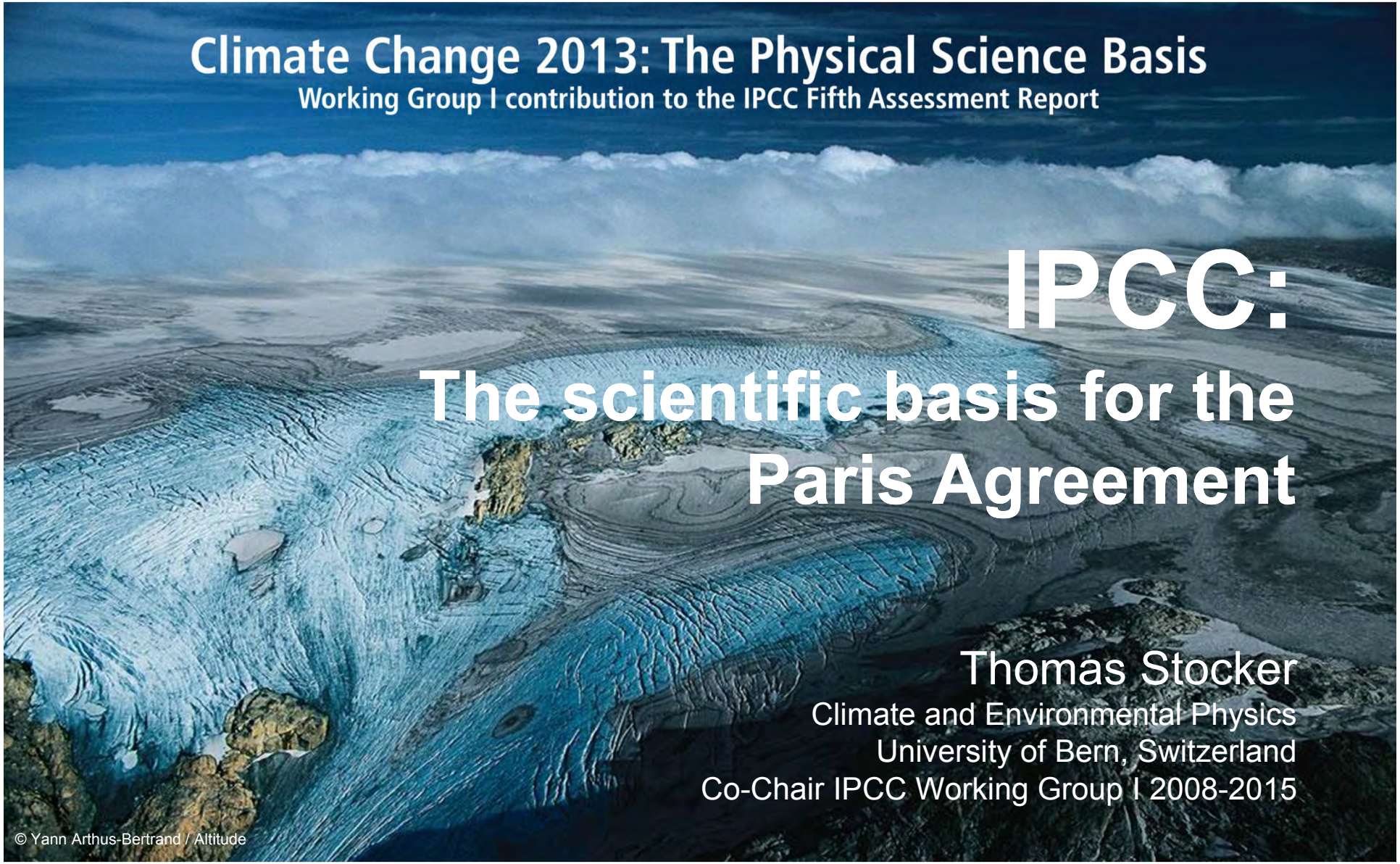
Climate Change 2013: The Physical Science Basis
Working Group I contribution to the IPCC Fifth Assessment Report
IPCC:
The scientific basis for the Paris Agreement
Thomas Stocker
Climate and Environmental Physics
University of Bern, Switzerland
Co-Chair IPCC Working Group I 2008-2015
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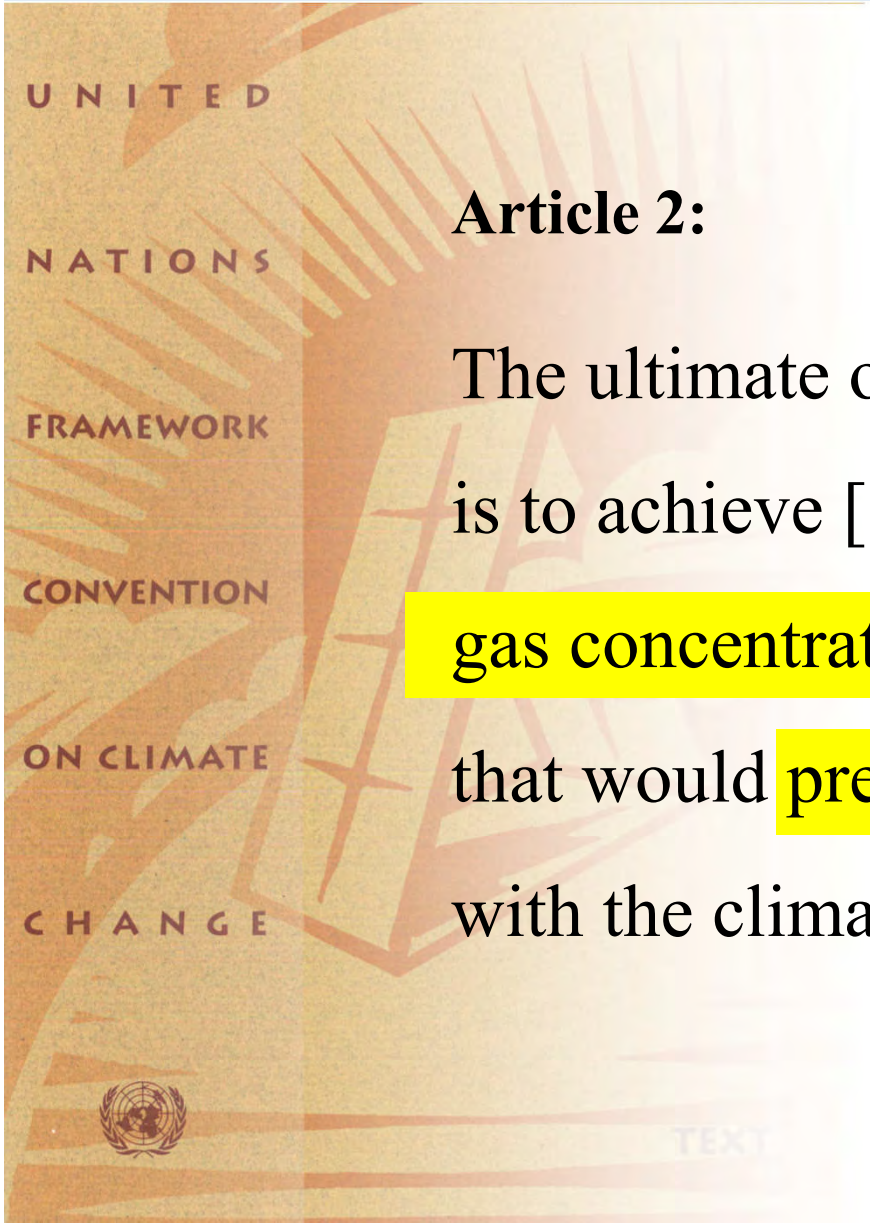
UNITED NATIONS CONFERENCE ON
ENVIRONMENT AND DEVELOPMENT
Rio de Janeiro 3 – 14 June 1992
SECRETARY-GENERAL
PRESIDENT

