

Climate Change 2013: The Physical Science Basis

Working Group I contribution to the IPCC Fifth Assessment Report

Highlights from the new IPCC Report

Gian-Kasper Plattner
Science Director
WGI Technical Support Unit

& WGI Co-Chairs and TSU
University of Bern, Switzerland

© Yann Arthus-Bertrand / Altitude

Key SPM Messages

19 Headlines

on less than 2 Pages

Summary for Policymakers
ca. 14,000 Words

14 Chapters
Atlas of Regional Projections

54,677 Review Comments
by 1089 Experts

2010: 259 Authors Selected
from 39 Countries

2009: WGI Outline Approved

ipcc

INTERGOVERNMENTAL PANEL ON climate change

CLIMATE CHANGE 2013

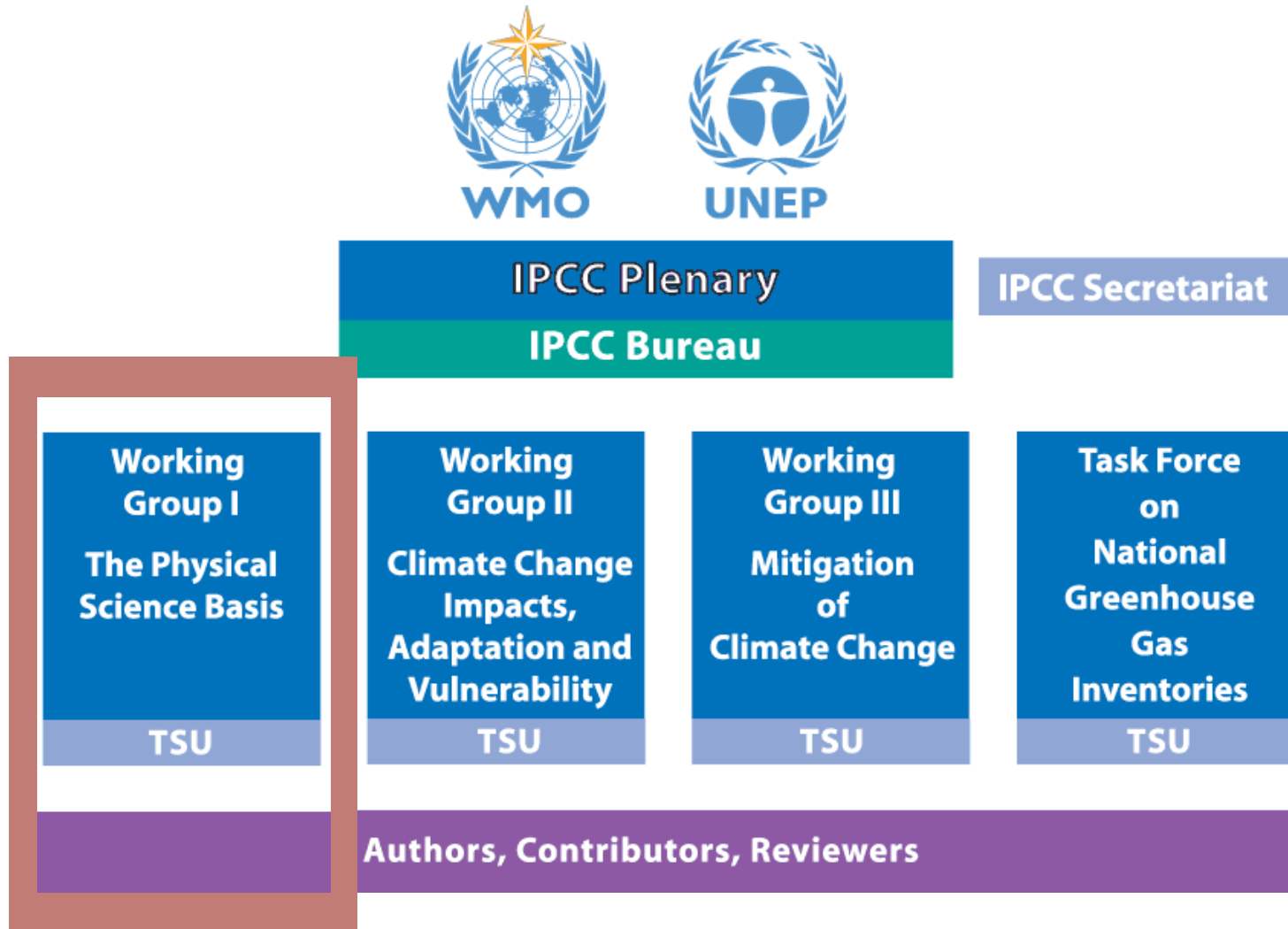
The Physical Science Basis

WG I

WORKING GROUP I CONTRIBUTION TO THE
FIFTH ASSESSMENT REPORT OF THE
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



The Intergovernmental Panel on Climate Change: Structure



Principles of IPCC (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.

[...]

The Process for IPCC Working Group I

Science

Lead Authors

Governments

2008

Election of Bureaux

2009

Development of the WGI Outline

Approval of the WGI Outline

2010

Nomination and Selection of Experts

2011

Informal Review

Zero Order Draft

2012

Expert Review

First Order Draft

Expert Review

Second Order Draft

Government Review

2013

Final Draft

Government Review

Sept
2013

Acceptance and Approval of the Report

IPCC Working Group I Reports Since 1990



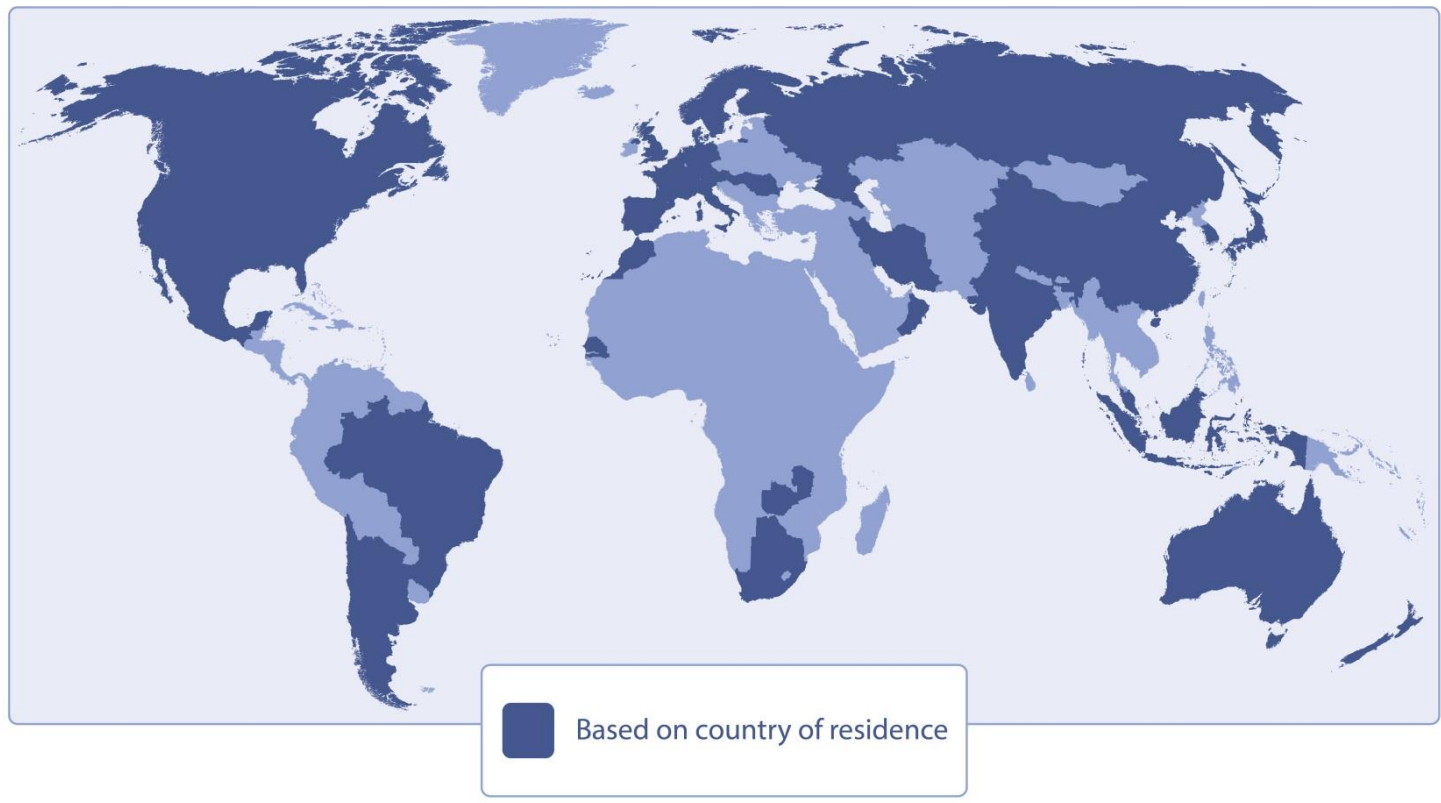
IPCC Working Group I Author Team

209 Lead Authors and 50 Review Editors from 39 countries
Over 600 Contributing Authors from 32 countries



IPCC Working Group I Author Team

209 Lead Authors and 50 Review Editors from 39 countries



The four Elements of the Fifth WGI Assessment Report

- **14 Chapters**

1'140'000 Words, ca. 2000 Pages

1250 Figures und Diagrams

- **Atlas: Regional Projections**

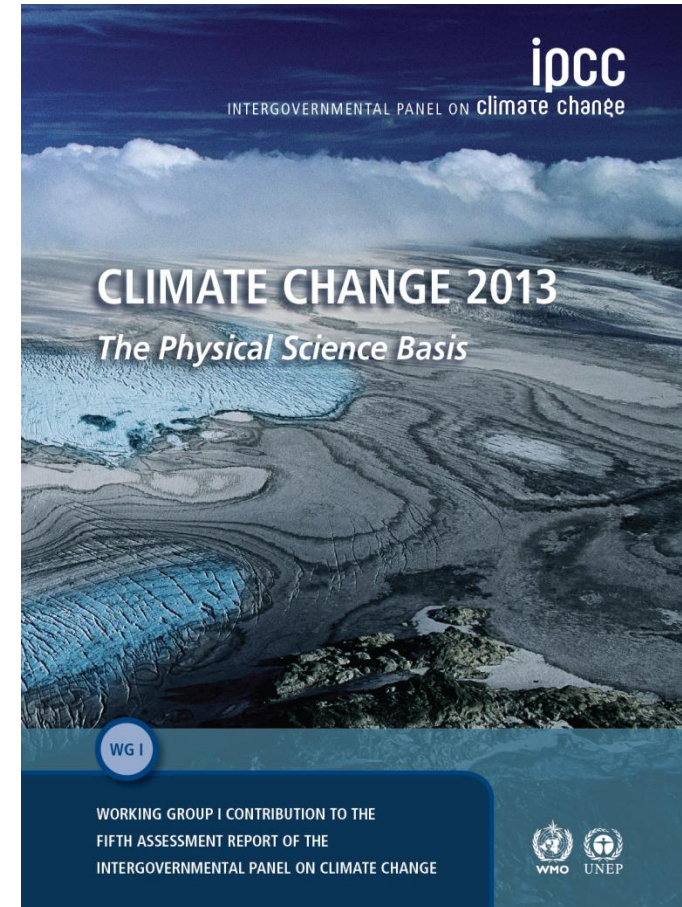
Maps for 35 Regions of the World, 2 Mio G Bytes

