

# The IPCC Special Report on 1.5°C: Some key findings

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# IPCC Special Report on 1.5°C

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INTERGOVERNMENTAL PANEL ON climate change

## GLOBAL WARMING OF 1.5 °C



“Holding the increase in the global average temperature to **well below 2°C** above pre-industrial levels and pursuing efforts to **limit the temperature increase to 1.5°C** above pre-industrial levels, **recognizing that this would significantly reduce the risks and impacts of climate change**”

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## GLOBAL WARMING OF 1.5 °C

an IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

### *Summary for Policymakers*

This Summary for Policymakers was formally approved at the First Joint Session of Working Groups I, II and III of the IPCC and accepted by the 48<sup>th</sup> Session of the IPCC, Incheon, Republic of Korea, 6 October 2018.

SUBJECT TO COPY EDIT



### A. Understanding Global Warming of 1.5°

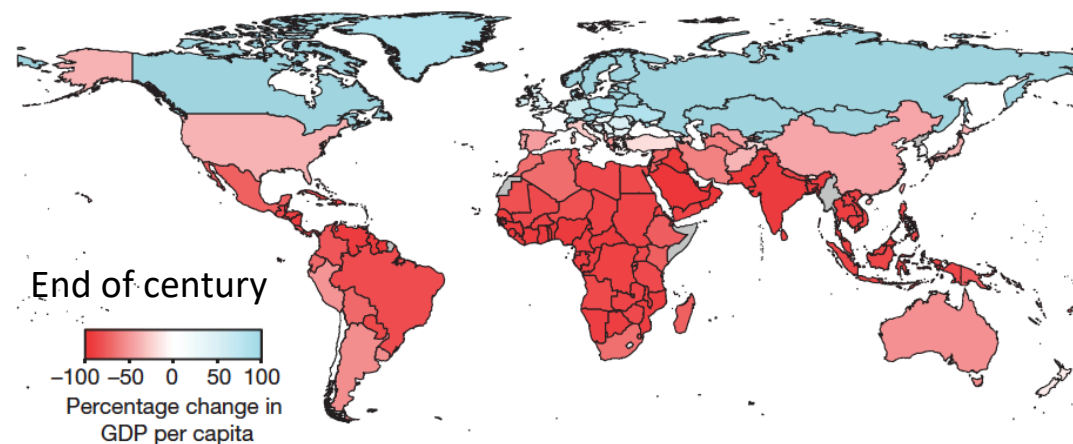
**A1. Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a *likely* range of 0.8°C to 1.2°C. Global warming is *likely* to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate. (*high confidence*)**

### B. Projected Climate Change, Potential Impacts and Associated Risks

**B1. Climate models project robust differences in regional climate characteristics between present-day and global warming of 1.5°C, and between 1.5°C and 2°C. These differences include increases in: mean temperature in most land and ocean regions (*high confidence*), hot extremes in most inhabited regions (*high confidence*), heavy precipitation in several regions (*medium confidence*), and the probability of drought and precipitation deficits in some regions (*medium confidence*).**

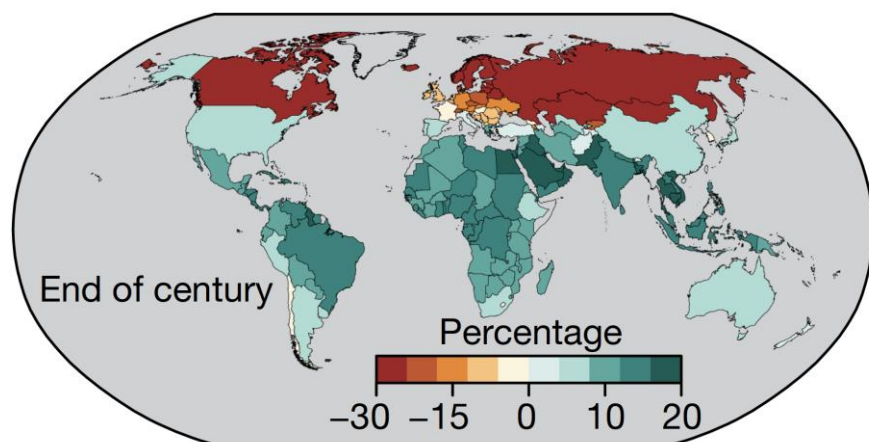
- **B5. Climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth are projected to increase with global warming of 1.5°C and increase further with 2°C.**
- **B5.1. Populations at disproportionately higher risk of adverse consequences of global warming of 1.5°C and beyond include disadvantaged and vulnerable populations, some indigenous peoples, and local communities dependent on agricultural or coastal livelihoods (high confidence).**
- **Regions at disproportionately higher risk include Arctic ecosystems, dryland regions, small-island developing states, and least developed countries (high confidence).**
- Poverty and disadvantages are expected to increase in some populations as global warming increases;
- **Limiting global warming to 1.5°C, compared with 2°C, could reduce the number of people both exposed to climate-related risks and susceptible to poverty by up to several hundred million by 2050 (medium confidence).**

