Role of the IPCC

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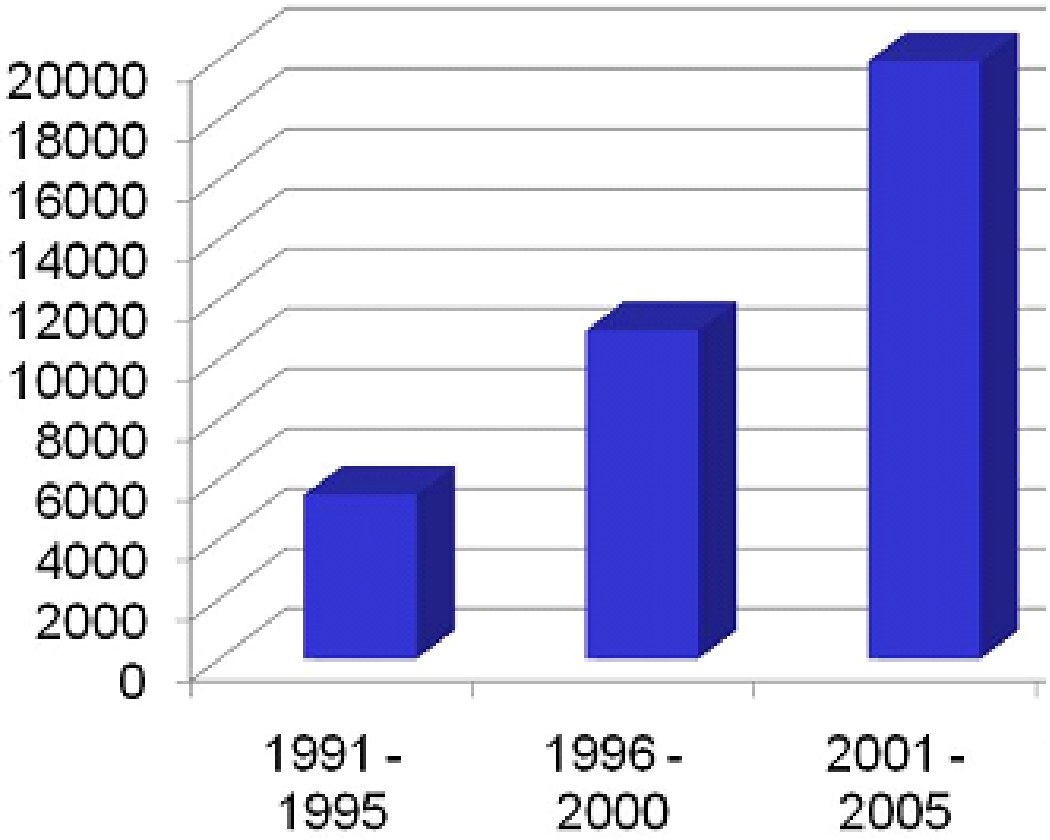
Why the IPCC ?

Established by WMO and UNEP in 1988

to provide policy-makers with an objective source of information about

- causes of climate change,
- potential environmental and socio-economic impacts,
- possible response options.

Number of papers published on climate change



Mandate of the IPCC

"The General Assembly […] endorses action of the World Meteorological Organisation and the United Nations Environment Programme in jointly establishing an Intergovernmental Panel on Climate Change to provide **international coordinated scientific assessments** of the magnitude, timing and potential environmental and socio-economic impact of climate change and realistic response strategies […]."

United Nations General Assembly
43rd session resolution, 6th December 1988

Role of IPCC

"The IPCC does not carry out research nor does it monitor climate related data or other relevant parameters. It bases its assessment mainly on peer reviewed and published scientific/technical literature."

(source: www.ipcc.ch)

IPCC Reports are policy-relevant, NOT policy-prescriptive

IPCC Structure

- **3 Working Groups, 1 Task Force**
- WG1: Physical basis for climate change
- WG2: Impacts, adaptation & vulnerability
- WG3: Mitigation (emission reductions)
- TF: Emission inventories (methodologies)

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IPCC writing cycle (4 years, 2500 scientists)

- Plenary decides table of content of reports
- Bureau appoints world-class scientists as authors, based on publication record
- Authors assess all scientific literature
- *Draft* – Expert review (+ Review editors)
- *Draft 2 (+ Draft 1 Summary for Policy Makers (SPM)* – Combined expert/government review
- *Draft 3 (+ Draft 2 SPM)*– Government review of SPM
- Approval Plenary (interaction authors – governments) – *SPM and full report*