- **Technical Summary**

55'000 Words, ca. 90 Pages

- **Summary for Policymakers**

14'000 Words, 22 Pages, 10 Figures



Observations

ipcc

INTERGOVERNMENTAL PANEL ON climate change

CLIMATE CHANGE 2013

The Physical Science Basis

WG I

WORKING GROUP I CONTRIBUTION TO THE
FIFTH ASSESSMENT REPORT OF THE
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



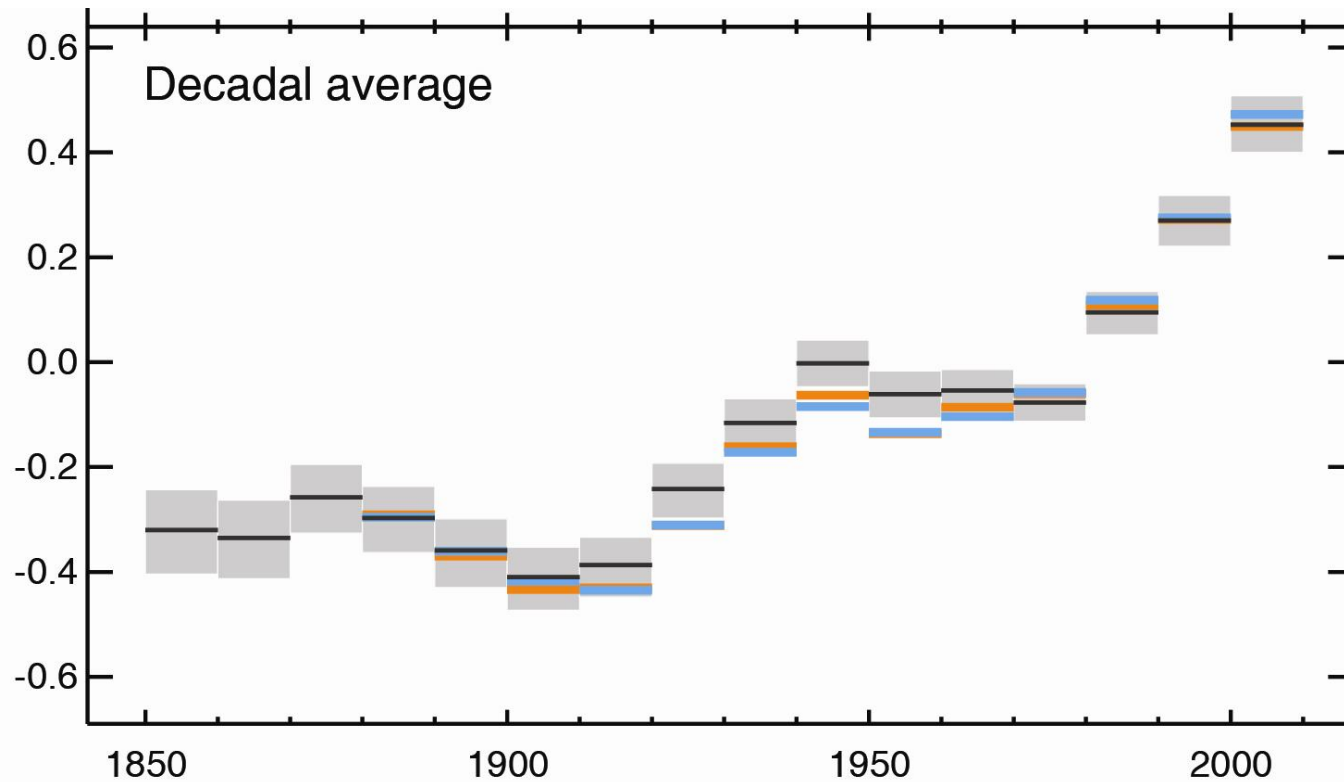


Fig. SPM.1a

Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850.

In the Northern Hemisphere, 1983–2012 was *likely* the warmest 30-year period of the last 1400 years (*medium confidence*).

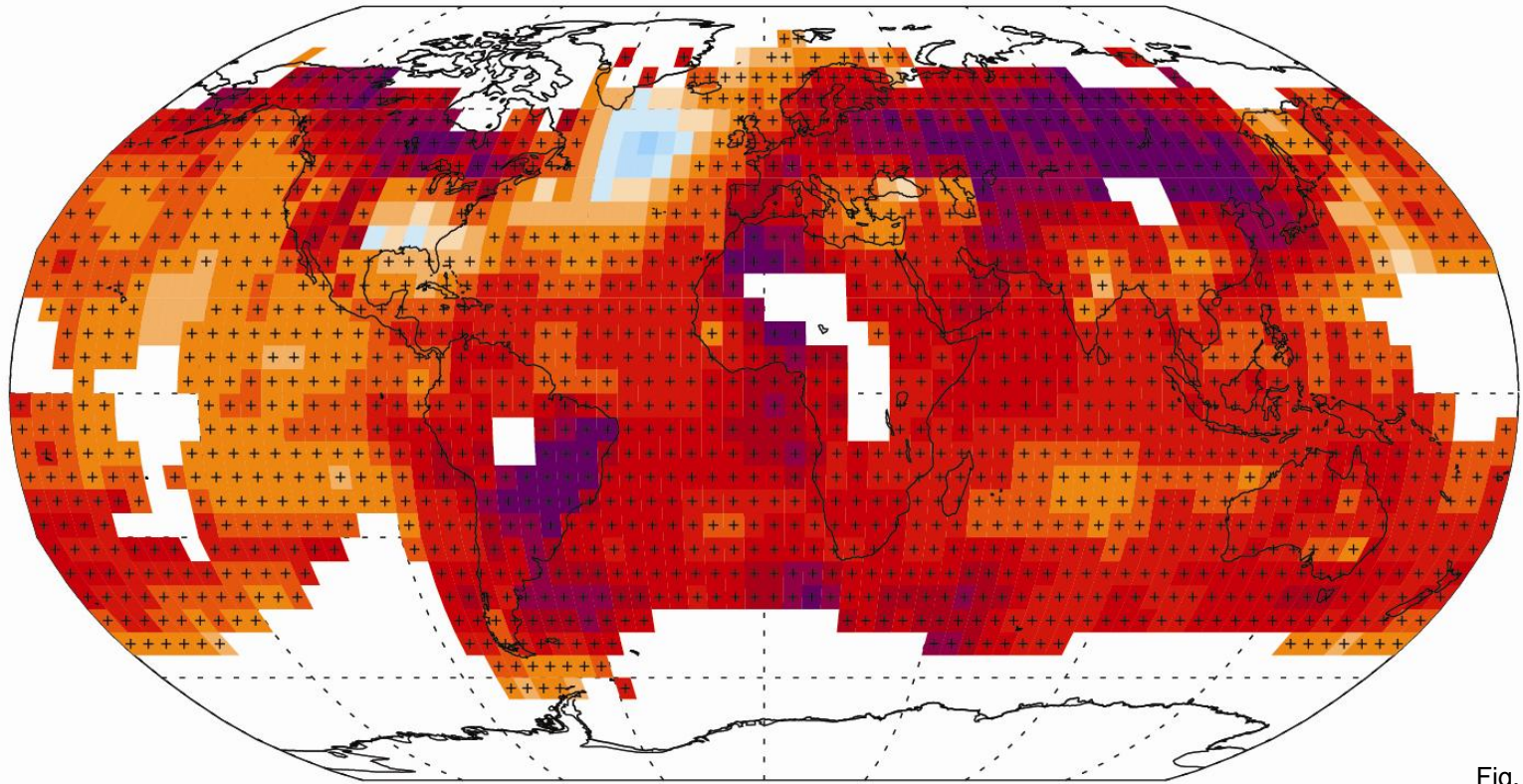
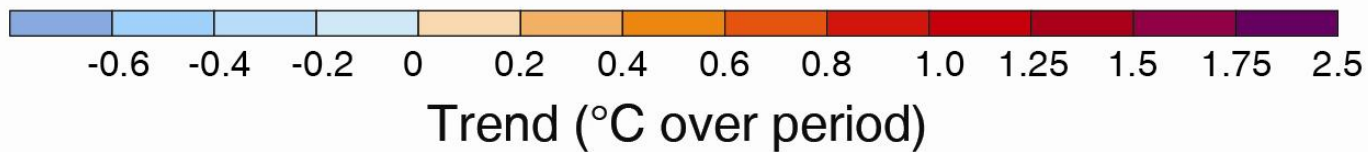


