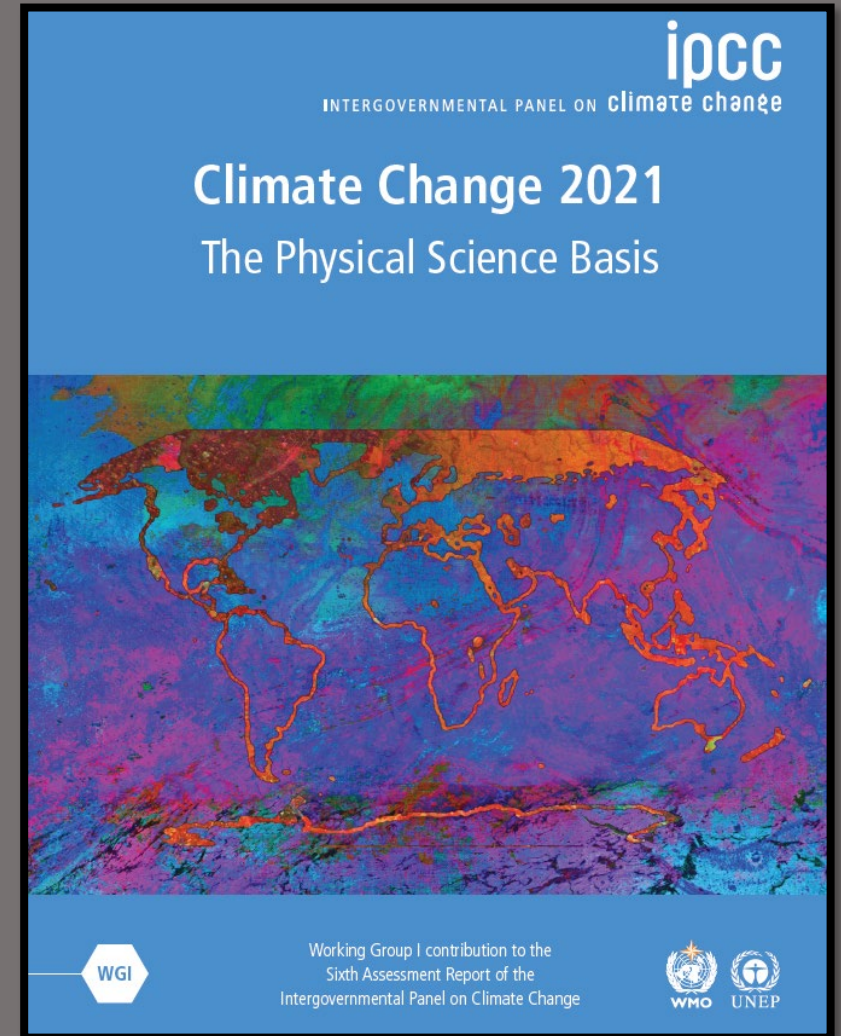


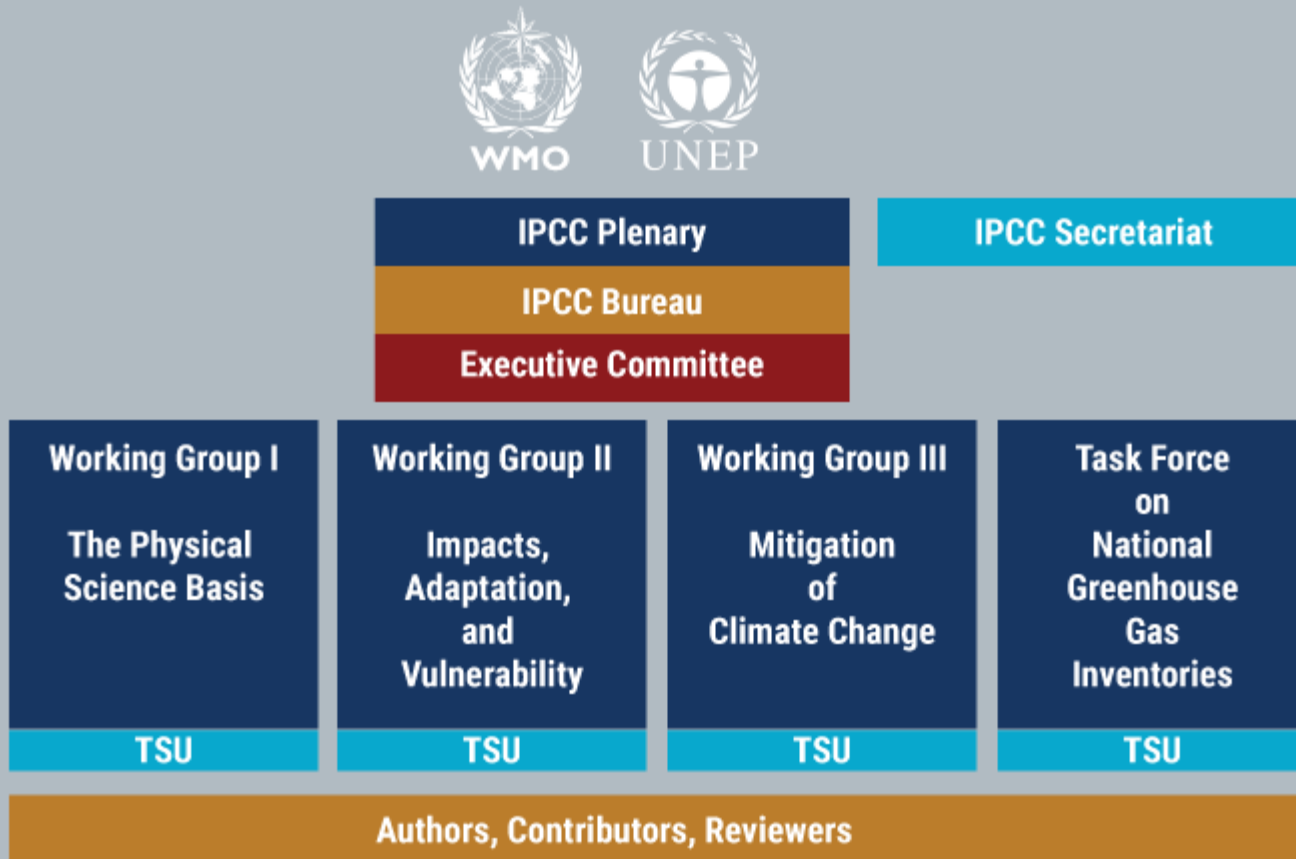
Highlights of the 2021 IPCC Assessment Report 6 (AR6)

