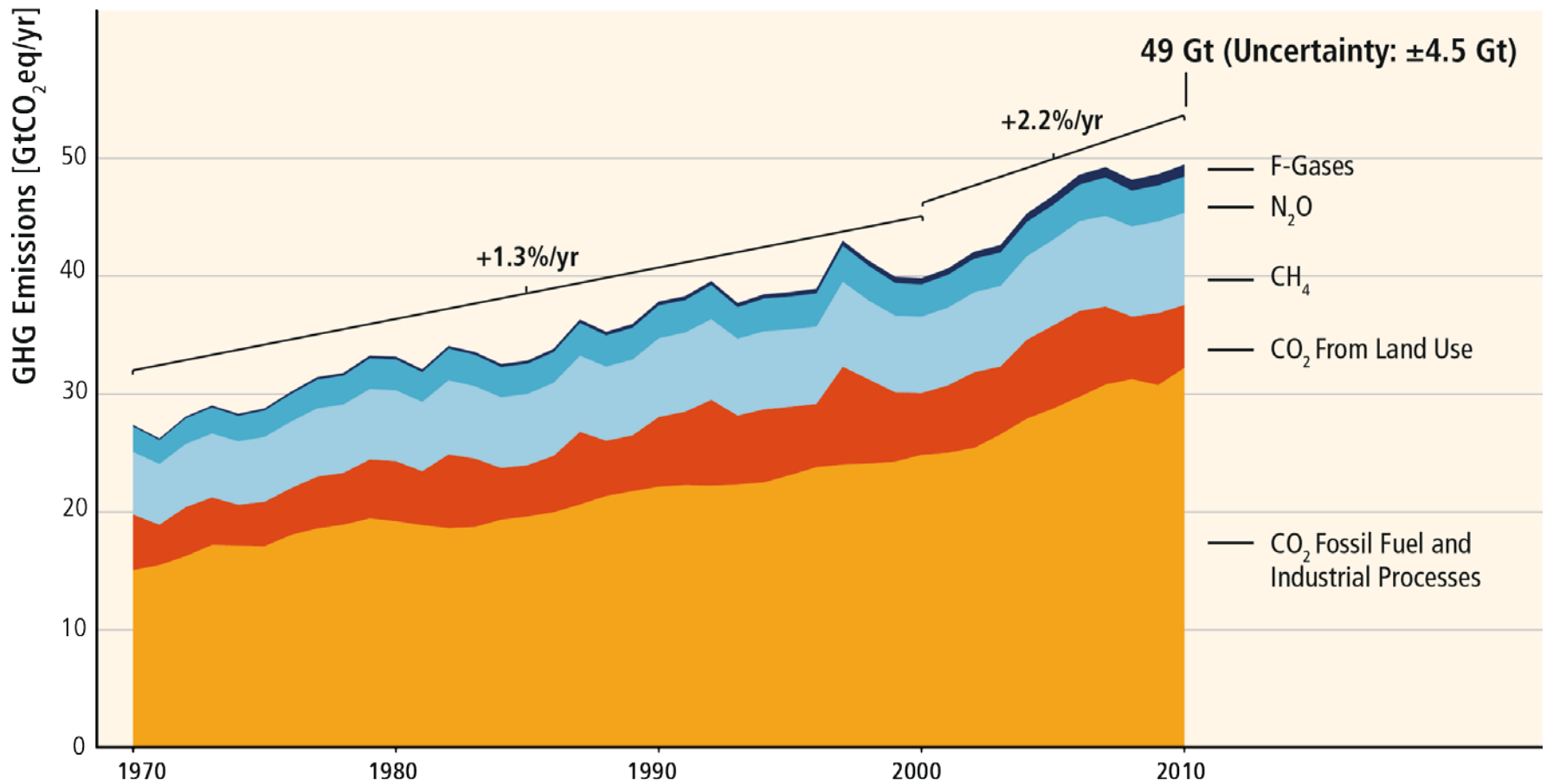
global mean sea level

Human influence
on the climate
system is clear

An aerial, high-angle photograph of a large-scale mining or construction site. The scene is dominated by a massive, dark-colored conveyor belt system that curves across the left and bottom portions of the frame. In the center-right, a large yellow and black tracked loader or bulldozer is positioned on a dirt path. The ground is a mix of dark earth and lighter-colored material, possibly coal or ore, with visible tire tracks and tracks from the machinery. The overall lighting is dim, giving the image a blue-tinted, industrial atmosphere.

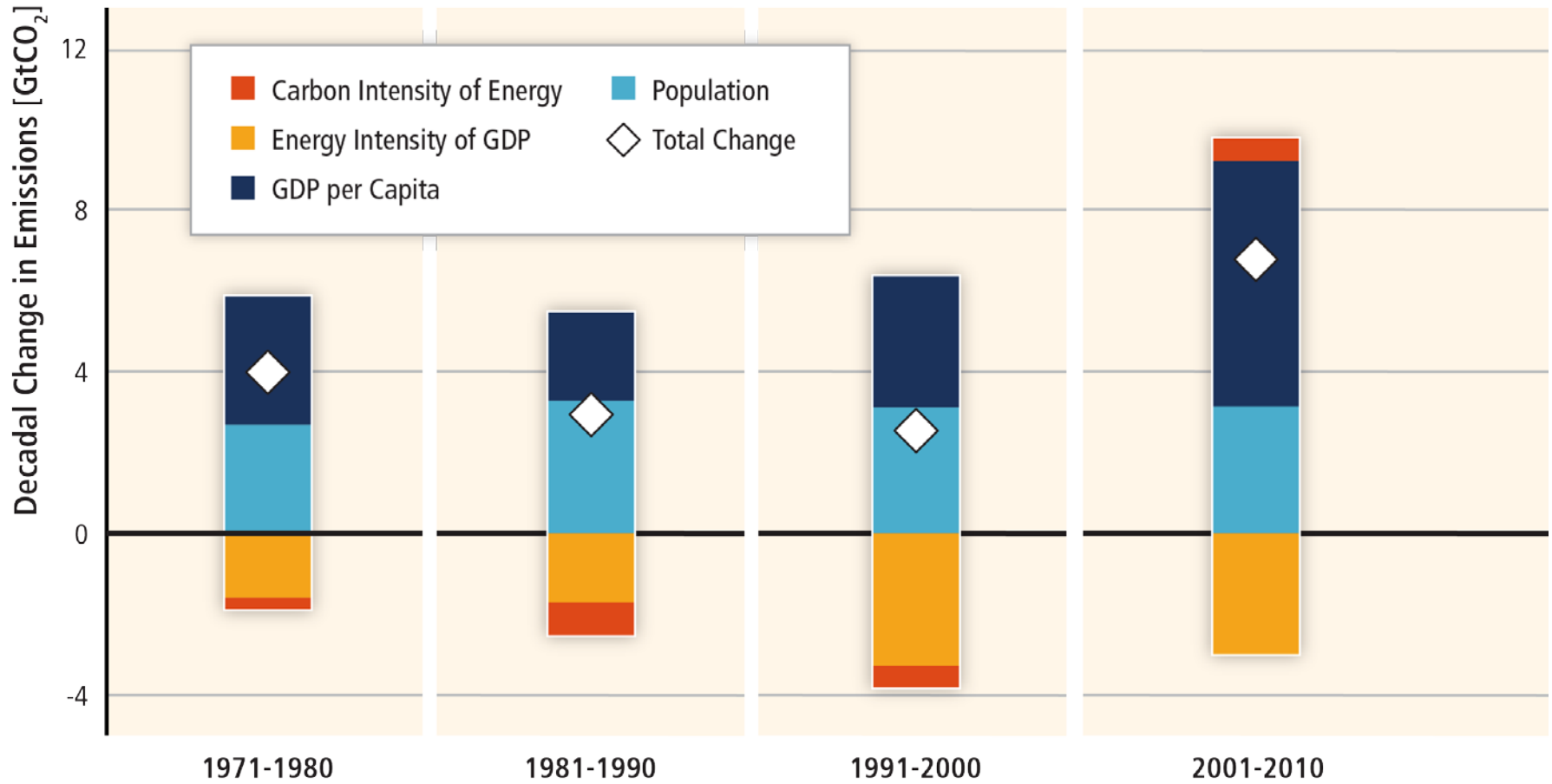
GHG EMISSIONS GROWTH
HAS ACCELERATED
DESPITE REDUCTION EFFORTS

GHG emissions growth between 2000 and 2010 has been larger than in the previous three decades.



Based on WGIII Figure SPM 1

GHG emissions rising with growth in GDP and population

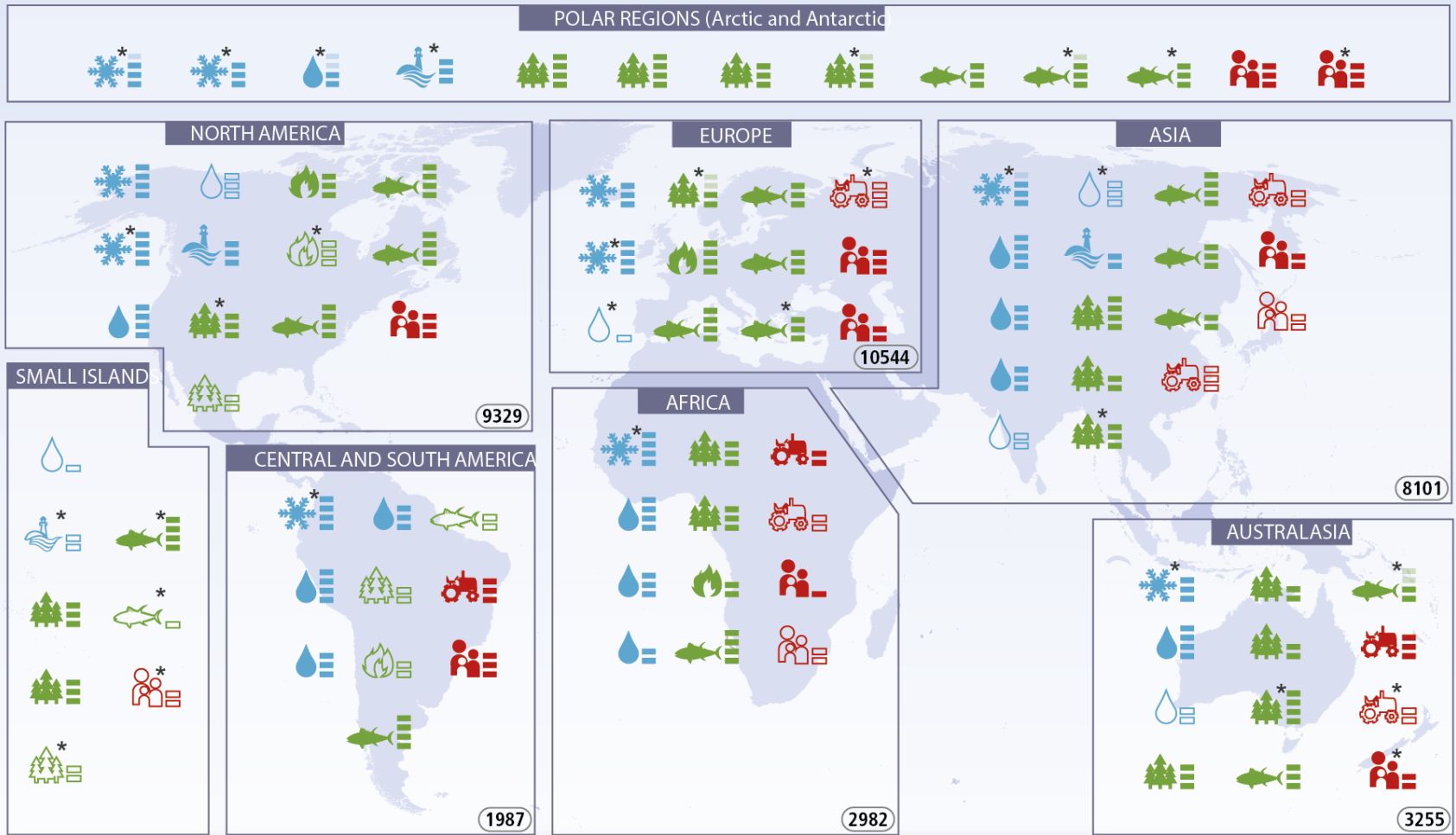


Based on WGIII Figure SPM 3

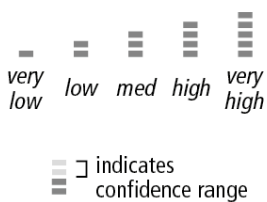
An underwater photograph of a coral reef. The water is a deep, murky green. In the center, there is a prominent, white, fan-shaped coral specimen. The surrounding reef is composed of various types of coral, including branching and table corals, which appear somewhat bleached and less vibrant. The overall scene suggests a degraded or recovering reef environment.