Fig. SPM.1b



Warming in the climate system is unequivocal

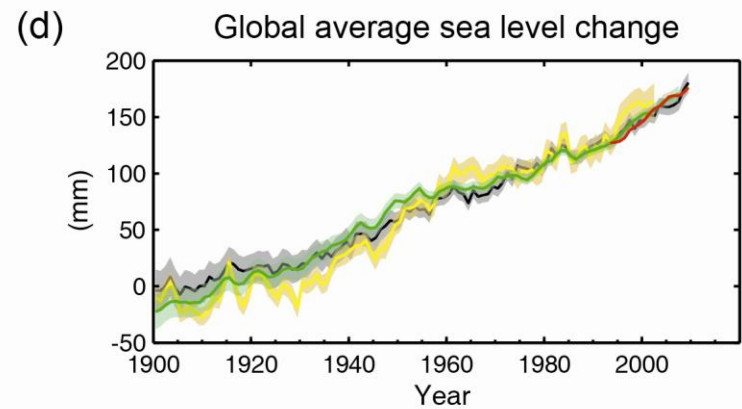
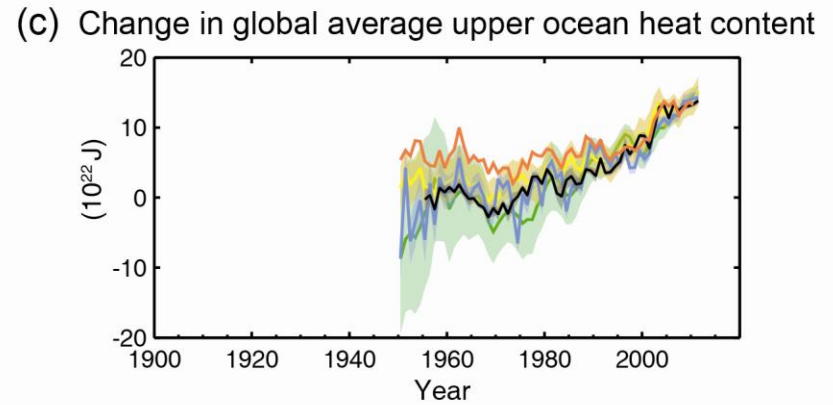
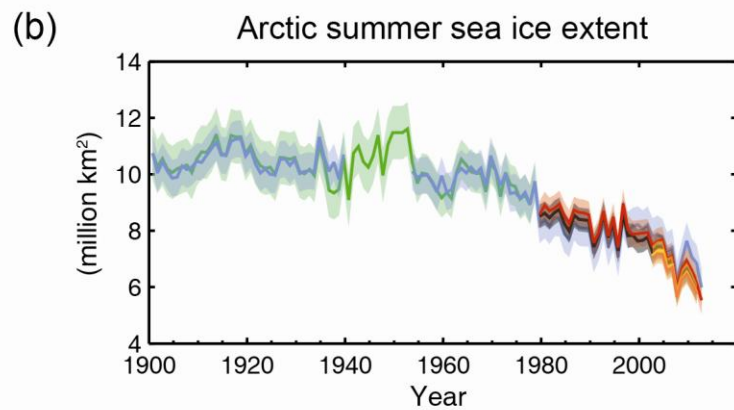
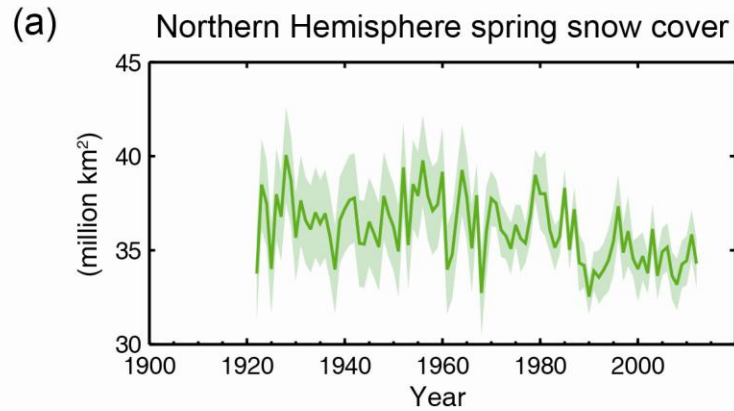