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The IPCC Fourth Assessment Report (2007)

+130 countries

around 450 lead authors

around 800 contributing authors

+2500 scientific expert reviewers

+18000 peer-reviewed publications cited

+90000 comments from experts and Governments

Completed IPCC Reports

4 Assessment Reports *(1990,1995, 2001, 2007)*

1992 Supplementary Report and 1994 Special Report

7 Special Reports *(1997,1999, 2000, 2005)*

Guidelines for National GHG Inventories, Good Practice Guidance *(1995-2006)*

6 Technical Papers *(1996-2008)*

⌘IPCC Working Group I: climatology

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Key points from the WG1 IPCC AR4 Report

- Warming of the climate system is unequivocal
- Very high confidence that net effect of human activities since 1750 = warming
- Last 50 years likely to be highest temperature in at least last 1300 yrs
- Most of this warming is very likely due to increase in human greenhouse gases
- Without emission reduction policies, global temperature could increase by 1.1 to 6.4°C, or even higher in 2100 compared to 1990
- Sea level could increase by 18 to 59 cm, or more
- Frequency/intensity of several extreme phenomena due to increase (ex: heat waves, droughts, floods, …)

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IPCC Working Group II: Impacts, Vulnerability, and adaptation

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Following addressed by WG II:

- Impacts observed so far

- Future scenarios
- Impacts on sectors:
  - Water
  - Ecosystems
  - Agriculture, forestry, fisheries
  - Coasts
  - Settlements and industry
  - Health

WMO

UNEP

Following addressed (cont.):

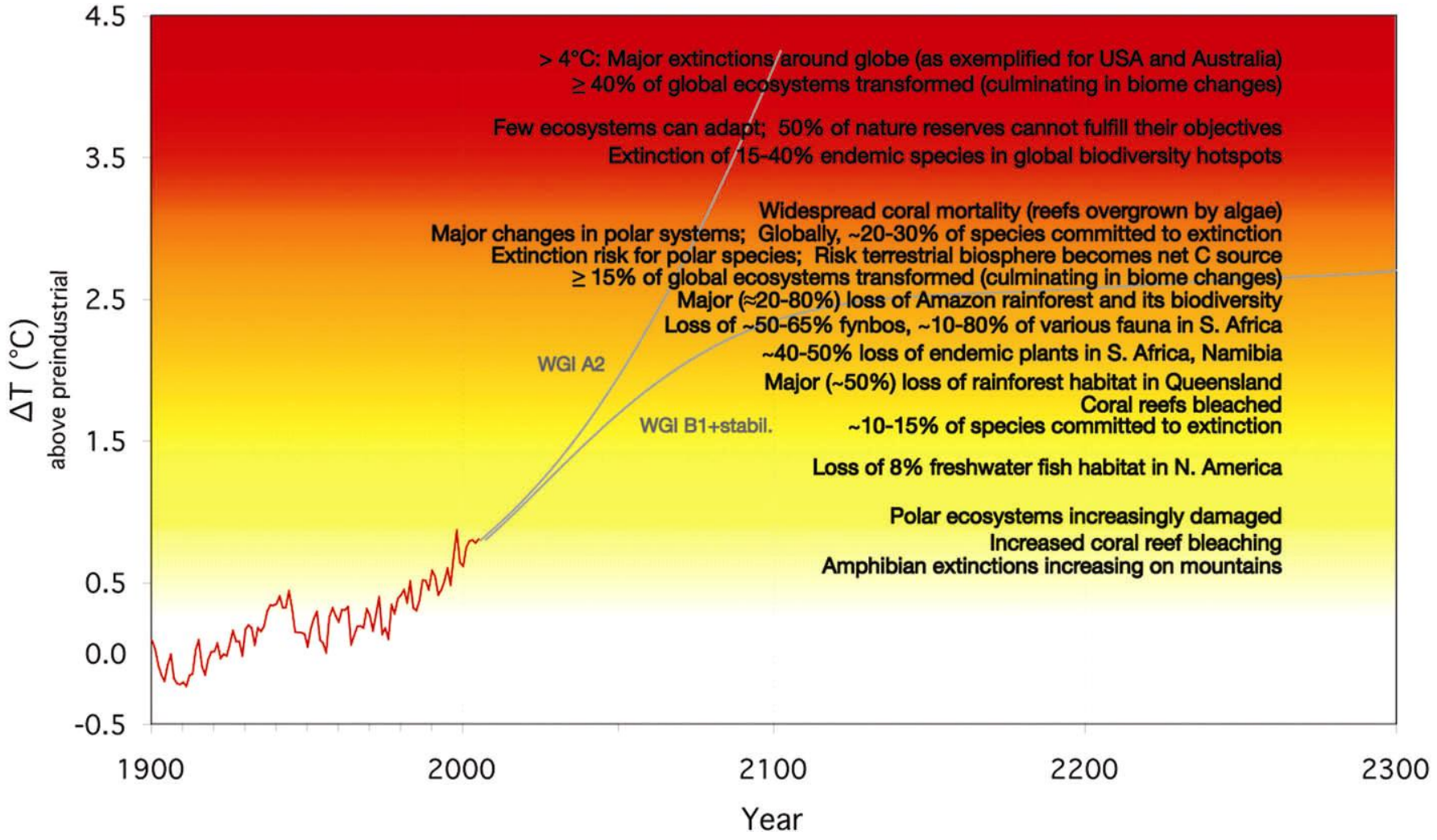
- Impacts on regions:
  - Africa, Asia, Australia and New Zealand, Latin America, North America, Polar regions, Small islands, and
  - Europe (including the Alps)