UN Framework Convention on Climate Change

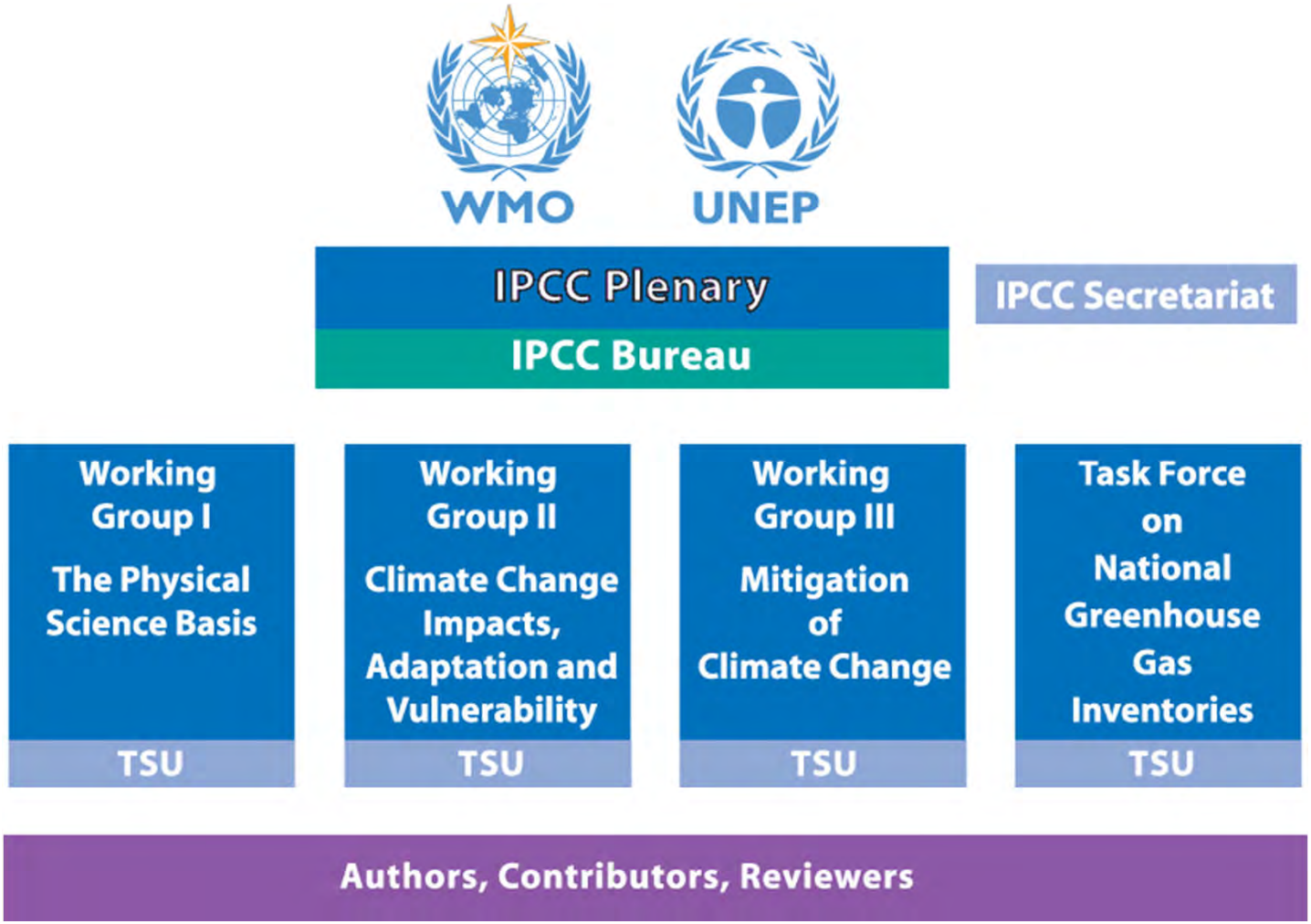
UNIVERSITÄT BERN
OESCHGER CENTRE CLIMATE CHANGE RESEARCH



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.

Structure of the Intergovernmental Panel on Climate Change



Principles Governing IPCC Work (1998, 2003, 2006, 2011)

[…]