"Let me explain. No, there is too much. Let me sum up."

Nicholas A. Procopio, Ph.D., GISP
Chief, Bureau of Environmental Assessment
Division of Science and Research

January 26, 2022





- The IPCC was created in 1988 and has 195 members.
- IPCC assessments are written by hundreds of leading scientists who volunteer their time and expertise as Coordinating Lead and Lead authors and they enlist hundreds of other experts as Contributing authors.
- First report issued in 1990

The [Intergovernmental Panel on Climate Change](#) (IPCC) released their 6th Assessment Report (AR6) on August 9th. This report presents findings on the physical science basis of *global* climate change.

The report builds upon:

- the 2013 contributions of the IPCC's Fifth Assessment Report (AR5),
- 3 IPCC special reports released between 2018–2019
- and incorporates subsequent new evidence from scientific literature accepted for publication through January 2021.

The Ocean and Cryosphere in a Changing Climate

September 2019

WORKING GROUP
REPORT

**Methodology
Report on
Short-lived
Climate Forcers**

June 2020

WORKING GROUP
REPORT

**Global Warming
of 1.5°C**

October 2018

WORKING GROUP
REPORT

**Climate Change
and Land**

August 2019

AR6 Synthesis Report: Climate Change 2022

September 2022

WORKING GROUP
REPORT

**AR6 Climate
Change 2022:
Impacts,
Adaptation and
Vulnerability**

February 2022

WORKING GROUP
REPORT

**AR6 Climate
Change 2022:
Mitigation of
Climate Change**

March 2022

WORKING GROUP
REPORT

**AR6 Climate
Change 2021:
The Physical
Science Basis**

August 2021

Where to start:

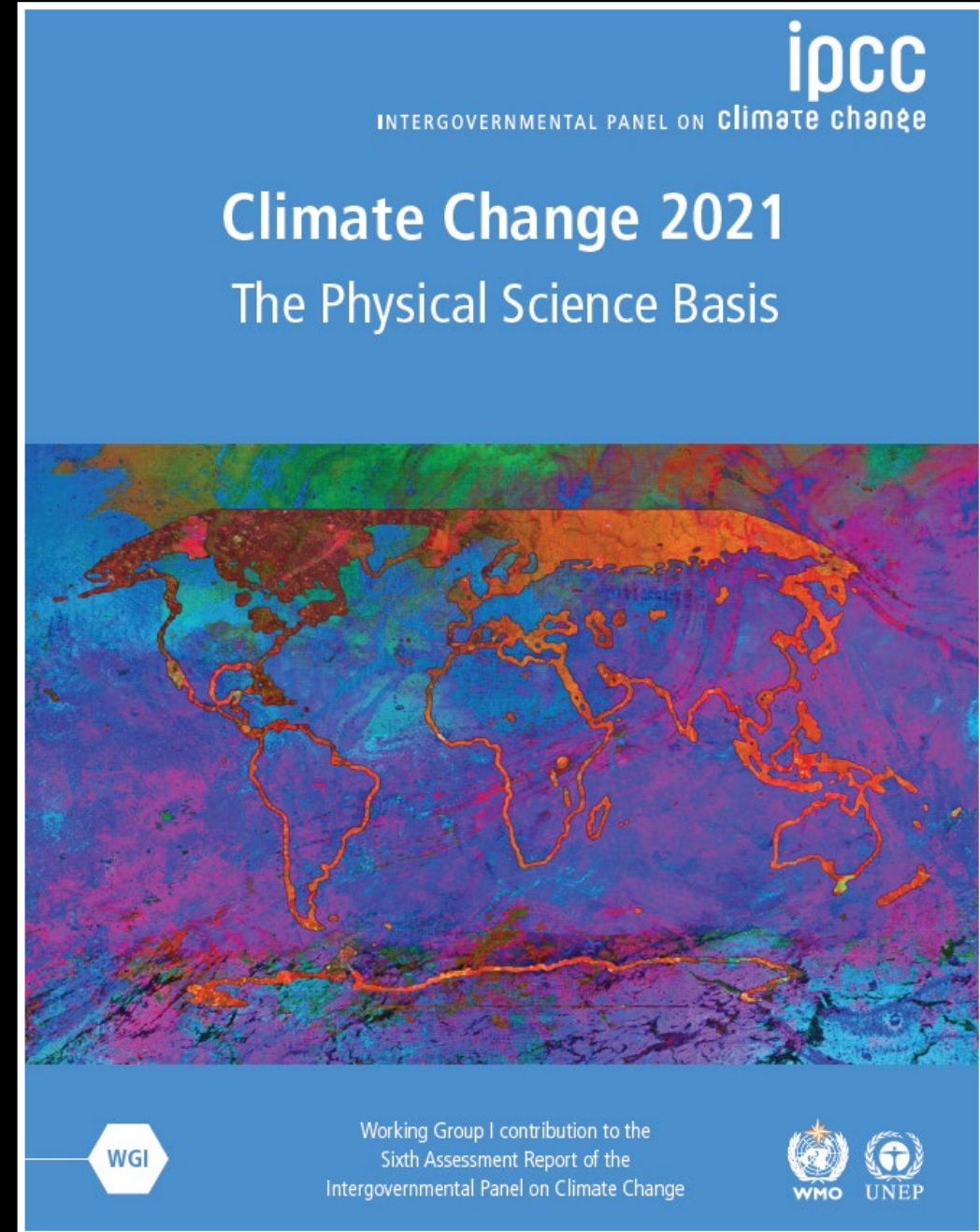
A Summary for Policymakers document highlights the nearly 4,000 page technical report and calls out the expectations for increasing global temperatures, prolonged dry spells, increased storm intensity, increased sea-level rise, and continued warming and acidification of the oceans.

