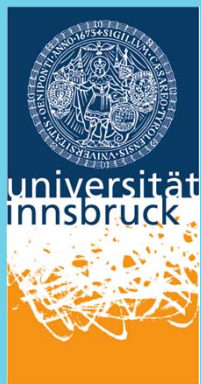




Forschungs-Herausforderungen für den AR6 mit Fokus auf WG1 Themen

Georg Kaser



160701 | ccca*öaw-ipcc_wien

IPCC «headlines»

19 Kernaussagen

< 2 Seiten

Summary for Policy Makers
ca. 14,000 Worte (22 Seiten)

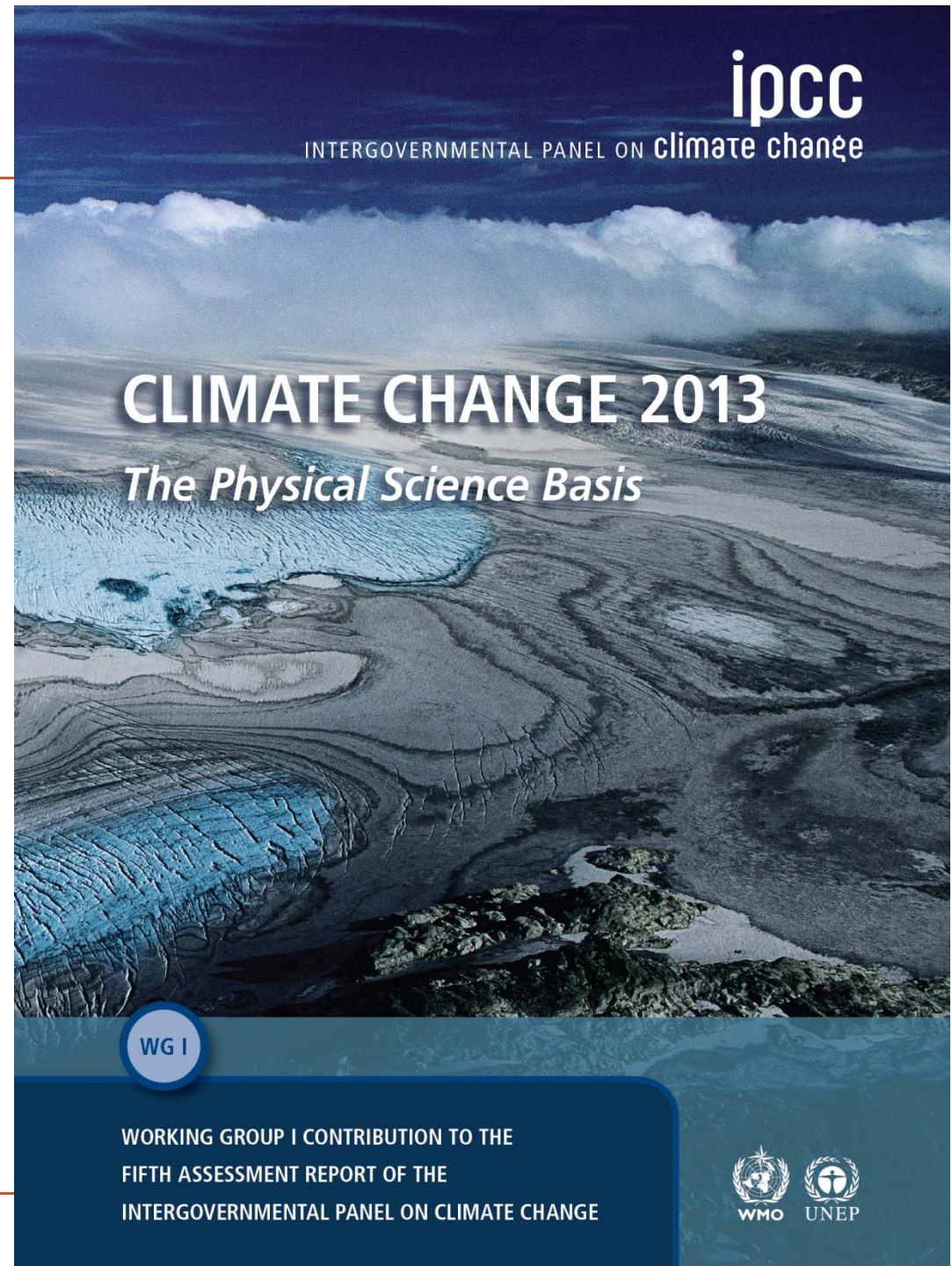
Report: 14 Kapitel
+ Atlas region. Projektionen

54,677 Kommentare
von 1089 Experten

2010: 259 Autoren aus 39
Ländern ausgewählt

2009: Gliederung WG1
genehmigt

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IPCC AR5 WG1 SPM (2013): 19 → 3 super key sentences

Die Erwärmung des Klimasystems ist eindeutig

Der Einfluss des Menschen auf das Klimasystem
ist sicher

Die Begrenzung des Klimawandels erfordert
substantielle und nachhaltige Reduktion der
Emissionen von Treibhausgasen

IPCC AR5 WG1 SPM (2013)

Detection

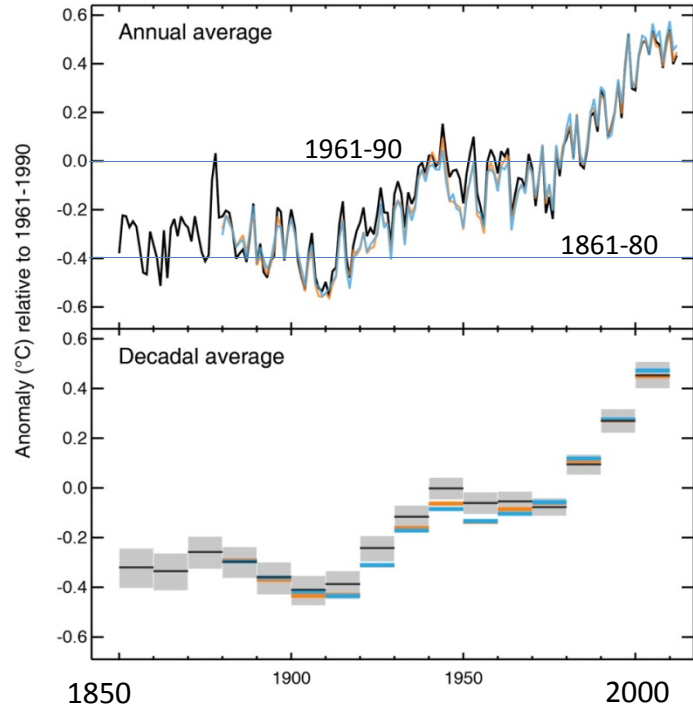
Detection of change is defined as the process of demonstrating that climate or a system affected by climate **has changed in some defined statistical sense without providing a reason for that change**. An identified change is detected in observations if its likelihood of occurrence by chance due to internal variability alone is determined to be small, for example, <10%.