Fig. SPM.3

Warming in the climate system is unequivocal

Causes

ipcc

INTERGOVERNMENTAL PANEL ON climate change

CLIMATE CHANGE 2013

The Physical Science Basis

WG I

WORKING GROUP I CONTRIBUTION TO THE
FIFTH ASSESSMENT REPORT OF THE
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



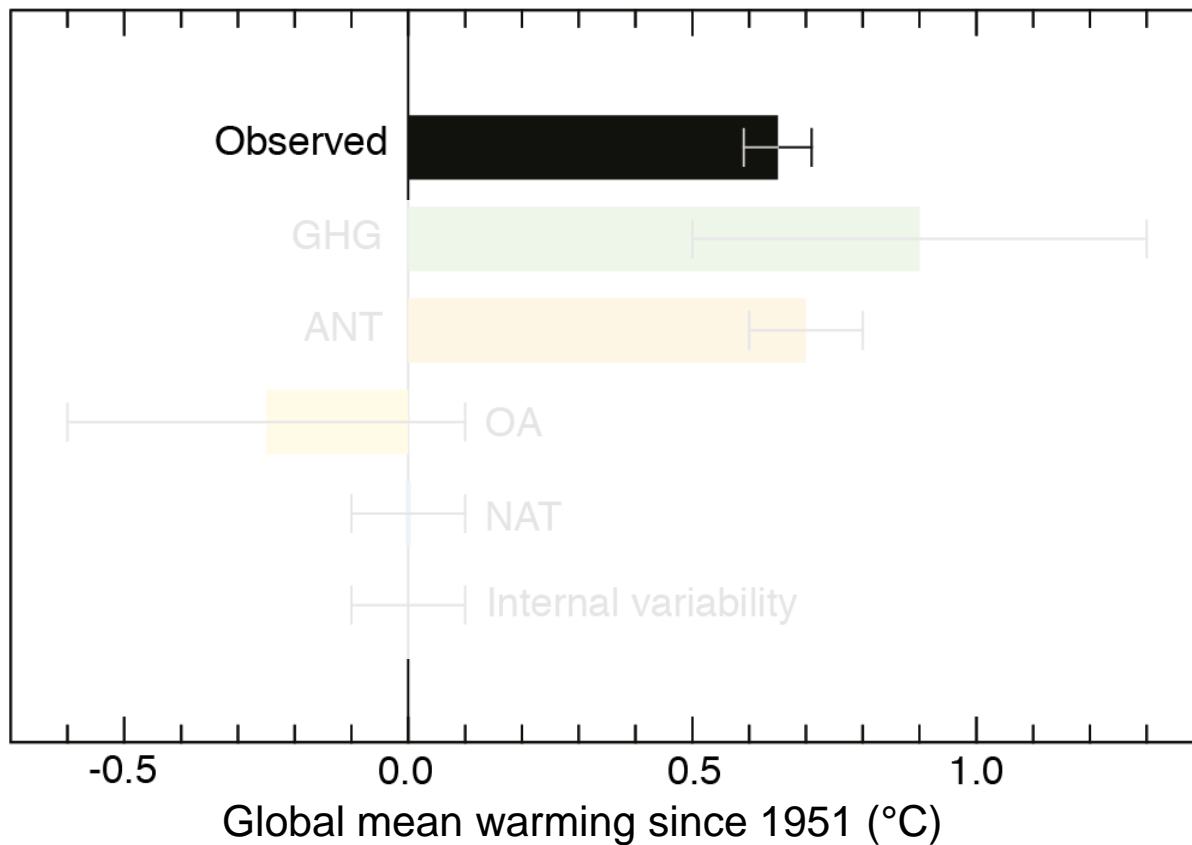


Fig. TS.10

Since 1951 it has warmed by about 0.6°C

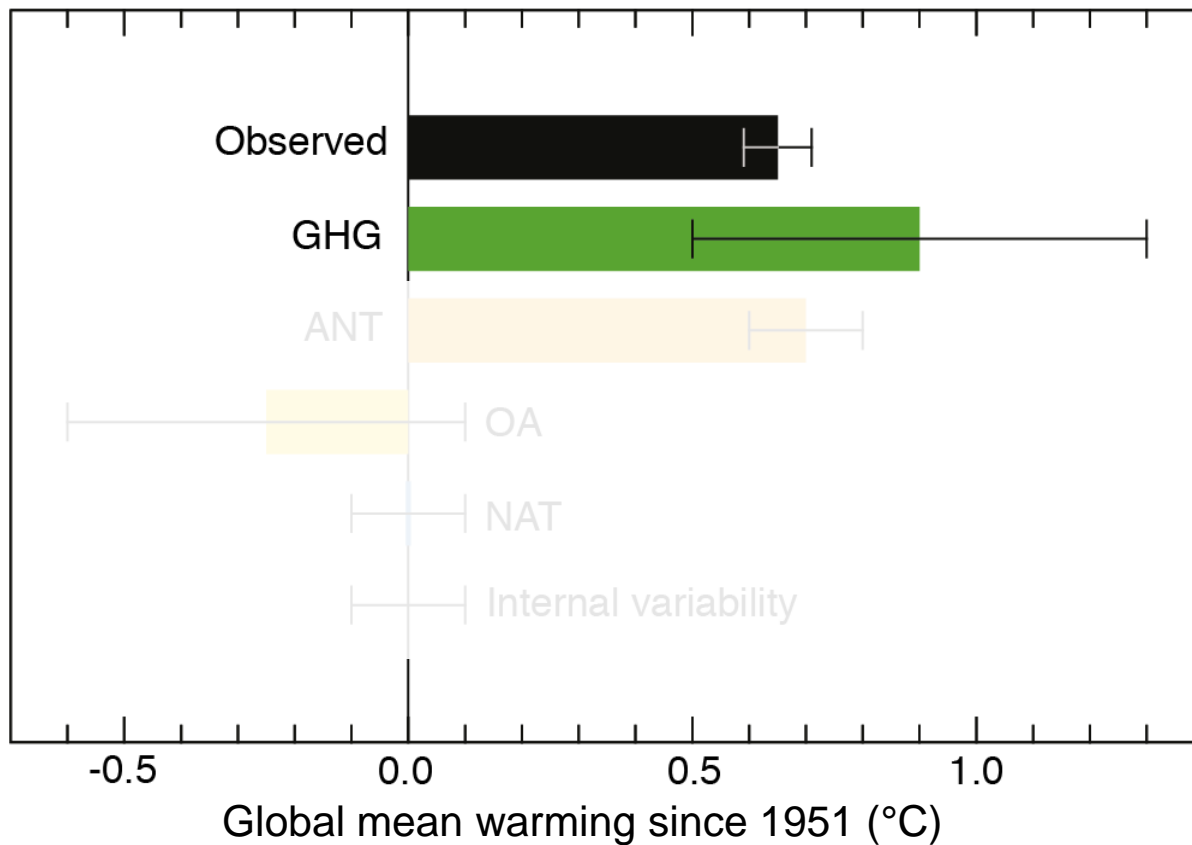


Fig. TS.10

Since 1951 it has warmed by about 0.6°C

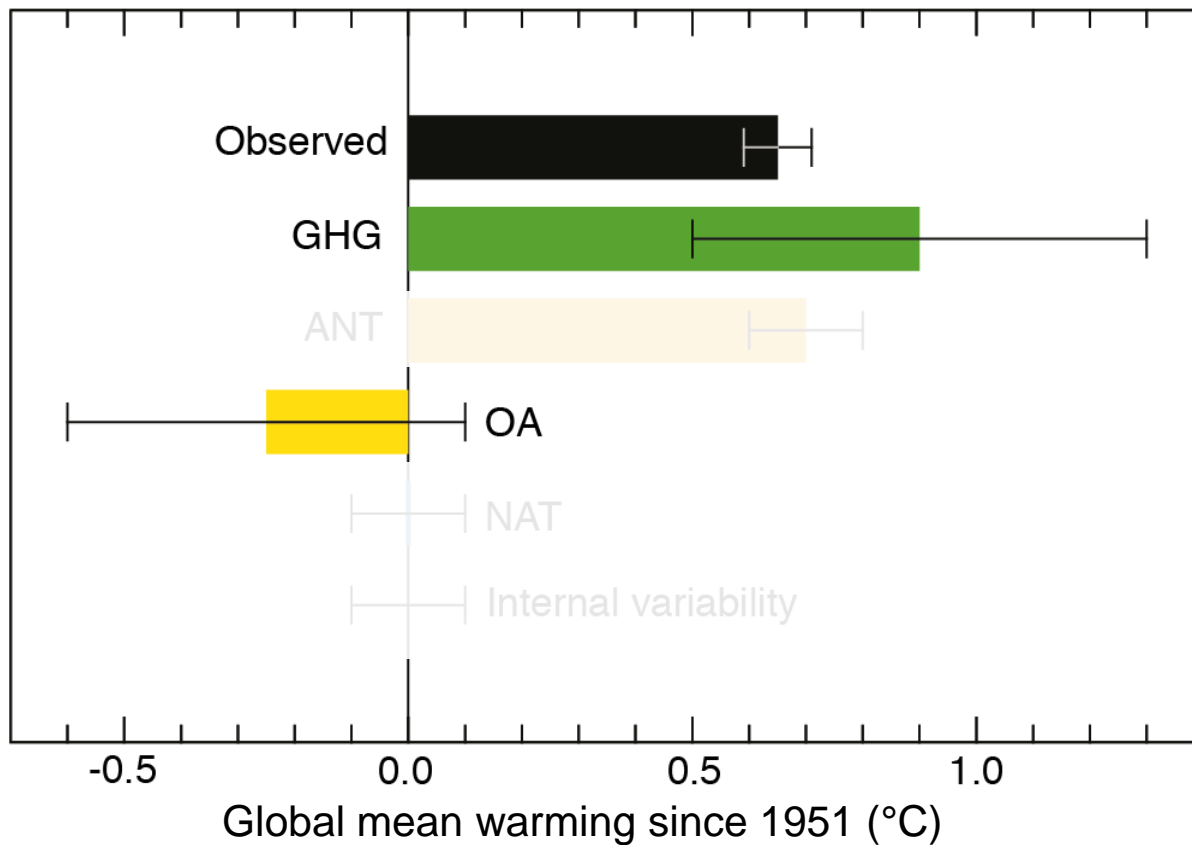


Fig. TS.10

Since 1951 it has warmed by about 0.6°C

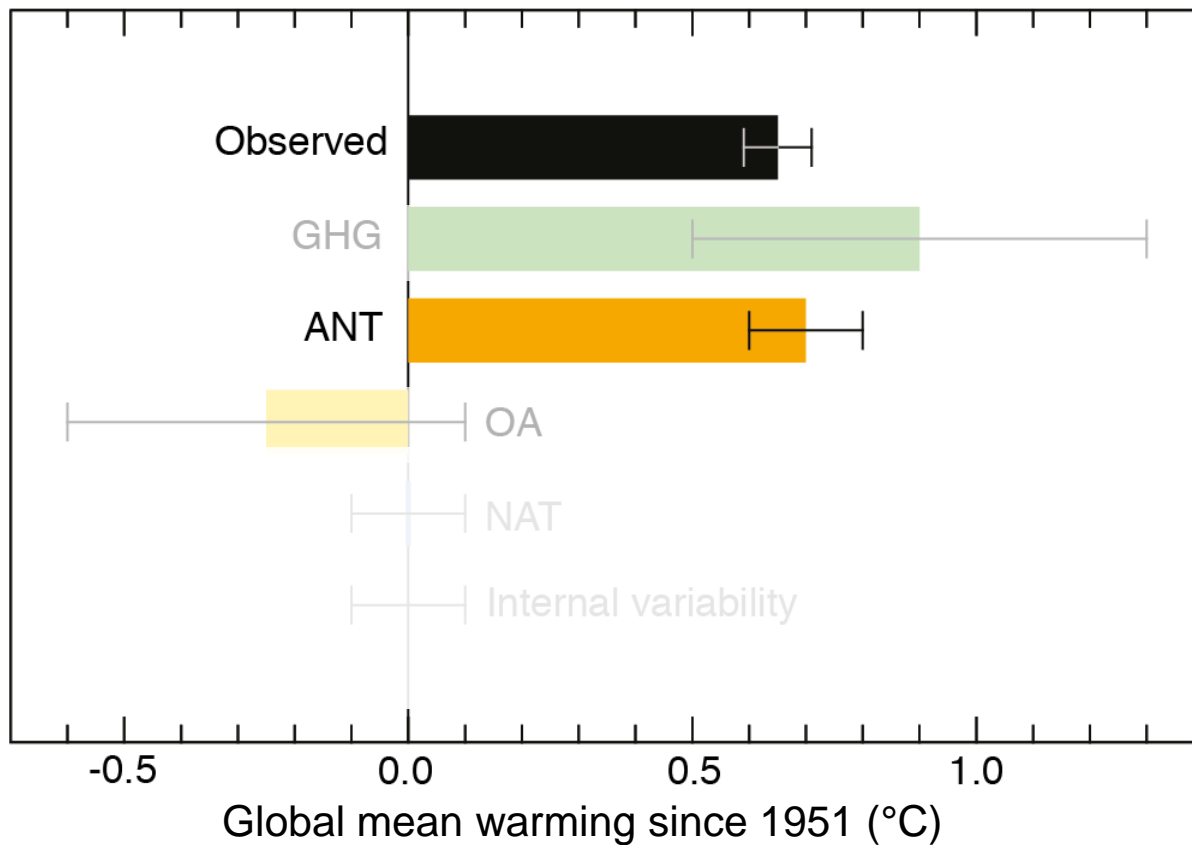


Fig. TS.10

Since 1951 it has warmed by about 0.6°C

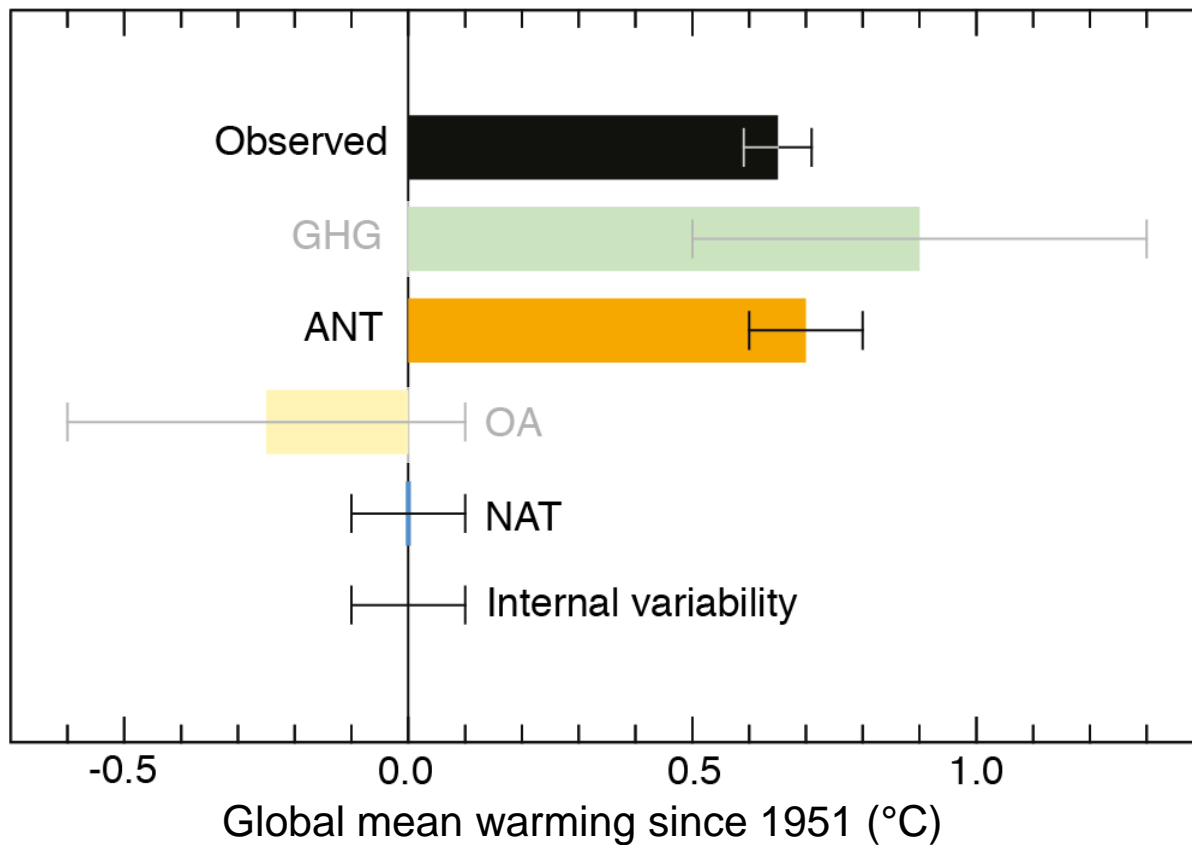


Fig. TS.10

Since 1951 it has warmed by about 0.6°C

