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OESCHGER CENTRE
CLIMATE CHANGE RESEARCH

3rd Sustainability Forum 2018, Basel

Climate Change:

Resource Problem of the 21st Century

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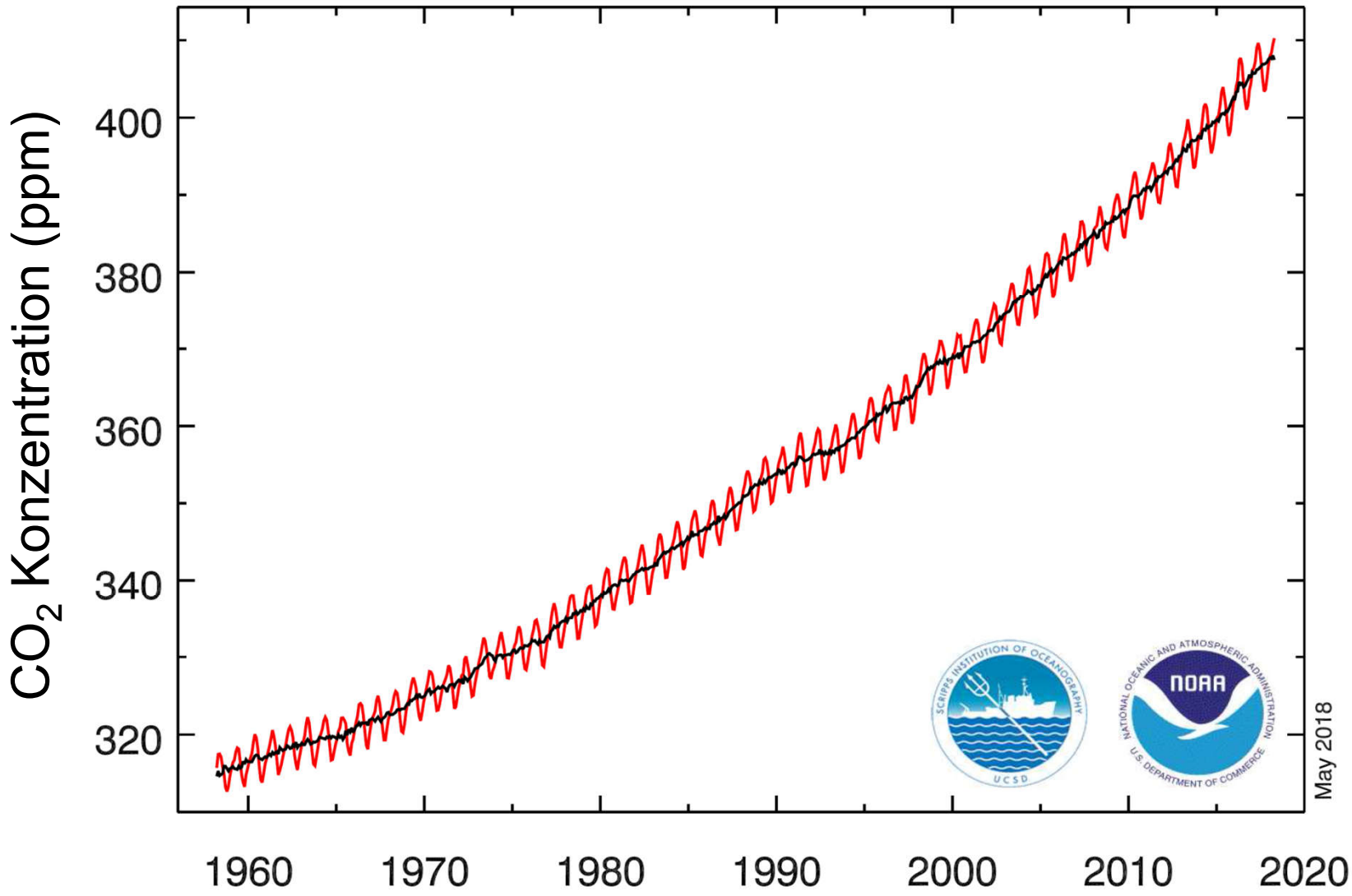
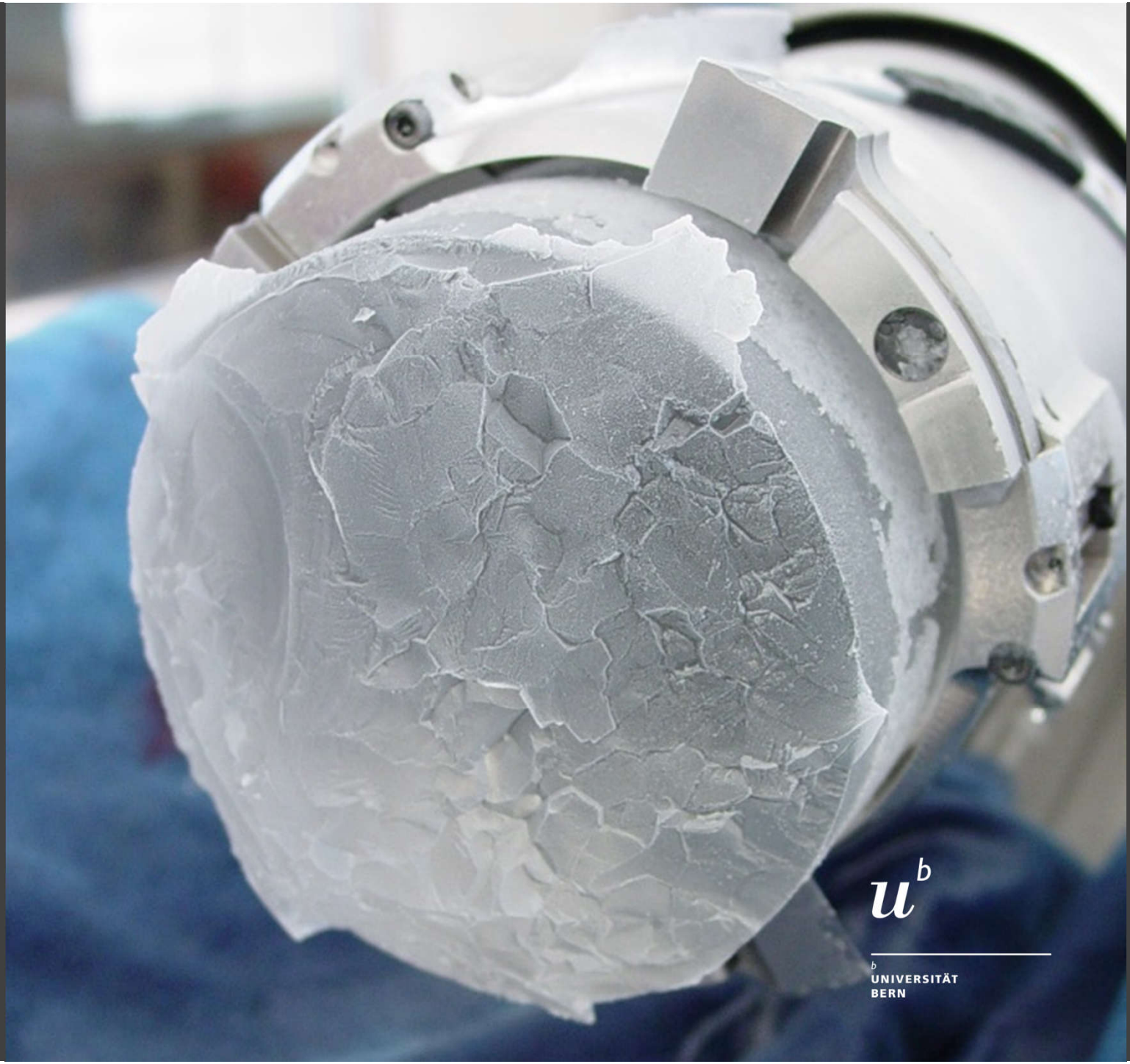
Apollo 8, 24.12.1968

1. Know the present
2. Estimate the future
3. Resources in danger
4. Synergy of ambitions

CO_2 Mauna Loa, Hawaii

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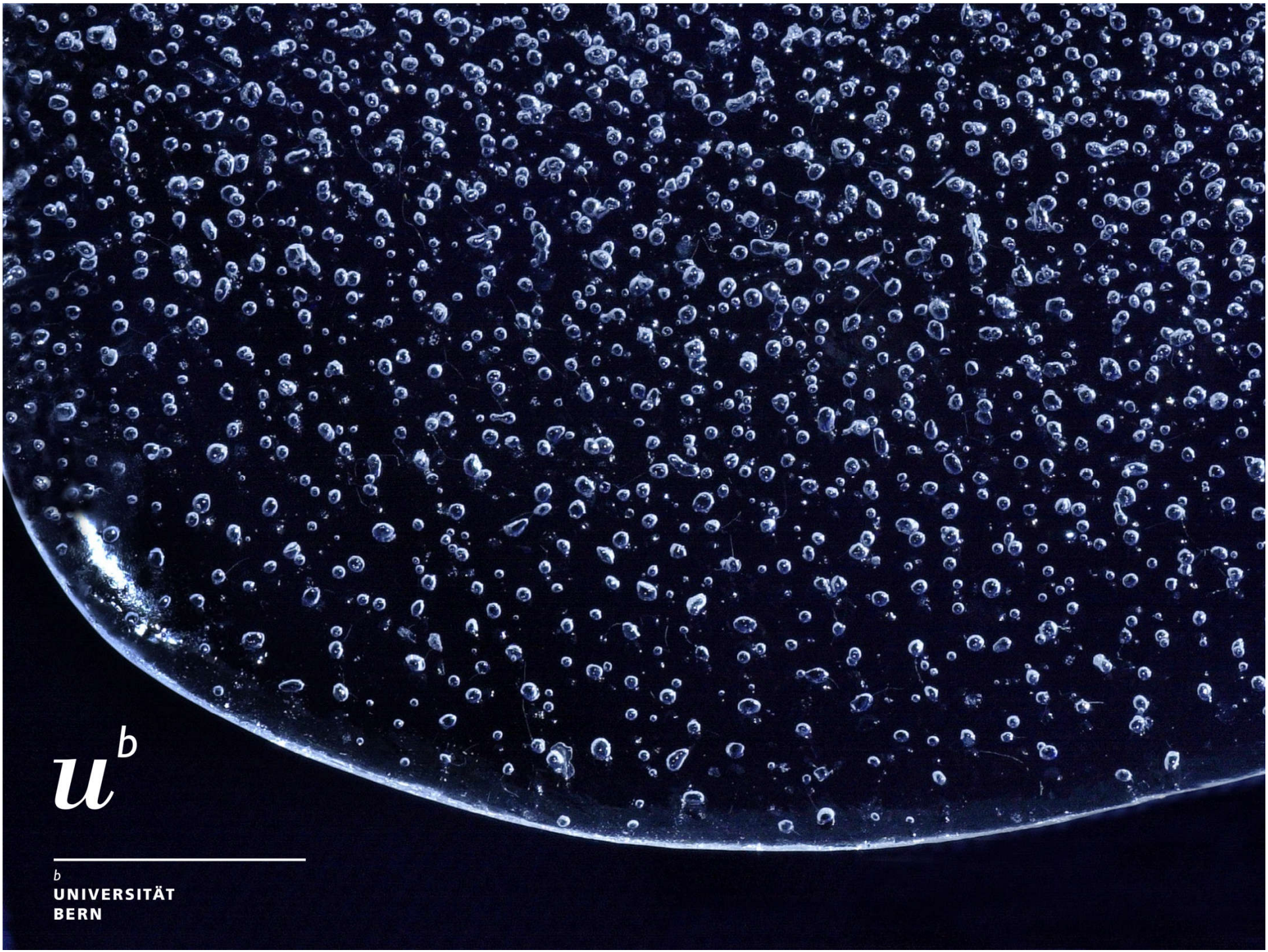

