CLIMATE CHANGE: THE ROAD THROUGH PARIS

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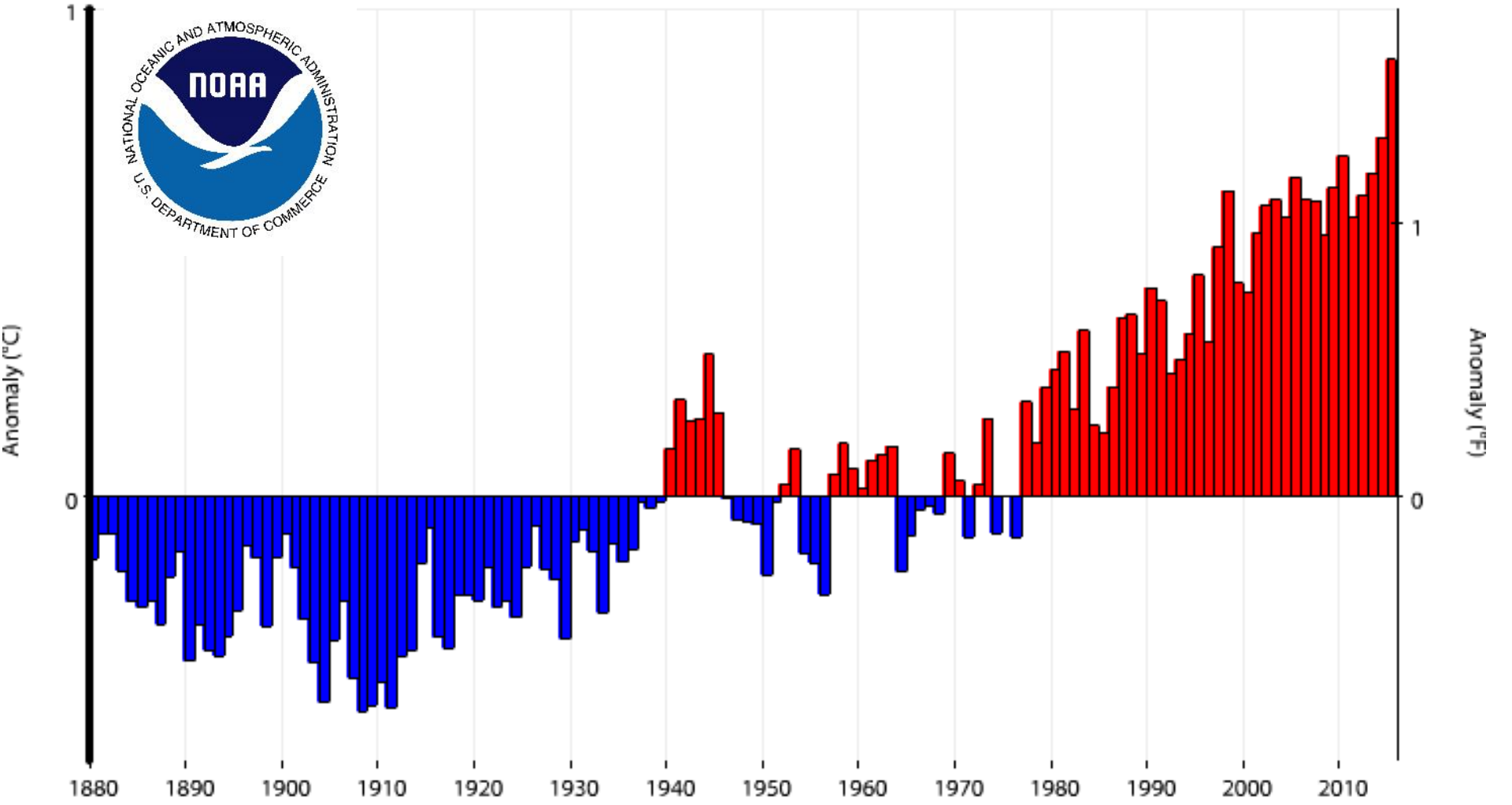
STANFORD UNIVERSITY & CARNEGIE SCIENCE

CLIMATE CHANGE

UNDERSTANDING, MANAGING, & REDUCING RISKS


NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE
Anomaly (°C)
Anomaly (°F)
1
0
1
0
1880
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010


OBSERVED IMPACTS
OF CLIMATE CHANGE
ARE WIDESPREAD
AND CONSEQUENTIAL
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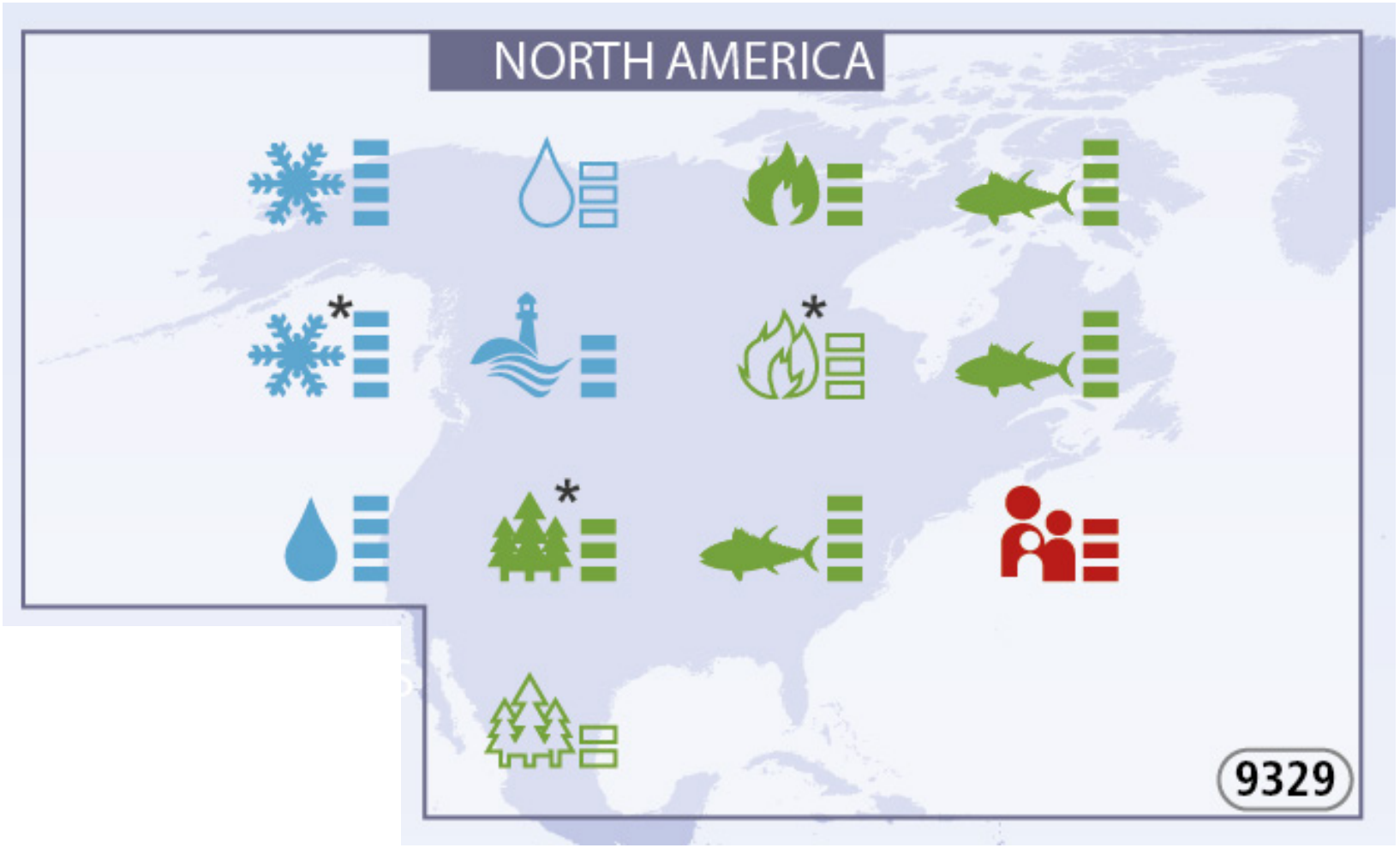
INTERGOVERNMENTAL PANEL ON climate change



