

Klimawandel auf dem Prüfstand! *oder* Weltklimabericht IPCC 2013

Eine (deutsch gesprochene) Kurzeinführung auf Basis des (englischen) Summary for Policymakers und eine Ermutigung zum Selber-Nutzen des Berichts sowie Hinweise zur Notwendigkeit zu Handeln und Bedeutung für die Steiermark

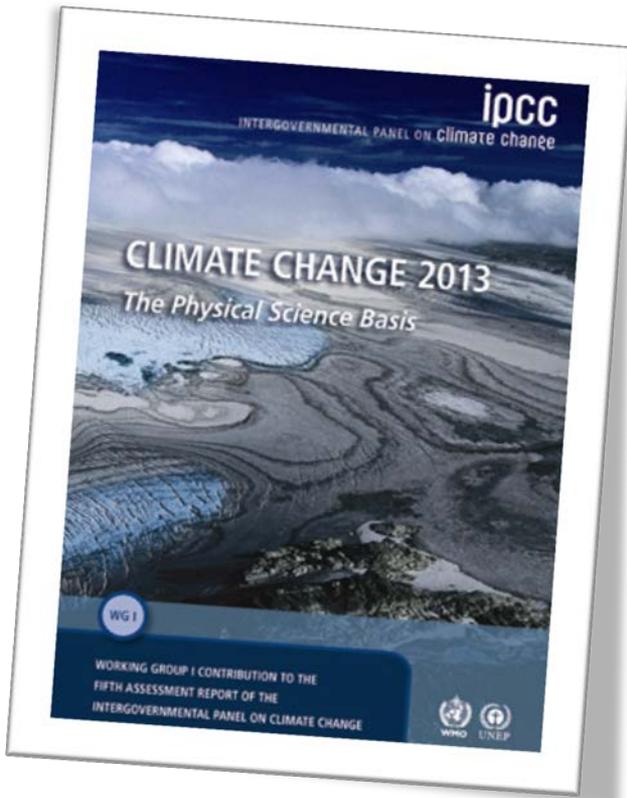
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Karl-Franzens-Universität Graz (www.wegcenter.at)**

**Impulsvortrag WIN Steiermark Diskussionsveranstaltung Klimawandel auf dem Prüfstand!
Aula FH der Wirtschaft CAMPUS 02, 9. April 2014**

(danke an Sabine Tschürtz und Robert Mandl vom Wegener Center für die Unterstützung bei der Erstellung der Folien)

Working Group I Contribution to the IPCC Fifth Assessment Report *Climate Change 2013: The Physical Science Basis* Summary for Policymakers



- A. Introduction
- B. Observed Changes in the Climate System
- C. Drivers of Climate Change
- D. Understanding the Climate System and its Recent Changes
- E. Future Global and Regional Climate Change

Weblinks:

www.climatechange2013.org/report (contains SPM, Headline Statements, WGI Fact Sheet, and Questions about the Report under DOWNLOADS; and the Full IPCC WGI Fifth Assessment Report under REPORT)

www.ipcc.ch (IPCC homepage, entry to full breadth of information)

www.de-ipcc.de (einige deutschsprachige Informationsressourcen)

“This Summary for Policymakers (SPM) follows the structure of the Working Group I report. The narrative is supported by a series of overarching highlighted conclusions which, taken together, provide a concise summary. Main sections are introduced with a brief paragraph in italics which outlines the methodological basis of the assessment.”

Wichtig: die geeichete IPCC Sprache zu (Un)Sicherheit

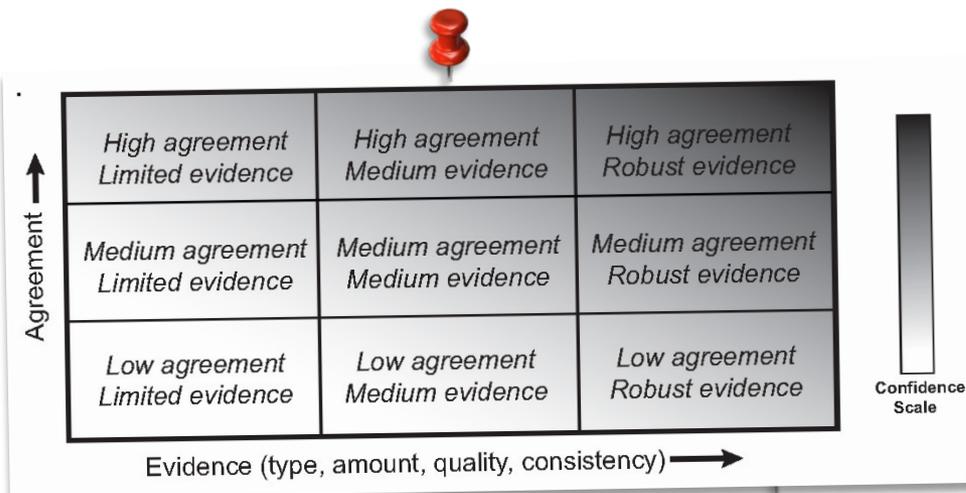
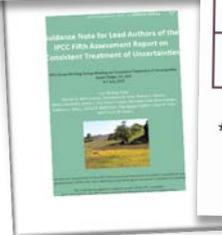


Table 1. Likelihood Scale

Term*	Likelihood of the Outcome
<i>Virtually certain</i>	99-100% probability
<i>Very likely</i>	90-100% probability
<i>Likely</i>	66-100% probability
<i>About as likely as not</i>	33 to 66% probability
<i>Unlikely</i>	0-33% probability
<i>Very unlikely</i>	0-10% probability
<i>Exceptionally unlikely</i>	0-1% probability

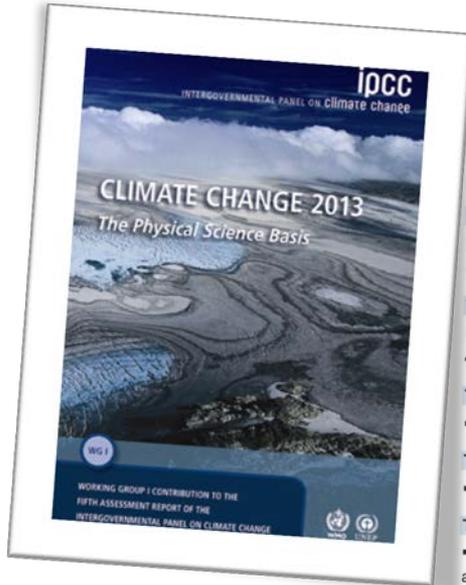
* Additional terms that were used in limited circumstances in the AR4 (*extremely likely* – 95-100% probability, *more likely than not* – >50-100% probability, and *extremely unlikely* – 0-5% probability) may also be used in the AR5 when appropriate.



