

SIXTH ASSESSMENT REPORT

Working Group I – The Physical Science Basis

11 June, 2022

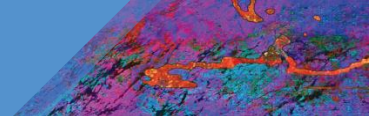
Roundtable Santiago

IPCC WGI contributions to quantifying climate impact and risk

Gregory M. Flato, Vice Chair, IPCC Working Group I,
CANADA

#ClimateReport #IPCC



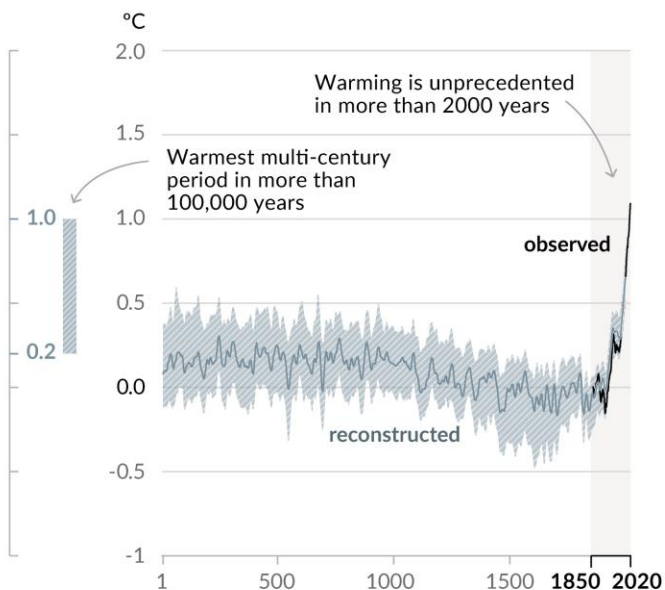


Human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years

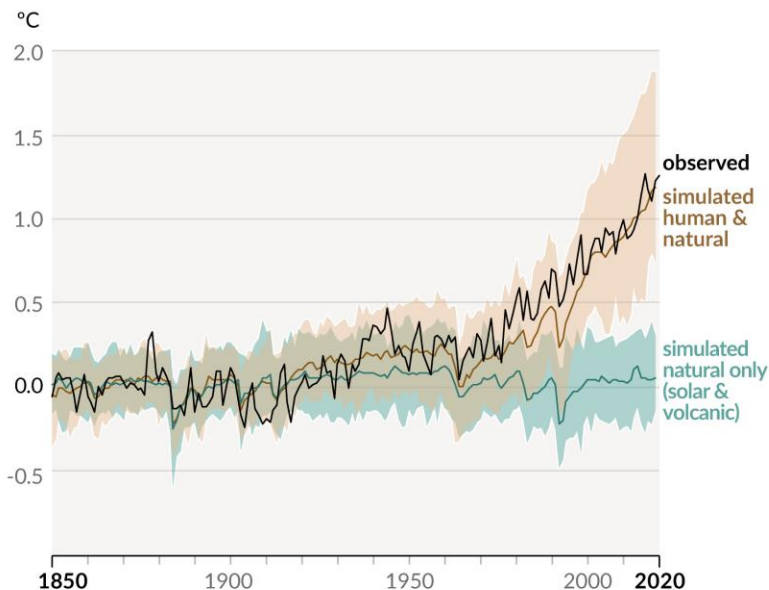
Figure SPM.1

Changes in global surface temperature relative to 1850-1900

a) Change in global surface temperature (decadal average) as reconstructed (1-2000) and observed (1850-2020)



b) Change in global surface temperature (annual average) as observed and simulated using human & natural and only natural factors (both 1850-2020)

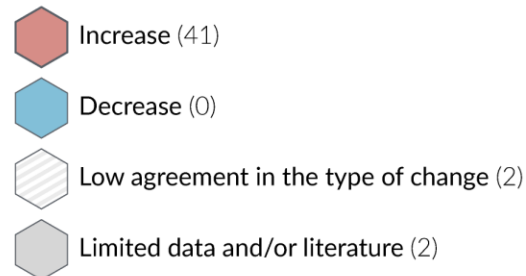


Climate change is already affecting every inhabited region across the globe, with human influence contributing to many observed changes in weather and climate extremes