Confidence in attribution to climate change

very low | low | med | high | very high

indicates confidence range

Observed impacts attributed to climate change for

Physical systems

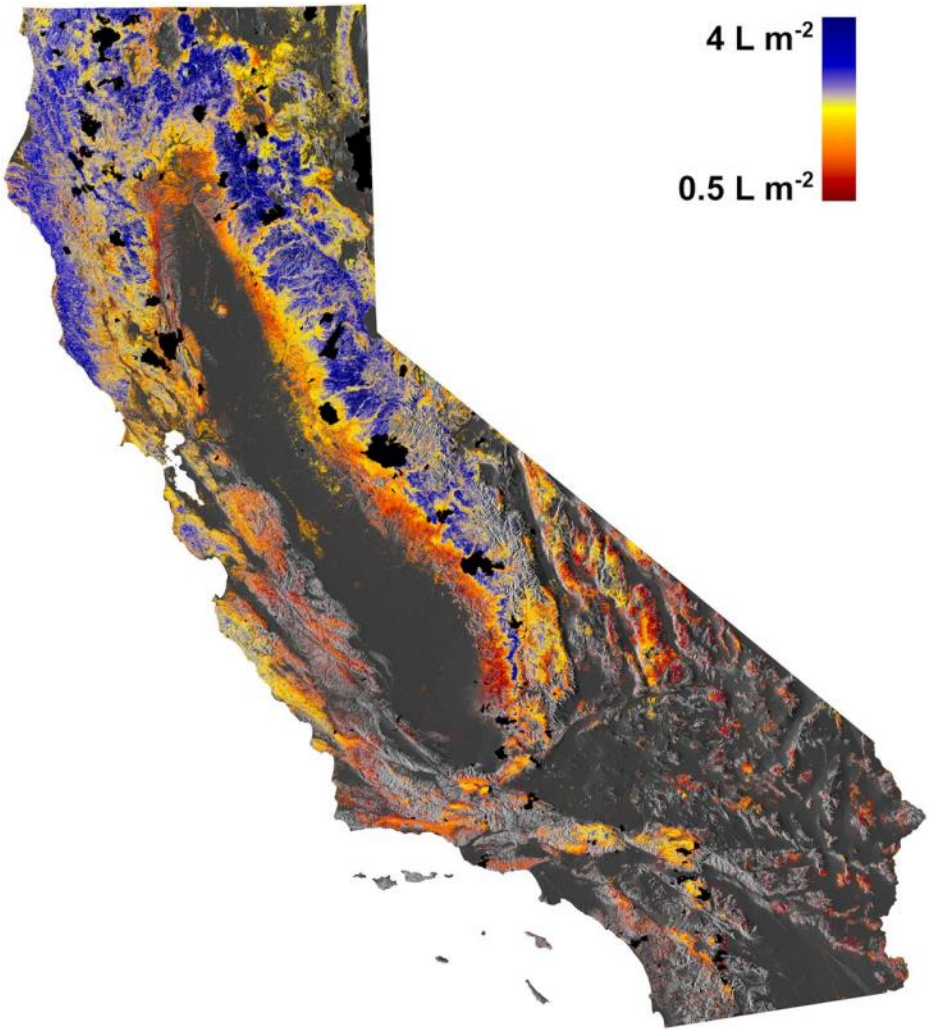
- Glaciers, snow, ice and/or permafrost
- Rivers, lakes, floods and/or drought
- Coastal erosion and/or sea level effects

Biological systems

- Terrestrial ecosystems
- Wildfire
- Marine ecosystems

Human and managed systems

- Food production
- Livelihoods, health and/or economics


4 L m-2
0.5 L m-2

VULNERABILITY AND EXPOSURE

AROUND THE WORLD

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INTERGOVERNMENTAL PANEL ON climate change


PEOPLE, SOCIETIES,
AND ECOSYSTEMS
AROUND THE WORLD
VULNERABLE
AND EXPOSED
IN DIFFERENT WAYS
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INTERGOVERNMENTAL PANEL ON climate change

INCREASING MAGNITUDES OF WARMING INCREASE THE LIKELIHOOD OF

SEVERE AND PERVASIVE IMPACTS

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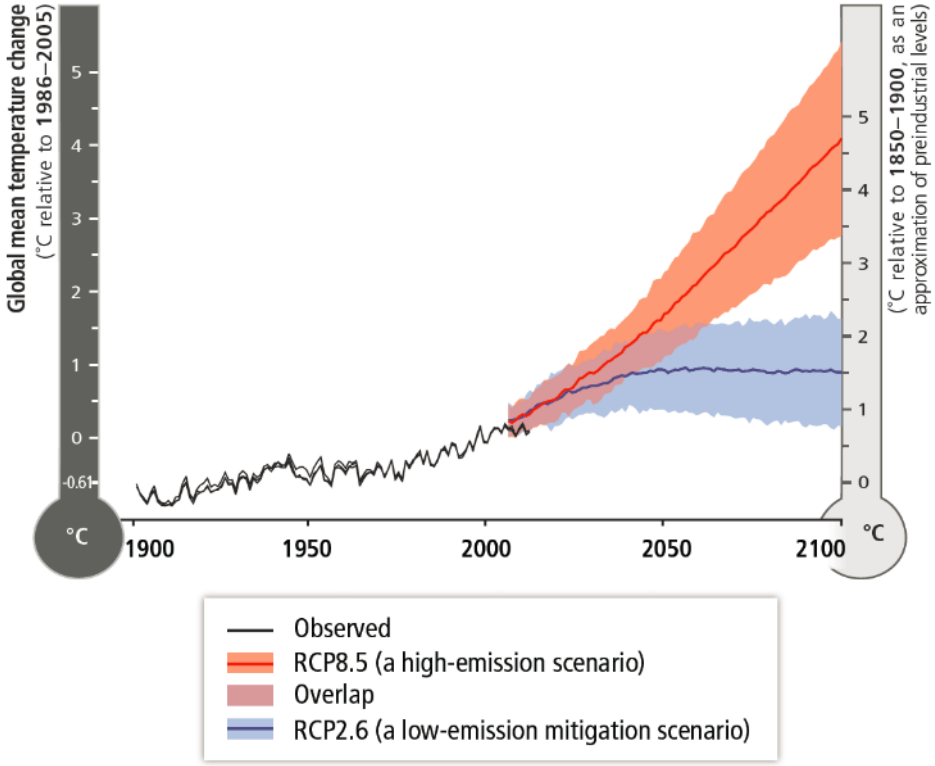
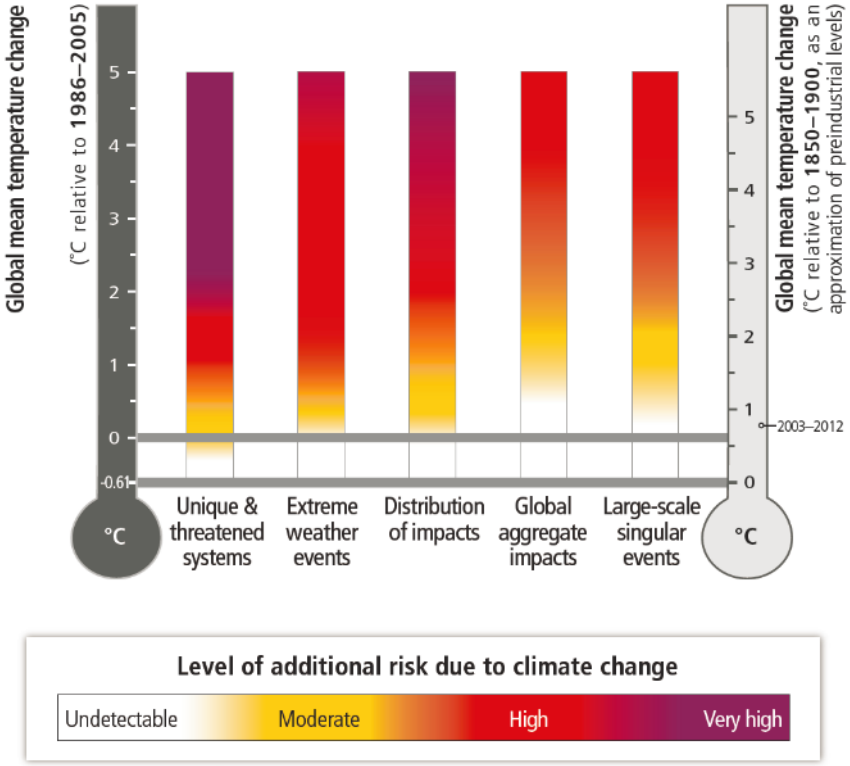
INTERGOVERNMENTAL PANEL ON climate change