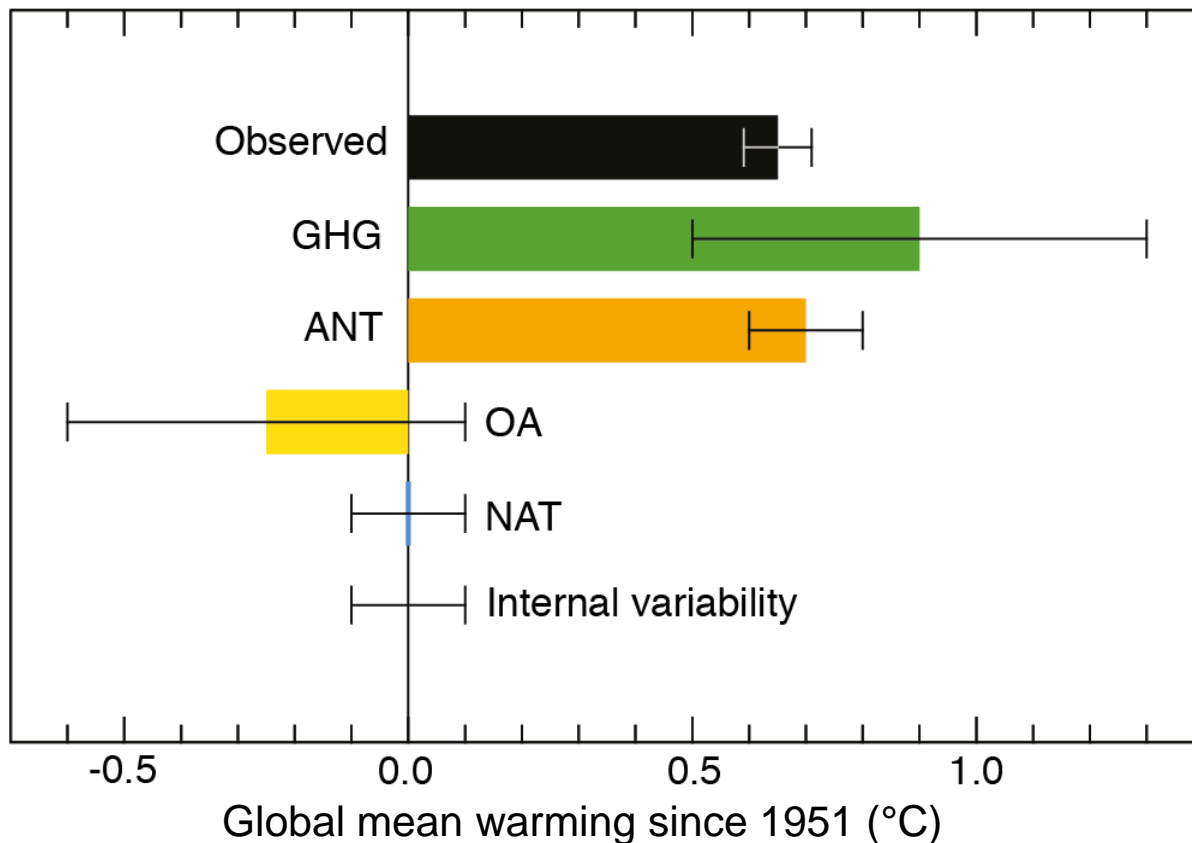


Fig. TS.10

It is *extremely likely* that more than **50% of the warming since 1951** is due to the increase in greenhouse gases and other anthropogenic forcings together

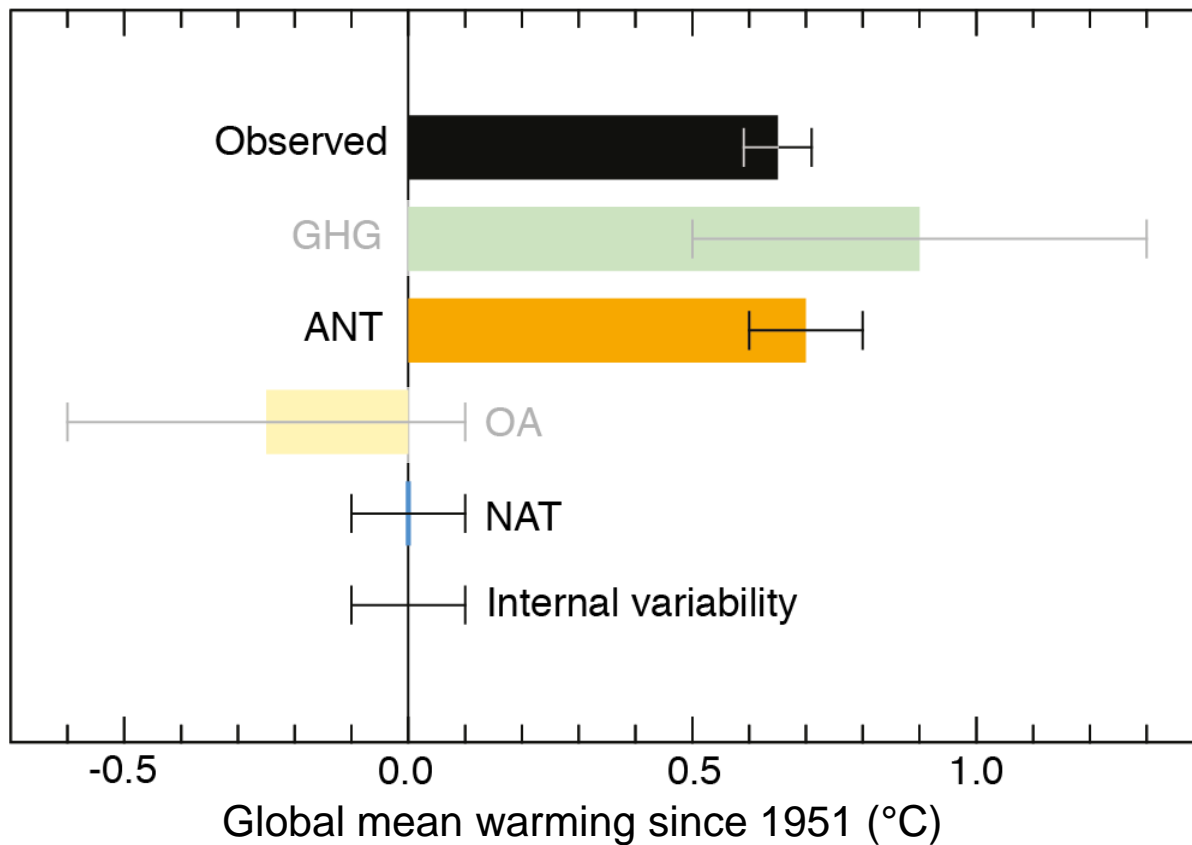


Fig. TS.10

Human influence on the climate system is clear

Options

ipcc

INTERGOVERNMENTAL PANEL ON climate change

CLIMATE CHANGE 2013

The Physical Science Basis

WG I

WORKING GROUP I CONTRIBUTION TO THE
FIFTH ASSESSMENT REPORT OF THE
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



Global average surface temperature change

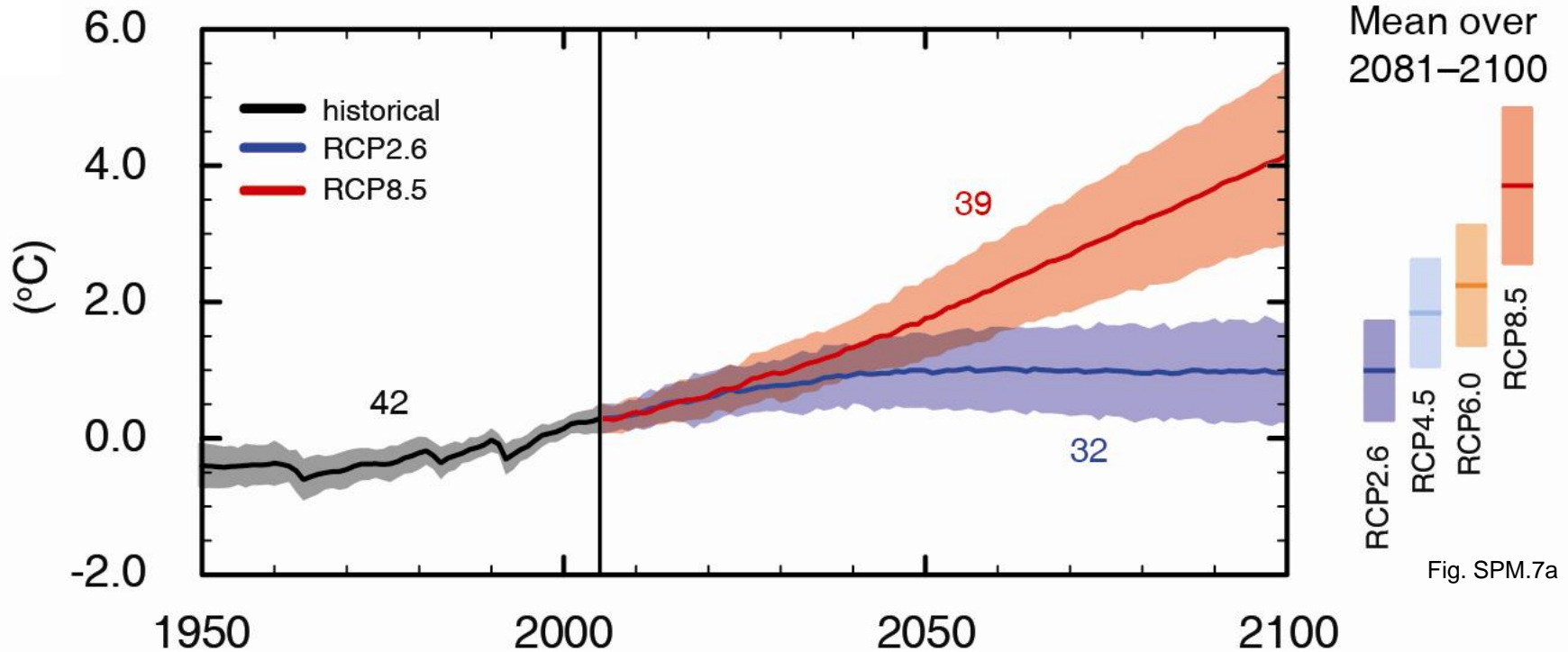


Fig. SPM.7a

Global surface temperature change for the end of the 21st century is *likely* to exceed 1.5°C relative to 1850 for all scenarios