# 1.5°C limit substantially reduces economic damages compared to 2°C



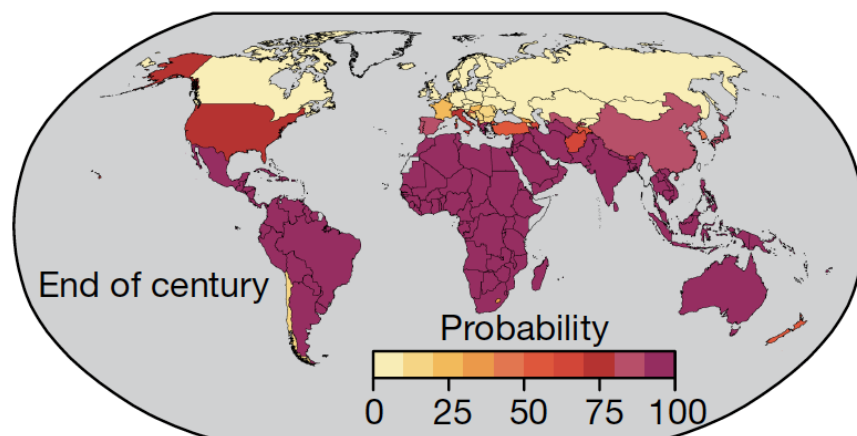
Substantial-to-extreme economic damages (red) for virtually all developing countries under 4°C warming

Source: Burke et al., 2015



Benefits (green) of reduced damages under 1.5°C warming in terms of change in GDP per capita, relative to 2°C warming





Source: Burke et al., 2018





Probability of reduced economic damages under 1.5°C warming relative to 2°C warming

Source: Burke et al., 2018

# Significant differences in impacts between 1.5°C and 2°C

		1.5° C WORLD	2° C WORLD
	HEATWAVES		
	Tropics	~ 2 months	~ 3 months
	ANNUAL WATER AVAILABILITY		
	Central America	20% reduction	30% reduction
	EXTREME PRECIPITATION		
	South East Asia	7% increase	10% increase
	SEA LEVEL RISE BY 2100		
	Small Islands in the South Pacific and Caribbean and South East Asia	40 cm	50 cm

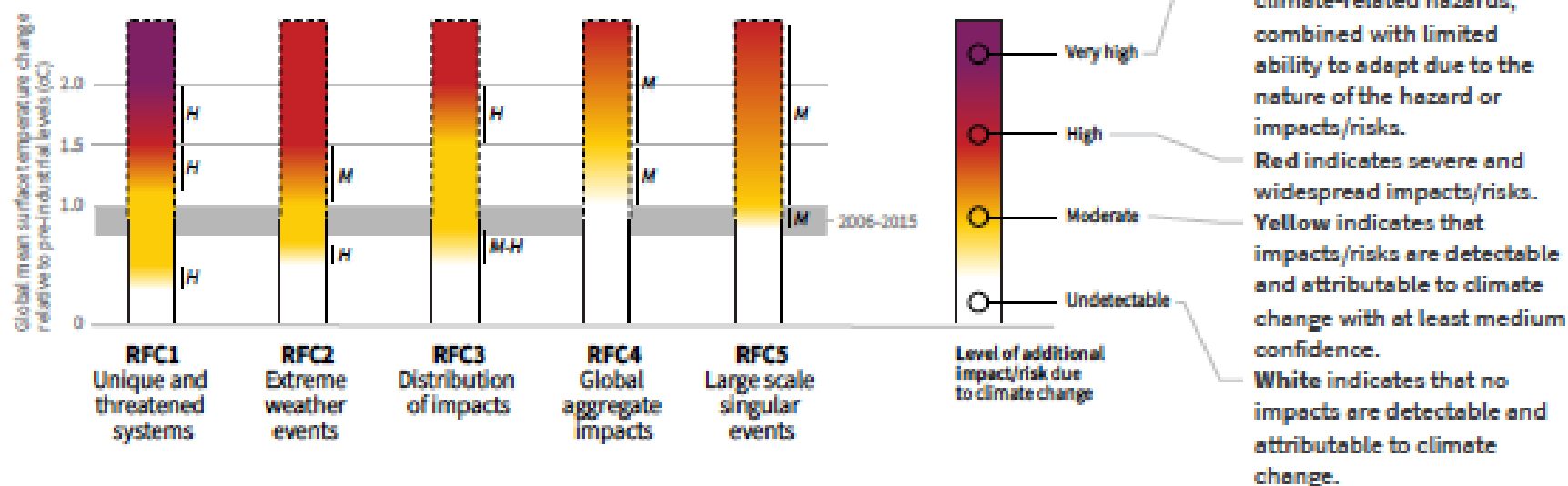
		1.5° C WORLD	2° C WORLD
	WHEAT YIELDS - RISK OF REDUCTIONS UP TO		
	West Africa	45% reduction	60% reduction
	East Africa	25% reduction	35% reduction
	Central America	25% reduction	40% reduction
	OCEAN ACIDIFICATION AND CORAL REEF LOSS		
	Small Islands in the South Pacific and Caribbean and South East Asia	90% reduction [50;99]	98% reduction [86;100]