OBSERVED IMPACTS
OF CLIMATE CHANGE
ARE WIDESPREAD
AND CONSEQUENTIAL

Widespread impacts attributed to climate change based on the available scientific literature since the AR4



Confidence in attribution to climate change

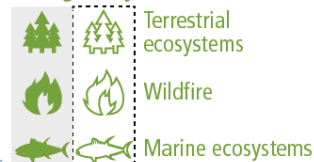


Observed impacts attributed to climate change for

Physical systems



Biological systems



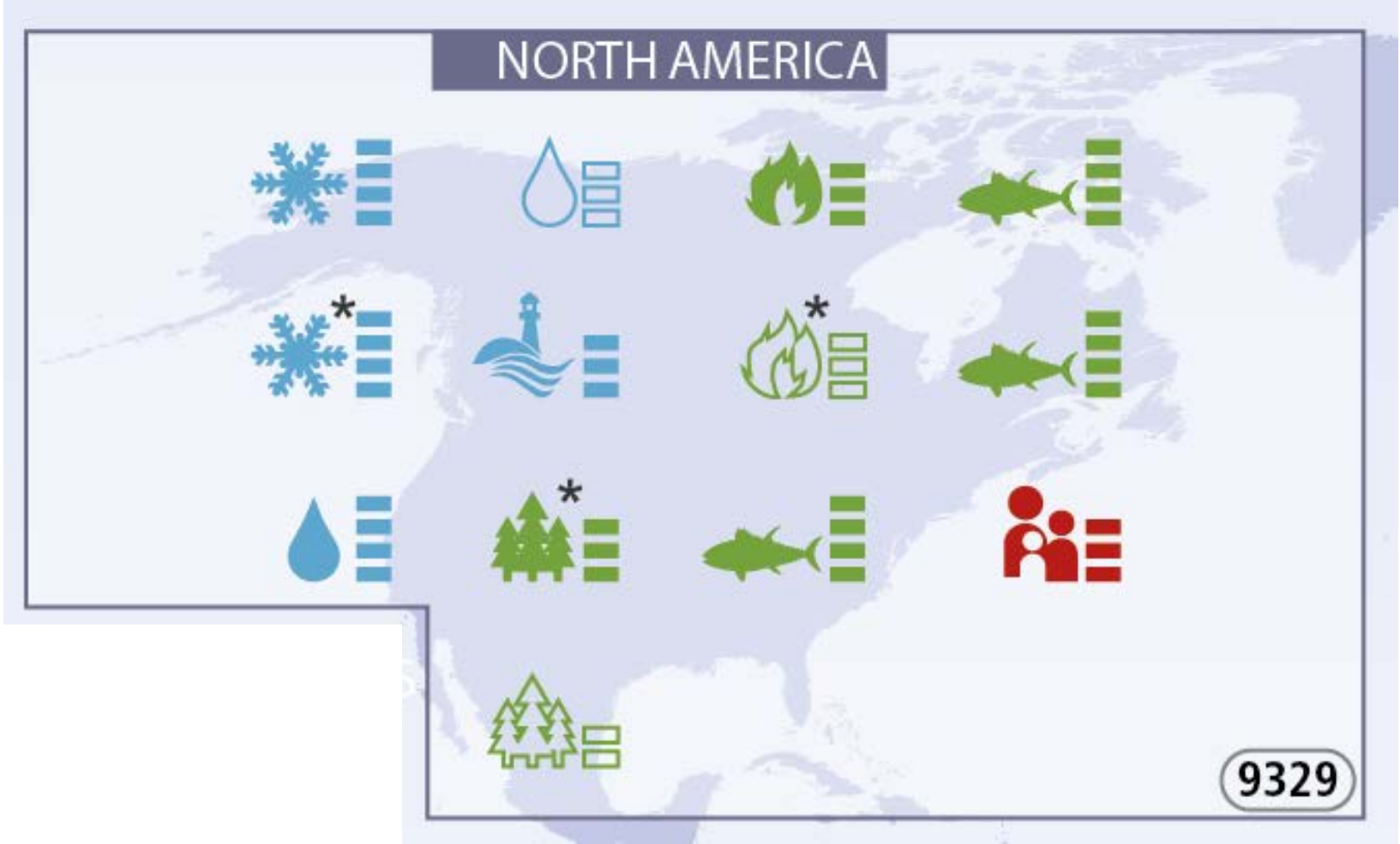
Human and managed systems



* Impacts identified based on availability of studies across a region

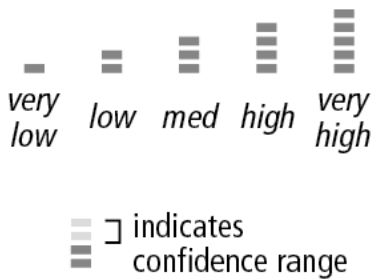
Outlined symbols = Minor contribution of climate change
Filled symbols = Major contribution of climate change

NORTH AMERICA



9329

Confidence in attribution to climate change



Observed impacts attributed to climate change for

Physical systems



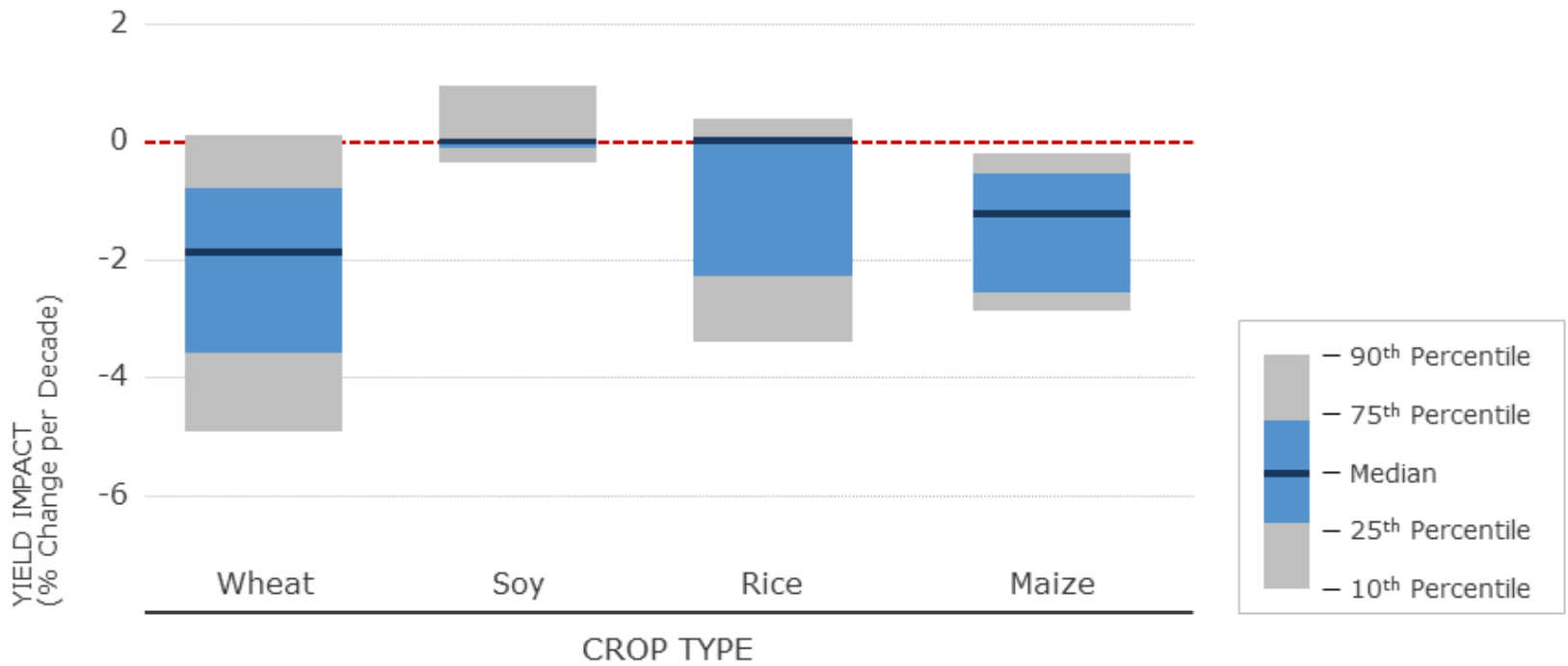
Biological systems



Human and managed systems



Outlined symbols = N
Filled symbols = M



WGII Figure SPM 2



VULNERABILITY AND EXPOSURE

AROUND THE WORLD

A photograph of a city street completely flooded with water. The water is dark and reflects the overcast sky. On the left, a multi-story brick building with many windows lines the street. On the right, another brick building with a modern glass and metal awning is visible. In the distance, a person in a red jacket is wading through the water, and a dark car is partially submerged. The overall atmosphere is somber and highlights the impact of flooding on urban infrastructure.

PEOPLE, SOCIETIES,
AND ECOSYSTEMS
AROUND THE WORLD

**VULNERABLE
AND EXPOSED**

IN DIFFERENT WAYS



**ADAPTATION IS
ALREADY OCCURRING**



ADAPTATION IS

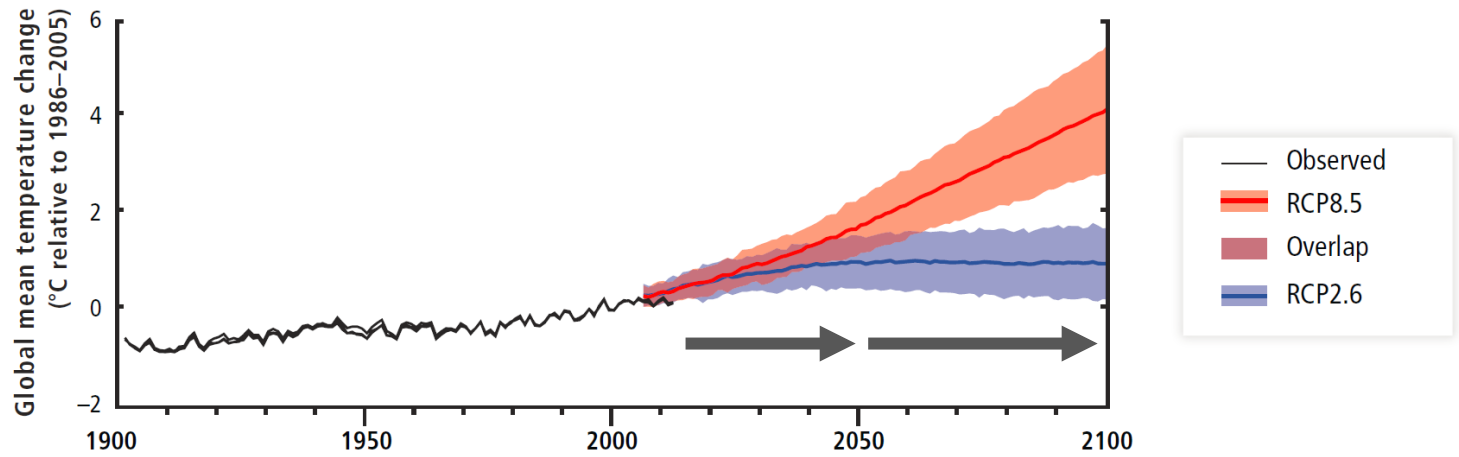
ALREADY OCCURRING



INCREASING MAGNITUDES
OF WARMING INCREASE
THE LIKELIHOOD OF

**SEVERE AND
PERVASIVE IMPACTS**

Warming over the 21st century



Projected Temperature Change



Difference from 1986-2005 mean (°C)