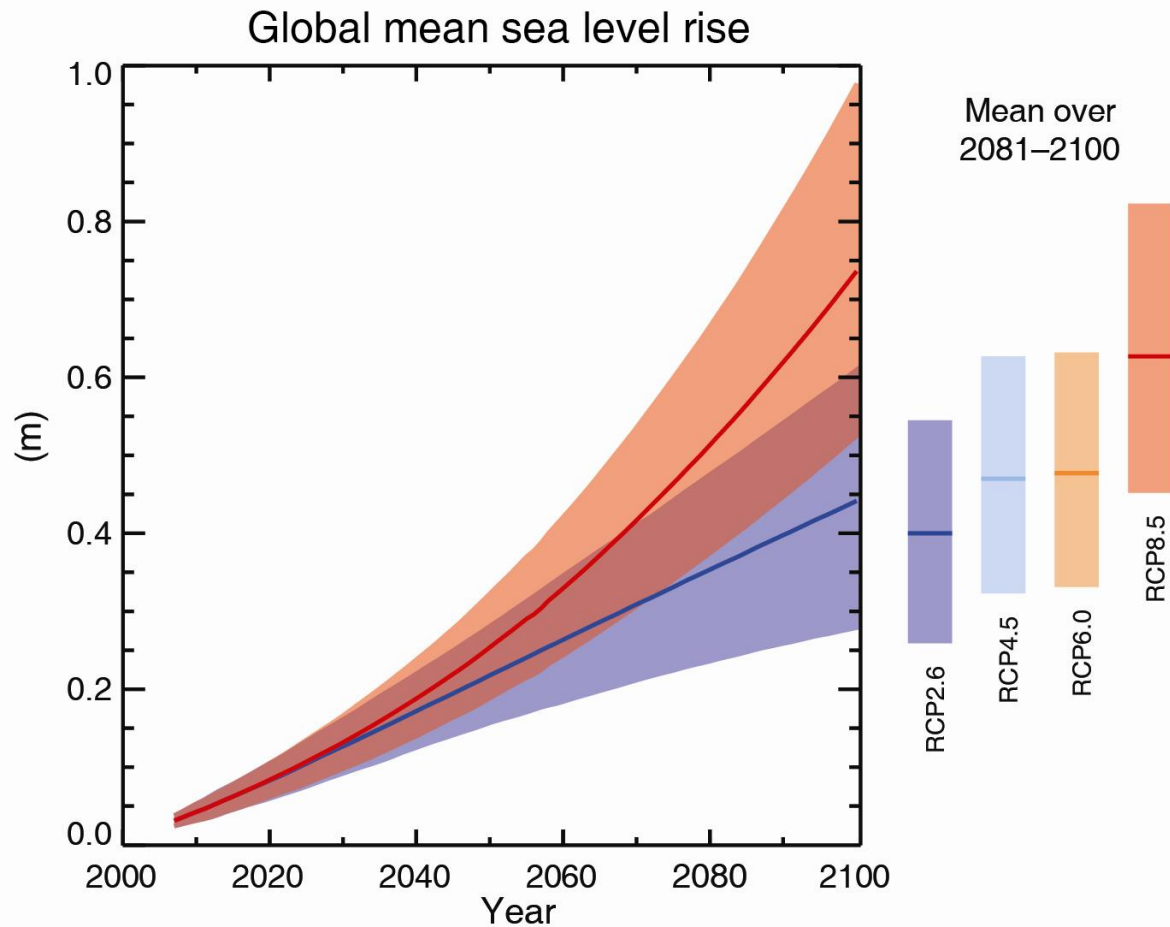


Fig. SPM.9

Global mean sea level will continue to rise during the 21st century

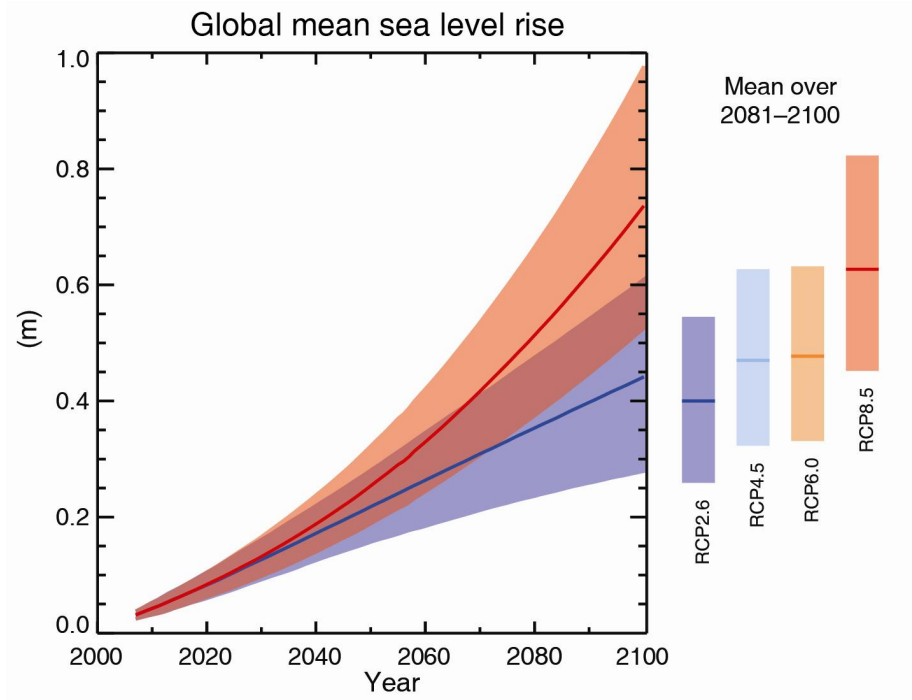


Fig. SPM.9

RCP2.6 (2081-2100): 0.26 to 0.55 m

RCP8.5 (2081-2100): 0.45 to 0.82 m

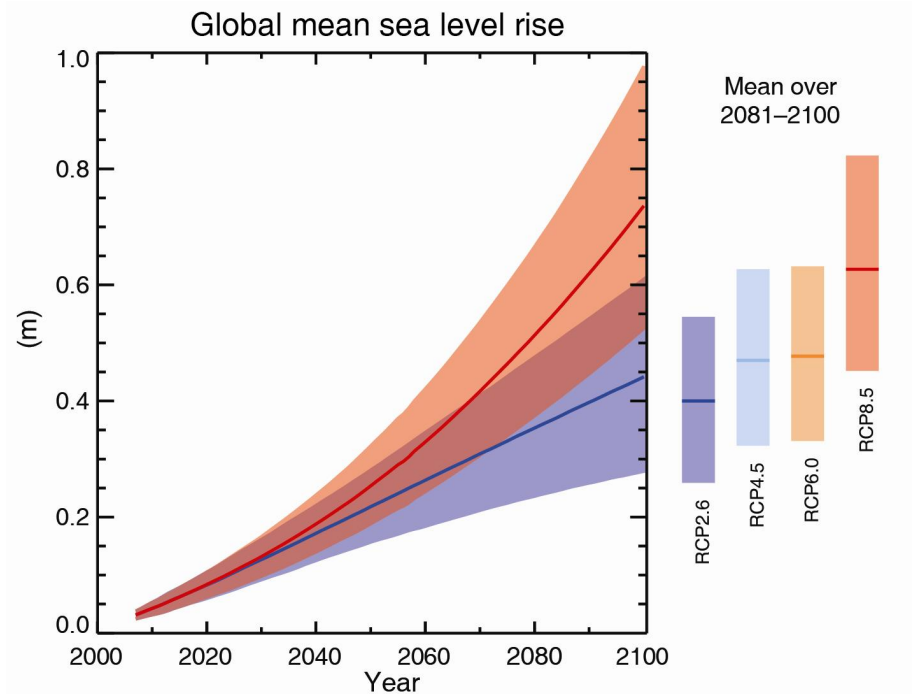


Fig. SPM.9

RCP8.5 (in 2100): **0.52 to 0.98 m**

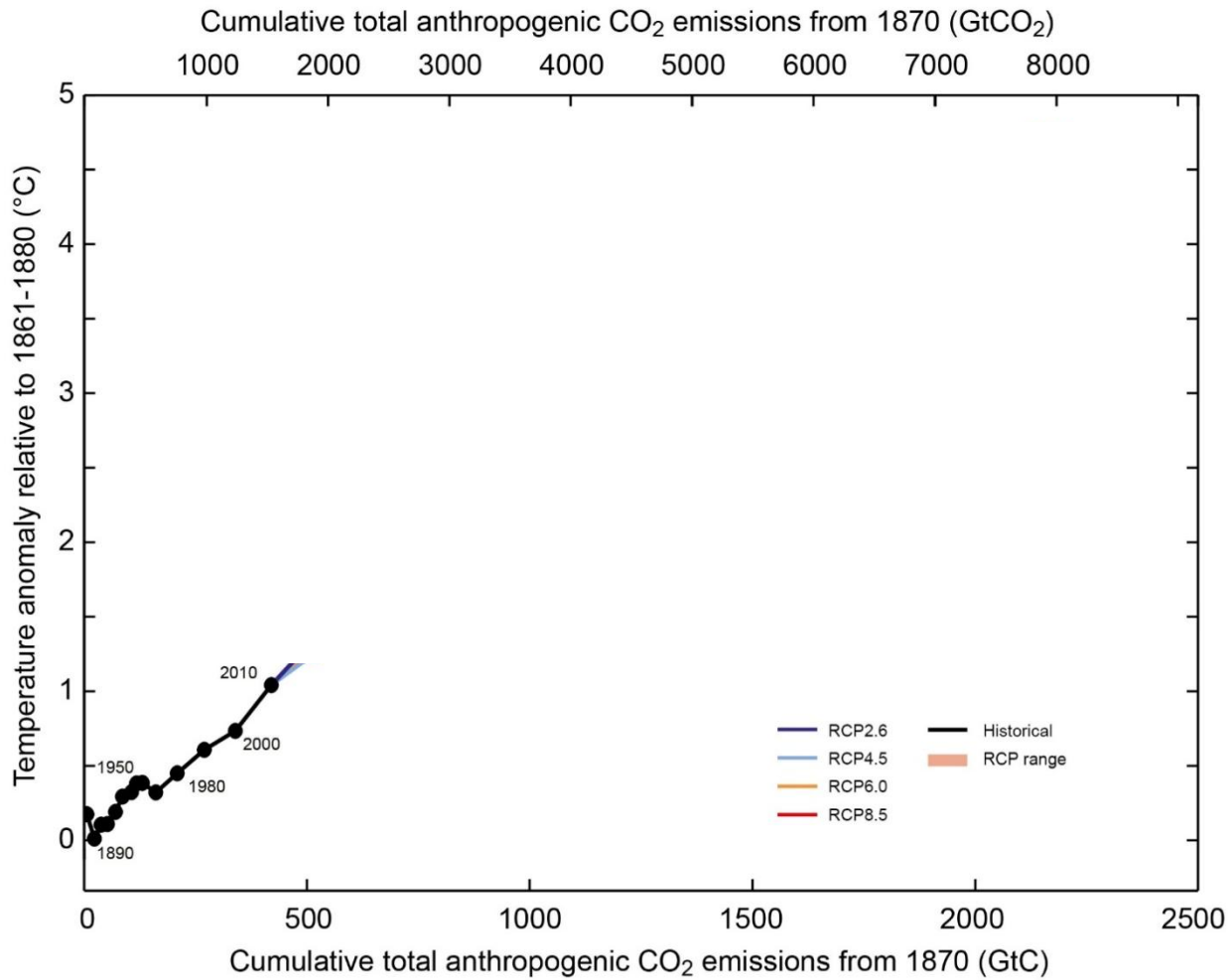


Fig. SPM.10

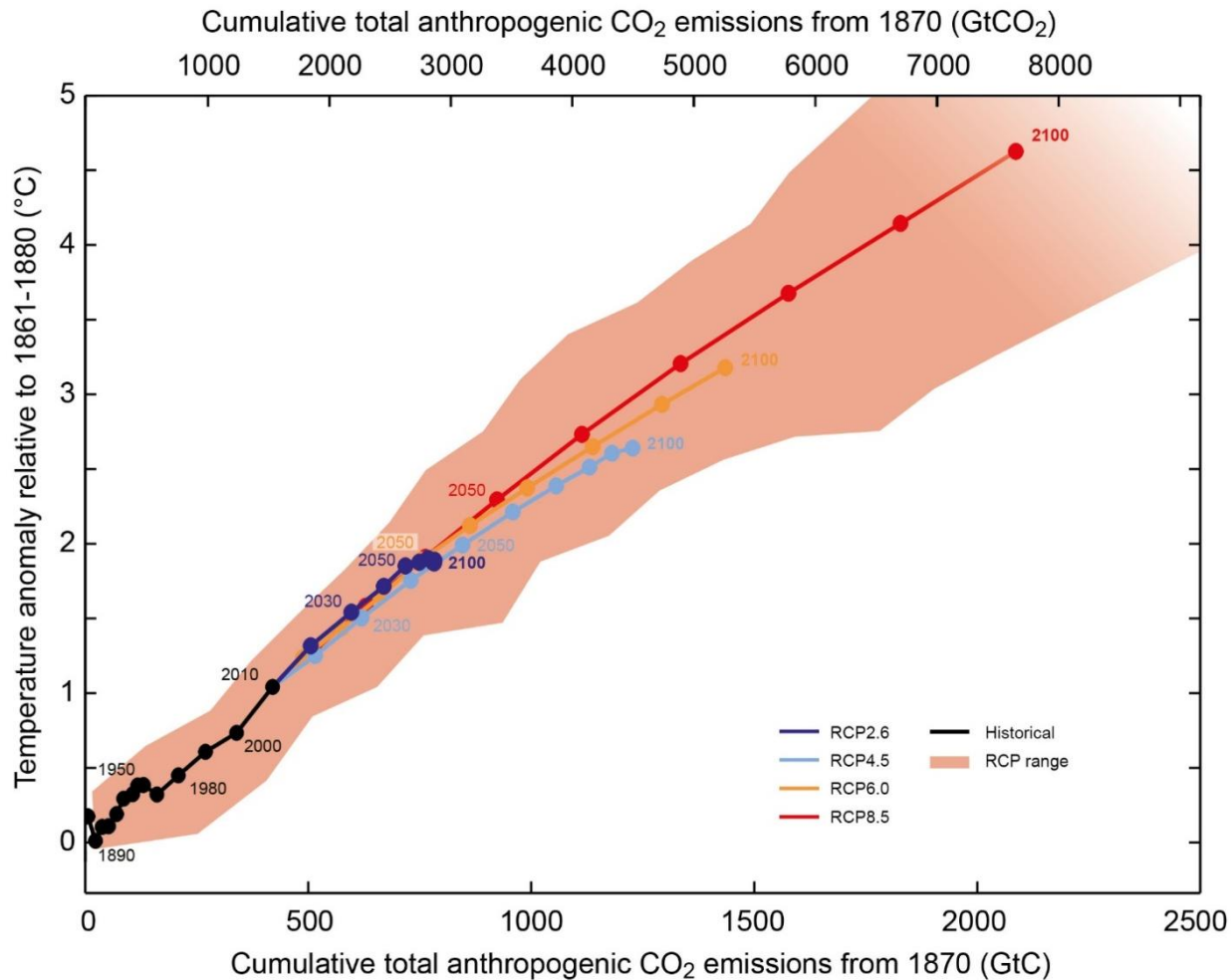


Fig. SPM.10

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

Key SPM Messages

19 Headlines

on less than 2 Pages

Options

Causes

Observations

ipcc

INTERGOVERNMENTAL PANEL ON climate change

CLIMATE CHANGE 2013

The Physical Science Basis

WG I

WORKING GROUP I CONTRIBUTION TO THE
FIFTH ASSESSMENT REPORT OF THE
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



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

Human influence on the climate system is clear

Warming in the climate system is unequivocal