# Principle risks climate change

## GLOBAL WARMING OF 1.5 °C

Five Reasons For Concern (RFCs) illustrate the impacts and risks of different levels of global warming for people, economies and ecosystems across sectors and regions.

### Impacts and risks associated with the Reasons for Concern (RFCs)



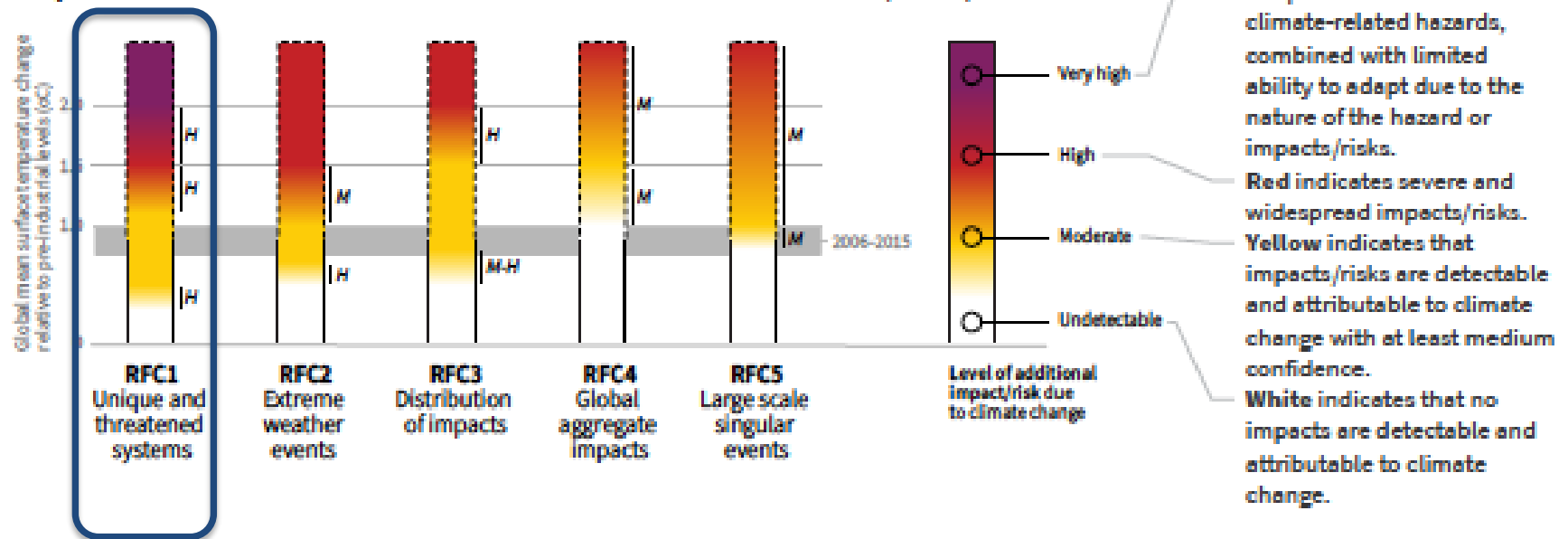
There are multiple lines of evidence that there has been a substantial increase since AR5 in the levels of risk associated with four of the five Reasons for Concern (RFCs) for global warming levels of up to 2°C (*high confidence*). Constraining warming to 1.5°C rather than 2°C avoids risk reaching a ‘very high’ level in RFC1 (Unique and Threatened Systems) (*high confidence*), and avoids risk reaching a ‘high’ level in RFC3 (Distribution of Impacts) (*high confidence*) and RFC4 (Global Aggregate Impacts) (*medium confidence*). It also reduces risks associated with RFC2 (Extreme Weather Events) and RFC5 (Large scale singular events) (*high confidence*) {3.5.2}.