Die Erwärmung des Klimasystems ist eindeutig

IPCC AR5 WG1 SPM (2013)

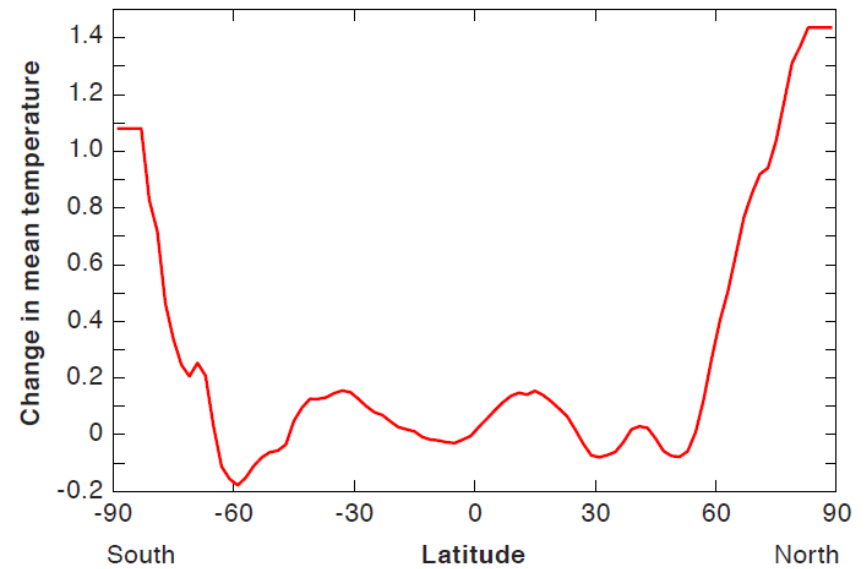
Hegerl, G.C., O. Hoegh-Guldberg, G. Casassa, M.P. Hoerling, R.S. Kovats, C. Parmesan, D.W. Pierce, P.A. Stott, 2010: Good Practice Guidance Paper on Detection and Attribution Related to Anthropogenic Climate Change. In: Meeting Report of the Intergovernmental Panel on Climate Change Expert Meeting on Detection and Attribution of Anthropogenic Climate Change [Stocker, T.F., C.B. Field, D. Qin, V. Barros, G.-K. Plattner, M. Tignor, P.M. Midgley, and K.L. Ebi (eds.)]. IPCC WGI TSU

Mittl. Oberflächentemperatur 1850 - 2012



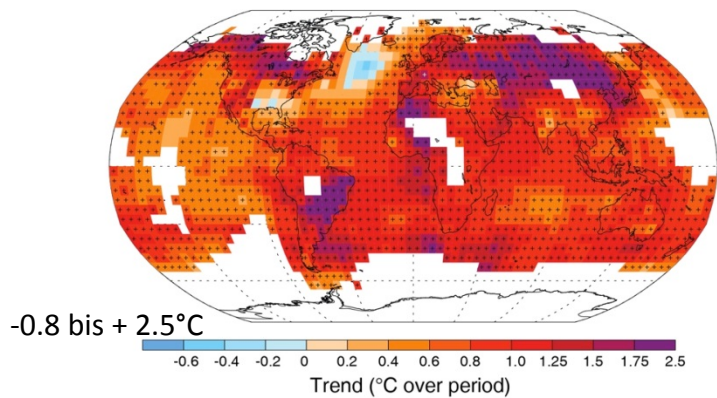
Beobachtete Änderungen

Temperature Change by Latitude Bands, 1998–2013



ICCI (December 2015) www.iccinet.org

Änderung d. Oberflächentemperatur 1901 - 2012



IPCC AR5 WG1 SPM (2013)

Meeresspiegelanstieg 1993-2010:

3.2 mm/Jahr

Erwärmung Ozeane: 38%

Gletscher: 28%

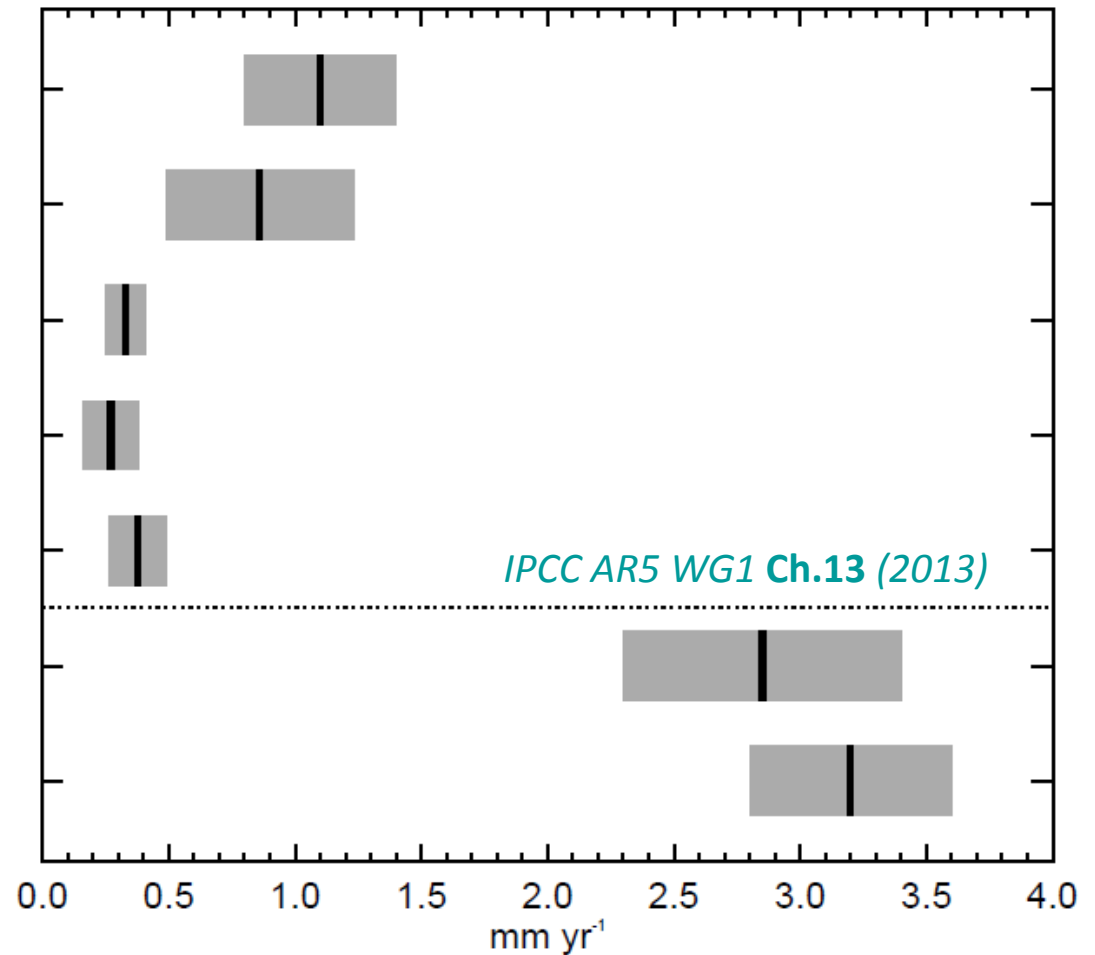
Grönl. Eisschild: 10%

Antarkt. Eisschild: 10%

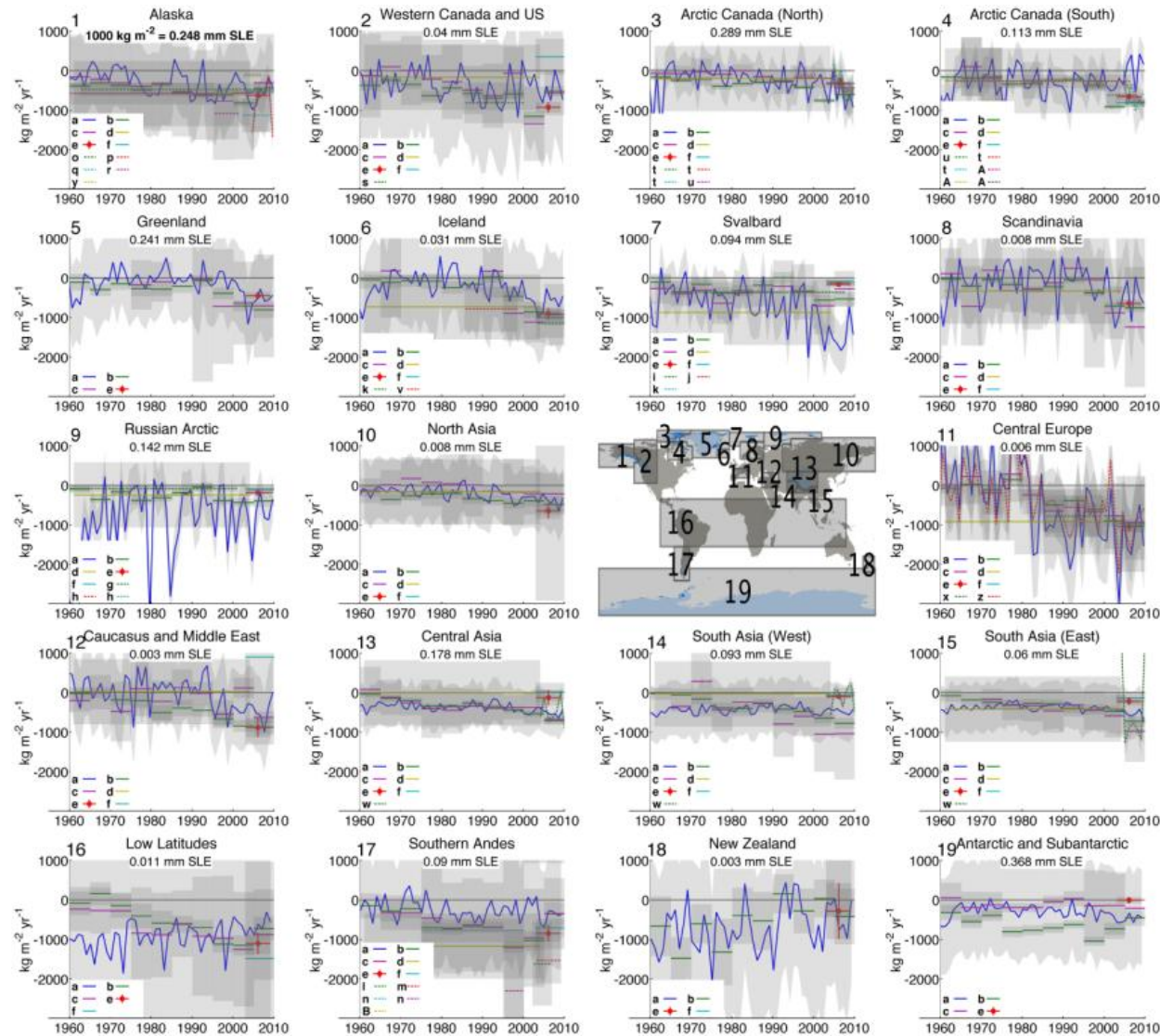
Grundwasser: 14%

Summe : 100%

Beobachtet: 110%



Glacier mass losses 1961 - 2009



$\text{Kg m}^{-2} \text{ yr}^{-1}$

IPCC AR5 WG1 Ch.4 (2013)

Attribution

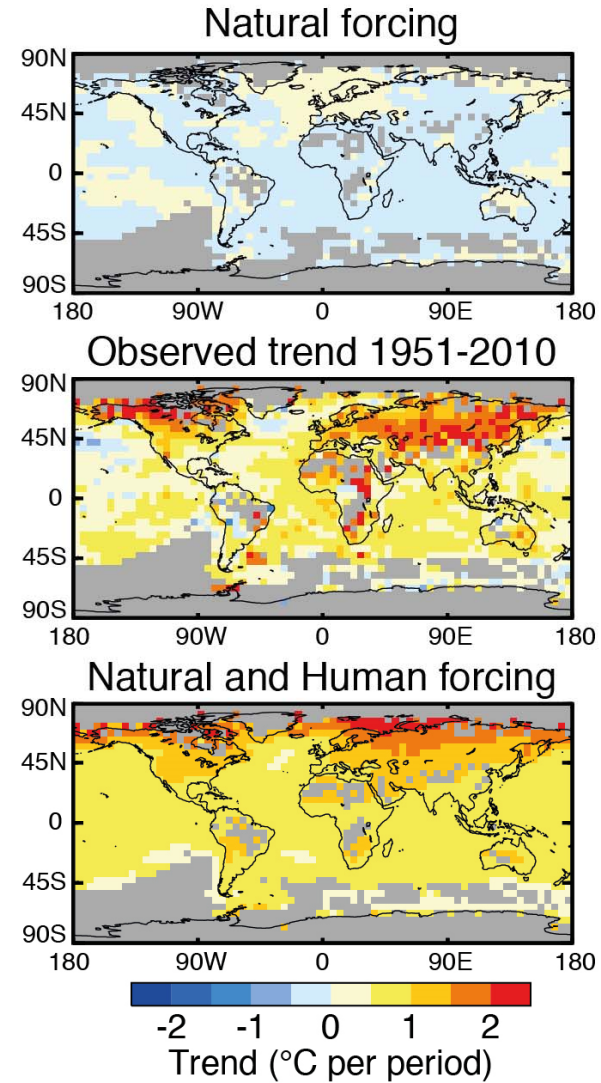
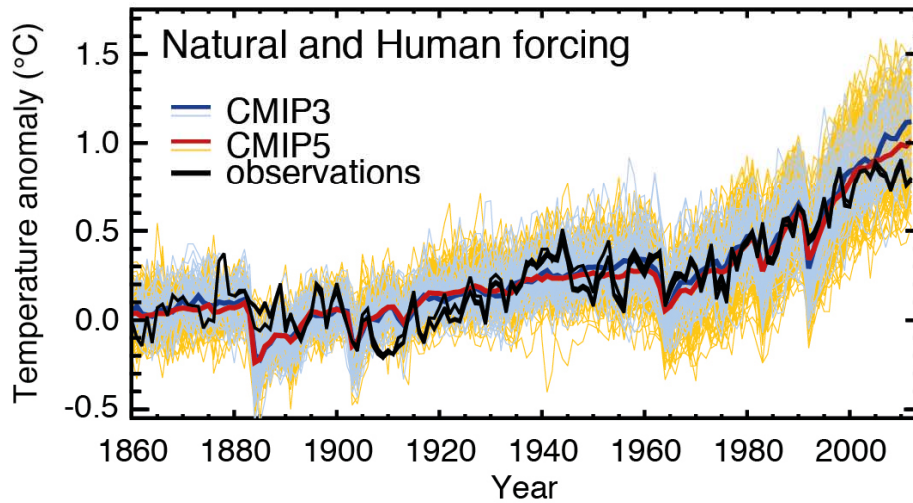
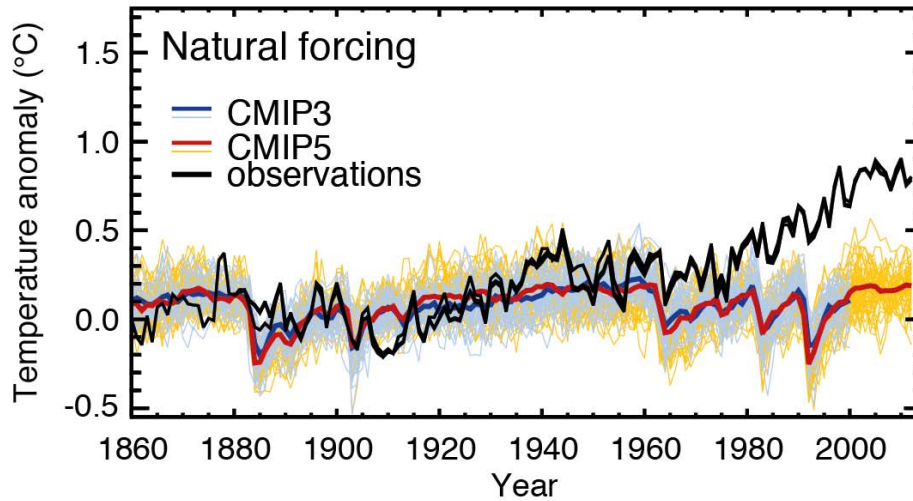
Attribution is defined as the process of **evaluating the relative contributions of multiple causal factors to a change or event with an assignment of statistical confidence**. The process of attribution requires the detection of a change in the observed variable or closely associated variables.