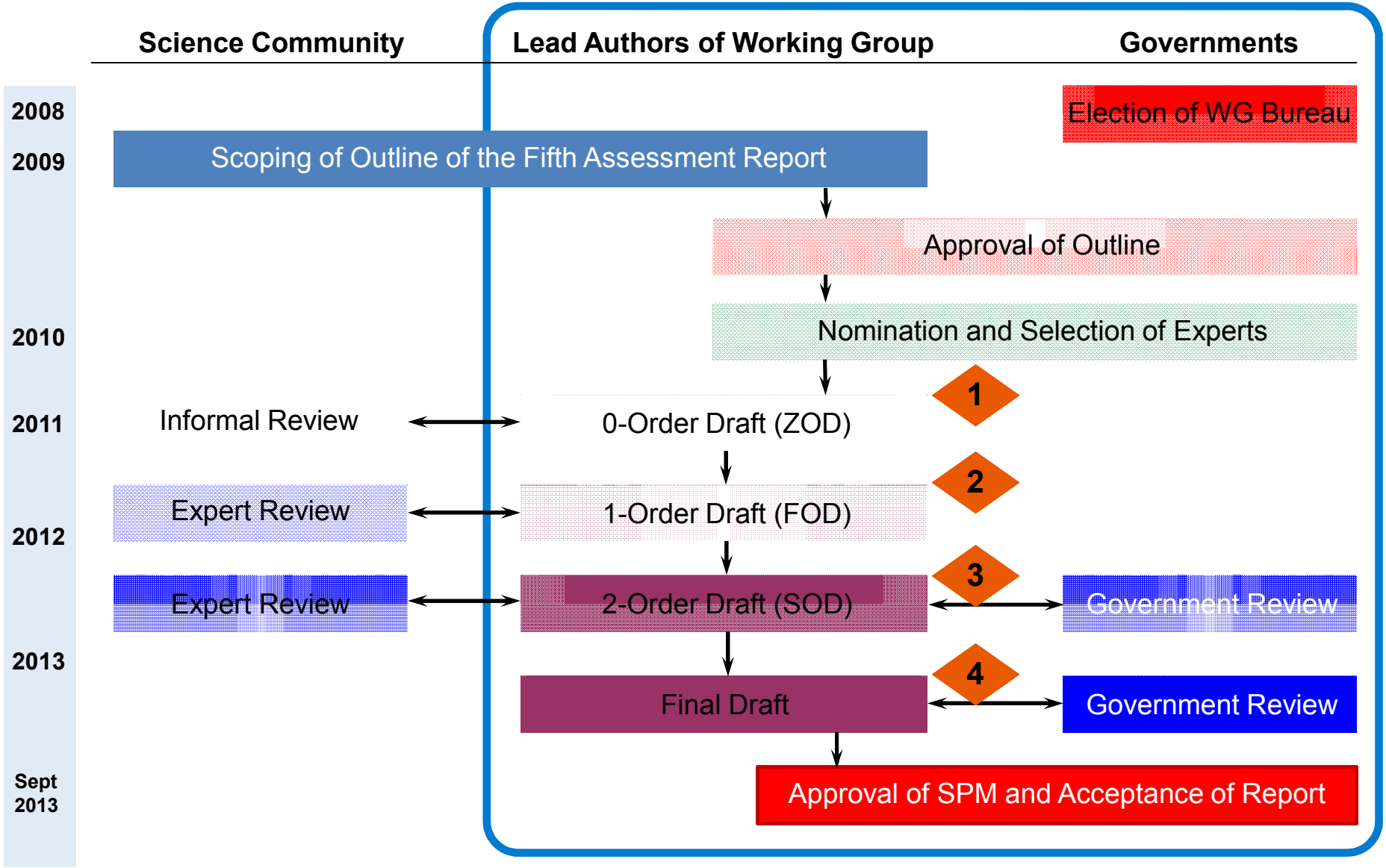
2. The role of the IPCC is to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. IPCC reports should be neutral with respect to policy, although they may need to deal objectively with scientific, technical and socio-economic factors relevant to the application of particular policies.

3. Review is an essential part of the IPCC process. Since the IPCC is an intergovernmental body, review of IPCC documents should involve both peer review by experts and review by governments.

[…]

IPCC Assessment Reports since 1990: WGI Contribution

IPCC Process (Working Group I):



IPCC AR5: More than 1100 authors

ipcc

WMO UNEP

IPCC Synthesis Report

21 Headline Statements

printed on only 2 Pages

IPCC Synthesis Report

Summary for Policymakers

31 printed pages

1 Synthesis Report
3 Comprehensive Reports
2 Special Reports

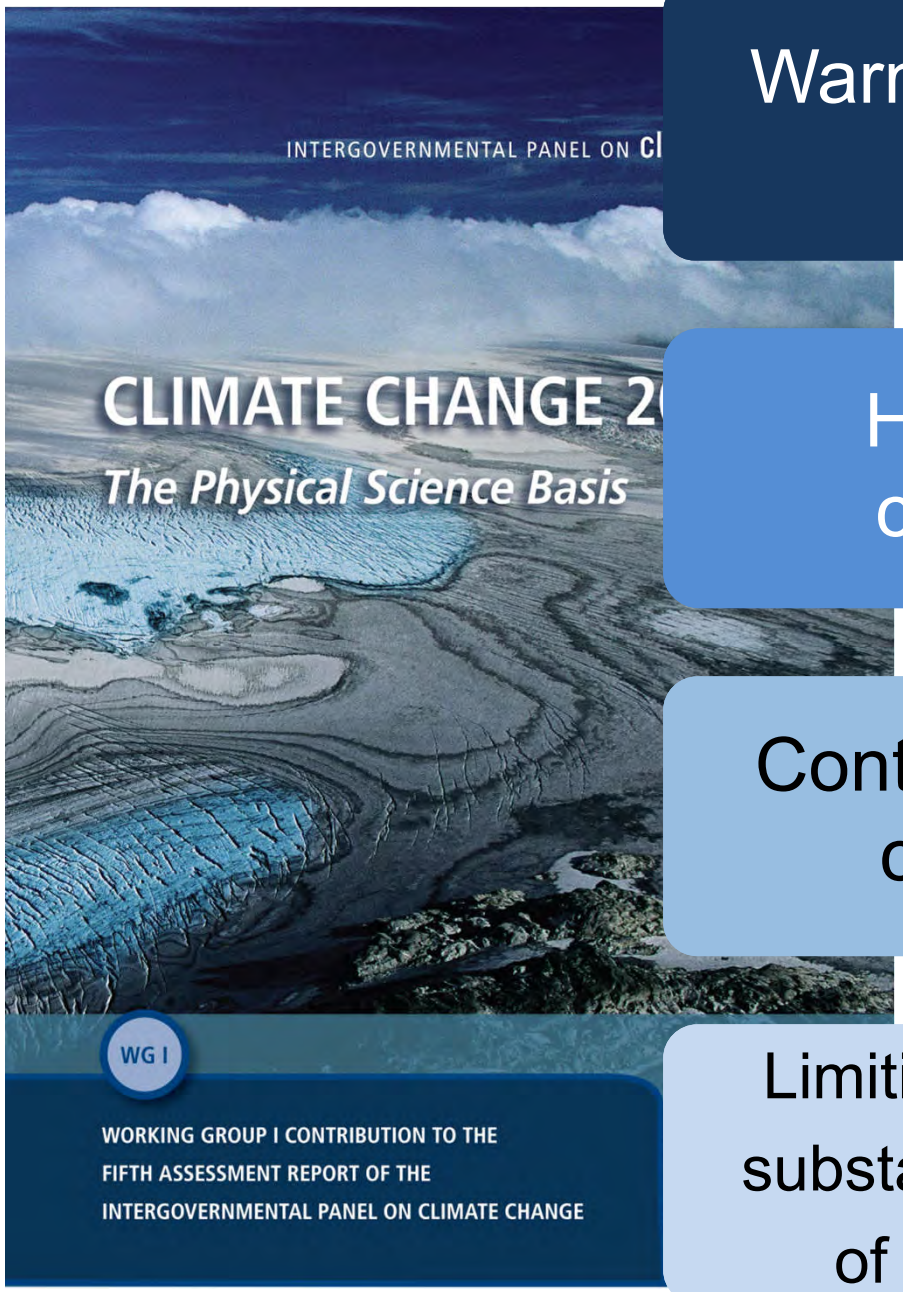
7579 printed pages

IPCC Working Group I 12th Plenary, Stockholm 23-27 September 2013:

Approval of the Summary for Policymakers: Word-by-word negotiation

IPCC Working Group I 12th Plenary, Stockholm 23-27 September 2013:

Finally, a sentence approved ....