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INTERGOVERNMENTAL PANEL ON climate change

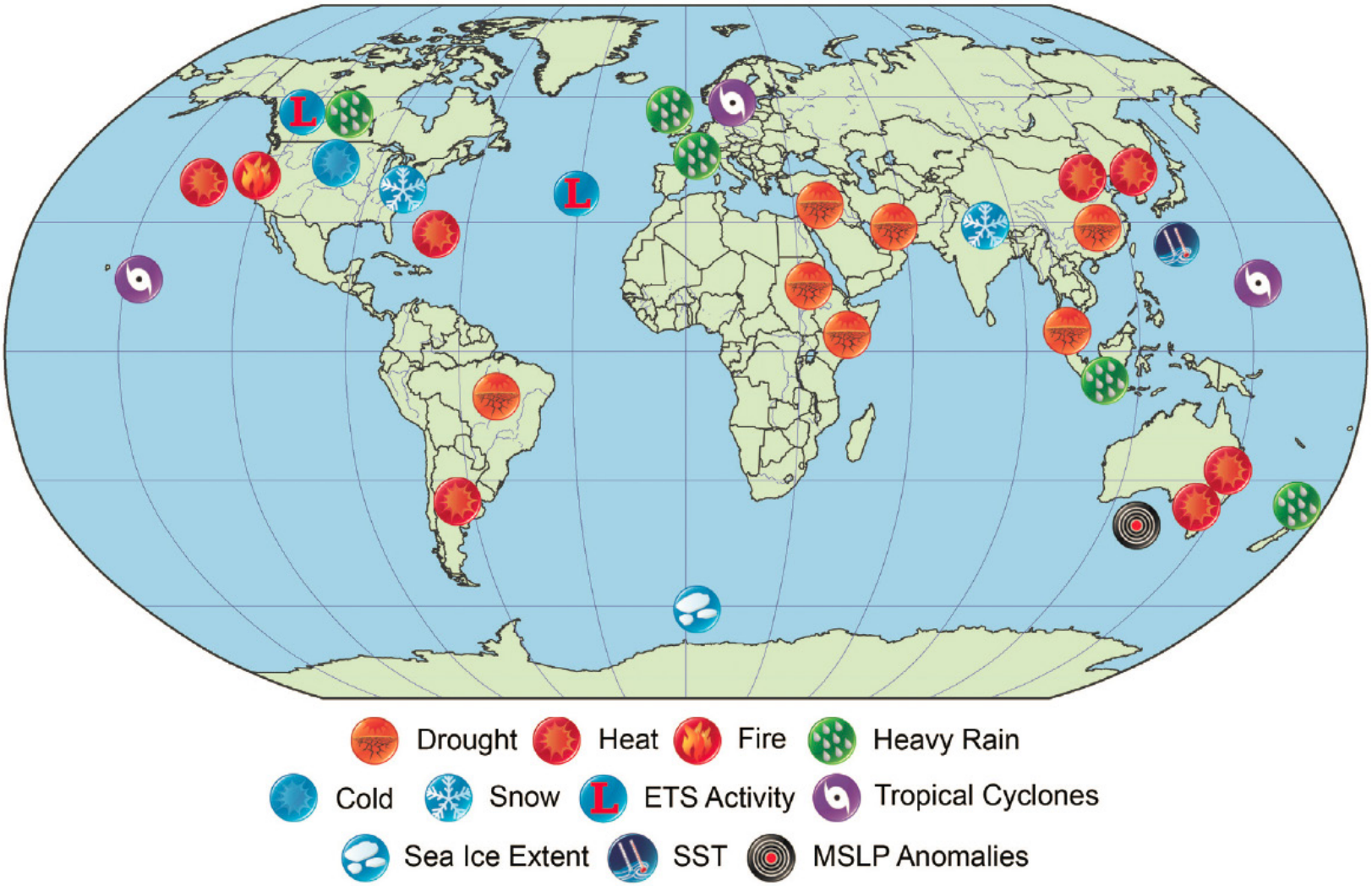
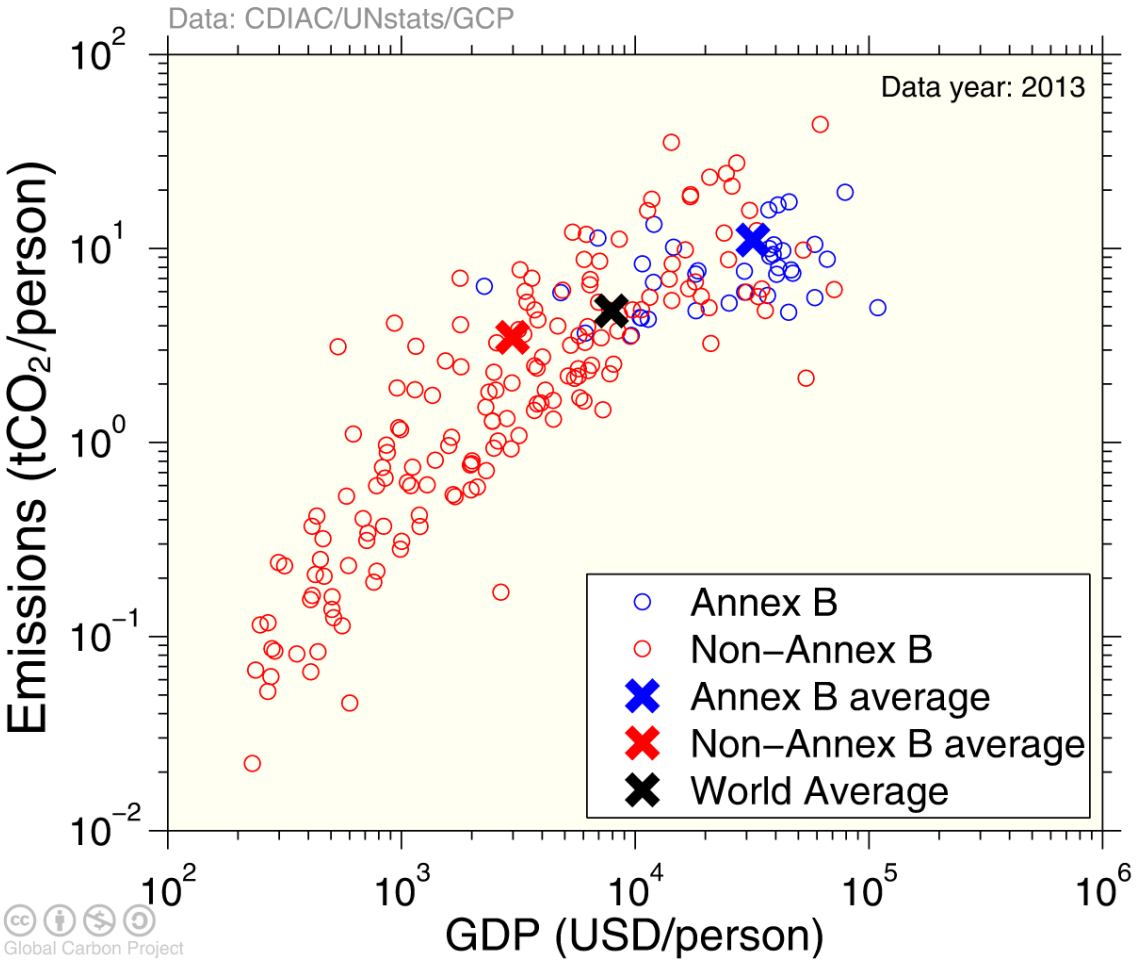
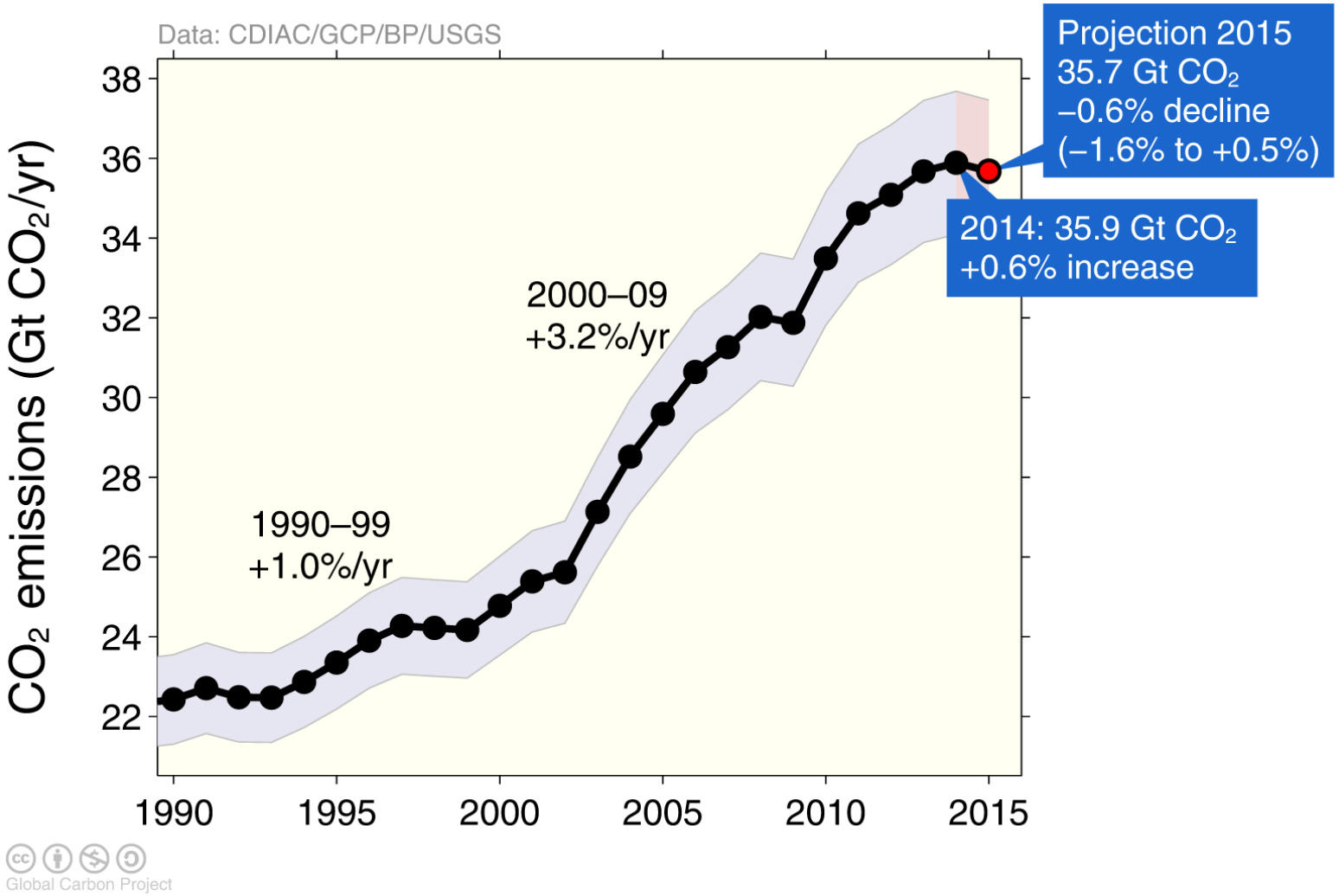
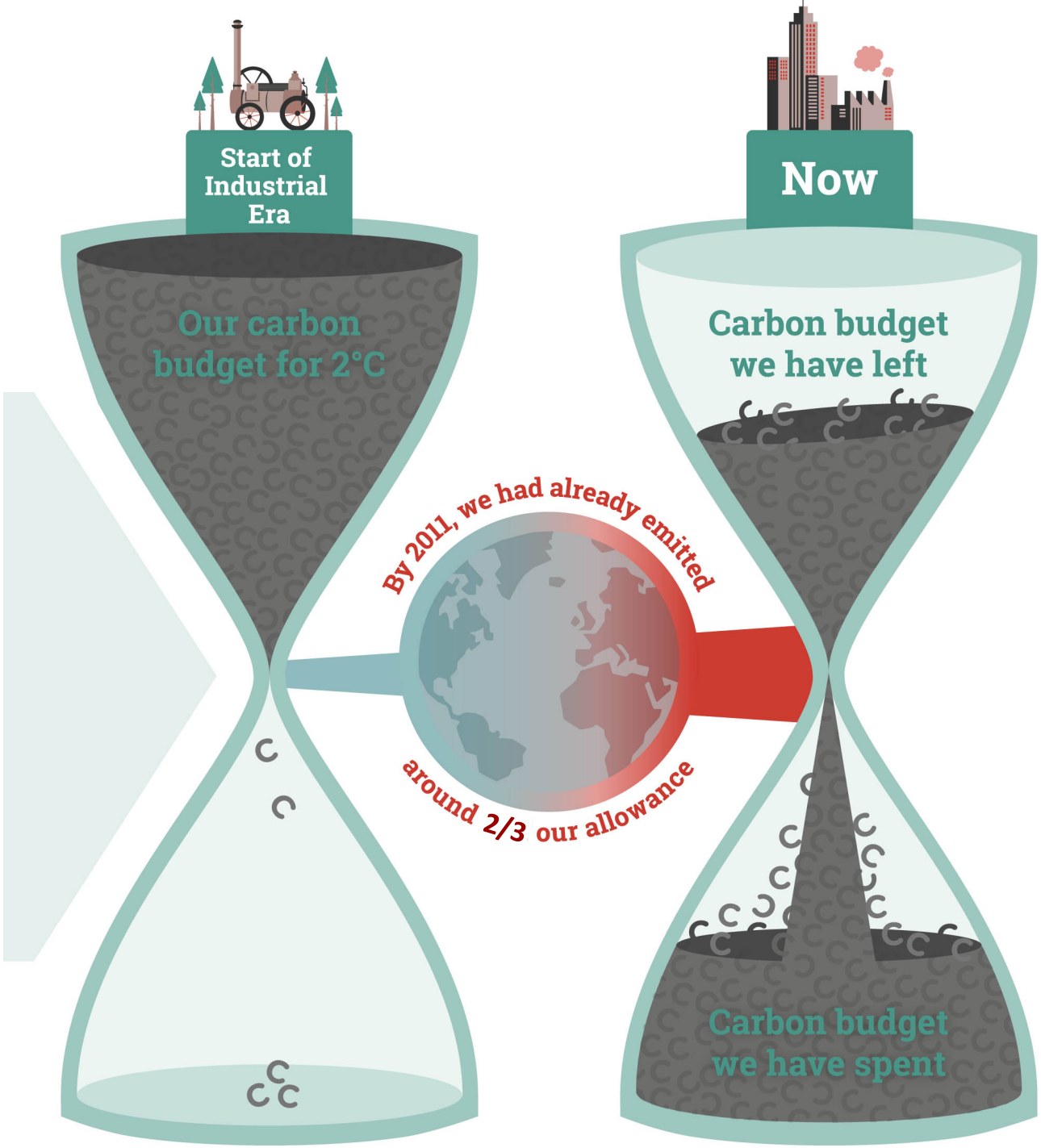


