SIXTH ASSESSMENT REPORT
Working Group I – The Physical Science Basis

ipcc
INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP

Selected highlights from the IPCC 2021 WGI climate change physical science basis report

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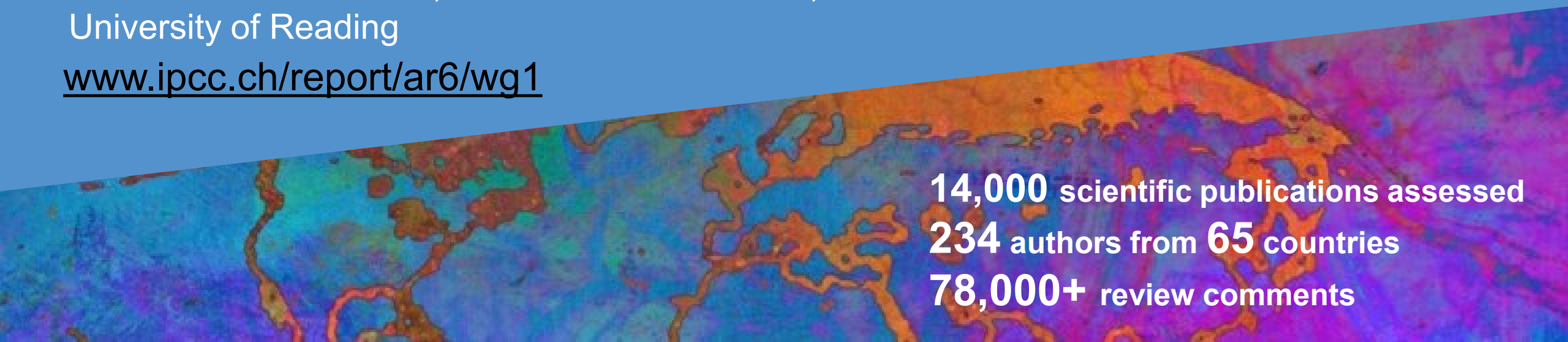
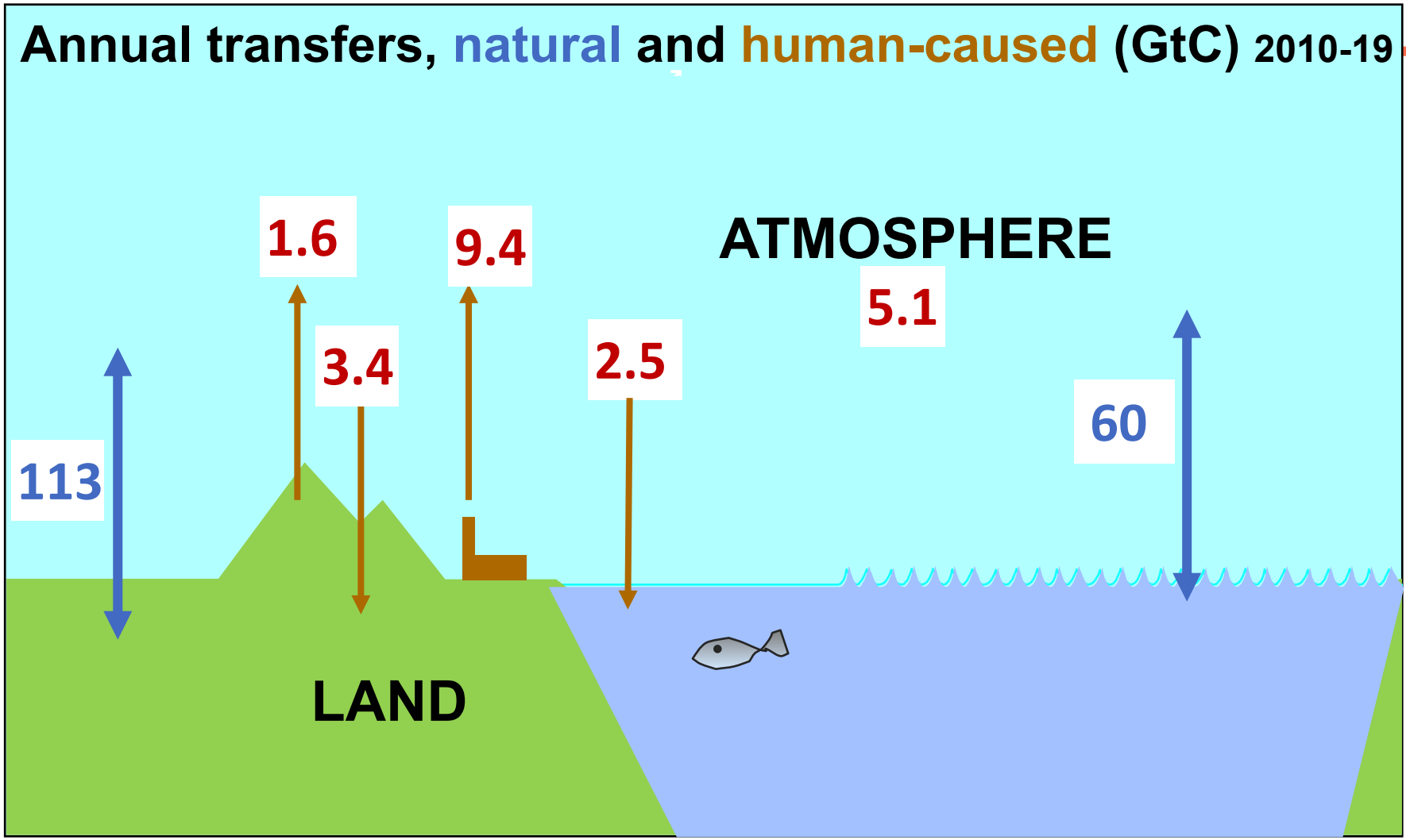
www.ipcc.ch/report/ar6/wg1