Solid Color

Very strong agreement

White Dots

Strong agreement

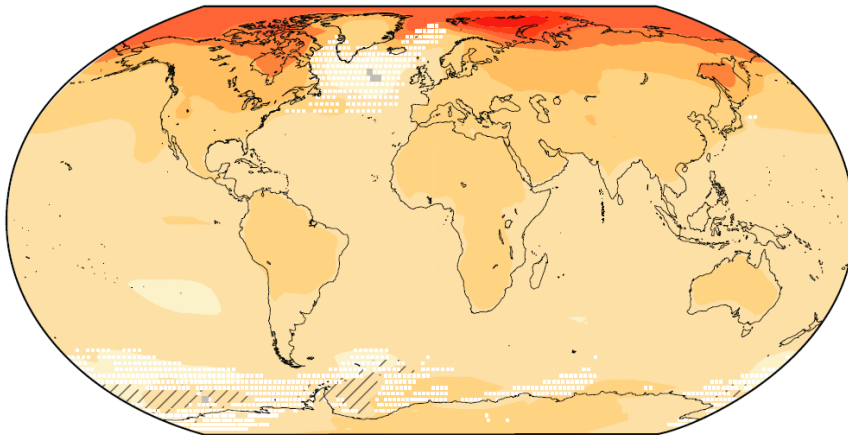
Gray

Divergent changes

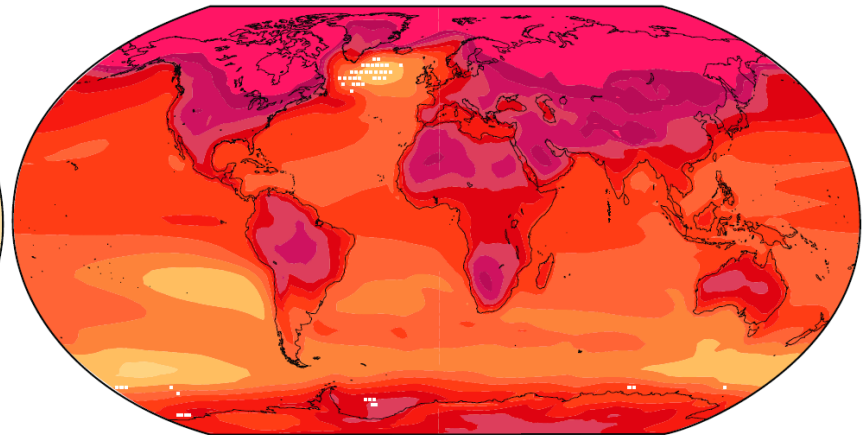
Diagonal Lines

Little or no change

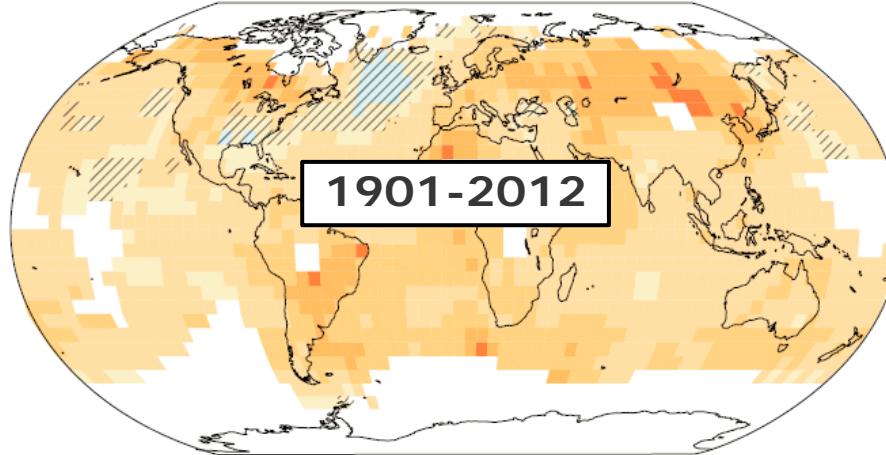
RCP2.6 2081-2100



RCP8.5 2081-2100



Warming over the 21st century



Projected Temperature Change



Difference from
1986-2005 mean (°C)