# Principle risks climate change

## GLOBAL WARMING OF 1.5 °C

Five Reasons For Concern (RFCs) illustrate the impacts and risks of different levels of global warming for people, economies and ecosystems across sectors and regions.

### Impacts and risks associated with the Reasons for Concern (RFCs)



In “Unique and Threatened Systems” (RFC1) the transition from high to very high risk is located between 1.5°C and 2°C global warming as opposed to at 2.6°C global warming in AR5, owing to new and multiple lines of evidence for changing risks for coral reefs, the Arctic, and biodiversity in general (*high confidence*) {3.5}.

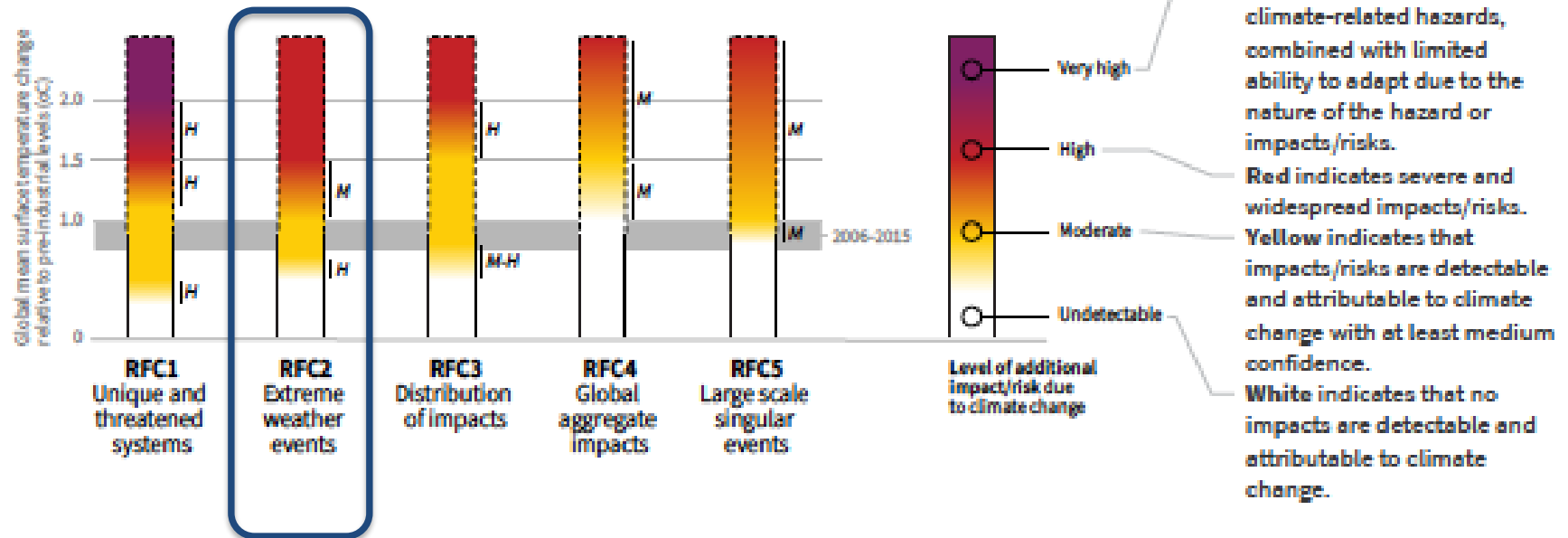


# Principle risks climate change

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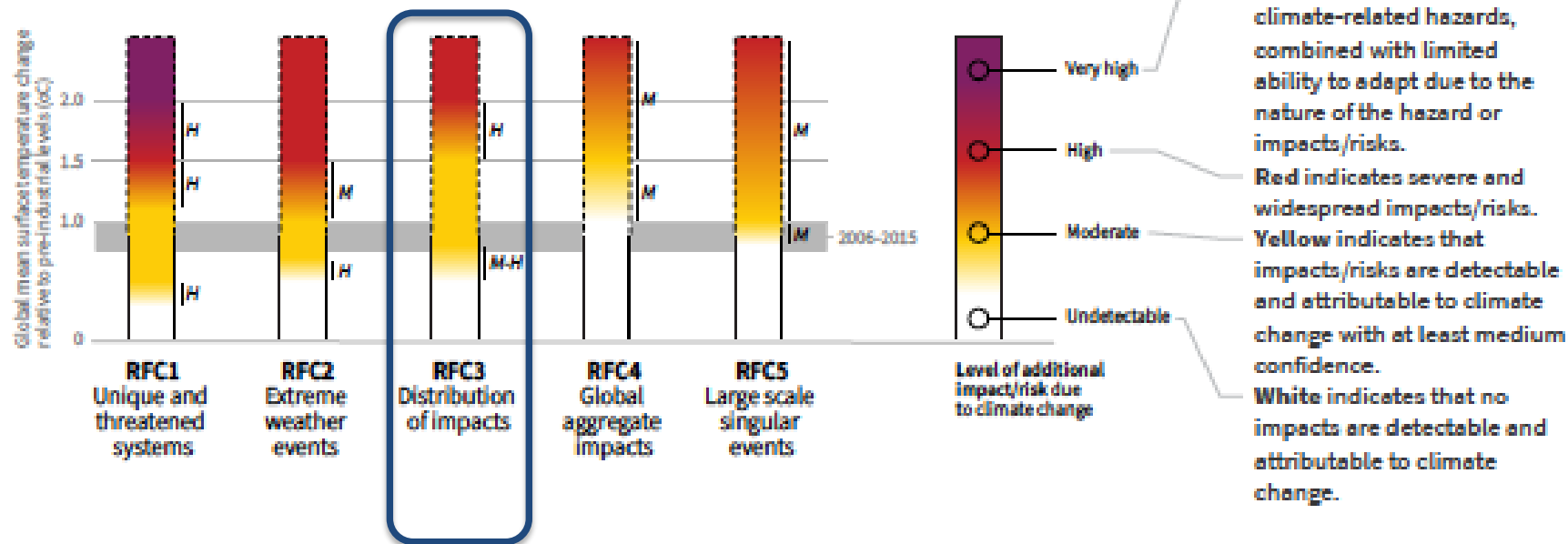
