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Building Sustainable Peace by Moving towards Sustainability Transition Ecology and Peace Commission (EPC)

12 August 2014, 14:00-15:30
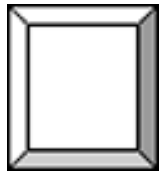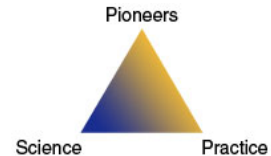
Session 2: Sustainability Transition and Peacebuilding

Pioneers

Science

Practice

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Abstract

The concept of 'sustainable peace' has been widely used in scientific and political contexts but it still lacks a clear definition as a goal, a process, its actors and outcomes. Building on a previous volume of IPRA's Ecology and Peace Commission (Oswald Spring/Brauch/Tidball 2014), this paper addresses the conceptual challenge of 'sustainable peace' from the vantage point of the Anthropocene (Crutzen 2000) that humankind has severely interfered into the earth system and that we are a major threat to the survival of human civilizations and life on earth. This paper is structured in six parts.

After a brief introduction and a contextualization of the different use of 'sustainable peace', part 2 offers a definition of 'sustainable peace' facing the challenges of the Anthropocene, part 3 refers to the new agency ('we are the threat'), while part 4 addresses a possible process of building sustainable peace not only in the realm of foreign and defence, but most particularly in the areas of economic and environmental policies and part 5 discusses policies, strategies and measures aiming at sustainable development and sustainability transition to counter two new human security threats of a) the possible security implications of climate change and b) of resource conflicts (on access to and control of oil, gas and coal). The chapter concludes as to whether strategies and policies of sustainability transition may contribute to the realization of the goal of a 'sustainable peace' in the Anthropocene

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5. Policies, strategies and measures aiming at sustainable development and sustainability transition
6. Counter possible security implications of climate change
7. Counter resource conflicts (access & control of oil, gas, coal).
8. Strategies & policies of sustainability transition contributing to the goal of a 'sustainable peace' in the Anthropocene

1. Changing Global Contexts: 1914 & 2014

Historical times & turning points of human & earth history

Fernand Braudel (1946): 3 historical times: events, conjunctures (repeating cycles) & long-duration (geographic time)

- **Events (short-term):** Single events (without major contextual changes) or Structure or context changing events: e.g. 11 Sept,2001: for USA - globally?
- **Conjuncture (medium term):** Business cycles & presidencies (4-6 years)
- **Structural (long-term):** Political revolutions, change of **international order**

Brauch (2012): very long times in human & earth history

- **Macrostructural:** Technical revolutions: agricultural, 1st, 2nd, 3rd industrial revolution
- **Geological Time** (periods of earth history): Holocene->Anthropocene

My thesis: Through Impacts of the Industrial Revolution: we - as part of humankind - have triggered a change in human history from the Holocene to the Anthropocene (Crutzen).

1.2 Structural structural turning points

- **Major macrostructural (very long-term) turning points:**
  - **Neolithic or agricultural revolution**: 10.000 to 6.000 years BP
  - **First industrial revolution**: energy (Watts: steam engine: fossil fuel: coal)
  - **Second industrial revolution**: communication (Edison: electricity, transportation: Daimler/Benz: cars, tanks, aircraft, ships, supertankers, container ships)
  - **Third industrial revolution:** IT revolution (computers since 1940s, 1980s, 1990s etc.)
  - **Fourth industrial revolution:** decarbonization of the energy sector & industry: resulting from a **sustainability transition (achieving sustainable development)**
- **Macrostructural turning points in international order**
  - **French revolution (1789): order of Vienna (1815)**
  - **Russian revolution (1917), WW I and order of Versailles (1919)**
  - **World War II (1939-1945): order of Yalta & San Francisco (1945)**
  - **End of Cold War and peaceful transition (1989)**

1.3 Context of 1914: Start of World War I & Turning Point of World History

- **Results: First Major World War:**
  – Impact of industrial revolution:
  – **Industrialization of warfare & total mobilization**
  – 20 million people died
- **Geopolitics and Geo-Economics**
  – Collapse of Empires: Russian, Austrian, German and Turkish Empire
  – Rise of revisionism: Japan, Italy, Germany
  – Rise of ideological competition: USA vs. USSR
  – Rise of Fascism and National Socialism
- **Failure of a Peace Order of Versailles (1919)**
  – Of three security visions & practice
  – Wilsonianism: Make World Safe for Democracy
  – Hobbessianism: Punish & Humiliate the Looser
  – Pragmatism and Appeasement
- **Missed Opportunities**
  – US Isolationism and Anti-Wilsonian Backlash
  – League of Nations: Weak Instruments and Lack of Inclusion: Soviet Union & Germany
  – Franco-German Reconciliation of late 1920s
  – Peace Research: Q. Wright, Richardson emerging in 1930s and 1940s

1.4 Context of 1989: Peaceful Transition

- **Results: First peaceful transition but emergence of new wars**
  - Peaceful collapse of the Soviet Union and disintegration of the Warsaw Pact
  - Peaceful dissolution of the Soviet Union
  - Violent disintegration of the Yugoslav space and of Serbia: 7 countries
  - Ethno-religious conflicts and Asymmetrie wars: terrorism etc.

- **Geopolitics and Geo-Economics**
  - **Collapse & disintegration**: Soviet Union, Yugoslavia, Czechoslovakia
  - **Globalization of financial flows & organized crime** (beyond national control)

- **Failure of a Peace Order of 1989:**
  - **No peace dividend**: no disarmament: rather new global arms build-up
  - **No strengthening of collective security systems**: UN, OSCE vs. NATO

- **Social construction of global environmental change**
  - World Earth Summit (1992) – turning point: COP 15: Copenhagen (2009)
  - Climate laggards: Australia (18.8), USA (16.4), Canada (16.0), Japan (10.4).

- **Missed Opportunities among major democracies**
  - Dominance of old military thinking (Hobbesian geostrategy)
  - Dominance of business as usual: short-term economic interest
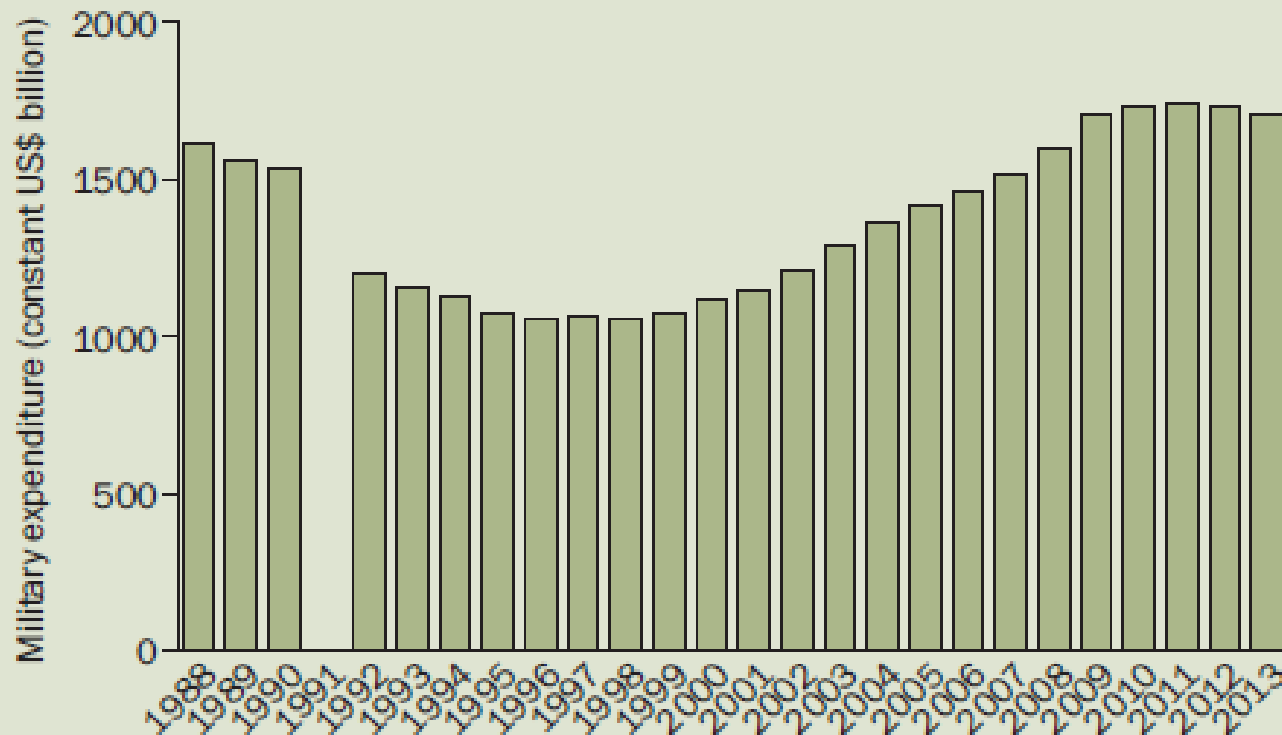
1.5 SIPRI Yearbook 2014