Solid Color

Very strong
agreement

White Dots

Strong
agreement

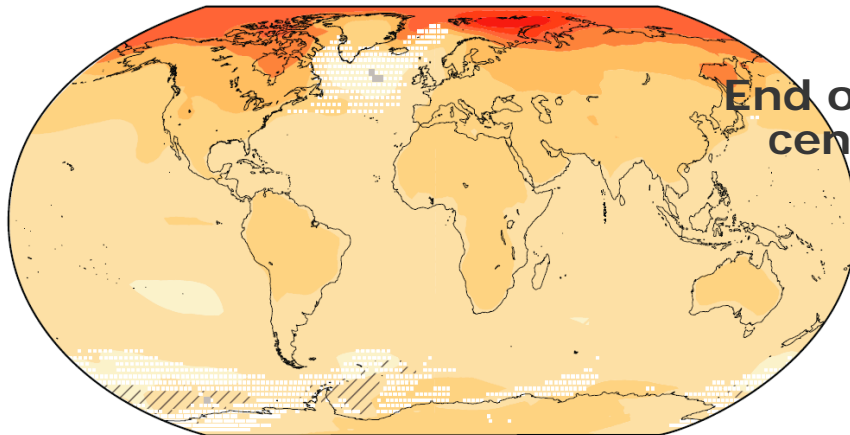
Gray

Divergent
changes

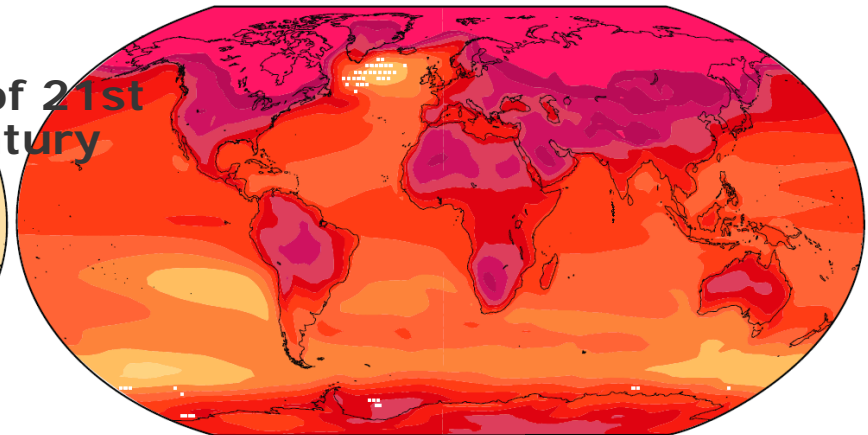
Diagonal Lines

Little or
no change

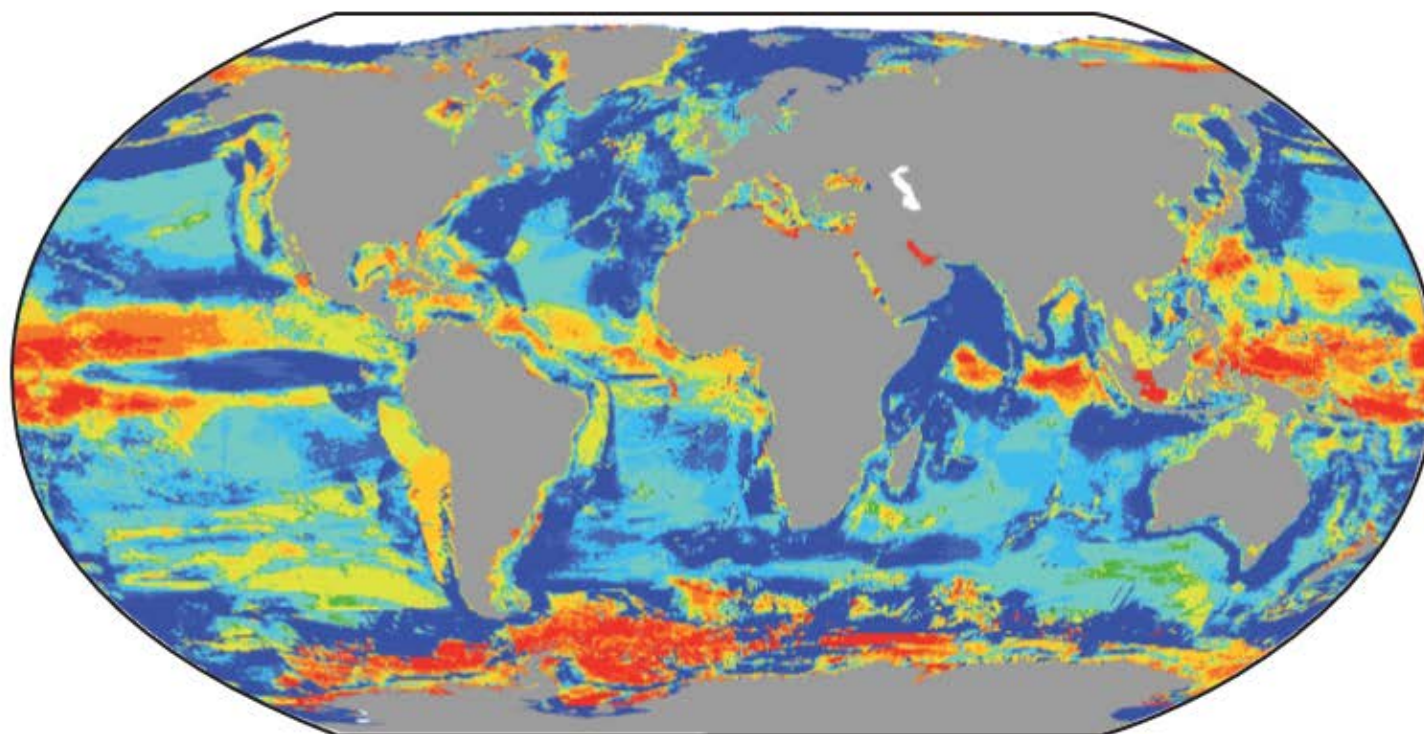
RCP2.6 2081-2100

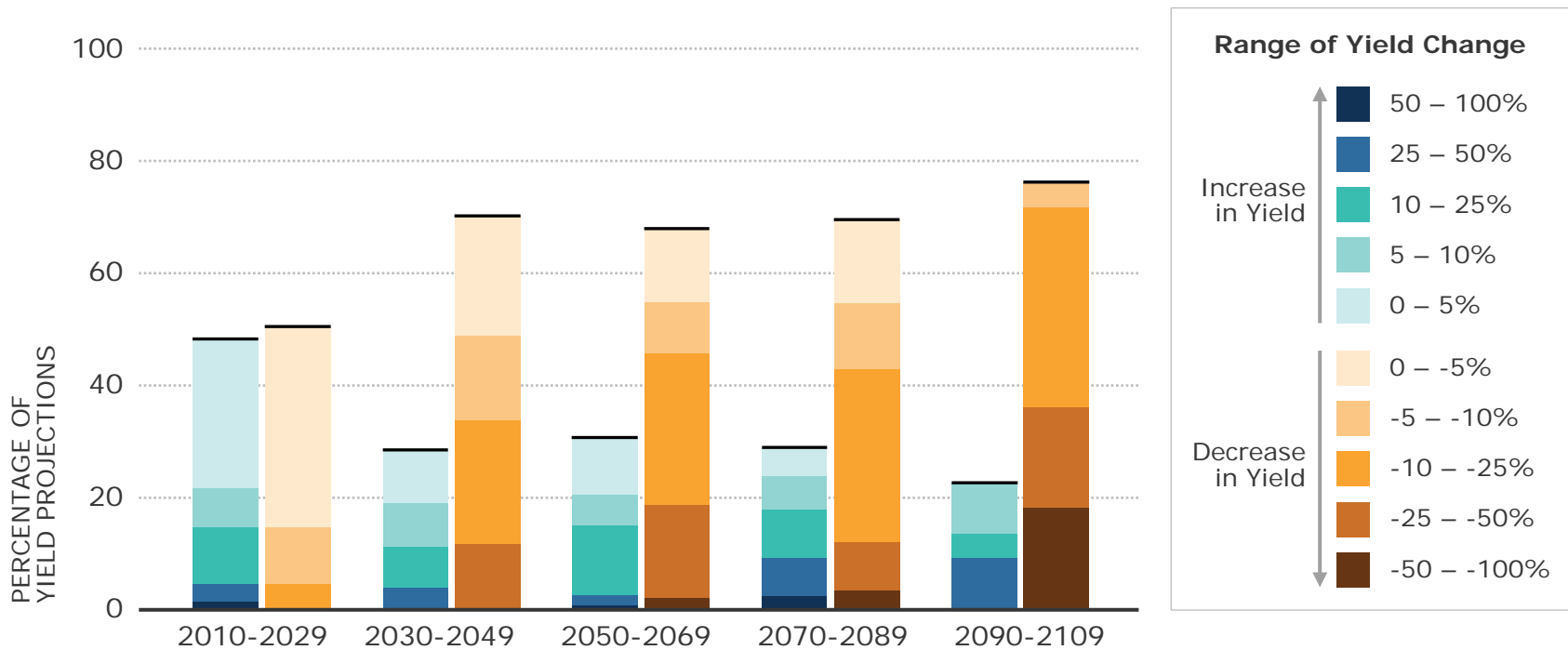


RCP8.5 2081-2100

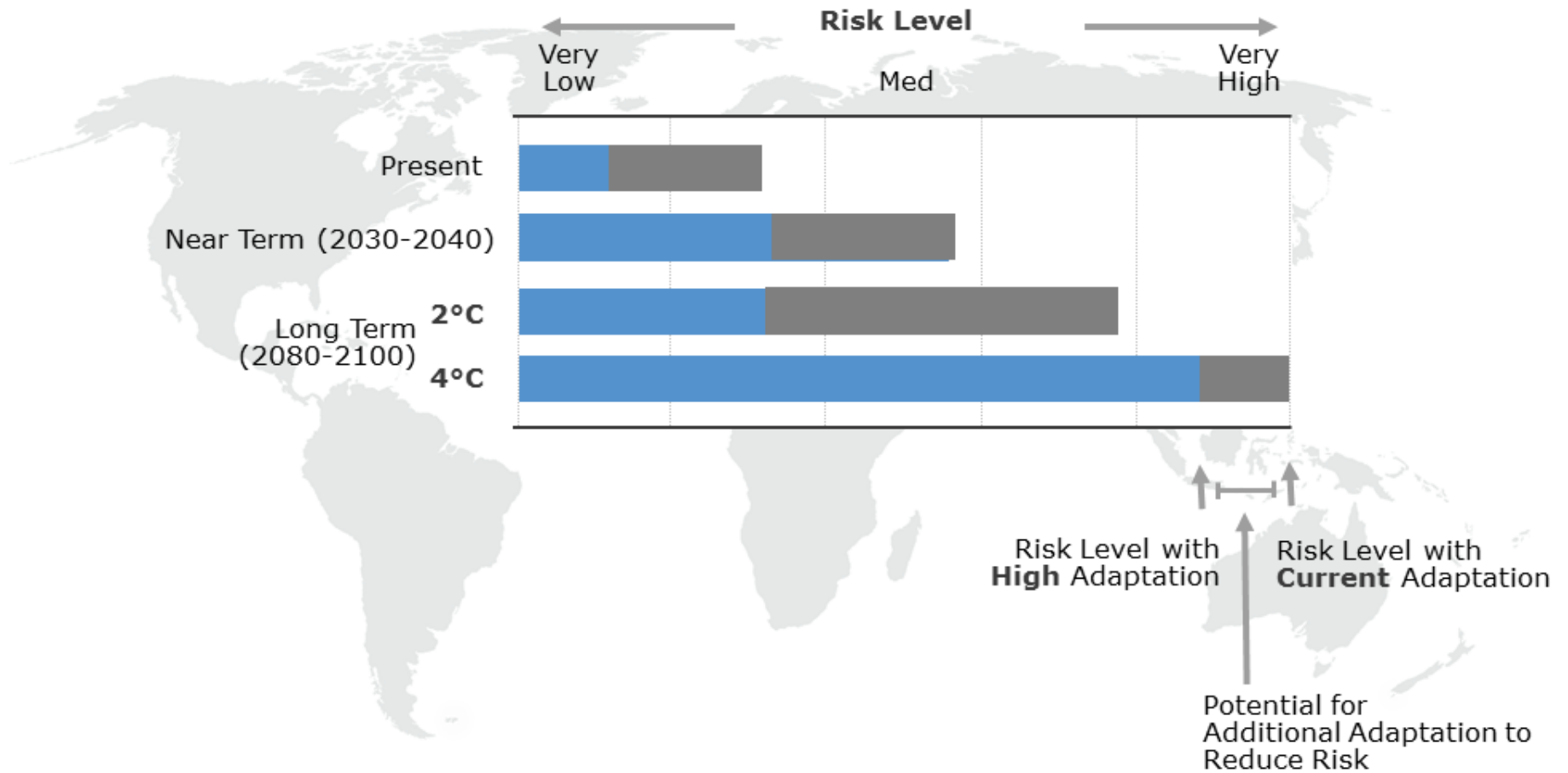


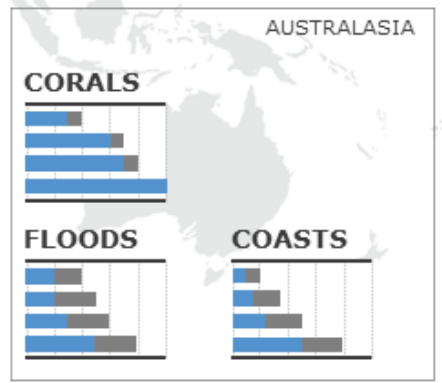
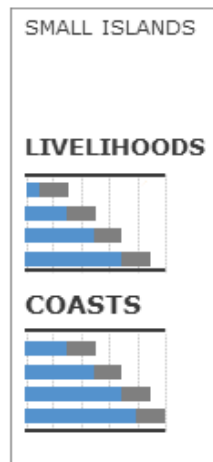
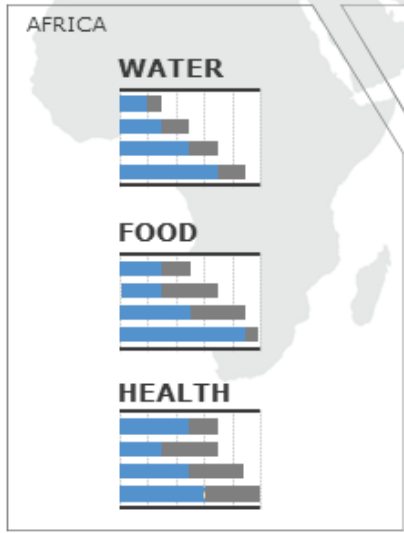
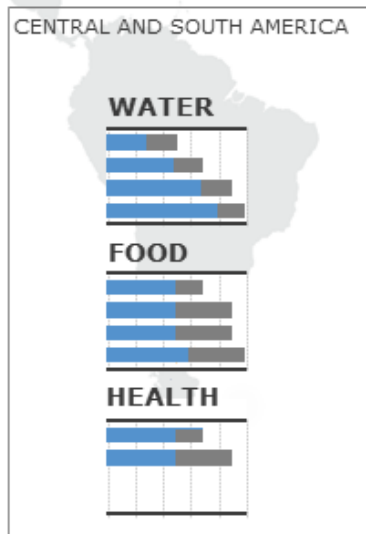
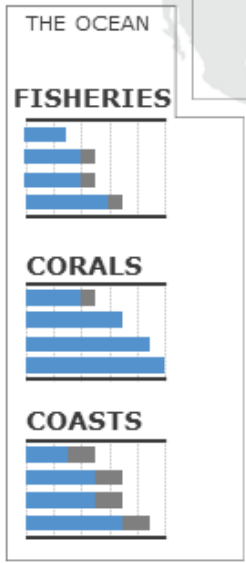
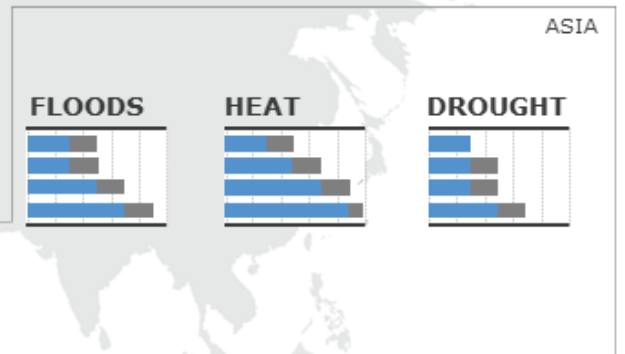
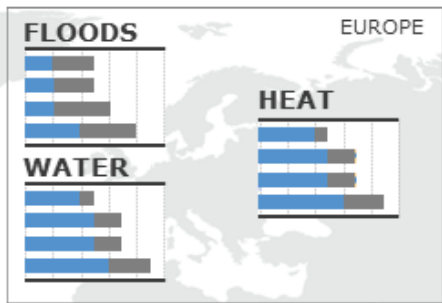
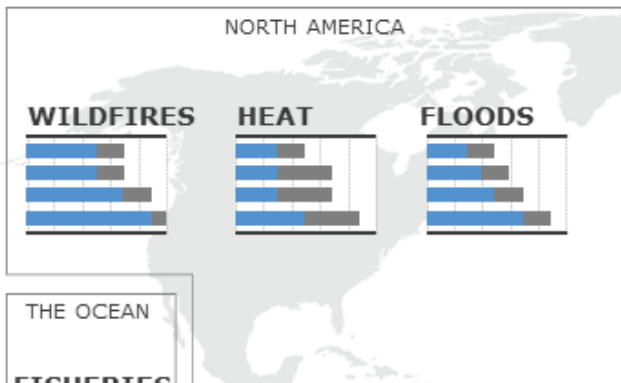
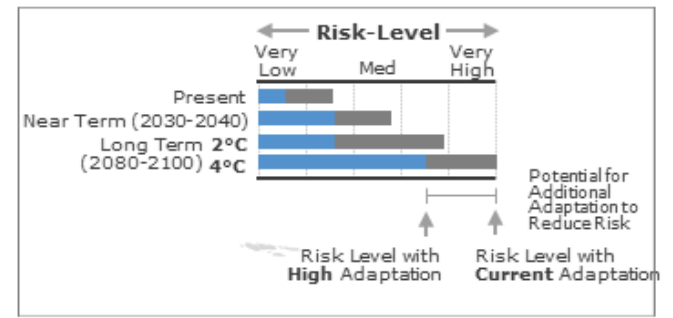
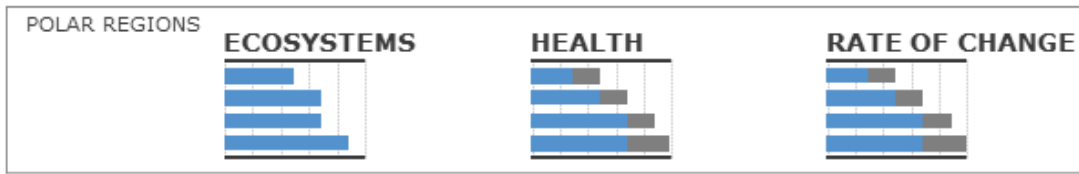
CHANGE IN MAXIMUM CATCH POTENTIAL (2051-2060 COMPARED TO 2001-2010, SRES A1B)









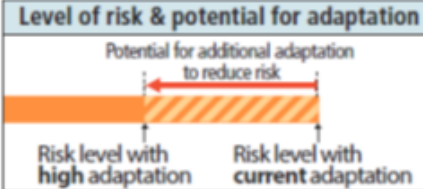

















Assessing risk



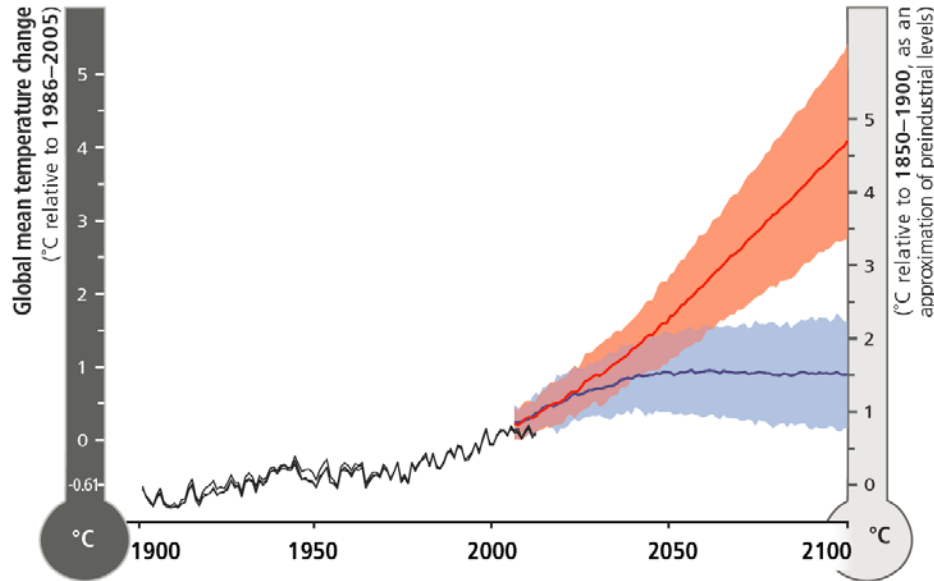


North America

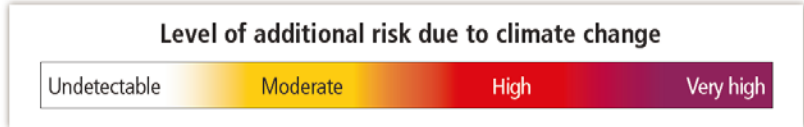
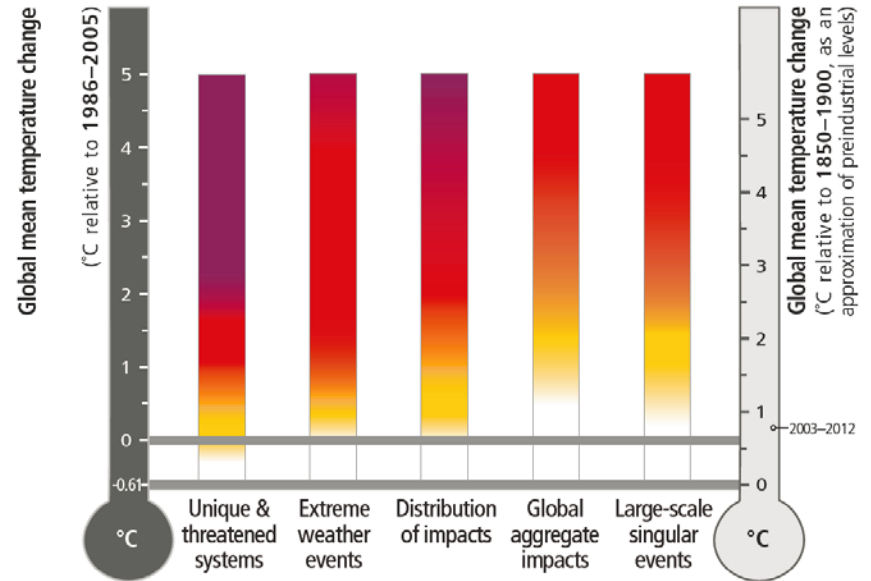
Climate-related drivers of impacts						Level of risk & potential for adaptation
 Warming trend	 Extreme temperature	 Drying trend	 Extreme precipitation	 Damaging cyclone	 Sea level	 <p>Potential for additional adaptation to reduce risk</p> <p>Risk level with high adaptation</p> <p>Risk level with current adaptation</p>