Key Messages (abridged)

- Earth's climate has always varied but it is an established fact that human activities are now driving climate change
- Recent changes in climate are widespread, rapid and unprecedented in thousands of years.
- Human activities are intensifying extreme climate events, including heat waves, heavy rainfall, and droughts
- Every bit of global warming increases the magnitude of climate change including the severity of climate extremes
- Limiting warming to 1.5°C requires immediate, rapid, and large-scale reductions in greenhouse gas emissions

Natural & human-influenced carbon cycle



- Human activities have tipped the natural carbon cycle out of balance
- This is driving increases in atmospheric CO_2 concentrations
- CO_2 concentrations highest in at least 2 million years

Values in billions of tonnes of Carbon per year from IPCC (2021) Ch5

It is indisputable that human activities are causing climate change

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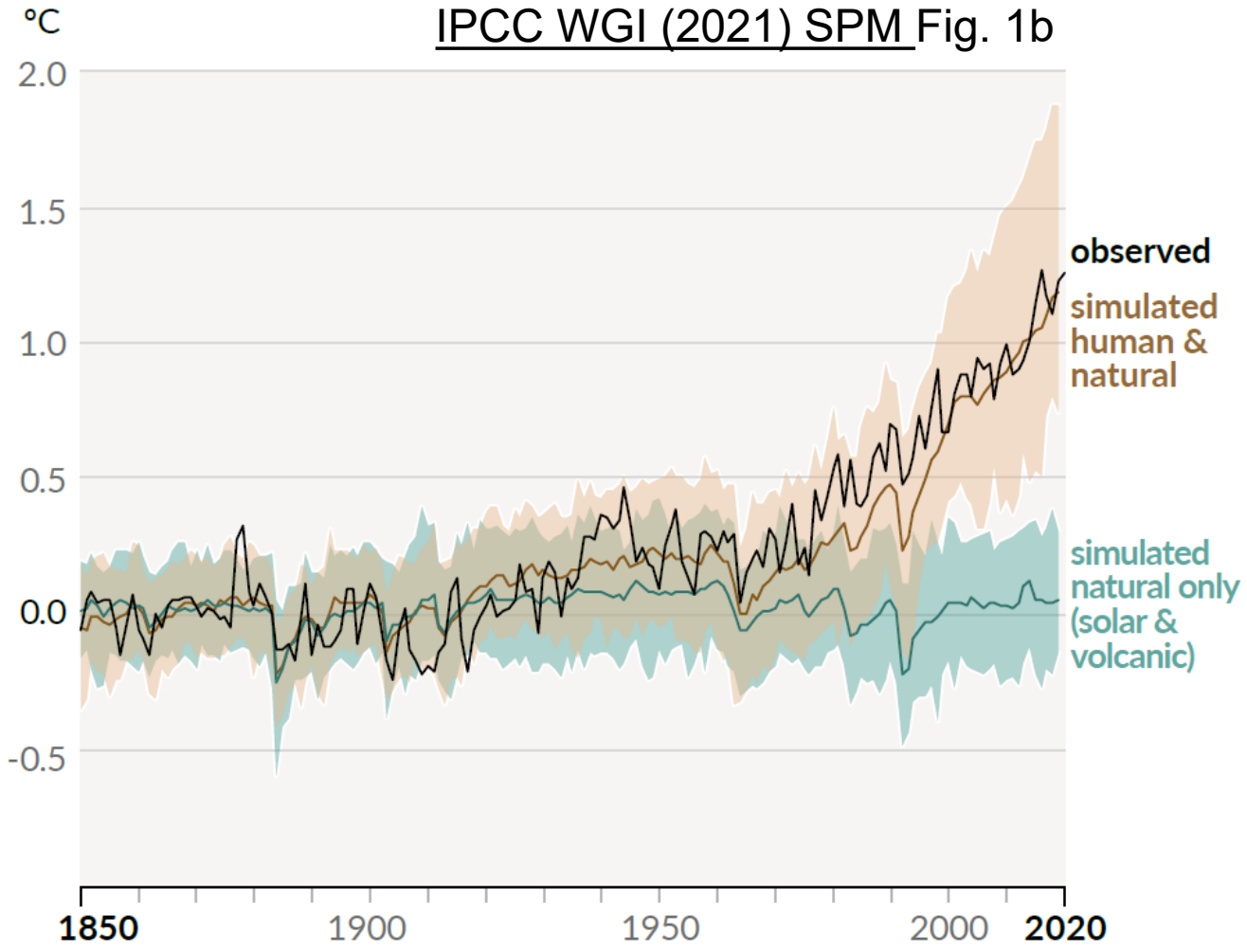
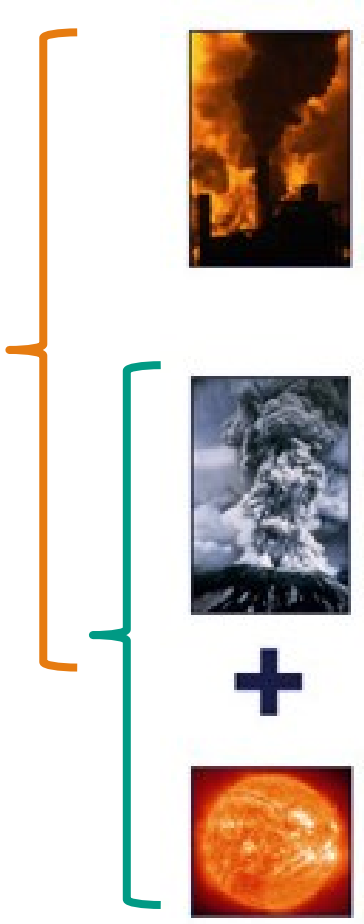
IPCC WGI (2021) SPM Fig. 1b