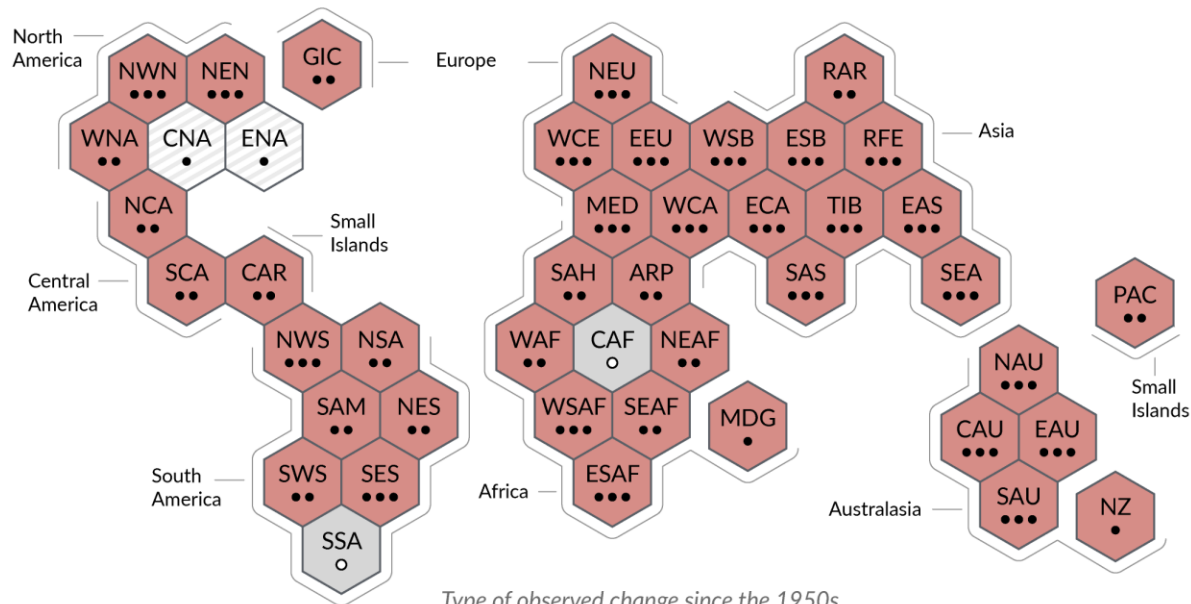
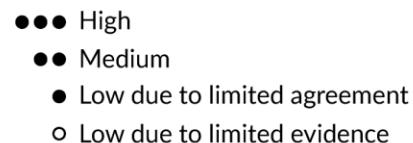
Figure SPM.3

a) Synthesis of assessment of observed change in **hot extremes** and confidence in human contribution to the observed changes in the world's regions

Type of observed change in hot extremes



Confidence in human contribution to the observed change

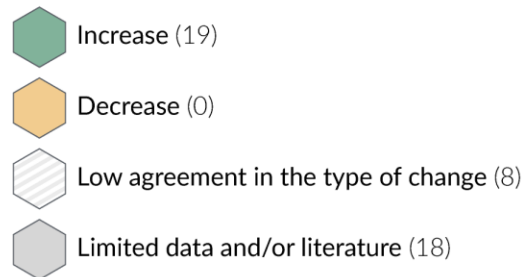


Climate change is already affecting every inhabited region across the globe, with human influence contributing to many observed changes in weather and climate extremes

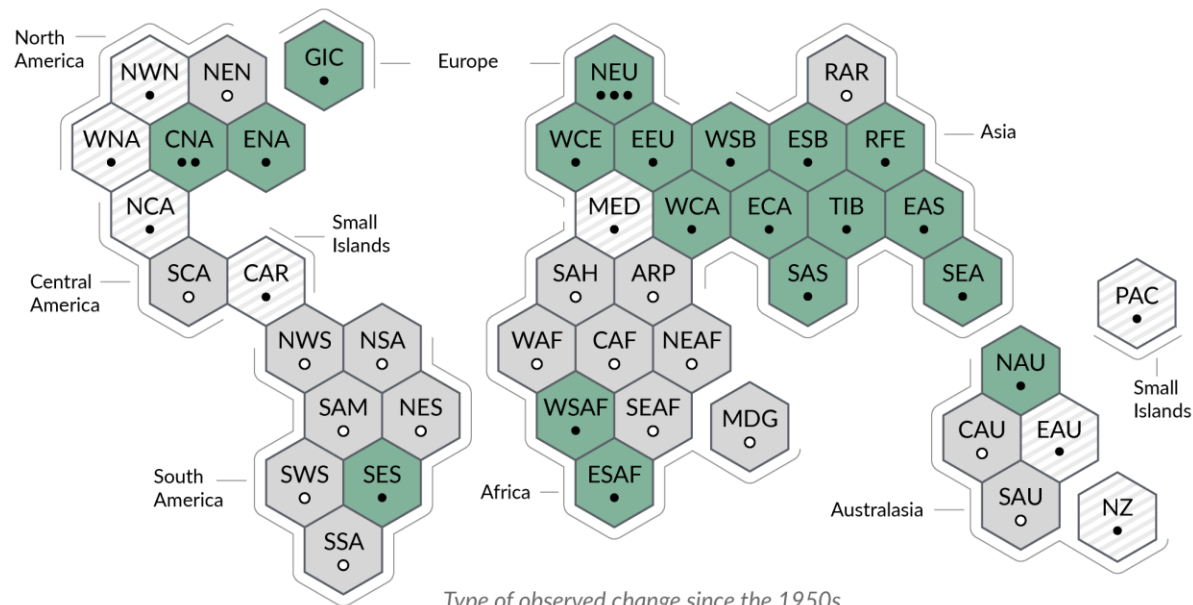
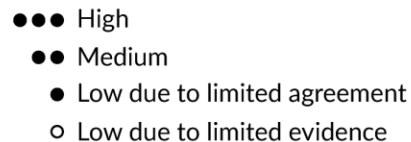
Figure SPM.3