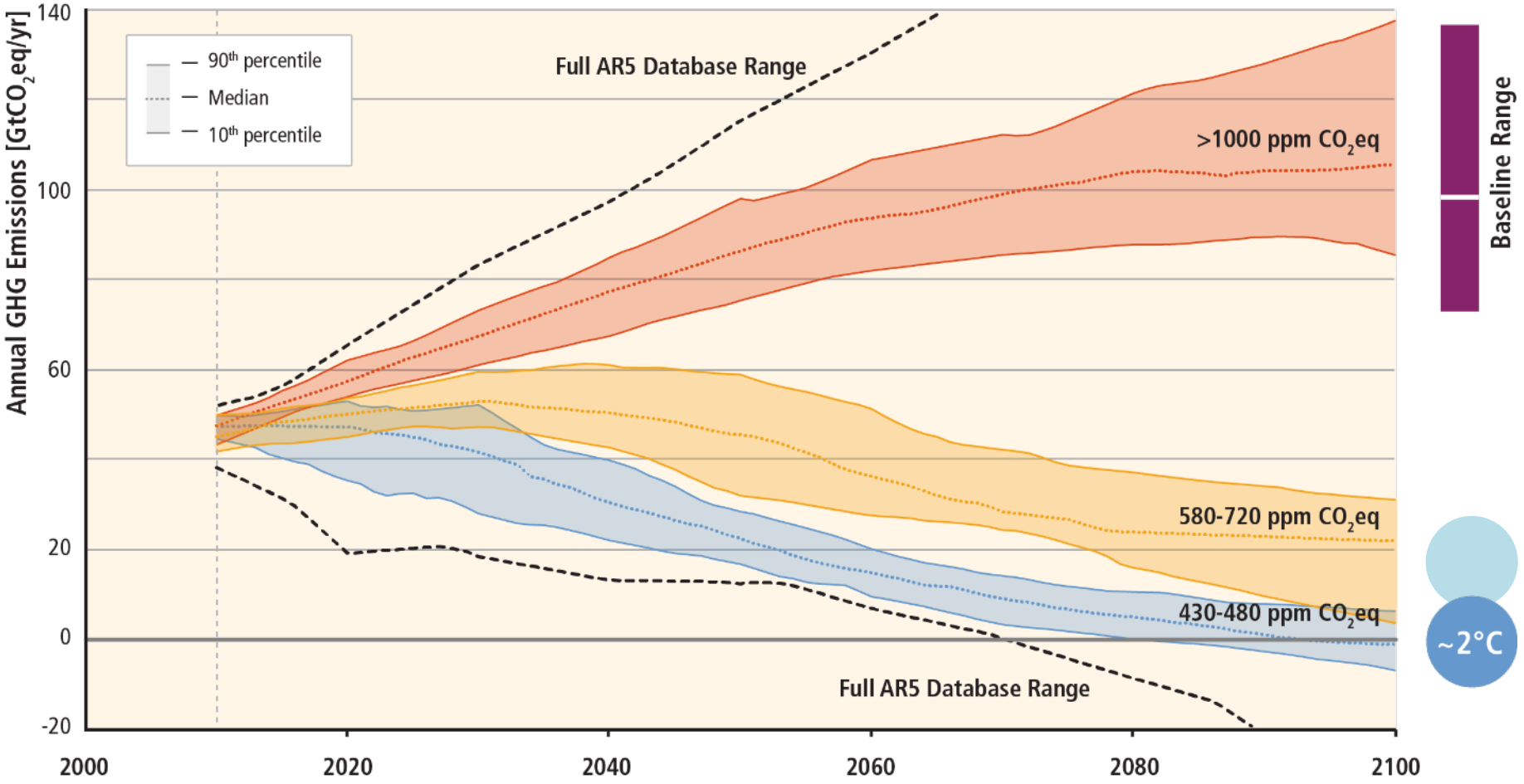
FIG. 1.1. Location and types of events analyzed in this publication.

