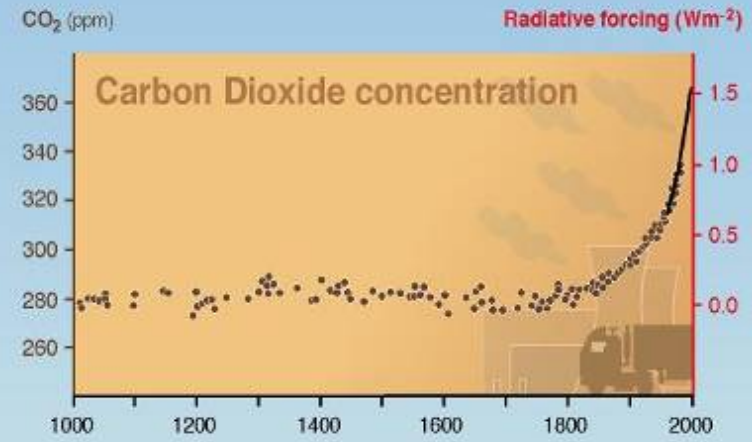
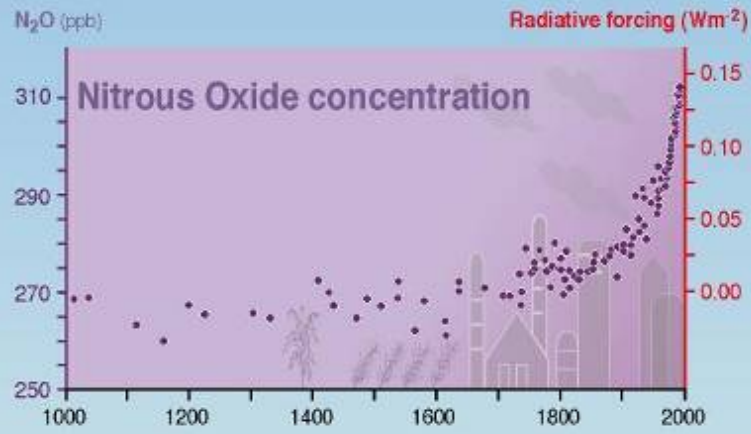
CLIMATE CHANGE

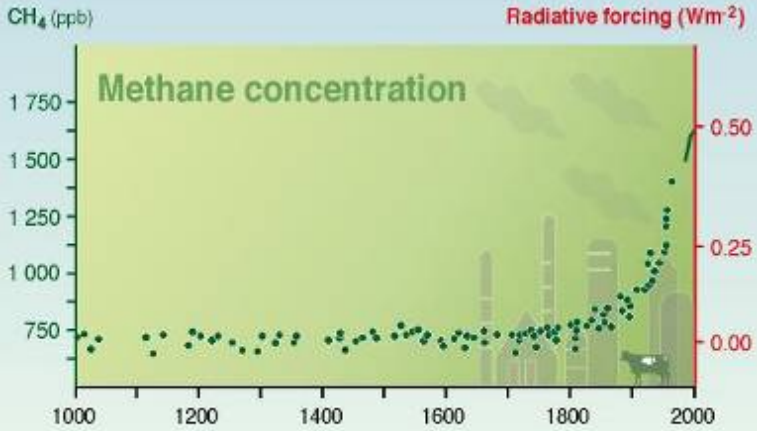
- Human activities are releasing greenhouse gases (GHG) into the atmosphere.
- Climate change is a global issue:
  1 tCO_2 emitted in India = 1 tCO_2 emitted in USA.
- Rising levels of greenhouse gases are already changing the climate.
- Climate models predict the global temperature will rise by ~1.4 - 5.8 ºC by 2100.
- Climate change is likely to have a significant impact on the global environment, economy and society.

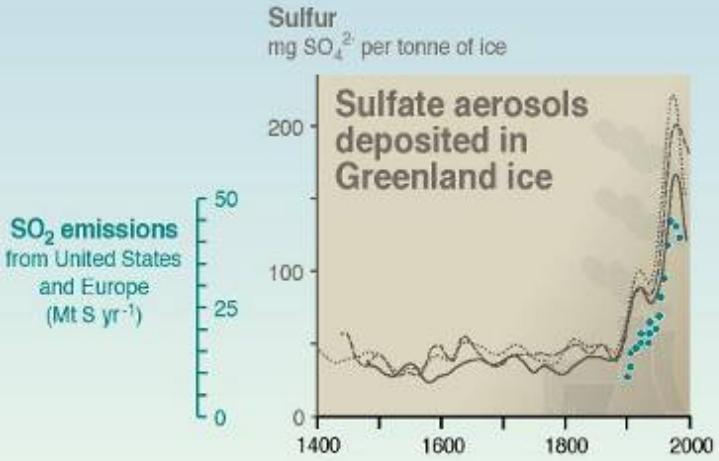
www.unep.fr/shared/publications/cdrom/.../session04_**UNFCCC.ppt**

Human activity influence









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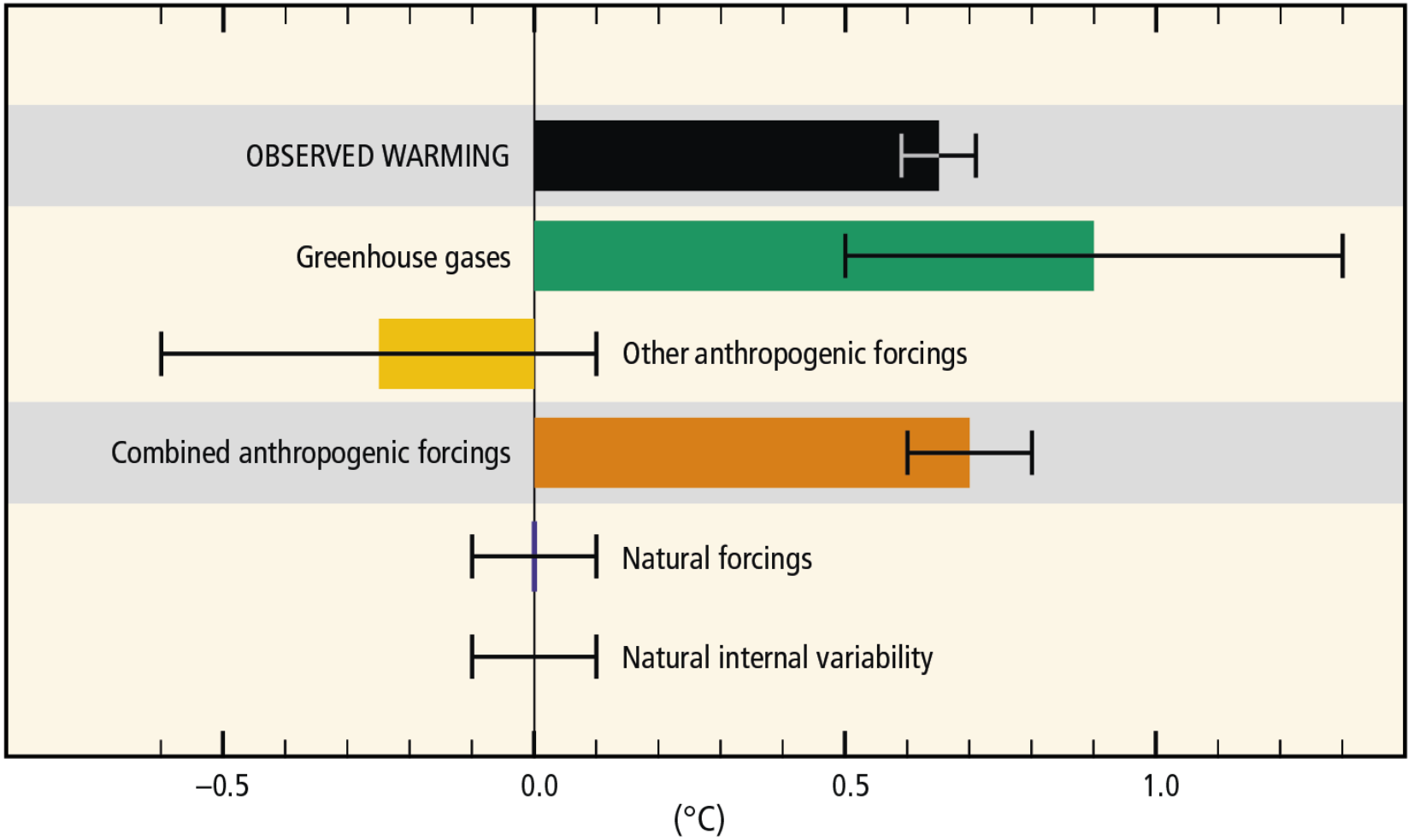
Contributions to observed surface temperature change over the period 1951–2010



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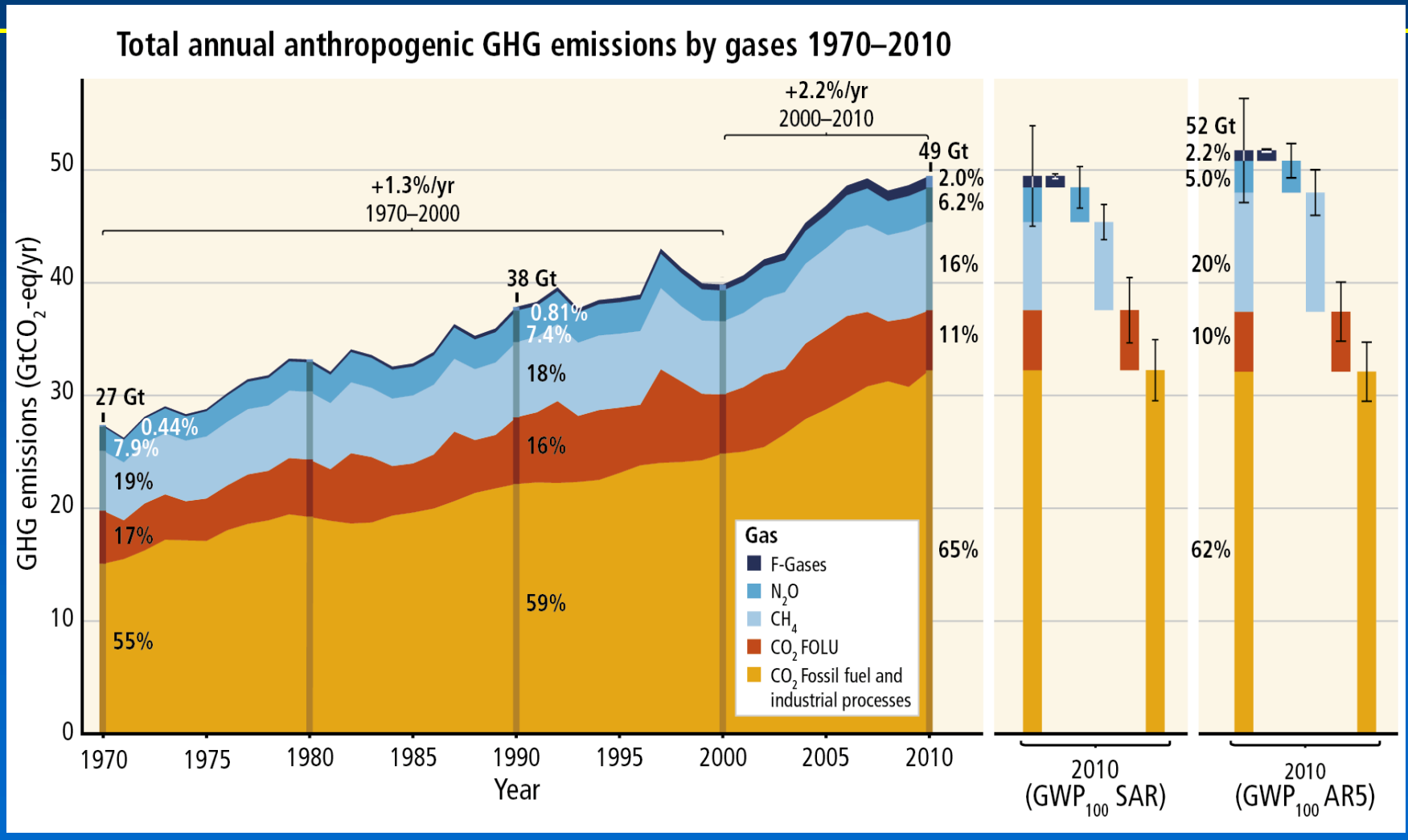