“It is unequivocal”:

It is clear that the effects of climate change are already happening and those effects will worsen over the coming decades. The authors show that even with immediate and significant reductions in greenhouse gasses, increases in average global temperature are essentially baked-in in the near term (through 2040).

Call to action:

The report is the strongest call to action from this impressive collection of scientific experts to date.



The report states: “It is **unequivocal** that human influence has warmed the atmosphere, ocean and land” and that “(w)idespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred.”

Essential Take-aways

Human influence has unequivocally warmed the planet.

- “It is unequivocal that human influence has warmed the atmosphere, ocean and land.”

Climate science is getting better and more precise.

- More observational data reduces uncertainty
- Computer models and computing power have improved

We are locked into 20 years of worsening climate impacts no matter what the world does.

- The globe has already warmed 1.1°C (~2°F) since beginning of industrial era (1850)
- We are “baked in” through about 2040
- Under all scenarios, Earth reaches 1.5°C (2.7°F) by 2040 or sooner.
1.5°C is Paris Agreement target

Essential Take-aways

Changes to the climate are happening and happening fast.

- CO₂ higher than any point in last 2,000,000 years
- Sea-ice at lowest levels in last 1,000 years
- *Rate* of sea-level rise has roughly doubled since 2006
- Heat waves are hotter since 1950
- Ocean heat waves have doubled in last 40 years

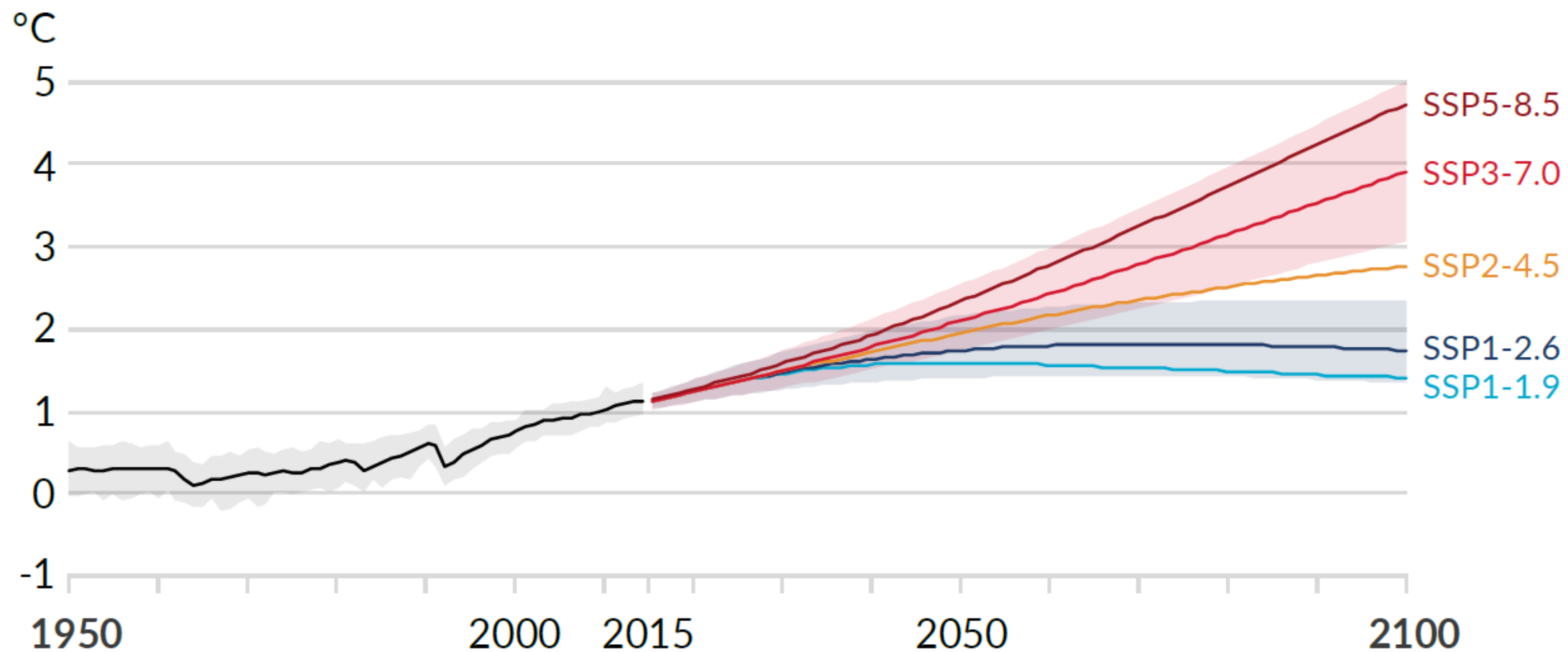
Greenhouse gas emissions have spurred changes that are irreversible for centuries to millennia.

- These include changes to the ocean, ice sheets and global sea level.

The good news?