“The degree of certainty in key findings in this assessment is based on the author teams’ evaluations of underlying scientific understanding and is expressed as a qualitative level of confidence (from *very low* to *very high*) and, when possible, probabilistically with a quantified likelihood (from *exceptionally unlikely* to *virtually certain*). Confidence in the validity of a finding is based on the type, amount, quality, and consistency of evidence (e.g., data, mechanistic understanding, theory, models, expert judgment) and the degree of agreement¹. Probabilistic estimates of quantified measures of uncertainty in a finding are based on statistical analysis of observations or model results, or both, and expert judgment². Where appropriate, findings are also formulated as statements of fact without using uncertainty qualifiers. (See Chapter 1 and Box TS.1 for more details about the specific language the IPCC uses to communicate uncertainty) ”

Zwei Praxis-Beispiele: zur geeichten Sprache über (Un)Sicherheit und zum Zitierstil im SPM

Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850 (see Figure SPM.1). In the Northern Hemisphere, 1983–2012 was *likely* the warmest 30-year period of the last 1400 years (*medium confidence*). {2.4, 5.3}



The Report

- 1 Scoping Meeting to outline 14 Chapters
- Over 1000 nominations from 63 countries
- 209 Lead Authors and 50 Review Editors from 39 countries
- Over 600 Contributing Authors from 32 countries
- Over 2 million gigabytes of numerical data from climate model simulations
- Over 9200 scientific publications cited

The First Order Draft Expert Review

- Nearly 1500 individuals registered
- 21,400 comments from 659 Expert Reviewers from 47 countries

The Second Order Draft Expert and Government Review

- Over 1500 individuals registered
- 31,422 comments from 800 Expert Reviewers from 46 countries and 26 Governments

The Final Government Distribution

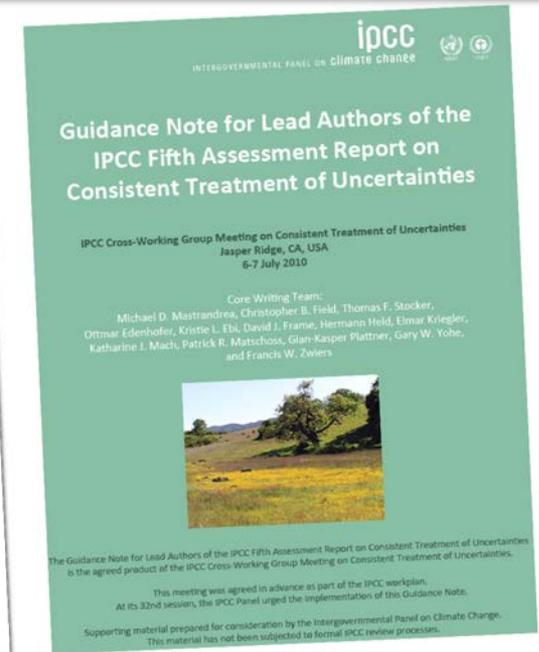
- 1855 comments from 32 Governments on the Final Draft Summary for Policymakers

Total Reviews

- 54,677 comments
- 1089 Expert Reviewers from 55 countries
- 38 Governments

The WGI Approval Session

- 23-26 September 2013, Stockholm, Sweden
- The Summary for Policymakers will be approved line-by-line by up to 195 Governments



Ocean warming dominates the increase in energy stored in the climate system, accounting for more than 90% of the energy accumulated between 1971 and 2010 (*high confidence*). It is *virtually certain* that the upper ocean (0–700 m) warmed from 1971 to 2010 (see Figure SPM.3), and it *likely* warmed between the 1870s and 1971. {3.2, Box 3.1}



“The IPCC’s reports are some of the most ambitious scientific undertakings in human history, and I am grateful for the contributions of everyone who make them possible.”

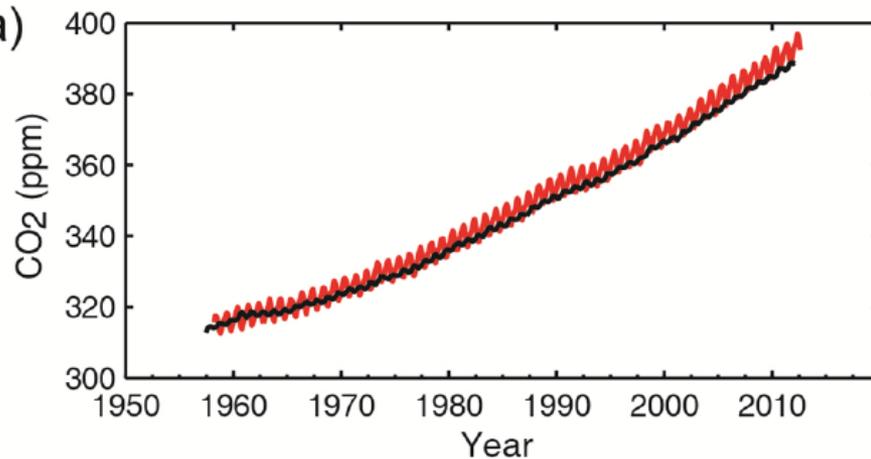
(Rajendra Pachauri, IPCC Vorsitzender, 31.3.2014)

1. Beobachtete Änderungen im Klimasystem

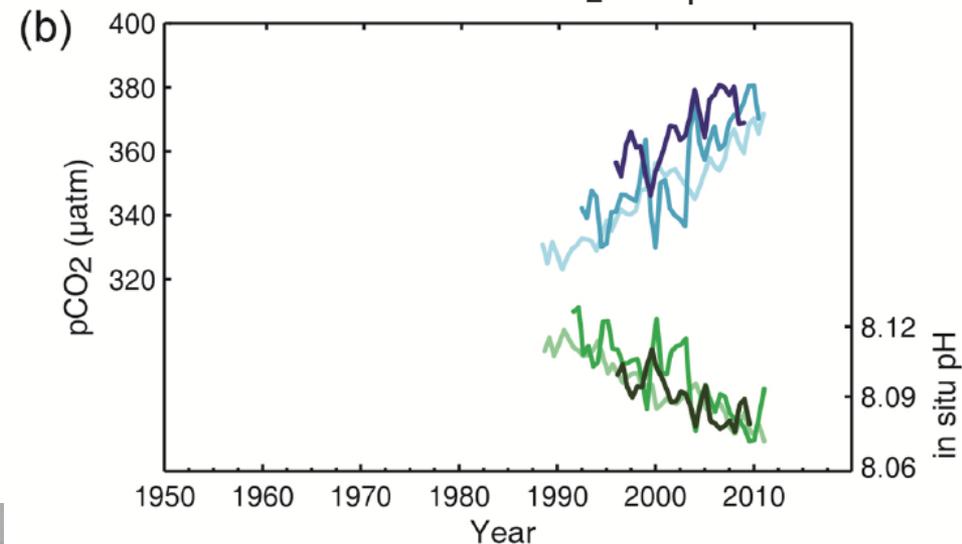
das CO₂ in der Luft und in den Meeren steigt stark an

The atmospheric concentrations of carbon dioxide (CO₂), methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. CO₂ concentrations have increased by 40% since pre-industrial times, primarily from fossil fuel emissions and secondarily from net land use change emissions. The ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide, causing ocean acidification (see Figure SPM.4). {2.2, 3.8, 5.2, 6.2, 6.3}