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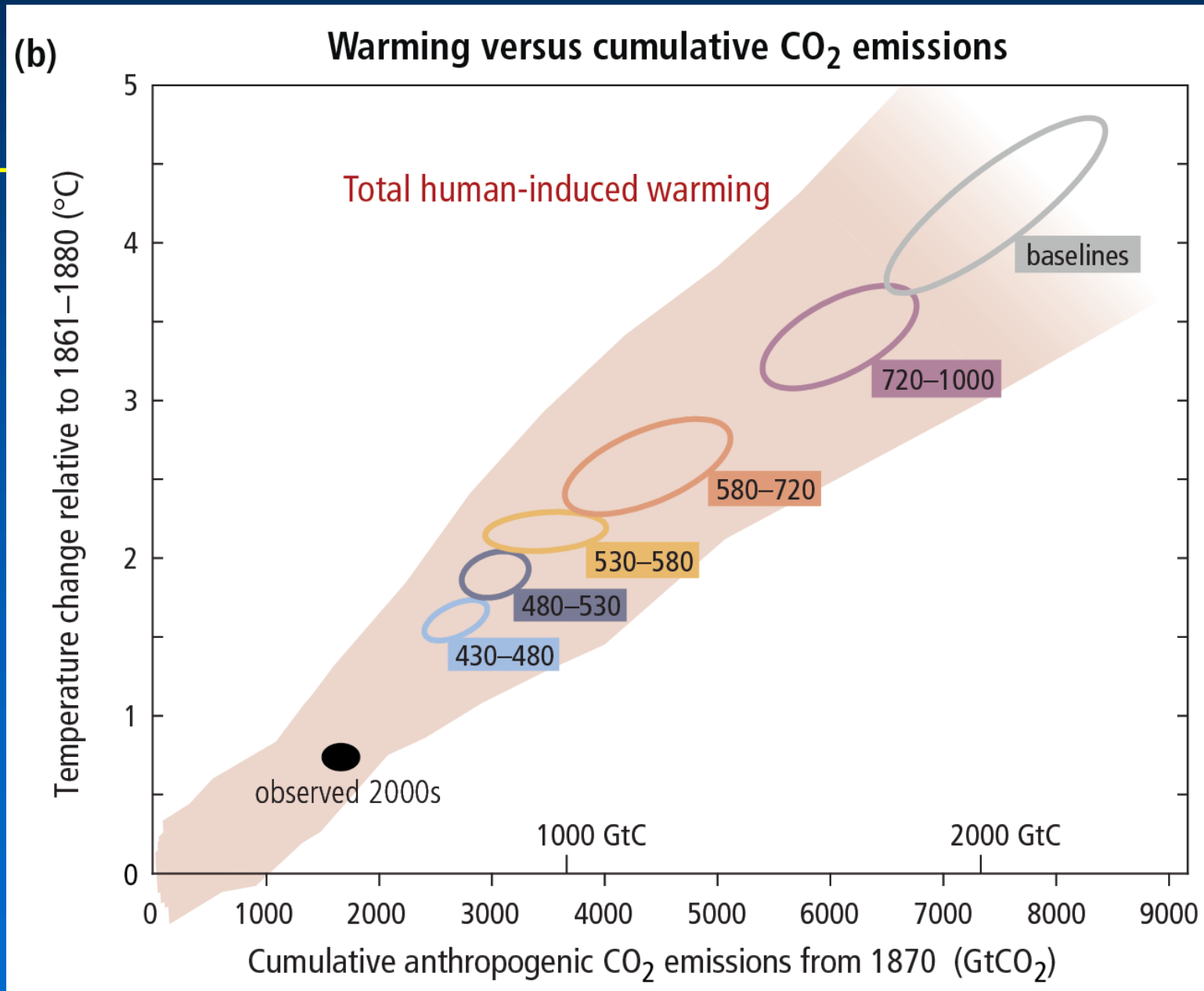
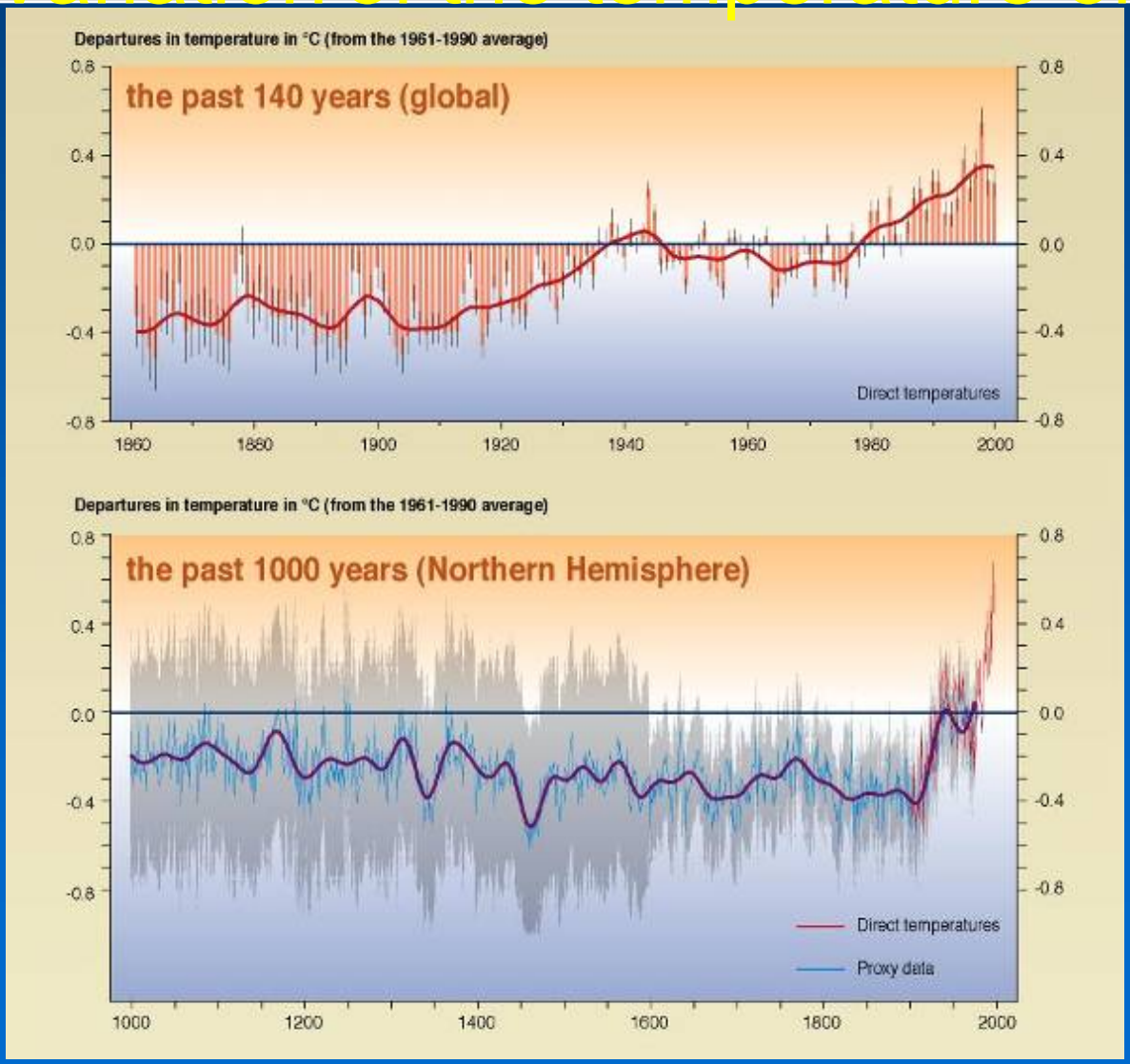


http://www.ipcc.ch/report/graphics/images/Assessment%20Reports/AR5%20-%20Synthesis%20Report/SPM/SPM.05-01.png