In “Extreme Weather Events” (RFC2) the transition from moderate to high risk is located between 1.0°C and 1.5°C global warming, which is very similar to the AR5 assessment but there is greater confidence in the assessment (*medium confidence*). The impact literature contains little

# Principle risks climate change

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### Impacts and risks associated with the Reasons for Concern (RFCs)



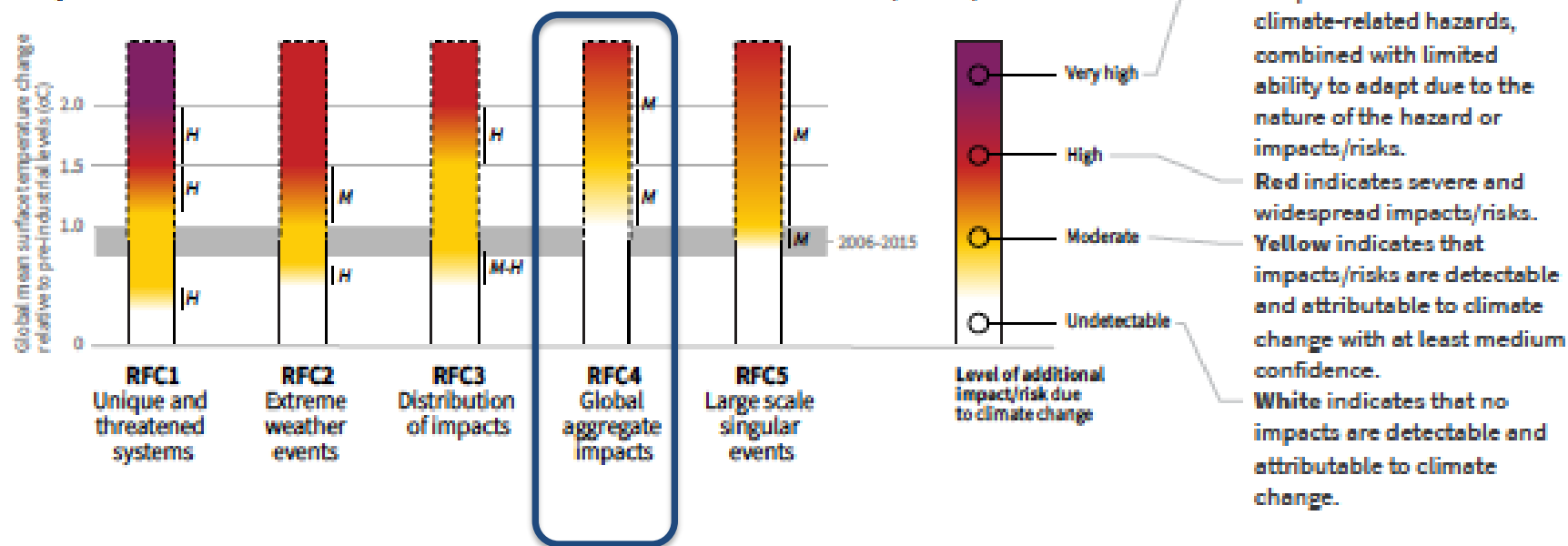
In “Distribution of impacts” (RFC3) a transition from moderate to high risk is now located between 1.5°C and 2°C global warming as compared with between 1.6°C and 2.6°C global warming in AR5, due to new evidence about regionally differentiated risks to food security, water resources, drought, heat exposure, and coastal submergence (*high confidence*) {3.5}.