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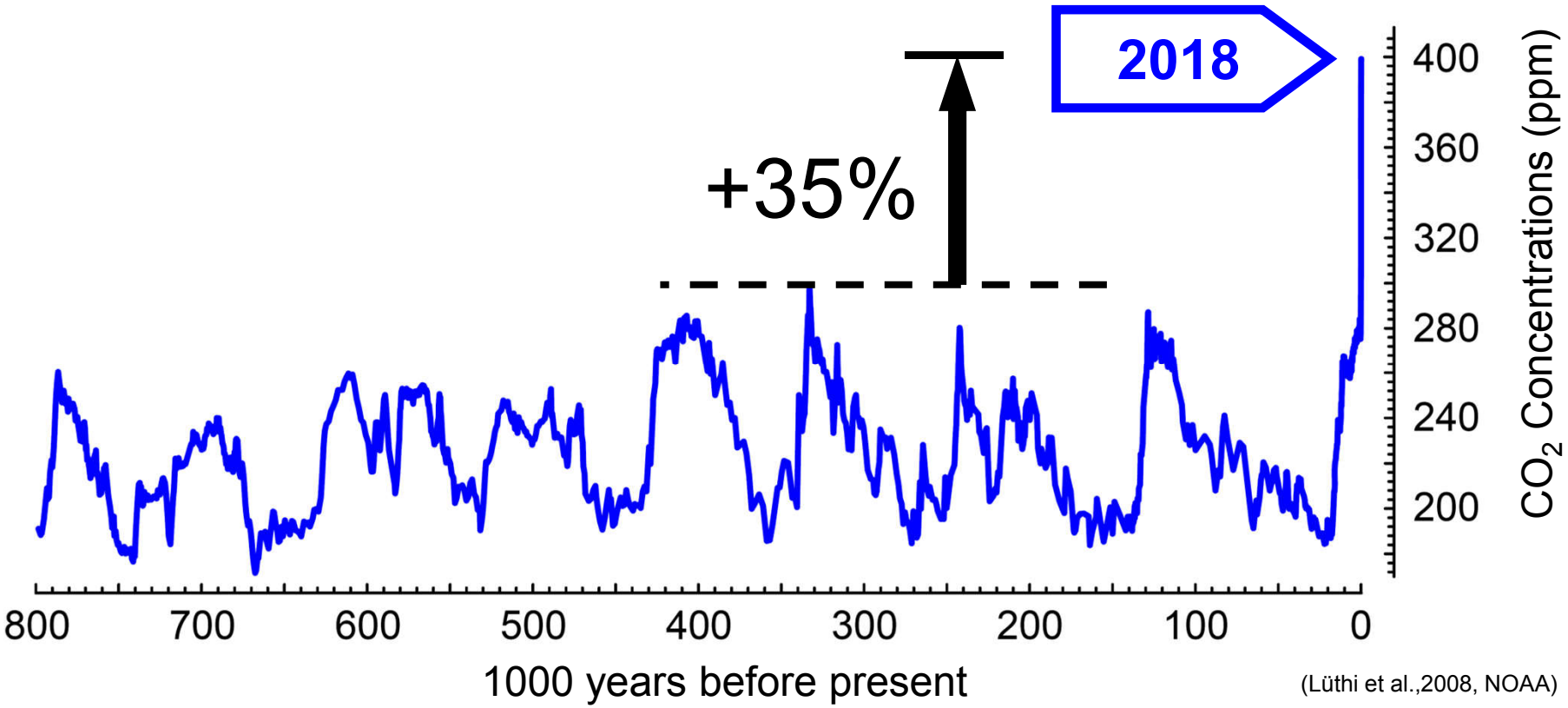
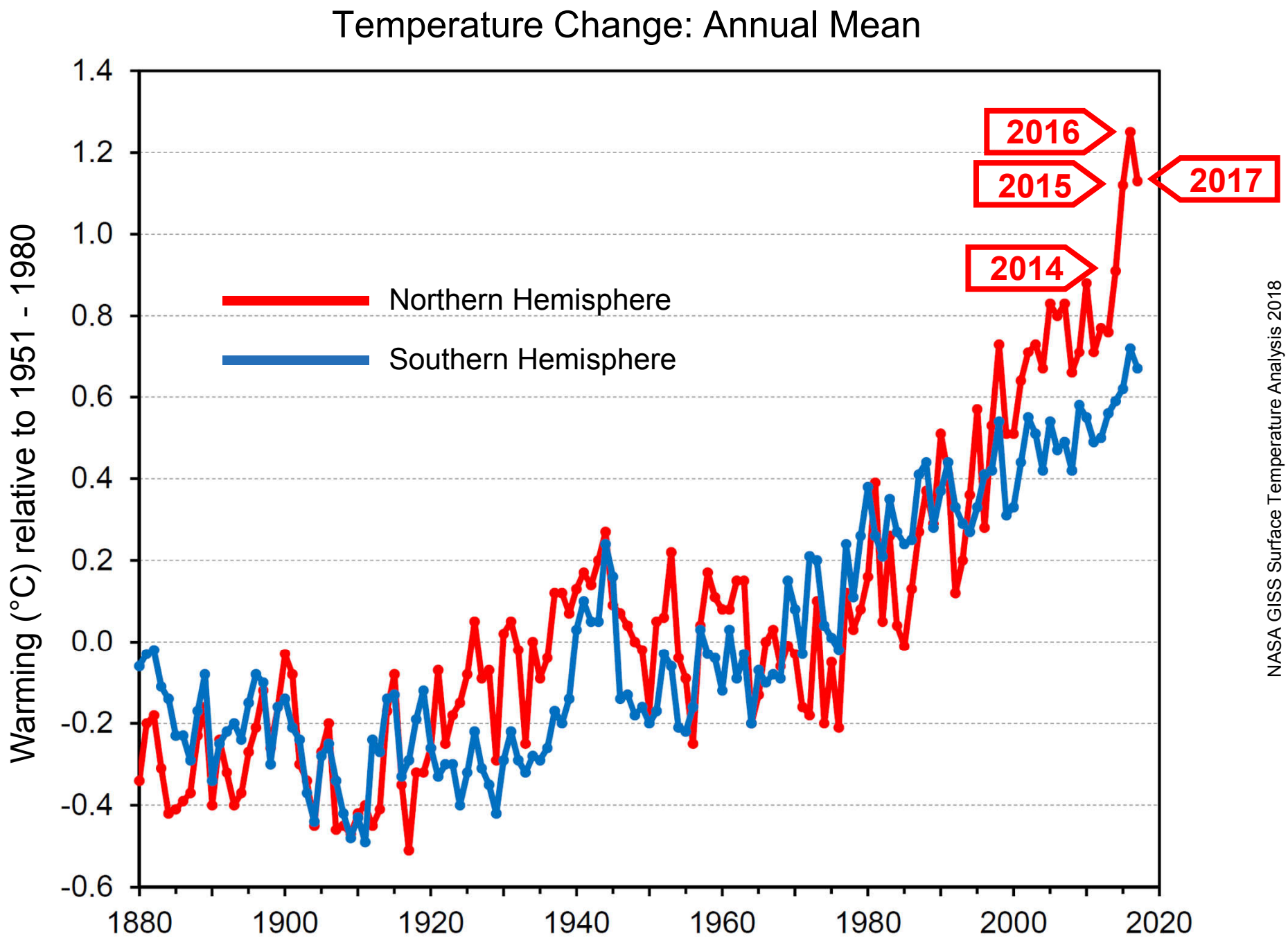
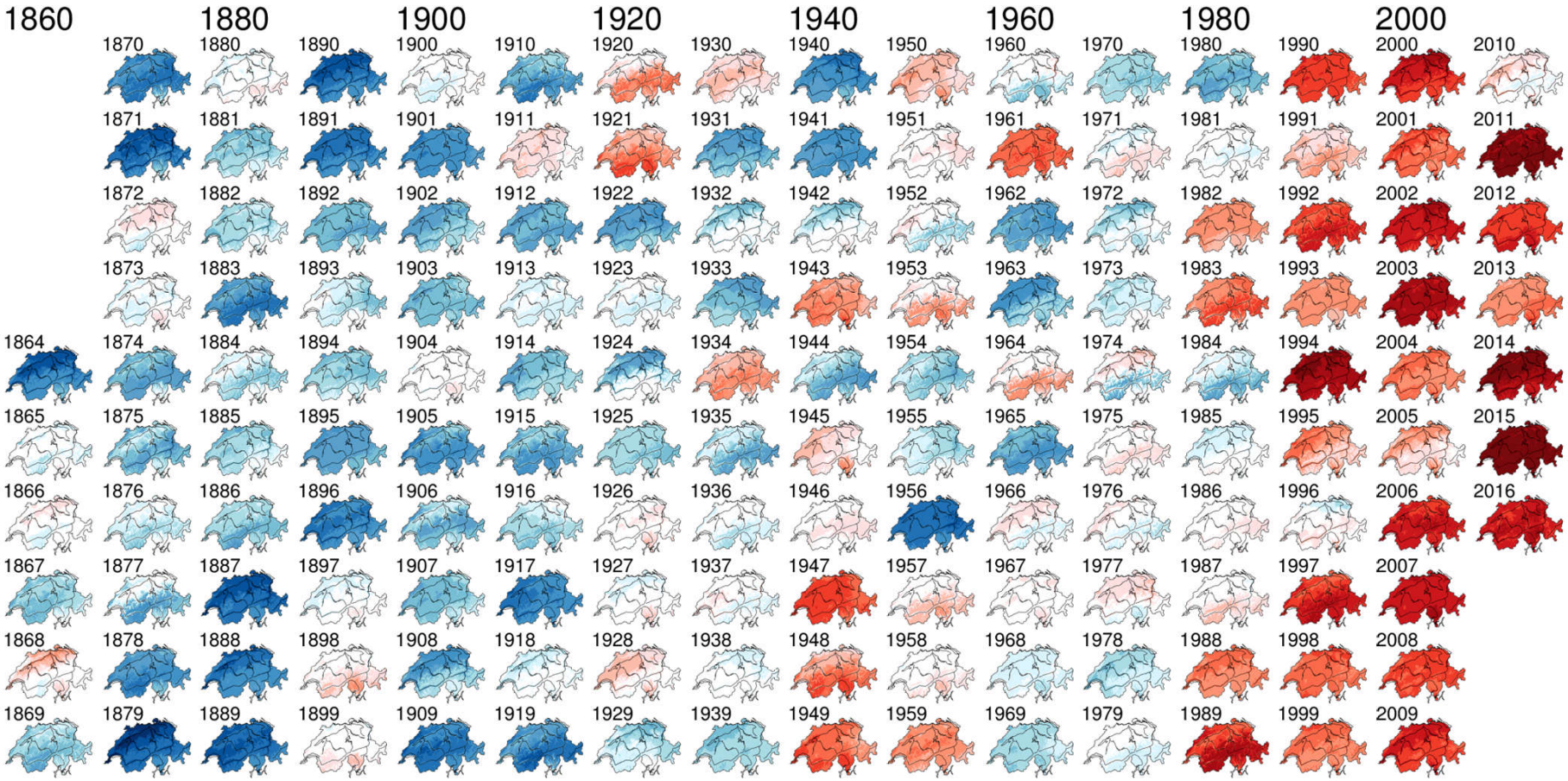
CO_2 concentration of the past 800,000 years