Climate Change 2013: The Physical Science Basis

Working Group I contribution to the IPCC Fifth Assessment Report

Further Information
www.climatechange2013.org

© Yann Arthus-Bertrand / Altitude

The four Elements of the WGI Fifth Assessment Report

- **14 Chapters**

1'140'000 Words, ca. 2000 Pages
1250 Figures und Diagrams

- **Atlas: Regional Projections**

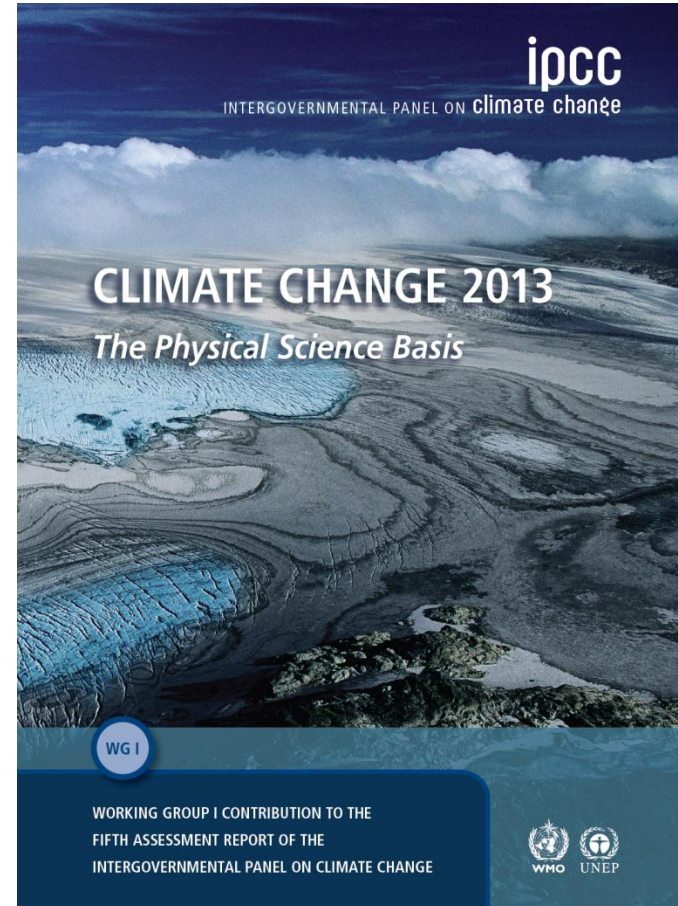
Timeseries und Maps for 35 Regions of the World, 2 Mio G Bytes, Atlas Team

- **Technical Summary**

55'000 Words, ca. 90 Pages

- **Summary for Policymakers**

14'000 Words, 22 Pages, 10 Figures



Atlas of Global and Regionale Climate Projections

- ❖ 42 global Climate Models

- ❖ 35 Regions

- ❖ 2 Variables

Temperature, Precipitation

- ❖ 4 Scenarios

RCPs 2.6, 4.5, 6.0, 8.5

- ❖ 2 Seasons

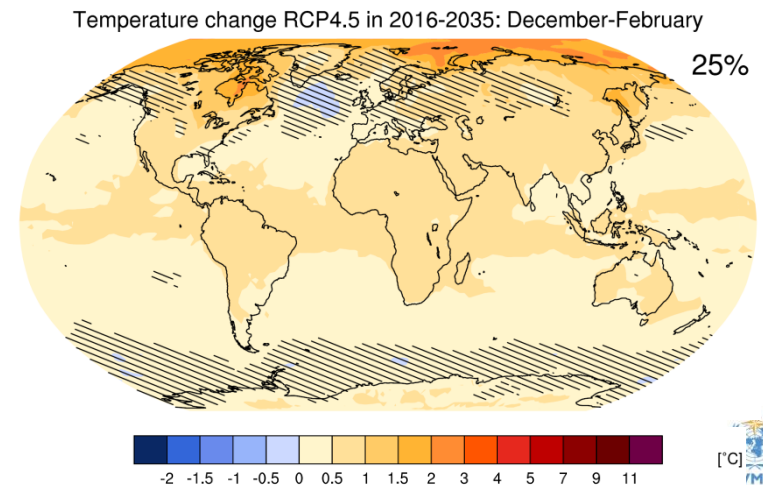
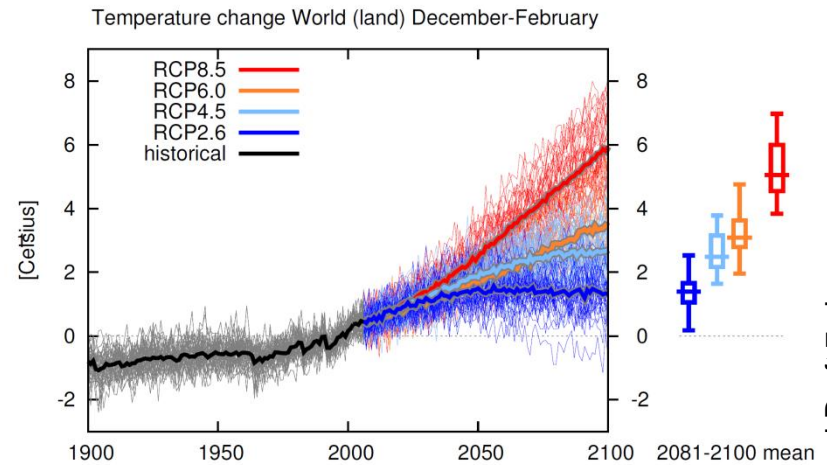
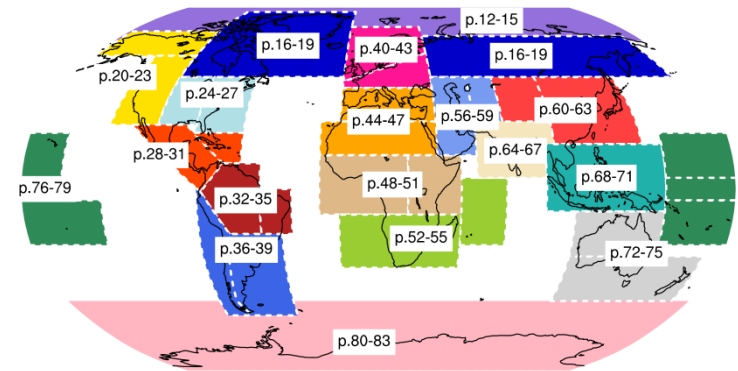
Dec-Feb, Jun-Aug (Temperature)