# Principle risks climate change

## GLOBAL WARMING OF 1.5 °C

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### Impacts and risks associated with the Reasons for Concern (RFCs)



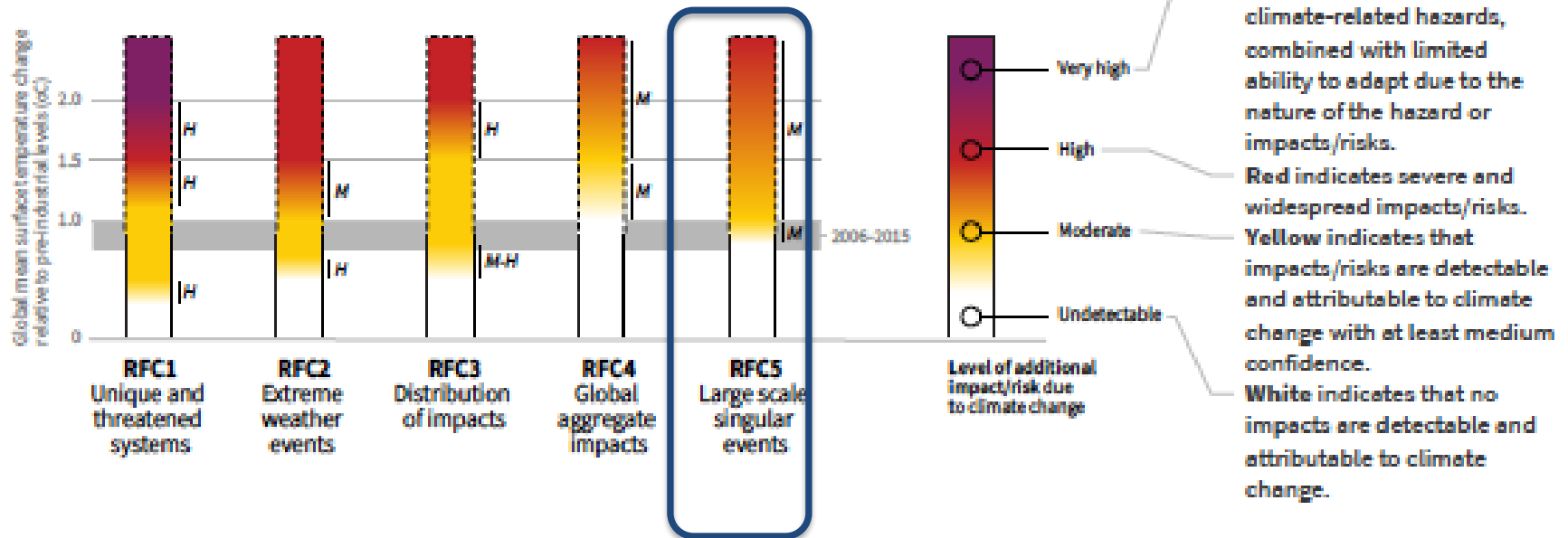
In “Global aggregate impacts” (RFC4) a transition from moderate to high levels of risk now occurs between 1.5°C and 2.5°C global warming as opposed to at 3°C warming in AR5, owing to new evidence about global aggregate economic impacts and risks to the earth’s biodiversity (*medium confidence*) {3.5}.