Der Einfluss des Menschen auf das Klimasystem
ist sicher

IPCC AR5 WG1 SPM (2013)

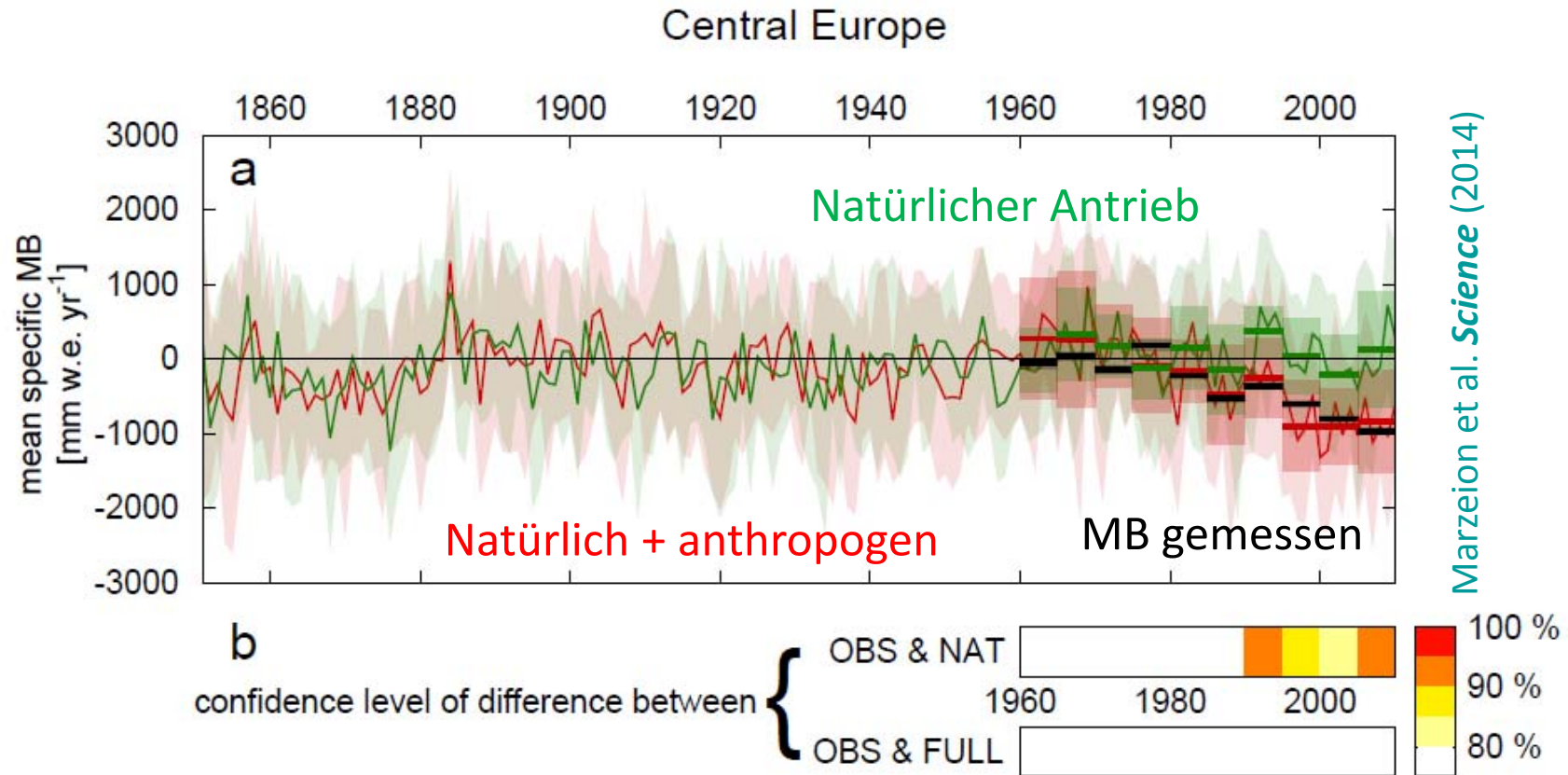
Hegerl, G.C., O. Hoegh-Guldberg, G. Casassa, M.P. Hoerling, R.S. Kovats, C. Parmesan, D.W. Pierce, P.A. Stott, 2010: Good Practice Guidance Paper on Detection and Attribution Related to Anthropogenic Climate Change. In: Meeting Report of the Intergovernmental Panel on Climate Change Expert Meeting on Detection and Attribution of Anthropogenic Climate Change [Stocker, T.F., C.B. Field, D. Qin, V. Barros, G.-K. Plattner, M. Tignor, P.M. Midgley, and K.L. Ebi (eds.)]. IPCC WGI TSU

Attribution



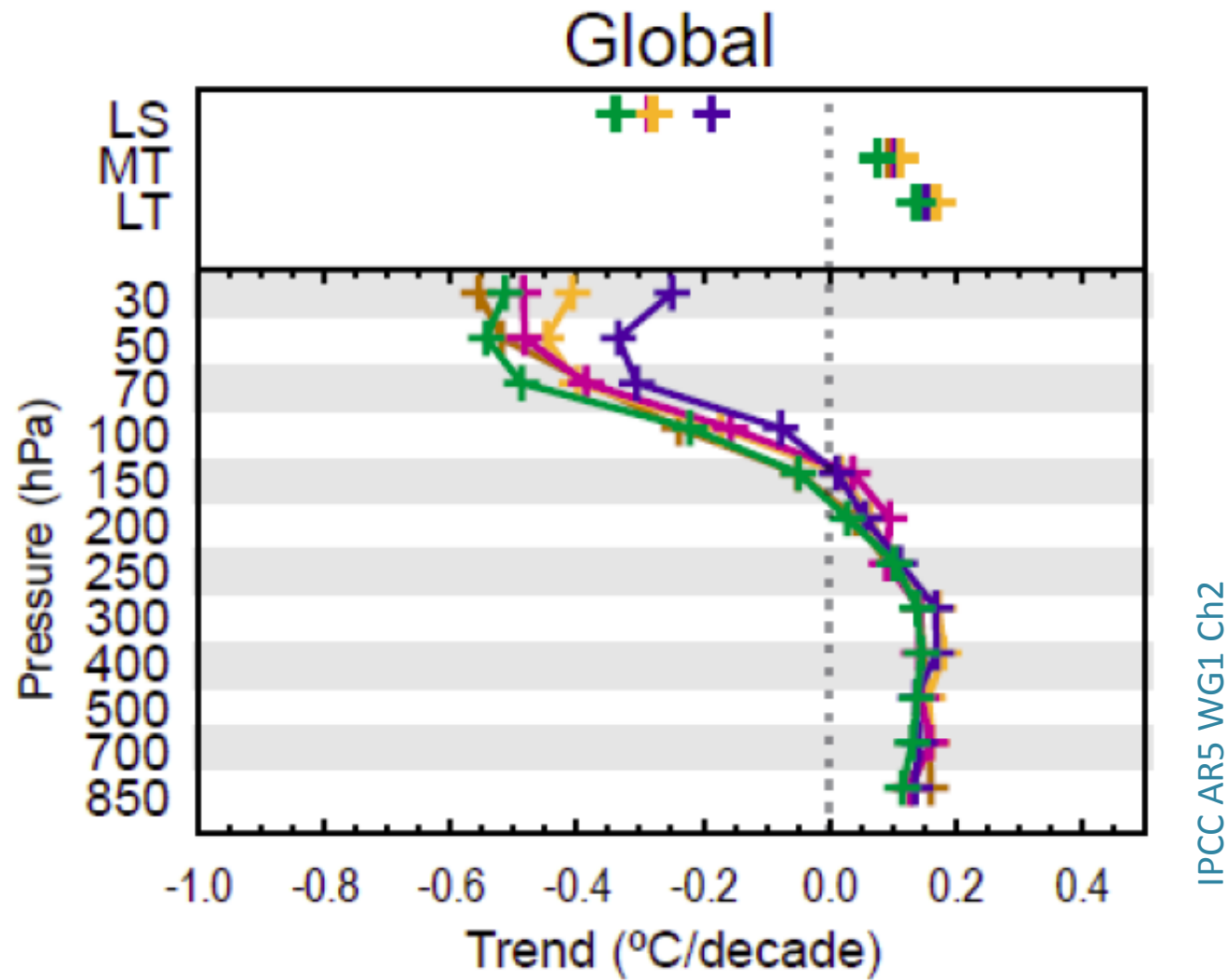
IPCC AR5 WG1 Ch10 (2013)