Aggressive, rapid and widespread emissions cuts, beginning now, could limit the warming beyond 2050. In the most optimistic scenario, reaching “net zero” emissions could even bring warming back slightly under 1.5 degrees Celsius in the second half of the century.

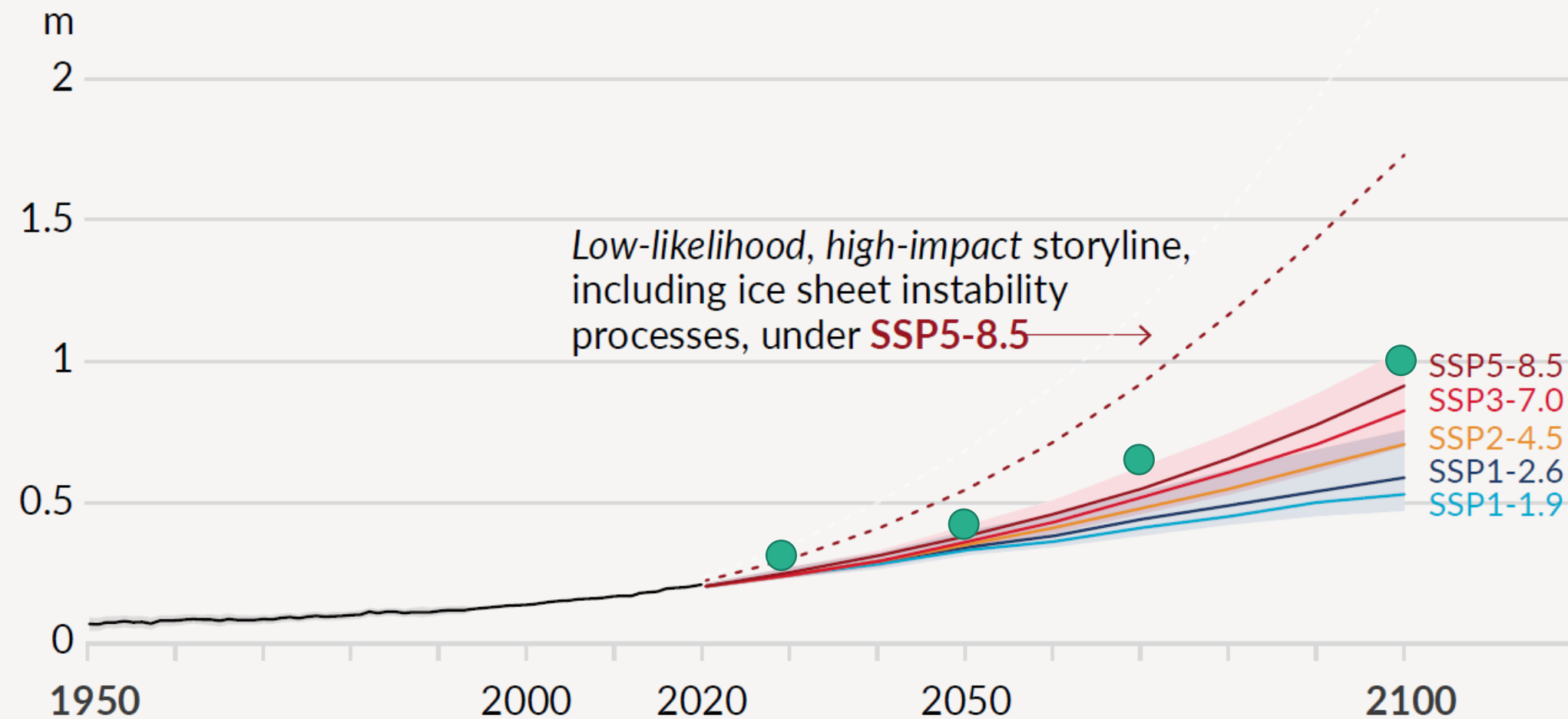
a) Global surface temperature change relative to 1850-1900



AR6 Temperature Projections

	Near term, 2021–2040		Mid-term, 2041–2060		Long term, 2081–2100	
Scenario	Best estimate (°C)	<i>Very likely</i> range (°C)	Best estimate (°C)	<i>Very likely</i> range (°C)	Best estimate (°C)	<i>Very likely</i> range (°C)
SSP1-1.9	1.5	1.2 to 1.7	1.6	1.2 to 2.0	1.4	1.0 to 1.8
SSP1-2.6	1.5	1.2 to 1.8	1.7	1.3 to 2.2	1.8	1.3 to 2.4
SSP2-4.5	1.5	1.2 to 1.8	2.0	1.6 to 2.5	2.7	2.1 to 3.5
SSP3-7.0	1.5	1.2 to 1.8	2.1	1.7 to 2.6	3.6	2.8 to 4.6
SSP5-8.5	1.6	1.3 to 1.9	2.4	1.9 to 3.0	4.4	3.3 to 5.7

d) Global mean sea level change relative to 1900



● Approx. sea level change relative to 2000 (STAP 2019, moderate emissions; 50% likelihood)

THE SHARED SOCIO-ECONOMIC PATHWAYS (SSPs)

