

Observed and projected changes, uncertainty, future scenarios – and one slide about impacts

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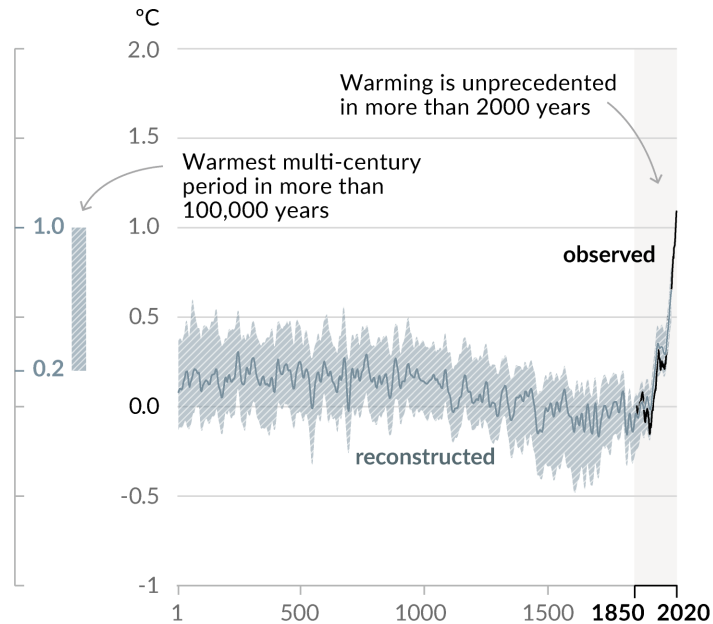
From IPCC AR6:
WG1 – The Physical Science Basis
Summary for Policy Makers (SPM)

Synthesis Report (SYR)

Human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years

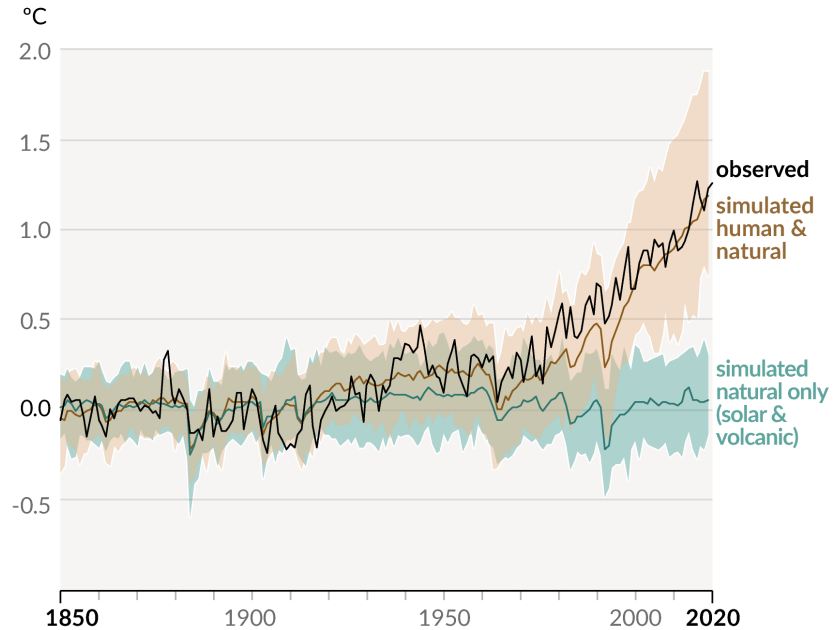
Figure SPM.1

Global temperature change as reconstructed and observed



Models cannot reproduce the warming without changes in GHGs

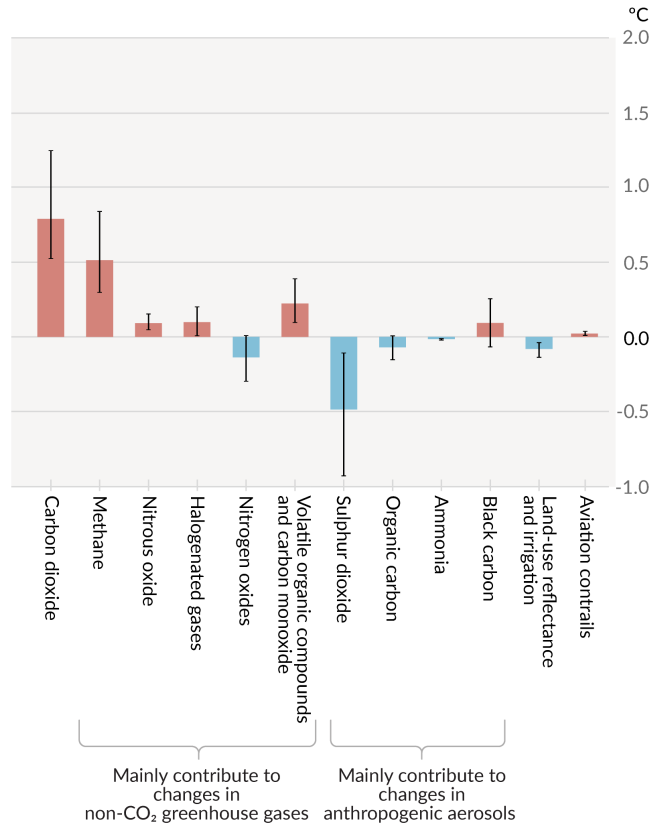
Figure SPM.1



Observed warming is driven by emissions from human activities, with greenhouse gas warming partly masked by aerosol cooling

Figure SPM.2

Contribution to 2010-2019 warming wrt 1850-1900







Human influence is contributing to many observed changes in weather and climate extremes

Figure SPM.3

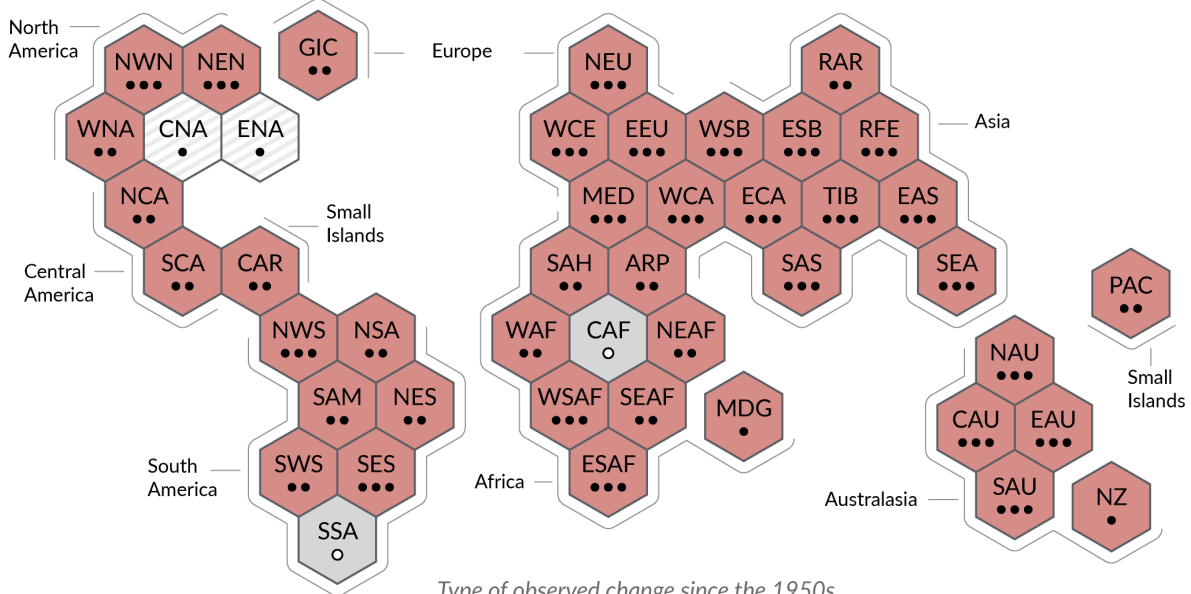
Hot Extremes

Type of observed change in hot extremes

-  Increase (41)
-  Decrease (0)
-  Low agreement in the type of change (2)
-  Limited data and/or literature (2)

Confidence in human contribution to the observed change

- High
- Medium
 - Low due to limited agreement
 - Low due to limited evidence



Type of observed change since the 1950s

Human influence is contributing to many observed changes in weather and climate extremes