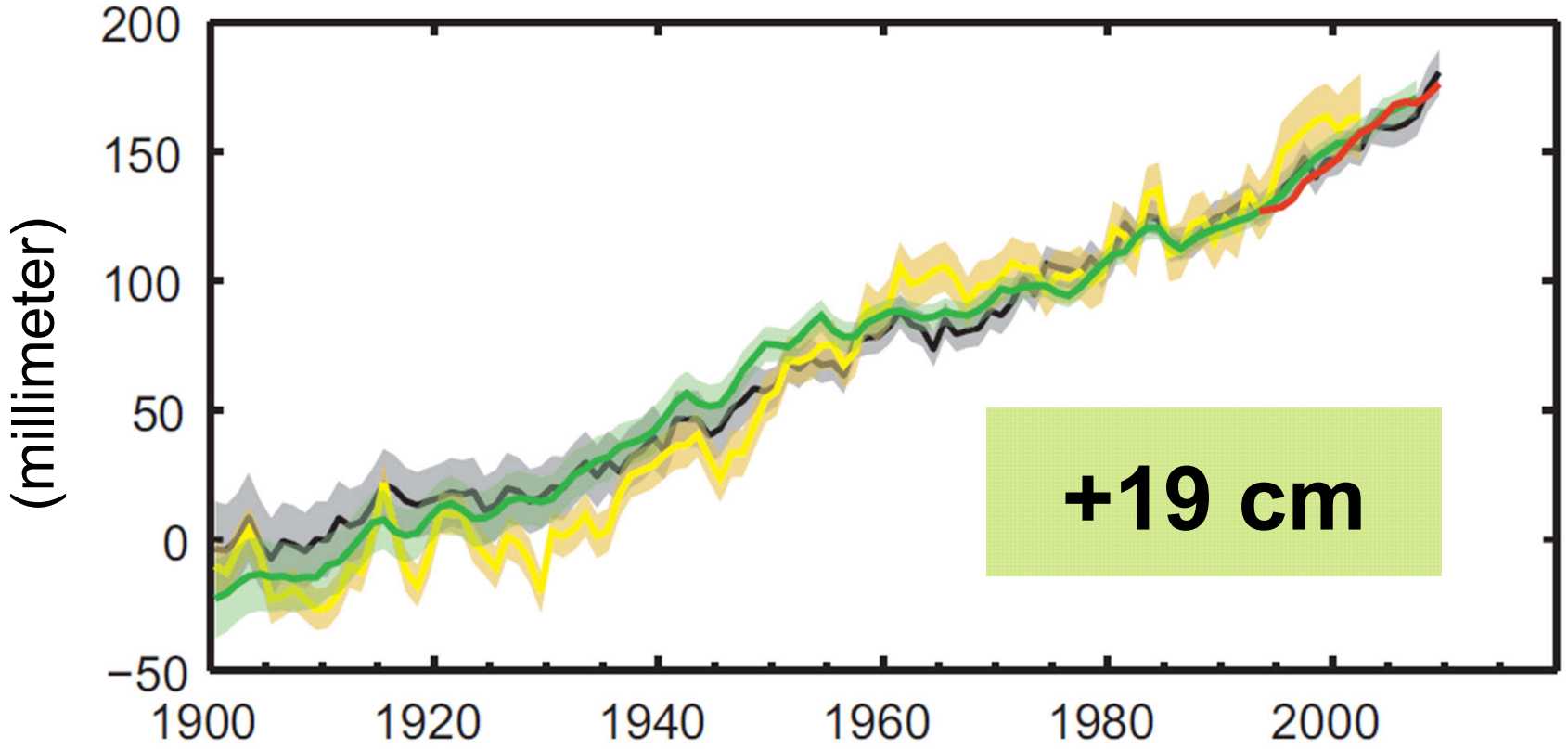
(Lüthi et al.,2008, NOAA)


Temperature Change: Annual Mean
Warming (°C) relative to 1951 - 1980
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
-0.4
-0.6
1880
1900
1920
1940
1960
1980
2000
2020
Northern Hemisphere
Southern Hemisphere
2016
2015
2017
2014
NASA GISS Surface Temperature Analysis 2018

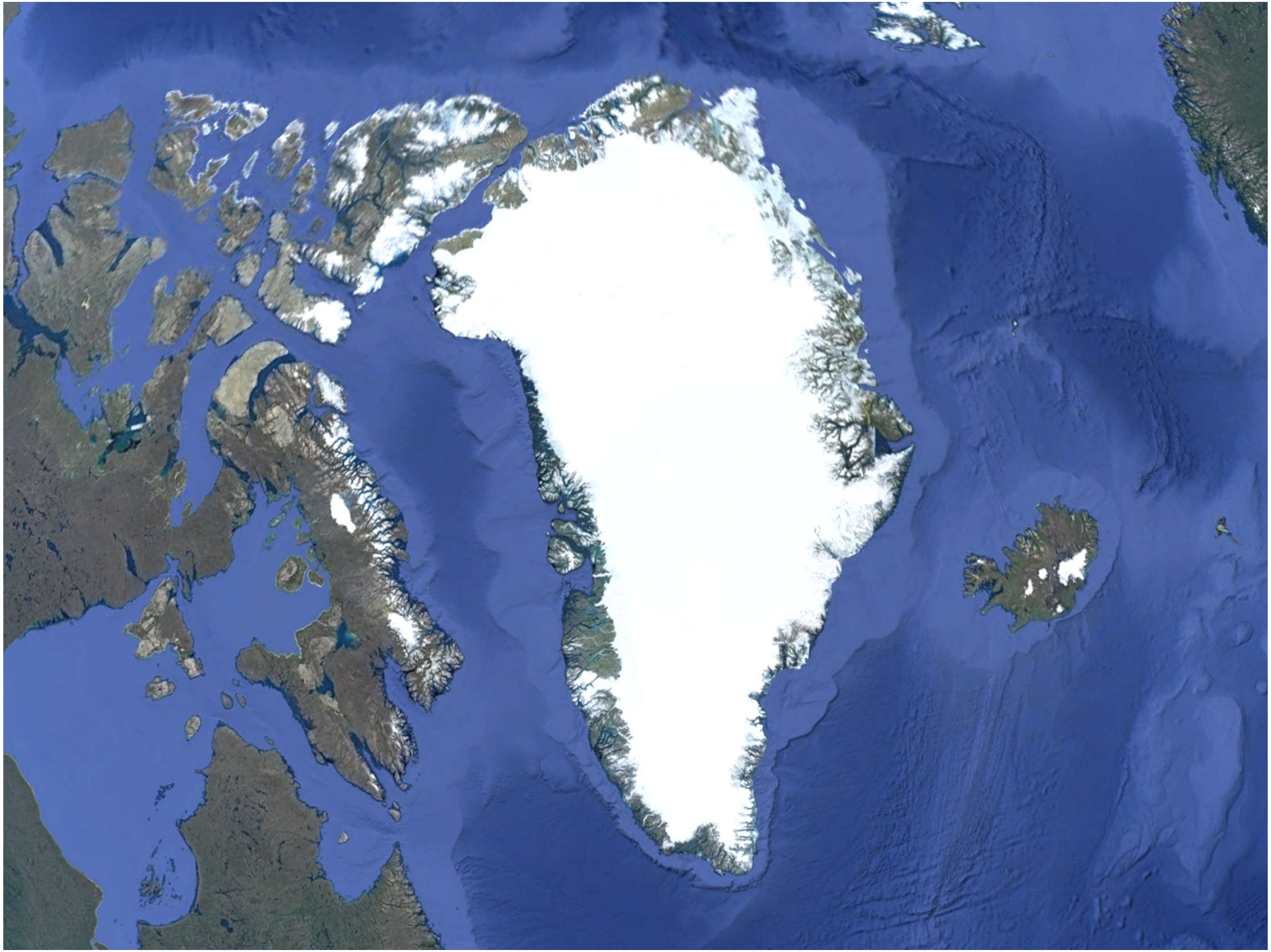
Temperature in Switzerland 1864-2016 (relative to 1961-1990)