sipri

Figure 1. World military expenditure, 1988–2013

Note: The totals are based on the data on 172 states in the SIPRI Military Expenditure Database, <http://www.sipri.org/databases/milex/>. The absence of data for the Soviet Union in 1991 means that no total can be calculated for that year.
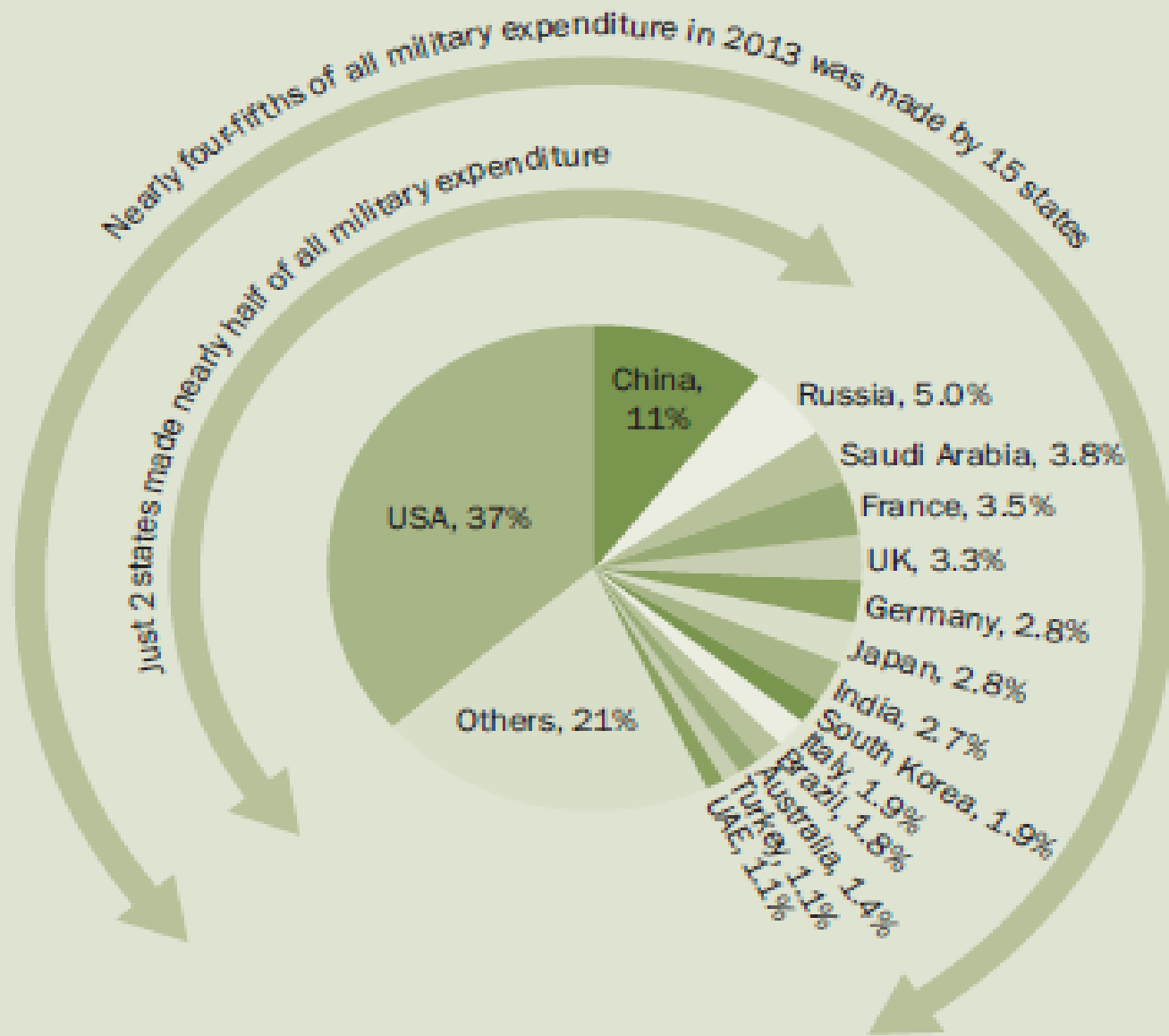
Figure 2. The share of world military expenditure of the 15 states with the highest expenditure in 2013

1.6 SIPRI YB 2014

1.7 Context of 2014: Another 1914, 1947?

- **Old and New Violent Conflicts:**
  - Multi-ethnic Ukraine: Start of a new Cold War (?) or geostrategic shift
  - Regime conflict Syria & ethno-religious conflict: ISIS & Iraq,
  - Territorial annexation of Krim (2014) and occupation (1976) : Palestine Occupied Ter.
  - Mexico: Drug war & organized crime
- **Ineffective Crisis Management & Conflict Prevention**
  - Lack of sensitivity, influence, institutions & diplomatic skills
  - Ukraine: economic sanctions but no military actions
  - Challenge of territorial integrity & occupation of territory (no sanctions)
  - Dominance of Hobbesian thinking & spying on friends (NSA, CIA, DIA in Germany)
- **Geostragegic & Geoeconomic counterstrategy**
  - Russia, China, Cental Asian countries: Military, energy & economic cooperation
  - BRIC & BASIC countries: Challenging World Bank and IMF: independent institutions
- **Failure to Recognize & Respond to Challenges of the Anthropocene**
  - Dominance of short-term economic interests: in USA, Canada, Australia, Japan
  - **Lack of political opportunity, will & courage**:
  - **COP 21 (of UNFCC) in 2015 in Paris:** A new post Kyoto Regime?
  - **Alternative:** Series of unilateral sustainability transition processes (e.g. in energy, production, transportation, agriculture, housing etc. towards decarbonization?

1.8. Sustainability Transition: War vs. Peace

- **Past transitions resulted in higher forms of killing & warfare**
  - **Neolithic & agricultural revolutions:** emergence of settlements, towns, cities, kingdoms: violent power conflicts (wars)
  - **First & second industrial revolutions:** total mobilization, industrialization of warfare (WW I, WW II) and of genocide
- **Sustainability transition as a threat?**
  - For special interests: fossil energy sector: coal, oil, gas, nuclear
  - Mining interests, pipelines, road & car lobbies: „tar sand" & „coal"
  - Discredit messenger (IPCC) by attacking the message: climate change
  - Trade Unions of old industries (coal) as allies.
- **Possible Peace Dividents of a Sustainability Transition?**
  - Reduction of dependence on coal, oil & gas imports?
  - Reduction of conflicts over the control of oil (resource war)
  - Requires a combination of unilateral national steps and sustainable & lasting international agreements (multilateral framework) in the economic, energy, environmental sectors

2. 'Sustainable Peace': Facing Challenges of the Anthropocene

- **Galtung** distinguished:„negative vs. positive peace", coined „cultural peace" & **Oswald** added „engendered peace

- **„Peace with nature" or „sustainable peace"**: underdefined normative goal used by some UN bodies (e.g. in Africa) and humanitarian NGOs (post conflict) and a few peace scholars.

- **Peace ecology in the Anthropocene** or '**peace ecology quintet'**: 5 pillars: **peace, security, equity, sustainability and gender**.