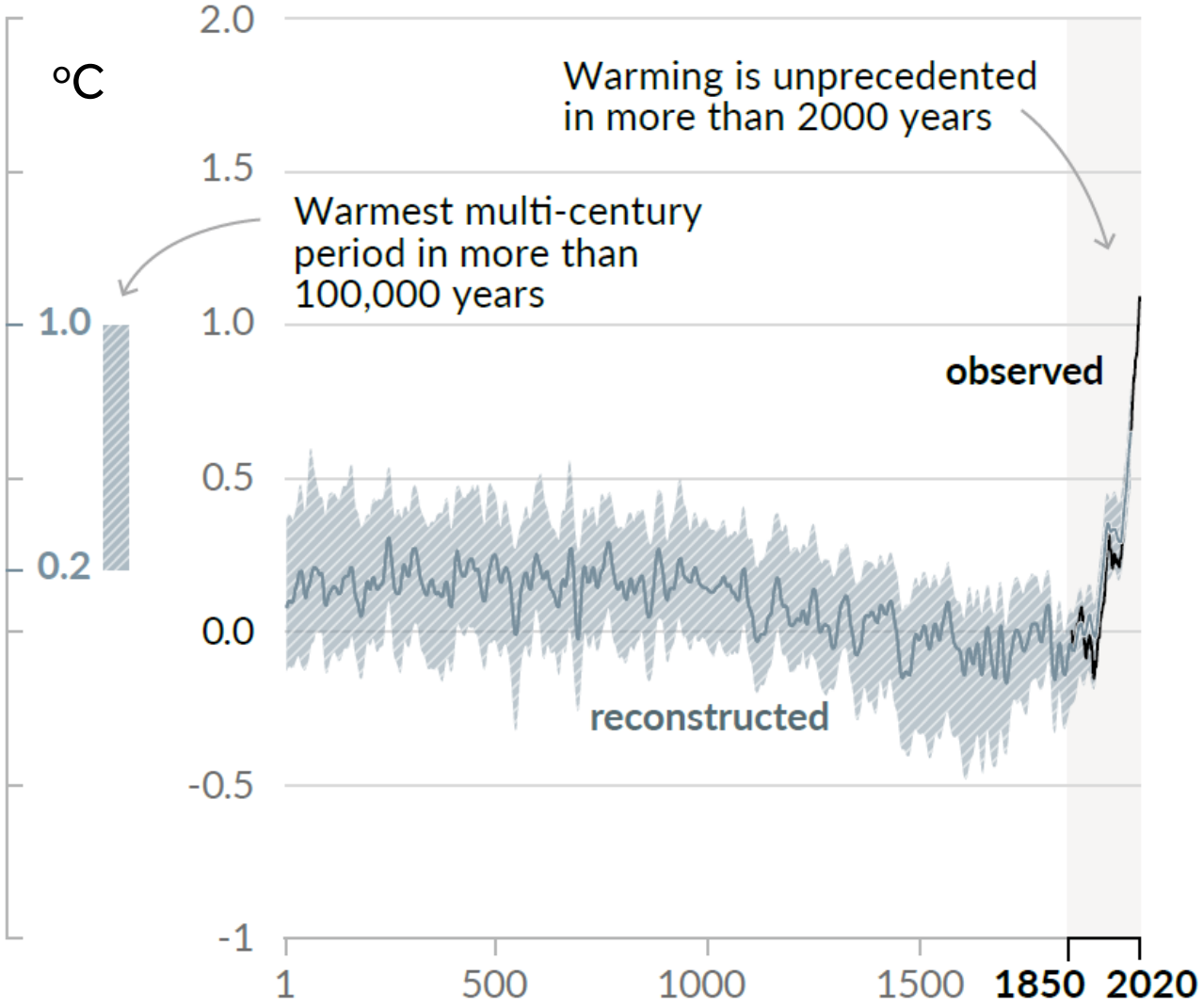
► Observed warming is driven by emissions from human activities