b) Synthesis of assessment of observed change in **heavy precipitation** and confidence in human contribution to the observed changes in the world's regions

Type of observed change in heavy precipitation



Confidence in human contribution to the observed change



Type of observed change since the 1950s

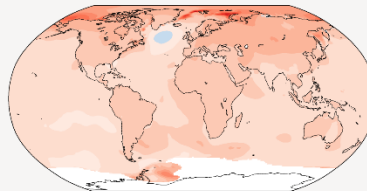
With every increment of global warming, changes get larger in regional mean temperature, precipitation and soil moisture

Figure SPM.5

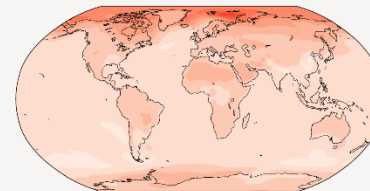
a) Annual mean temperature change (°C) at 1 °C global warming

Warming at 1 °C affects all continents and is generally larger over land than over the oceans in both observations and models. Across most regions, observed and simulated patterns are consistent.

Observed change per 1 °C global warming



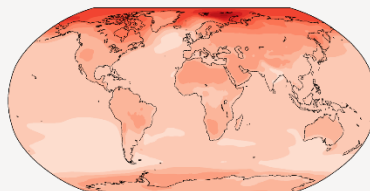
Simulated change at 1 °C global warming



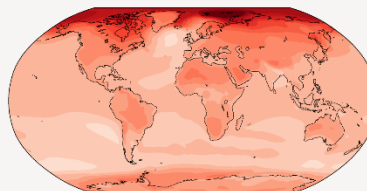
b) Annual mean temperature change (°C) relative to 1850-1900

Across warming levels, land areas warm more than oceans, and the Arctic and Antarctica warm more than the tropics.

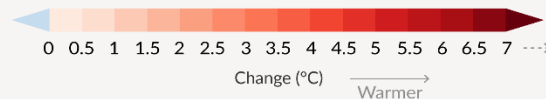
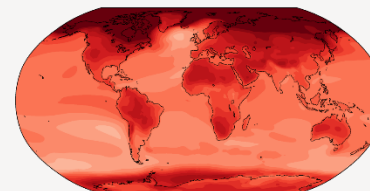
Simulated change at 1.5 °C global warming



Simulated change at 2 °C global warming



Simulated change at 4 °C global warming



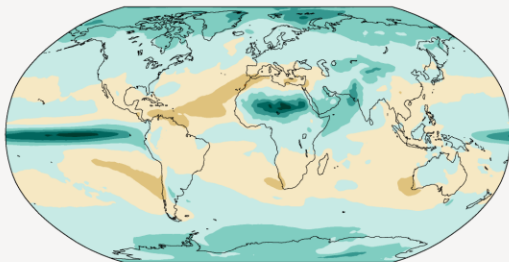
With every increment of global warming, changes get larger in regional mean temperature, precipitation and soil moisture

Figure SPM.5

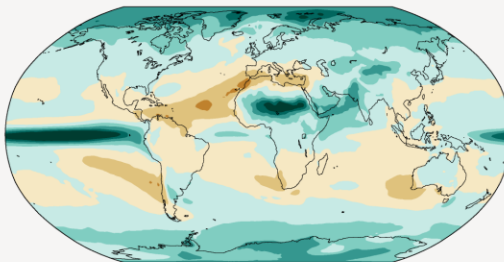
c) Annual mean precipitation change (%) relative to 1850-1900

Precipitation is projected to increase over high latitudes, the equatorial Pacific and parts of the monsoon regions, but decrease over parts of the subtropics and in limited areas of the tropics.