- For linkages between peace and security: '**negative peace**'

- For relationship between peace & equity: '**positive peace**'

- For interactions: peace, gender & environment: '**cultural peace**'

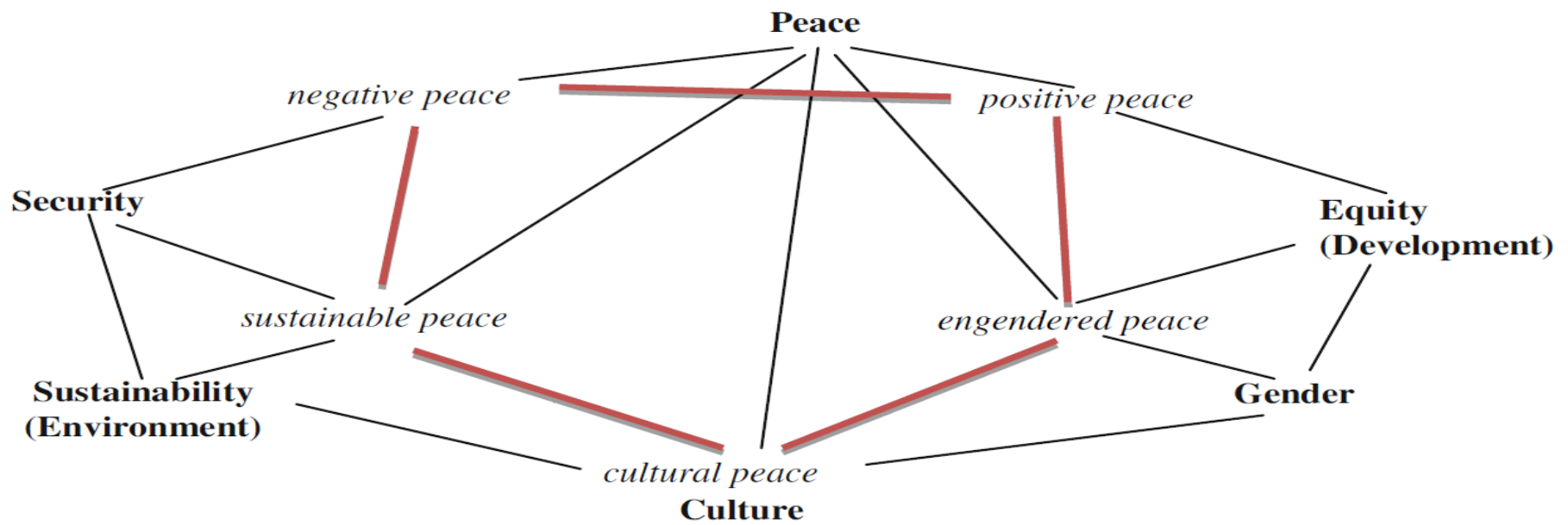- For relations of peace, equity & gender: '**engendered peace**.'

Fig. 1.1 Five pillars of peace ecology and their four linkage concepts of negative, positive, cultural and engendered peace. *Source* The Authors

Sustainable peace refers to the manifold links among peace, security and the environment, **where humankind & environment as 2 interdependent parts of global Earth face the consequences of destruction, extraction and pollution.**

The **sustainable peace concept** includes also processes of recovering from environmental destruction, reducing human footprint in ecosystems through less carbon-intensive, and in the long-term possibly carbon-free & increasingly dematerialized production processes, so that future generations may still be able to decide on their own resources & development strategies.

# 3. We are the Threat!
We are the Victims!

3.1 We are threatening survival of humankind!

- In classical conflict analysis: **we vs. them**: the „other" is the attacker – „we" are the defender.
- This is fundamentally changing in the Anthropocene
  - Since **1st industrial revolution** for first time **humankind (we)** have directly interfered into the earth system
  - **Cause of the threat**: our burning (consumption) of coal, oil and gas for agriculture, industrial production, housing (heating & coooling), transportation & consumption
  - **We are the threat** with our **ecological footprint**
  - **We are the victims of natural hazards (storms, floods, landslides, droughts, forest fires, heat waves etc.**
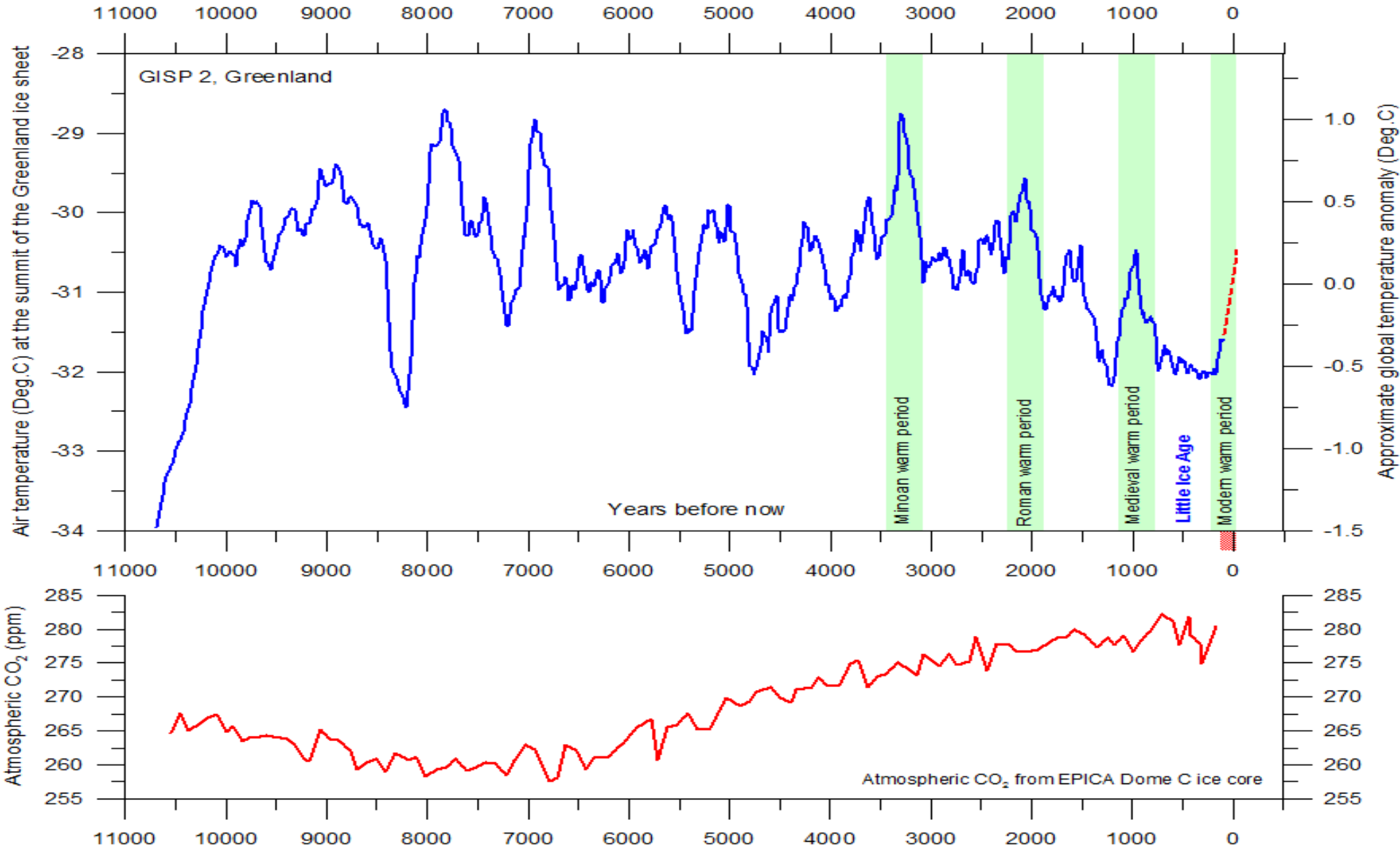 - **„We" differ in North (climate laggards) & South: equity**