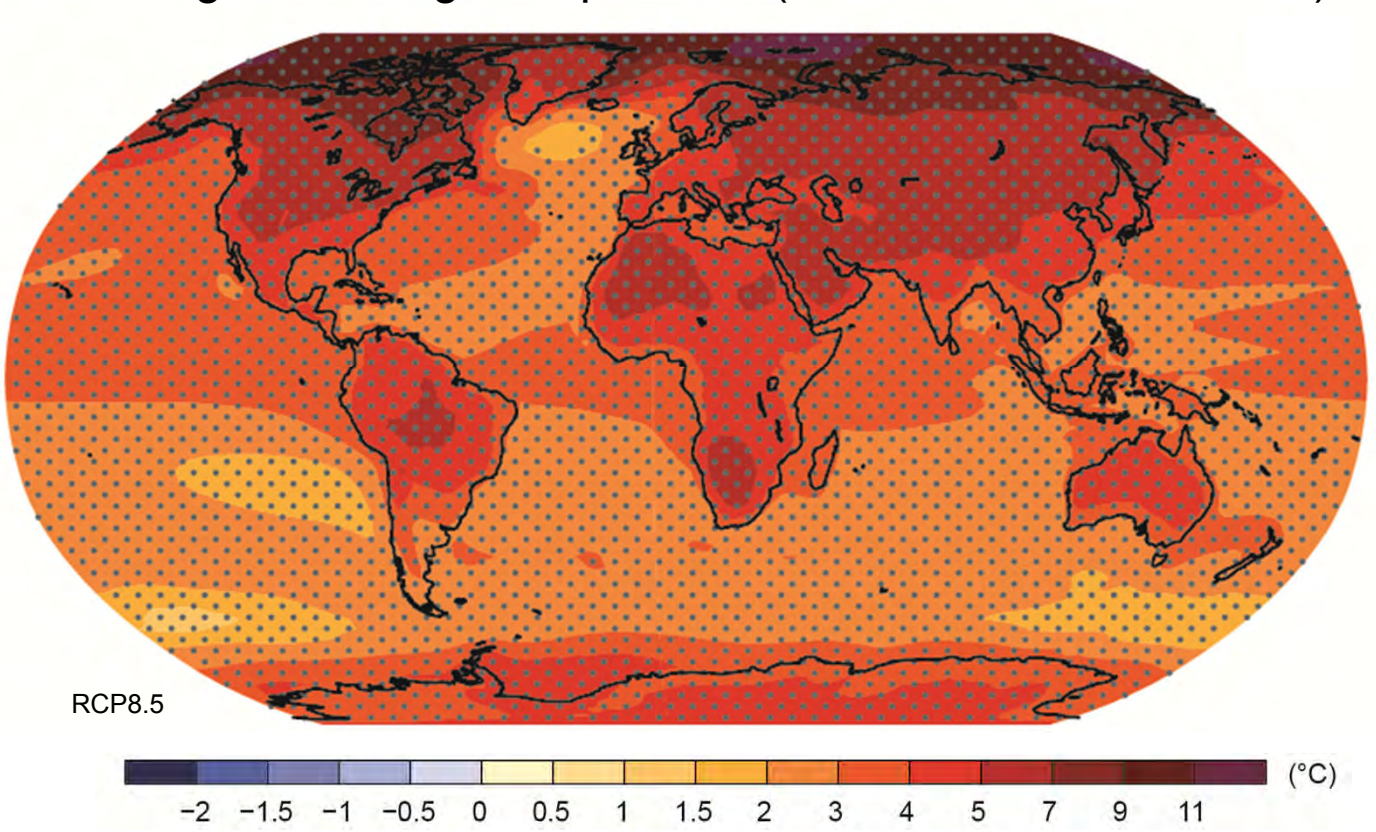
Warming of the climate system is unequivocal.

Human influence on the climate system is clear.

Continued GHG emissions will cause further warming.

Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions.

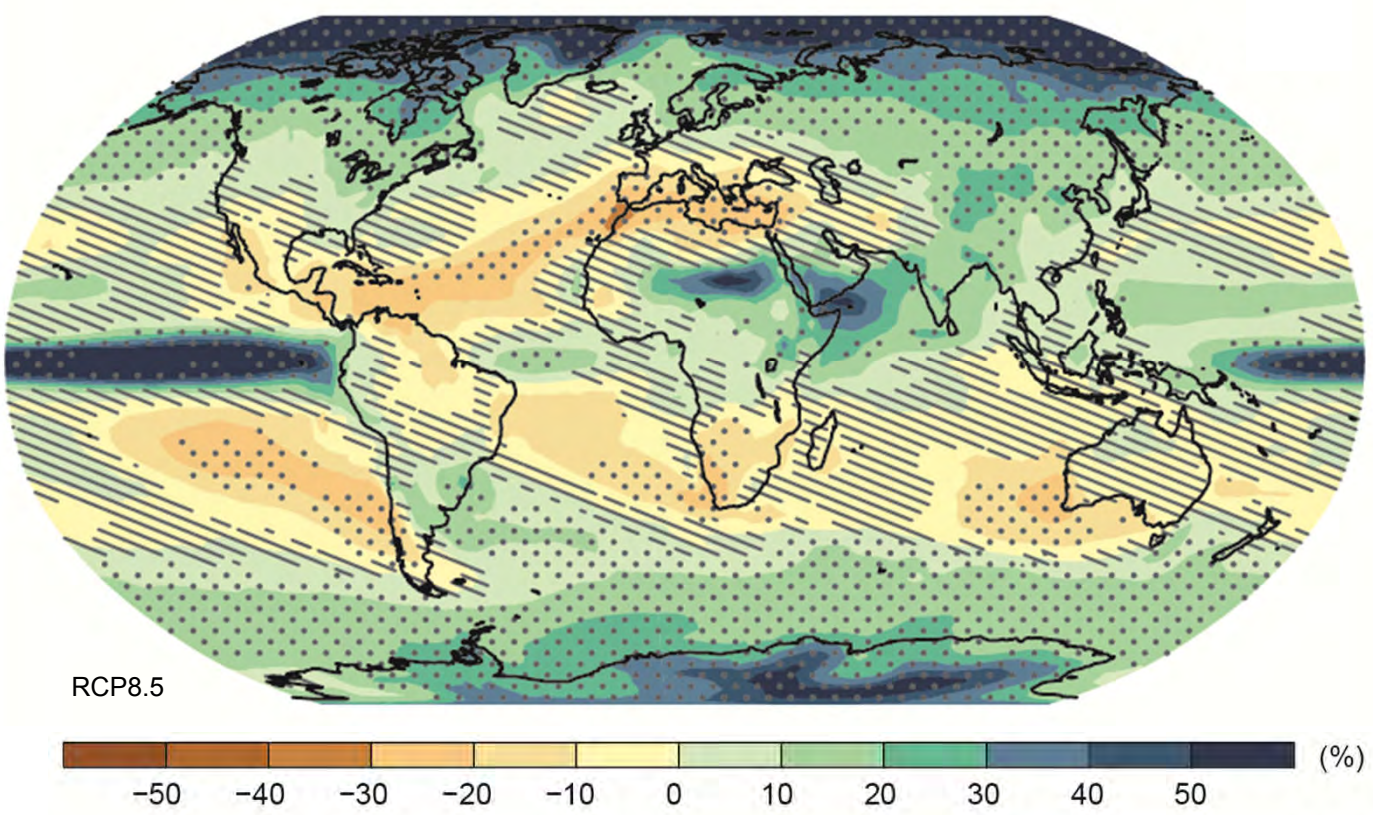
Change in average temperature (1986-2005 to 2081-2100)