► Greenhouse gas warming has been partly masked by aerosol cooling

► Warming is amplified by feedback loops involving water vapour, ice & clouds

► Natural factors do not contribute to rapid warming over past 5 decades

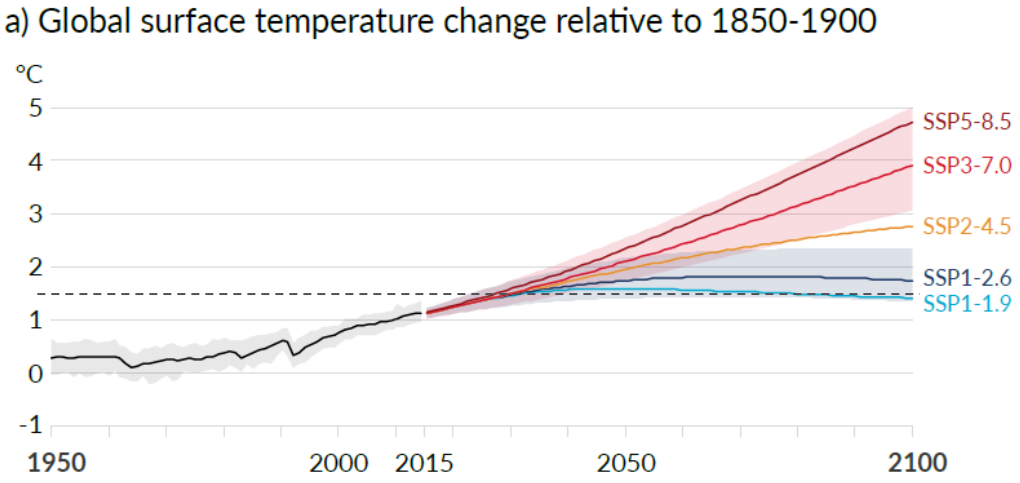
Recent changes in the climate are widespread, rapid and unprecedented in thousands of years



- Global mean surface temperature increased faster since 1970 than in any other 50 year period over at least the last 2000 years
- Warmth of past decade comparable to last interglacial 125,000 years ago *[when peak sea level was 5-10m higher than today]*