3.2 Geological Time: Earth History
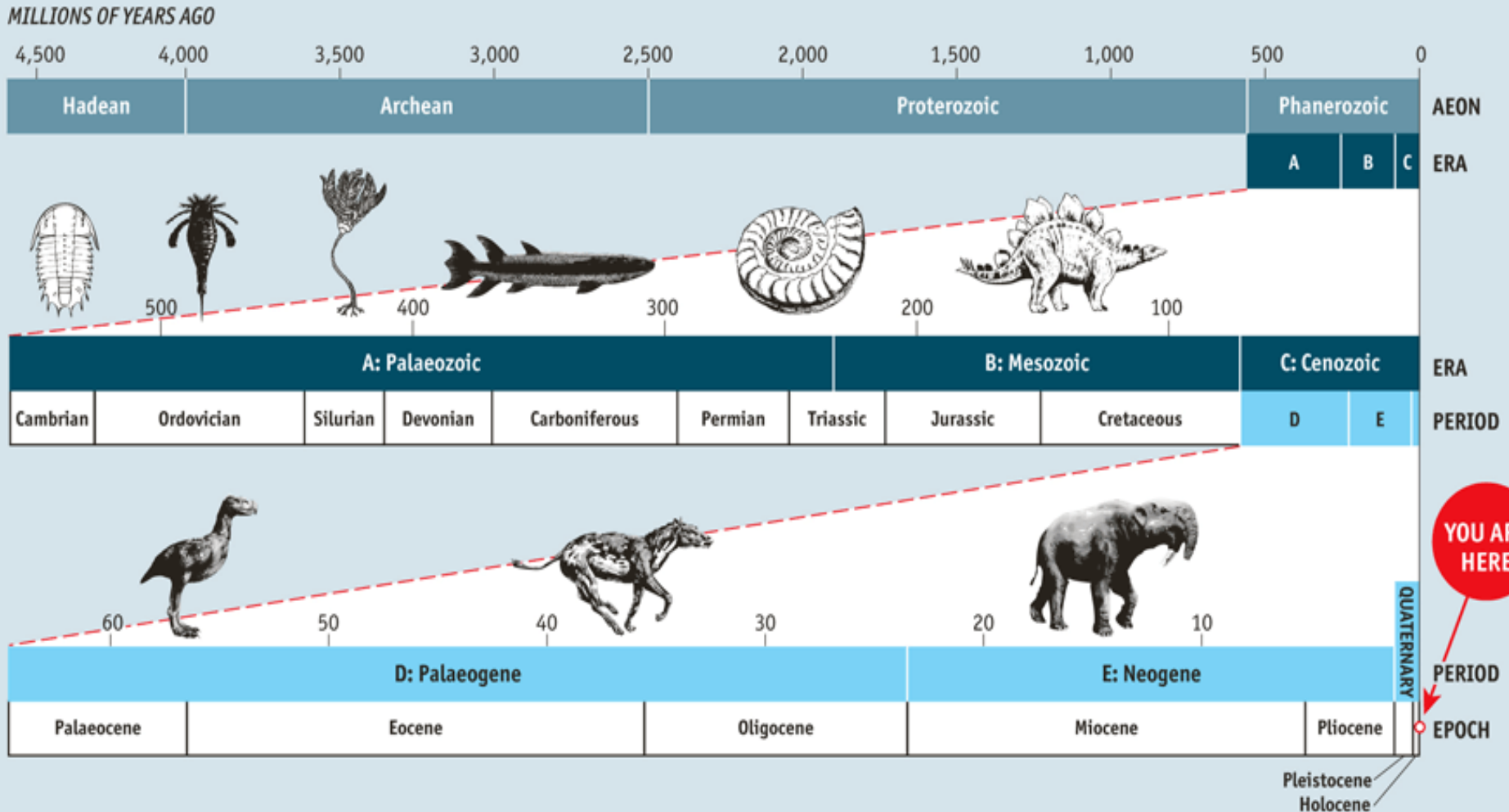
1.4. Geological times:
400 000 years of climate history
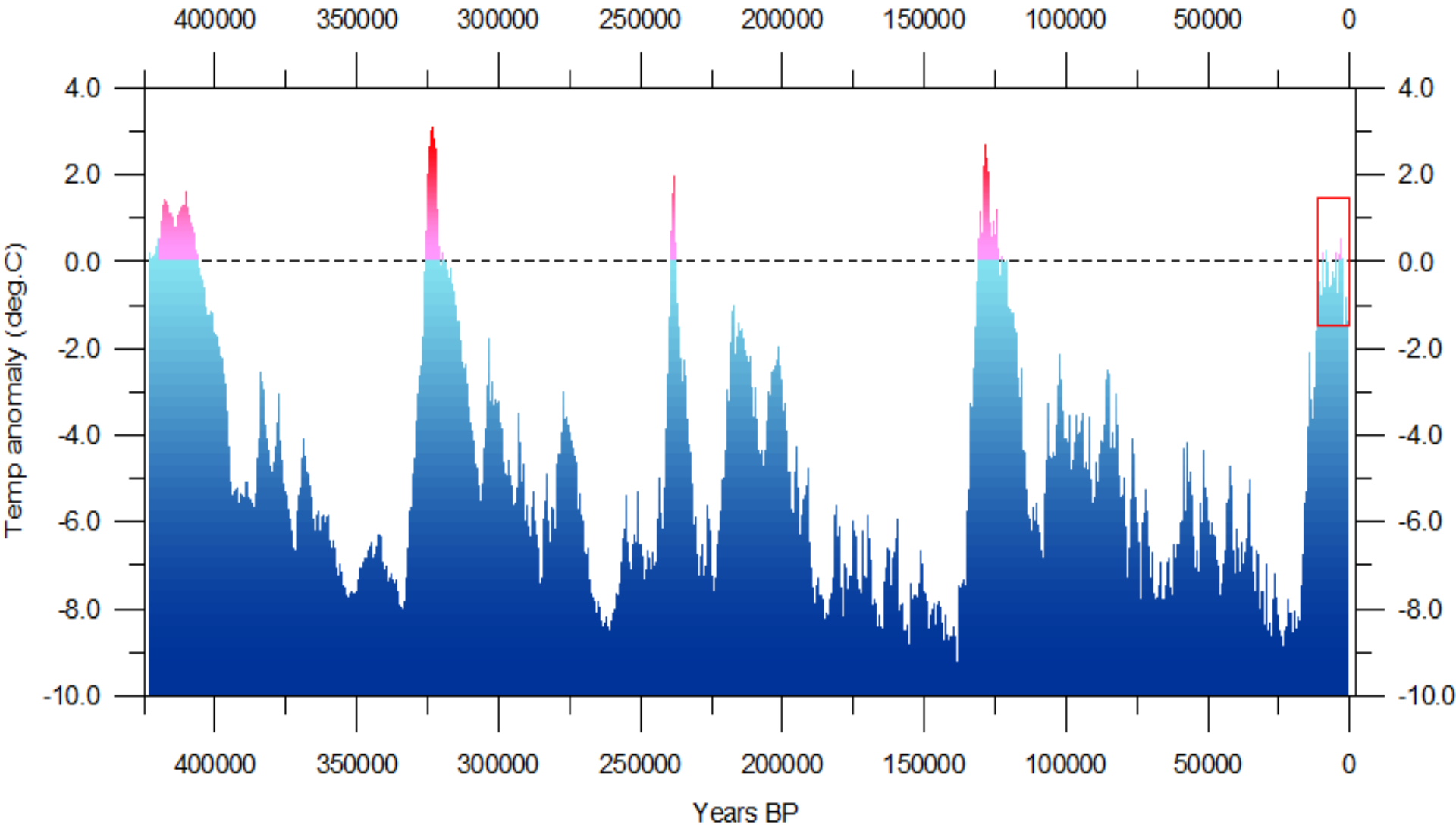
3.3. The Holocene (11600 BP-now)
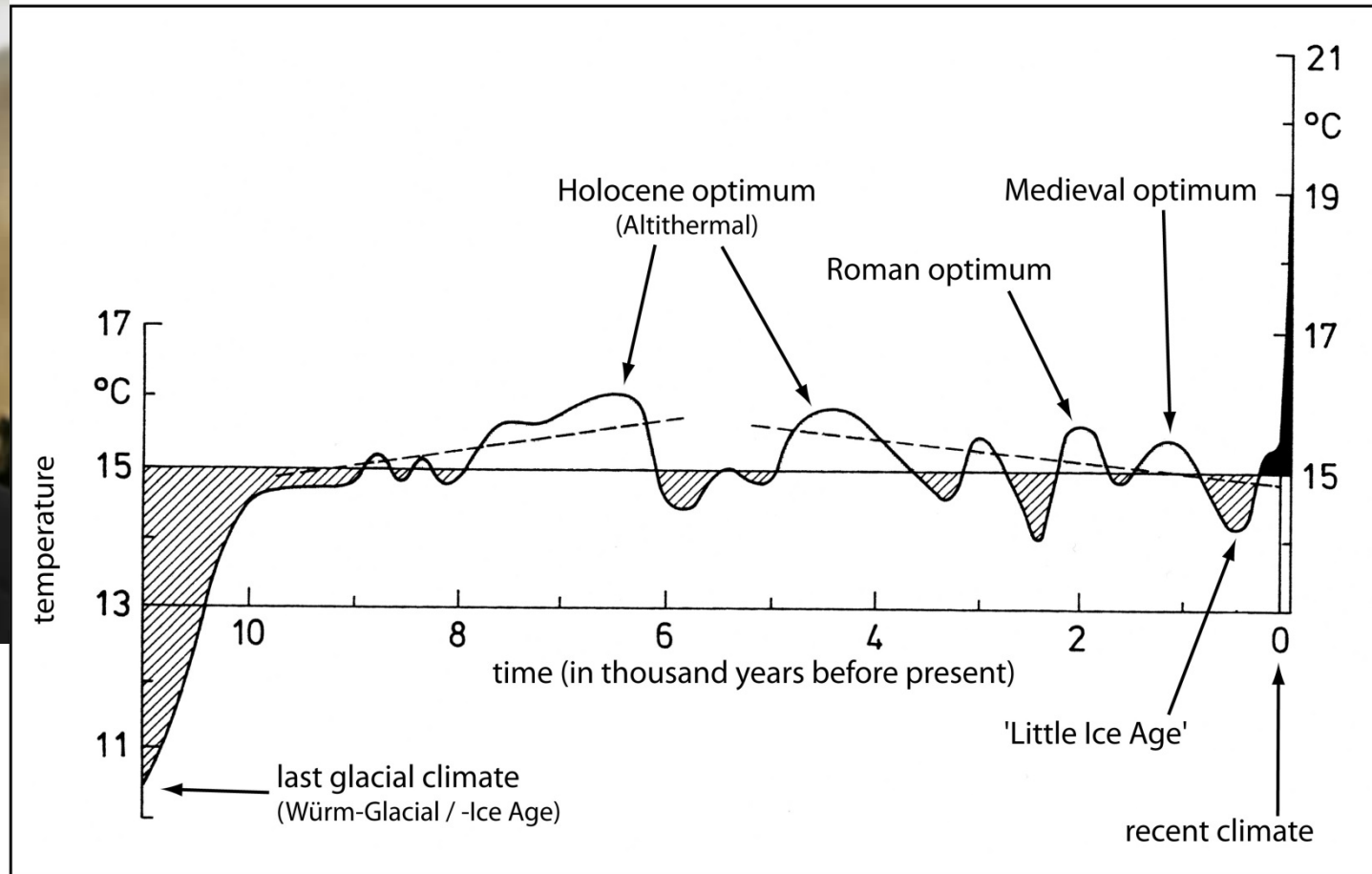
3.4. From the Holocene (12.000 years b.p.) to the Anthropocene (1784 AD)