- Adaptation practices
- Adaptation vs. mitigation
- Key vulnerabilities
- Sustainability

WMO

UNEP

Figure TS.6. Projected risks due to critical climate change impacts on ecosystems



WMO

UNEP

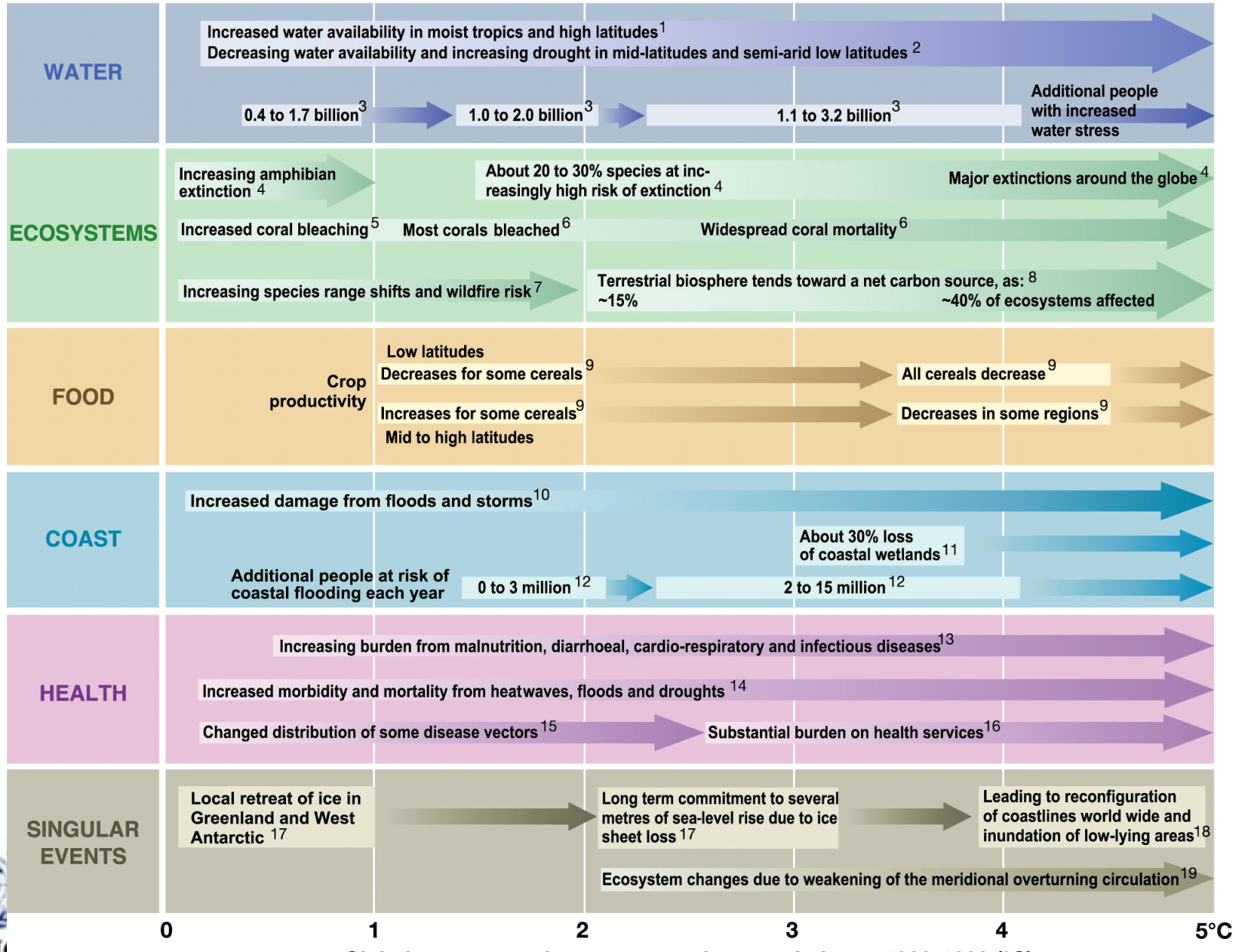
20% - 30% of plants and animals species at increased risk of extinction