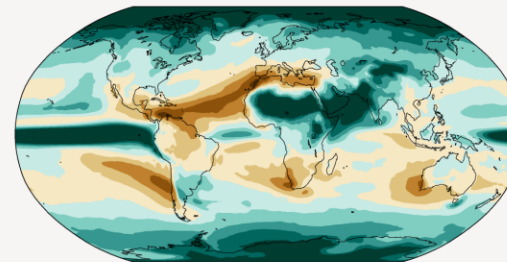
Simulated change at 1.5 °C global warming



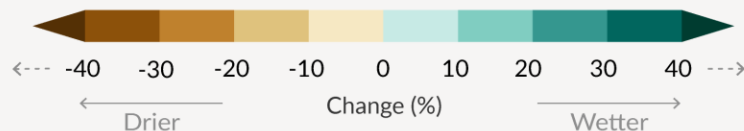
Simulated change at 2 °C global warming

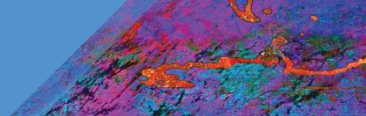


Simulated change at 4 °C global warming



Relatively small absolute changes may appear as large % changes in regions with dry baseline conditions

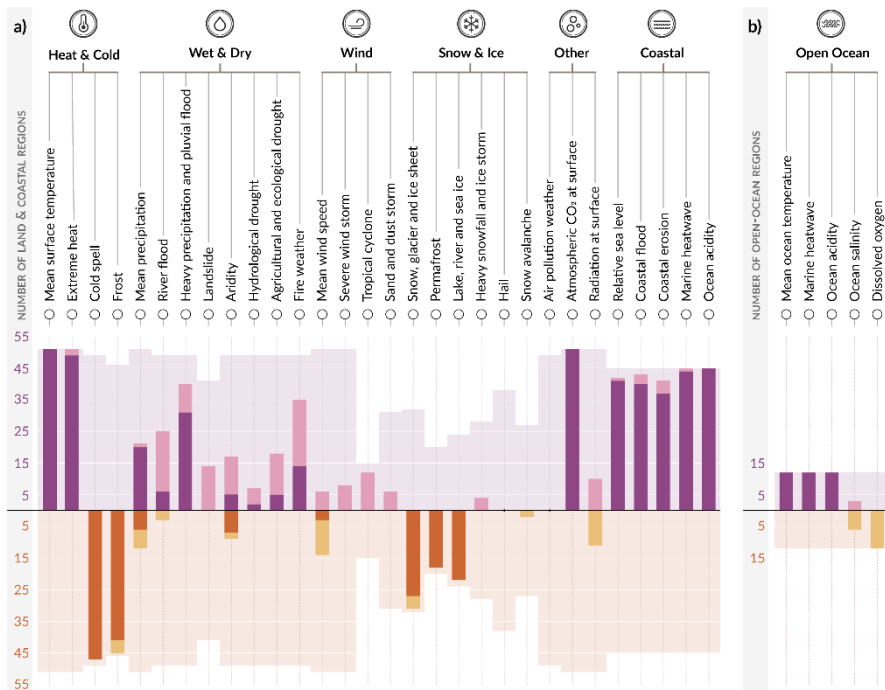




We refer to such changes as “climatic impact-drivers”. They feed directly into the quantification of risk assessed by WGII

Figure SPM.9

Number of land & coastal regions (a) and open-ocean regions (b) where each climatic impact-driver (CID) is projected to increase or decrease with high confidence (dark shade) or medium confidence (light shade)

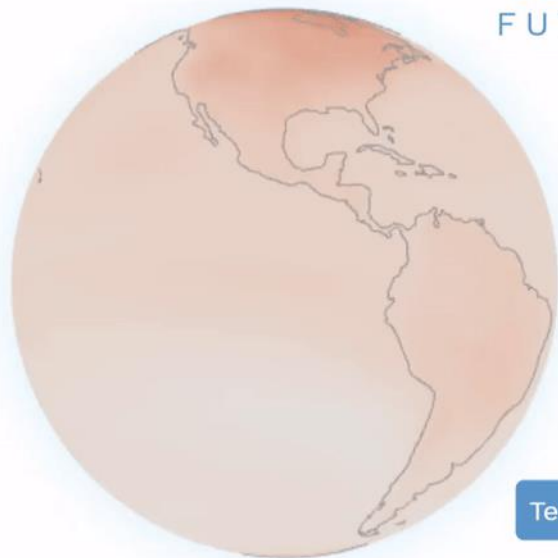


These climatic impact drivers cover a wide range of climate quantities, and they are changing everywhere.

They constitute ‘hazards’ that drive increasing risk, and lead to a range of losses and damages.

WGI has developed an open-access *Interactive Atlas* that provides a wealth of quantitative information – historical and future

OUR POSSIBLE
CLIMATE
FUTURES



+1.5°C

+2°C

+3°C

+4°C

Temperature

Precipitation



<https://interactive-atlas.ipcc.ch/>

#IPCCData

#IPCCAtlas

Though IPCC Assessments are rigorous and authoritative, there are other regularly-updated sources of physical climate information ...