Attribution Gletscher 1850 to 2010

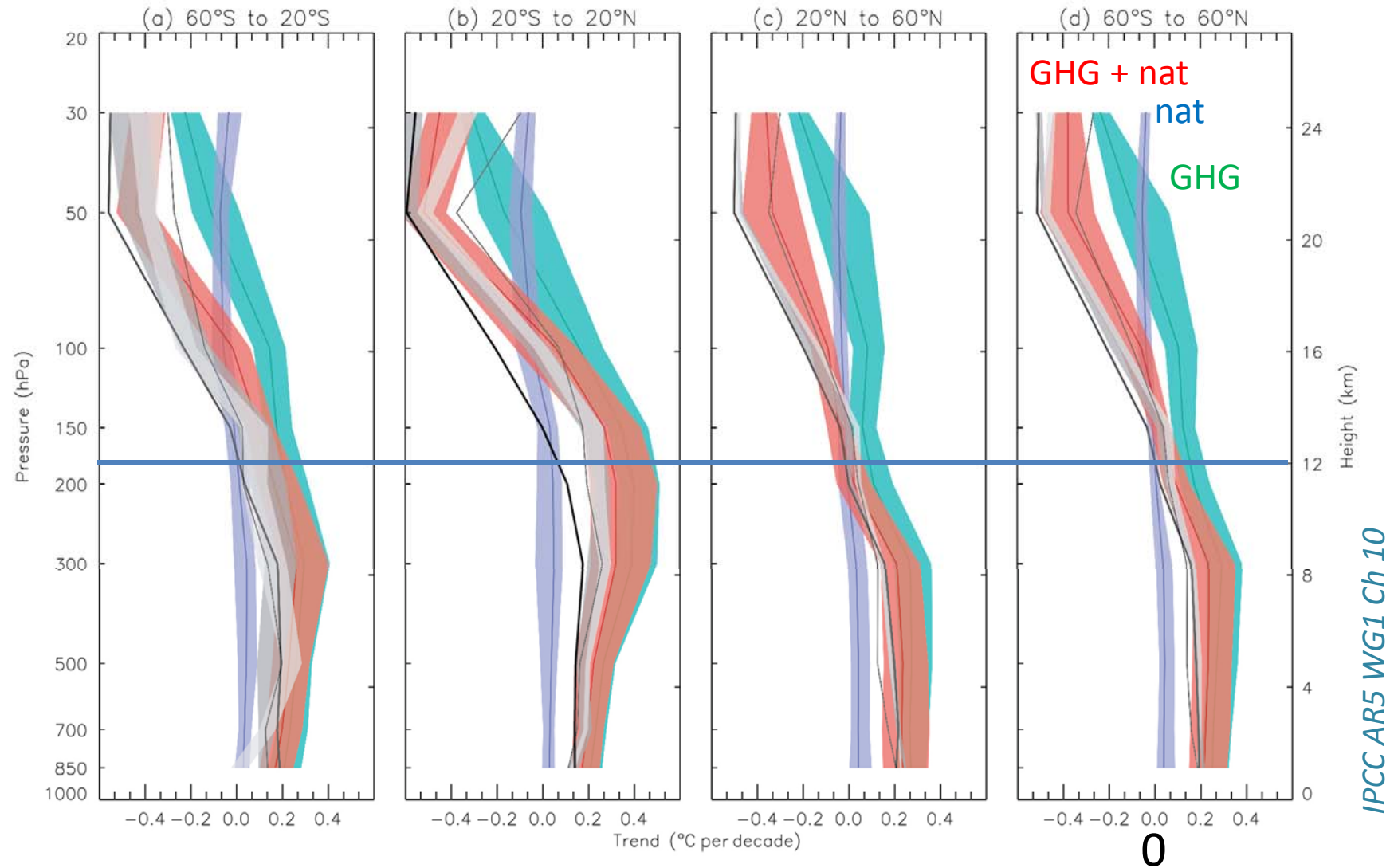


Alps (small glaciers) at present.: 100 % from anthropogenic forcing.
 Worldwide (big glaciers): 70 % from anthropogenic forcing,
 30 % „recovery“ from the Little Ice Age.

T(t, z) (Radiosonden) 1958 - 2012



Attribution $\Delta T / \Delta z$ 1961 to 2010



IPCC AR5 WG1 Ch 10

Impact

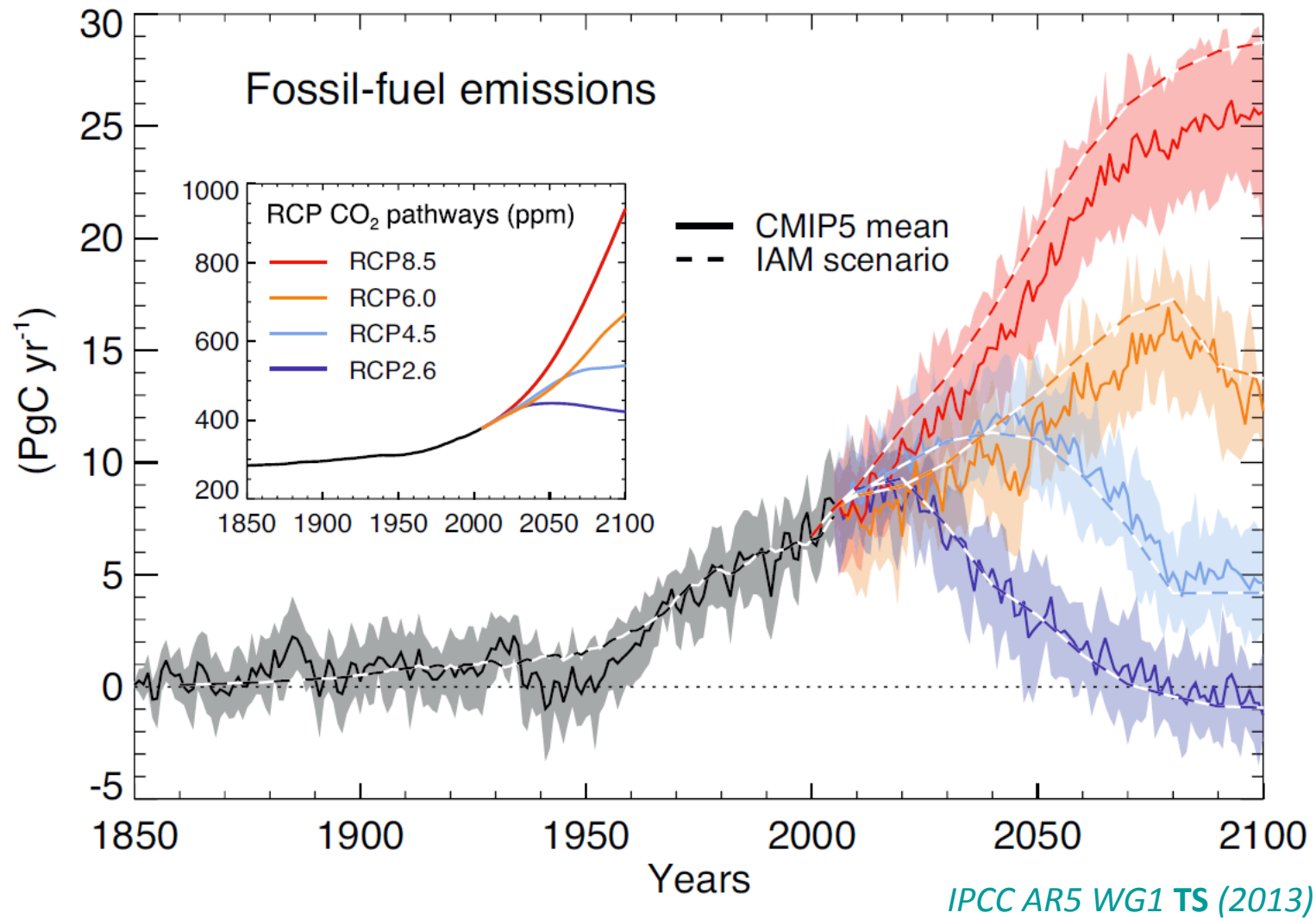
Die Erwärmung des Klimasystems ist eindeutig