if ΔT 1.5°C - 2.5°C (above 1990 temperature)

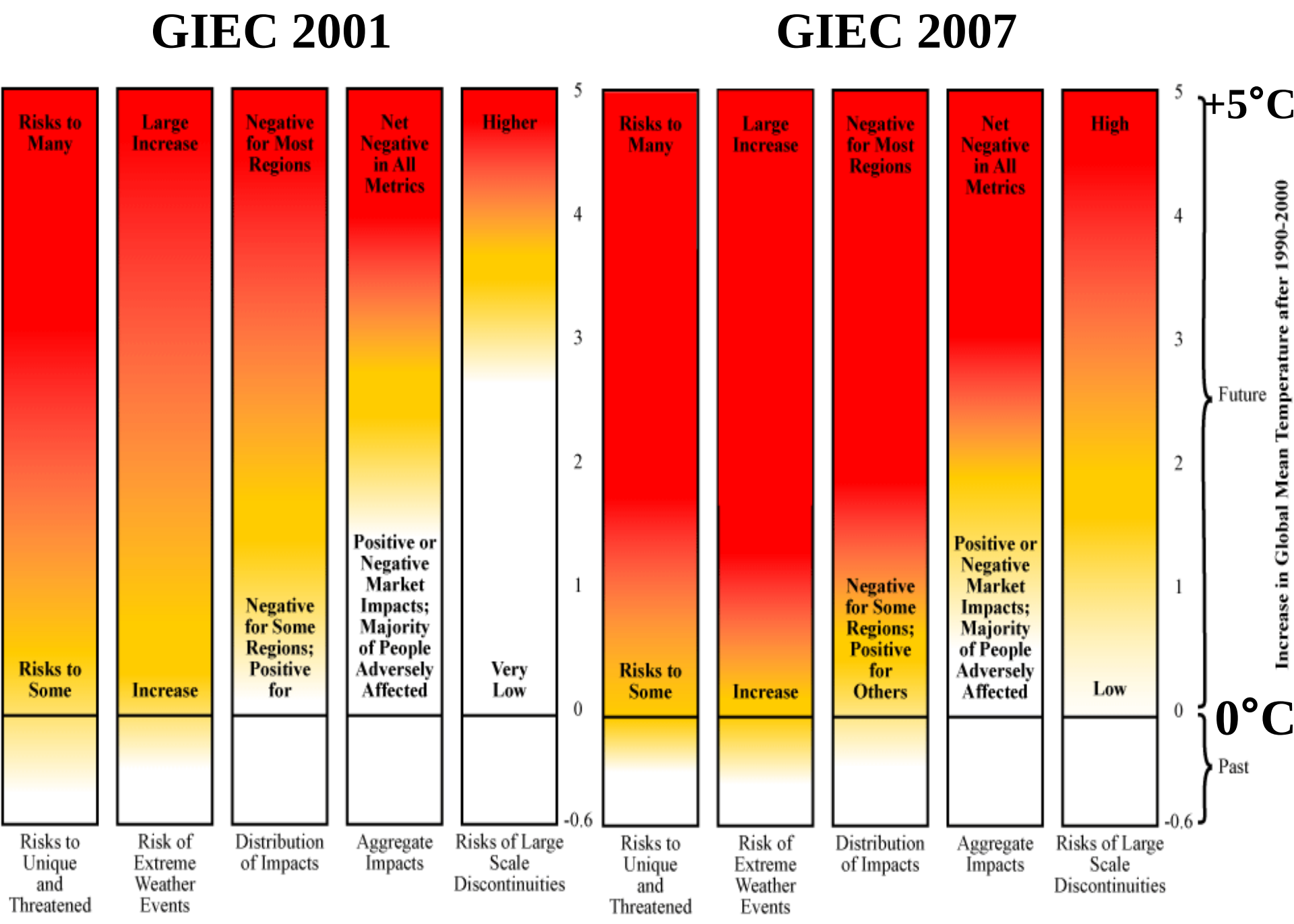
WMO

UNEP

Table TS.3. (lower) Examples of global impacts projected for changes in climate (and sea level and atmospheric CO_2 where relevant)