BACKGROUND

Variation of the temperature on Earth



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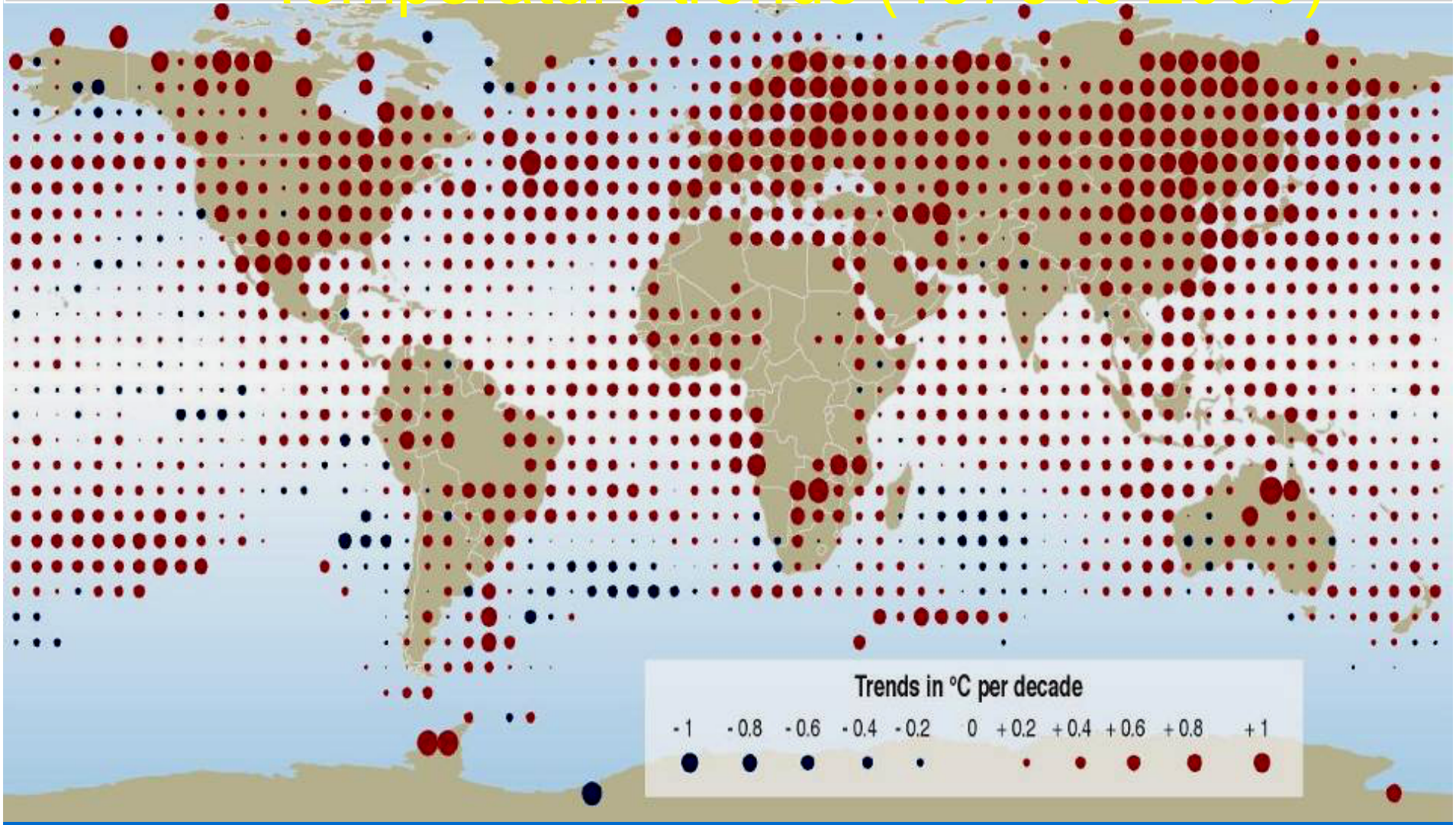
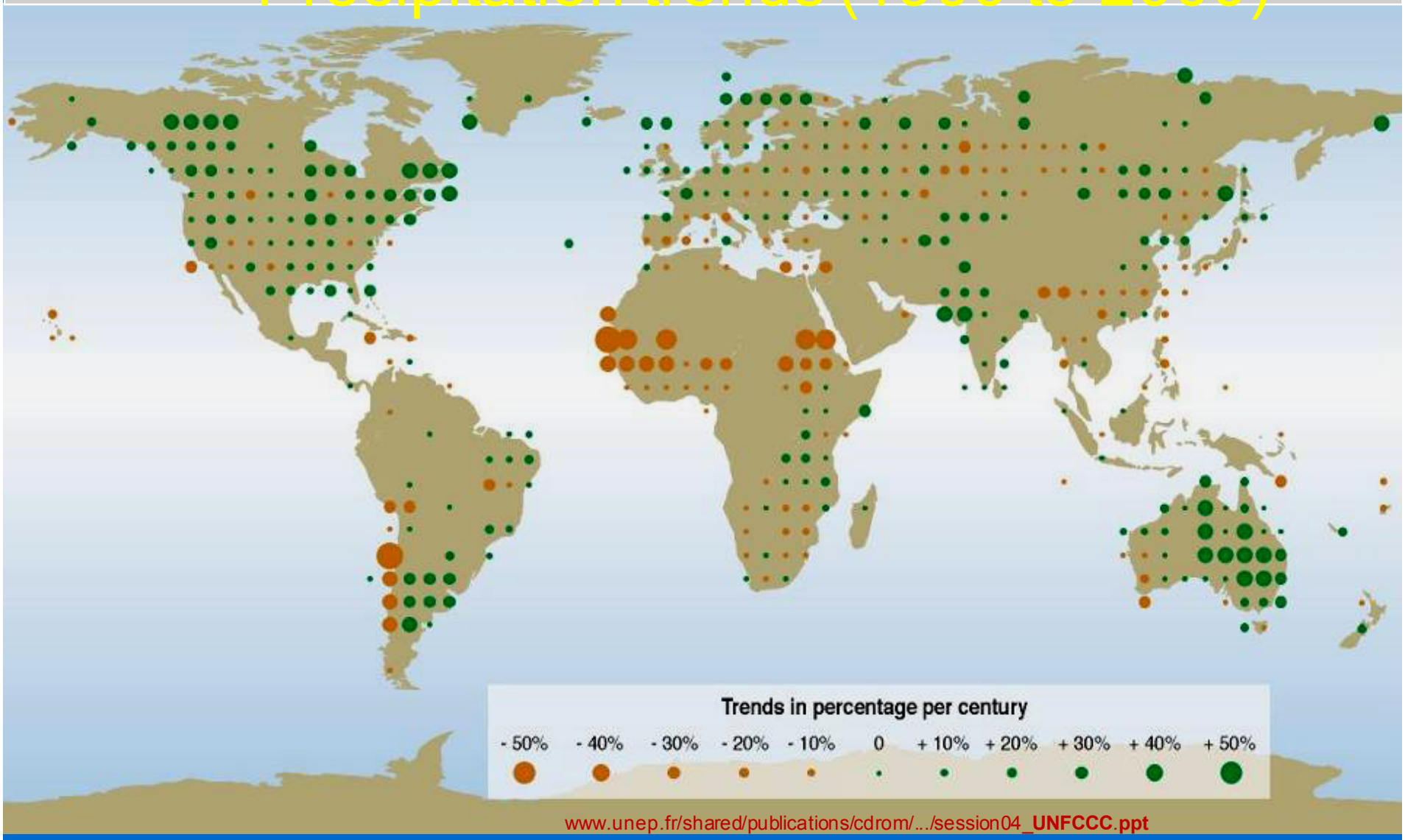
BACKGROUND

Temperature trends (1976 to 2000)



BACKGROUND

Precipitation trends (1900 to 2000)



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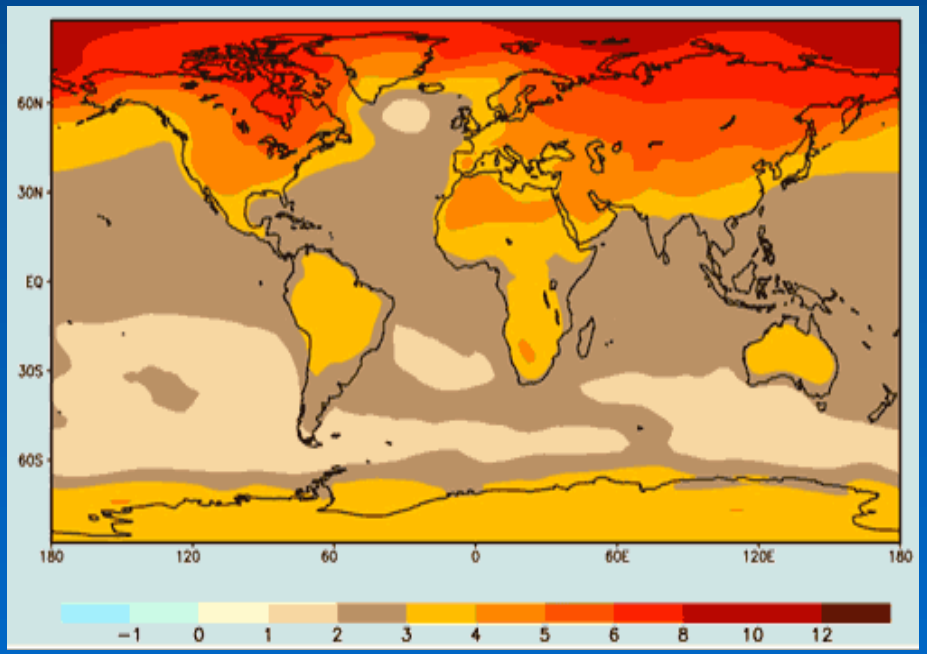
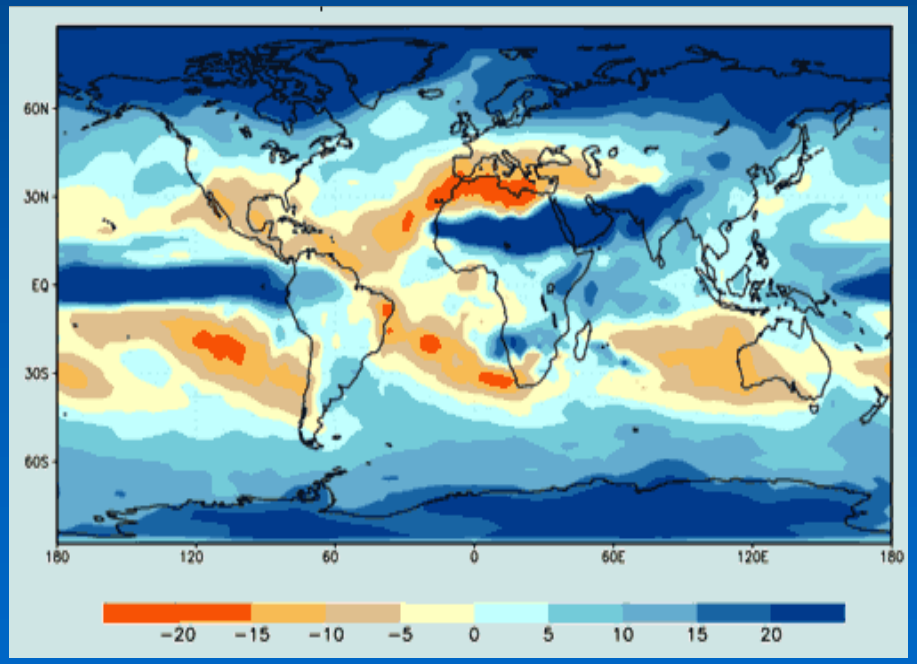
BACKGROUND

Climate change trends by 2100

TEMPERATURE



PRECIPITATIONS



5 degrees = What separates us from the last glacial era (-15 000 BC)

Models' forecasts : **+1.4** to **+5.8 degrees** by 2100.

Sources: Geophysical Fluid Dynamics Laboratory (GFDL), Princeton University.

Source : IPCC/SRESA2

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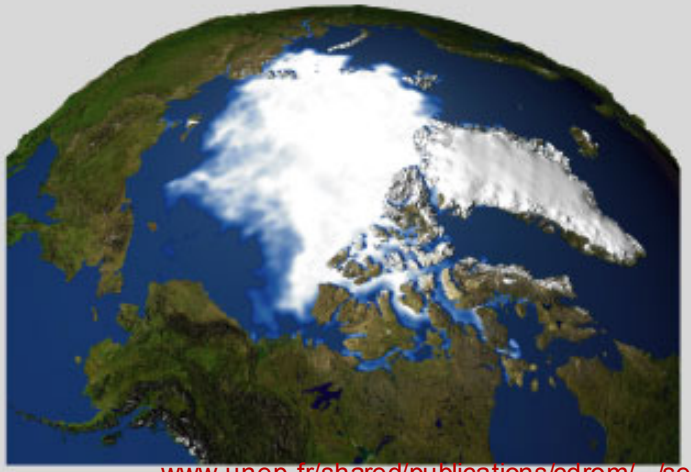
CLIMATE CHANGE

Visual impact of Climate Change

Observed sea ice September 1979

Arctic polar ice cap

Observed sea ice September 2003



Source:
Arctic Climate Impact Assessment (ACIA), 2004.
Impacts of a Warming Arctic.