IPCC 2013, Fig. SPM.8a

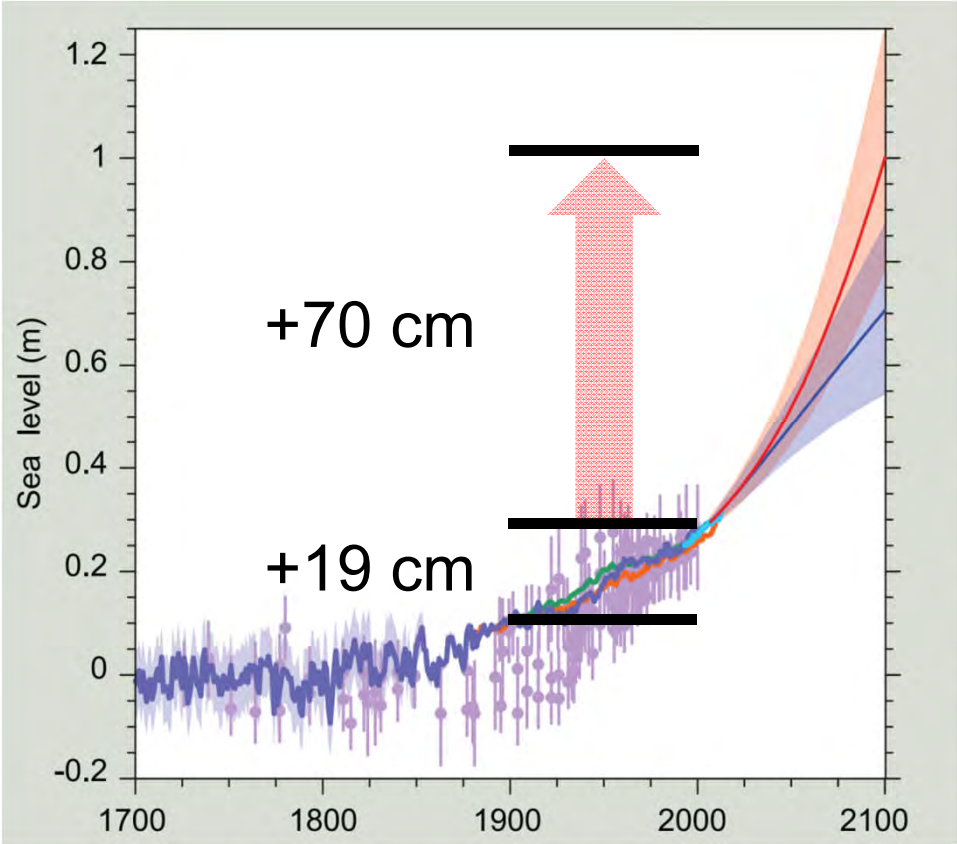
Further warming will increase the likelihood of severe, pervasive and irreversible impacts for people and ecosystems