Atmospheric CO₂



Surface Ocean CO₂ and pH

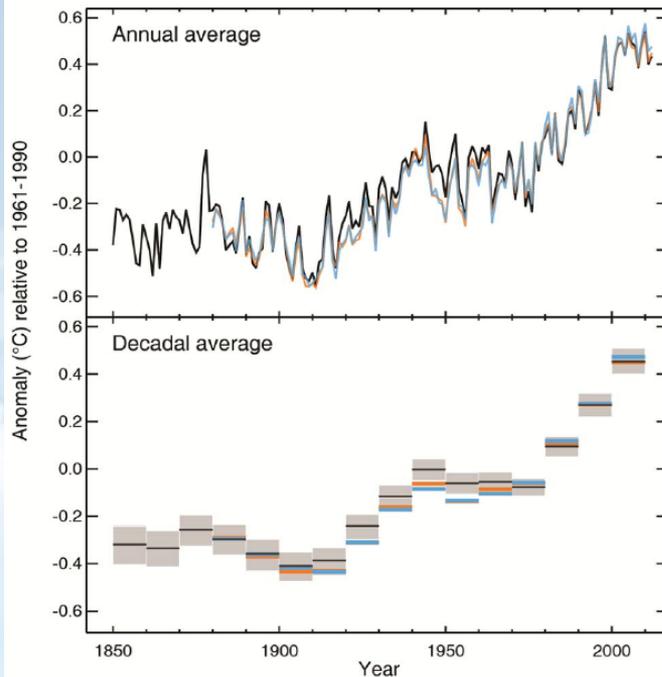


1. Beobachtete Änderungen im Klimasystem

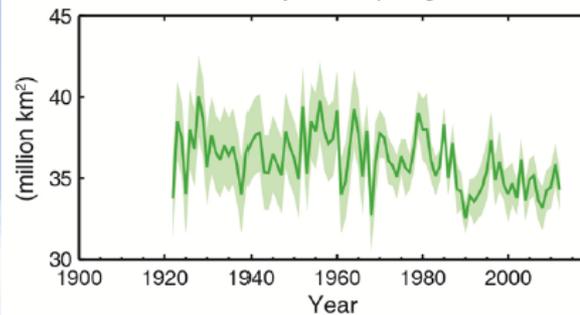
viele Indikatoren zeigen schon den Klimawandel

Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased (see Figures SPM.1, SPM.2, SPM.3 and SPM.4). {2.2, 2.4, 3.2, 3.7, 4.2–4.7, 5.2, 5.3, 5.5–5.6, 6.2, 13.2}

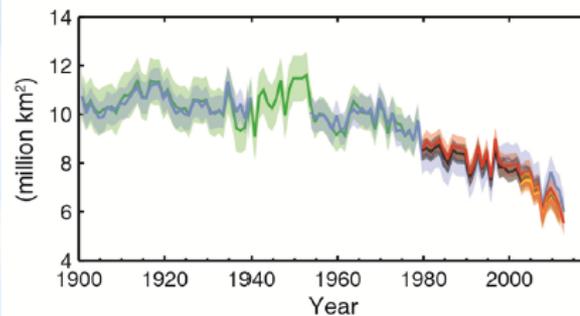
Observed globally averaged combined land and ocean surface temperature anomaly 1850–2012



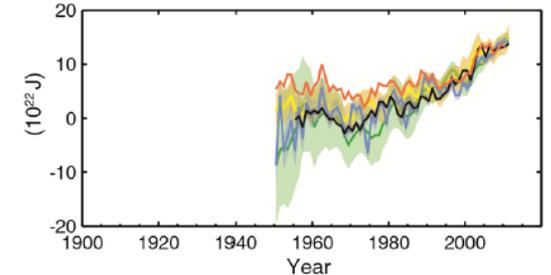
Northern Hemisphere spring snow cover



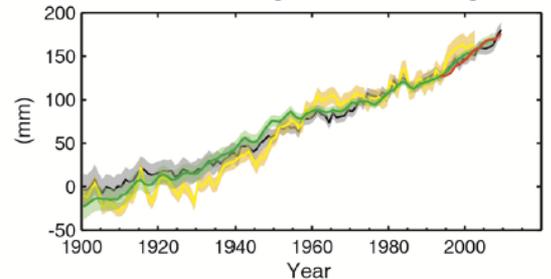
Arctic summer sea ice extent



Change in global average upper ocean heat content

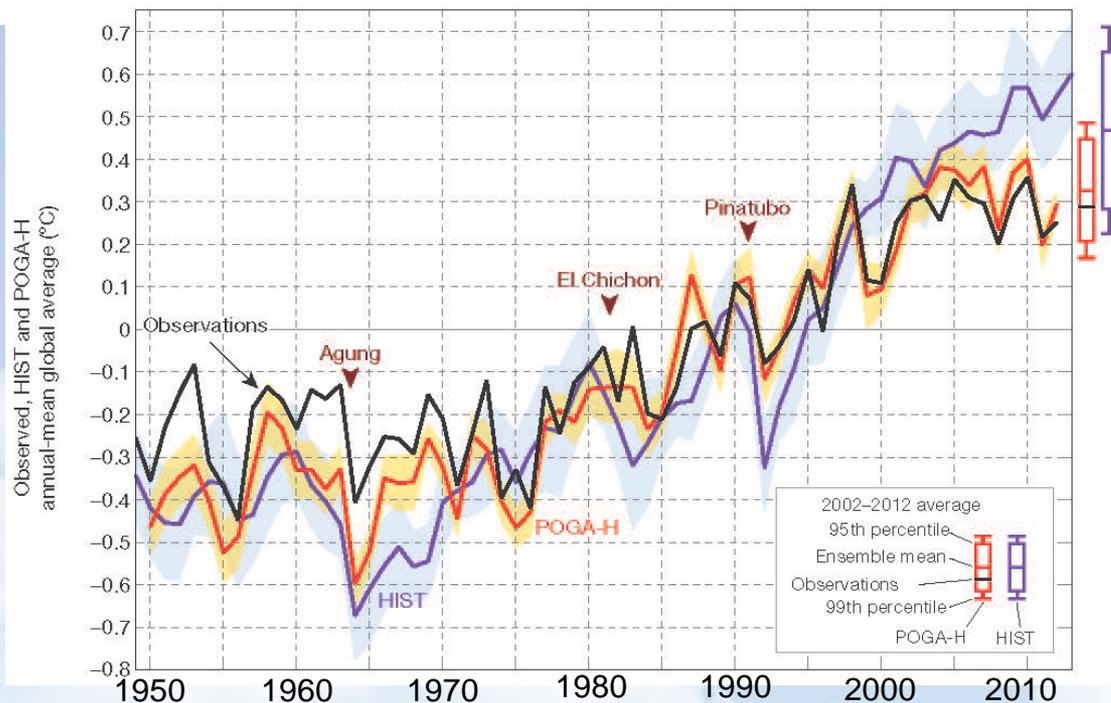


Global average sea level change



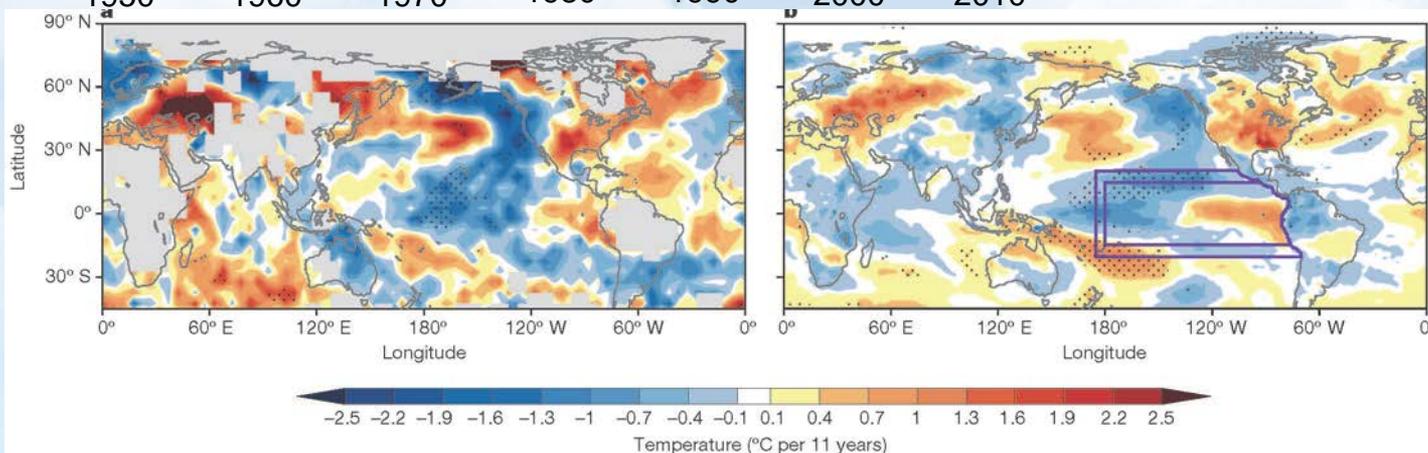
1. Beobachtete Änderungen im Klimasystem

Seitenanm: Schwankungen können langfristige Trends befristet überlagern, diese wirken aber weiter fort



Zu Temperaturänderungen der letzten zehn bis fünfzehn Jahre: Berücksichtigung des treibhausgas-gesteuerten Langfristrends und der überlagerten Schwankungen erklärt die Änderungen gut.