North America				
Key risk	Adaptation issues & prospects	Climatic drivers	Timeframe	Risk & potential for adaptation
Wildfire impacts to ecosystems, assets, and human health	Fire protection measures for forests and ecosystems. Constraints from private property. Agroforestry to reduce slash/burn.	 		Very low Medium Very high
			Present	
			Near term (2030–2040)	
			Long term (2080–2100) 2°C 4°C	
Heat-related human mortality	Residential air conditioning, with limits for outdoor workers and athletes. Family support, heat warning systems, cooling centers, and greening.			Very low Medium Very high
			Present	
			Near term (2030–2040)	
			Long term (2080–2100) 2°C 4°C	
Urban floods in riverine and coastal areas	Urban drainage. Ecosystem conservation and land-use planning. Low regrets strategies with co-benefits.	  		Very low Medium Very high
			Present	
			Near term (2030–2040)	
			Long term (2080–2100) 2°C 4°C	

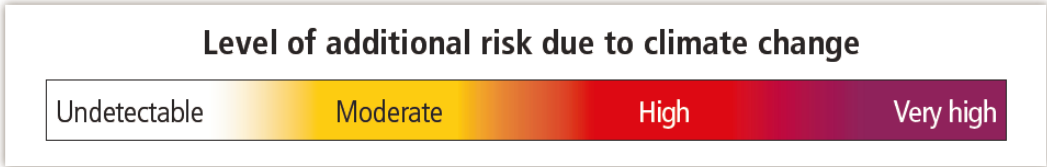
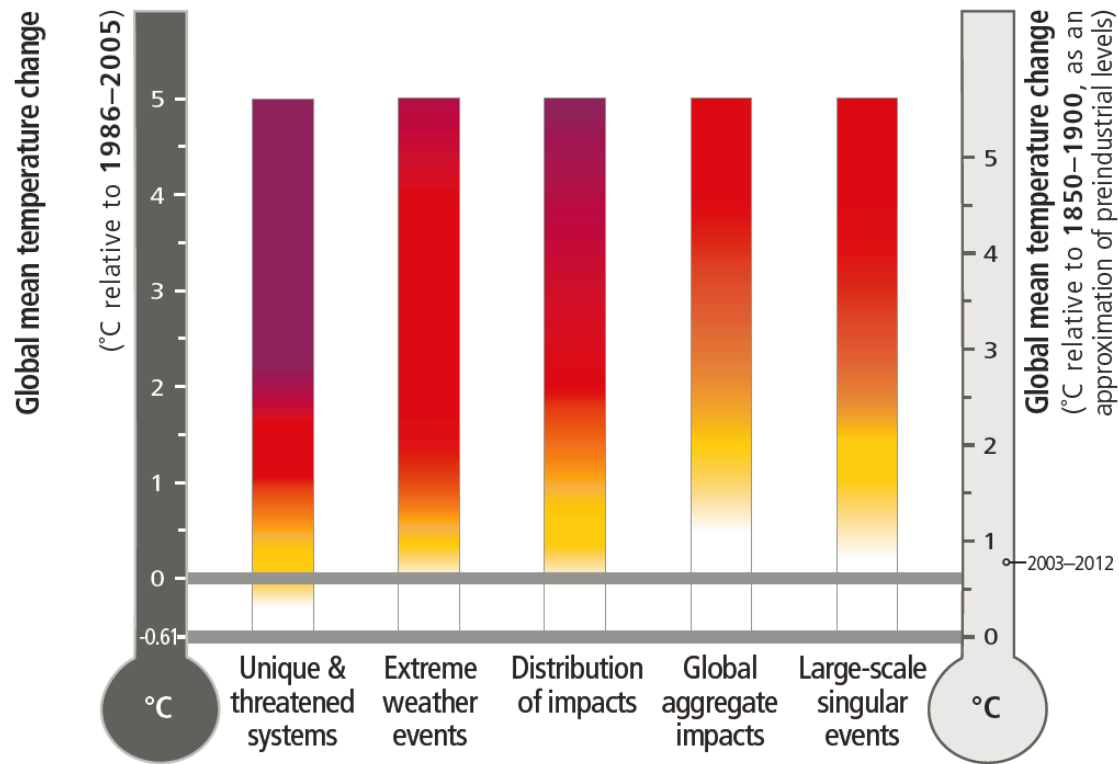
A global perspective on risks



- Observed
- RCP8.5 (a high-emission scenario)
- Overlap
- RCP2.6 (a low-emission mitigation scenario)

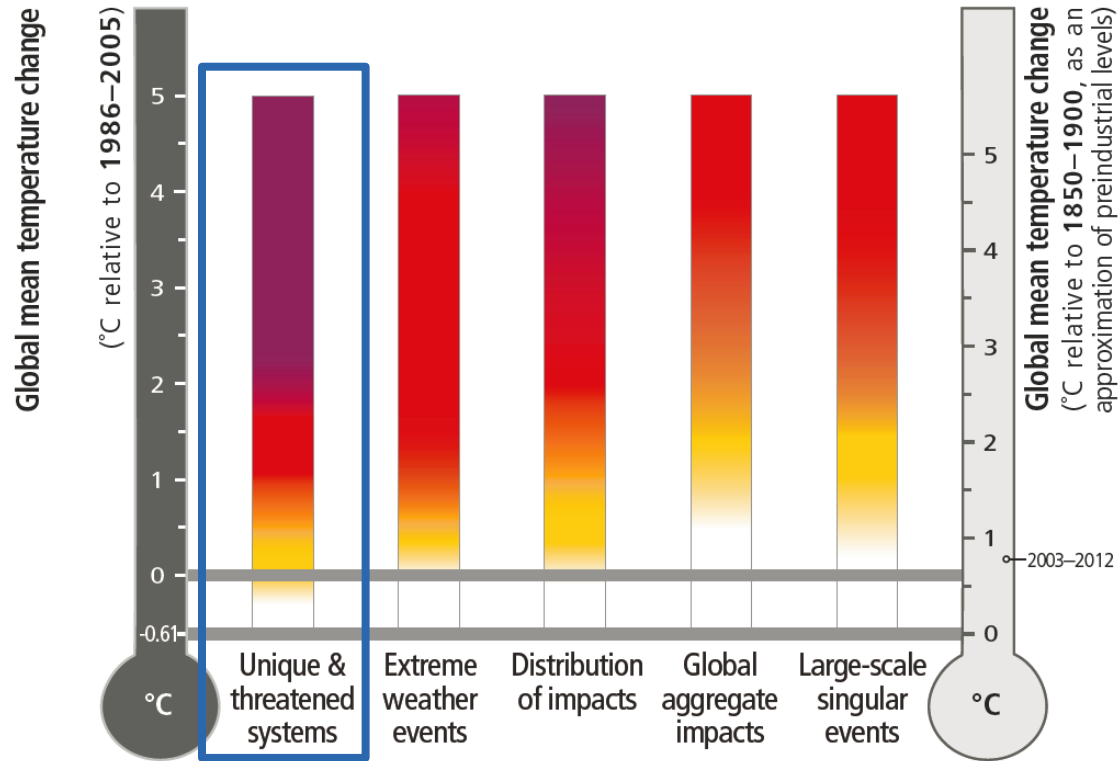


Based on WGII Box SPM 1 Figure 1



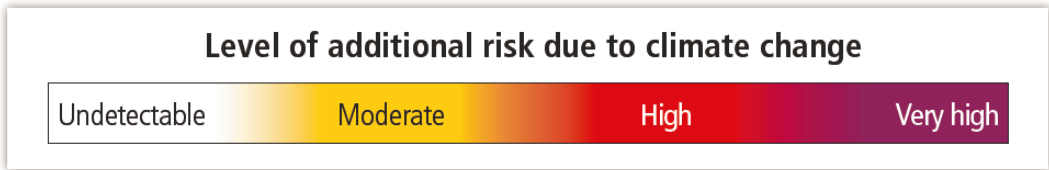
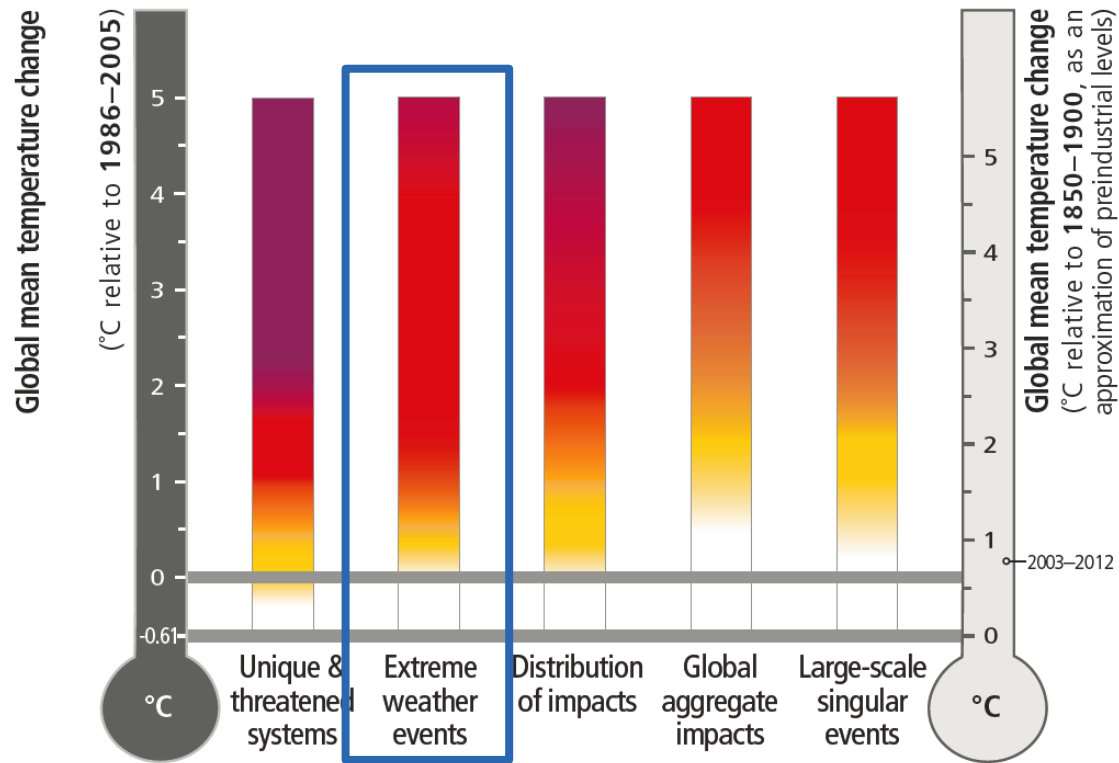
Based on WGII
Box SPM 1 Figure 1