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



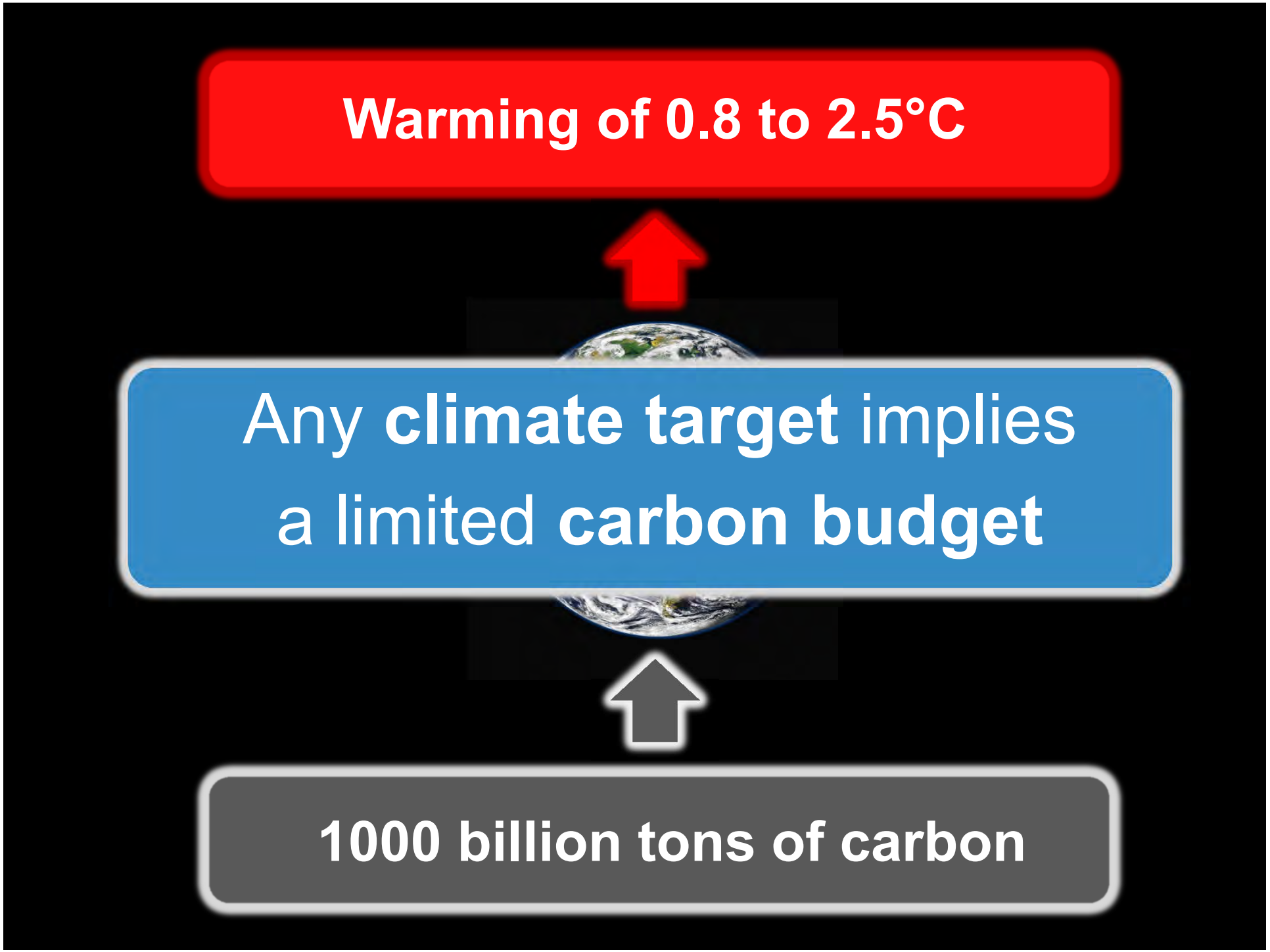
IPCC 2013, Fig. SPM.8b

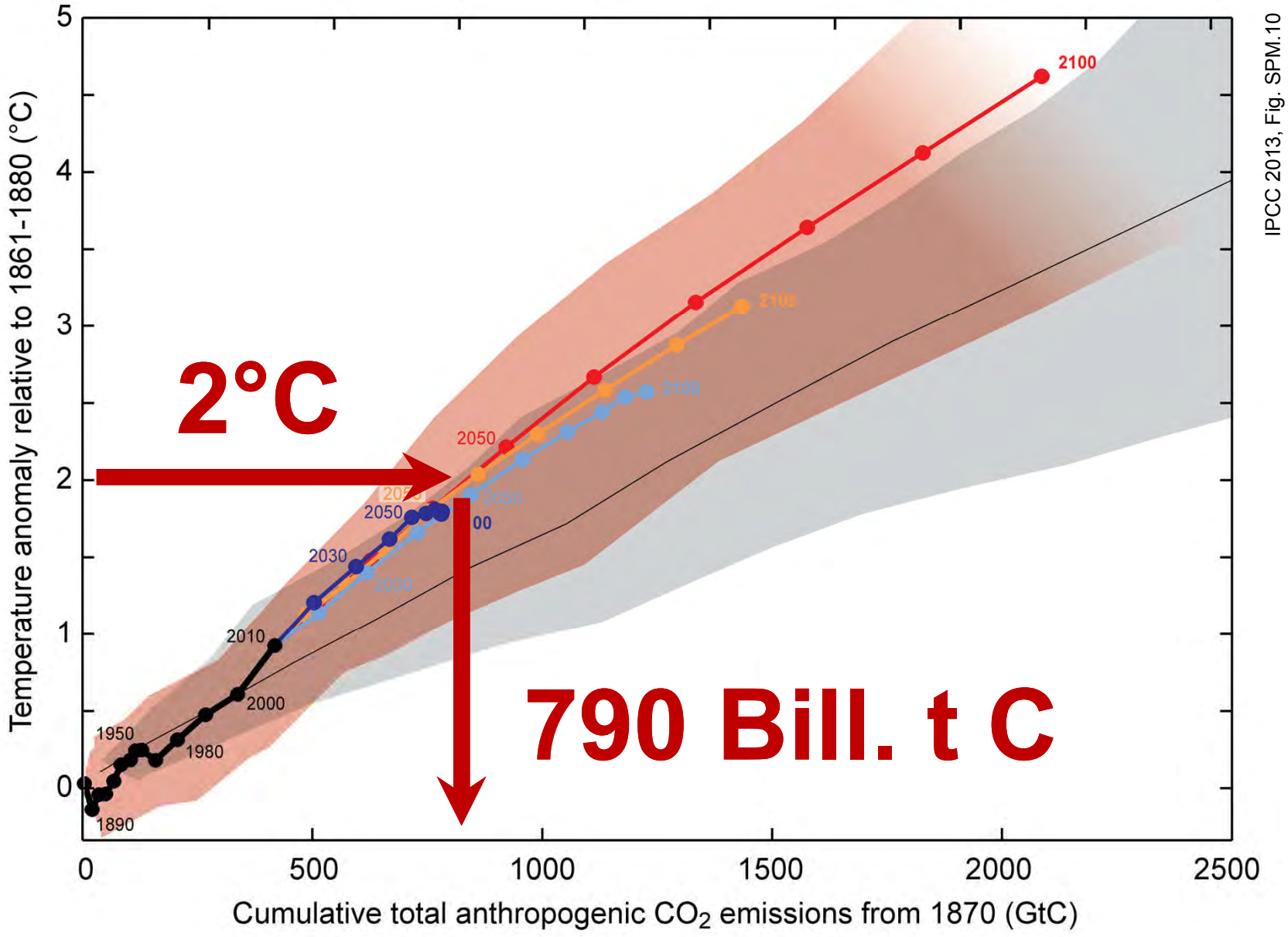
Further warming will increase the likelihood of severe, pervasive and irreversible impacts for people and ecosystems



IPCC 2013, TFE.2, Fig. 2

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


Warming of 0.8 to 2.5°C
Any climate target implies a limited carbon budget
1000 billion tons of carbon



IPCC 2013, Fig. SPM.10

Budget for the 2°C target:	790 bil t C
CO_2 emissions until 2016*:	−565 bil t C
remaining emissions:	**225 bil t C**
CO_2 emissions in 2016*:	***10 bil t C***

* updated from IPCC 2013

The CO_2 budget will be exhausted by about 2040.

By 2040, the 2°C target will be lost.