Figure SPM.3

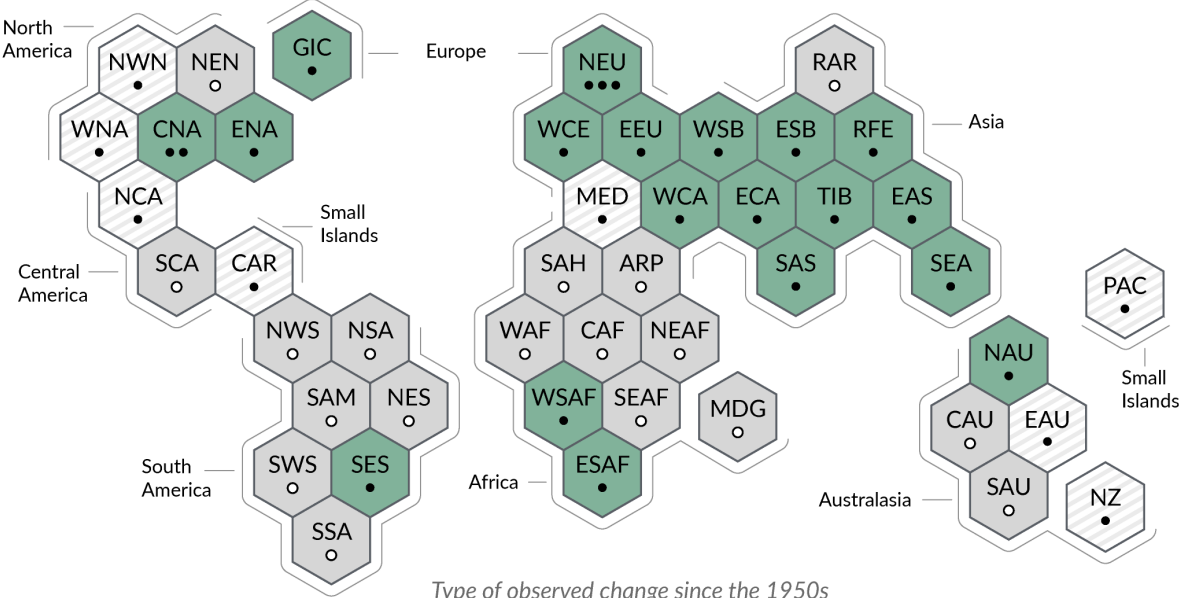
Heavy precipitation

Type of observed change in heavy precipitation

- Increase (19)
- Decrease (0)
- Low agreement in the type of change (8)
- Limited data and/or literature (18)

Confidence in human contribution to the observed change

- High
- Medium
- Low due to limited agreement
- Low due to limited evidence



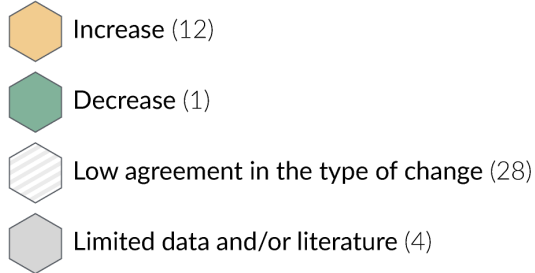
Type of observed change since the 1950s

Human influence is contributing to many observed changes in weather and climate extremes

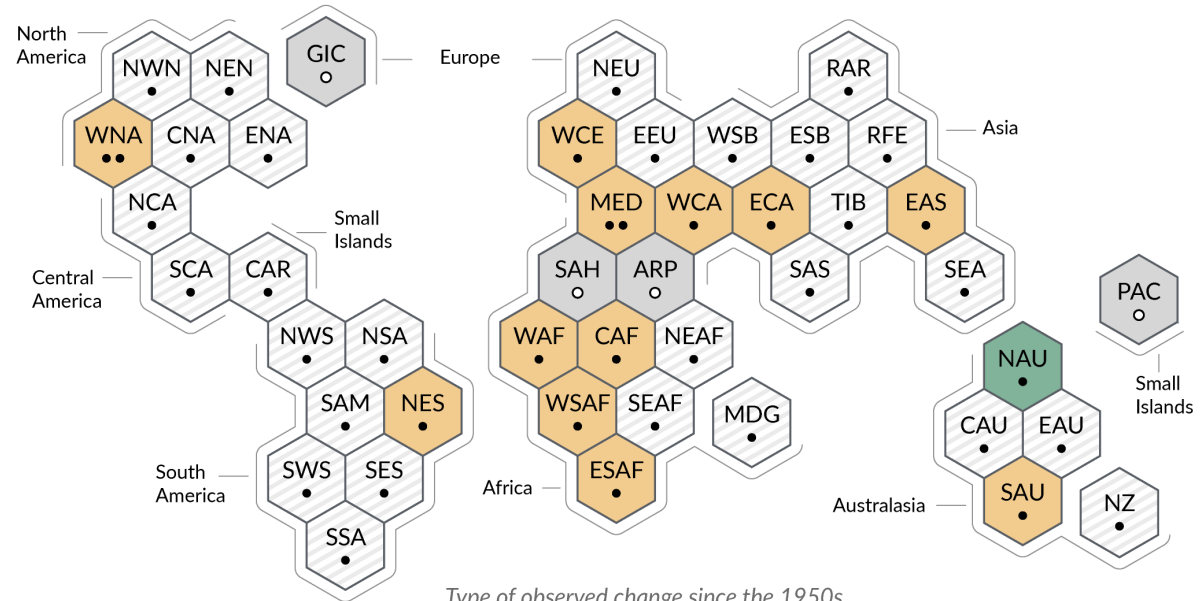
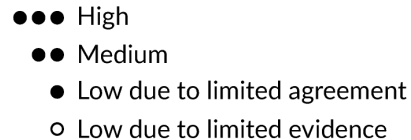
Figure SPM.3