Small-scale, unique, nonmarket



Based on WGII
Box SPM 1 Figure 1

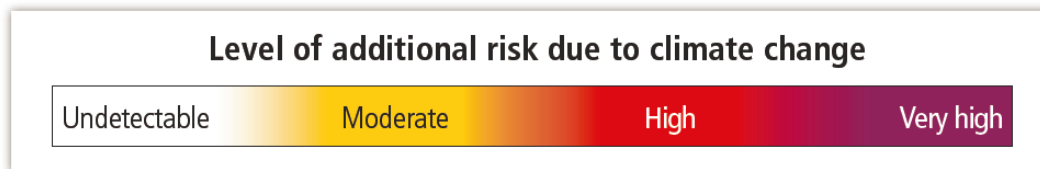
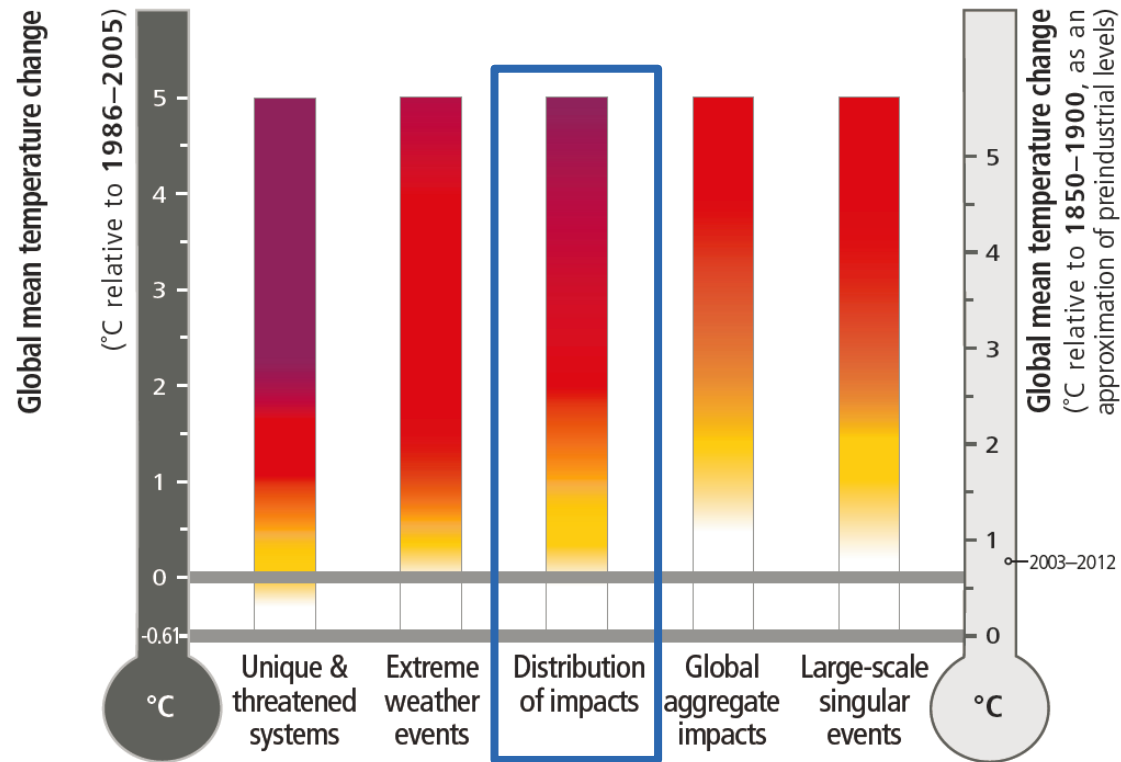
Extremes



Based on WGII
Box SPM 1 Figure 1

Unfairness of impacts

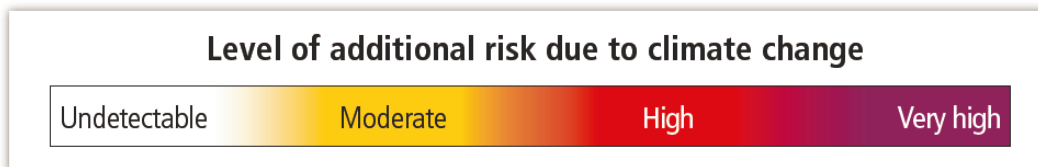
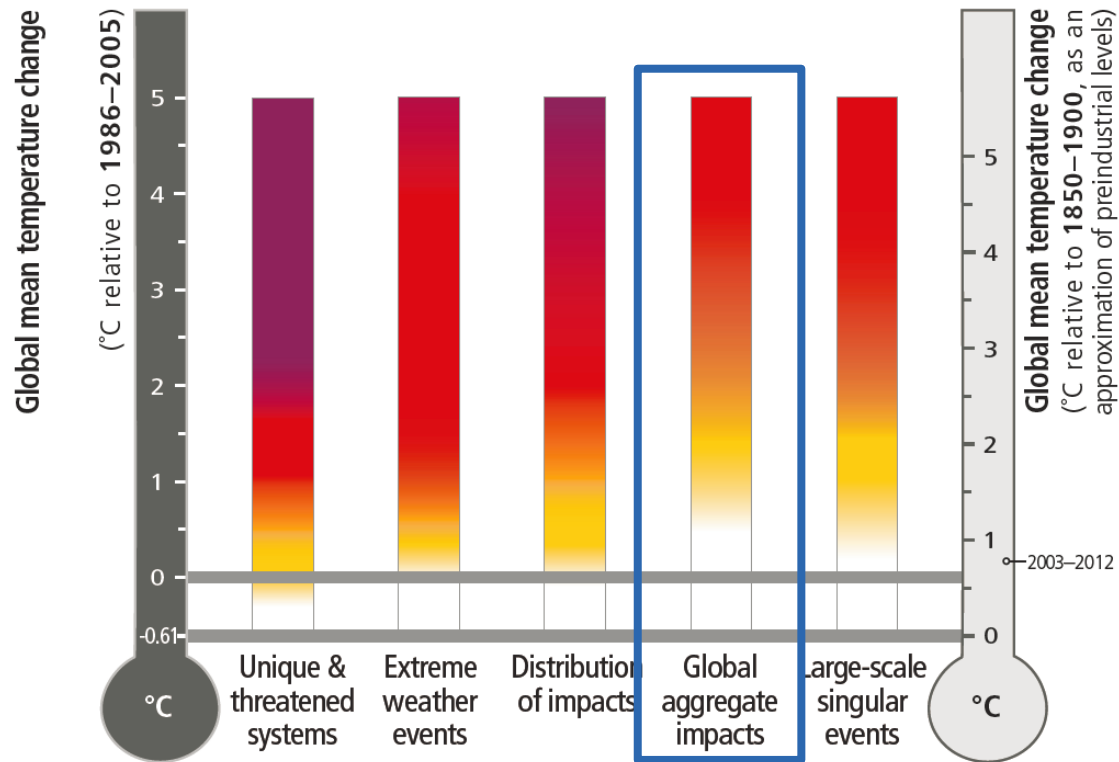
- Unevenness spatially and temporally
- Challenges of resolution



Based on WGII
Box SPM 1 Figure 1

An aggregate view

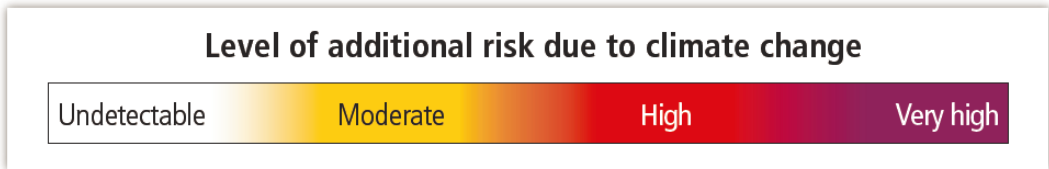
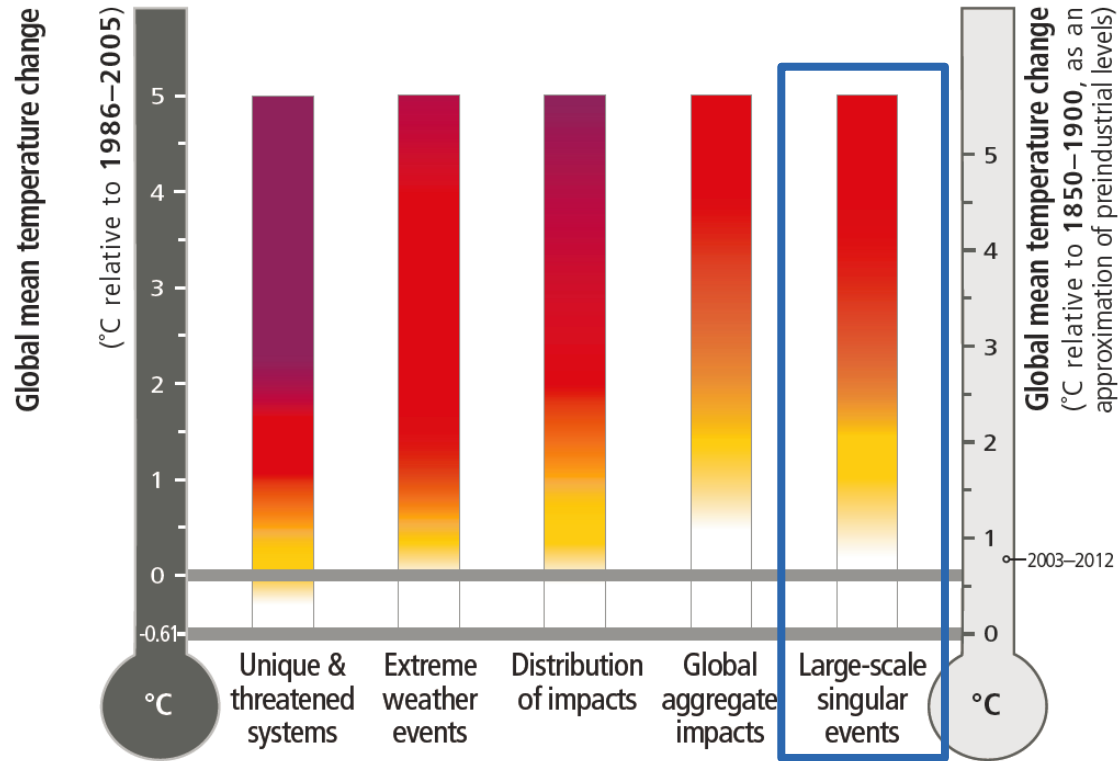
- Next generation of economic estimates?
- Next generation of non-economic estimates?



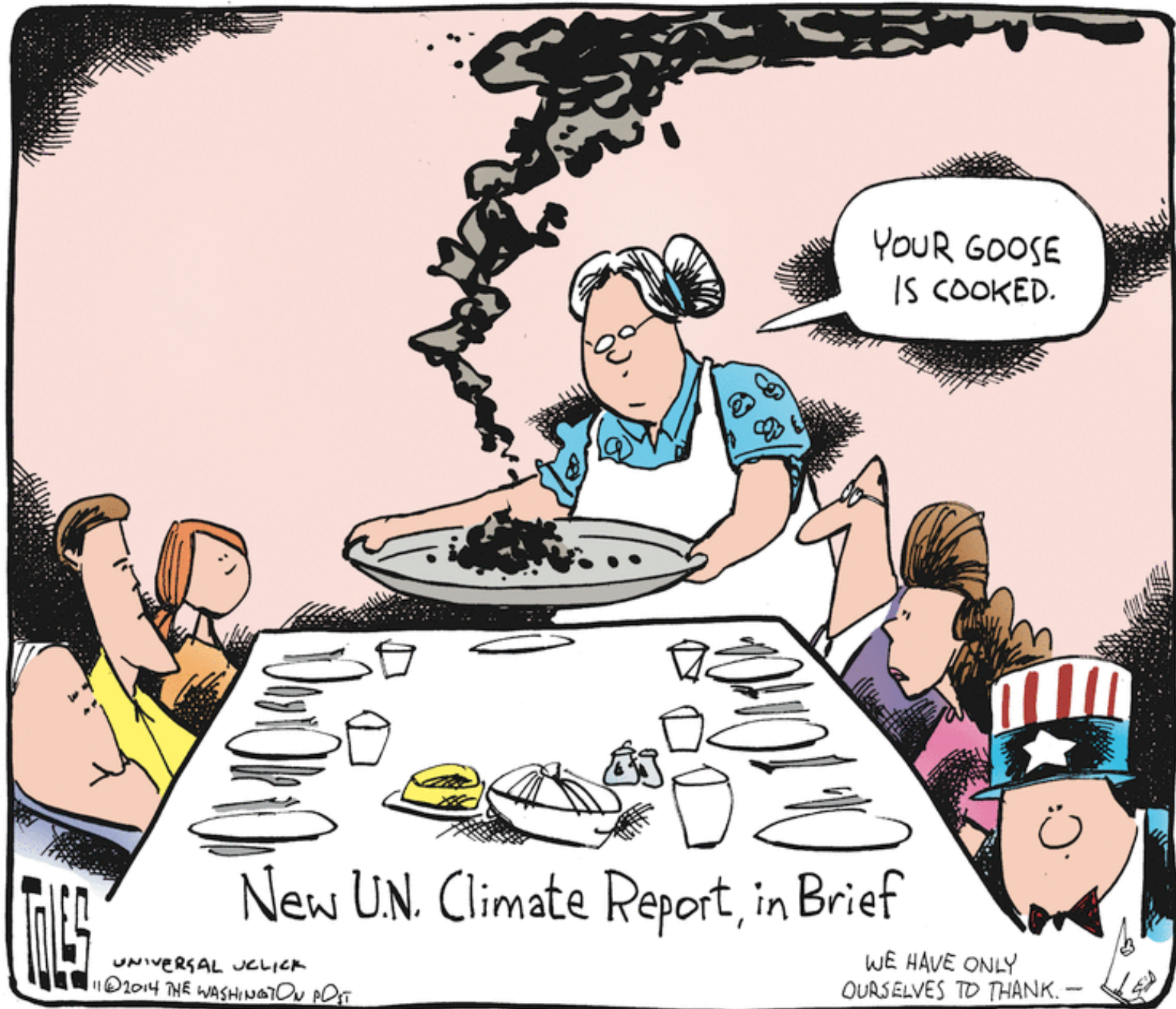
Based on WGII
Box SPM 1 Figure 1

Abrupt and irreversible changes

- Long timeframes, large uncertainties



Based on WGII
Box SPM 1 Figure 1



YOUR GOOSE IS COOKED.