Paul Crutzen, Nobel Laureate for Chemistry (1995)

In Geology/geography: **Holocene** era of earth history since end of glacial period (10-12.000 years ago, Anthropocene, since industrial revolution (1784, J.Watt's invention of steam engine: anthropogenic climate changte: burning of coal.oil,gas➔GHG increase

3.5. Anthropogenic Climate Change in the Anthropocene Era (1750 to 2012)

1958-1974 Scripps Inst. Oceanography
1974-2008 NOAA/ESRL
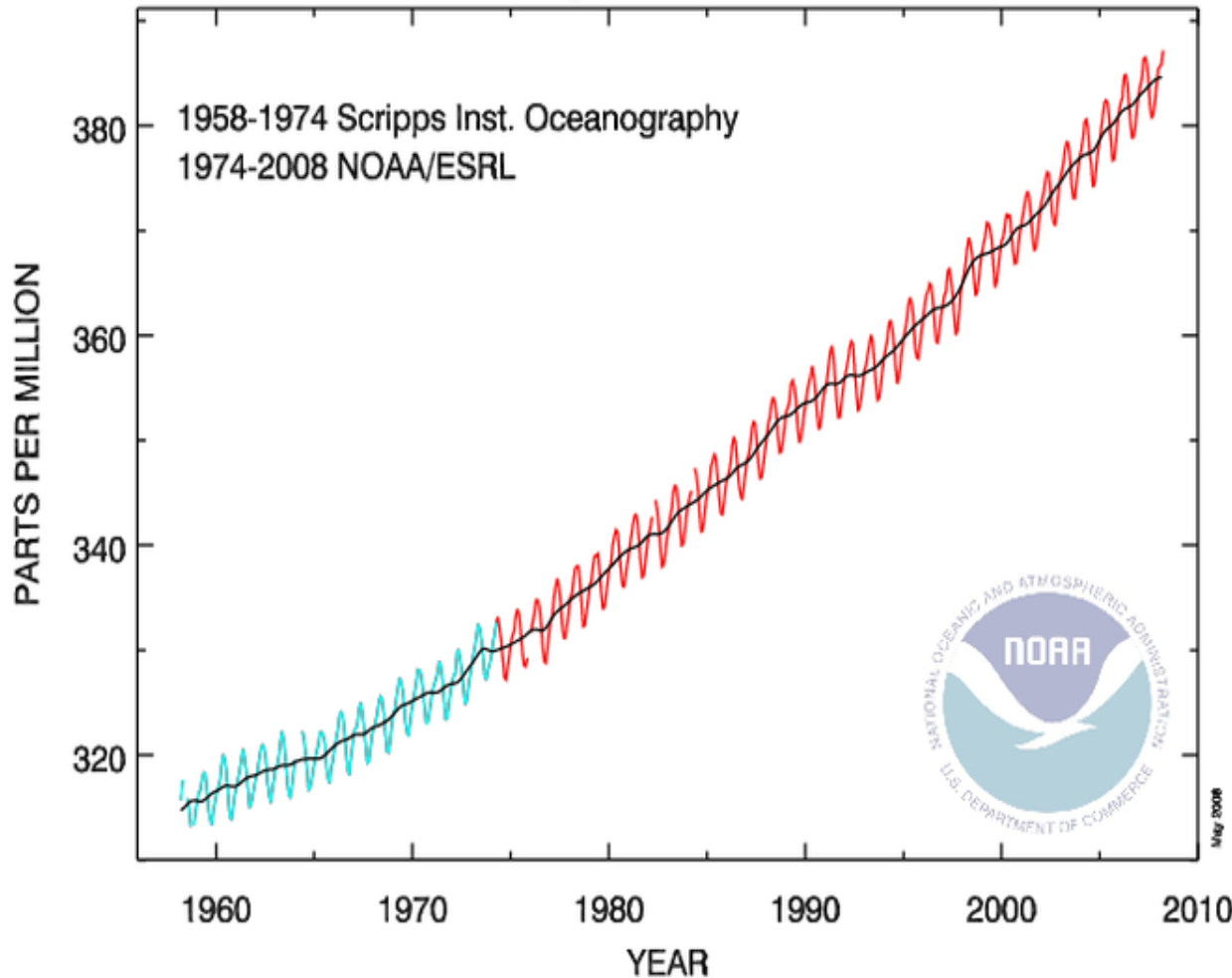
- **GHG concentration in the atmosphere**
- **1750: 279 ppm, 2013: 400 ppm**
- **1/3: 1750-1958: 279 to 315 ppm**