Agricultural and ecological drought

Type of observed change in agricultural and ecological drought



Confidence in human contribution to the observed change

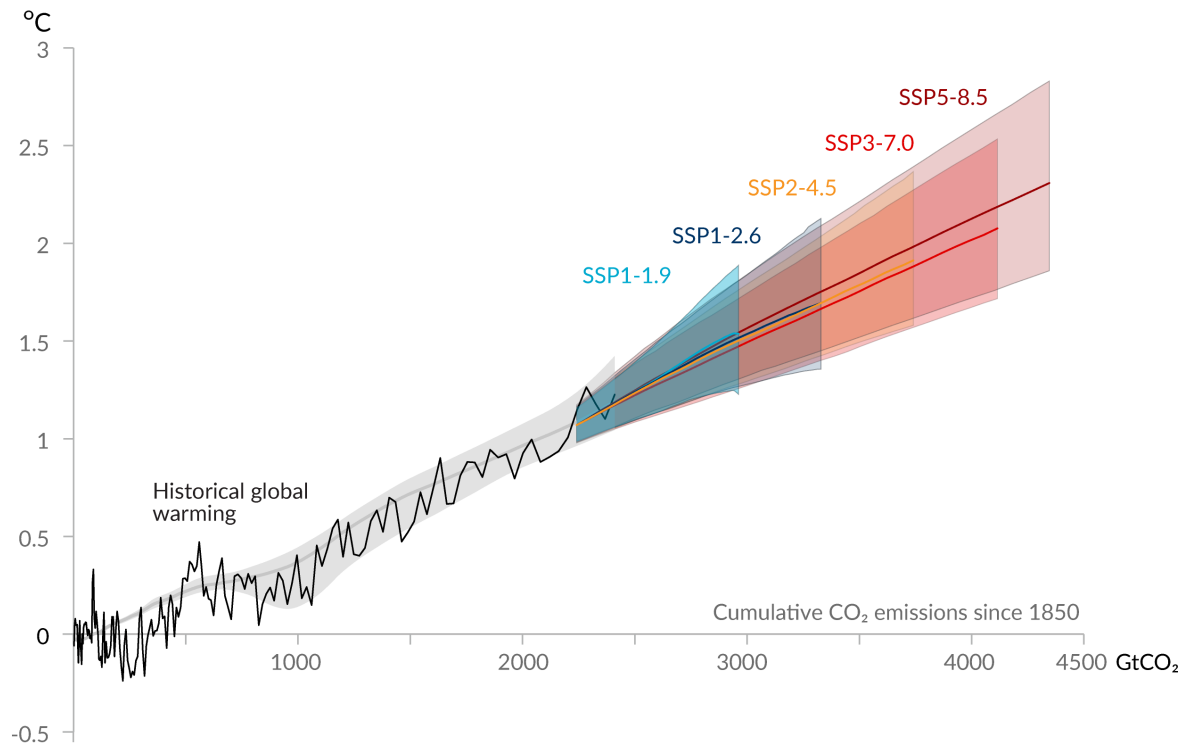


Type of observed change since the 1950s

Every tonne of CO₂ emissions adds to global warming

Figure SPM.10

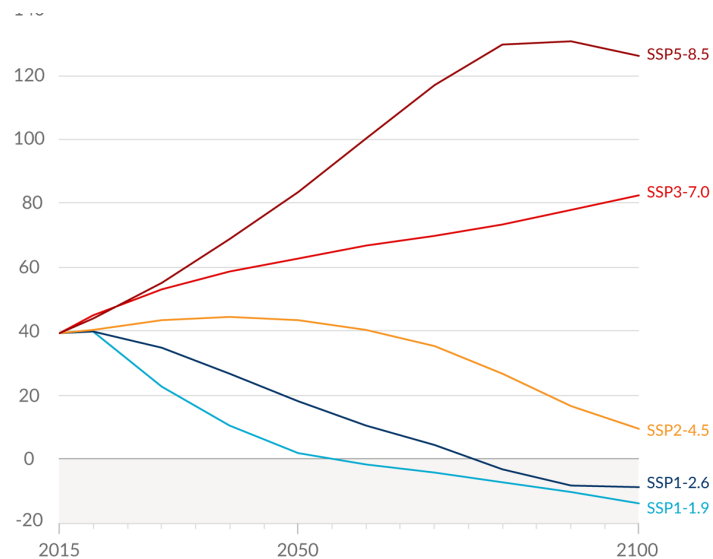
Linearity of global temperature increase to cumulative emissions of CO₂



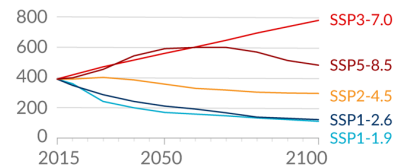
Future emissions scenarios

Figure SPM.4

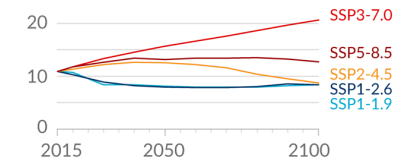
Carbon Dioxide (Gt/yr)