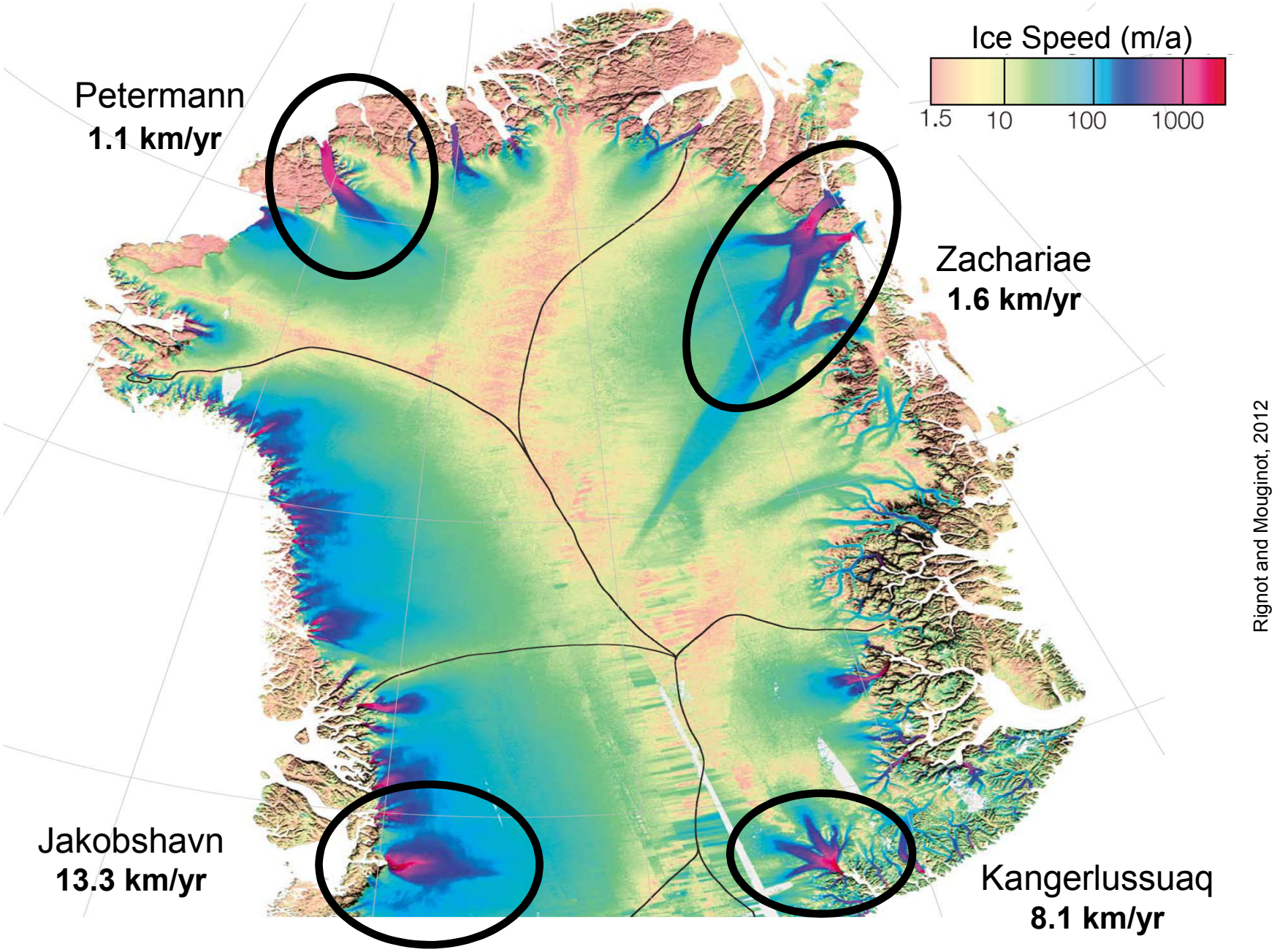


Increase in sea level since 1900



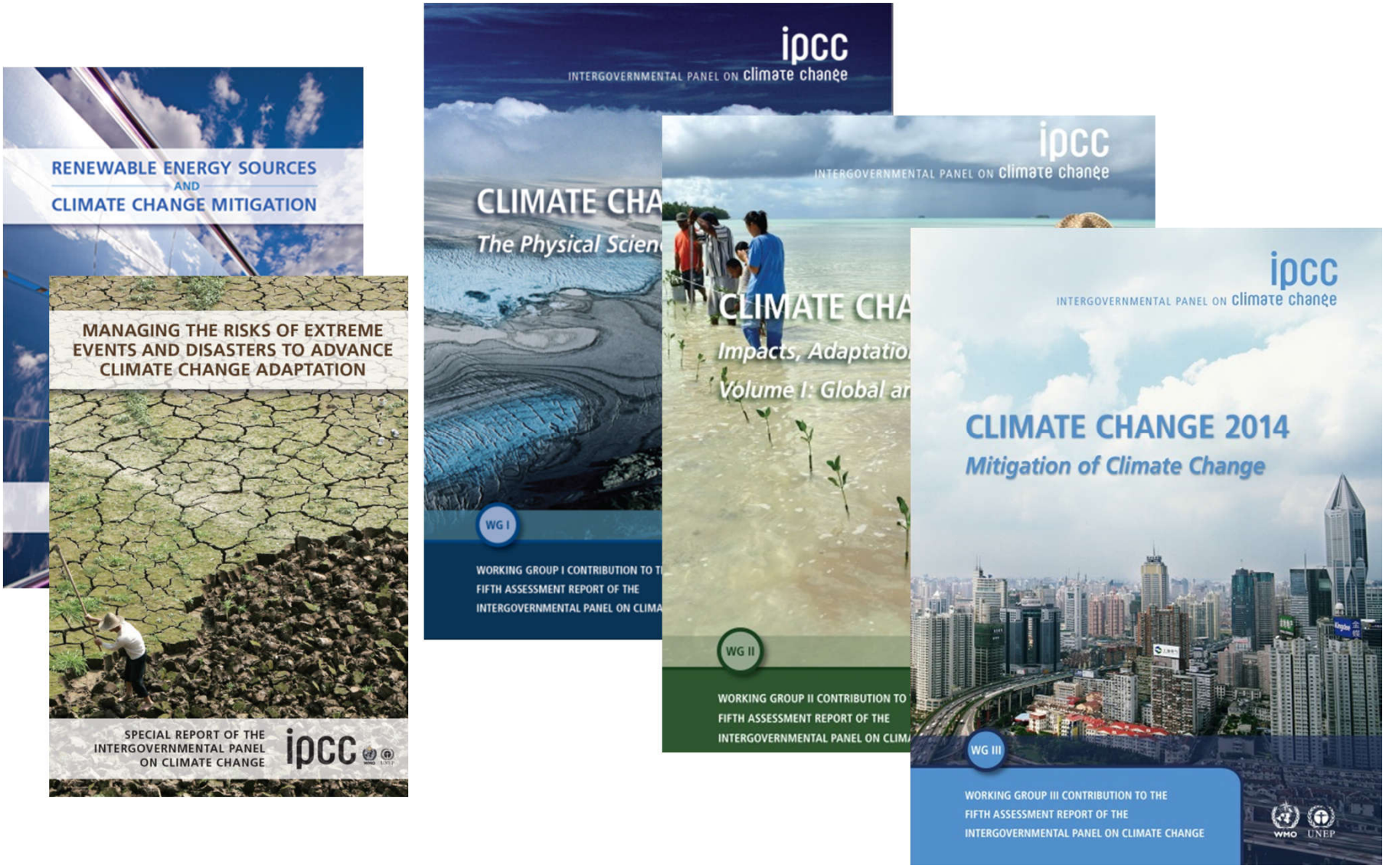
IPCC 2013, Fig. SPM.3d




Ice Speed (m/a)
1.5
10
100
1000
Petermann
1.1 km/yr
Zachariae
1.6 km/yr
Jakobshavn
13.3 km/yr
Kangerlussuaq
8.1 km/yr
Rignot and Mouginot, 2012


Greenland loses ~ 1 km³ ice per day
Jakobshavn Isbræ
69.15 °N, 50.22 °W
9.8.2017

IPCC 5. Assessment Report (2008-2014):



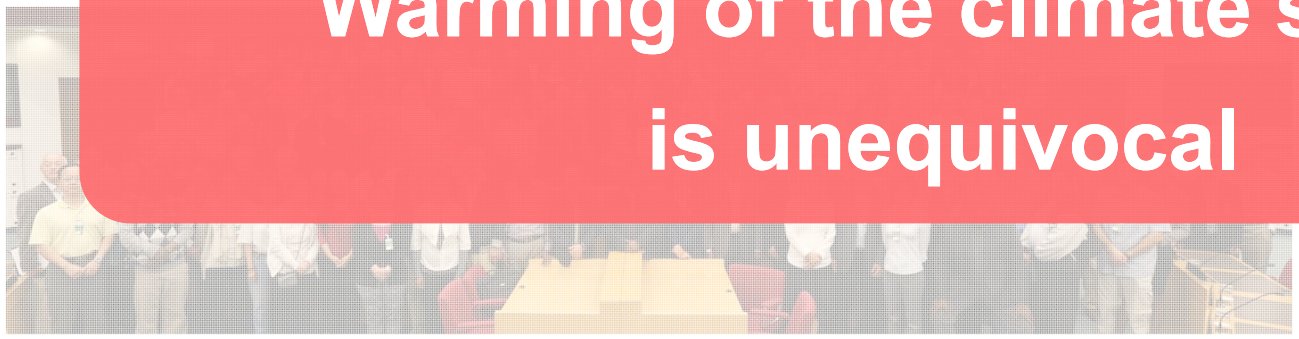
IPCC AR5: More than 1100 authors

ipcc

WMO UNEP

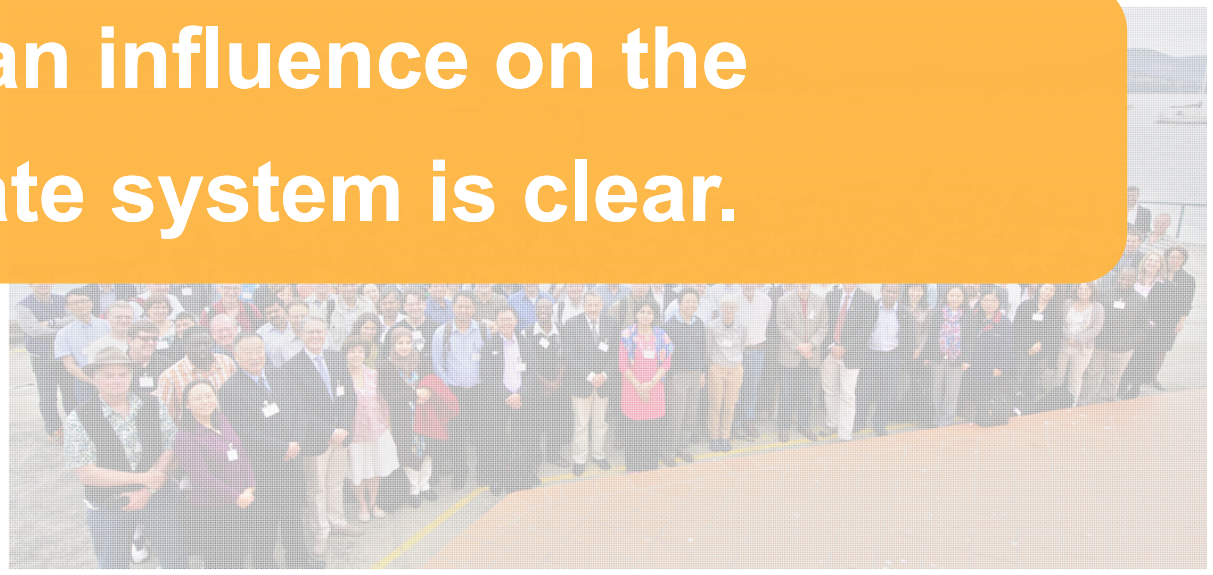
IPCC AR5: More than 1100 authors

Warming of the climate system is unequivocal



WMO UNEP

Human influence on the climate system is clear.