208 years:36ppm

- **2/3: 1958-2012: 315 to 395 ppm**

56 years:+85 ppm
10 years:+20.8ppm
1 year: ca. 4ppm

3.6 IPCC, AR5, WG 1 (Sep. 2013)

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

Observed change in surface temperature 1901–2012
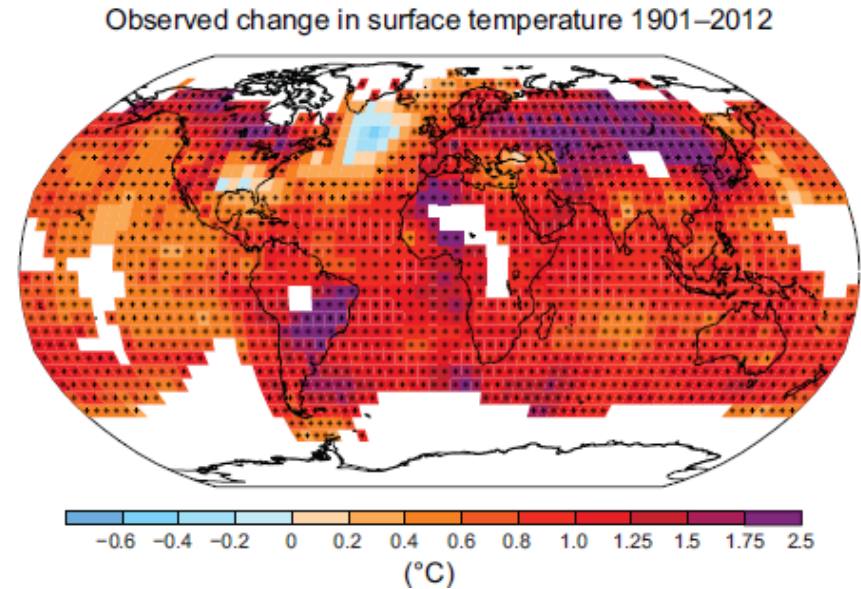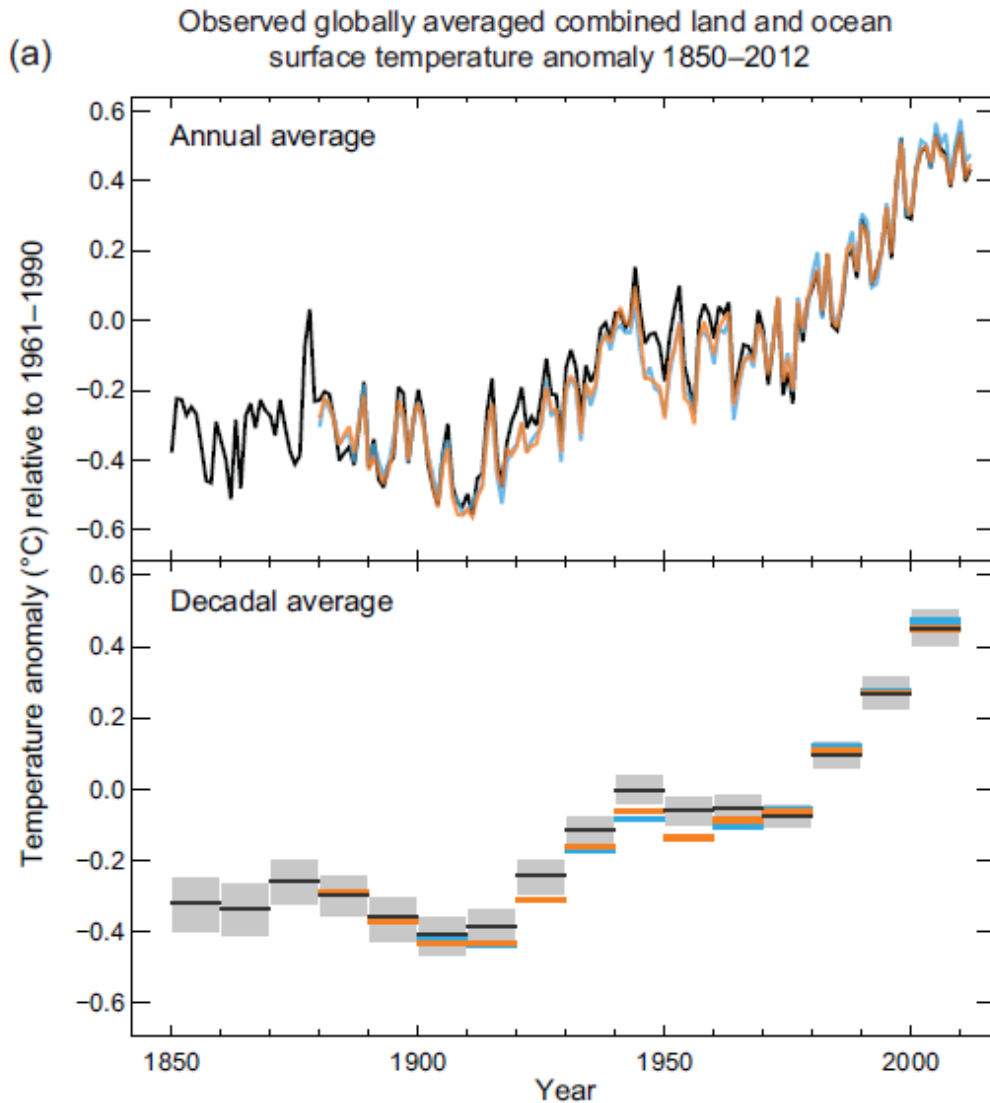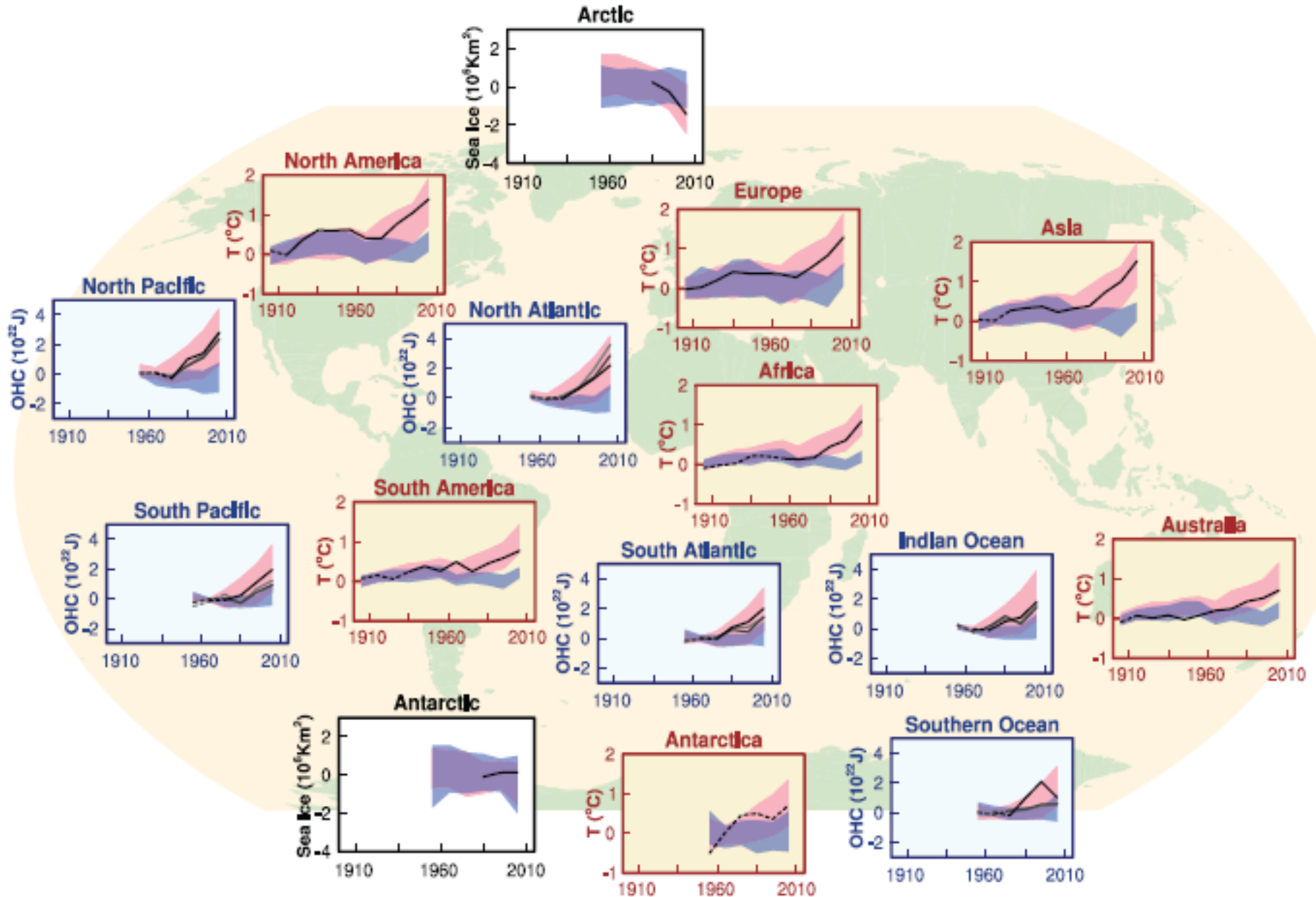
3.7 IPCC, AR5, WG 1 (2013)