Der Einfluss des Menschen auf das Klimasystem
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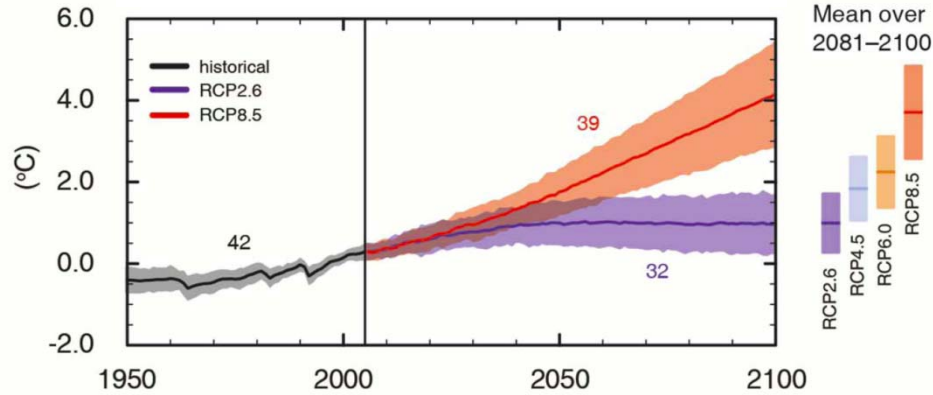
Die Begrenzung des Klimawandels erfordert
substantielle und nachhaltige Reduktion der
Emissionen von Treibhausgasen, **SONST ...**

IPCC AR5 WG1 SPM (2013)

Emissionsszenarien (bis 2100)



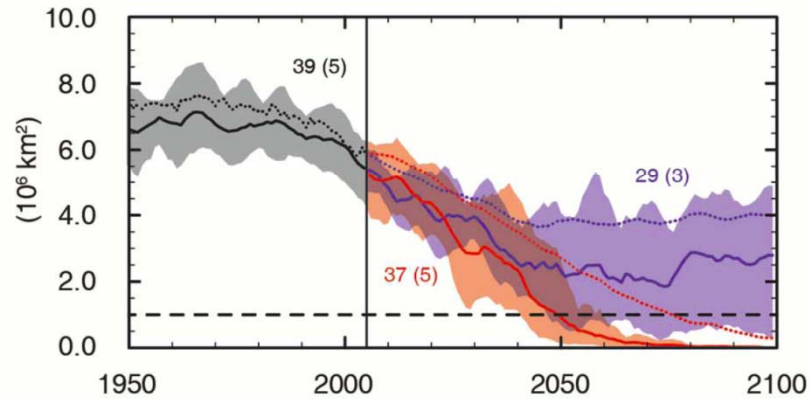
(a) Glob. mean surface temp. change



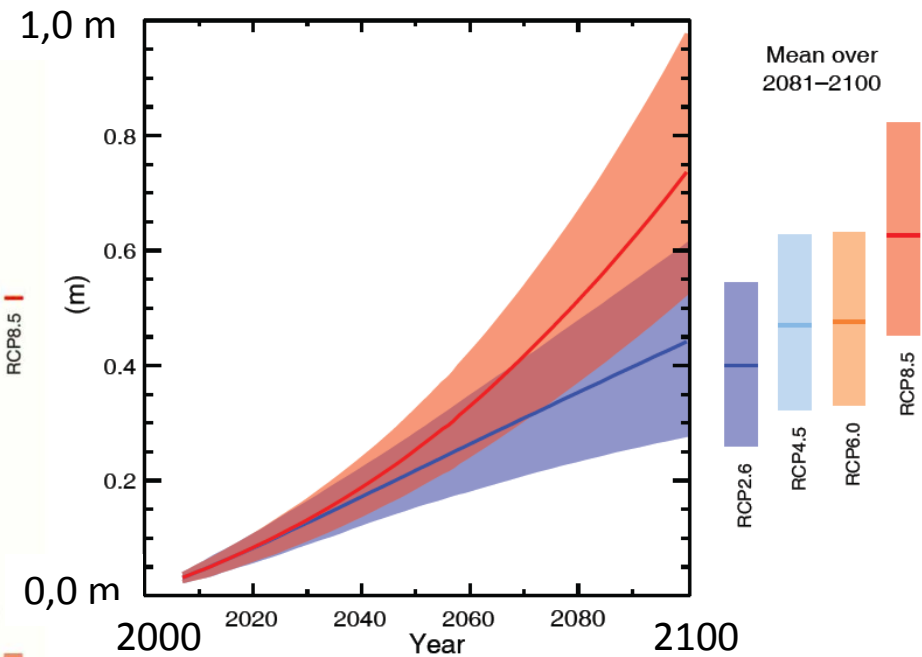
RCP2.6 = 2°C bis 2100

IPCC AR5 WG1 SPM (2013)