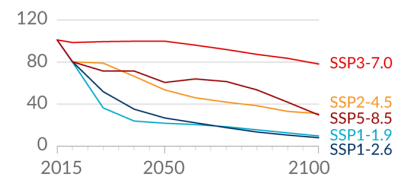
Methane



Nitrogen Dioxide



One air pollutant and contributor to aerosols



Sulphur Dioxide

Figure SPM.8

Global surface temperature change relative to 1850-1900

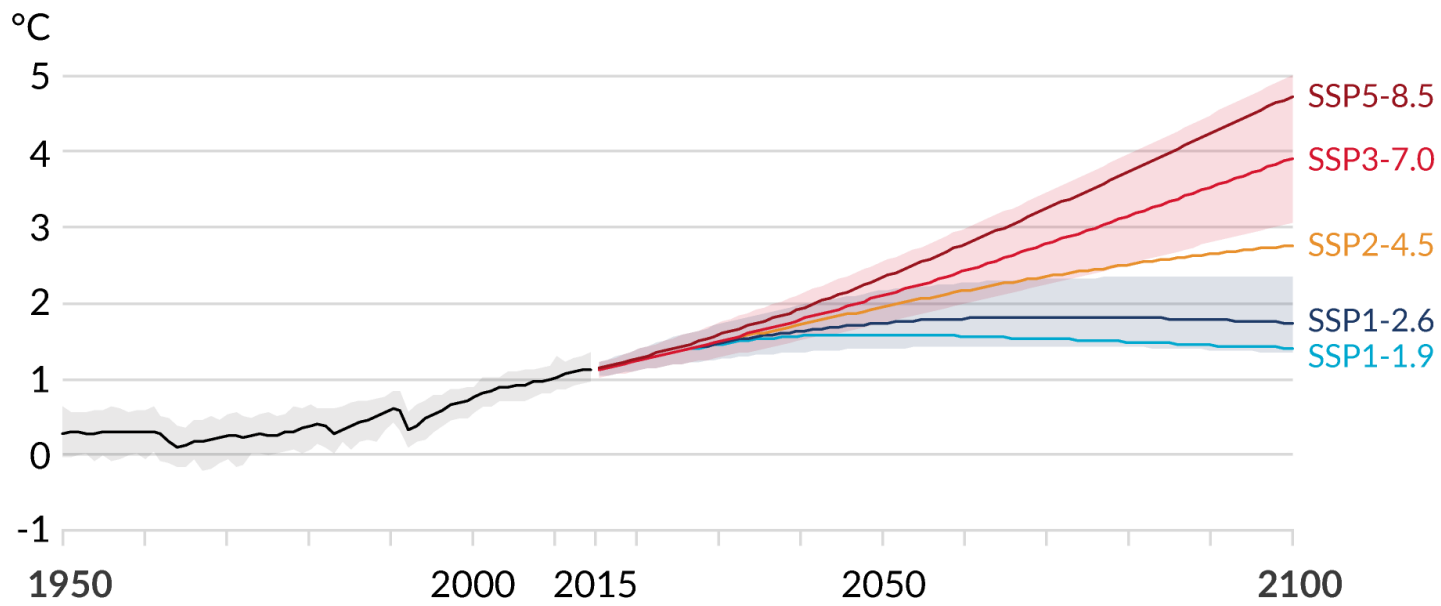


Figure SPM.8

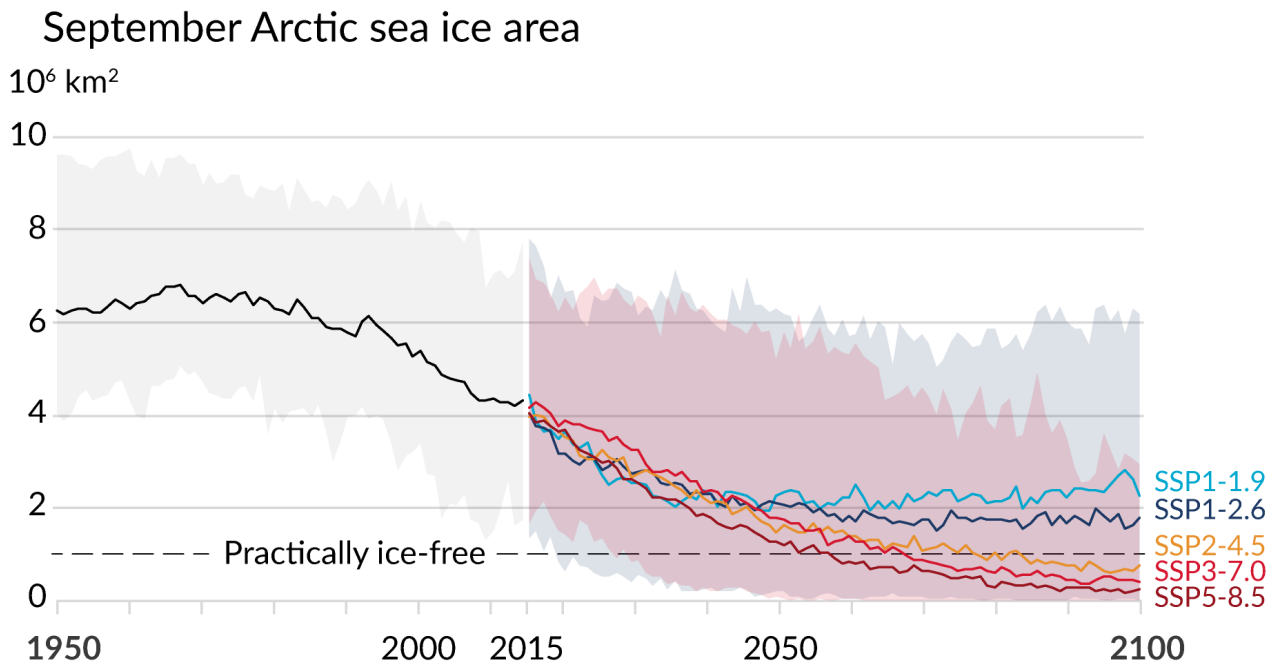
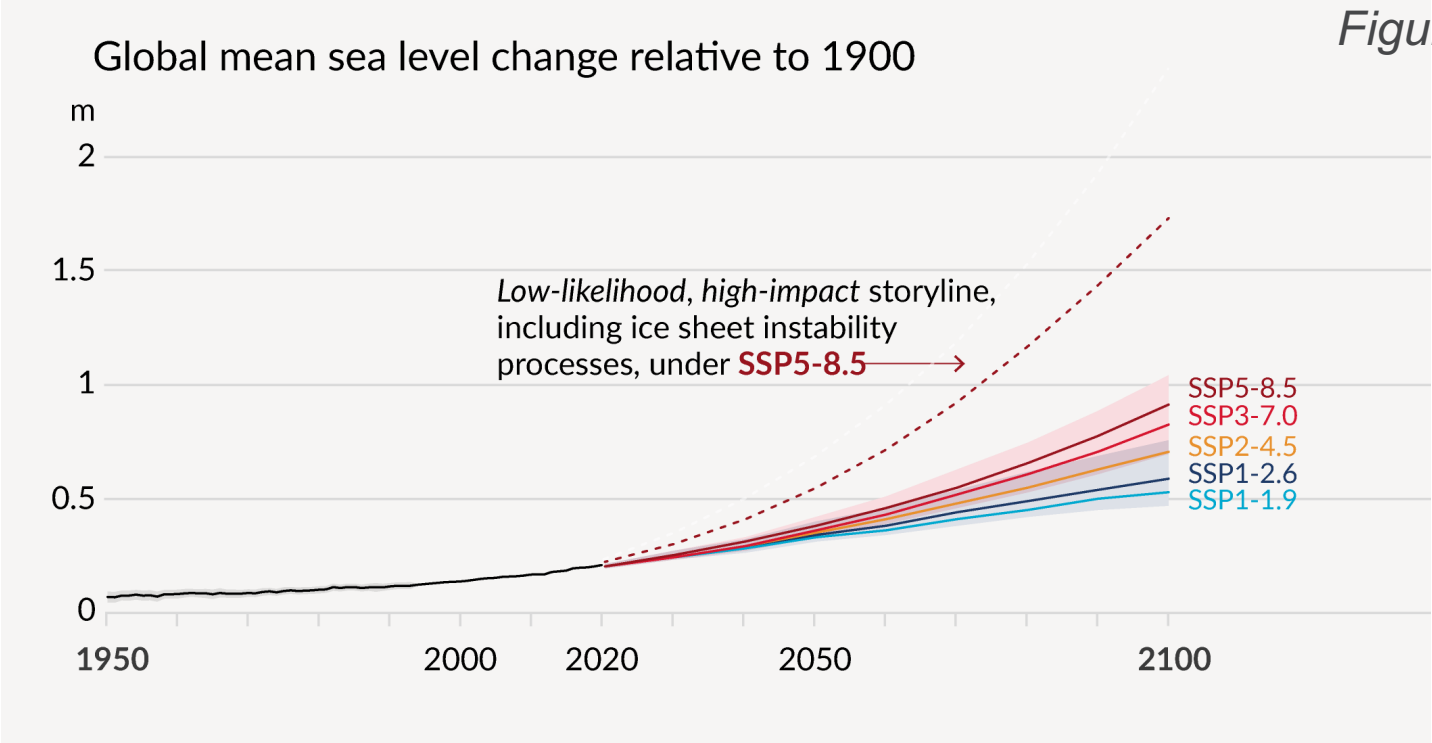
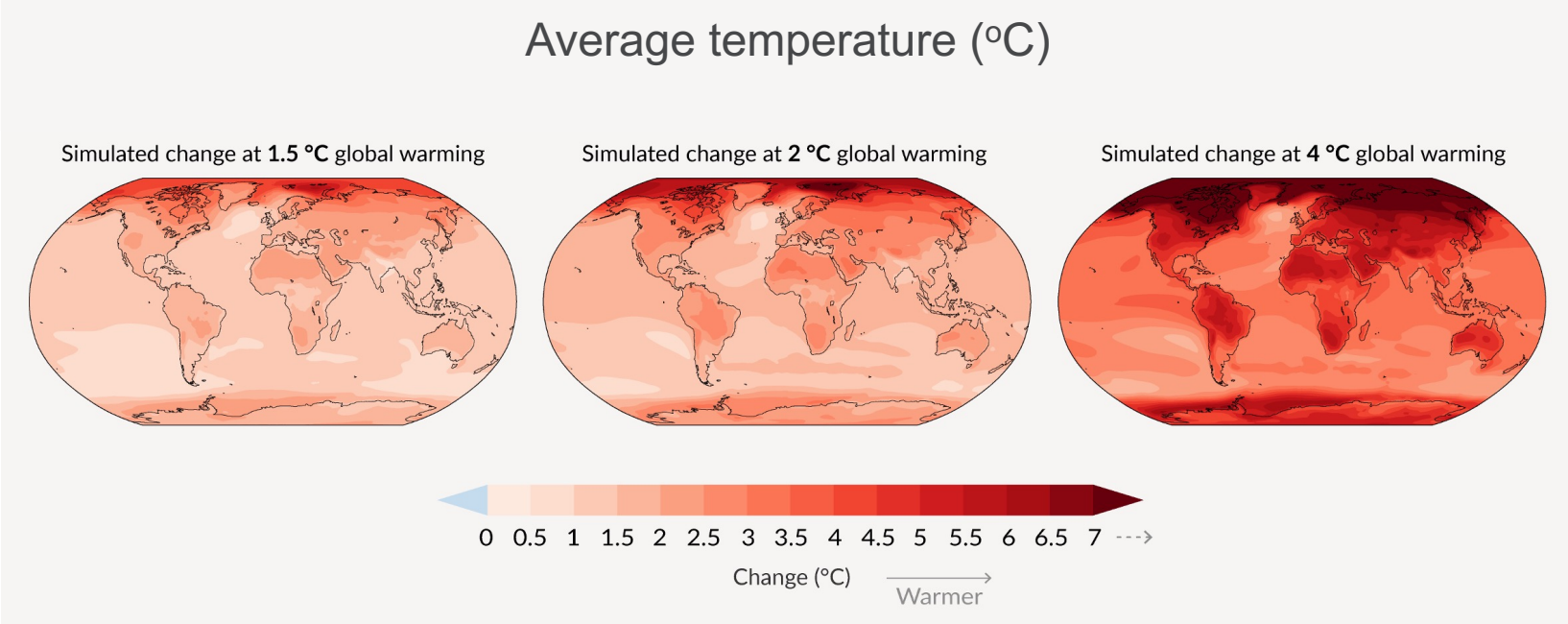


Figure SPM.8



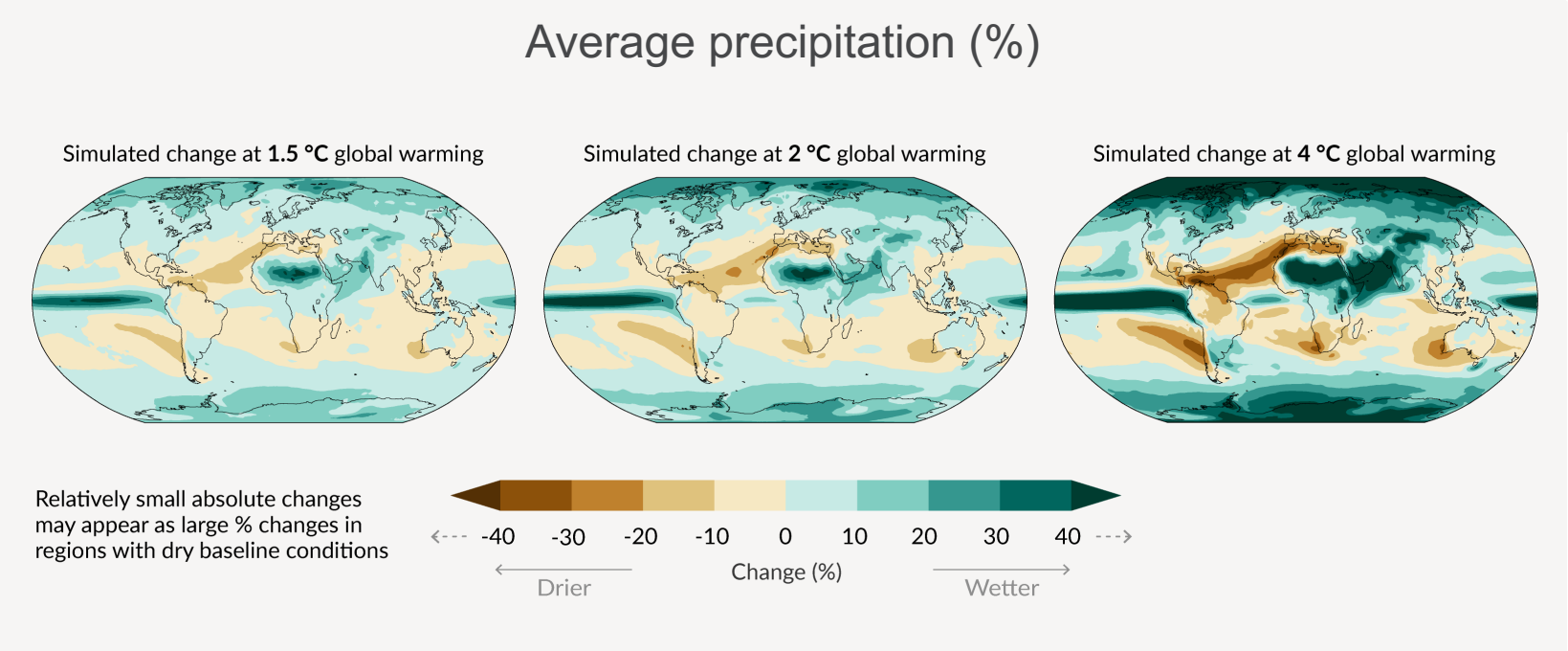
With every increment of global warming, changes get larger in many quantities driving impacts