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CLIMATE CHANGE

Impact of Climate Change on society

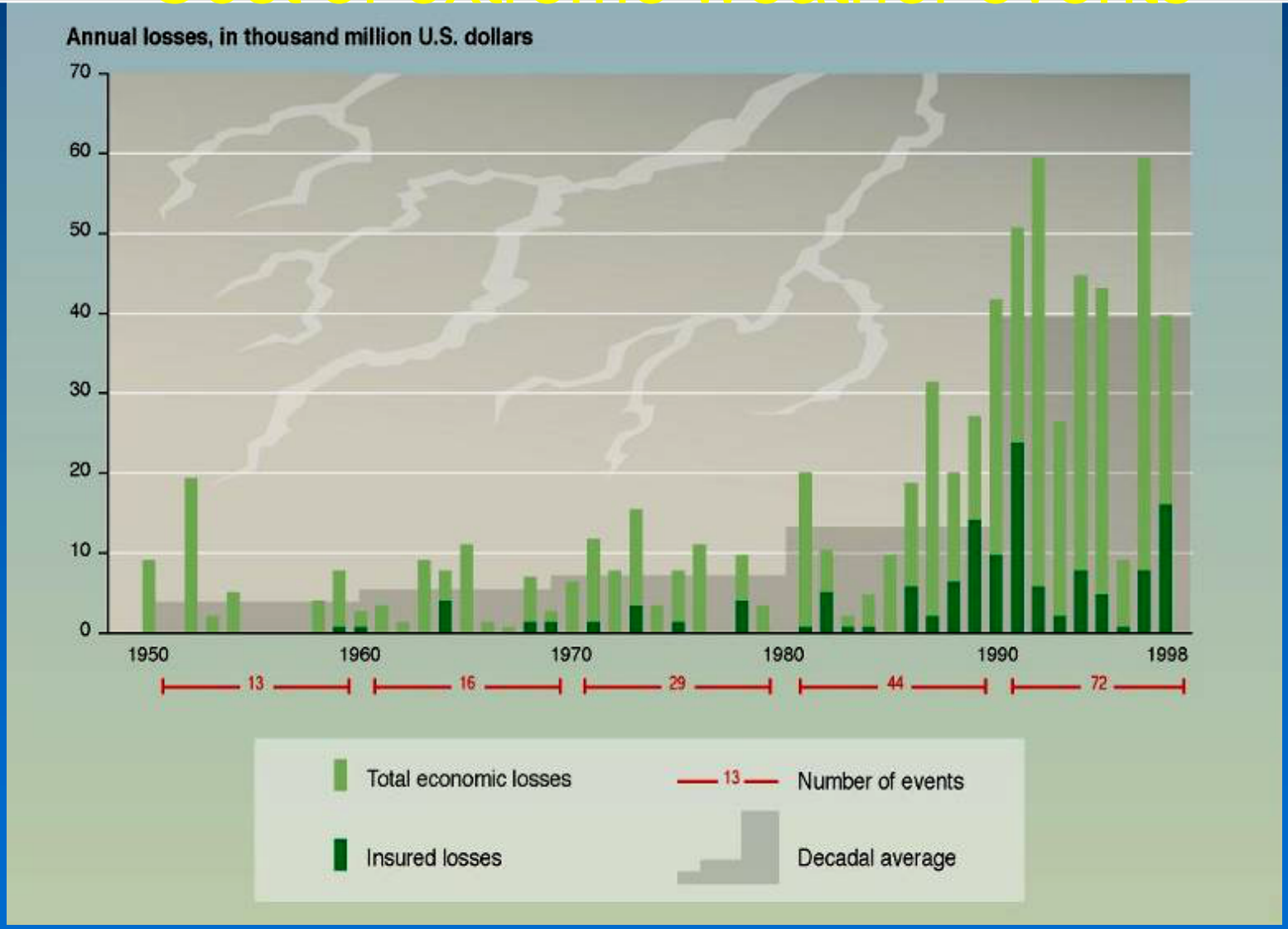
…Katrina, Rita, Stan, Wilma…

➡ Climate change will cause **heavier tropical cyclones**.

www.unep.fr/shared/publications/cdrom/.../session04_**UNFCCC**.ppt

CLIMATE CHANGE

Cost of extreme weather events



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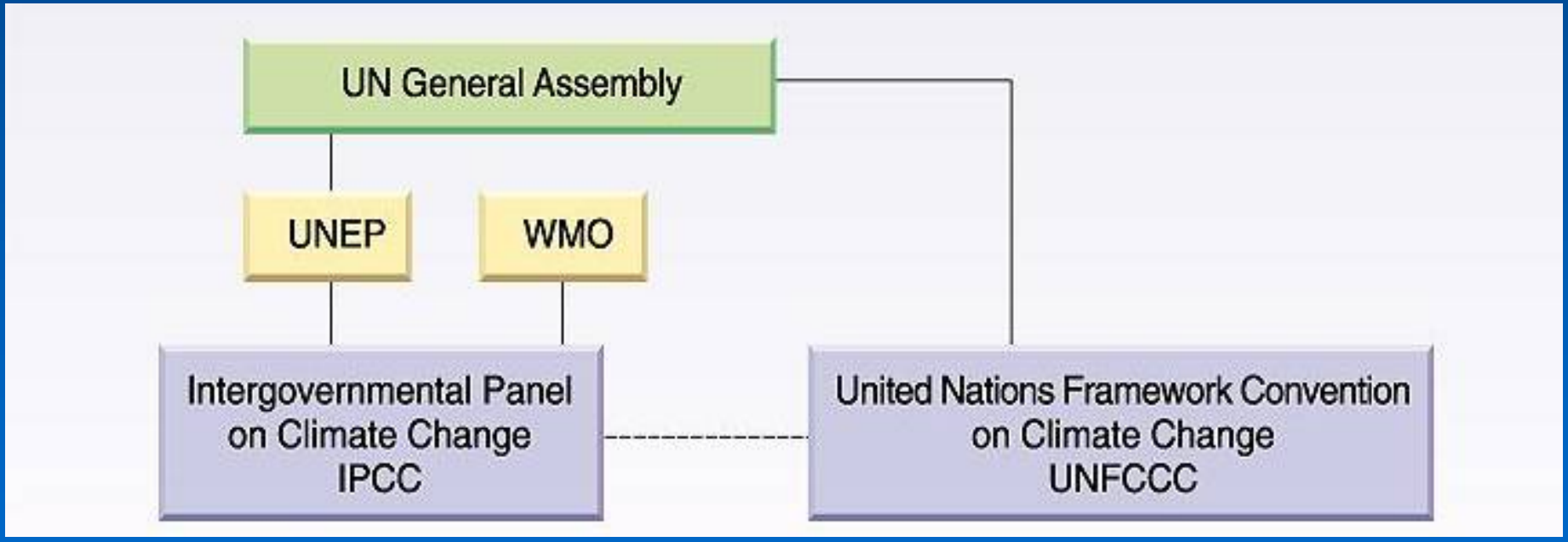
United Nations Framework Convention on Climate Change (UNFCCC)

Institutional framework



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Intergovernmental Panel on Climate Change (IPCC)

- Formed in 1988, the IPCC is a multinational scientific body organized under the United Nations.
- The mission of the IPCC is to convene scientists and other experts to publish reports assessing the state of the science on climate change and to evaluate economic and technical issues on the subject.
- The IPCC has issued five comprehensive “Assessment Reports” since its establishment which have greatly influenced the evolution of the international climate change regime.

IPCC Plenary

IPCC Bureau

IPCC Executive Committee

IPCC Secretariat

Working Group I	Working Group II	Working Group III	Task Force on National Greenhouse Gas Inventories
The Physical Science Basis	Climate Change Impacts, Adaptation and Vulnerability	Mitigation of Climate Change	
TSU	TSU	TSU	TSU

Authors, Contributors, Reviewers

United Nations Framework Convention on Climate Change (UNFCCC)

- The IPCC's First Assessment Report in 1990 concluded that GHG emissions from human activities were substantially increasing atmospheric concentrations which would enhance the greenhouse effect and result in additional global warming.
- In response to this report, the United Nations General Assembly initiated negotiations in 1990 on what would eventually become the UNFCCC.
- Negotiations on the UNFCCC were conducted between February 1991 and May 1992.
- The UNFCCC was opened for signature at the 1992 U.N. Conference on Environment and Development in Rio de Janeiro (the "Earth Summit").

UNFCCC

Overview of UNFCCC

United Nations Framework Convention on Climate Change

The United Nations Framework Convention on Climate Change (UNFCCC or FCCC) is an international environmental treaty that was produced at the United Nations Conference on Environment and Development (UNCED) (informally known as the Earth Summit) in Rio de Janeiro, June, 1992.

A global legal instrument (international agreement) on the control and management of **greenhouse gases (GHG)**.

Adopted in **1992**, entered into force in **1994**.

Status of participation: **189 Parties**.

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UNFCCC
Overall goal and objectives

What is the overall goal?

*" to **protect the climate system** for the benefit of present and future generations of mankind. "*

What are the further objectives?

*" to **achieve stabilisation of greenhouse gas** concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. "*

UNFCCC

- The treaty as originally framed set no mandatory limits on greenhouse gas emissions for individual nations and contained no enforcement provisions; it is therefore considered legally non-binding.
- Included provisions for updates (called “protocols”) that would set mandatory emission limits.
- The principal update is the Kyoto Protocol, which has become much better known than the UNFCCC itself.

UNFCCC

- A key element of the UNFCCC
- The parties should act to protect the climate system "on the basis of equality and in accordance with their **common but differentiated responsibilities** and respective capabilities."

- The principle of 'common but differentiated responsibility' includes two fundamental elements.
  - The first is the common responsibility of Parties to protect the environment, or parts of it, at the national, regional and global levels.
  - The second is the need to take into account the different circumstances, particularly each Party's contribution to the problem and its ability to prevent, reduce and control the threat.