New U.N. Climate Report, in Brief

WE HAVE ONLY OURSELVES TO THANK. —

TUES

UNIVERSAL UCLICK
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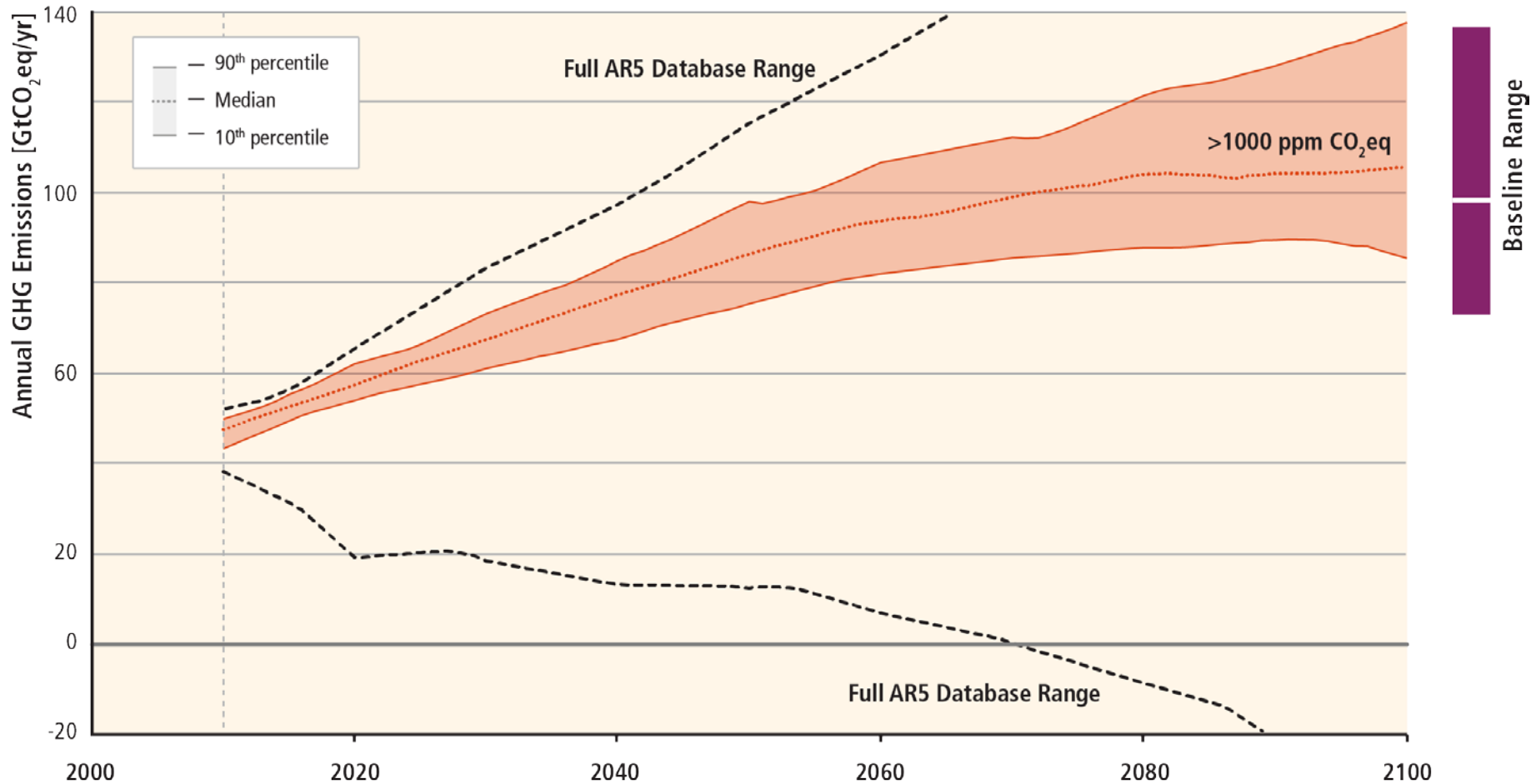
11-4-14



LIMITING WARMING TO 2°C
INVOLVES SUBSTANTIAL
TECHNOLOGICAL,
ECONOMIC AND INSTITUTIONAL
CHALLENGES

Stabilizing temperature (eventually) requires zero net emissions – regardless of the warming limit chosen

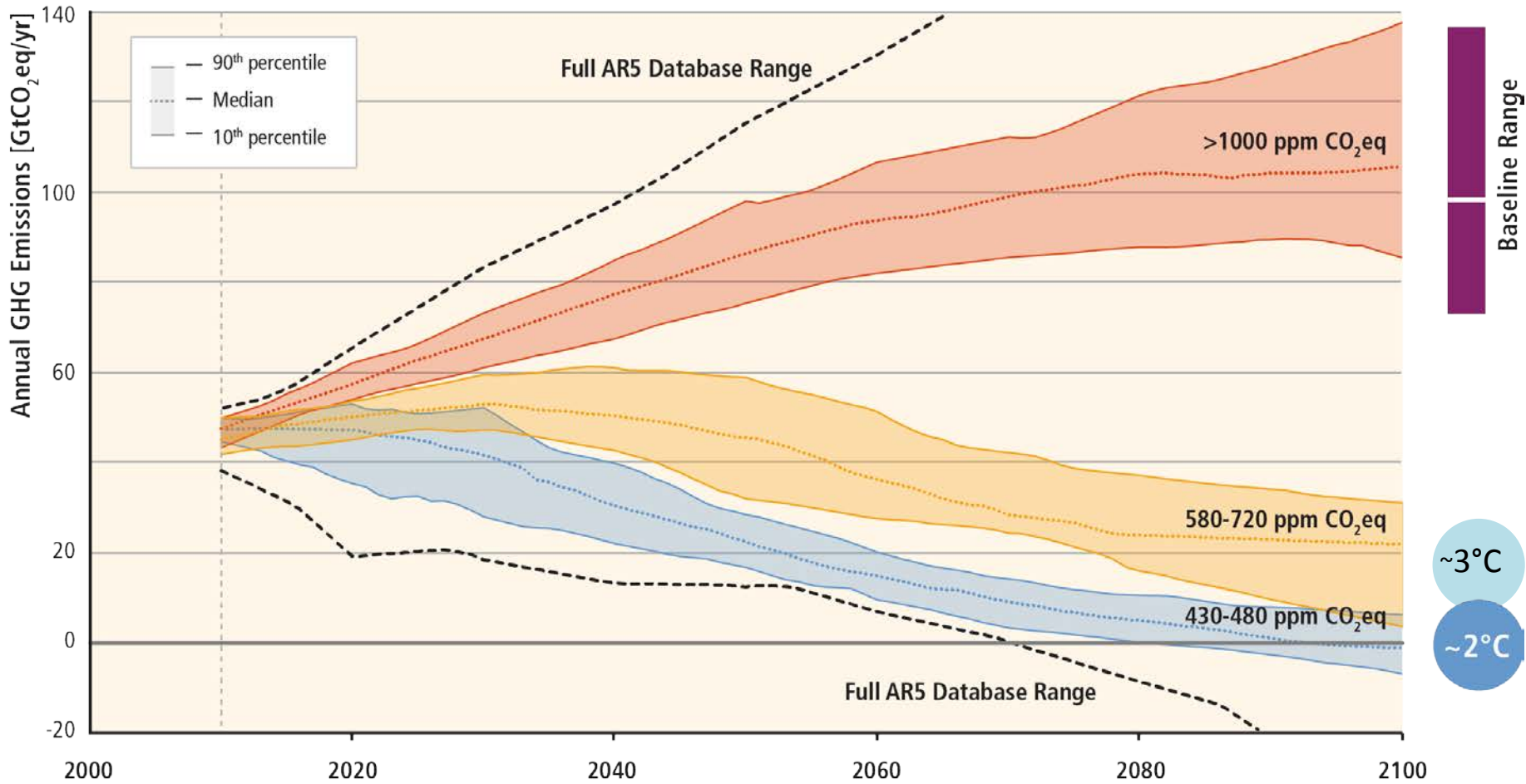
– regardless of the warming limit chosen



Based on WGIII Figure SPM 4

Stabilizing temperature (eventually) requires zero net emissions – regardless of the warming limit chosen

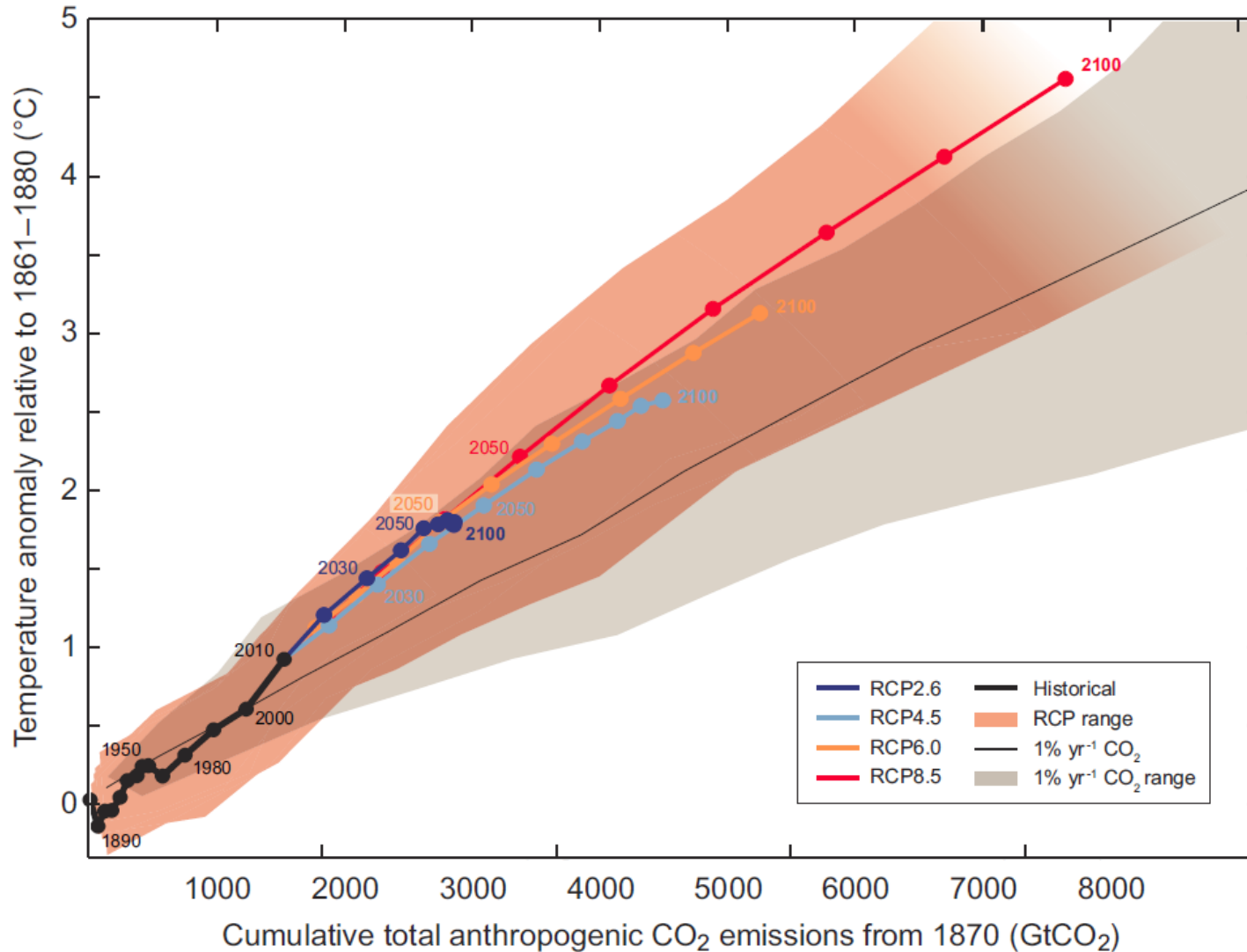
– regardless of the warming limit chosen



Based on WGIII Figure SPM 4

Stabilizing temperature (eventually) requires zero net emissions – regardless of the warming limit chosen