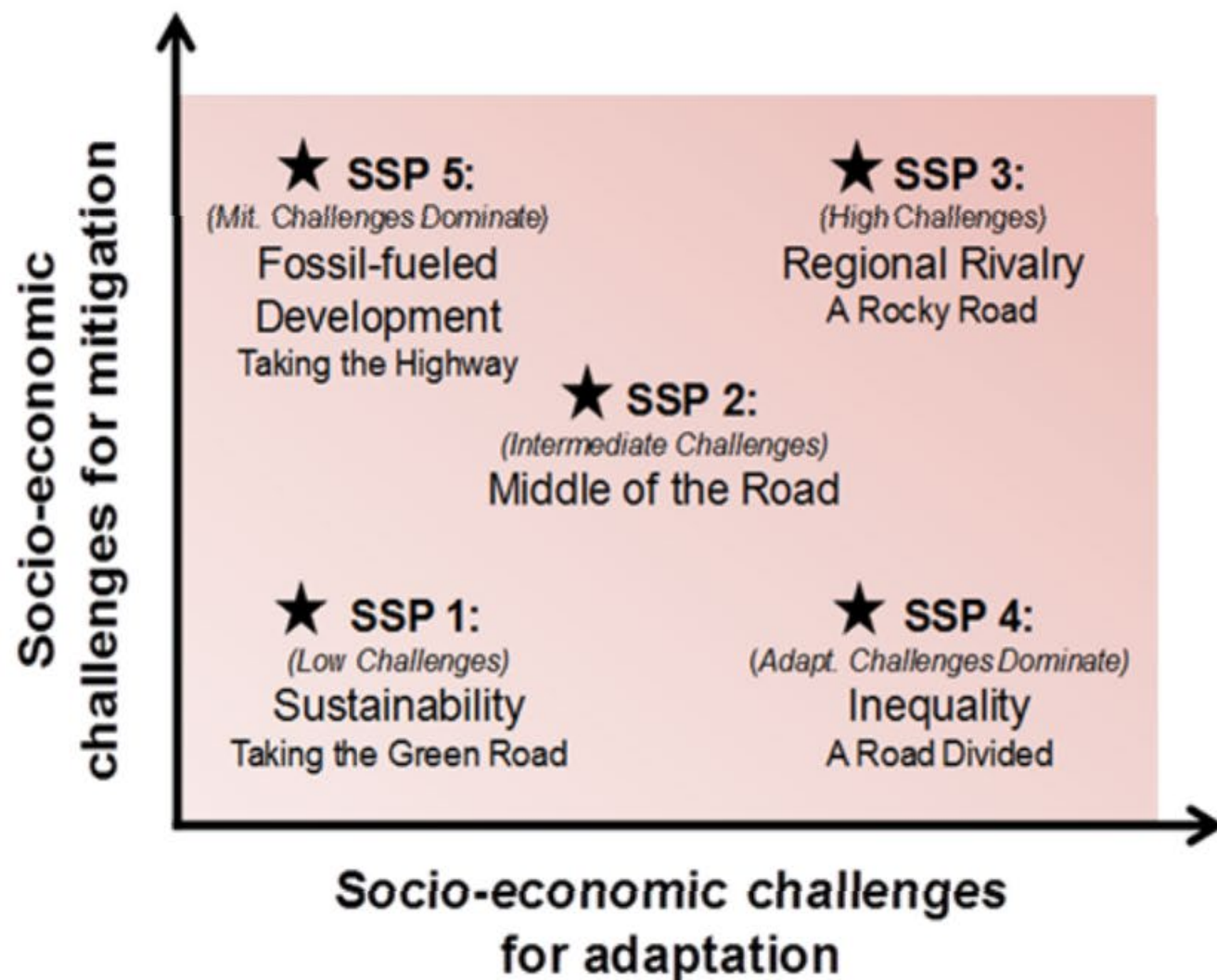


Fig. 1 Overview of SSPs

(Narratives in O'Neill et al., 2016, *Glob Env Change*, online first)

SSP1: low challenges for mitigation (resource efficiency) and adaptation (rapid development)

SSP3: high challenges for mitigation (regionalized energy / land policies) and adaptation (slow development)

SSP4: low challenges for mitigation (global high tech economy), high for adapt. (regional low tech economies)

SSP5: high challenges for mitigation (resource / fossil fuel intensive) and low for adapt. (rapid development)

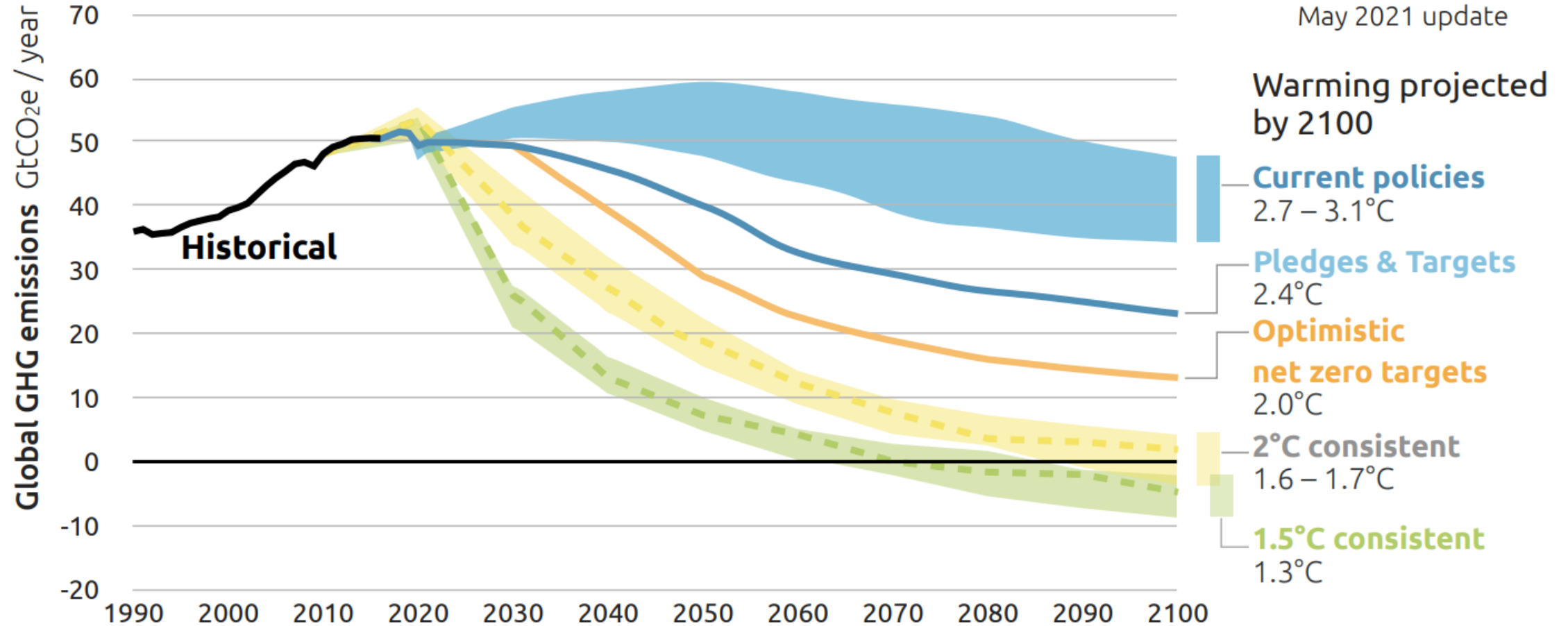
So where are we?