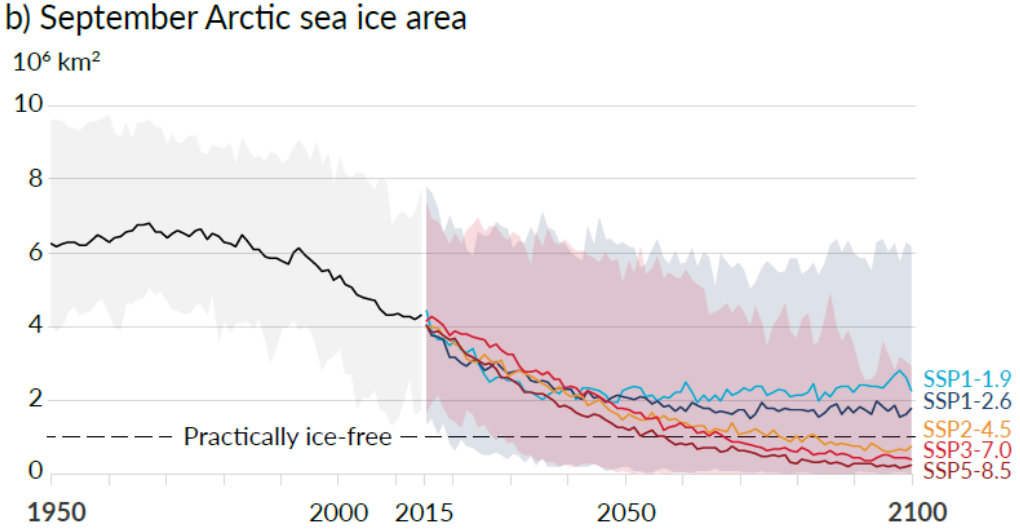
[IPCC WGI 2021 SPM]

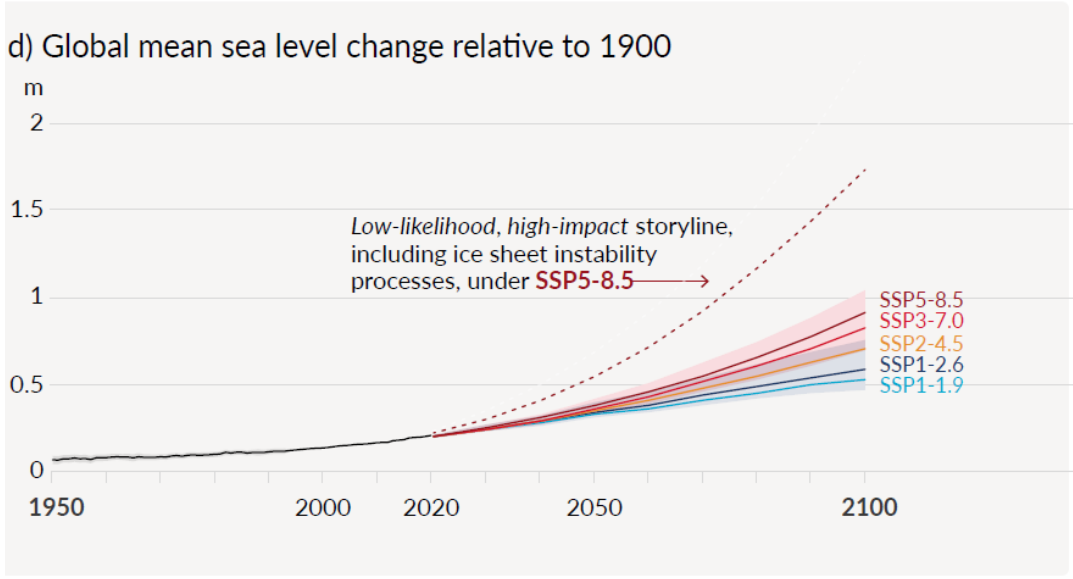
Some changes in the climate system are irreversible but many changes can be slowed or stopped by limiting warming

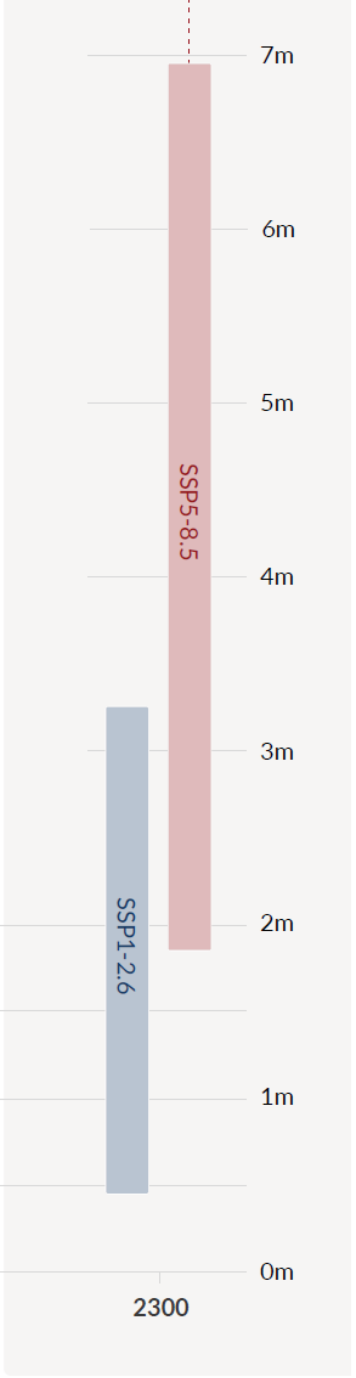


Global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO_2 and other greenhouse gas emissions occur in the coming decades
[IPCC (2021) WG1 SPM]