Source: IPCC WGII AR4


GIEC 2001
GIEC 2007
Risks to Many
Risks to Some
Large Increase
Increase
Negative for Most Regions
Negative for Some Regions; Positive for
Net Negative in All Metrics
Positive or Negative Market Impacts; Majority of People Adversely Affected
Higher
Very Low
Risks to Many
Risks to Some
Large Increase
Increase
Negative for Most Regions
Negative for Some Regions; Positive for Others
Net Negative in All Metrics
Positive or Negative Market Impacts; Majority of People Adversely Affected
High
Low
5
4
3
2
1
0
-0.6
+5°C
Future
0°C
Past
Increase in Global Mean Temperature after 1990-2000
Risks to Unique and Threatened
Risk of Extreme Weather Events
Distribution of Impacts
Aggregate Impacts
Risks of Large Scale Discontinuities
Risks to Unique and Threatened
Risk of Extreme Weather Events
Distribution of Impacts
Aggregate Impacts
Risks of Large Scale Discontinuities

⌘IPCC Working Group III: Mitigation

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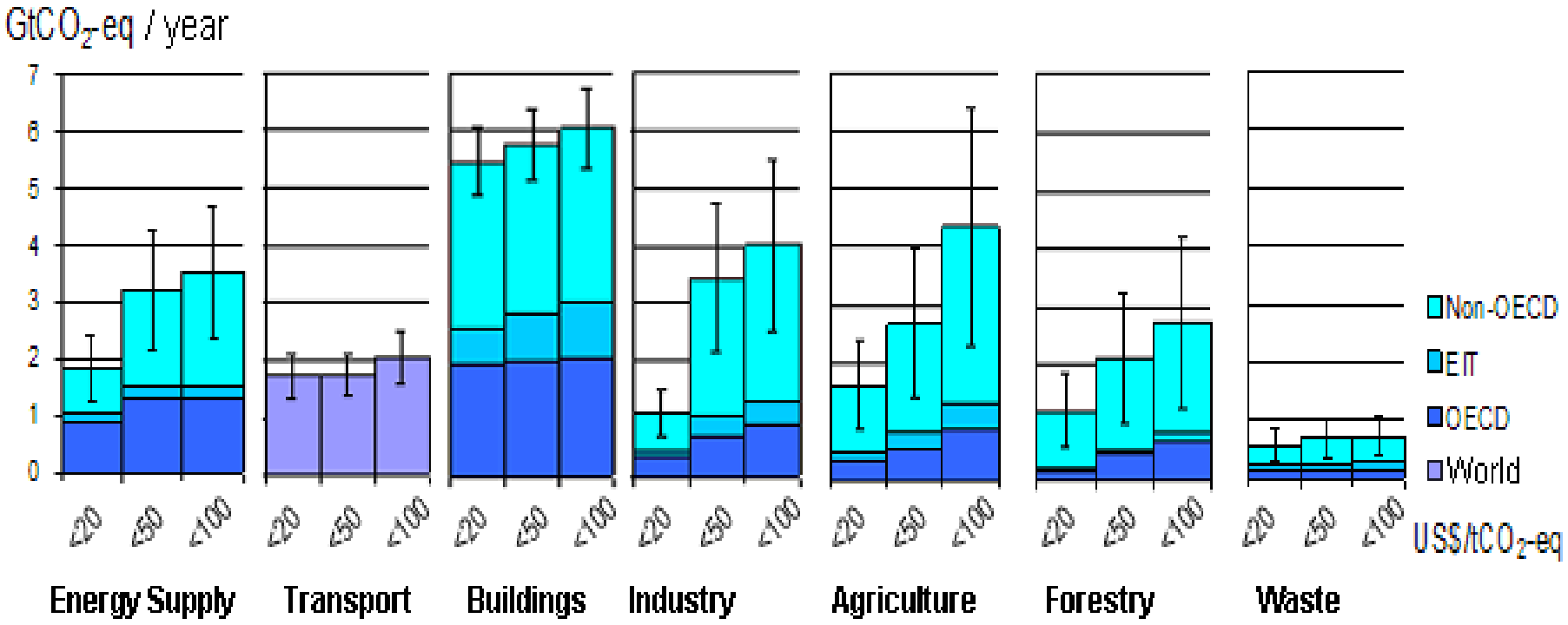
All sectors and regions have the potential to contribute



Note: estimates do not include non-technical options, such as lifestyle changes.