2100 WARMING PROJECTIONS

Emissions and expected warming based on pledges and current policies



May 2021 update



Source Climate Action Tracker:

<https://climateactiontracker.org/publications/global-update-climate-summit-momentum/>

Figure II: The Global Risks Landscape 2020

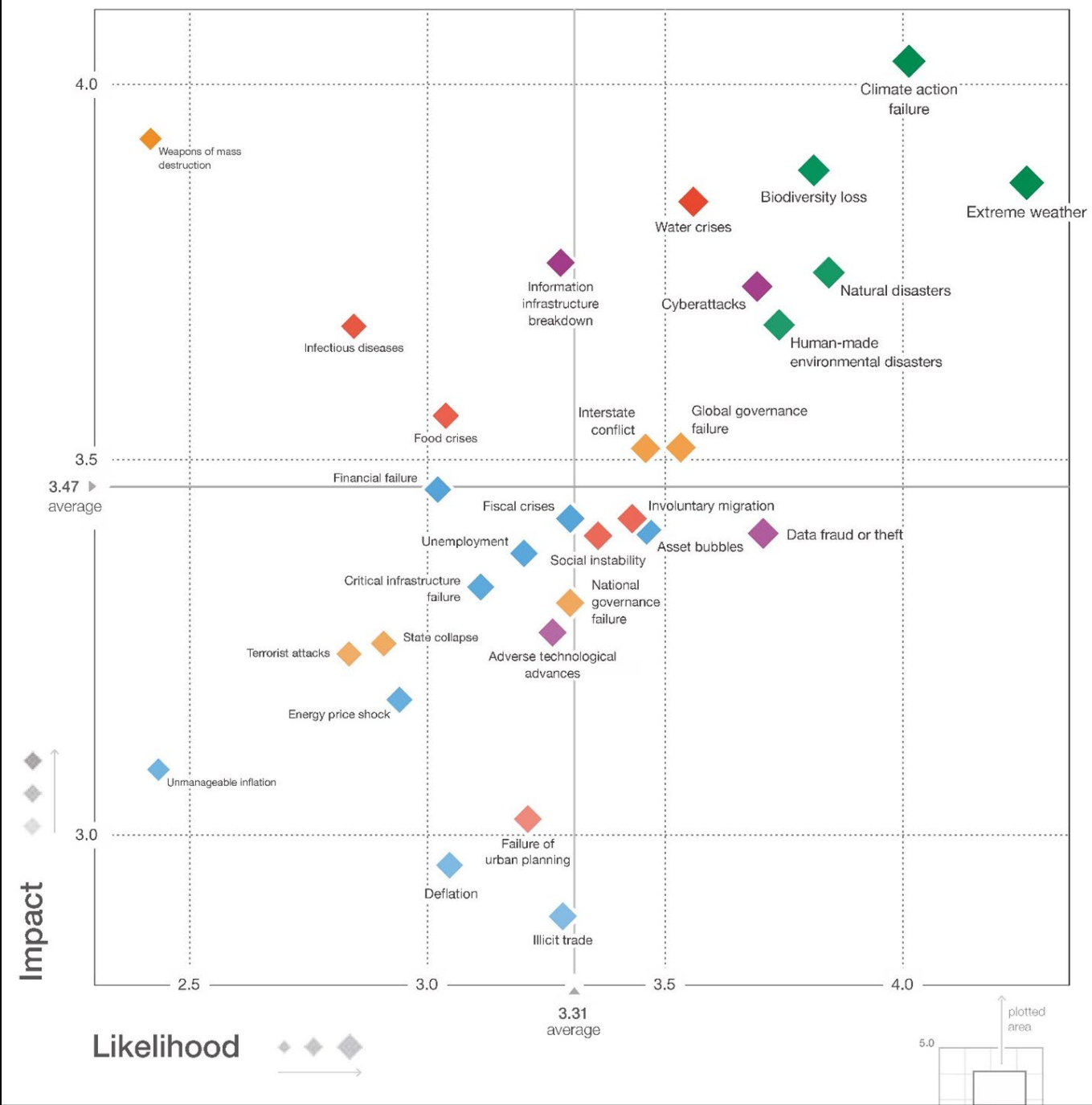
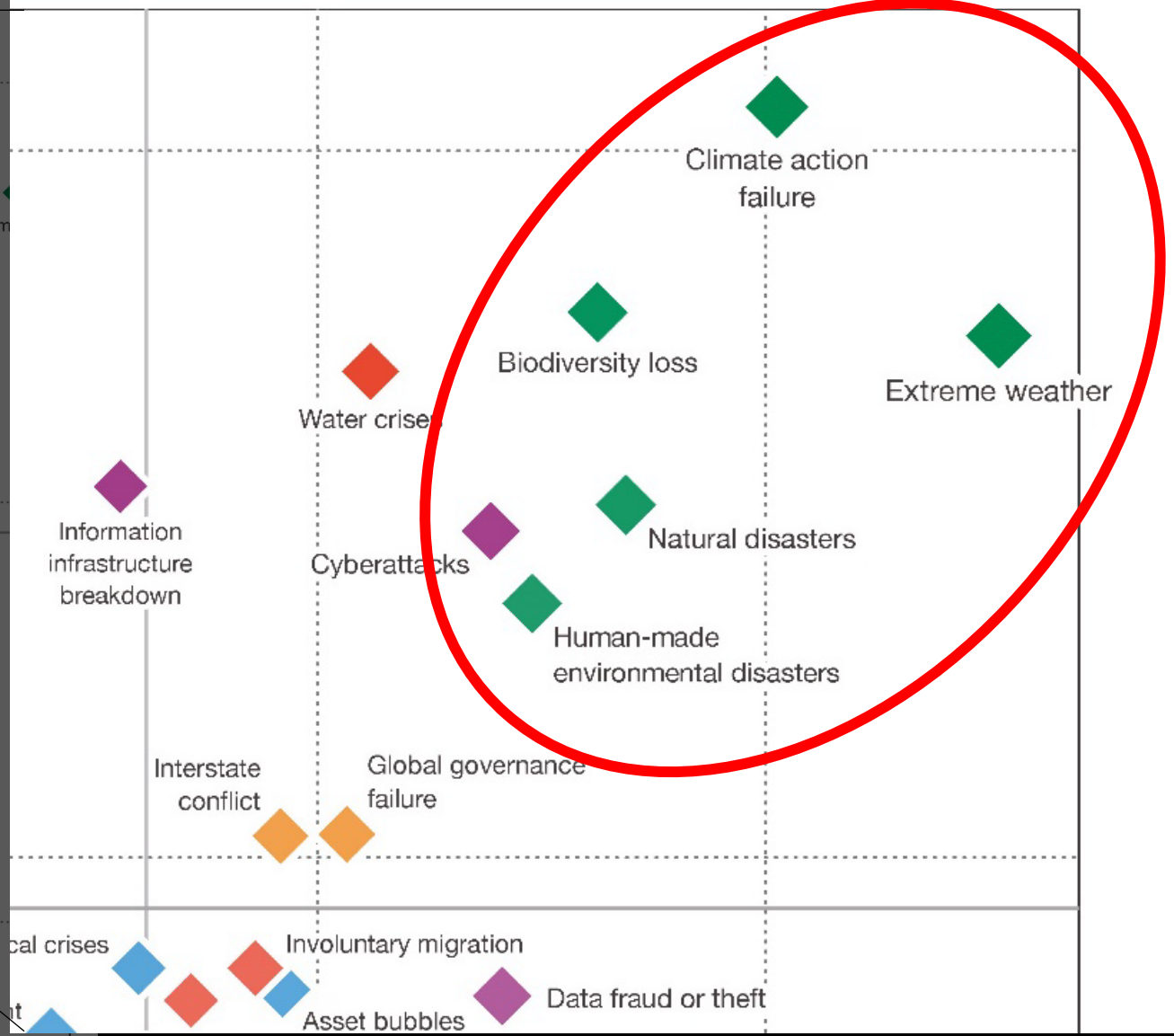
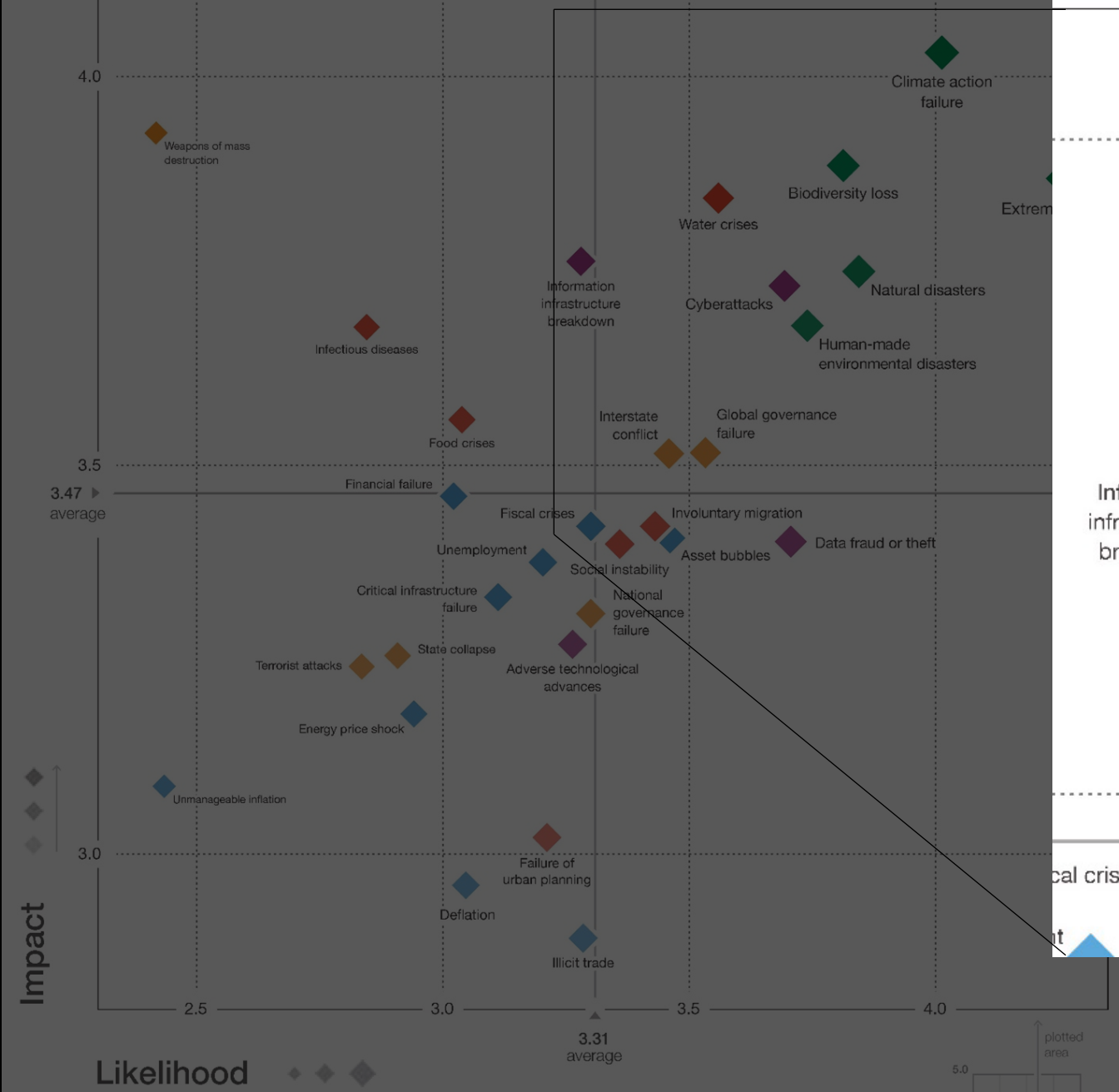