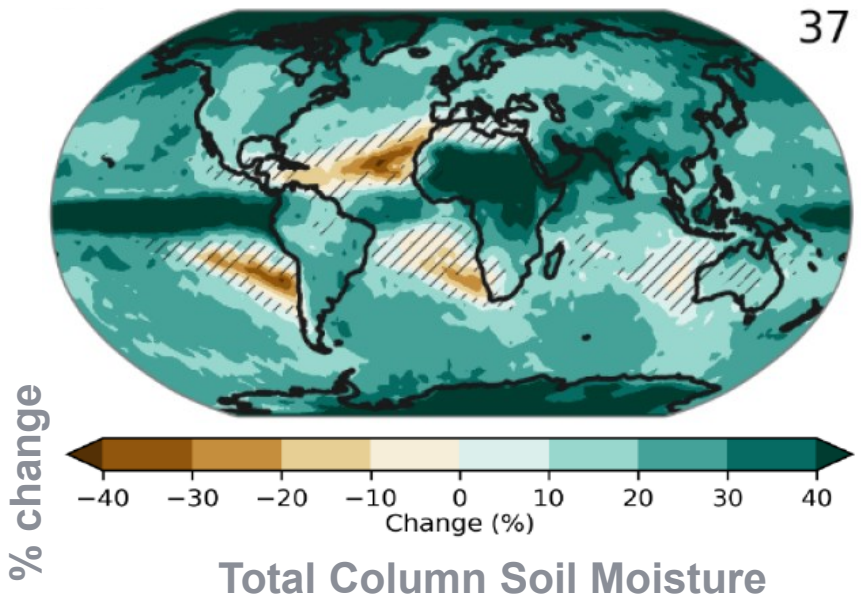
High emissions
Low emissions







Precipitation intensity (Rx1day)



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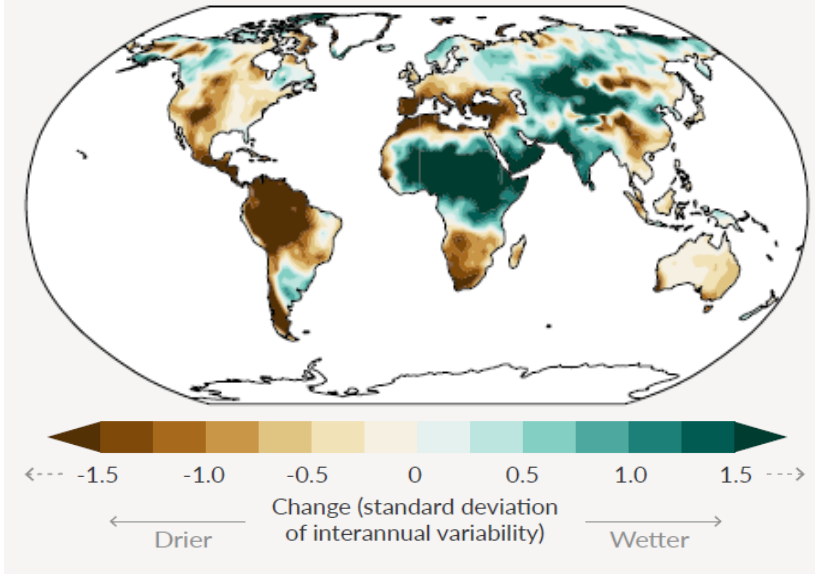
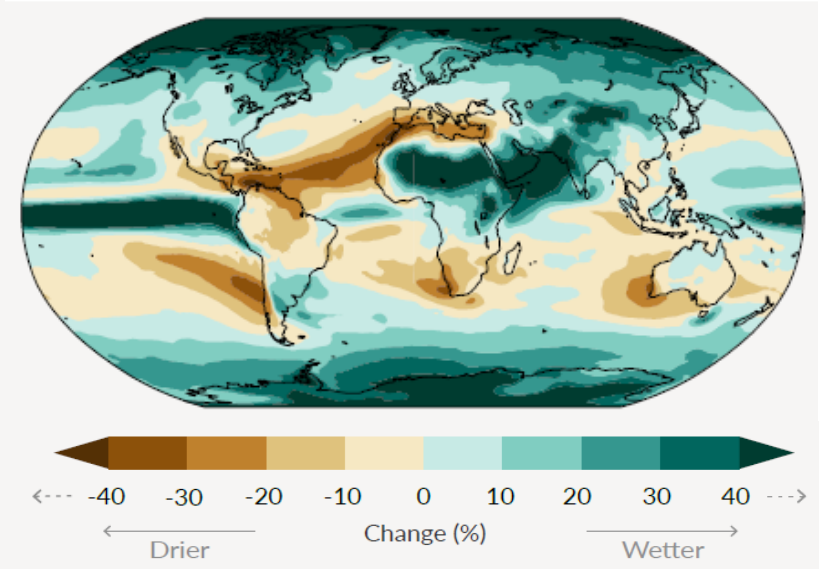
Continued global warming is projected to further intensify the global water cycle including the severity of wet and dry events