Figure SPM.5



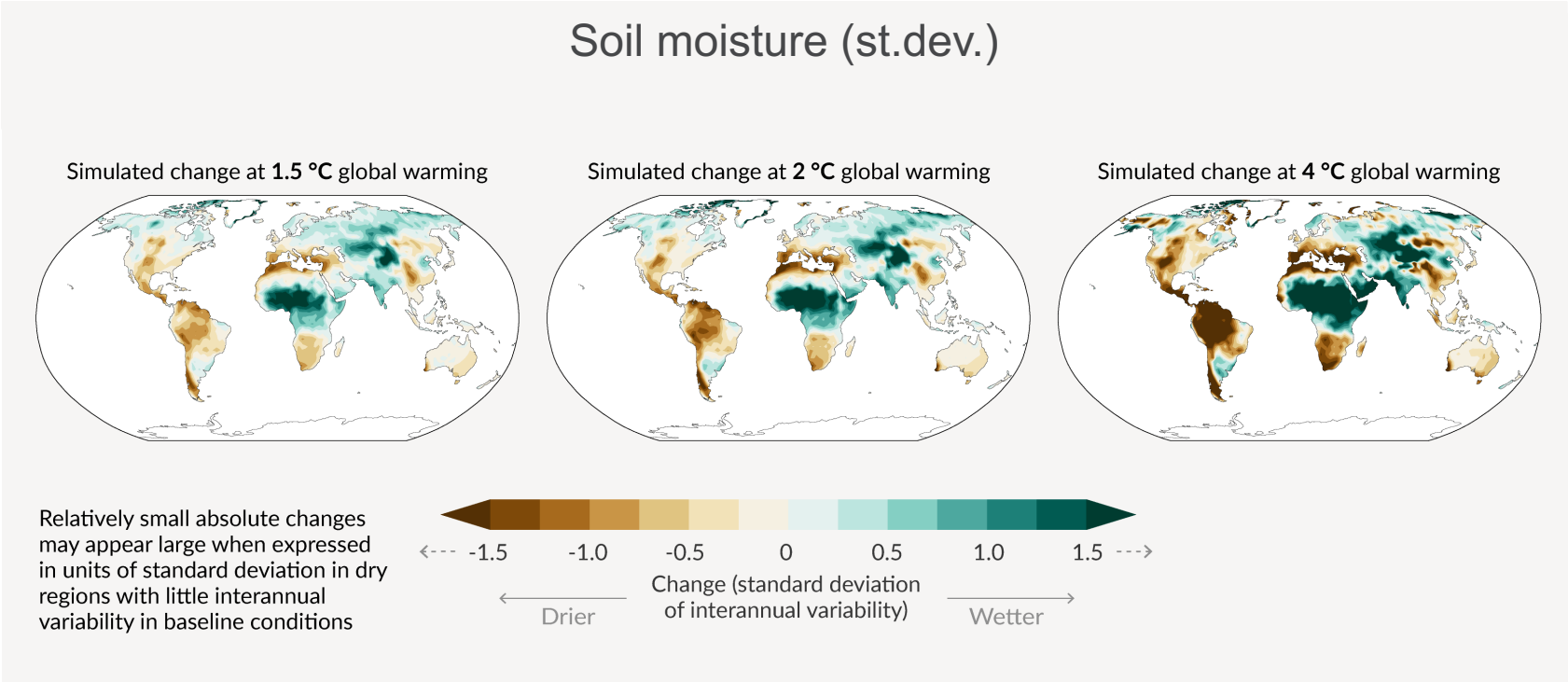
With every increment of global warming, changes get larger in many quantities driving impacts

Figure SPM.5



With every increment of global warming, changes get larger in many quantities driving impacts

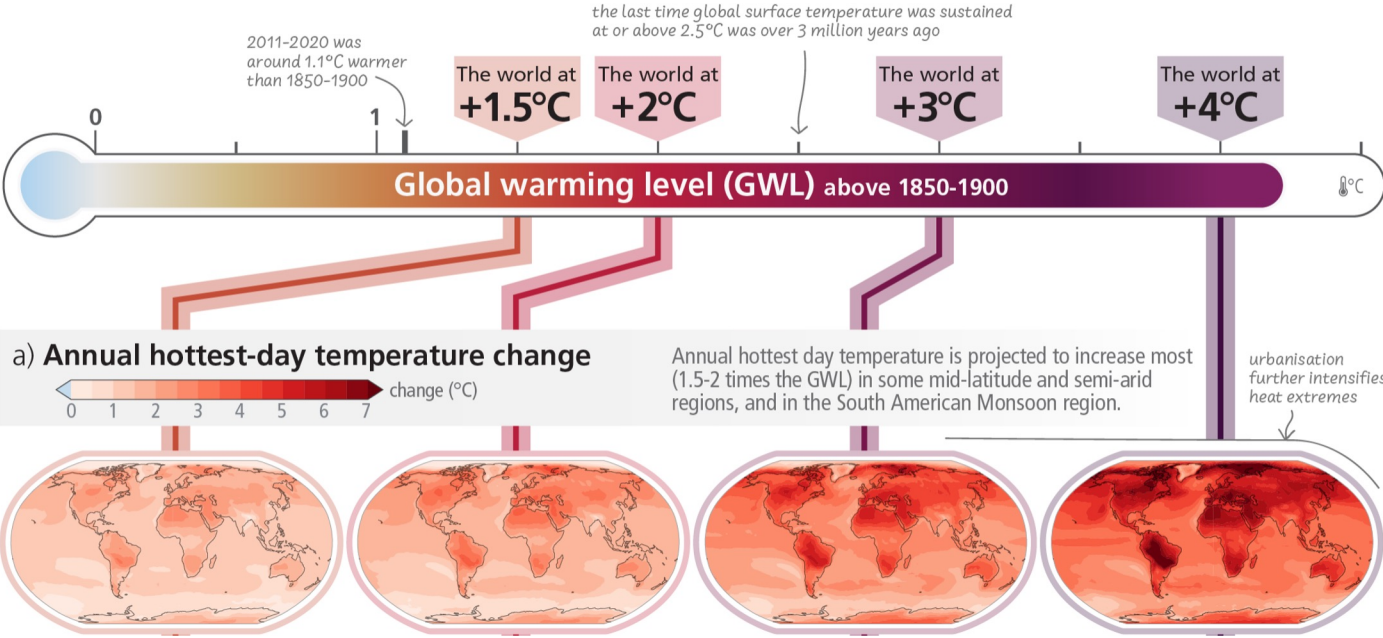
Figure SPM.5



Projected changes in extremes are larger in frequency and intensity with every additional increment of global warming