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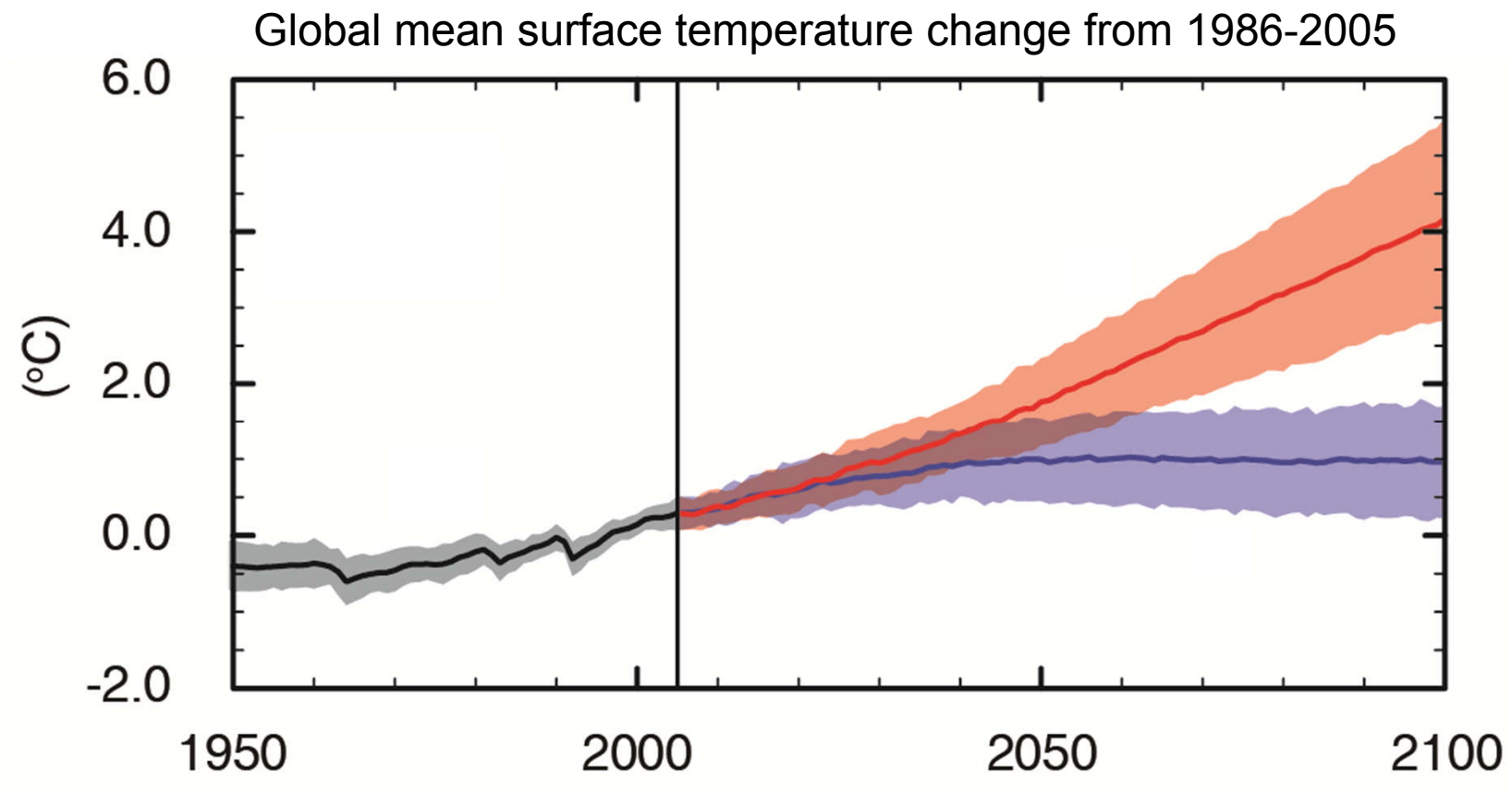
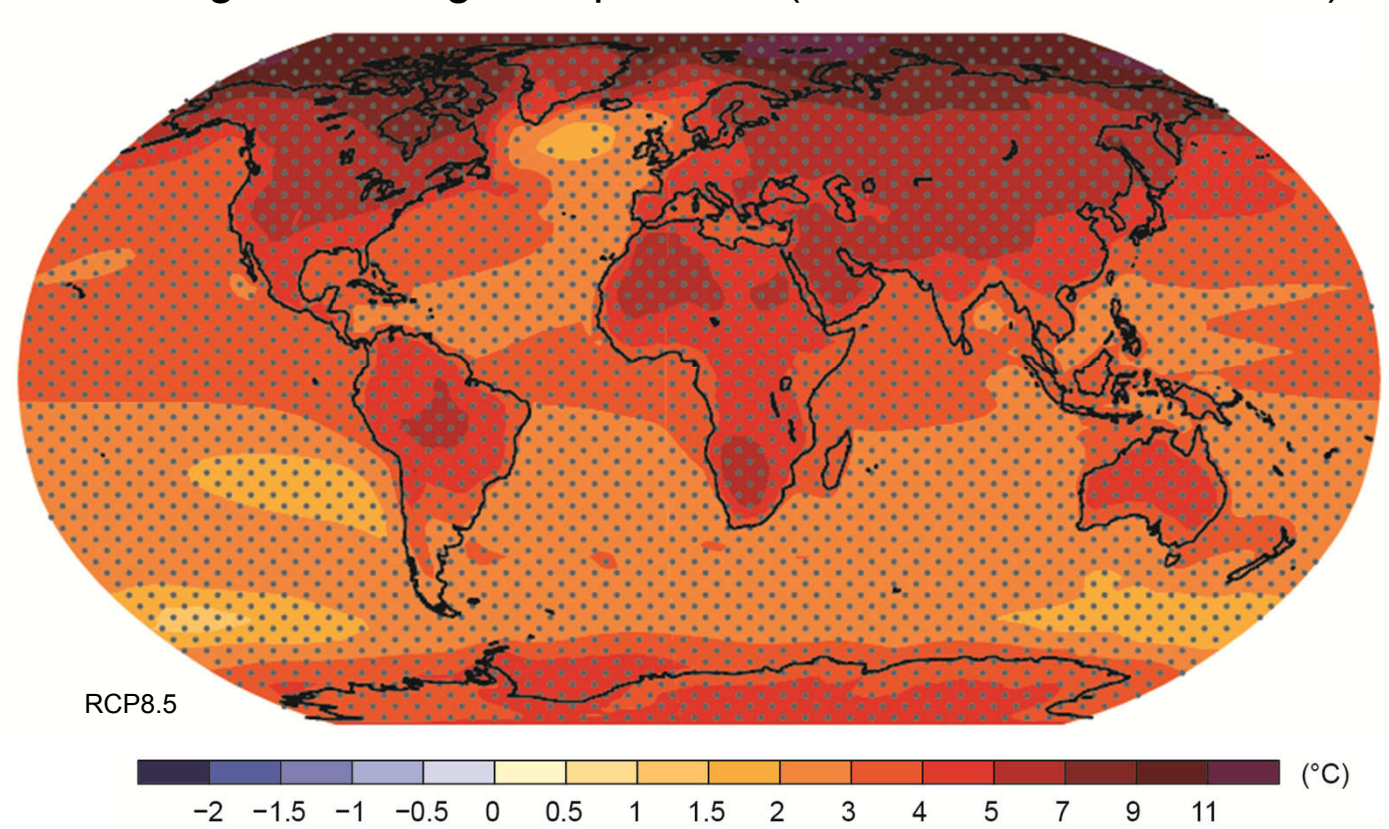


IPCC 2013, Fig. SPM.7a, modified

Further warming will increase the likelihood of severe, pervasive and irreversible impacts

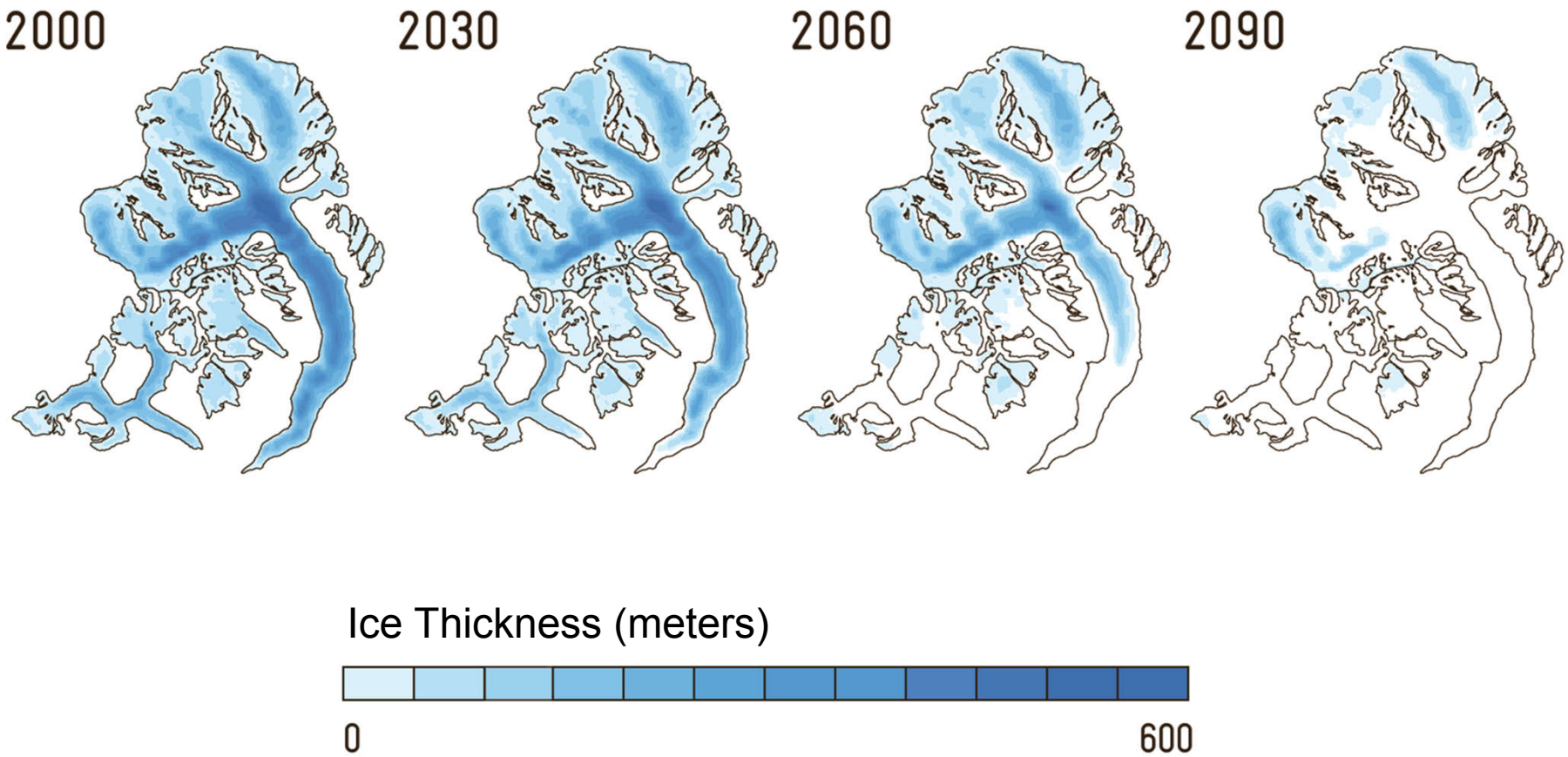
Change in average temperature (1986-2005 to 2081-2100)



IPCC 2013, Fig. SPM.8a

Further warming will increase the likelihood of severe, pervasive and irreversible impacts