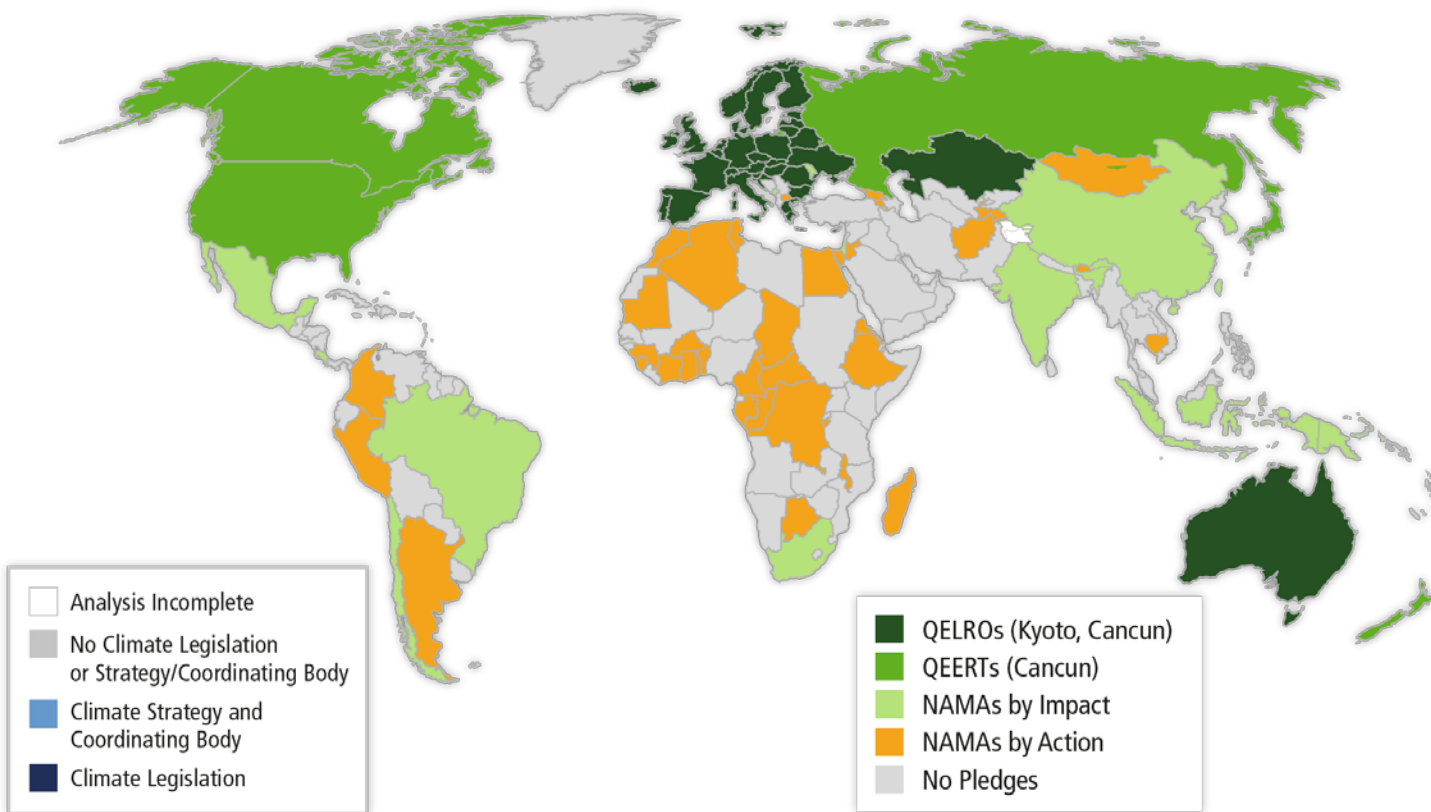
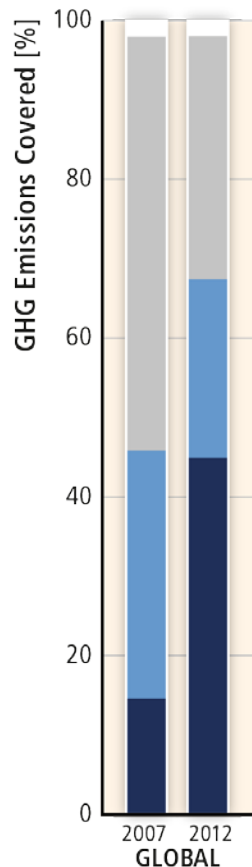
– regardless of the warming limit chosen





INCREASING FRACTION OF
EMISSIONS COVERED BY
MITIGATION PLANS
AND STRATEGIES

Increase in national and sub-national mitigation policies



Based on WGIII Figures 15.1 and 13.3

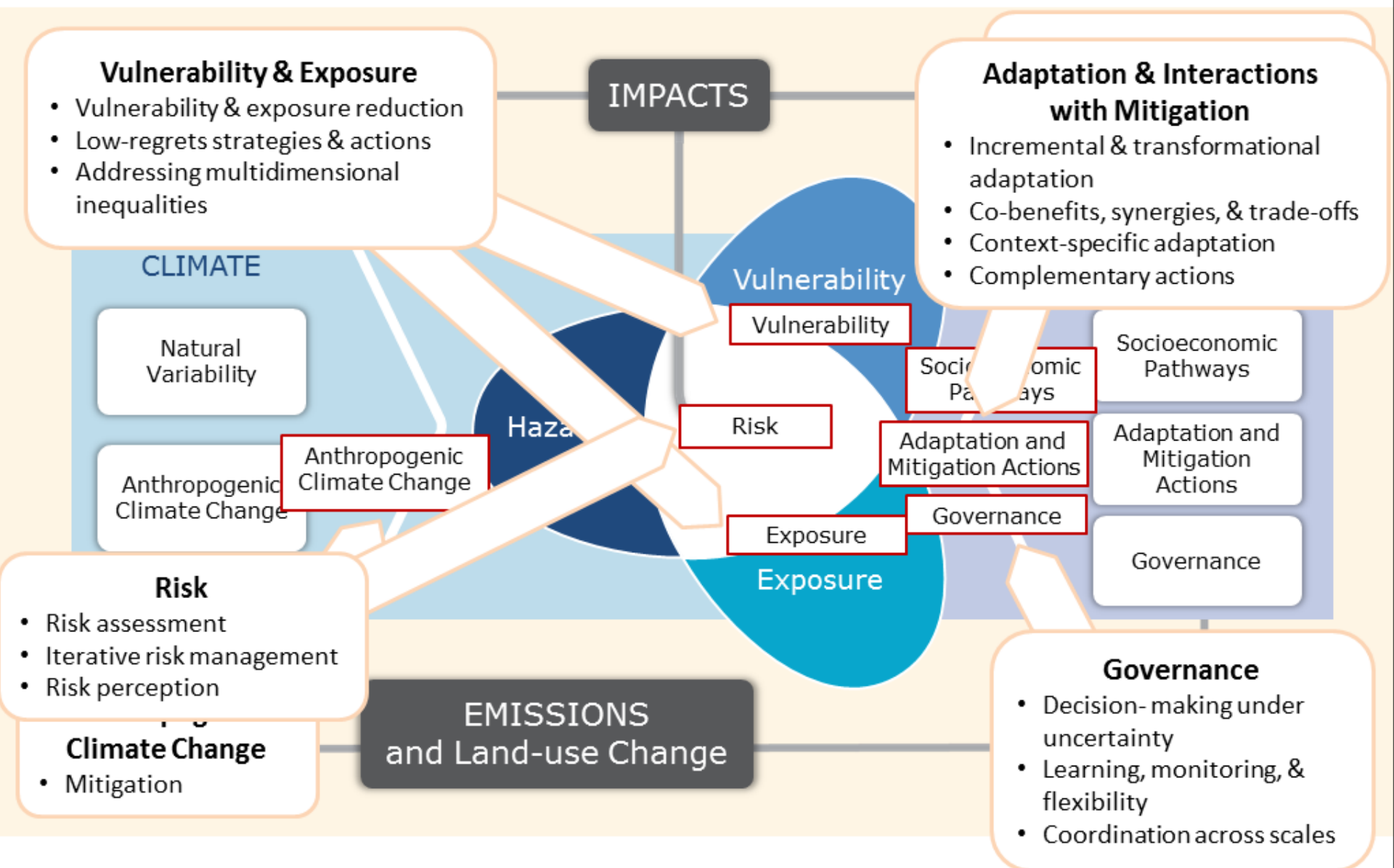


EFFECTIVE CLIMATE CHANGE RESPONSES

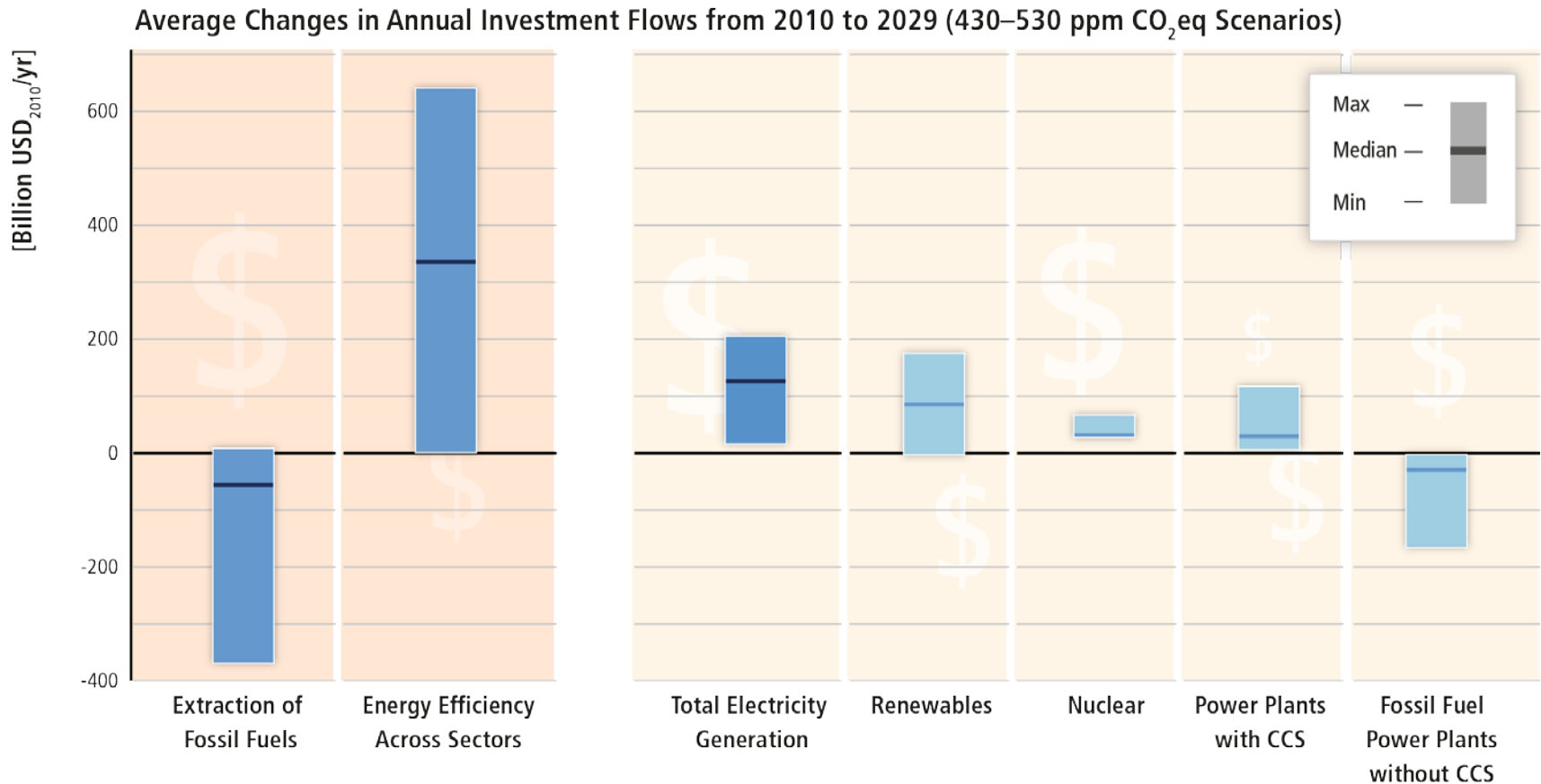
A MORE VIBRANT WORLD

ipcc

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



Substantial emissions reductions linked to new investments



Based on WGIII Figure SPM 9



CLIMATE CHANGE

UNDERSTANDING,
MANAGING, &
REDUCING RISKS

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INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

Year 2060: The search for a breakthrough technology to solve climate change continues.

IT'S A TIME MACHINE WE HOPE WILL TAKE US BACK 50 YEARS WHEN WE SHOULD HAVE PUT A PRICE ON CARBON.

WE BETTER HURRY!

NO! THAT'S THE GREAT THING ABOUT THIS TECHNOLOGY!

TOLSON

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