Apr-Sept, Oct-Mar (Precipitation)

- ❖ Maps for 3 Time Horizons

2016-35, 2046-65, 2081-2100

Reference Period 1986-2005



Atlas of Global and Regional Climate Projections

❖ Publication

WGI AR5 Annex I, RCP4.5
83 Pages

❖ Electronic Supplement

4 RCPs, additional
Annual mean, all 4 Seasons
for Temperature
4 x 153 Pages

❖ Atlas Data

Electronically available at
the time of Publication of the
Full Report (January 2014)

Final Draft

Annex I

IPCC WG1 Fifth Assessment Report

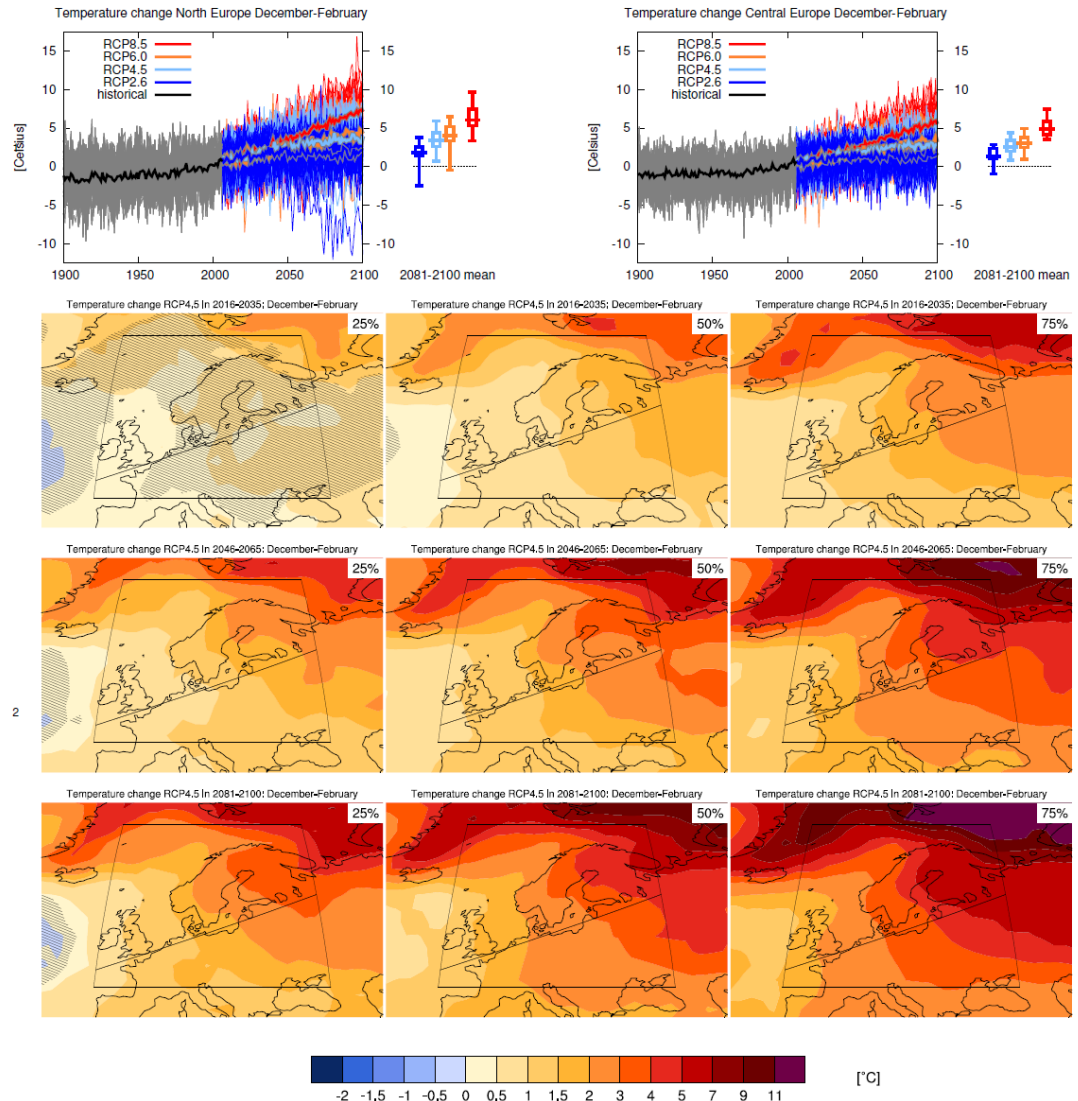


Fig. Al.36, Final Draft 7. June

The four Elements of the Technical Summary

❖ Summary of the 14 Chapters

Observations – Drivers – Understanding – Projections

❖ Key Uncertainties

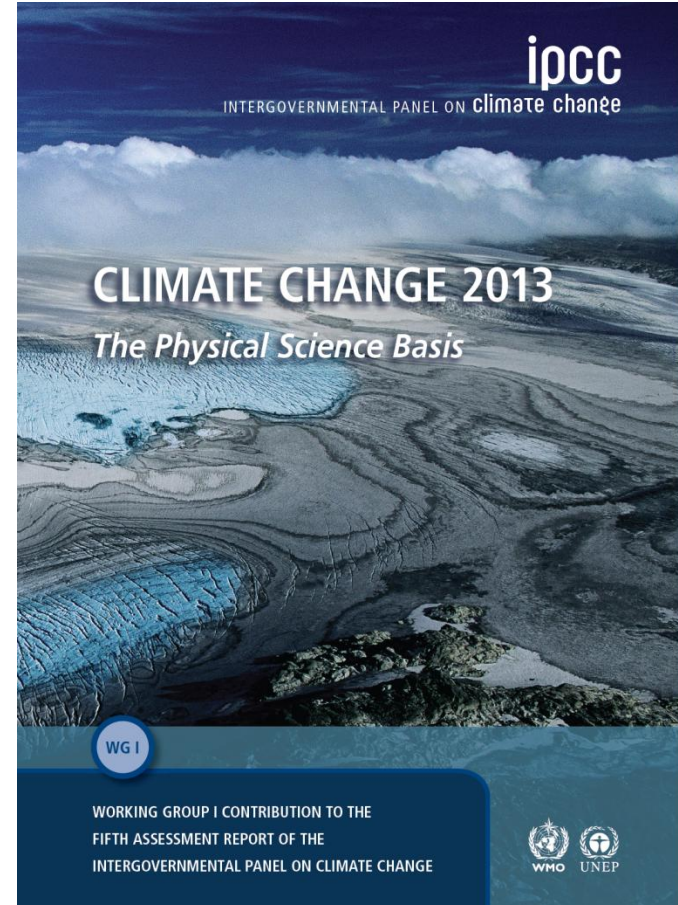
❖ Technical Boxes

7 Boxes, ca. 1 Page

e.g., “Treatment of Uncertainty in IPCC Reports”, “RCP Scenarios”, “Climate Models and the last 15 years of warming”, “Climate (Geo-)engineering Methods”

❖ Thematic Highlights

9 “Thematic Focus Elements”, 1-2 Pages, 1 Figure



Technical Summary: Thematic Focus Elements

End-to-End Assessments

TFE.1: Water Cycle Change

TFE.2: Sea Level Change: Scientific Understanding and Uncertainties

TFE.3: Comparing Projections from Previous IPCC Assessments with Observations

TFE.4: The Changing Energy Budget of the Global Climate System

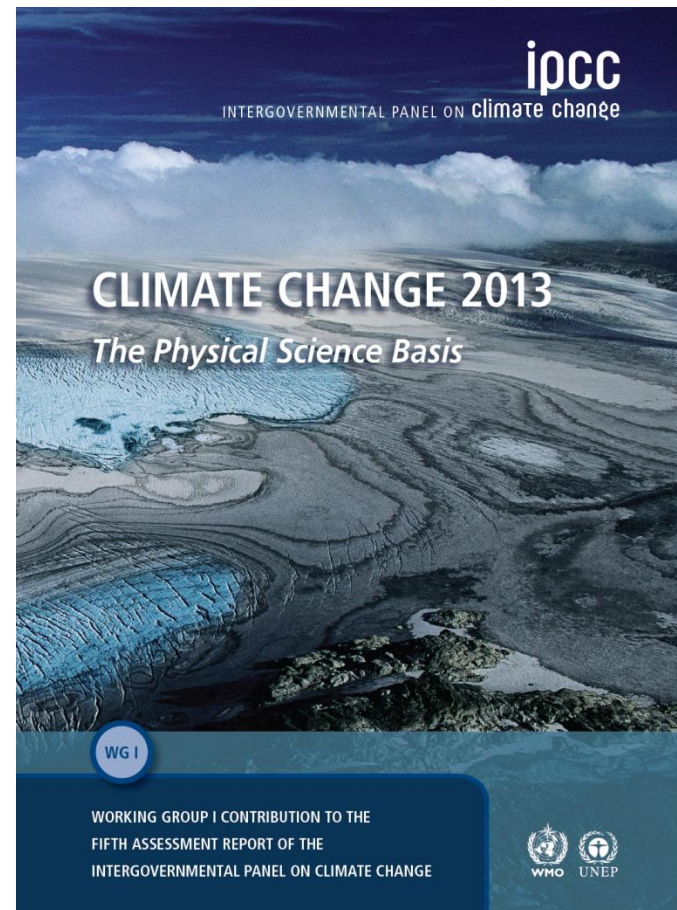
TFE.5: Irreversibility and abrupt Change

TFE.6: Climate Sensitivity and Feedbacks

TFE.7: Carbon Cycle Perturbation and Uncertainties

TFE.8: Climate Targets and Stabilization

TFE.9: Climate Extremes



Climate Change 2013: The Physical Science Basis

Working Group I contribution to the IPCC Fifth Assessment Report

Further Information
www.climatechange2013.org

© Yann Arthus-Bertrand / Altitude