Nations Unies
rence sur les Changements Climatique
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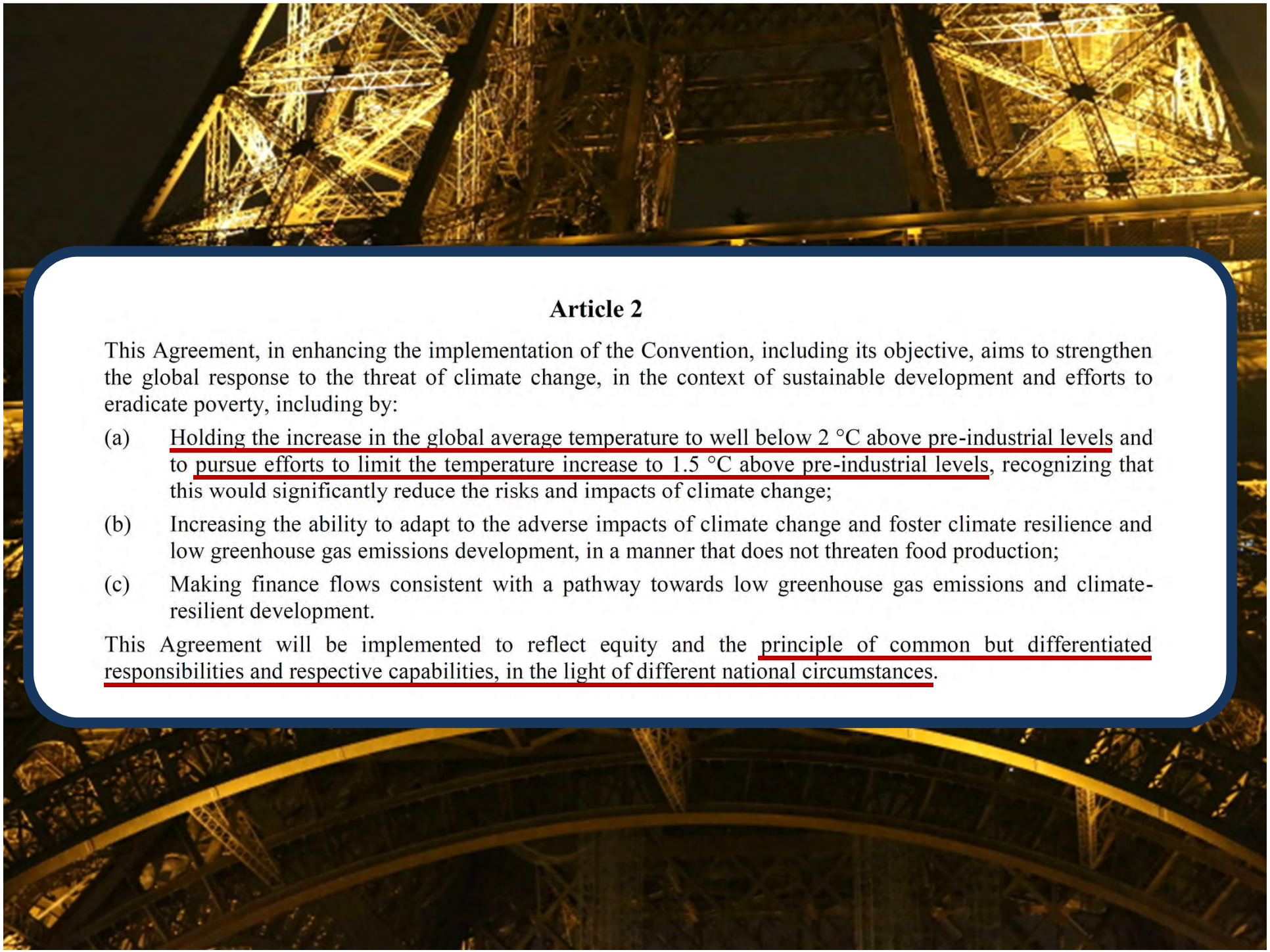
Paris France
SECRETAIRE EXECUTIVE CCNUCC
PRESIDENT
SECRET



Article 2

This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by:

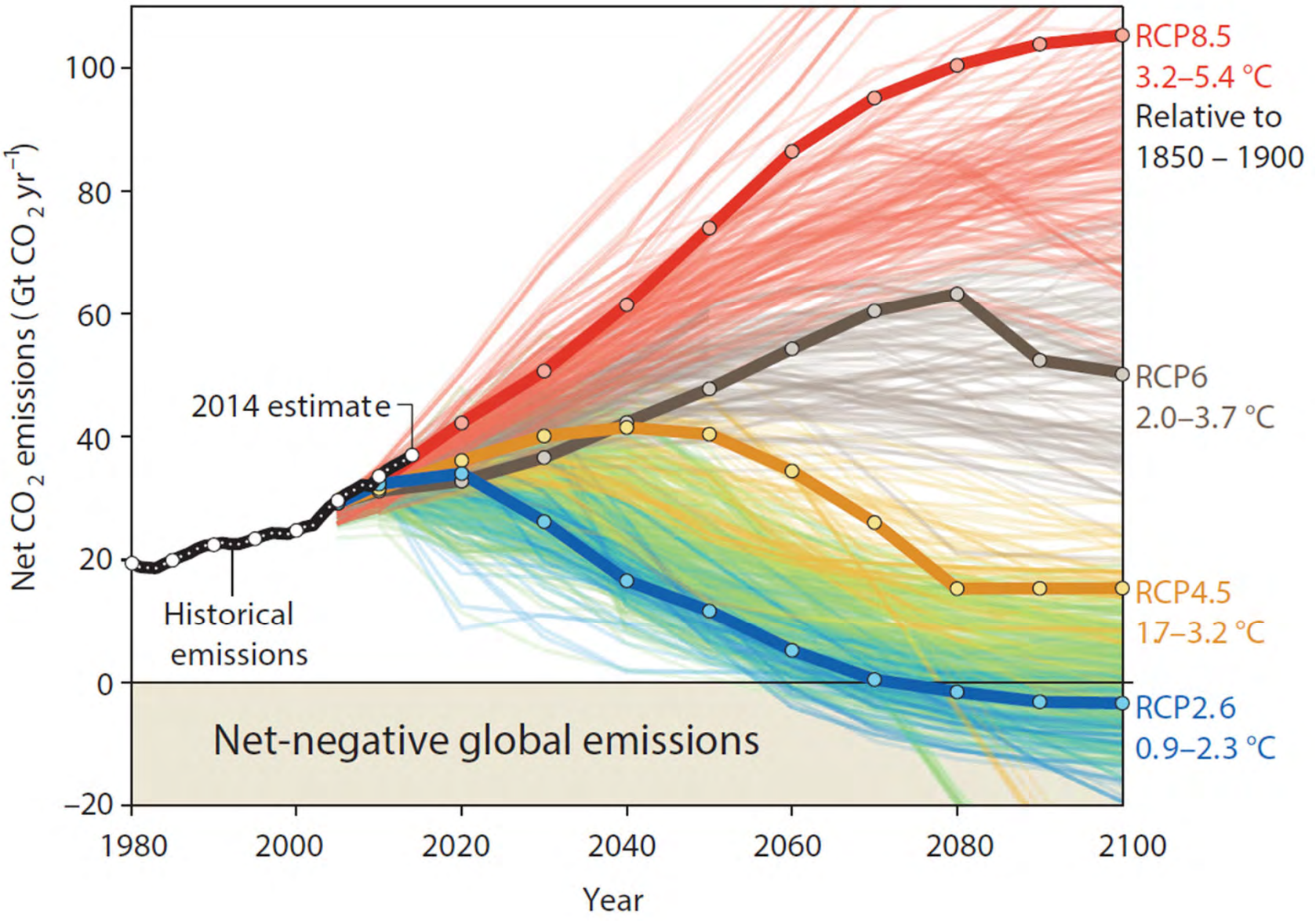
(a) Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;