UNFCCC

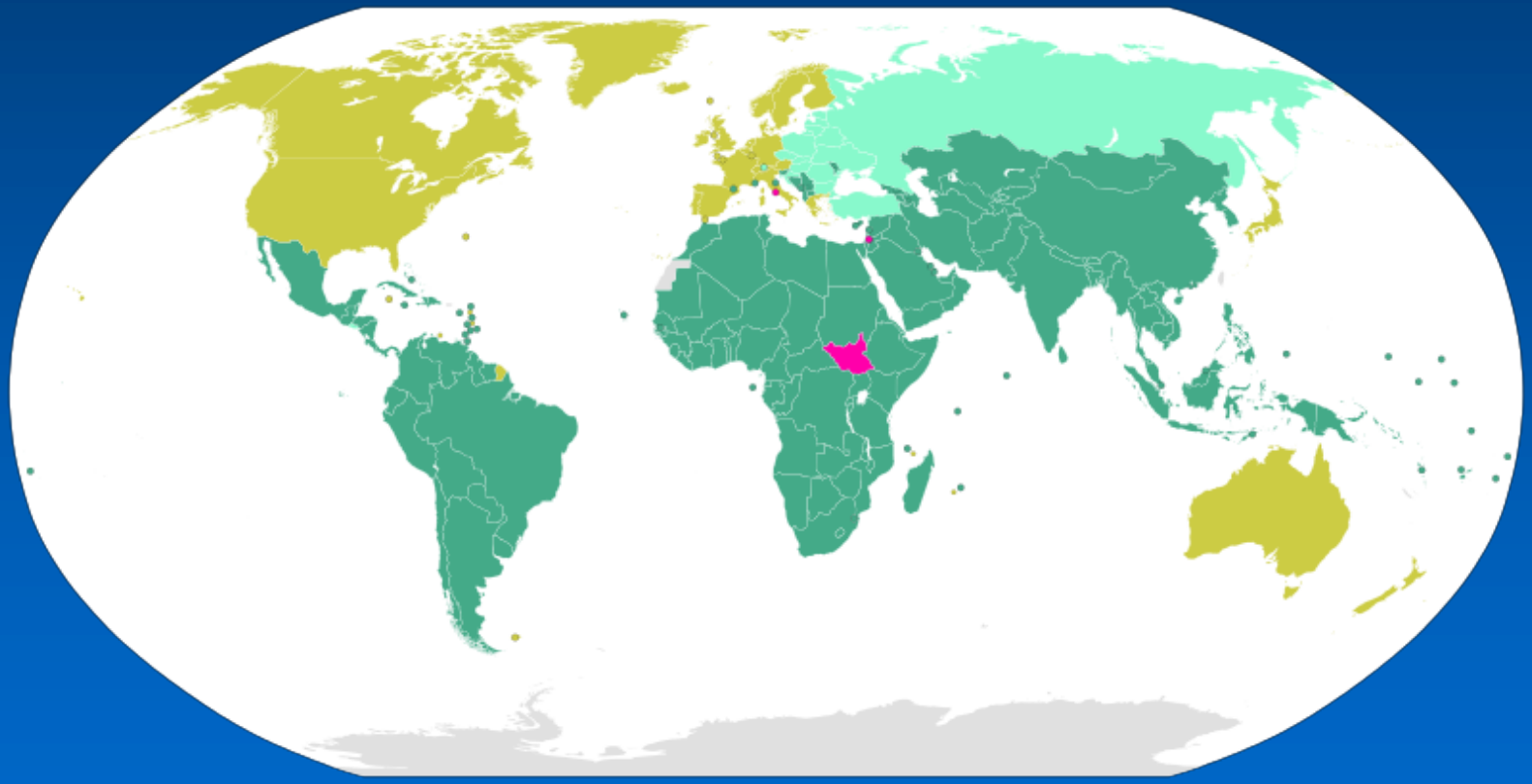
Overview of UNFCCC

United Nations Framework Convention on Climate Change

Contains 2 annexes:

- **Annex 1**: countries with obligations to take measures to mitigate the effects of climate change
- **Annex 2**: countries with obligations to provide financing to developing countries for their obligations under UNFCCC

UNFCCC

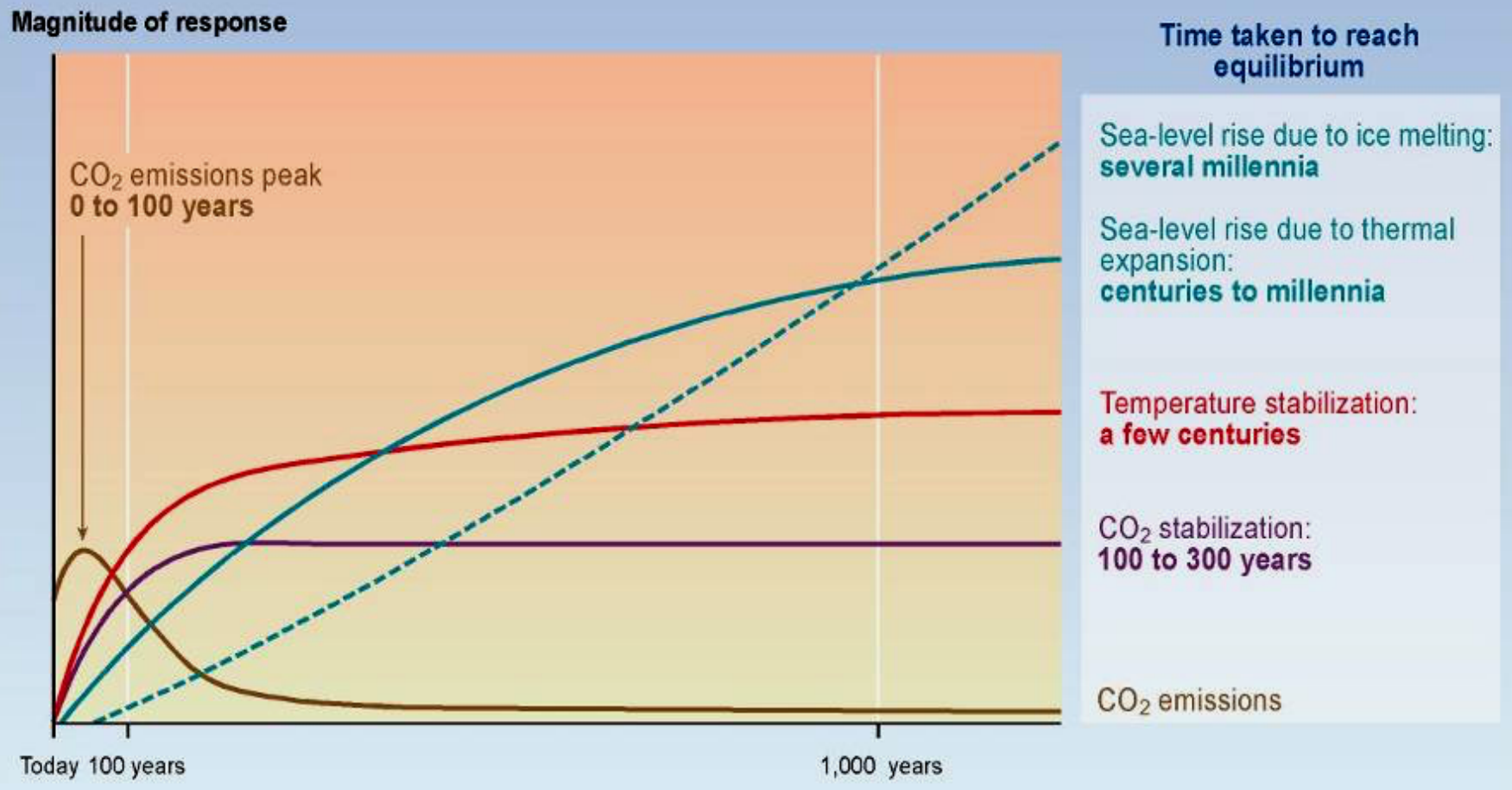


English: Member states of the United Nations Framework Convention on Climate Change

- Party
- Party (Annex I)
- Party (Annex I and II)
- Observers

UNFCCC

Time taken to reach equilibrium



CO2 concentration, temperature, and sea level continue to rise long after emissions are reduced !

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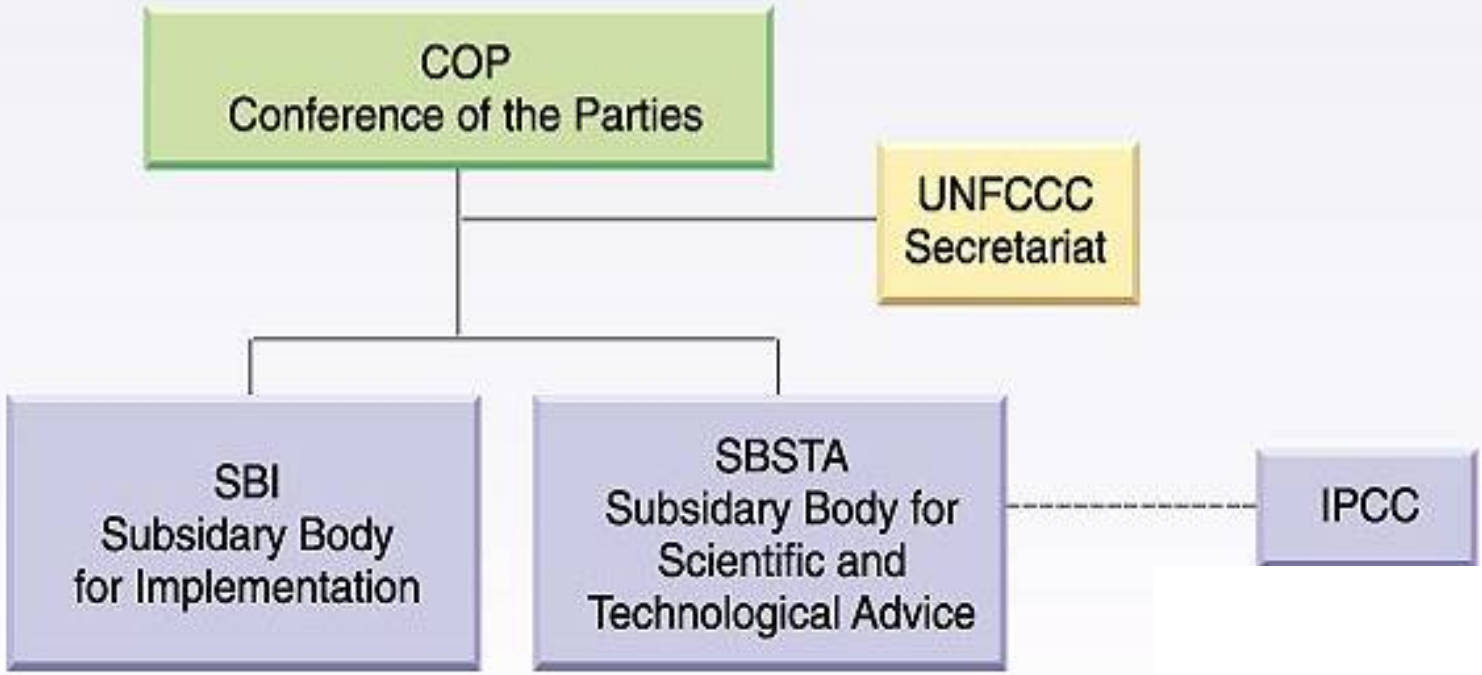
UNFCCC
Organisation of the Convention



UNFCCC

Conferences of the Parties:

- COP is the Convention's supreme body
- Meets annually and is charged with devising ways to implement the UNFCCC's goals.

Secretariat:

- Serves bodies of both the UNFCCC and KP, provides implementation assistance to parties

UNFCCC

- **Subsidiary Body for Scientific and Technological Advice**: links scientific and technological assessments, the information provided by competent international bodies, and the policy-oriented needs of the COP
- **Subsidiary Body for Implementation:** develop recommendations to assist the COP in the review and assessment of the implementation of the Convention and in the preparation and implementation of its decisions
- **Joint Working Group on Compliance (JWG)**: develop procedures and mechanisms relating to a compliance system

UNFCCC
National level actors

National UNFCCC focal points

> Responsible for the Government's interaction and communication with UNFCCC.

> Usually a specific ministry / department.

> Usually interacting with a wide range of other organizations / stakeholders at the national level.

National CDM or JI organizations

> Specific organization (authority) that is responsible for approving CDM and JI activities at the national level.

> Often, but not always, the same as the National Focal Point.

KYOTO PROTOCOL

Bringing UNFCCC into action

The Kyoto Protocol

> An addition to UNFCCC that requires developed countries to limit their GHG emissions in 2012, as compared to their emissions in 1990.