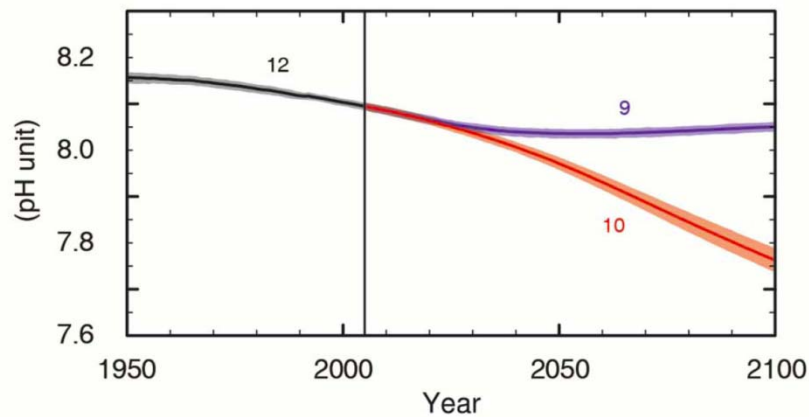
(b) NH September Sea Ice Extent



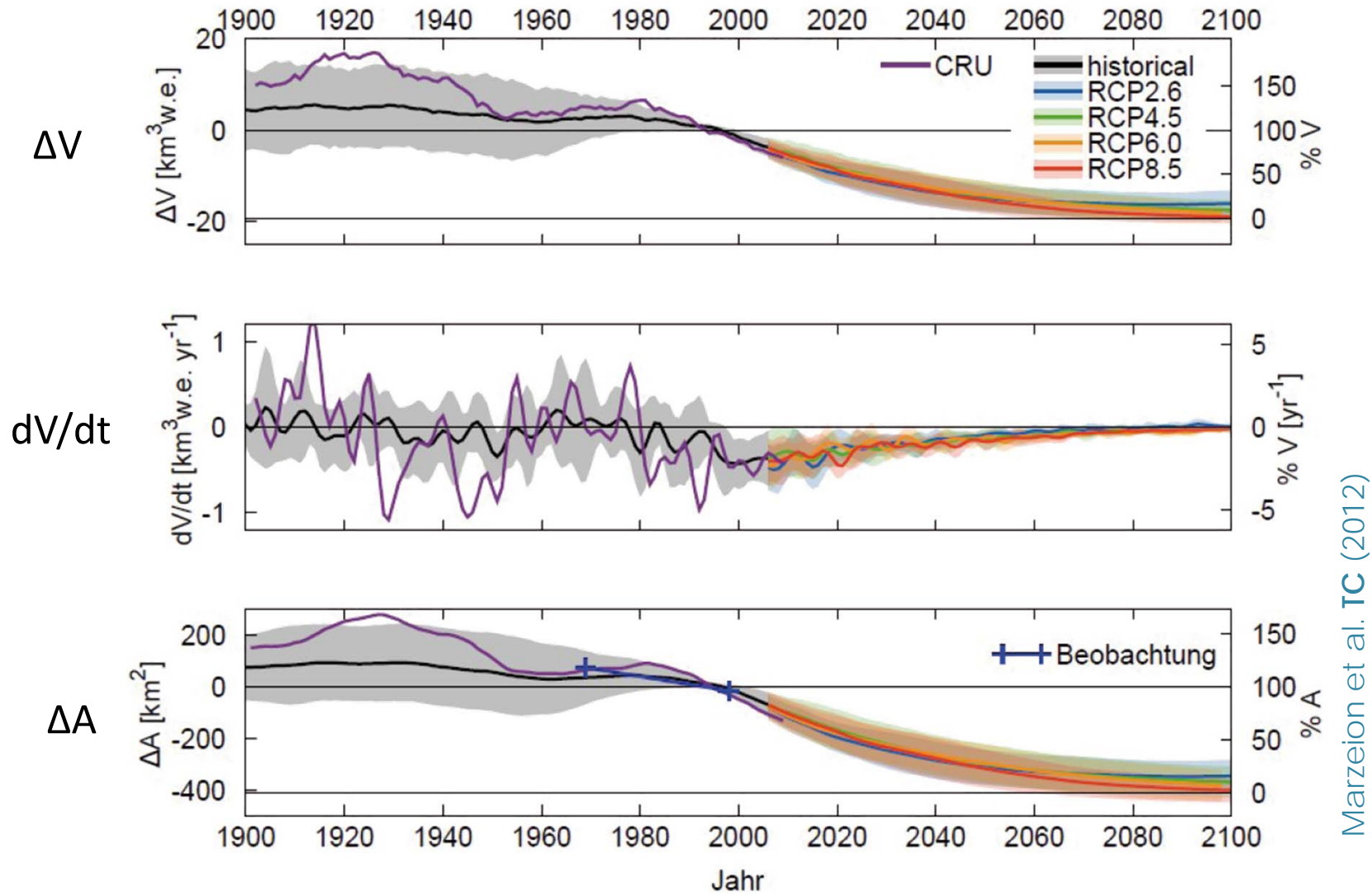
Global mean SLR



(c) Glob. Ocean Surface pH



Projektionen Gletscher (AUT)



Marzeion et al. TC (2012)

Die “Sensation” von Paris (UNFCCC - COP21)

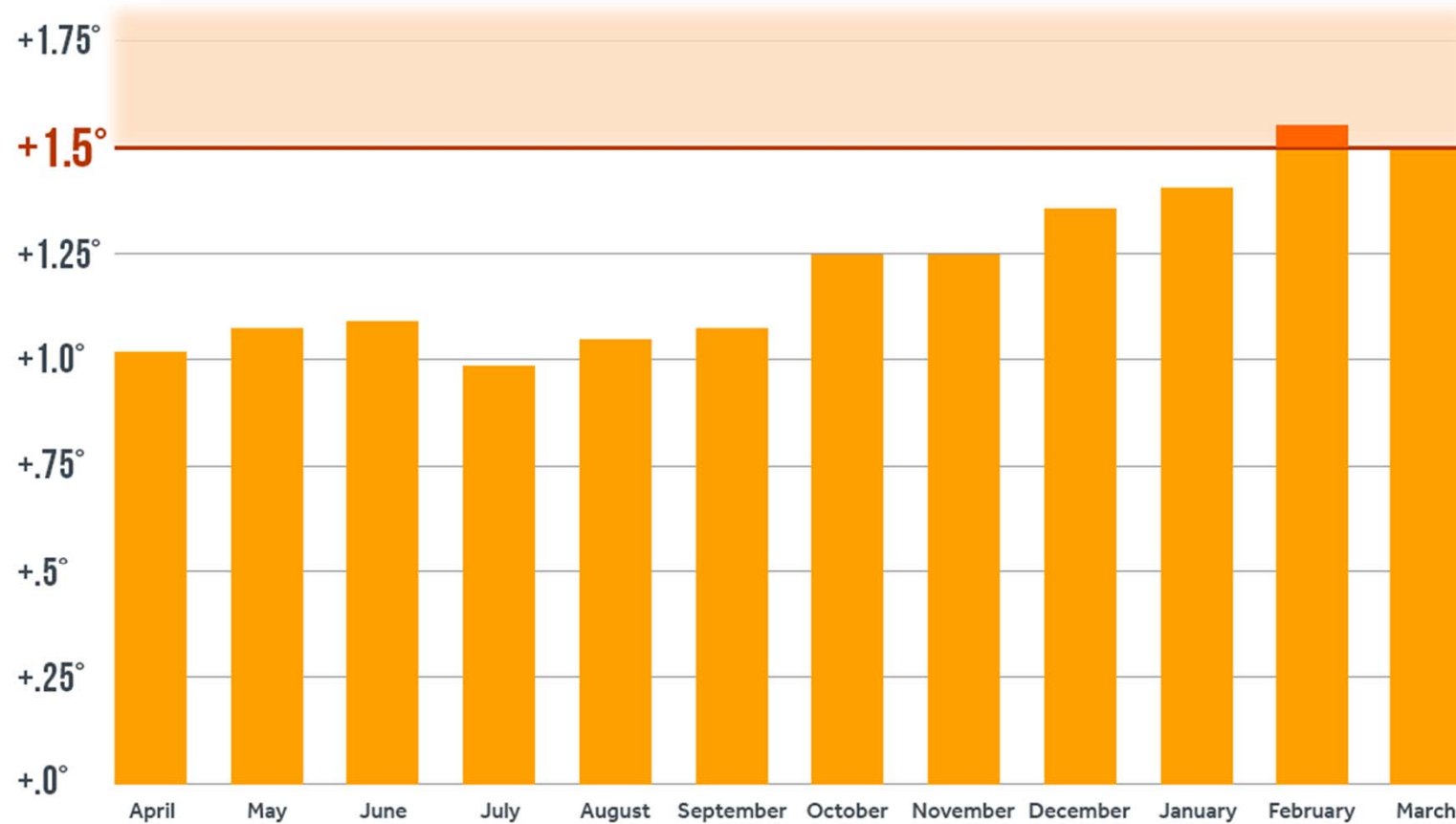
Article 2.1. a: Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;

Article 14.2: The Conference of the Parties serving as the meeting of the Parties to the Paris Agreement shall undertake its first global stocktake in 2023 and every five years thereafter unless otherwise decided by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement.