Figure SPM.2a of SYR

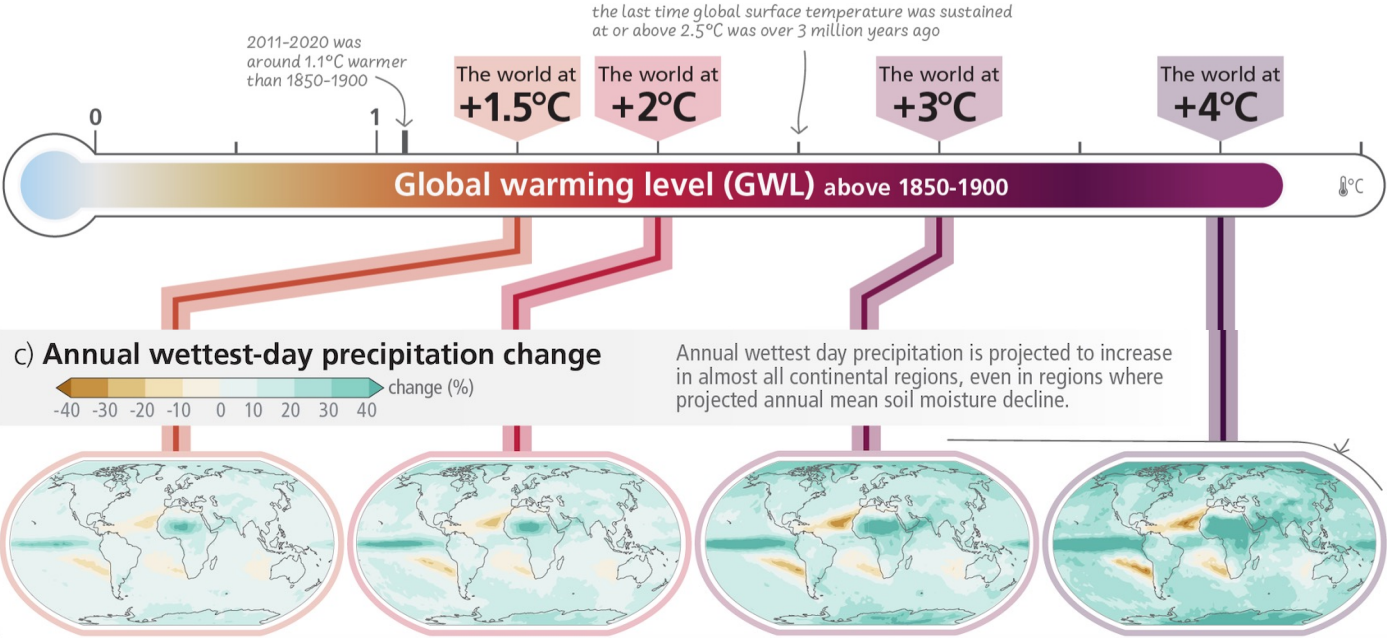
With every increment of global warming, regional changes in mean climate and extremes become more widespread and pronounced



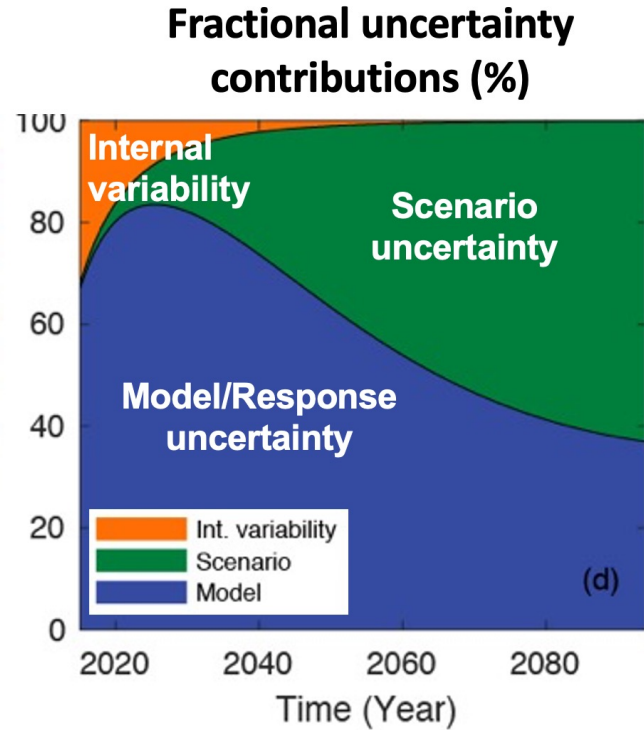
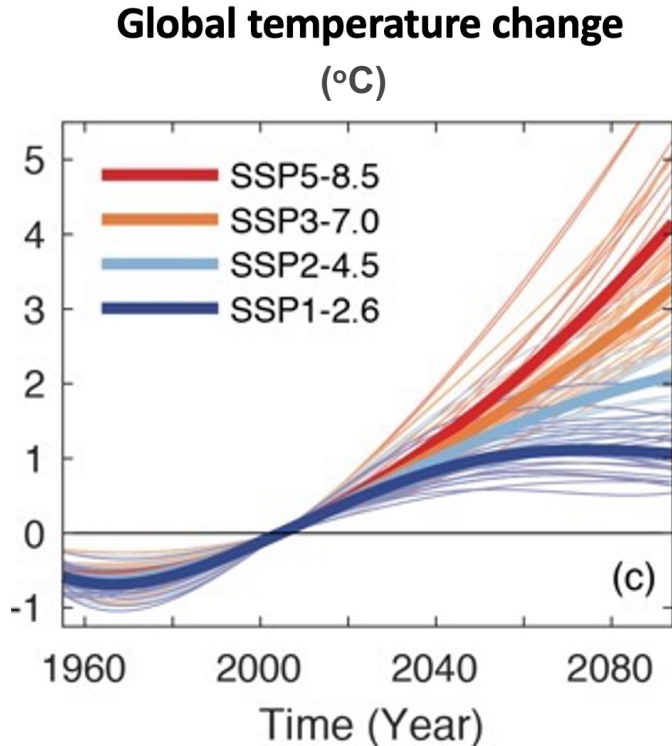
Projected changes in extremes are larger in frequency and intensity with every additional increment of global warming

Figure SPM.2a of SYR

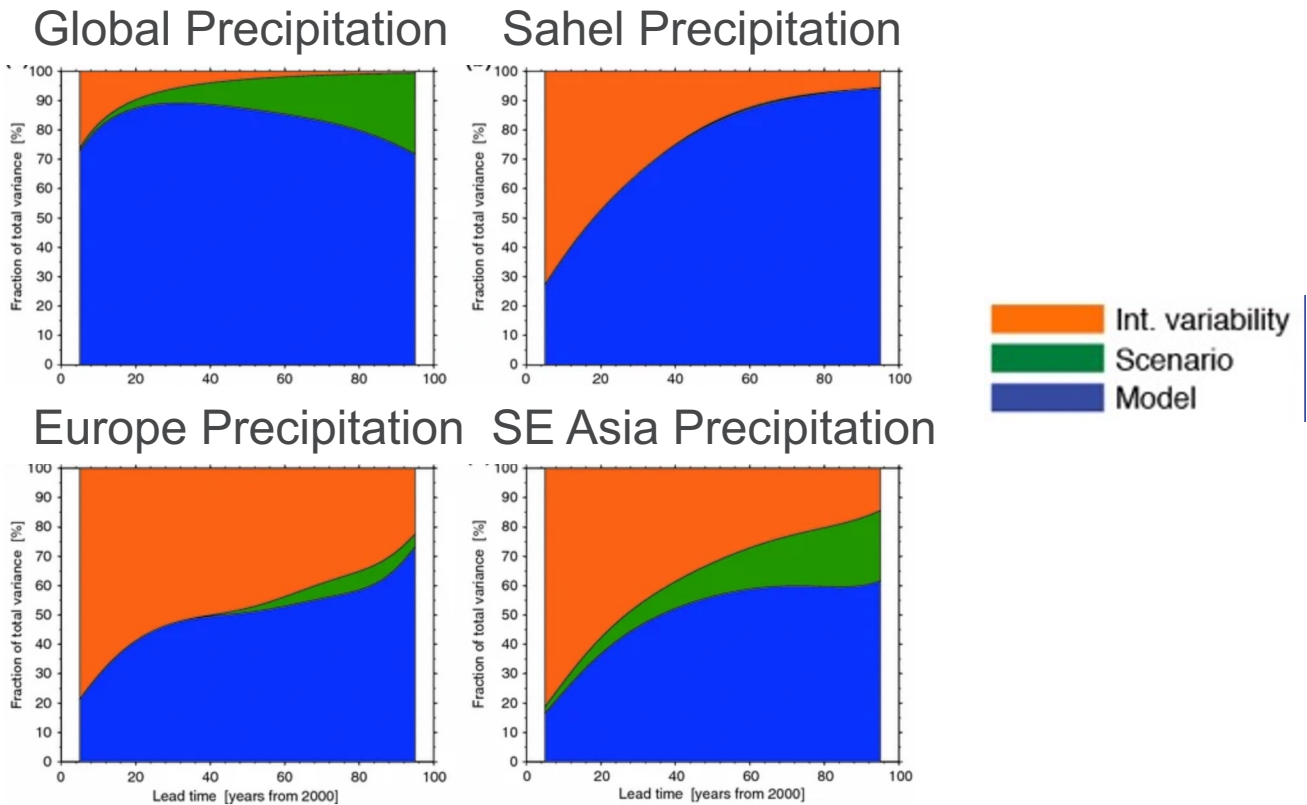
With every increment of global warming, regional changes in mean climate and extremes become more widespread and pronounced