> Provides detailed methods and mechanisms for how the emission reductions can be achieved, measured and verified.

> All members in UNFCCC have not agreed to sign the Kyoto Protocol!

A long process of ratification

> Adopted in 1997, but required the ratification of more than 55 countries representing more than 55% of GHG emissions.

> Entered into force on February 16th, 2005 after ratification of the Russian Federation (now 163 countries covering 61.6% of global emissions have ratified the protocol).

KYOTO PROTOCOL

A market-based instrument

Kyoto Protocol **characteristics**

> Commits Annex 1 countries to reduce GHG emissions by 5.2% by 2012 compared to 1990.

> Actual commitment period: 2008 - 2012.

> Individual goals for each country.

3 mechanisms to help countries to reach their commitments

> ETS - Emissions Trading System

> CDM - Clean Development Mechanism

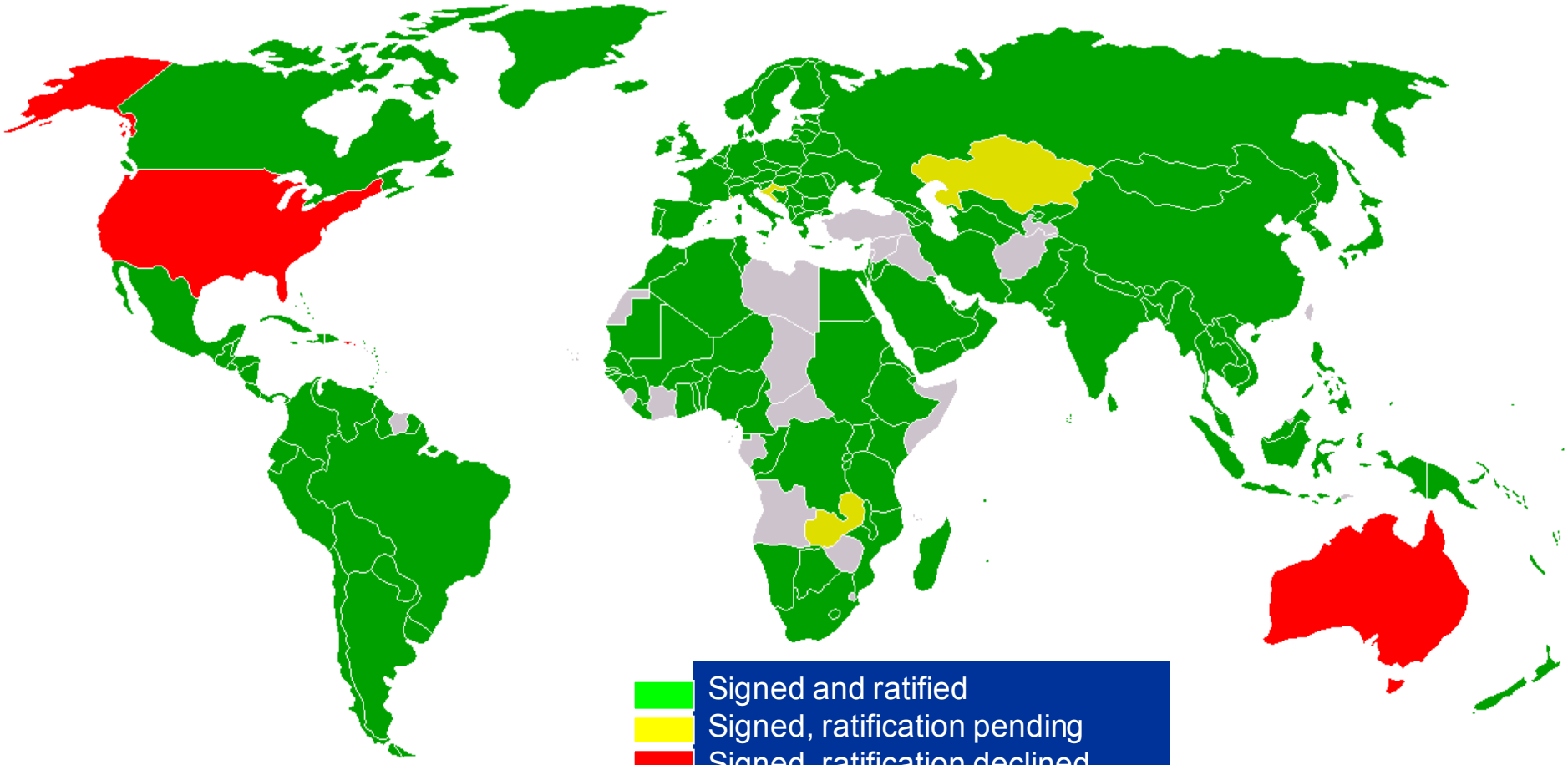
> JI - Join Implementation

6 greenhouse gases: CO_2, CH_4, N_2O, PFCs, HFCs, SF_6.

www.unep.fr/shared/publications/cdrom/.../session04_**UNFCCC**.ppt

UNFCCC

Ratification of the Kyoto protocol



UNFCCC
Ratification of the Kyoto protocol

First commitment period: 2008-2012

- 37 industrialized countries and the European Community (the European Union-15, made up of 15 states at the time of the Kyoto negotiations) commit themselves to binding targets for GHG emissions
- The targets apply to the four greenhouse gases carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulphur hexafluoride (SF_6), and two groups of gases, hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs)
- These reduction targets are in addition to the industrial gases, chlorofluorocarbons, or CFCs, which are dealt with under the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer.

- Under the Protocol, only the Annex I Parties have committed themselves to national or joint reduction
- The non-Annex I Parties may participate in the Kyoto Protocol through the **Clean Development Mechanism**
- The emissions limitations of Annex I Parties varies between different Parties. Some Parties have emissions limitations reduce below the base year level, some have limitations at the base year level (i.e., no permitted increase above the base year level), while others have limitations above the base year level.
- Emission limits do not include emissions by international aviation and shipping.

KYOTO PROTOCOL

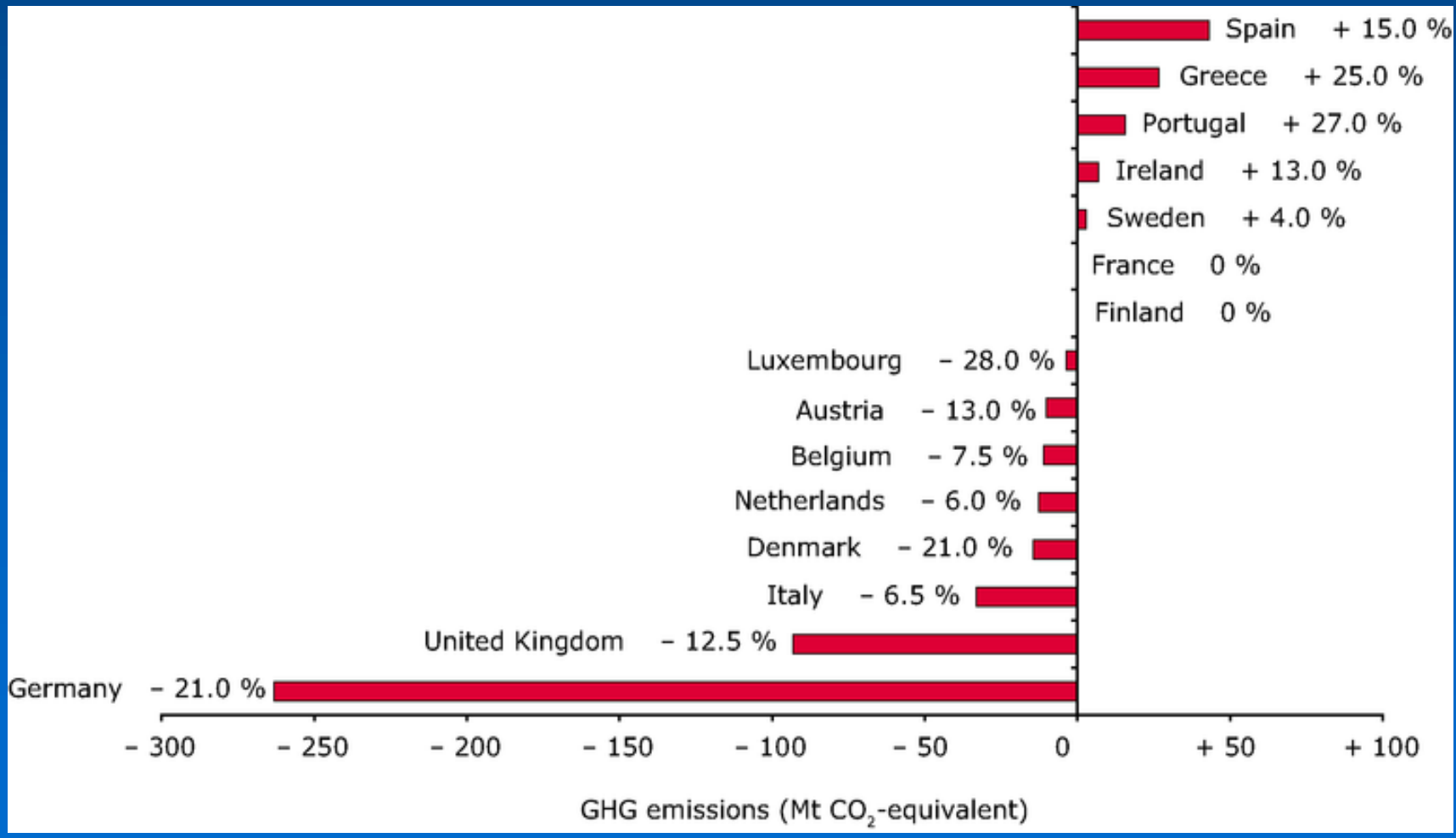
List of countries in Annex 1

Australia	Estonia	Latvia	Russia
Austria	Finland	Liechtenstein	Slovakia
Belarus	France	Lithuania	Slovenia
Belgium	Germany	Luxembourg	Spain
Bulgaria	Greece	Netherlands	Sweden
Canada	Hungary	New Zealand	Switzerland
Croatia	Iceland	Norway	Turkey
Czech Rep	Ireland	Poland	Ukraine
Denmark	Italy	Portugal	UK
EC	Japan	Romania	**USA**