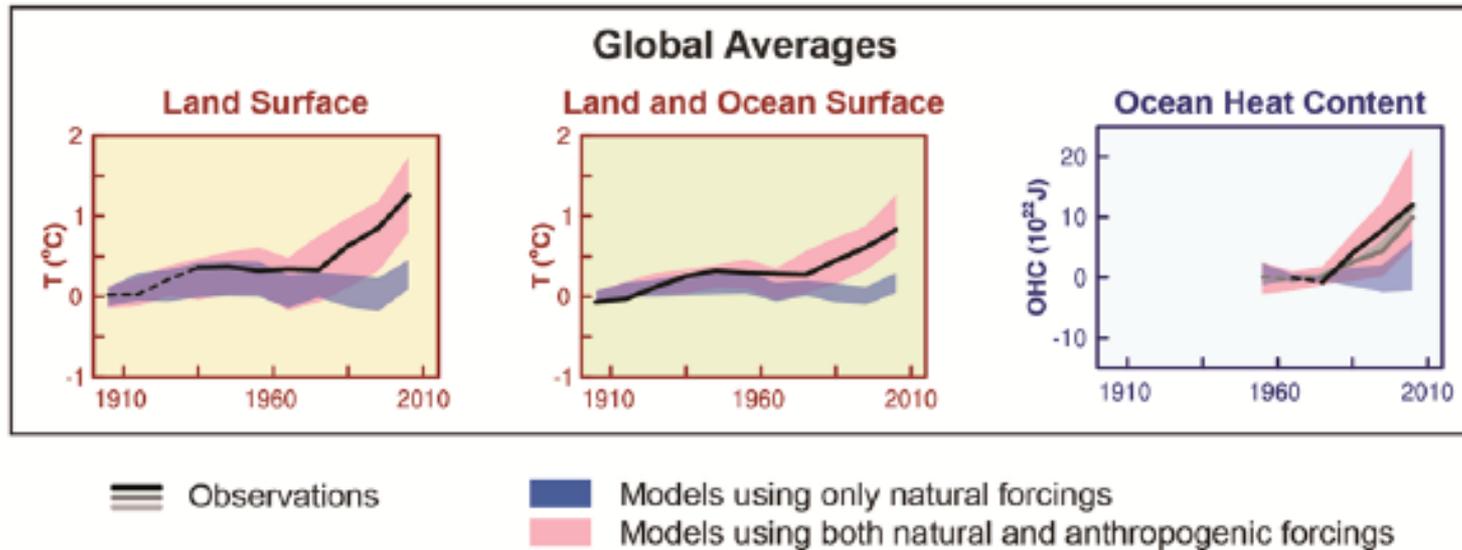
[Bilder: Kosaka & Xie, 2013]



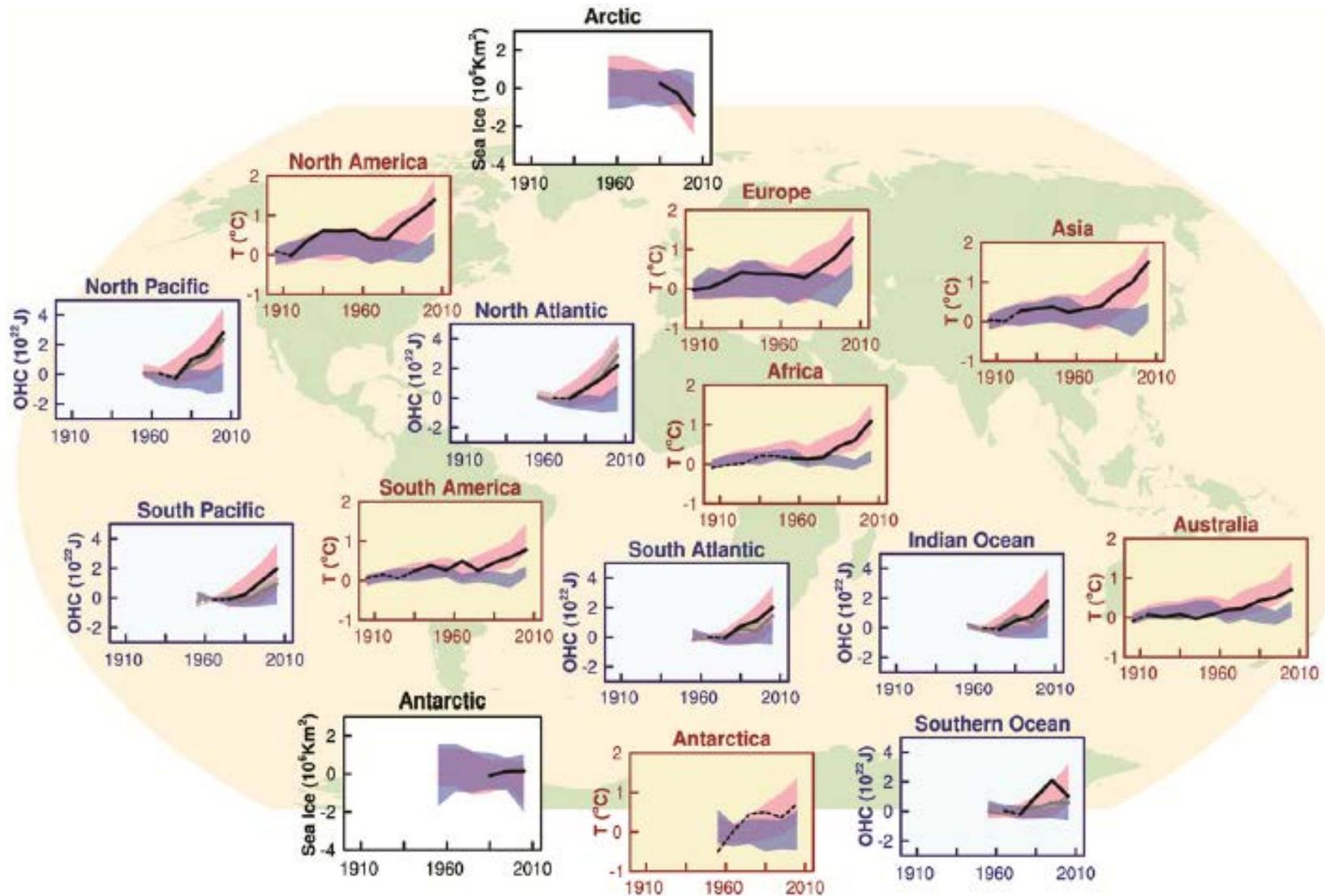
2. Wissen zum Klimasystem und seinen Änderungen *der menschlichen Einfluss ist nun sehr sicher belegt*