# Principle risks climate change

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Five Reasons For Concern (RFCs) illustrate the impacts and risks of different levels of global warming for people, economies and ecosystems across sectors and regions.

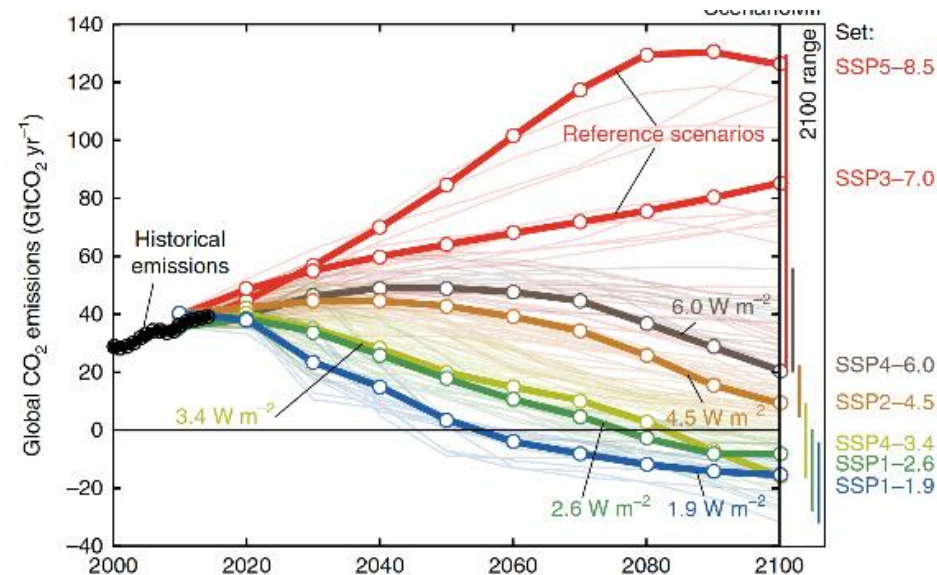
### Impacts and risks associated with the Reasons for Concern (RFCs)



In “Large scale singular events” (RFC5), moderate risk is located at 1°C global warming and high risks are located at 2.5°C global warming, as opposed to 1.9°C (moderate) and 4°C global warming (high) risk in AR5 because of new observations and models of the West Antarctic ice sheet (*medium confidence*) {3.3.9, 3.5.2, 3.6.3}

# Limiting warming to 1.5°C is feasible

- New 1.5°C scenarios for IPCC 1.5C Special Report show warming can be limited to **well below 2°C and below 1.5°C**:
  - Confirms technological and economic feasibility
- Sustainability is key enabling factor for 1.5°C
- 1.5°C development pathways have large benefits
  - Avoided climate-change damages and crop risks
  - Improved air quality, improved health
  - Eliminated damage/pollution from fossil fuel use
- Sustainability challenges can be managed/avoided



## C. Emission Pathways and System Transitions Consistent with 1.5°C Global Warming

- No or limited overshoot of 1.5°C
- Global net anthropogenic CO<sub>2</sub> emissions
  - Decline by about 45% from 2010 levels by 2030
  - Net zero around 2050
- Non-CO<sub>2</sub> emissions in pathways that limit global warming to 1.5°C show deep reductions that are similar to those in pathways limiting warming to 2°C.

# Limiting warming to 1.5°C is feasible

- C2. Pathways limiting global warming to 1.5°C with no or limited overshoot would require rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings), and industrial systems (high confidence).
- These systems transitions are unprecedented in terms of scale, but not necessarily in terms of speed, and imply deep emissions reductions in all sectors, a wide portfolio of mitigation options and a significant upscaling of investments in those options (medium confidence).