** Countries with economies in transition to a market economy.*

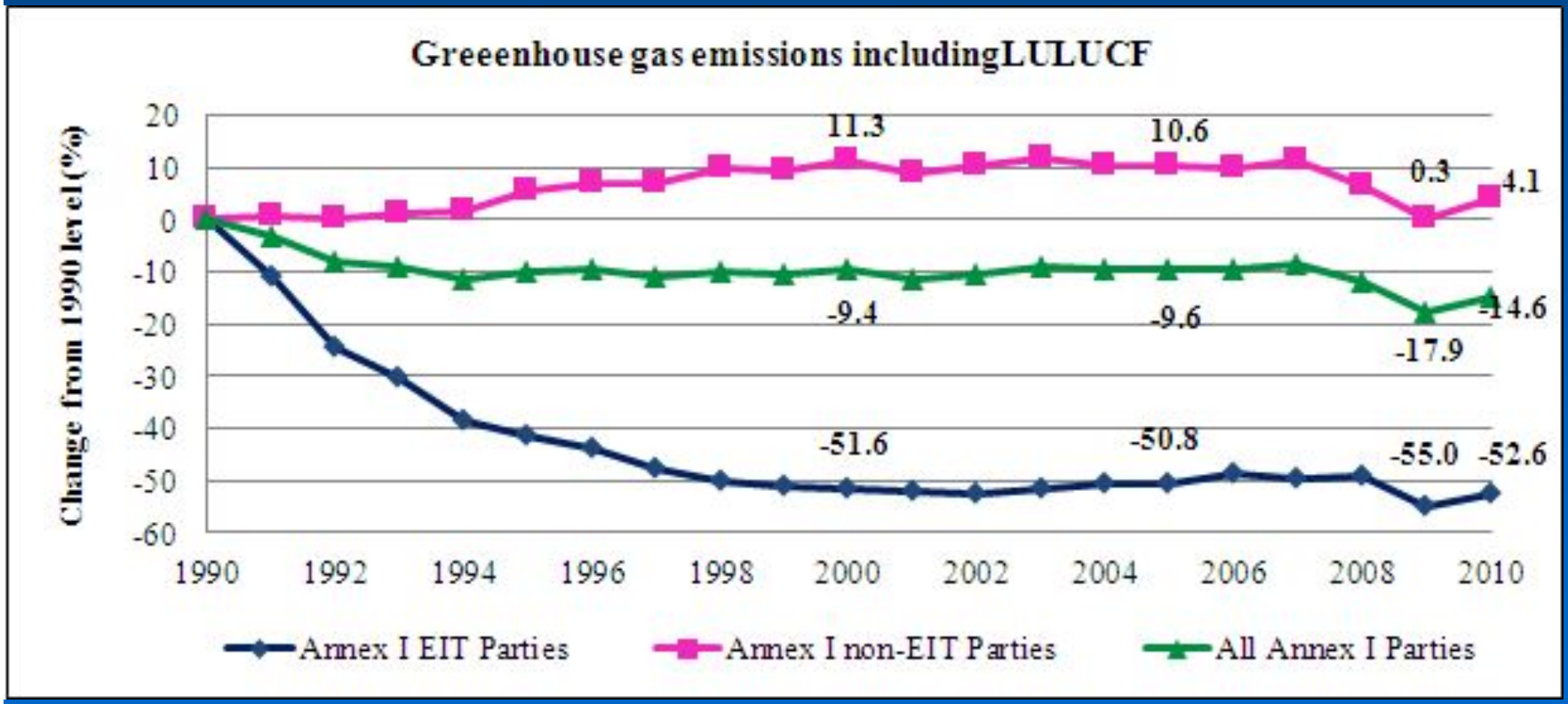
** Countries which did not ratify Kyoto protocol.*

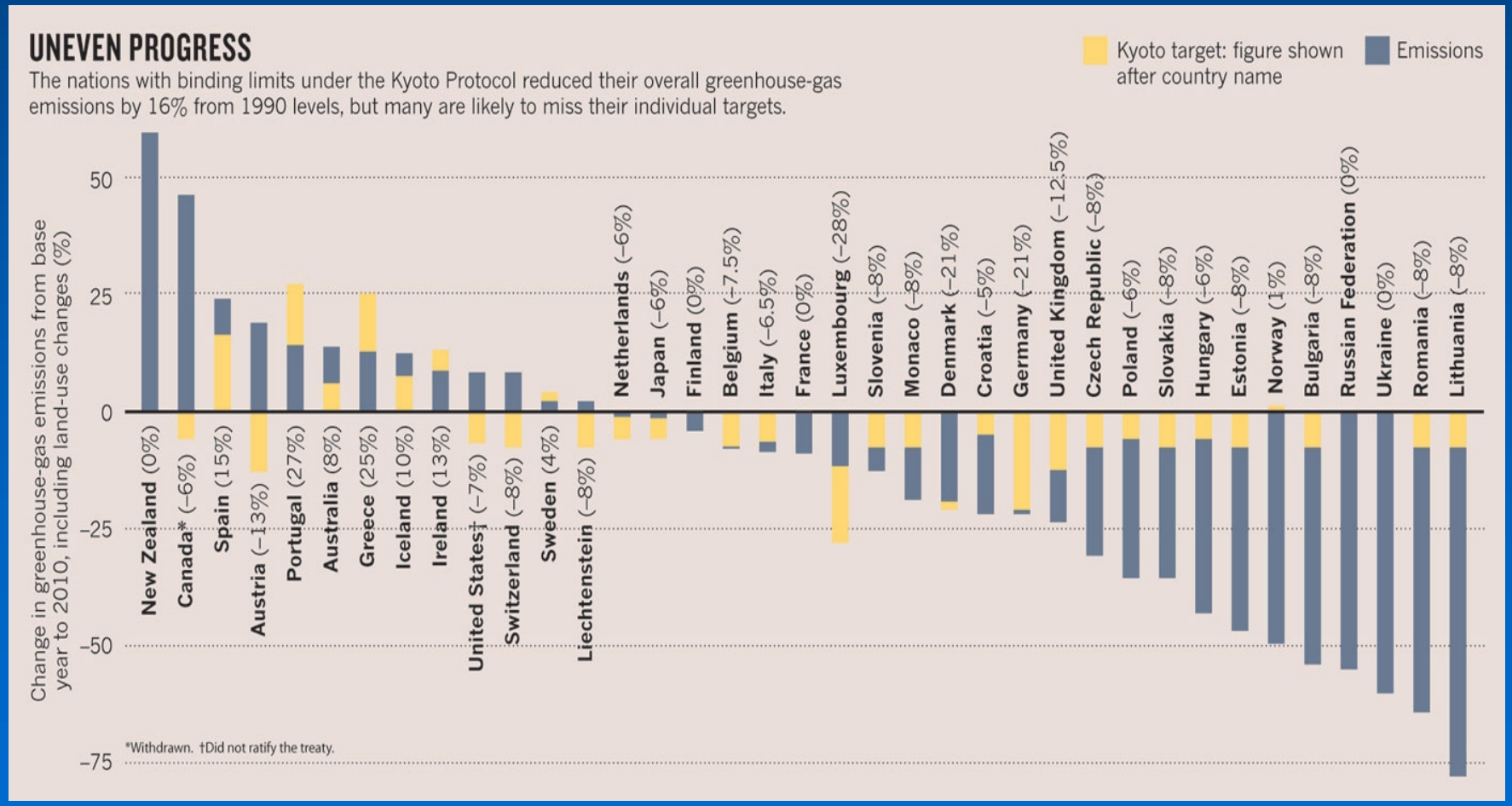
Greenhouse gas emission targets of EU-15 Member States for 2008-12 relative to base-year emissions under the EU burden-sharing decision



http://www.eea.europa.eu/data-and-maps/figures/kyoto-burden-sharing-targets-for-eu-15-countries

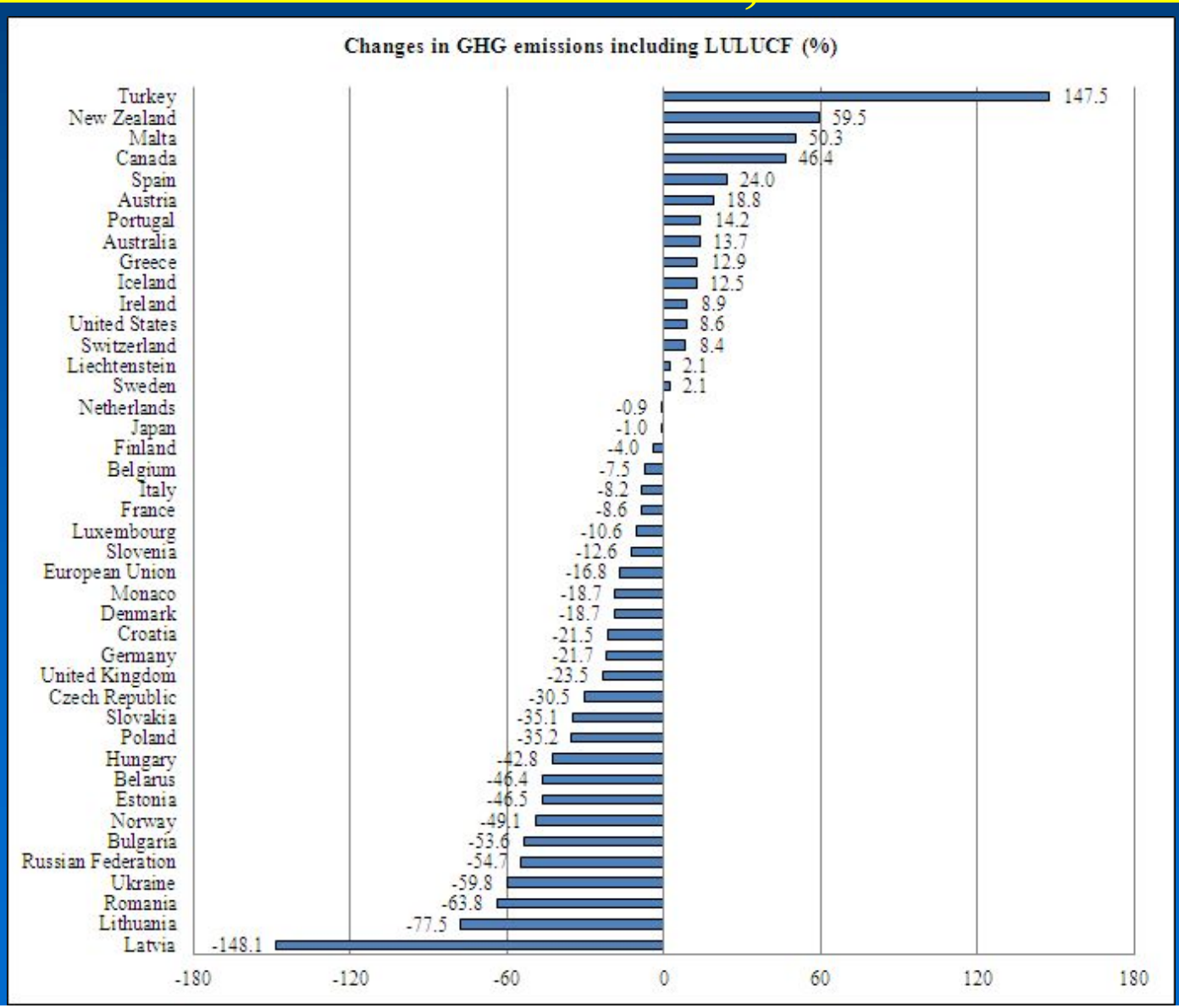
Trends in aggregate greenhouse gas emissions, 1990- 2010