3.7 IPCC, AR5, WG 1 (2013)

RCP 2.6

RCP 8.5

(a) Change in average surface temperature (1986−2005 to 2081−2100)

32

39

-2 -1.5 -1 -0.5 0 0.5 1 1.5 2 3 4 5 7 9 11 (°C)

(b) Change in average precipitation (1986−2005 to 2081−2100)

32

39

-50 -40 -30 -20 -10 0 10 20 30 40 50 (%)
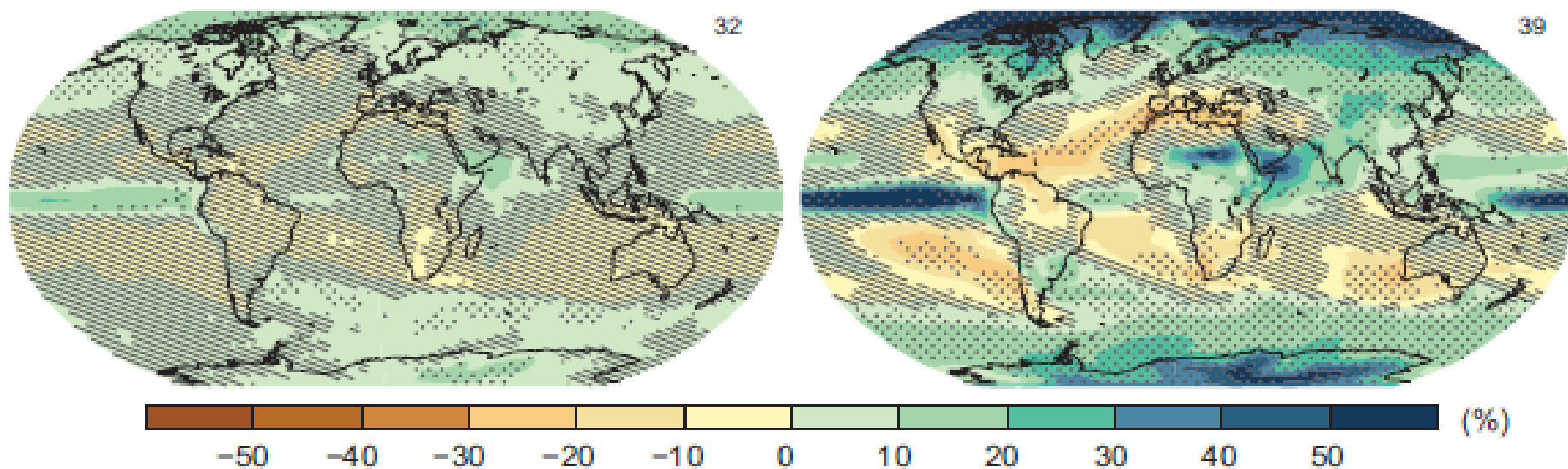
1.25 IPCC, AR5, WG 1 (2013)

Global mean sea level rise
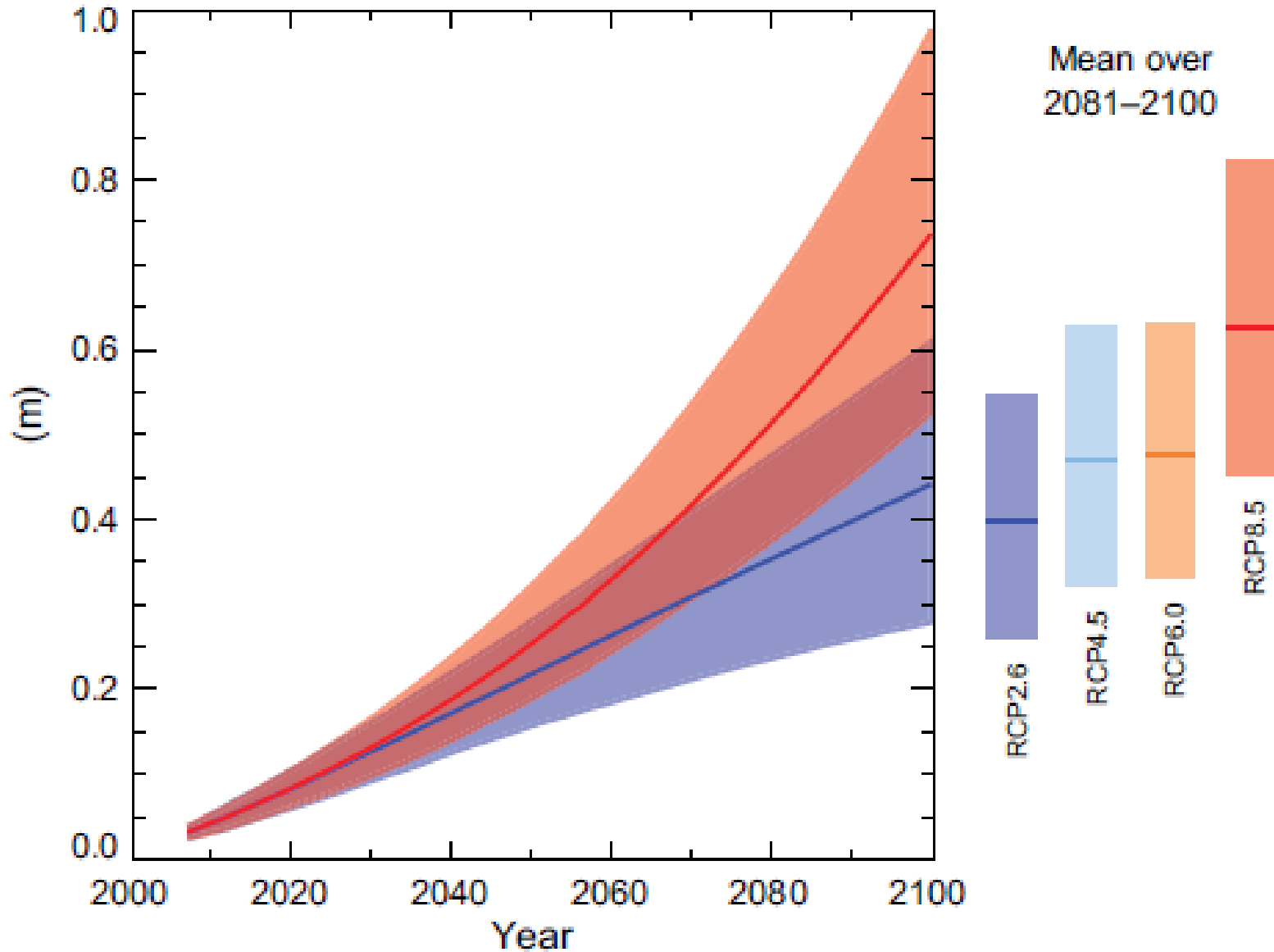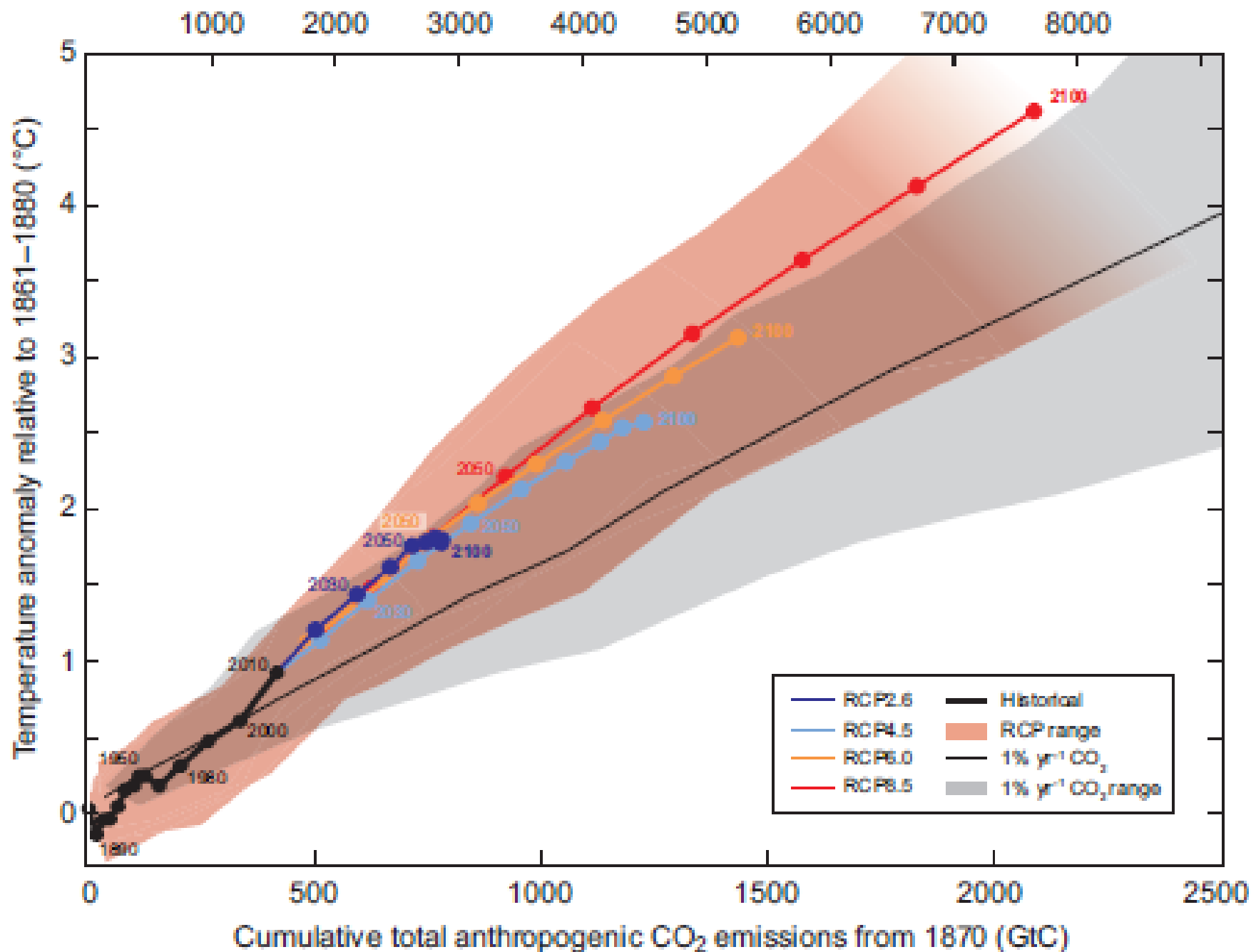
4. Possible process of building sustainable peace: not only in foreign & defence, but in economic & environment policies