A slide about uncertainty



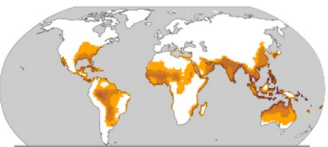
A slide about uncertainty



Projected risks and impacts of climate change on natural and human systems, at different global warming levels

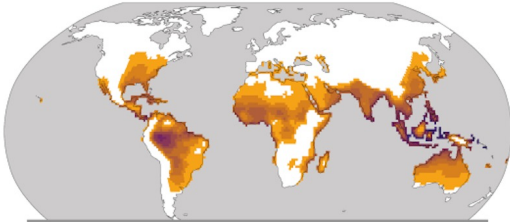


Heat-humidity risks to human health

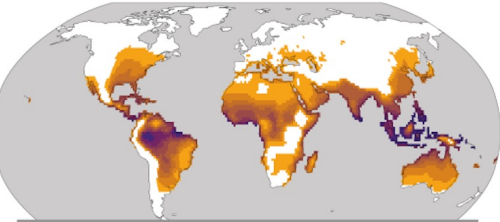


Historical 1991–2005

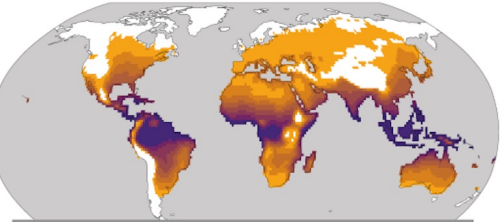
Days per year where combined temperature and humidity conditions pose a risk of mortality to individuals³



1.7 – 2.3°C



2.4 – 3.1°C



4.2 – 5.4°C

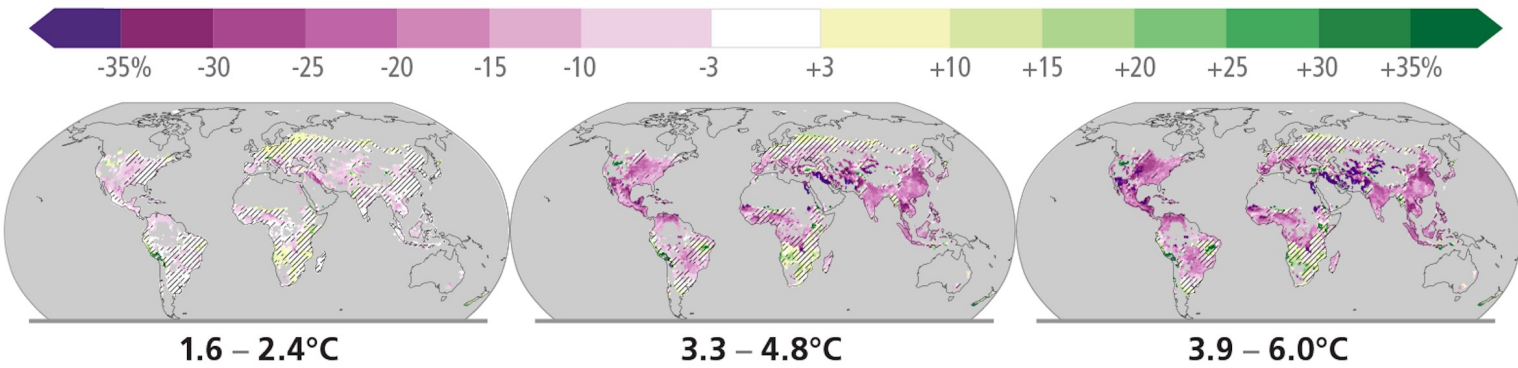
³Projected regional impacts utilize a global threshold beyond which daily mean surface air temperature and relative humidity may induce hyperthermia that poses a risk of mortality. The duration and intensity of heatwaves are not presented here. Heat-related health outcomes vary by location and are highly moderated by socio-economic, occupational and other non-climatic determinants of individual health and socio-economic vulnerability. The threshold used in these maps is based on a single study that synthesized data from 783 cases to determine the relationship between heat-humidity conditions and mortality drawn largely from observations in temperate climates.

Projected risks and impacts of climate change on natural and human systems, at different global warming levels

Food production impacts



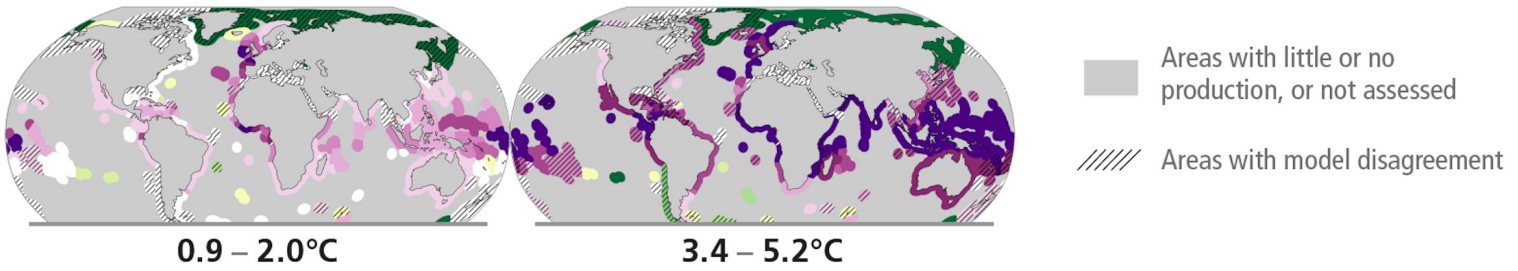
Maize yield⁴ Changes (%) in yield



⁴Projected regional impacts reflect biophysical responses to changing temperature, precipitation, solar radiation, humidity, wind, and CO₂ enhancement of growth and water retention in currently cultivated areas. Models assume that irrigated areas are not water-limited. Models do not represent pests, diseases, future agro-technological changes and some extreme climate responses.