THE SOLUTION SPACE


Data: CDIAC/UNstats/GCP
Data year: 2013
Emissions (tCO2/person)
GDP (USD/person)
Annex B
Non–Annex B
Annex B average
Non–Annex B average
World Average
Global Carbon Project


Data: CDIAC/GCP/BP/USGS
Projection 2015
35.7 Gt CO_2
–0.6% decline
(–1.6% to +0.5%)
2014: 35.9 Gt CO_2
+0.6% increase
2000–09
+3.2%/yr
1990–99
+1.0%/yr
CO_2 emissions (Gt CO_2/yr)
38
36
34
32
30
28
26
24
22
1990
1995
2000
2005
2010
2015
Global Carbon Project


Start of Industrial Era
Now
Our carbon budget for 2°C
Carbon budget we have left
By 2011, we had already emitted
around 2/3 our allowance
Carbon budget we have spent



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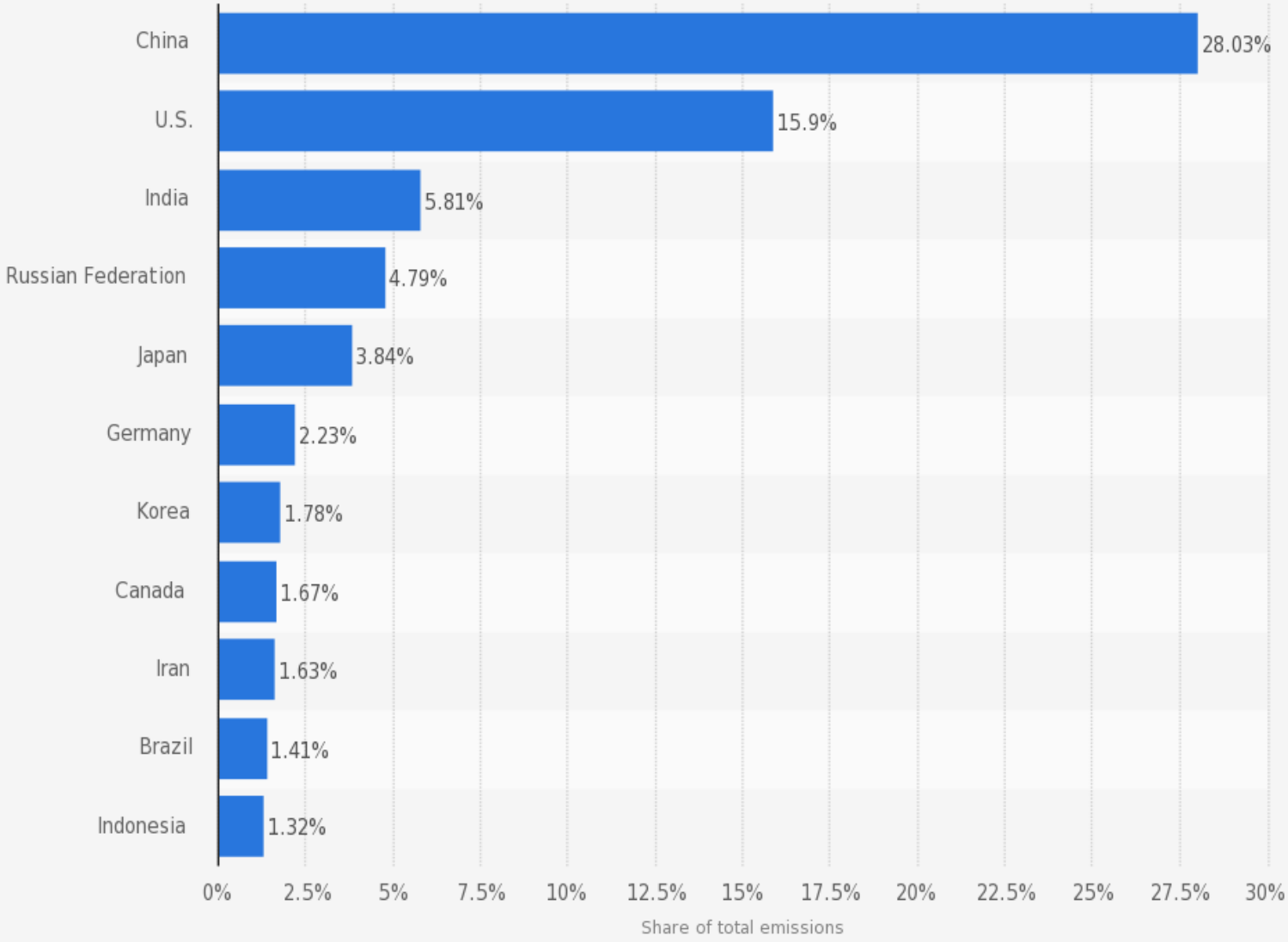
INTERGOVERNMENTAL PANEL ON climate change