Human influence on the climate system is clear. This is evident from the increasing greenhouse gas concentrations in the atmosphere, positive radiative forcing, observed warming, and understanding of the climate system. {2–14}

Human influence has been detected in warming of the atmosphere and the ocean, in changes in the global water cycle, in reductions in snow and ice, in global mean sea level rise, and in changes in some climate extremes (Figure SPM.6 and Table SPM.1). This evidence for human influence has grown since AR4. It is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century. {10.3–10.6, 10.9}



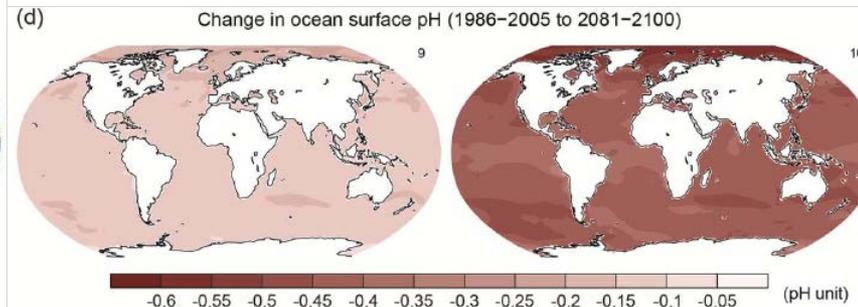
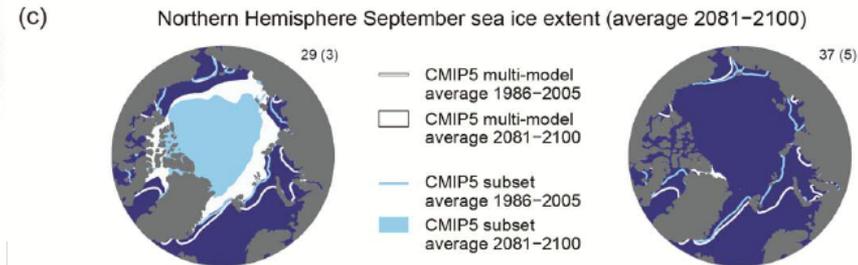
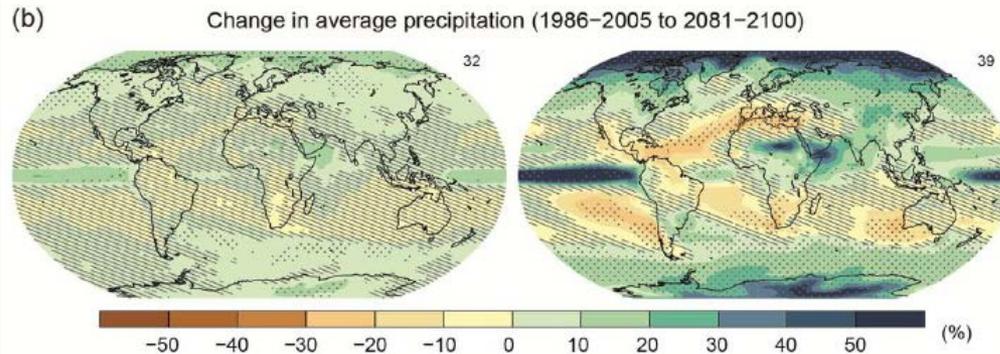
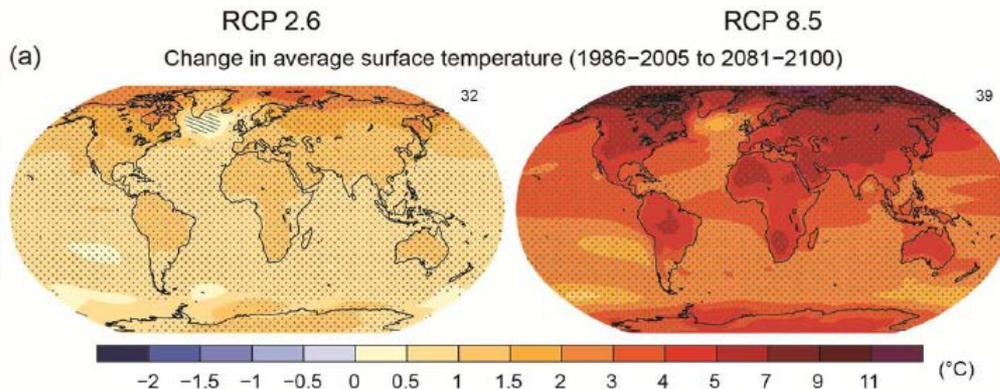
2. Wissen zum Klimasystem und seinen Änderungen *Nachweis des menschlichen Einflusses in Regionen*



3. Zukünftiger globaler und regionaler Klimawandel

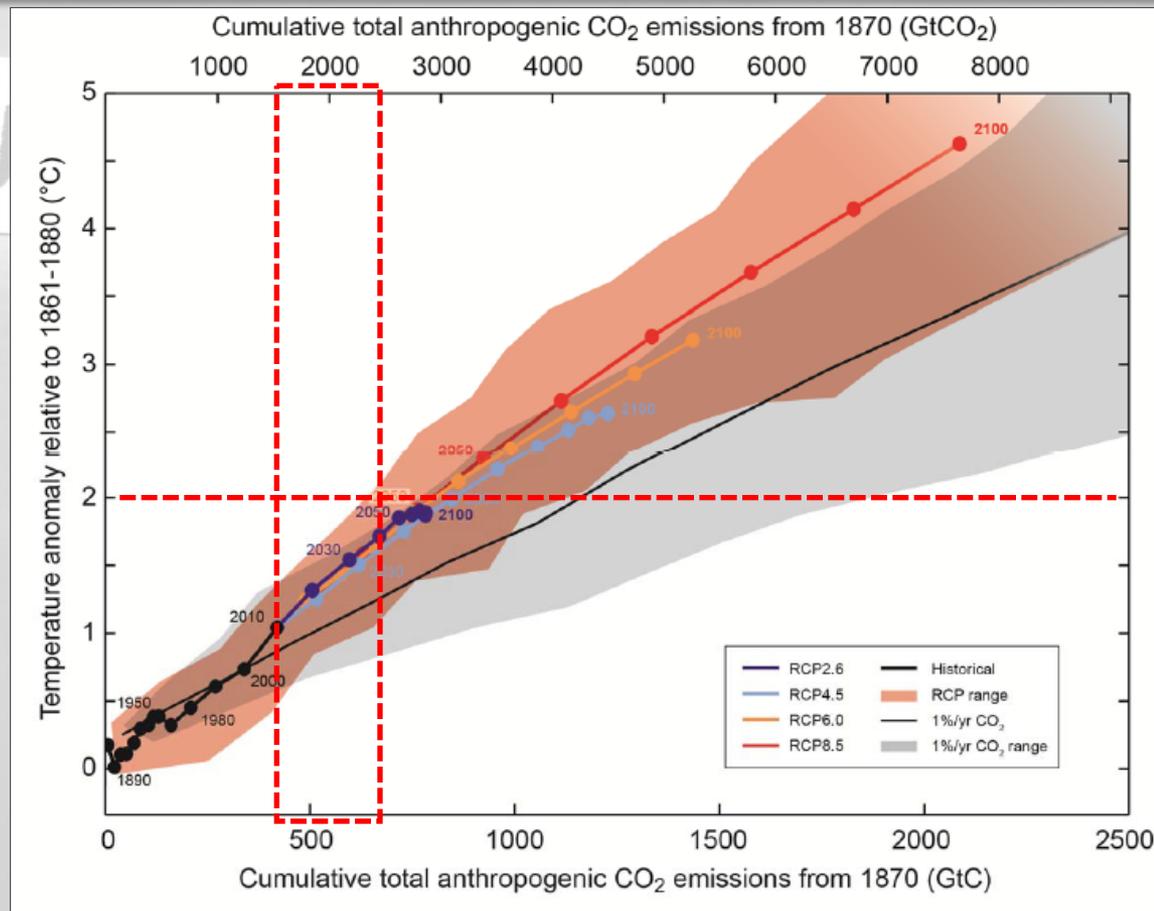
die globale Erwärmung geht (verstärkt) weiter

Continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system. Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions. {Chapters 6, 11, 12, 13, 14}



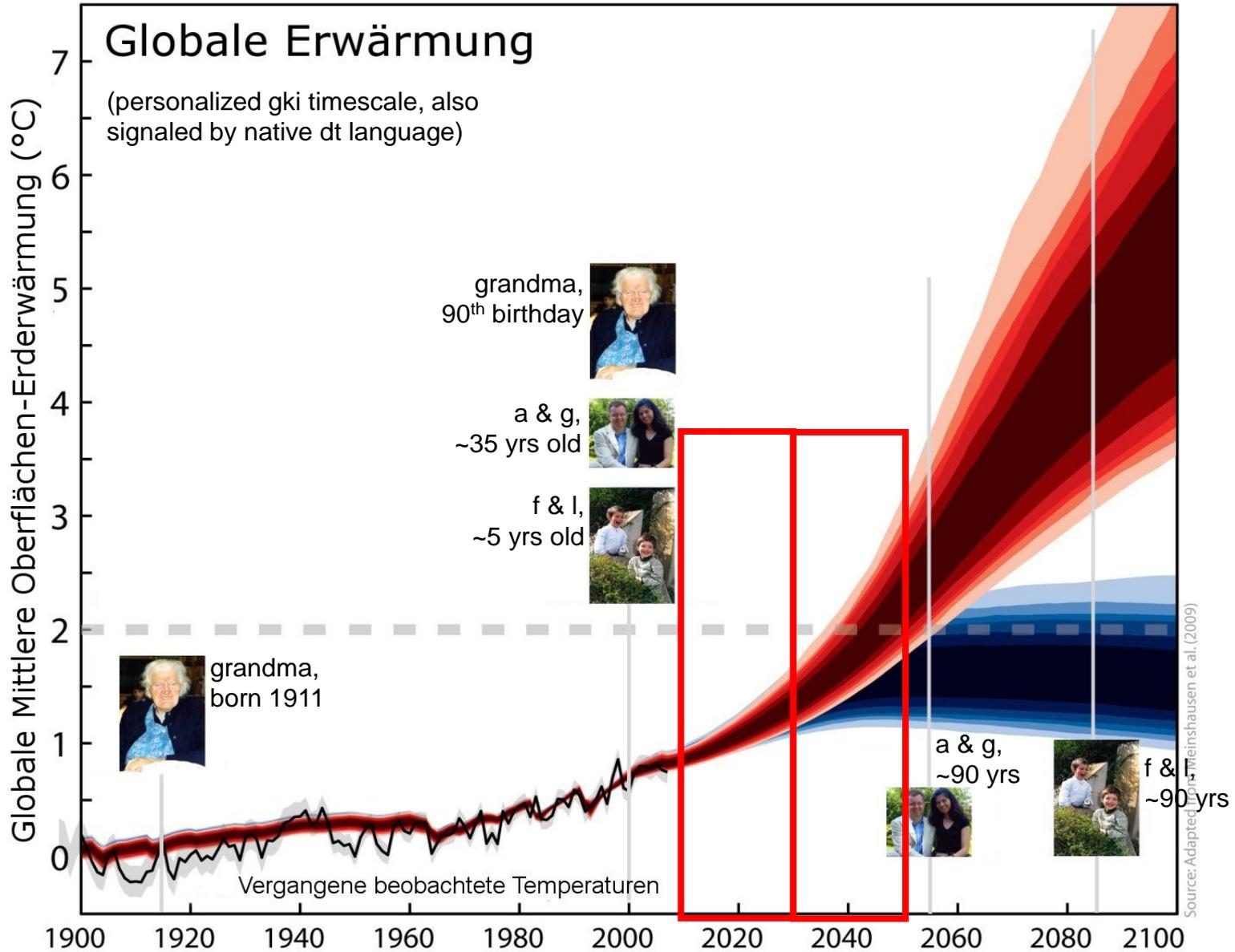
3. Zukünftiger globaler und regionaler Klimawandel *die CO₂ Gesamtemissionen werden die Stärke der weiteren Erwärmung für Jahrhunderte bestimmen*

Cumulative emissions of CO₂ largely determine global mean surface warming by the late 21st century and beyond (see Figure SPM.10). Most aspects of climate change will persist for many centuries even if emissions of CO₂ are stopped. This represents a substantial multi-century climate change commitment created by past, present and future emissions of CO₂. {12.5}



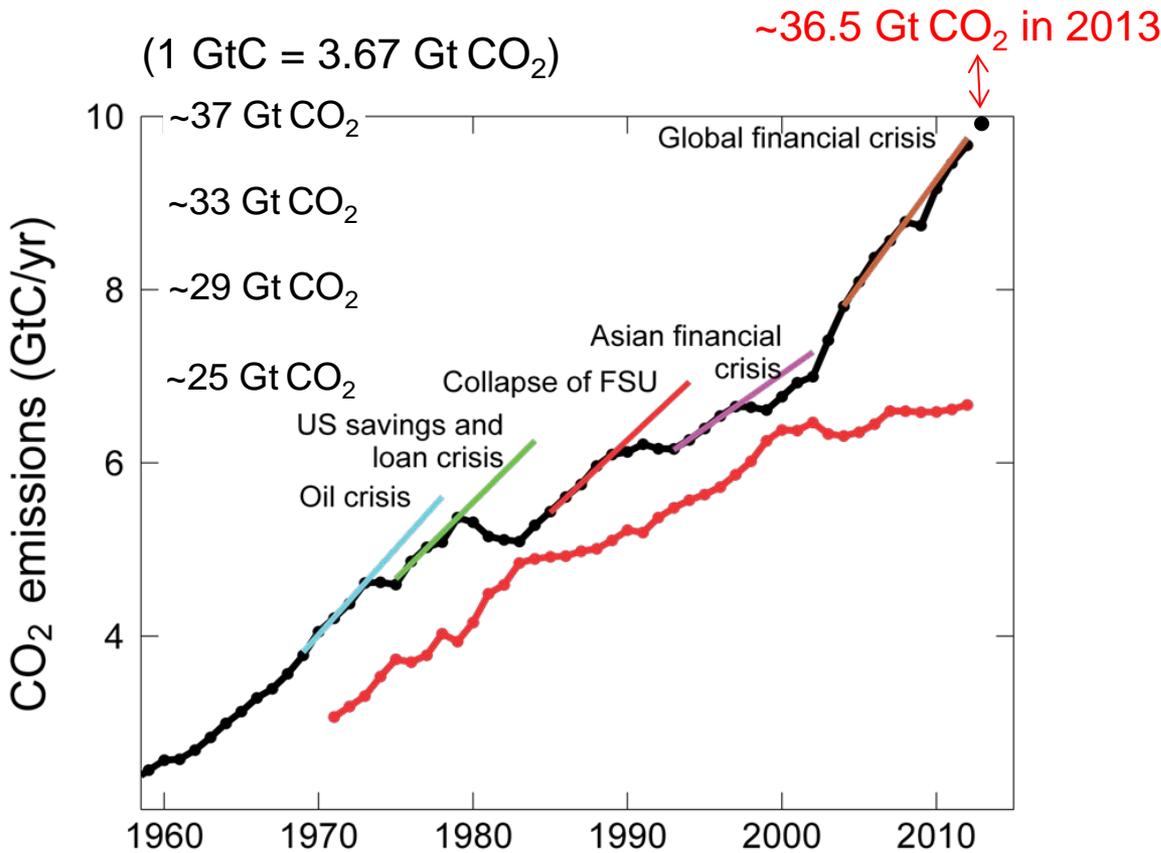
4. Wie rasches Handeln ist für Klimaschutz gefragt?