How can emissions be reduced?

Sector	**(Selected) Key mitigation technologies and practices currently commercially available.**
Energy Supply	efficiency; fuel switching; nuclear power; renewable (hydropower, solar, wind, geothermal and bioenergy); combined heat and power; early applications of CO2 Capture and Storage
Transport	More fuel efficient vehicles; hybrid vehicles; biofuels; modal shifts from road transport to rail and public transport systems; cycling, walking; land-use planning
Buildings	Efficient lighting; efficient appliances and airco; improved insulation ; solar heating and cooling; alternatives for fluorinated gases in insulation and aplliances

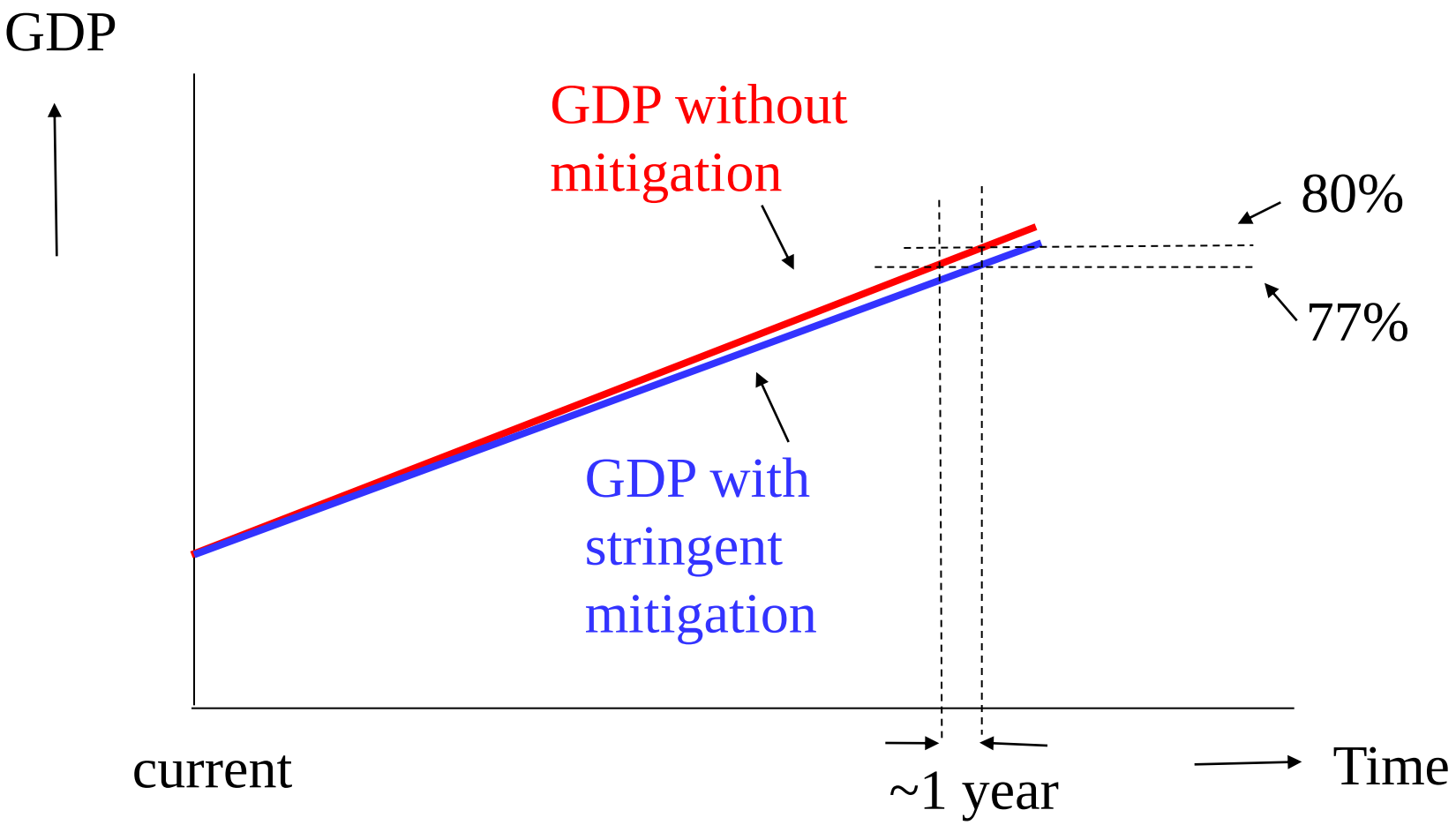
How can emissions be reduced?