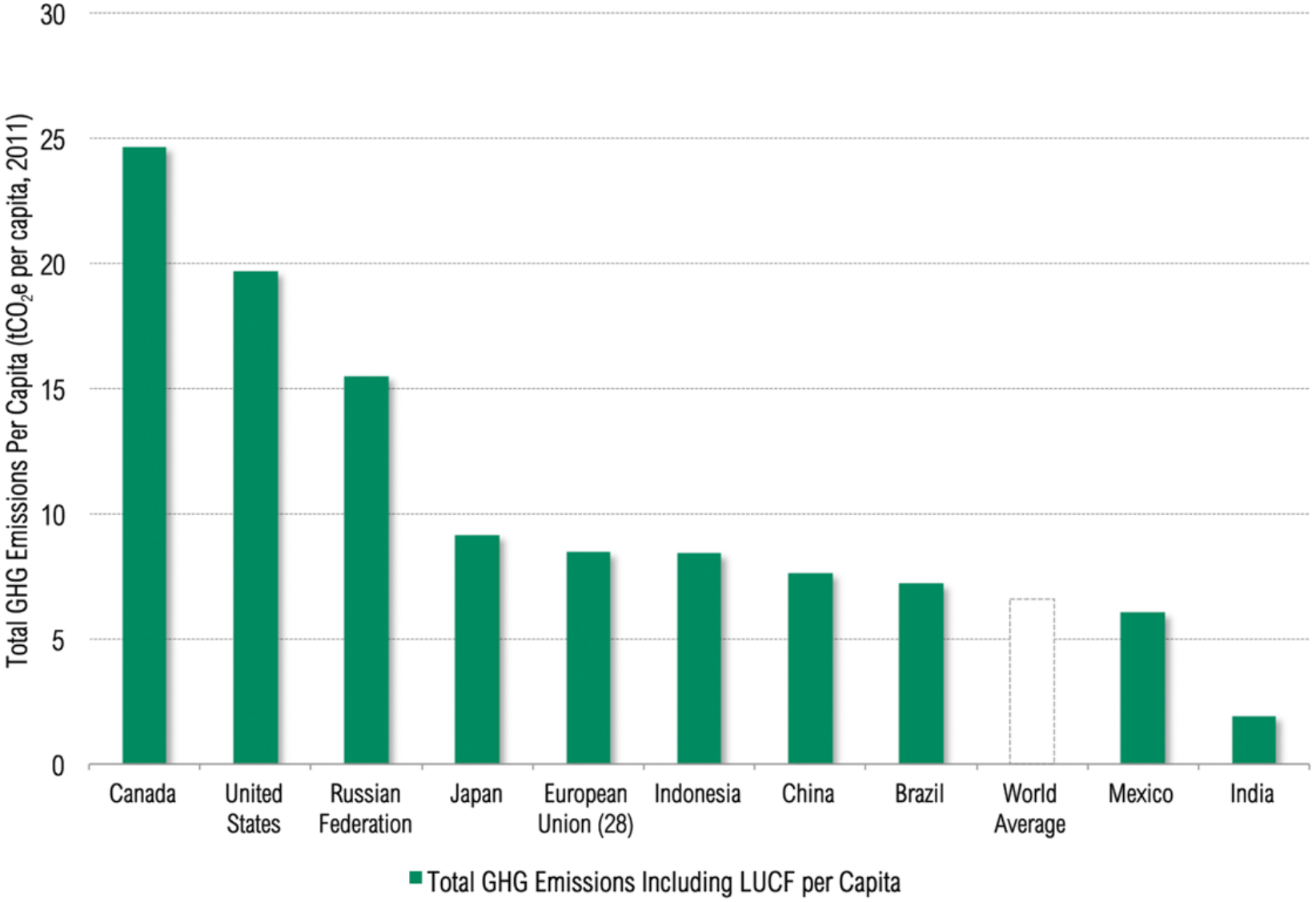
The largest producers of CO2 emissions worldwide in 2015, based on their share of global CO2 emissions