Massive demise of glaciers worldwide



CH 2014 Impacts

1. Know the present
2. Estimate the future
3. **Resources in danger**
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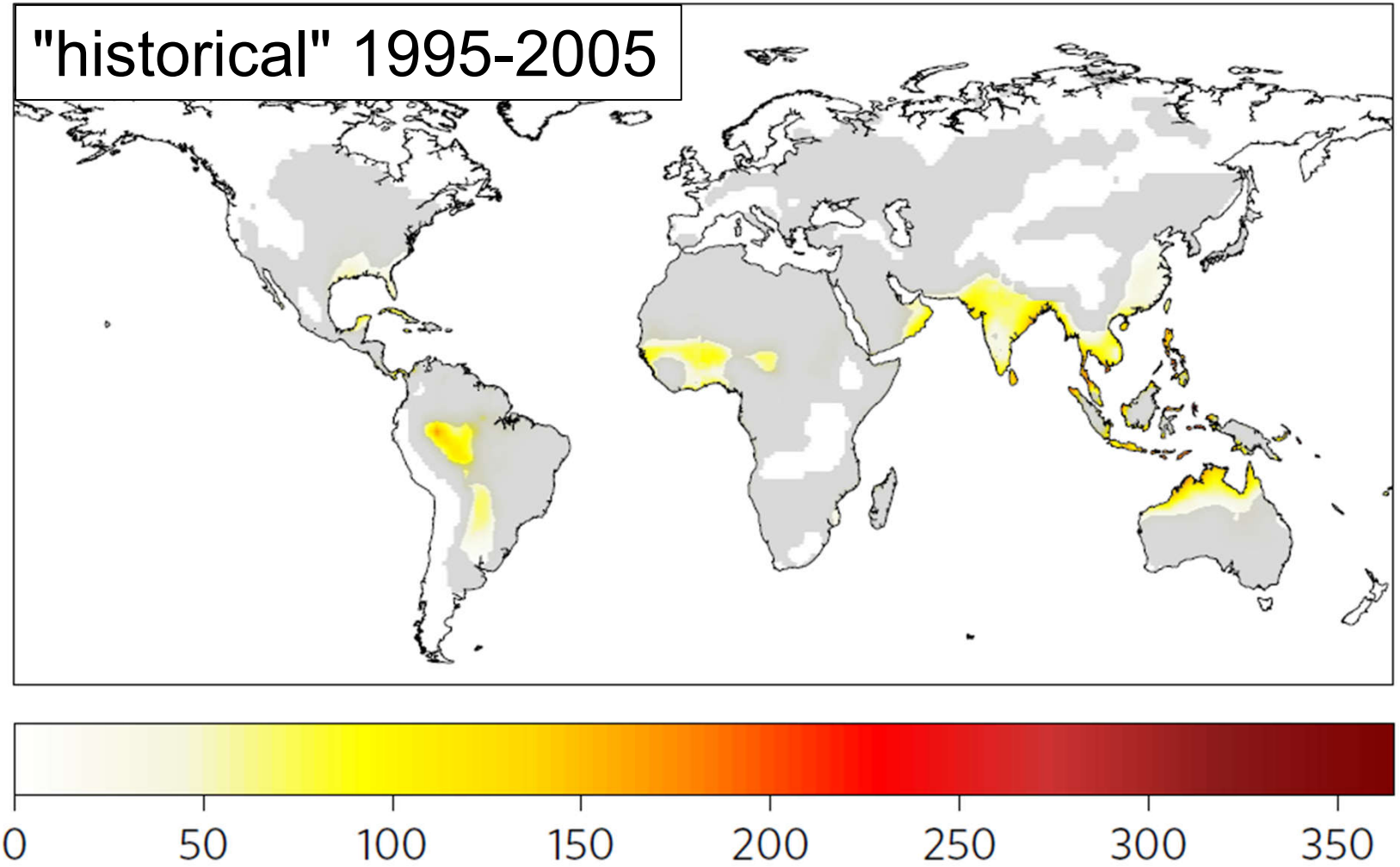
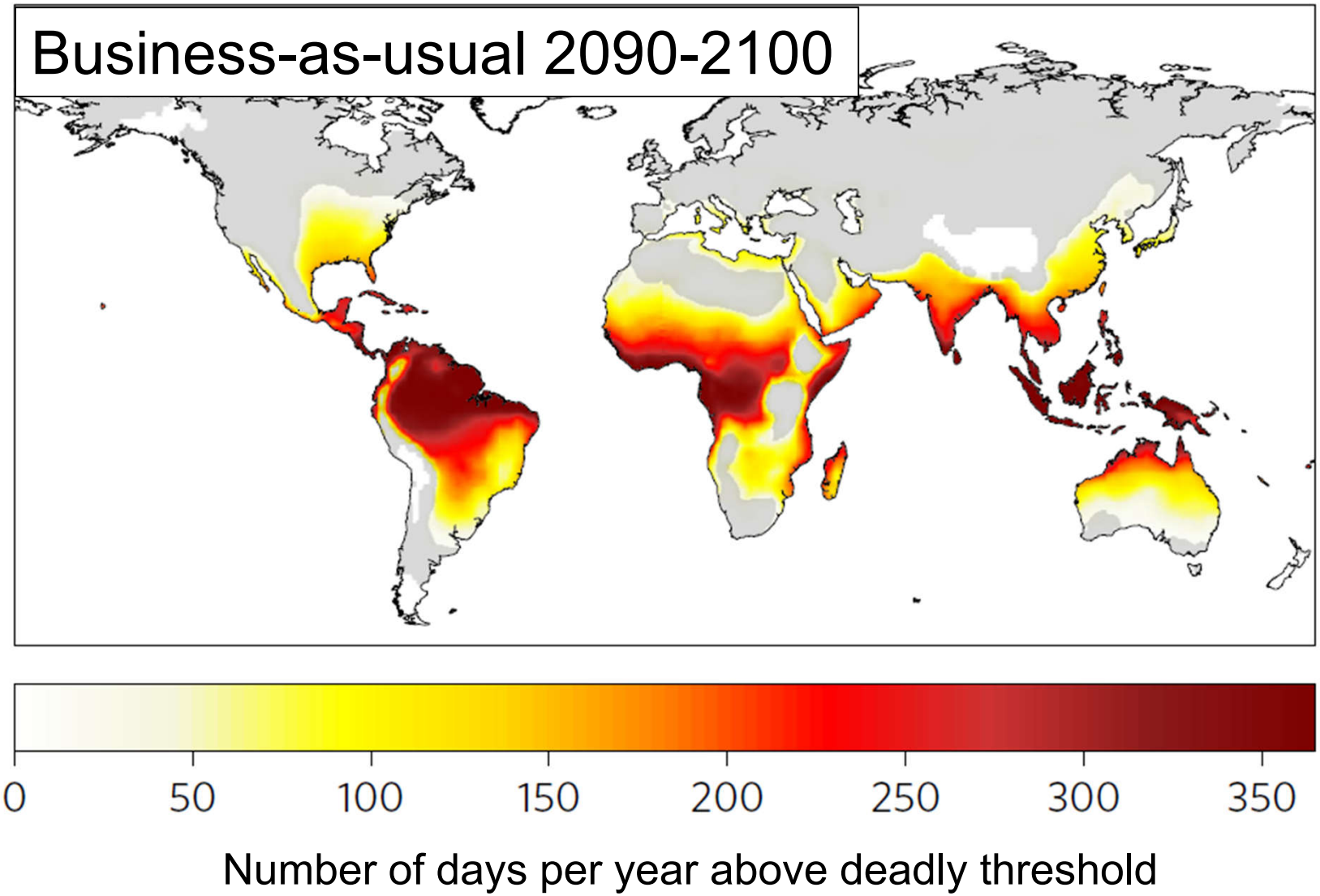
Resource Health: Dangerous Heat

Resource Health: Dangerous Heat



Mora et al., 2017

Resource Health: Dangerous Heat



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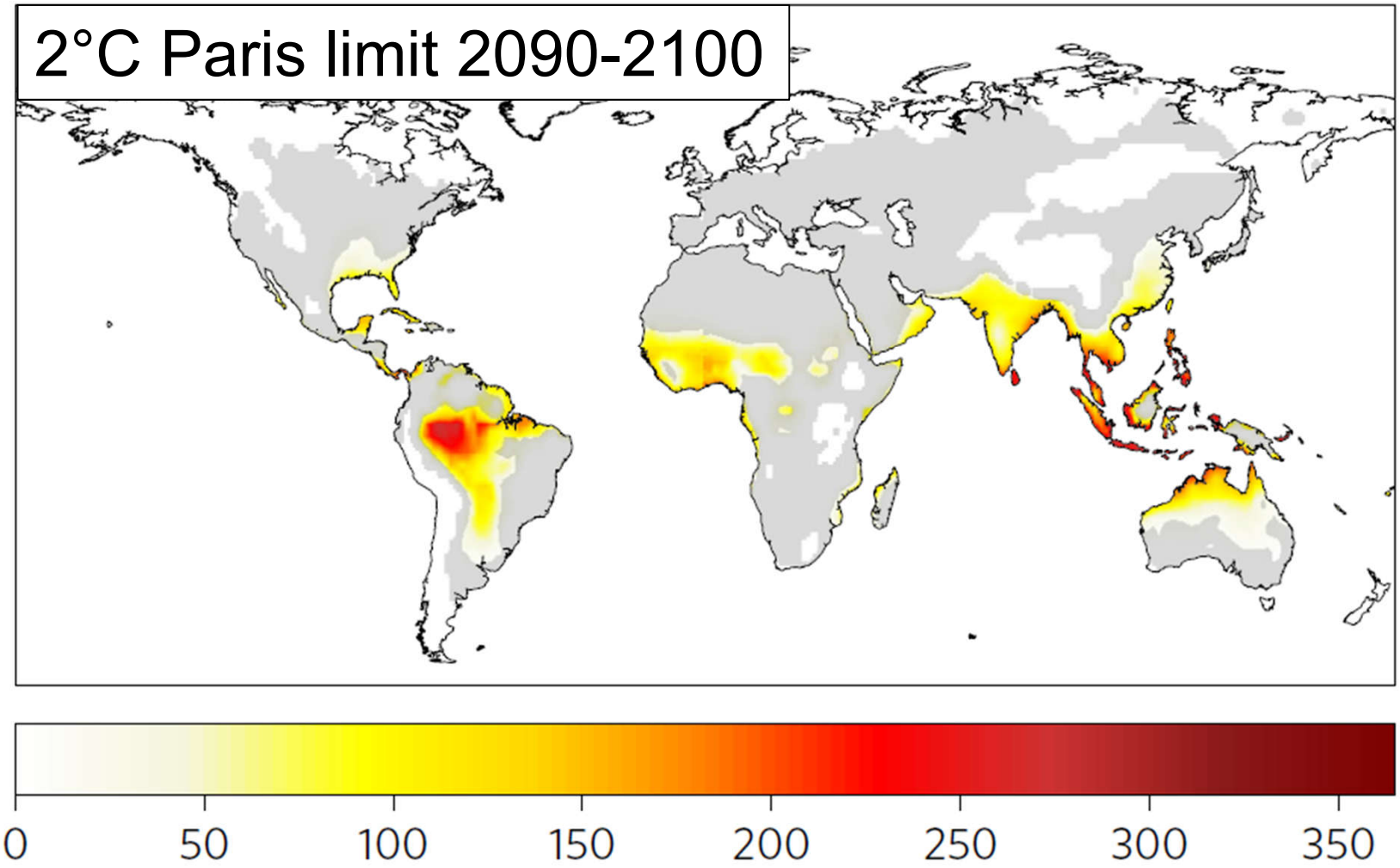
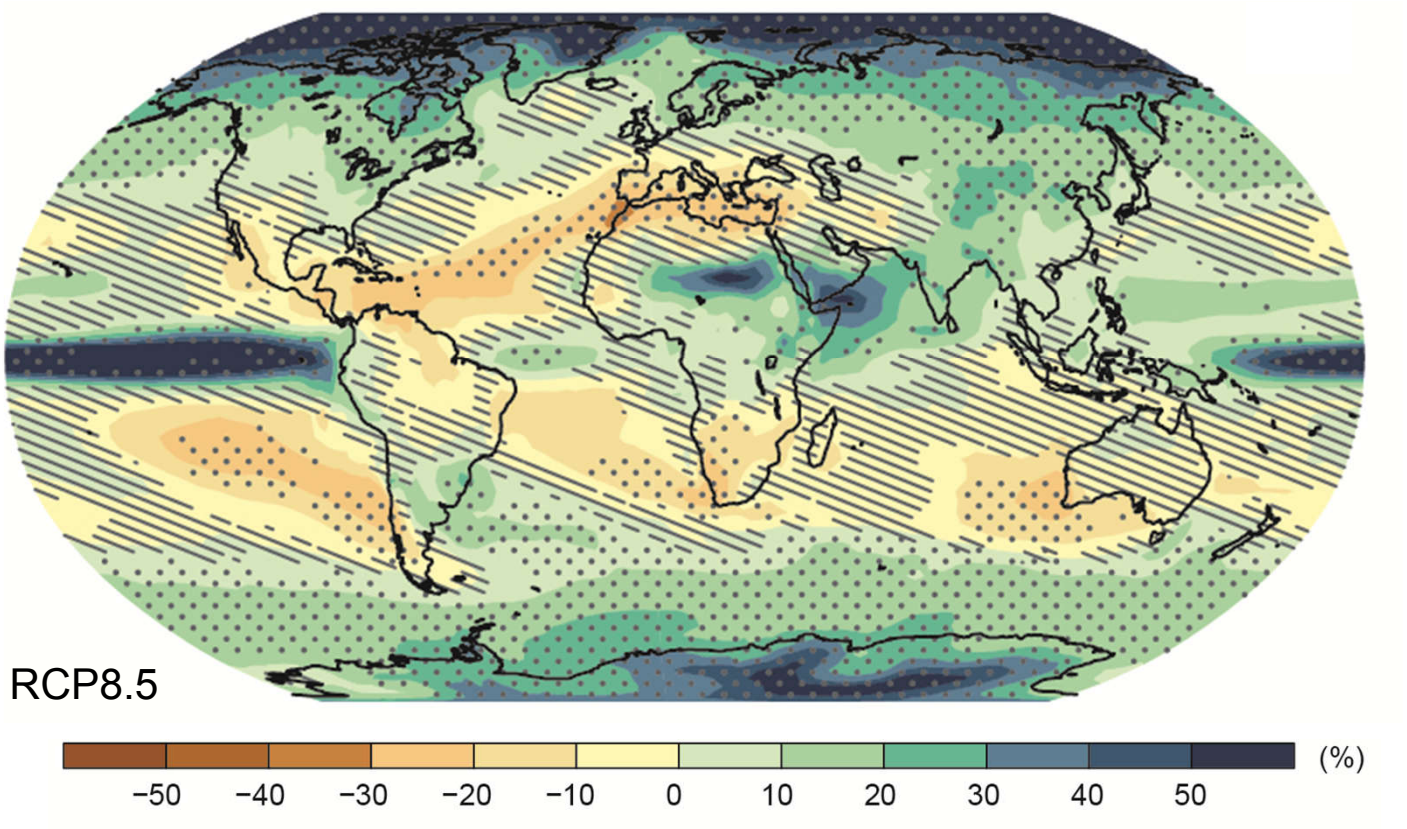