Figure II: The Global Risks Landscape 2020
World Economic Forum WEF; The Global Risks Report 2020 15th Edition

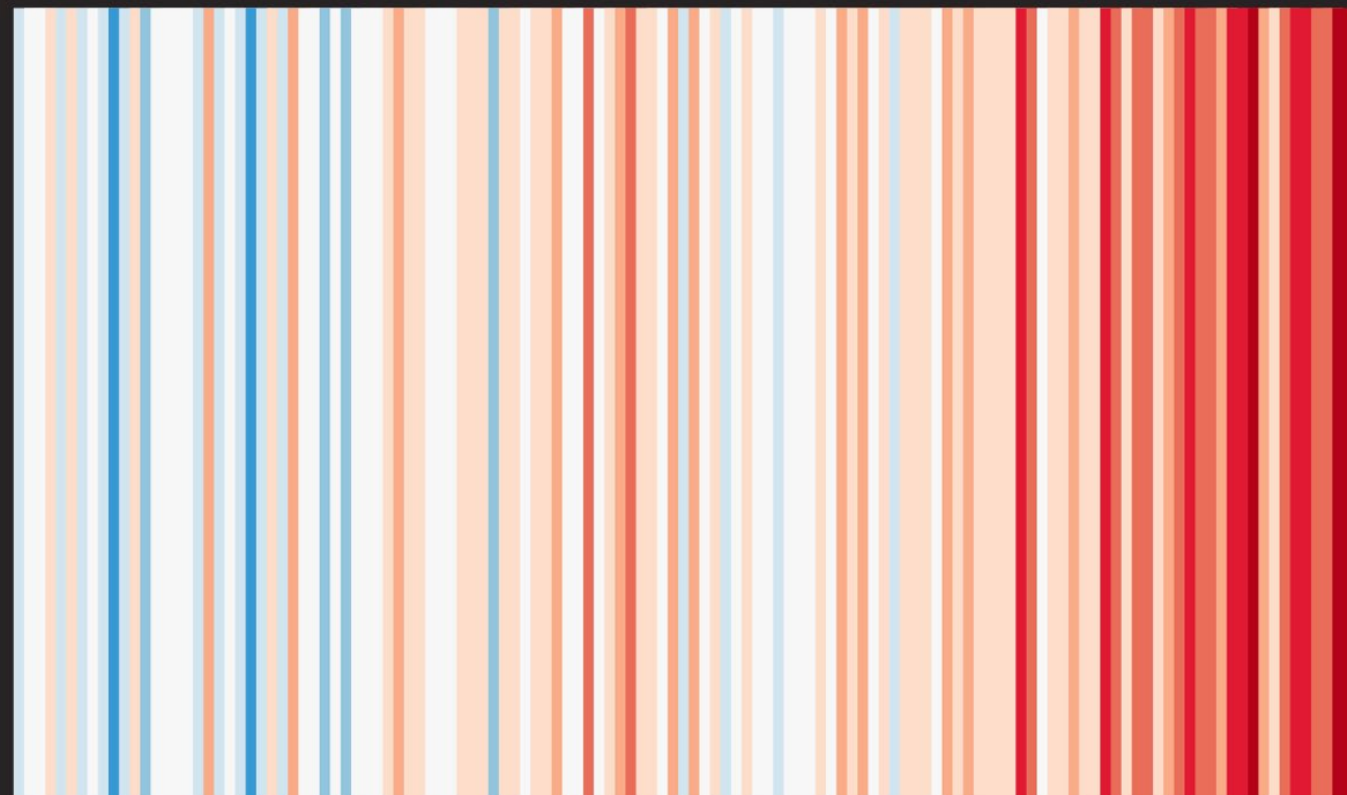


2020 NEW JERSEY

SCIENTIFIC REPORT ON

CLIMATE CHANGE

June 30, 2020



1895

NEW JERSEY

2020

Based on Ed Hawkins "Warming Stripes".
Source: NOAA/NCEI Climate at a Glance

CLIMATE  CENTRAL

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