Total Column Soil Moisture



Mean Precipitation



Water cycle changes at 4°C warming

IPCC WG1 (2021) Chapters 11, 4, 8 and SPM; see also Technical Summary BoxTS.6

Mitigation of Climate Change

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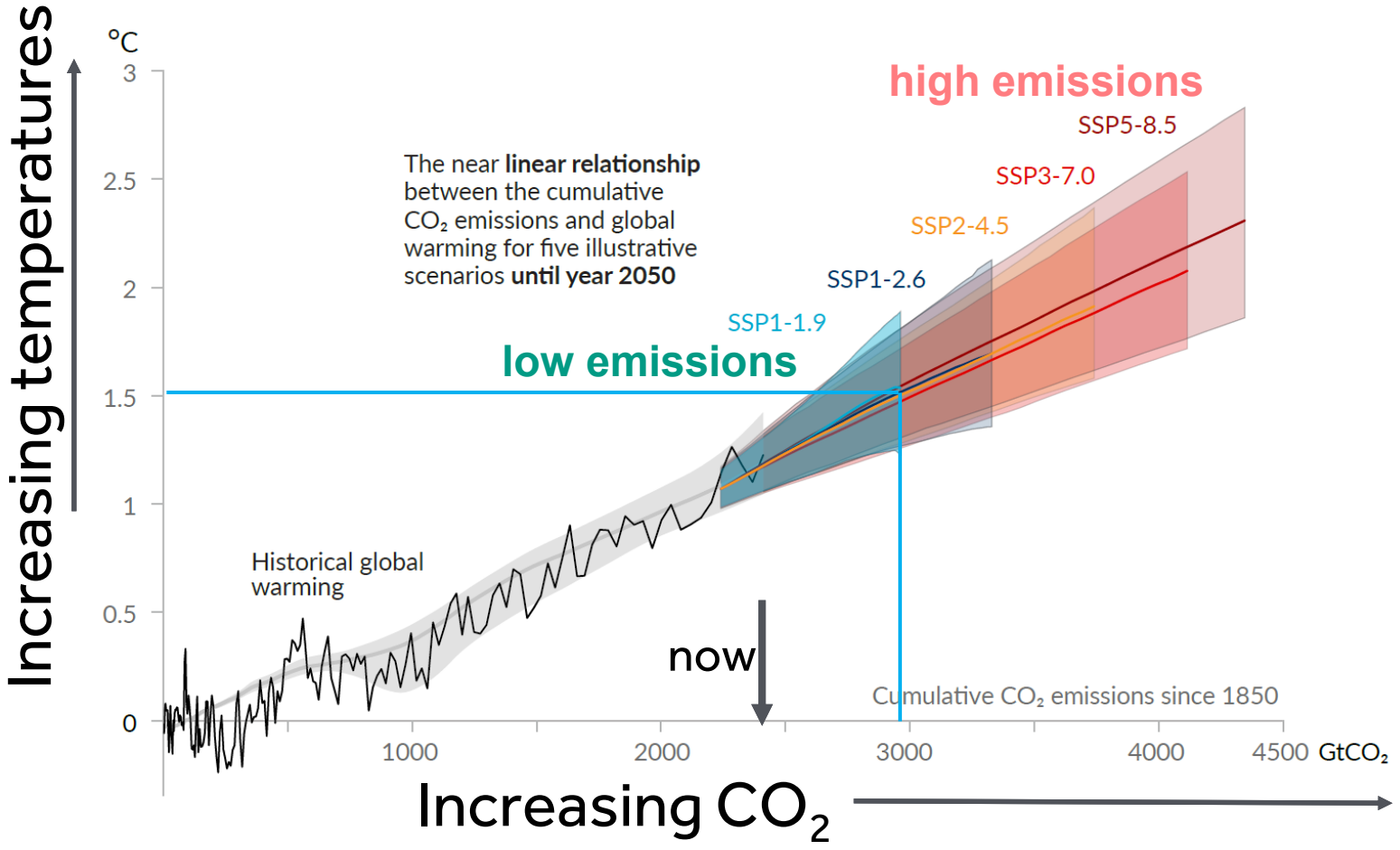
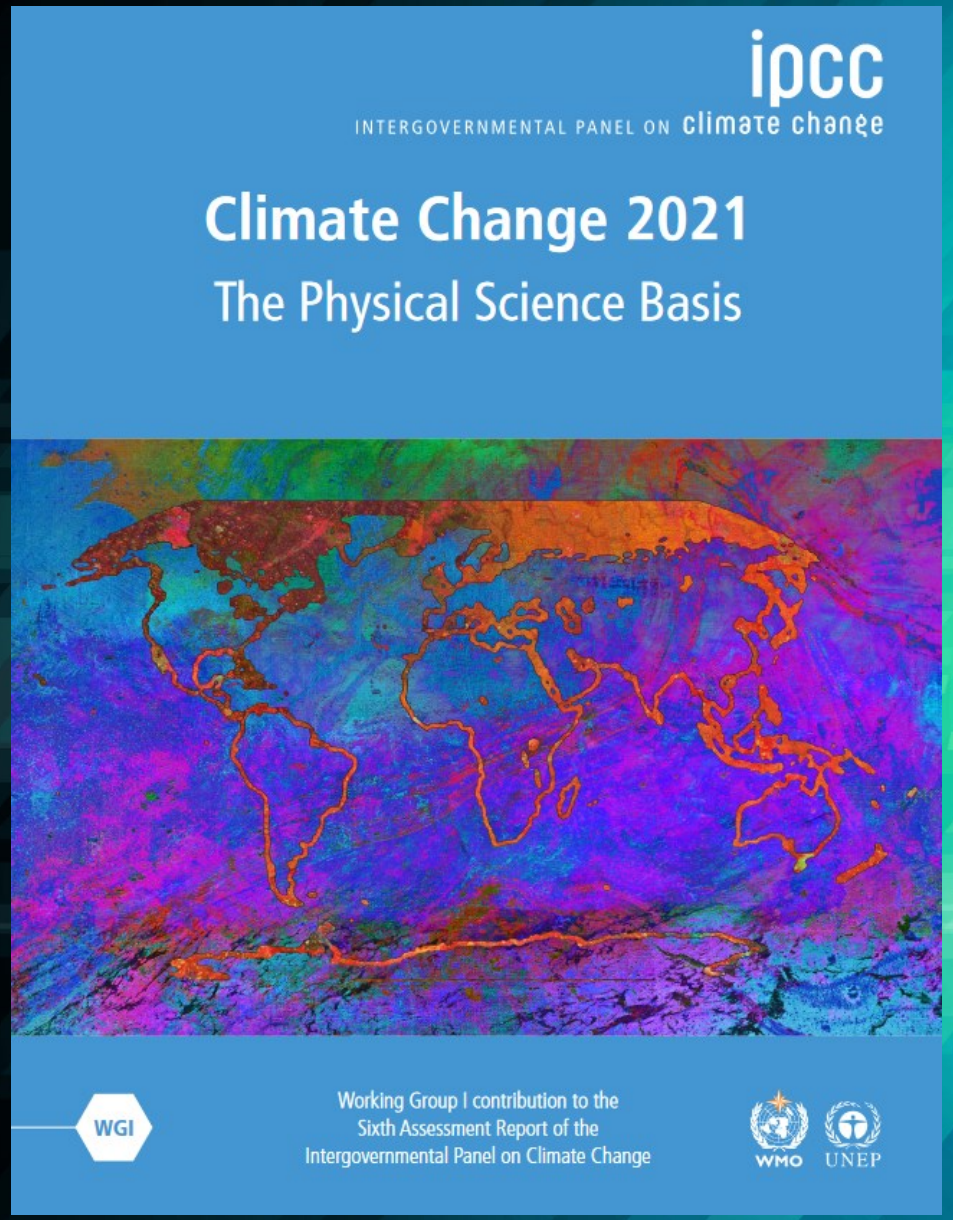


[IPCC WGI 2021 SPM]

- Each 1000 billion tonnes of CO_2 emission increases global temperature by ~0.5°C
- It is still physically possible to limit global warming to 1.5°C, but that requires deep reductions in CO_2 and other greenhouse gas emissions in the coming decades
- Reductions in methane emissions would limit warming effect resulting from declining particulate pollution and would improve air quality



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