Mora et al., 2017

Resource Water: Drought and Water Stress

Resource Water: Drought and Water Stress

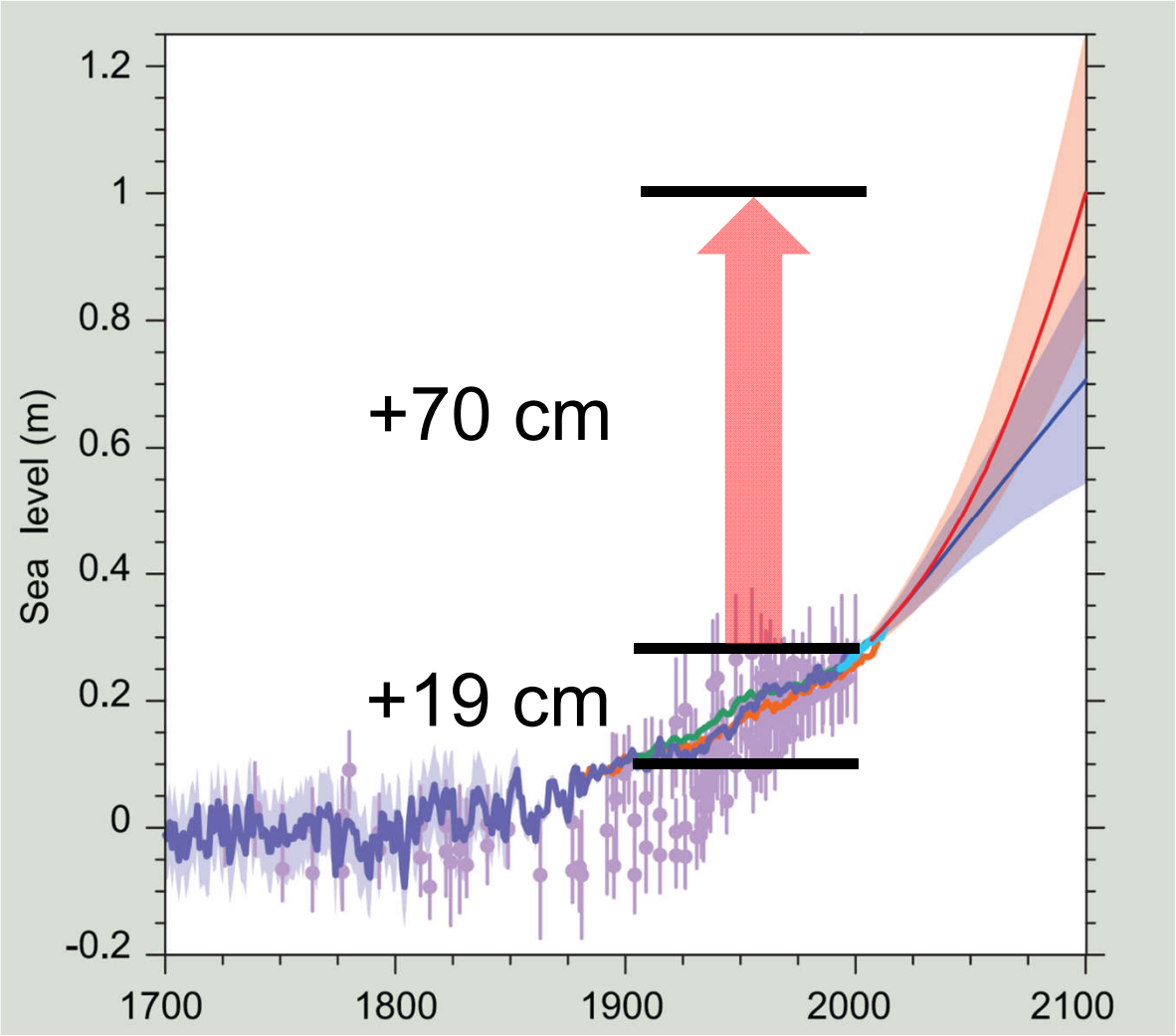
Change in Precipitaiton (1986-2005 to 2081-2100)



IPCC 2013, Fig. SPM.8b

Resource Land: Loss of Home and Habitat

Resource Land: Loss of Home and Habitat



IPCC 2013, TFE.2, Fig. 2

Warming: Resource Health

Precipitation: Resource Water

Sea Level: Resource Land

Climate change is a resource problem

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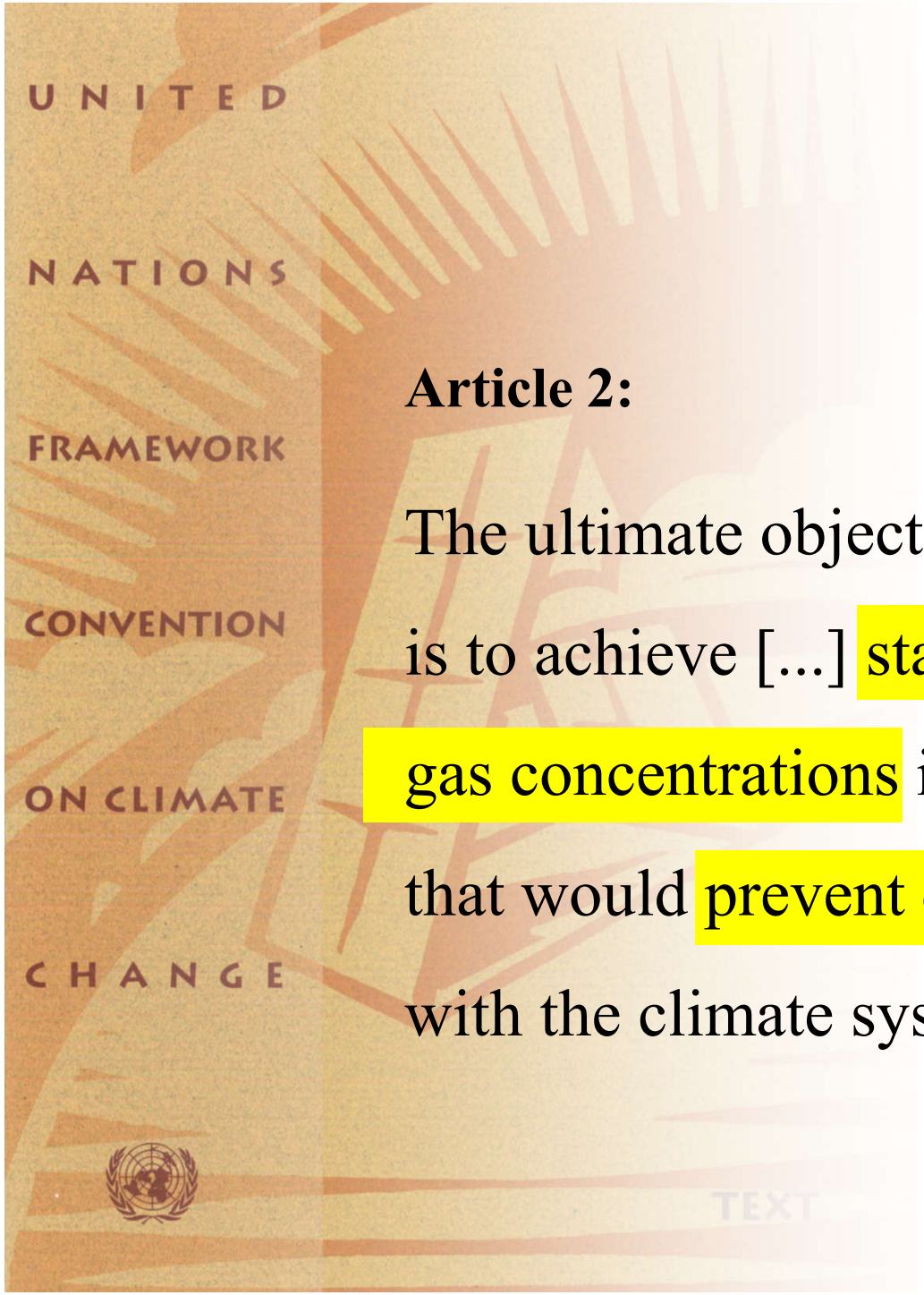

Article 2:

The ultimate objective of this Convention [...] is to achieve [...] stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous [...] interference with the climate system.


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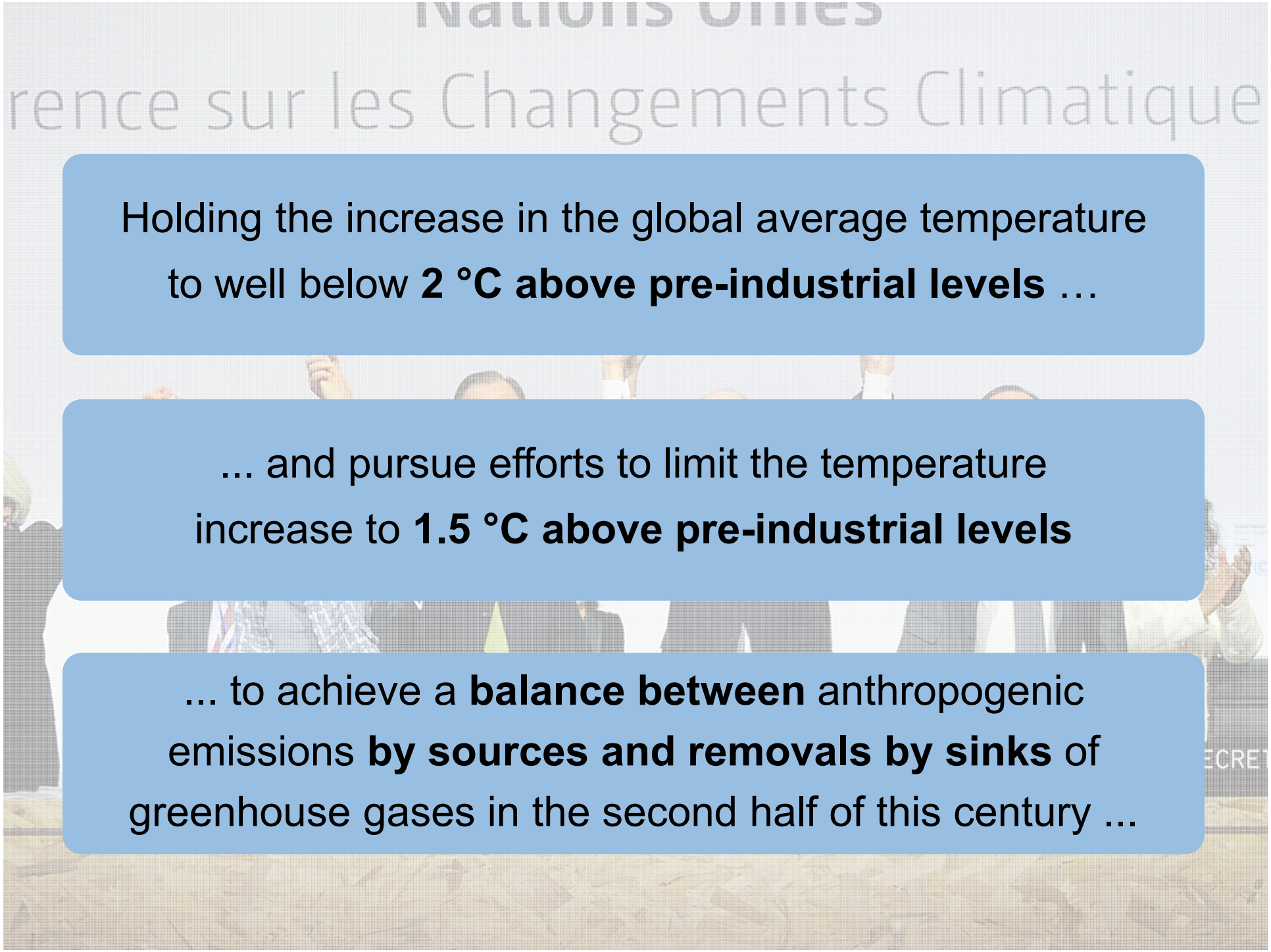
rence sur les Changements Climatique
COP21/CMP11
Paris France
SECRETAIRE EXECUTIVE CCNUCC
PRESIDENT
SECRET