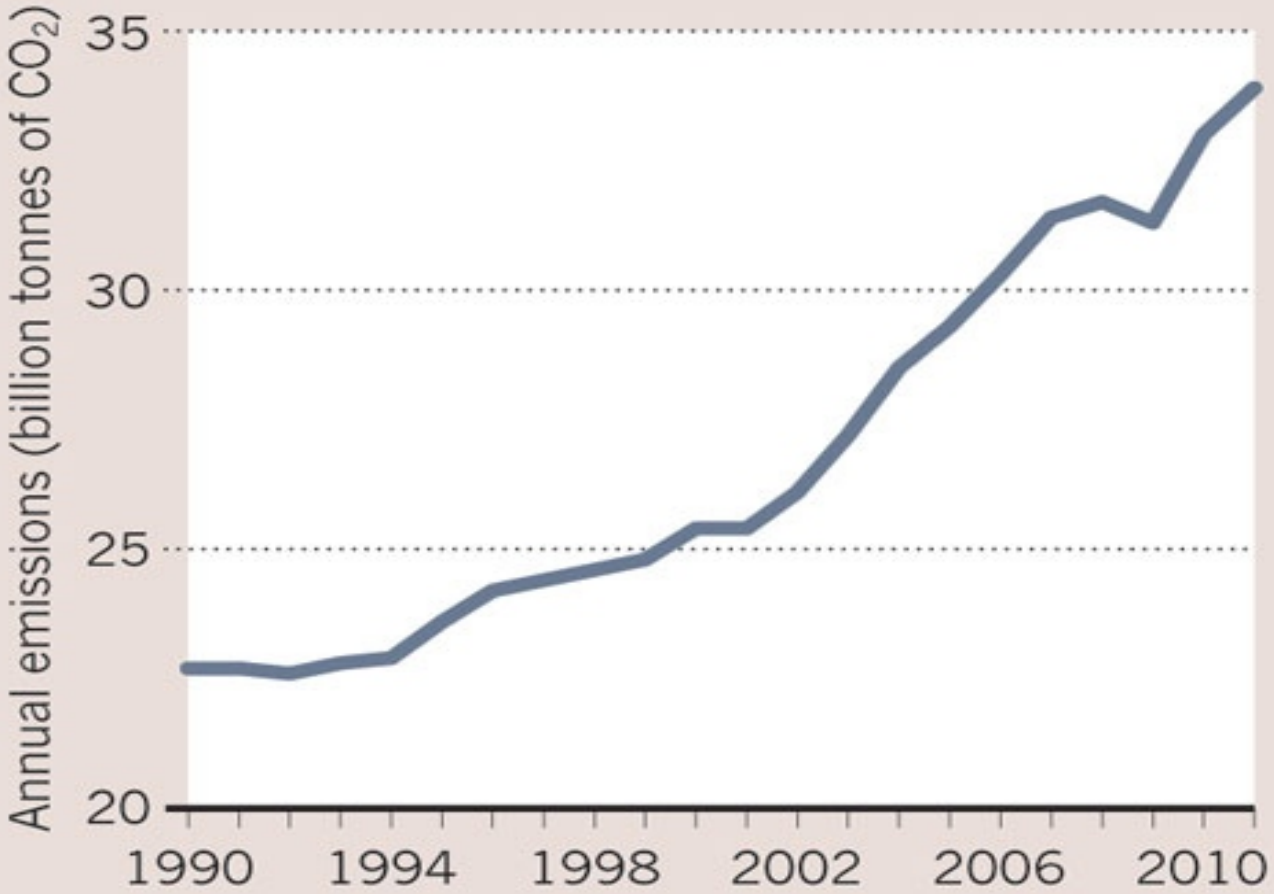
http://www.nature.com/news/the-kyoto-protocol-hot-air-1.11882

Total aggregate greenhouse gas emissions of individual Annex I Parties, 1990-2010



BEFORE AND AFTER

Global emissions of carbon dioxide surged after the 1997 Kyoto Protocol.



http://www.nature.com/news/the-kyoto-protocol-hot-air-1.11882

KYOTO PROTOCOL

"Flexible mechanisms"

ETS - Emissions Trading System

> Can be used as supplementary to actions to meet reduction commitments.

> One AAU (Assigned Amount Units) represents the tradable right to emit one t CO2eq.

CDM - Clean Development Mechanism

> Allows public or private entities to invest in greenhouse gas (GHG) mitigating activities in developing countries.

> CERs (Certified Emission Reductions) can be used by the project investor to meet its own commitments, or sold on the open market.

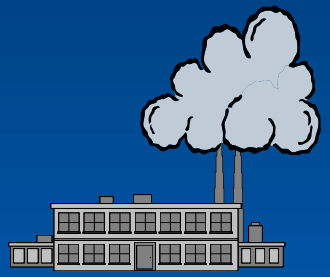
JI - Joint Implementation

> Emission reduction projects implemented jointly between Annex I countries (developed countries and transition economies).

> ERUs (Emission Reduction Units) can be used by the project investor to meet its own commitments, or sold on the open market.

KYOTO PROTOCOL

CO_2 market mechanisms

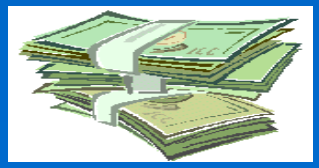


Limitations of CO2 emissions in developed countries (Annex I)

↓

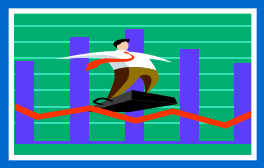
4 options for companies

1/ Pay expensive **fines.**



2/ Carry out carbon reduction through **processes improvement.**

3/ Buy emissions credits on the **CO_2 market (ETS).**



4/ Carry out carbon reduction through technology transfers in **CDM or JI project.**

KYOTO PROTOCOL
Key Opportunities for industrials

In **Developing Countries** (part of Annex 2):

No national GHG reduction commitments but opportunity to host CDM projects, thereby benefiting from associated investments, technology transfer and transfer of know-how.

In **Economies in Transition** (part of Annex 1):

JI present an opportunity for these countries with "emission reductions to spare" to attract investments and technology transfer.

What are the **main opportunities for industrials**?

> Technology transfer to improve process and energy efficiency

> Co-finance investments by selling emission credits

> Prepare for future commitments (after 2012)

> Achieve sustainable development

KYOTO PROTOCOL
Financial assistance

Special Climate Change Fund (UNFCCC)

Will fund projects relating to capacity building, adaptation, tech transfer, climate change mitigation, economic diversification for countries highly dependent on fossil fuel.

Least developed countries Fund (UNFCCC)

Will fund a special work programme to assist LDCs.

Adaptation Fund (Kyoto Protocol)

Global Environment Facility (GEF)

GEF is the operating entity of the financial mechanism and the main funding channel for developing countries.

Kyoto protocol after 2012

2007 United Nations Climate Change Conference in Bali

- Negotiations on a successor to the Kyoto Protocol dominated the Conference.

2009 United Nations Climate Change Conference in Copenhagen (COP-15)

- The Copenhagen Accord recognizes the scientific case for keeping temperature rises below 2° C, but does not contain commitments for reduced emissions that would be necessary to achieve that aim.
- US$ 30 billion were pledged to the developing world over the next three years, rising to US$ 100 billion per year by 2020, to help poor countries adapt to climate change.
- An agreement was also reached that would set up a deal to reduce deforestation in return for cash from developed countries.
- In a meeting of the Group of Eight G8, the world top leaders agreed to halve carbon emissions by 2050; however, they did not set specific targets because they did not agree on a base year
- No legal binding

2011 United Nations Climate Change Conference held in Durban, South Africa

- The conference agreed to a legally binding deal comprising all countries, which will be prepared by 2015, and to take effect in 2020.

2012 United Nations Climate Change Conference held in Doha, Qatar

- The conference reached an agreement to extend the life of the Kyoto Protocol until 2020, and to reify the 2011 Durban Platform, meaning that a successor to the Protocol is set to be developed by 2015 and implemented by 2020.
- Agreeing a second commitment for Kyoto Protocol (1 January-2013 to 31 December, 2020).
- This kept Kyoto instruments like the Clean Development Mechanism functioning, and continued to hold participating countries to their binding emission reduction commitments.

Source: http://www.carbontrust.com/news/2013/01/doha-it-kept-the-show-on-the-road-but-only-just

2012 United Nations Climate Change Conference held in Doha, Qatar

- Kyoto's second round covers 15% of global emissions, and commits participants to cutting emissions by an average of 18% below 1990 levels by 2020, with specific targets.
- Fewer countries will be bound by the second commitment period compared to the first, leaving countries like the US, Japan, New Zealand, Canada, and Russia without internationally binding targets.
- Has symbolic importance and helpful for future agreements--if Kyoto wasn't extended, many developing countries wouldn't have signed up for the Durban Platform, which would have stymied progress towards a future agreement.

Source: http://www.carbontrust.com/news/2013/01/doha-it-kept-the-show-on-the-road-but-only-just

2012 United Nations Climate Change Conference held in Doha, Qatar

- Pledging and disbursing finance
  - As developed countries aim to raise and mobilise $100 billion per year. The commitment was reconfirmed in Doha
  - Europe committed another $6 billion to keep climate finance flowing in 2013
- Including "loss and damage"—kept alive
- Streamlining the process--The Durban Platform will be the only negotiating forum for the 2015 agreement.

Source: http://www.carbontrust.com/news/2013/01/doha-it-kept-the-show-on-the-road-but-only-just

2013 United Nations Climate Change Conference

- Held in Warsaw, Poland from 11-22 November 2013.
- Decisions on further advancing the Durban Platform, the Green Climate Fund and Long-Term Finance

2014 United Nations Climate Change Conference

- 1 to 14 December in Lima, Peru.
- Governments Agree Ground Rules on Contributions to Paris 2015 Agreement and Boost Adaptation

Source: http://www.carbontrust.com/news/2013/01/doha-it-kept-the-show-on-the-road-but-only-just

2015 United Nations Climate Change Conference

- The **2015 United Nations Climate Change Conference**, **COP 21** held in Paris from November 30 to December 11.
- The conference **objective is to achieve a legally binding and universal agreement on climate, from all the nations of the world**.
- The agreement calls for zero net anthropogenic greenhouse gas emissions to be reached during the second half of the 21st century. In the adopted version of the Paris Agreement, the parties will also "pursue efforts to" limit the temperature increase to 1.5 ° C.
- The 1.5 ° C goal will require zero emissions sometime between 2030 and 2050, according to some scientists.
- The Paris Agreement will enter into force on 4 November 2016, thirty days after the date on which at least 55 Parties to the Convention accounting in total for at least an estimated 55 % of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with the Depositary.

Source: http://www.carbontrust.com/news/2013/01/doha-it-kept-the-show-on-the-road-but-only-just

2015 United Nations Climate Change Conference

- Each country that ratifies the agreement will be required to set a target for emission reduction or limitation, called a "nationally determined contribution," or "NDC," but the amount will be voluntary.

Source: http://www.carbontrust.com/news/2013/01/doha-it-kept-the-show-on-the-road-but-only-just

India-Intended Nationally Determined Contribution

- To reduce the emissions intensity of its GDP by 33-35% by 2030 from 2005 level.
- To achieve about 40% cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030 with the help of transfer of technology and low cost international finance including from Green Climate Fund (GCF).
- To create an additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent through additional forest and tree cover by 2030.

India

"The Government of India declares its understanding that, as per its national laws; keeping in view its development agenda, particularly the eradication of poverty and provision of basic needs for all its citizens, coupled with its commitment to following the low carbon path to progress, and on the assumption of unencumbered availability of cleaner sources of energy and technologies and financial resources from around the world; and based on a fair and ambitious assessment of global commitment to combating climate change, it is ratifying the Paris Agreement."