Source:
Germanwatch

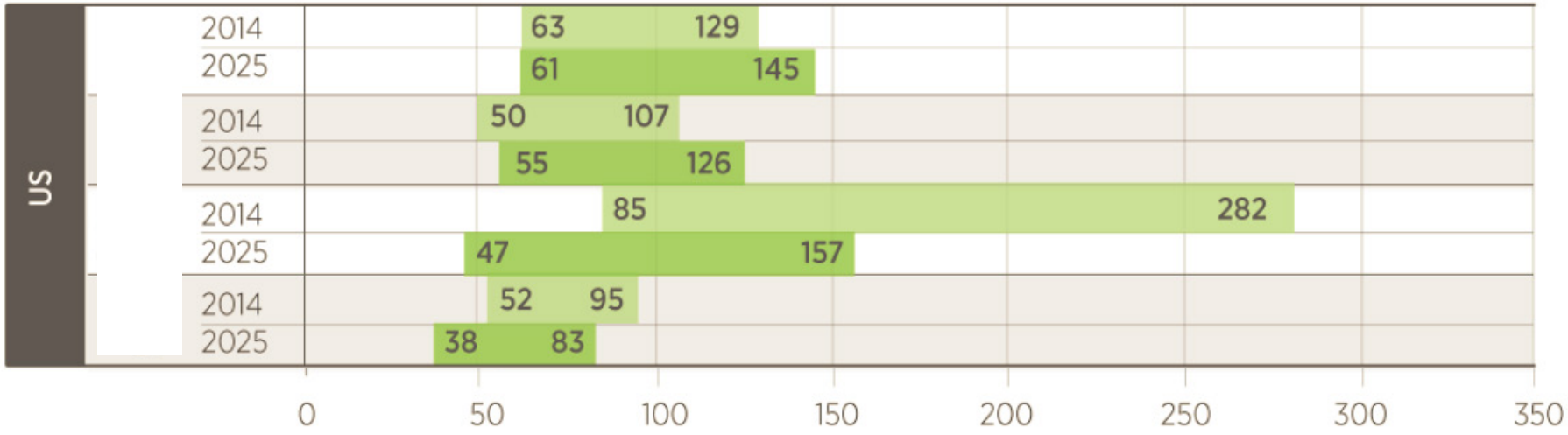
Additional Information:
Worldwide

Per Capita Emissions for Top 10 Emitters

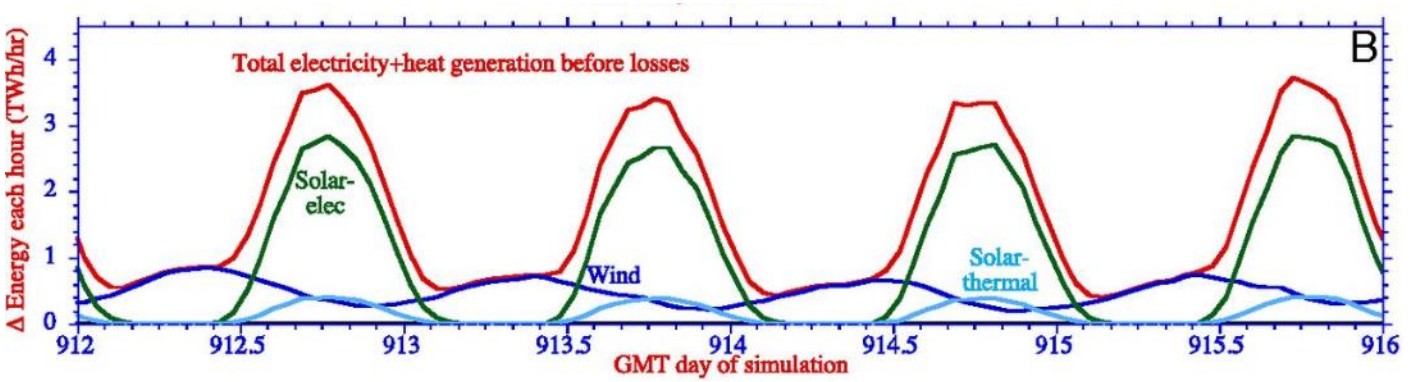


http://bit.ly/11SMpjA

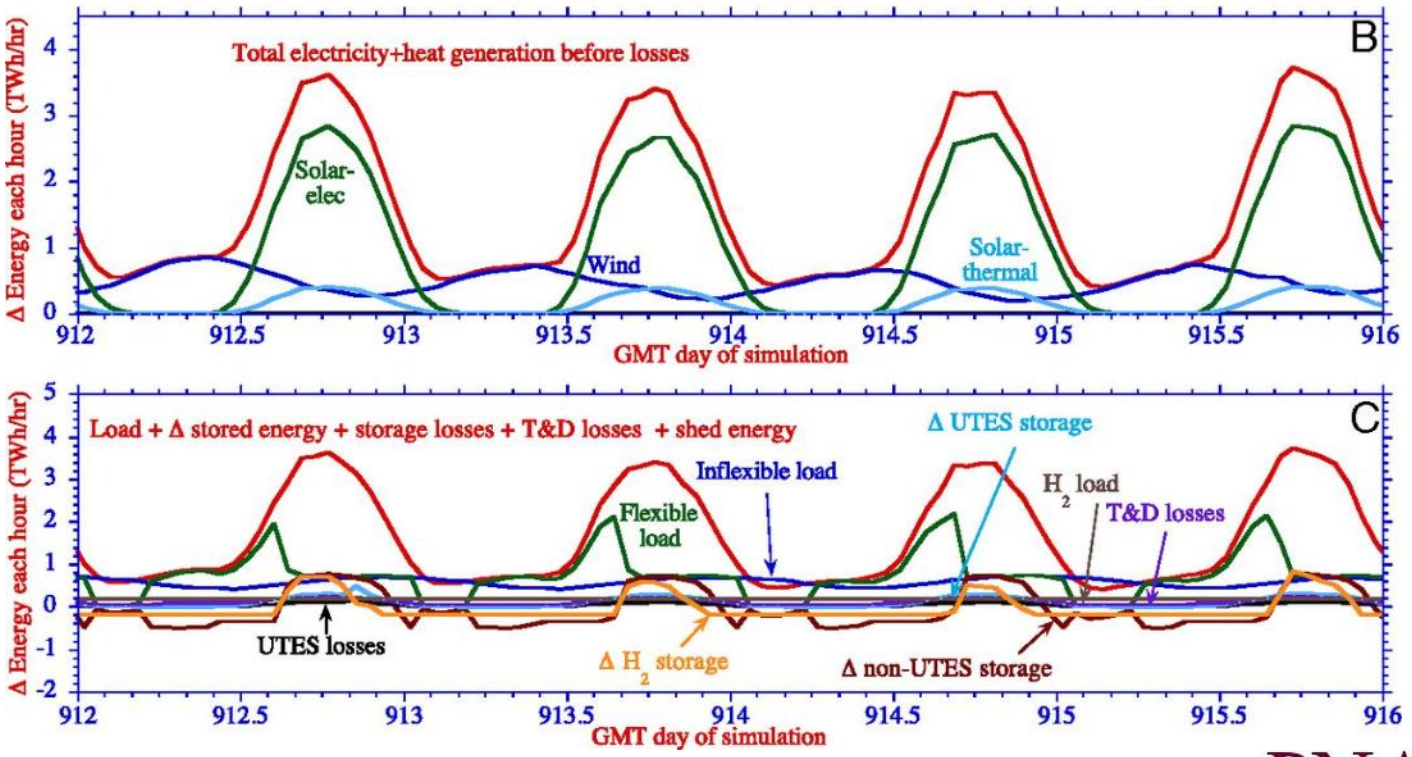
WORLD RESOURCES INSTITUTE


US
2014
2025
2014
2025
2014
2025
2014
2025
63
129
61
145
50
107
55
126
85
282
47
157
52
95
38
83
0
50
100
150
200
250
300
350

Practicality of a 100% renewable grid?

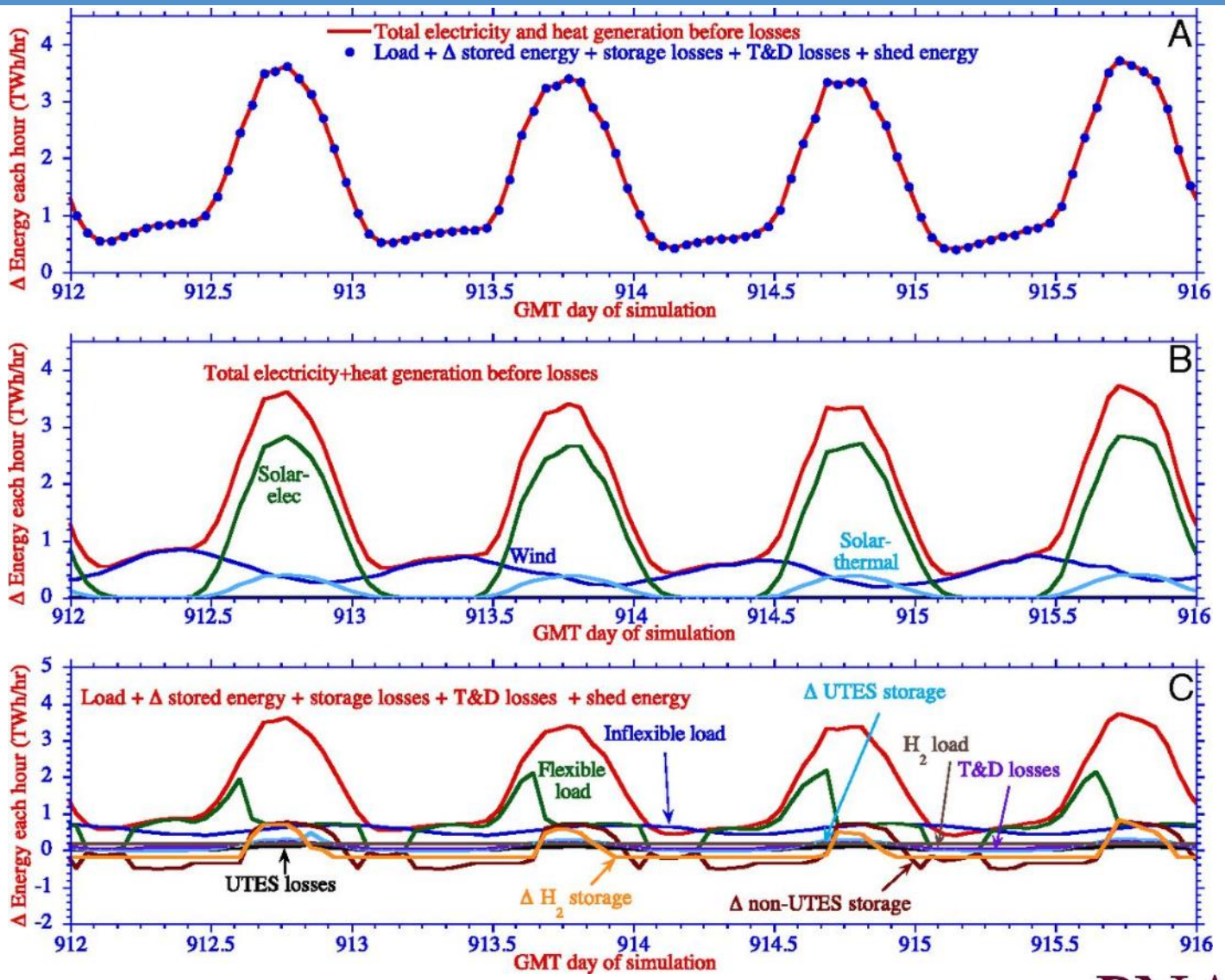


Practicality of a 100% renewable grid?