Nations Unies
rence sur les Changements Climatique
Holding the increase in the global average temperature to well below **2 °C above pre-industrial levels** …
... and pursue efforts to limit the temperature increase to **1.5 °C above pre-industrial levels**
... to achieve a **balance between** anthropogenic emissions **by sources and removals by sinks** of greenhouse gases in the second half of this century ...

We need the

4. Industrial Revolution

We need the

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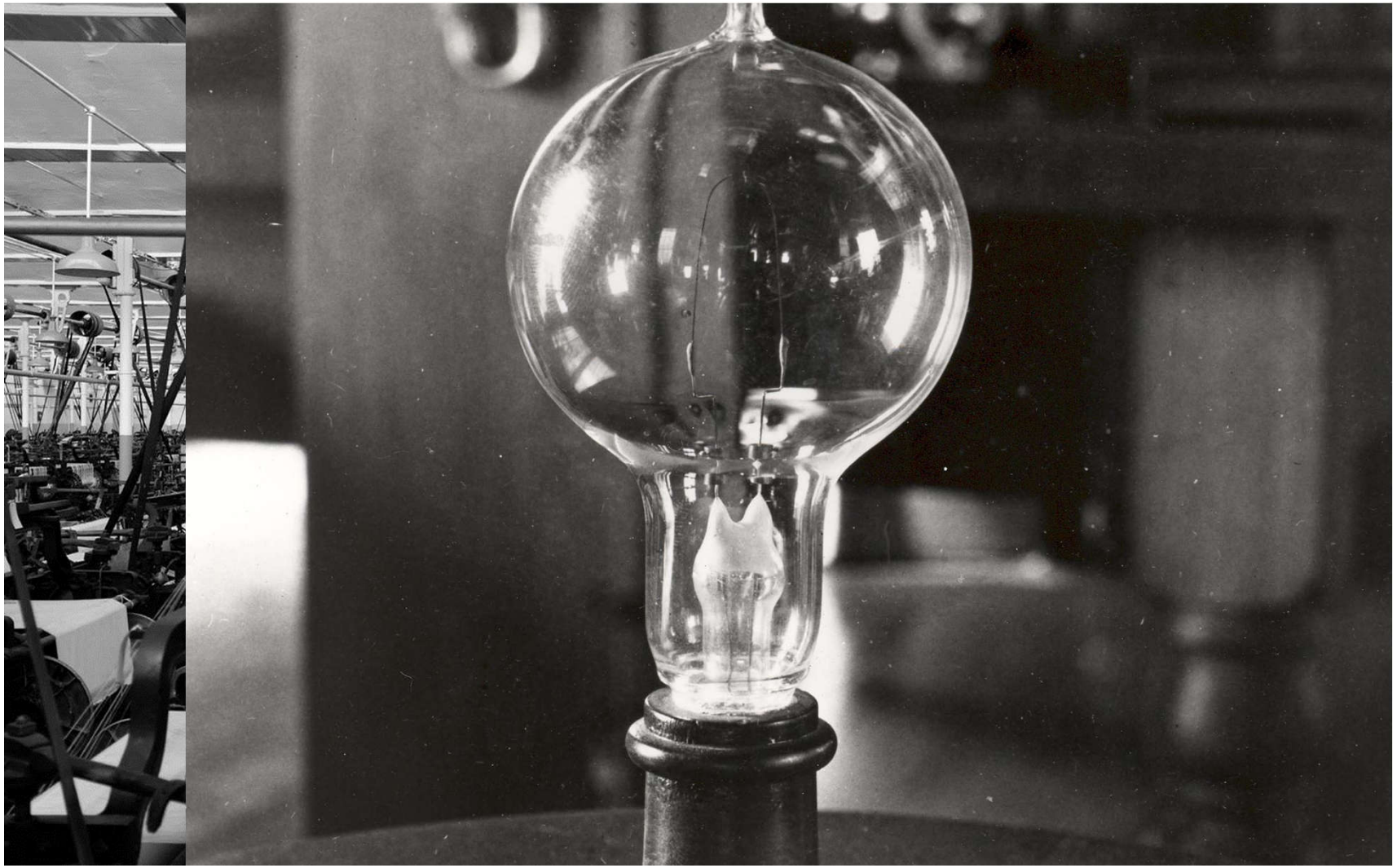
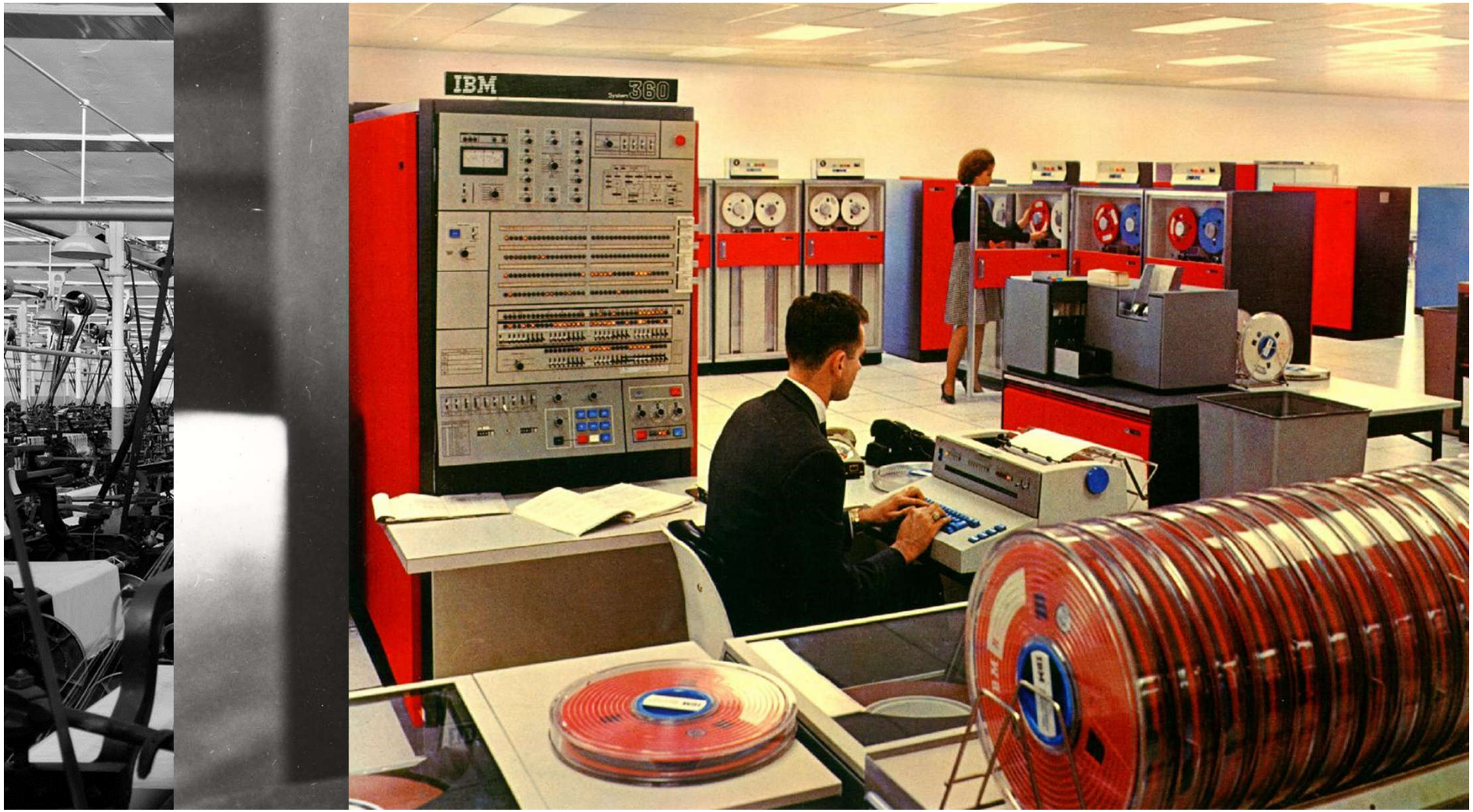


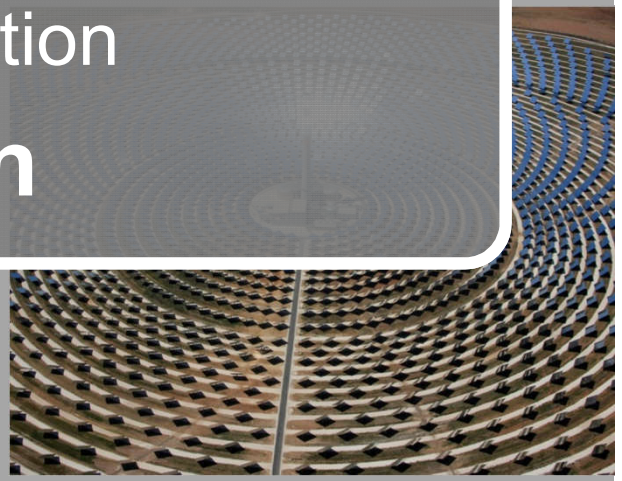
We need the

4. Industrial Revolution



Fourth Industrial Revolution

Decarbonisation




Industrial Revolution means
smarter products
new jobs and professions
better life quality
new values

Climate change is a threat to sustainable development.

Climate change must be limited to achieve these Sustainable Development Goals

These Sustainable Development Goals must be achieved to limit climate change

Fundamental links and synergies between Sustainability and Climate Change

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Conclusions:

- **The science is clear**: We know what is happening, who is responsible, and what options remain;
- **Climate targets are now precisely defined**;
- **Decarbonisation,** the 4th Industrial Revolution, is required
- **UN SDGs and Paris Agreement: Synergy of ambitions**