Sector	**(Selected) Key mitigation technologies and practices currently commercially available.**
Industry	More efficient electrical equipment; heat and power recovery; material recycling; control of non-CO_2 gas emissions
Agriculture	Land management to increase soil carbon storage; restoration of degraded lands; improved rice cultivation techniques; improved nitrogen fertilizer application; dedicated energy crops
Forests	Afforestation; reforestation; forest management; reduced deforestation; use of forestry products for bioenergy
Waste	Landfill methane recovery; waste incineration with energy recovery; composting; recycling and waste minimization

Changes in lifestyle and behaviour patterns can contribute to climate change mitigation

- Changes in occupant behaviour, cultural patterns and consumer choice in buildings.
- Reduction of car usage and efficient driving style, in relation to urban planning and availability of public transport
- Staff training, reward systems, regular feedback and documentation of existing practices in industrial organizations

Illustration of cost numbers



Long term mitigation (after 2030)

- The lower the stabilization level, the more quickly emissions would need to peak and to decline thereafter
- Mitigation efforts over the next two to three decades will have a large impact on opportunities to achieve lower stabilization levels

Stab level (ppm CO2-eq)	Global Mean temp. increase at equilibrium (ºC)	Year CO2 needs to peak	Reduction in 2050 compared to 200
445 – 490	2.0 – 2.4	2000 - 2015	-85 to -50
490 – 535	2.4 – 2.8	2000 - 2020	-60 to -30
535 – 590	2.8 – 3.2	2010 - 2030	-30 to +5
590 – 710	3.2 – 4.0	2020 - 2060	+10 to +60
710 – 855	4.0 – 4.9	2050 - 2080	+25 to +85
855 – 1130	4.9 – 6.1	2060 - 2090	+90 to +140

⌘What's up with the IPCC?

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Glaciers in the Himalaya: a real error

- In the WGII contribution, chapter on Asia (10), also reported in the WGII technical summary
- Two main wrong claims:
  - *the likelihood of* [Himalayan glaciers] *disappearing by the year 2035 and perhaps sooner is very high*
  - *Its total area will likely shrink from the present 500,000 to 100,000 km2 by the year 2035*
- Facts:
  - melting is not that fast; in addition, some Himalayan glaciers may last longer because they are higher in altitude
  - but the majority of the world glaciers are retreating (WGI)

Glaciers in the Himalaya
what went wrong

- Application of IPCC procedures for inclusion of non-peer-reviewed literature :
  - Rules requires each chapter team to review the quality and validity of each source before incorporating results from the source into an IPCC Report
  - Use of such literature is mainly intended to fill gaps were few peer-reviewed documents are available, e.g. for case studies, while here information was available from WGI
- The review did not succeed in removing this particular error (out of 3000+ pages)
  - no expert or government informed chapter authors in time, but some warned that the paragraph is lacking consistency and appropriate likelihood qualifiers

Agricultural yields in Africa

- Issue is how the information was summarized in the (approved) Synthesis report:
  - By 2020, in some countries, yields from rain-fed agriculture could be reduced by up to 50%.
- This appears to be oversimplified, since the key statement in the underlying report is
  - In other countries, additional risks that could be exacerbated by climate change include (...) deficiencies in yields from rain-fed agriculture of up to 50% during the 2000-2020 period
- However, AR4 contains evidence that increased frequency or intensity of drought due to climate change could occur in some parts of Africa

Area under sea level in the Netherlands

- AR4 Europe chapter (12) contains a sentence that is imprecise :
  - The Netherlands is an example of country highly susceptible to both sea level rise and river flooding because 55% of its territory is below sea level'.
- The area below **mean** sea level is about the half of this 55% figure; a corrected sentence could be
  - "... because 55% of the Netherlands is at risk of flooding".
  - Note: 55% also approximates the area below the level reached by sea water during extreme storms
- The imprecise AR4 sentence was received from a Dutch gov. agency (!) and is found in many sources; the 55% figure is used in AR4 for information only