PNAS

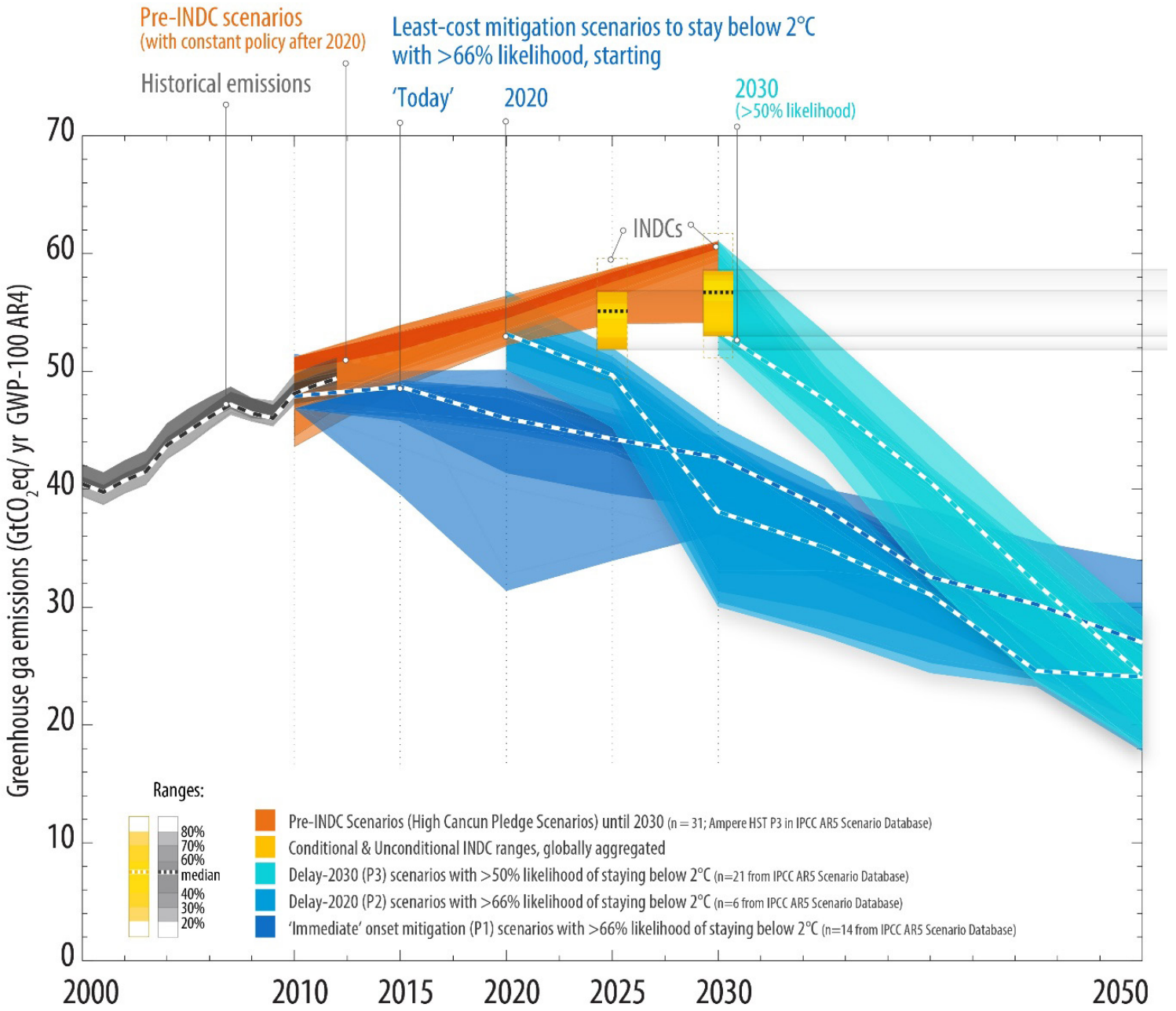
Practicality of a 100% renewable grid?



PNAS

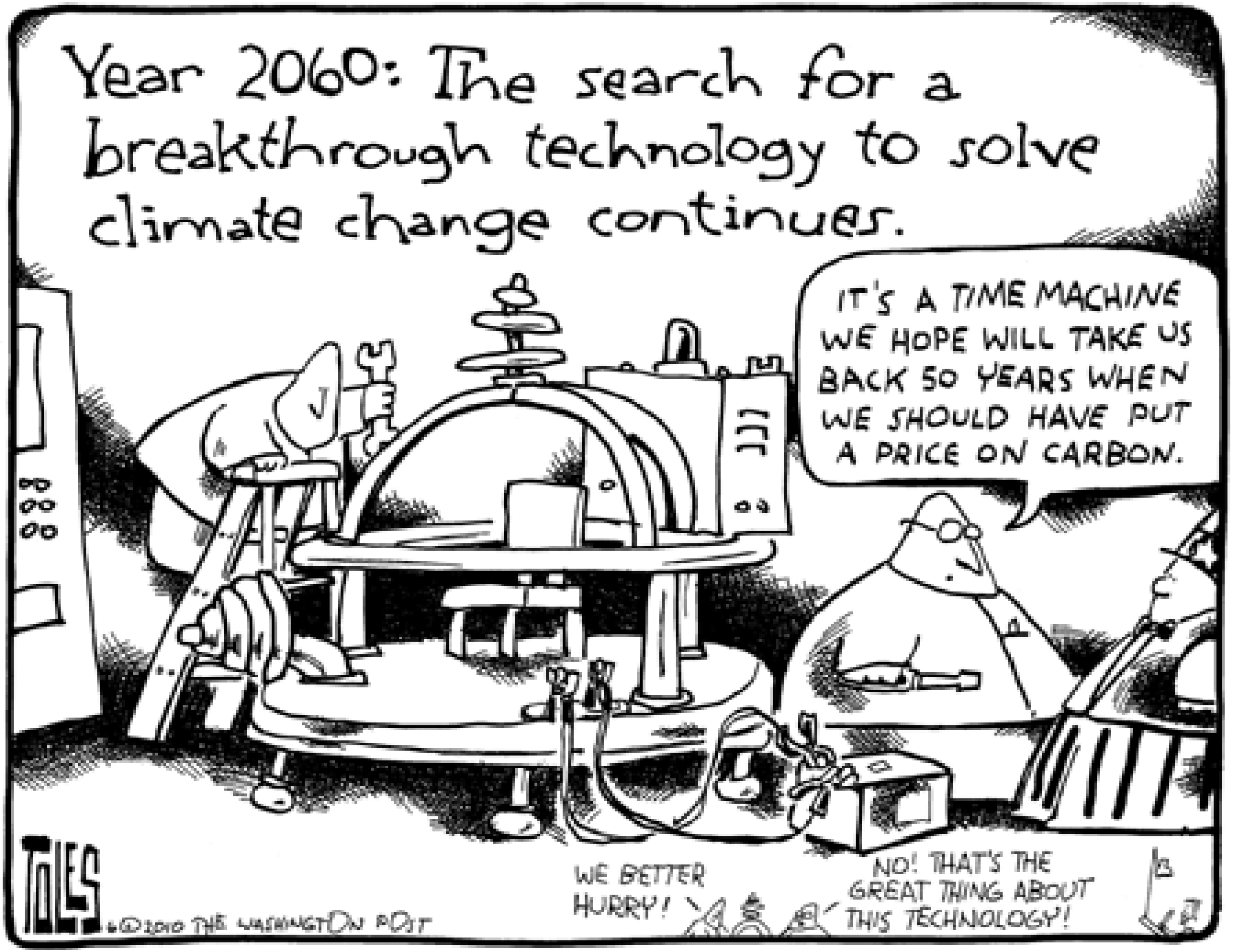
EFFECTIVE CLIMATE CHANGE RESPONSES

A MORE VIBRANT WORLD


Pre-INDC scenarios
(with constant policy after 2020)
Historical emissions
Least-cost mitigation scenarios to stay below 2°C
with >66% likelihood, starting
'Today'
2020
2030
(>50% likelihood)
INDCs
Greenhouse ga emissions (GtCO2eq/ yr GWP-100 AR4)
70
60
50
40
30
20
10
0
2000
2010
2015
2020
2025
2030
2050
Ranges:
80%
70%
60%
median
40%
30%
20%
Pre-INDC Scenarios (High Cancun Pledge Scenarios) until 2030 (n = 31; Ampere HST P3 in IPCC AR5 Scenario Database)
Conditional & Unconditional INDC ranges, globally aggregated
Delay-2030 (P3) scenarios with >50% likelihood of staying below 2°C (n=21 from IPCC AR5 Scenario Database)
Delay-2020 (P2) scenarios with >66% likelihood of staying below 2°C (n=6 from IPCC AR5 Scenario Database)
'Immediate' onset mitigation (P1) scenarios with >66% likelihood of staying below 2°C (n=14 from IPCC AR5 Scenario Database)

EFFECTIVE CLIMATE CHANGE RESPONSES

A MORE VIBRANT WORLD


Year 2060: The search for a breakthrough technology to solve climate change continues.
IT'S A TIME MACHINE WE HOPE WILL TAKE US BACK 50 YEARS WHEN WE SHOULD HAVE PUT A PRICE ON CARBON.
WE BETTER HURRY!
NO! THAT'S THE GREAT THING ABOUT THIS TECHNOLOGY!
TOLES
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