#1: Gefühl für „rasch“, persönl. Zeitskala kann helfen

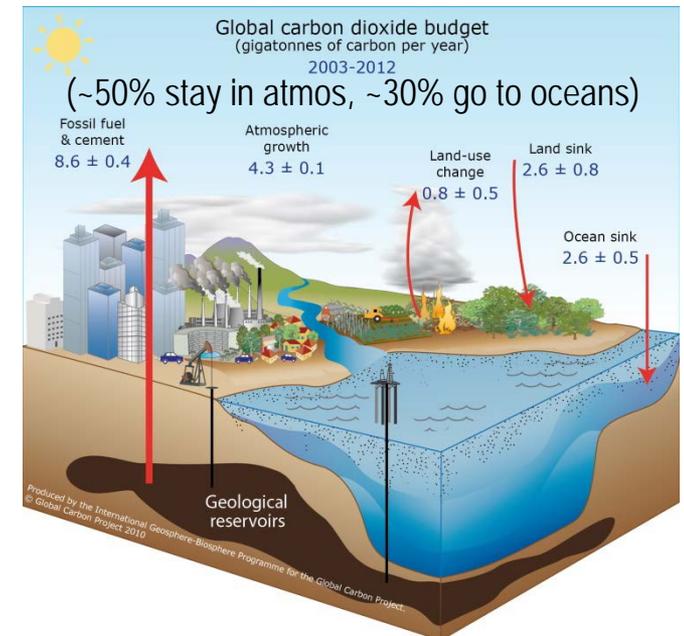


4. Wie rasches Handeln ist für Klimaschutz gefragt? *bisher steigen unsere CO₂ Emissionen ungebrochen...*

- Over the most recent decade (2003-2012) CO₂ emissions still rose faster than in any decade before – quo vadis?



(land use change emissions add ~10% to the fossil-fuel&cement CO₂ emissions shown)

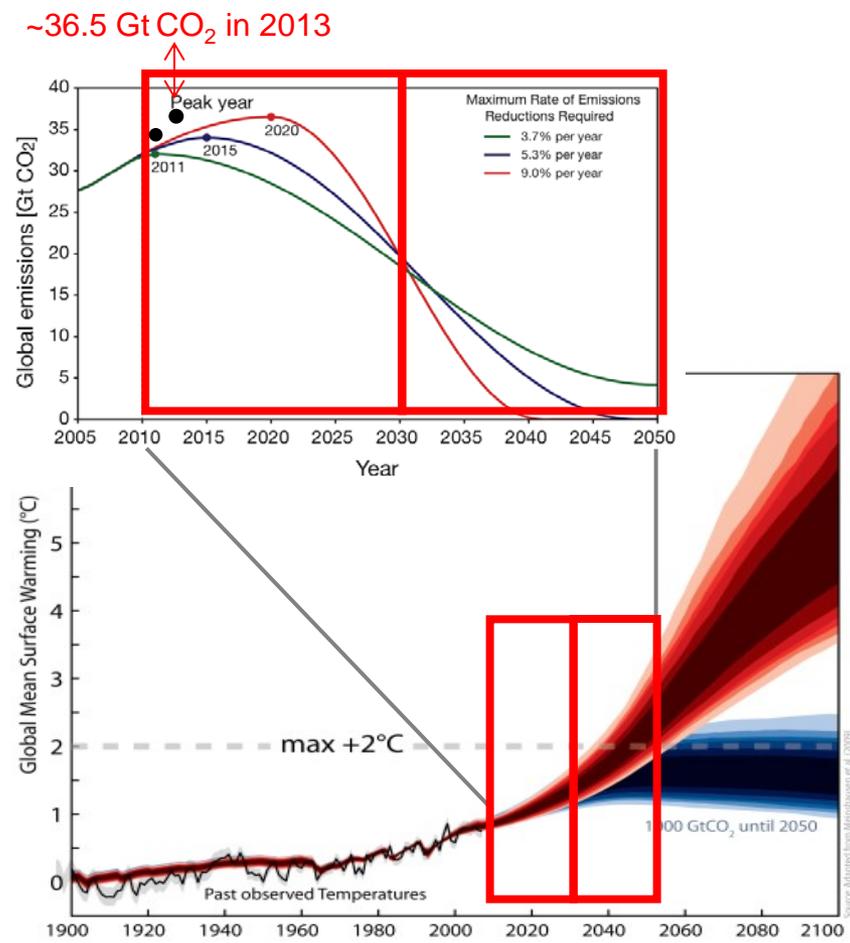
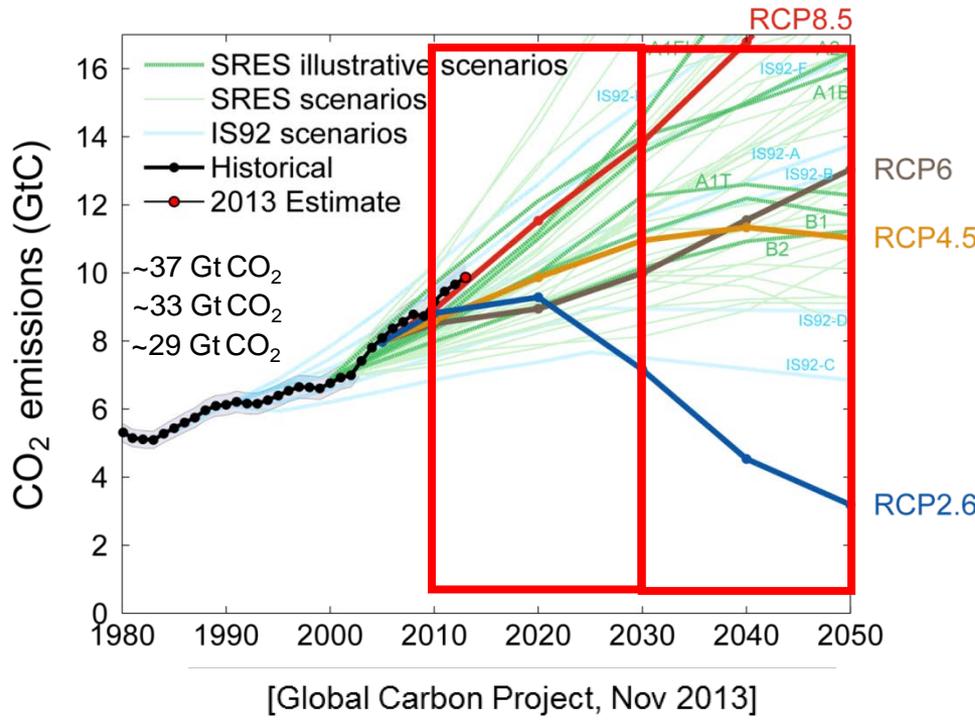


[Global Carbon Project, Nov 2013]

4. Wie rasches Handeln ist für Klimaschutz gefragt?

...sie müssen aber rasch sinken, je später umso stärker

- Globally about -60% CO₂ to 2050 (OECD countries -80%) is estimated to be needed for likely keeping below $+2^{\circ}\text{C}$