<https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>

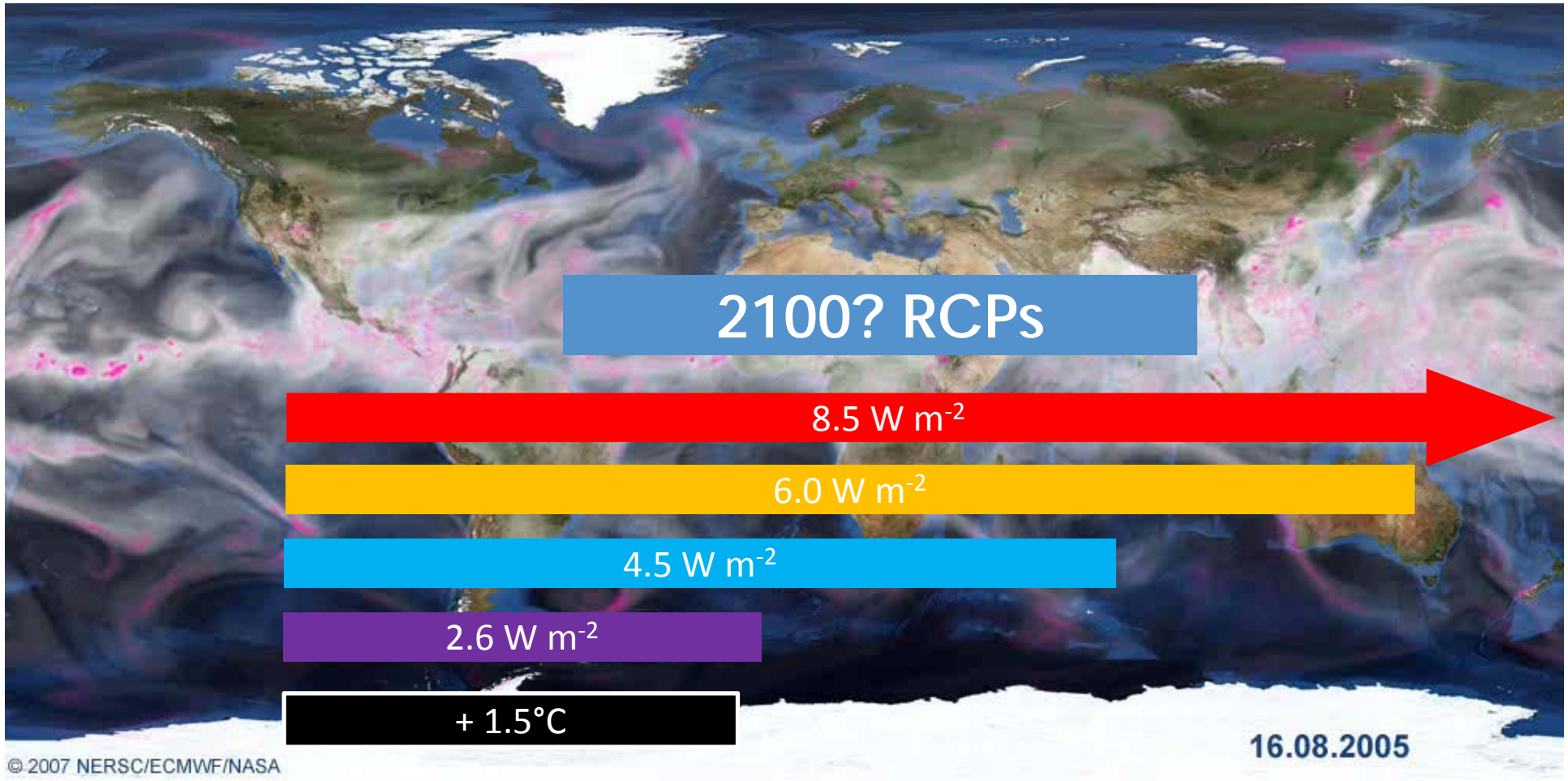
On the Edge of 1.5°C

Global monthly temp anomalies referenced to 1881-1910 baseline

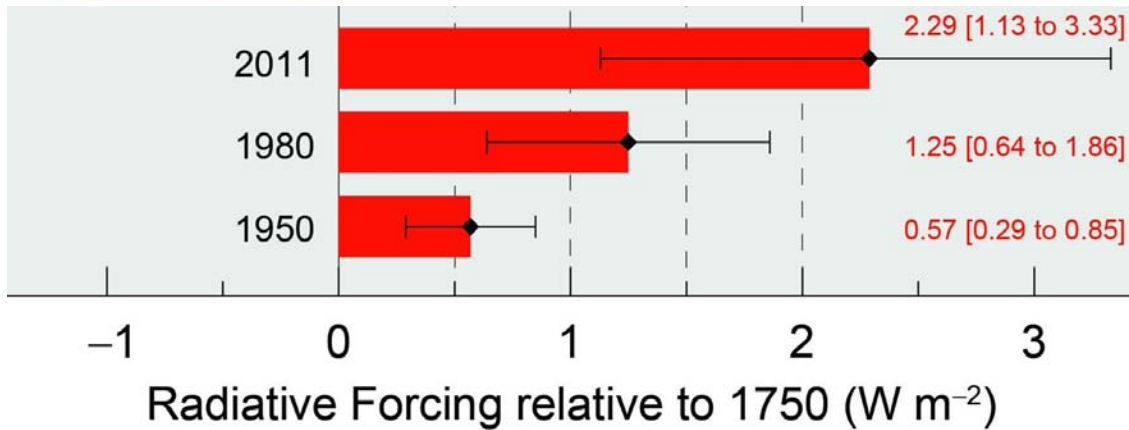


Average of NOAA and NASA data adjusted to an 1881-1910 baseline. Data as of April 2016.
NASA reports global temperature change in reference to a 1951 to 1980 climate baseline.
NOAA reports the anomaly in reference to a 20th century average temperature.

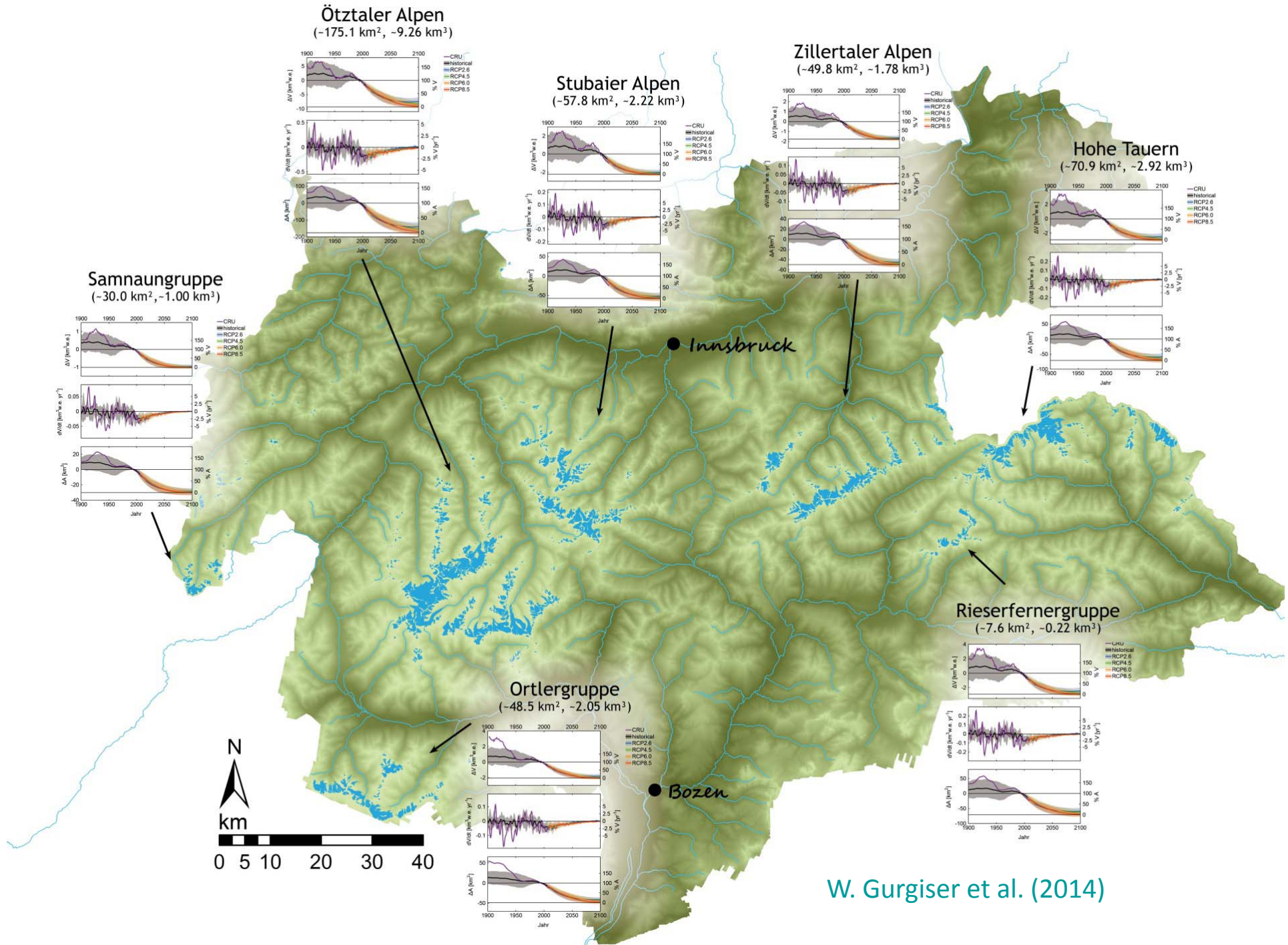
CLIMATE  CENTRAL



© 2007 NERSC/ECMWF/NASA



IPCC AR5 WG1 SPM (2013)



Expertise in Österreich (Detection – Attribution – Impact)

- Glaziologie
- Permafrost
- Regionales Klima – komplexes Gelände - LES
- Hohe Troposphäre – Stratosphäre
- Aerosole
- Paläoklima (Mio-/ Oligozän)
- Kohlestoffkreislauf
-