Measures taken

- ***Responses (cfr IPCC web site)***
- ***Errata: in process***
- ***Corrections: TBD at Bureau/Plenary (October)***
- ***Internal review of procedures + strict implementation for the two Special Reportsdue in 2011 (Disasters & extreme events; Renewable energy)***
- ***Review by Inter Academy Council (due: 30/8, for discussion at October plenary)***

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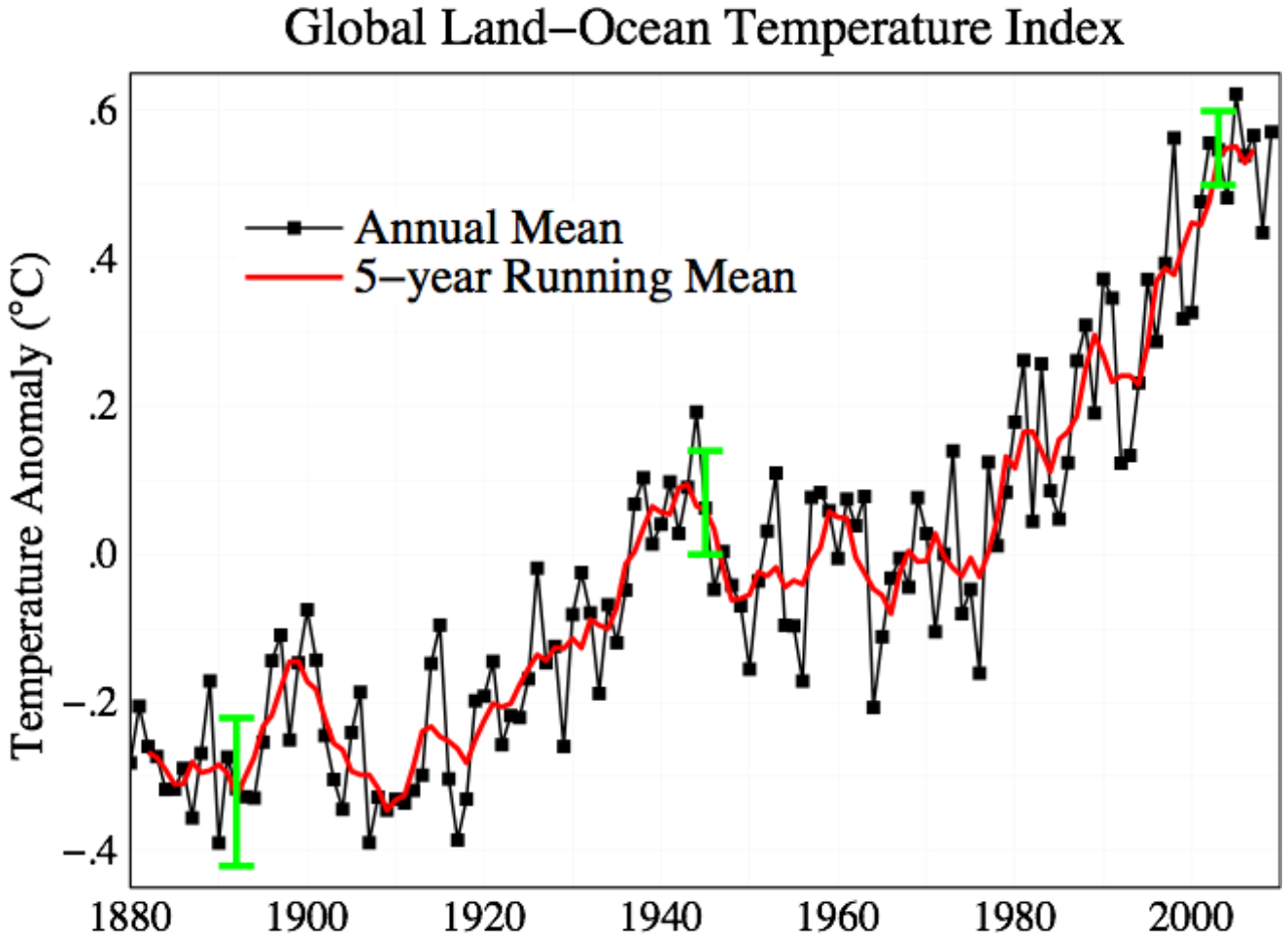
Global Temperature Change
(NASA GISS)



Useful links:

- www.ipcc.ch : IPCC
- www.unfccc.int : Climate Convention
- www.climate.be/vanyp: many of my slides

www.climate.be/JCM: interactive climate model

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