## C2.2. In energy systems - 1.5°C pathways

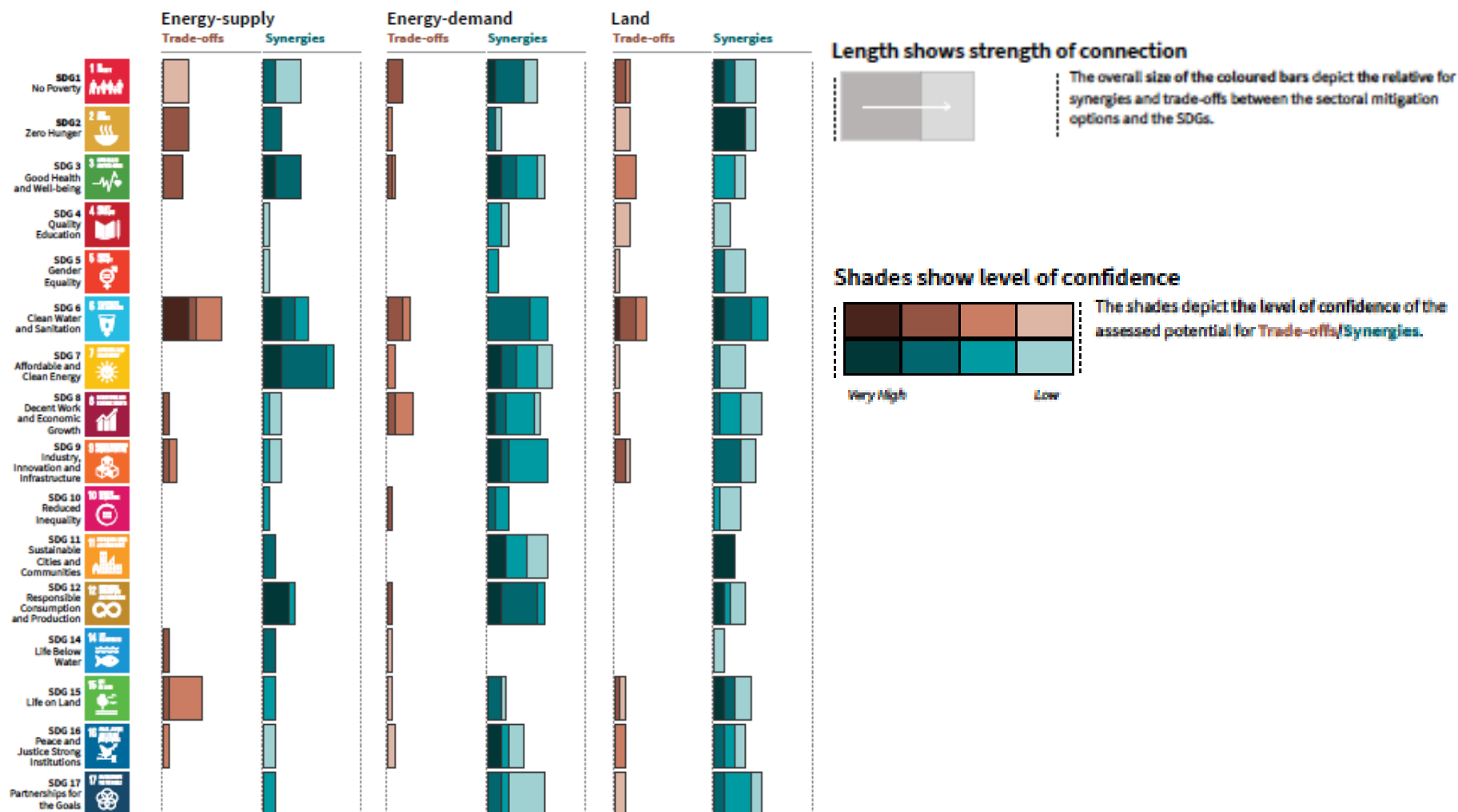
GLOBAL WARMING OF 1.5 °C

- Enhanced energy efficiency, faster electrification compared to 2°C (high confidence).
- Renewables 70–85% of electricity in 2050 (high confidence).
- Coal reduced to close to 0% of electricity by 2050
- Feasibility of solar energy, wind energy and electricity storage technologies have substantially improved over past few years (high confidence).
  - These improvements signal a potential system transition in electricity generation



# 1.5°C Synergies and trade-offs with Sustainable development

GLOBAL WARMING OF 1.5 °C



**Indicative linkages between mitigation options and sustainable development using SDGs** (The linkages do not show costs and benefits)

# Conclusion – 4 key messages from IPCC 1.5 SR

- **Limiting global warming to 1.5°C, compared with 2°C matters**
- **Limiting warming to 1.5°C is feasible but actions needs to happen very soon**
- **Sustainability is key enabling factor with potentially large sustainable development benefits from a 1.5°C path**
  - avoiding climate change damages
  - Improved air quality, health benefits, avoiding pollution damages
- **Investment must shift** - towards low-carbon and renewable technologies and energy efficiency

# Thank you!



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