(b) Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production;

(c) Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

This Agreement will be implemented to reflect equity and the principle of common but differentiated responsibilities and respective capabilities, in the light of different national circumstances.

CO_2 Emission Pathways until year 2100

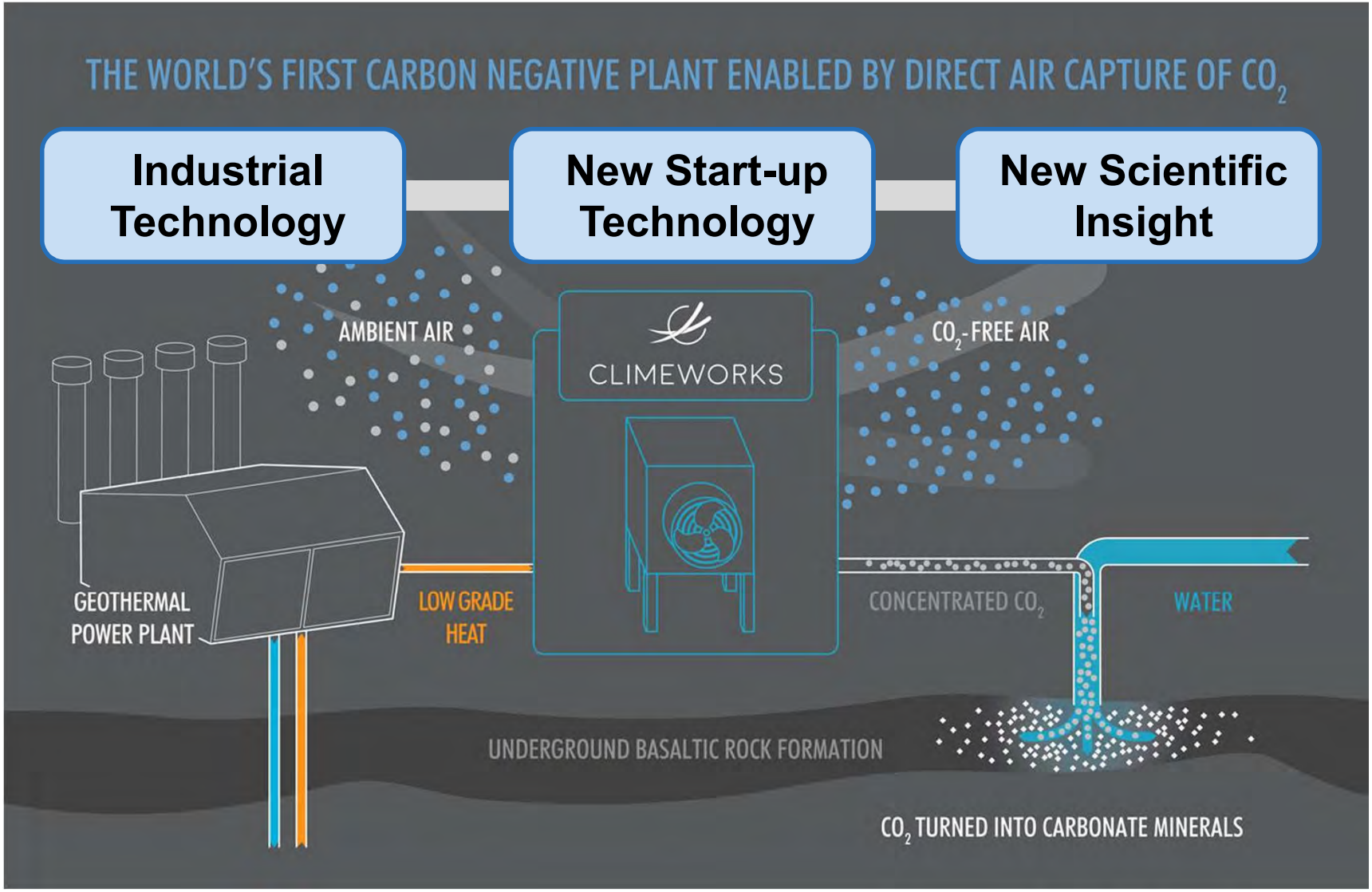


Fuss et al., 2014

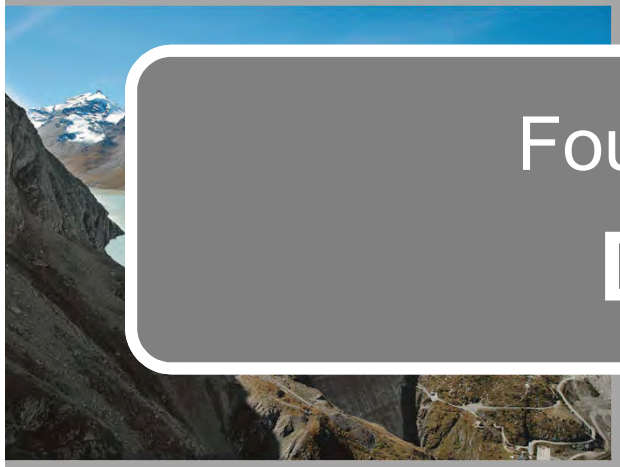
12. October 2017 Hellisheiði, Iceland: First net-negative emission power generation

Climeworks 2017

12. October 2017 Hellisheiði, Iceland: First net-negative emission power generation



Climeworks 2017



Fourth Industrial Revolution

Decarbonisation