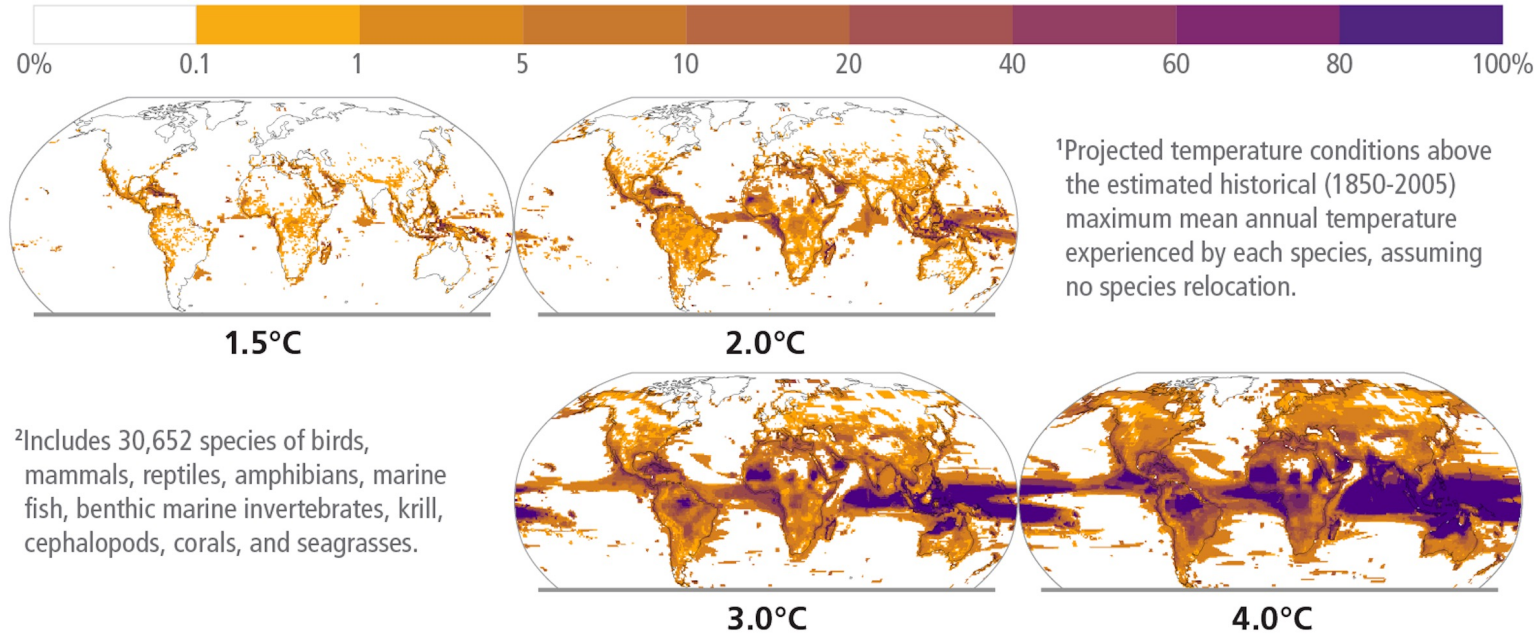
Fisheries yield⁵ Changes (%) in maximum catch potential



Projected risks and impacts of climate change on natural and human systems, at different global warming levels



Percentage of animal species and seagrasses exposed to potentially dangerous temperature conditions^{1, 2}

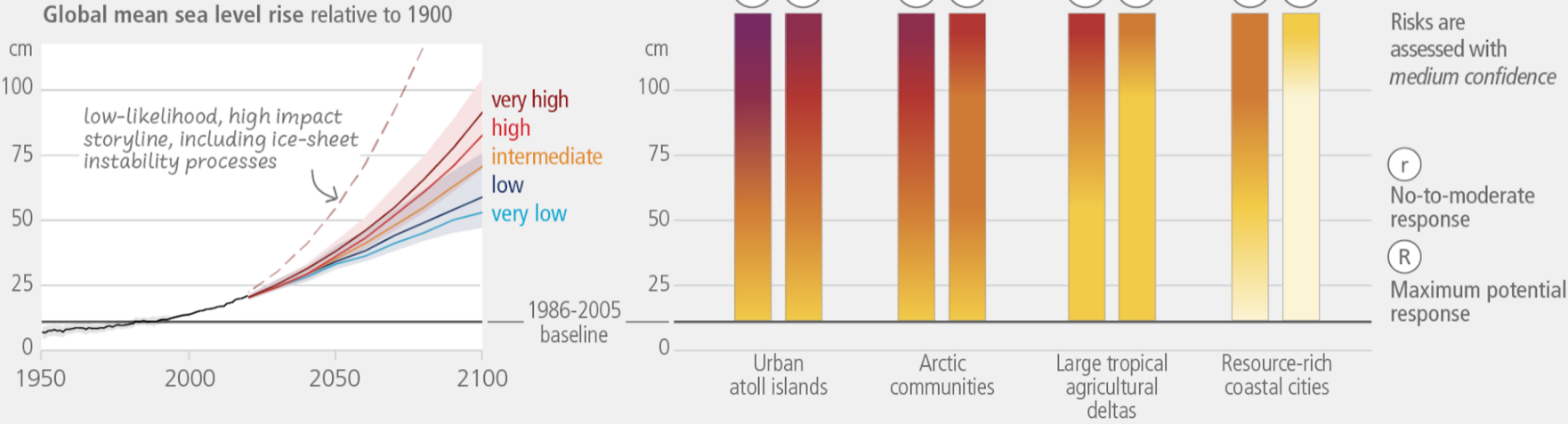


¹Projected temperature conditions above the estimated historical (1850-2005) maximum mean annual temperature experienced by each species, assuming no species relocation.

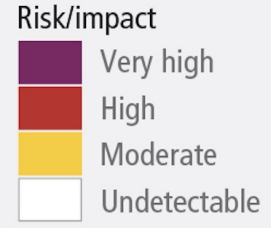
²Includes 30,652 species of birds, mammals, reptiles, amphibians, marine fish, benthic marine invertebrates, krill, cephalopods, corals, and seagrasses.

Considering socio-economic pathways and adaptation responses

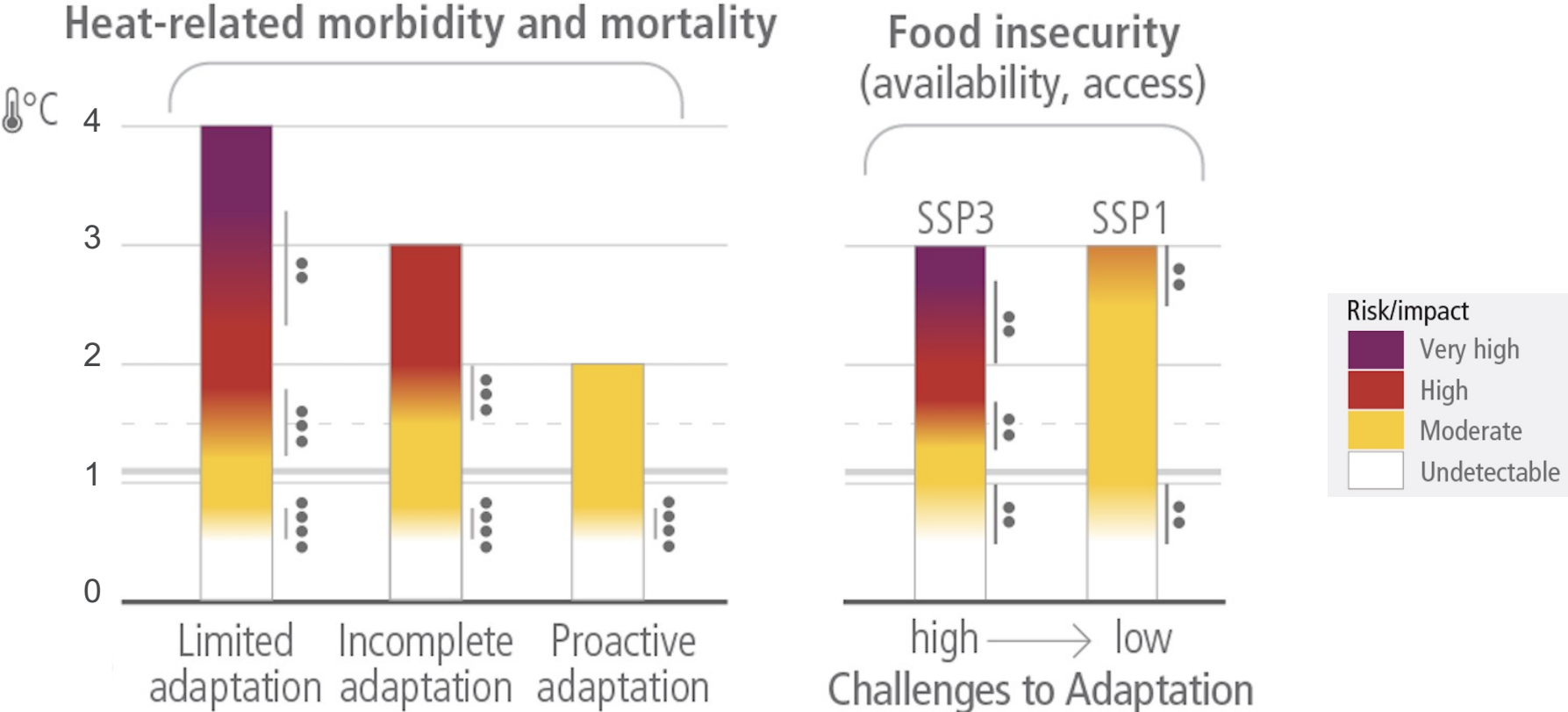
Risks to coastal geographies increase with sea level rise and depend on responses



SYR Figure SPM.4c



Considering socio-economic pathways and adaptation responses



SYR Figure SPM.4c

Thank you

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