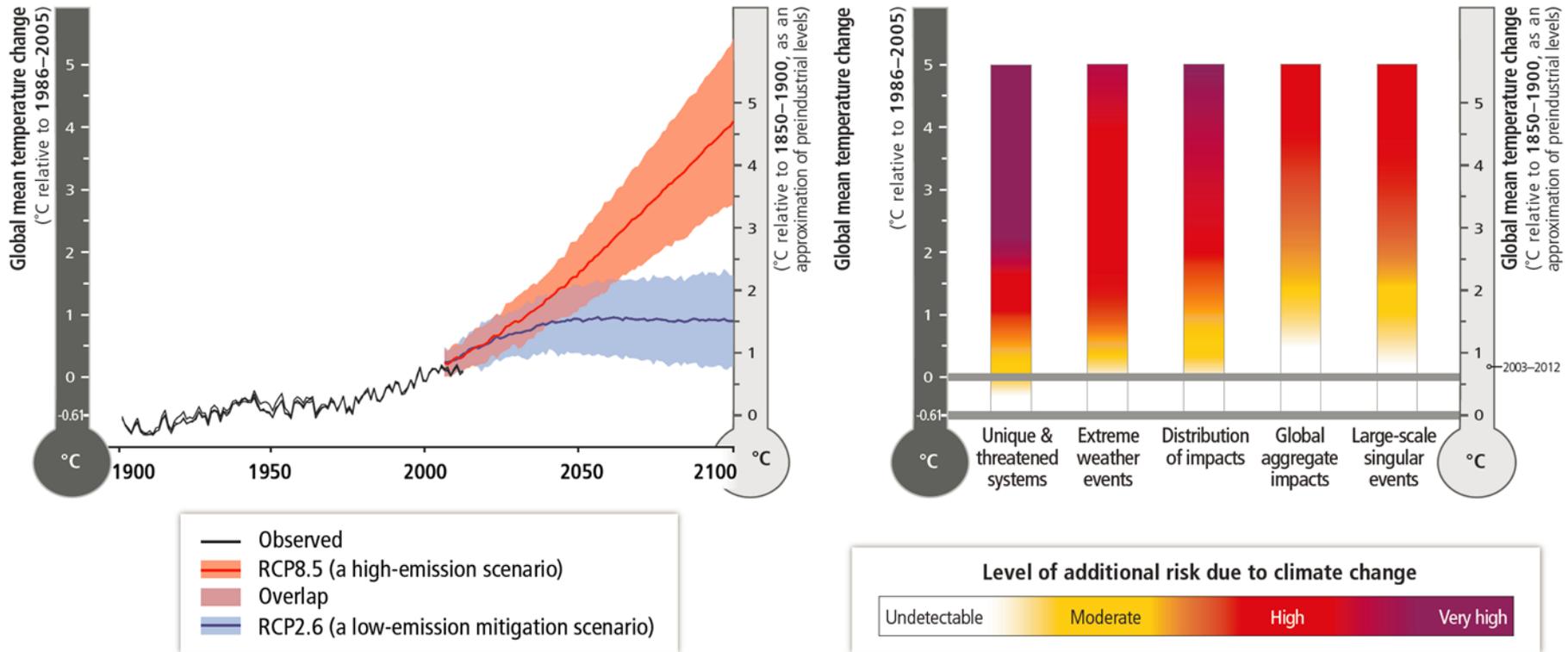


[Allison et al., 2009; Meinshausen et al., 2009]

4. Wie rasches Handeln ist für Klimaschutz gefragt?

Risikominderung erfordert raschen Kurs aufs 2°C Ziel

- Global perspective on climate-related risks. Risks associated with the five overall Reasons for Concern are shown at right.



[IPCC WGII AR5 Report, 2014]



[gki insert/cropped Jun.2013]

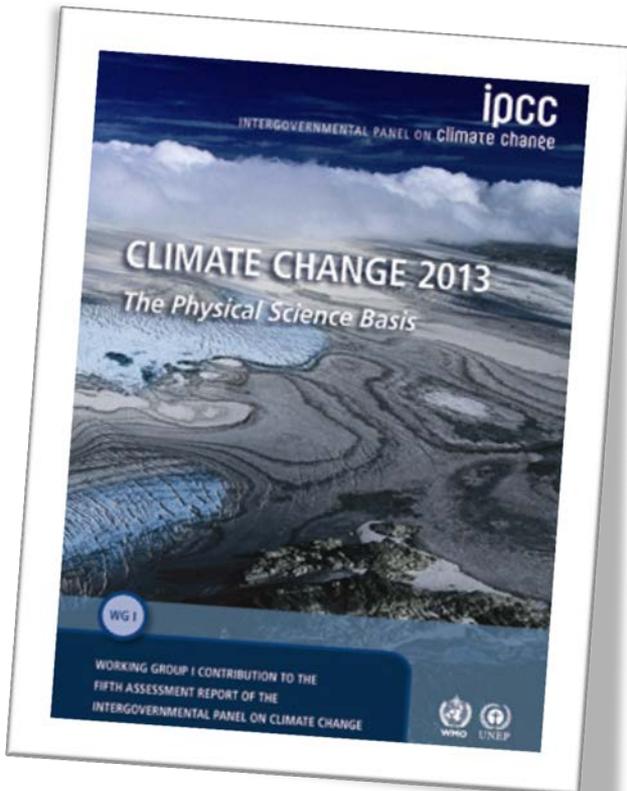
Der Inn trat in Schärding über die Ufer und flutete Häuser meterhoch. „Niemand hat gedacht, dass das Wasser so hoch wird“, sagt der Bürgermeister APA/FESL

RISKS OF
CLIMATE CHANGE
INCREASE
WITH CONTINUED
HIGH EMISSIONS

[from IPCC WGII AR5 Report Presentation, Field et al., 2014]

Bedeutung des IPCC Berichts für die Steiermark *massive Bestärkung für mehr Klimaschutz auch hier.*

Working Group I Contribution to the IPCC Fifth Assessment Report *Climate Change 2013: The Physical Science Basis* Summary for Policymakers



- In der Steiermark zeigen sich die Erwärmung und viele Aspekte des Klimawandels, wie beispielsweise Wetter- und Klimaextreme, bereits noch deutlicher als bei globalen Klimabetrachtungen.
- Die steirische Wirtschaft und Gesellschaft, und allen voran die Politik, wird durch den neuen Weltklimabericht massiv daran erinnert—und massiv darin bestärkt—sowohl beim Klimaschutz zur Verringerung der Emissionen (Stichwort „Klimaschutzplan“) als auch bei der notwendigen Anpassung an den Klimawandel (Stichwort „Klimawandelanpassungs-Strategie“) ihre Bemühungen und Aktivitäten weiter zu intensivieren.
- Wir müssen auch auf Bundesebene und EU-Ebene wirksame Maßnahmen unterstützen, sodass das 2°C Ziel noch mit aller notwendigen Kraft angepeilt wird und erreicht werden kann.

Weblinks reminder (cf. slide 2):

www.climatechange2013.org/report
(contains SPM, Headline Statements, WGI Fact Sheet,...and the REPORT)

www.ipcc.ch (IPCC homepage)

www.de-ipcc.de (dt-sprachige Infos)

Wie werd ma des derheb'n? Gemeinsam! Und wir alle...

- ...brauchen Verstand, Mut und Herz. Gönnen wir uns ruhig mehr davon!
(und nicht vergessen: Politiker und Politikerinnen brauchen Ermutigung)