- Goal of transition process: sustainable development/sustainability
  - Political Concept of Brundtland Commission (1987)
  - From Earth Systems Science: Clark, Crutzen, Schellnhuber (2004)
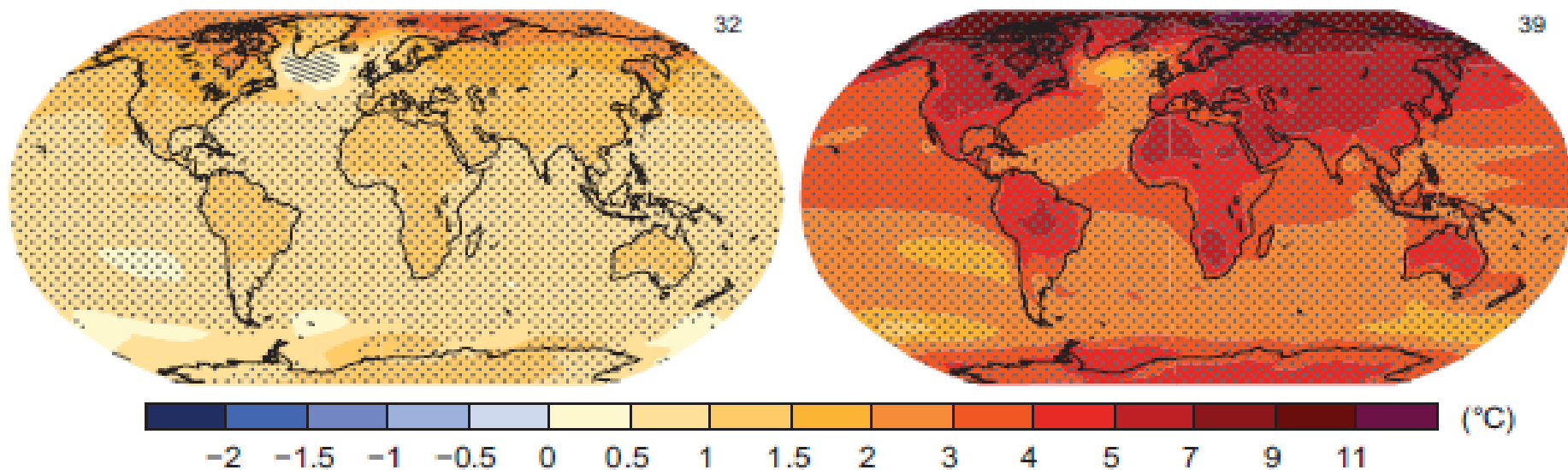   - A new Scientific Revolution (Kuhn) of Sustainability: Change of Worldview
    - A New Contract for Sustainability (Rousseau after 1789)
- **Persistent problems – e.g. economic growth = more energy use = more GHG production**
- **Why can we not do good without doing harm?**
  - Side effects of established practices,
  - … embedded in and privileged by structures
  - … that have co-evolved with these practices
- **Transition:** mutually consistent and reinforcing changes in practices and associate structures ('regime')
- **These changes** may be influenced by 'autonomous' chan-ges (the **'landscape'**) that press on (destabilize, challenge) incumbent structures and practices:

4.1. Multi-Level Perspective on Transitions: Socio-technical Approach of F. Geels

Landscape developments

Landscape developments put pressure on regime, which opens up, creating windows of opportunity for novelties

New socio-technical regime influences landscape

Socio-technical regime

Markets, user preferences

Science

Policy

Culture

Technology

Socio-technical regime is 'dynamically stable'. On different dimensions there are ongoing processes

New technology breaks through, taking advantage of 'windows of opportunity'. Adjustments occur in socio-technical regime.

Elements are gradually linked together, and stabilise around a dominant design. Internal momentum increases

Technological niches

Learning processes with novelties on multiple dimension Different elements are gradually linked together.

Time

Relies on:
- Contextual history = historiography +STS
- Evolutionary theory
- (social theory)

Three Levels:
- **Socio-technical landscape (exogen.)** present system (structures, interests, worldview) stable. E.g. market economy high carbon footprint
- **Socio-technical regime** (political realm: sciene-policy-technology-market)
- **Niche innovations** (knowledge, inven-tions, innovations)

Dynamic multilevel interaction

4.2. WBGU's Adaptation of KSI Model (Geels)

- **WBGU added Megatrends:**
  - **Earth System:** climate, biodiversity, land degradation, water, raw materials
  - **Human System:** development, democratization, energy, urbanization, food

4.3. WBGU Focus is Wider

Figure showing Social costs (y-axis) versus Decarbonisation level (x-axis), from Status quo to Complete decarbonisation.

Favourable factors
Low-carbon technology development
- Financially viable
  - Changing values towards sustainability
    - Global knowledge networks
      - Potential co-benefit of transformation

Barriers
- Path dependencies
- Tight timeframe
- Barriers obstructing global cooperation
- Rapid urbanisation
- Easily available cheap coal supply

4.4. WBGU: Transformation to a Low-carbon Society: Temporal Dynamics & Action Levels
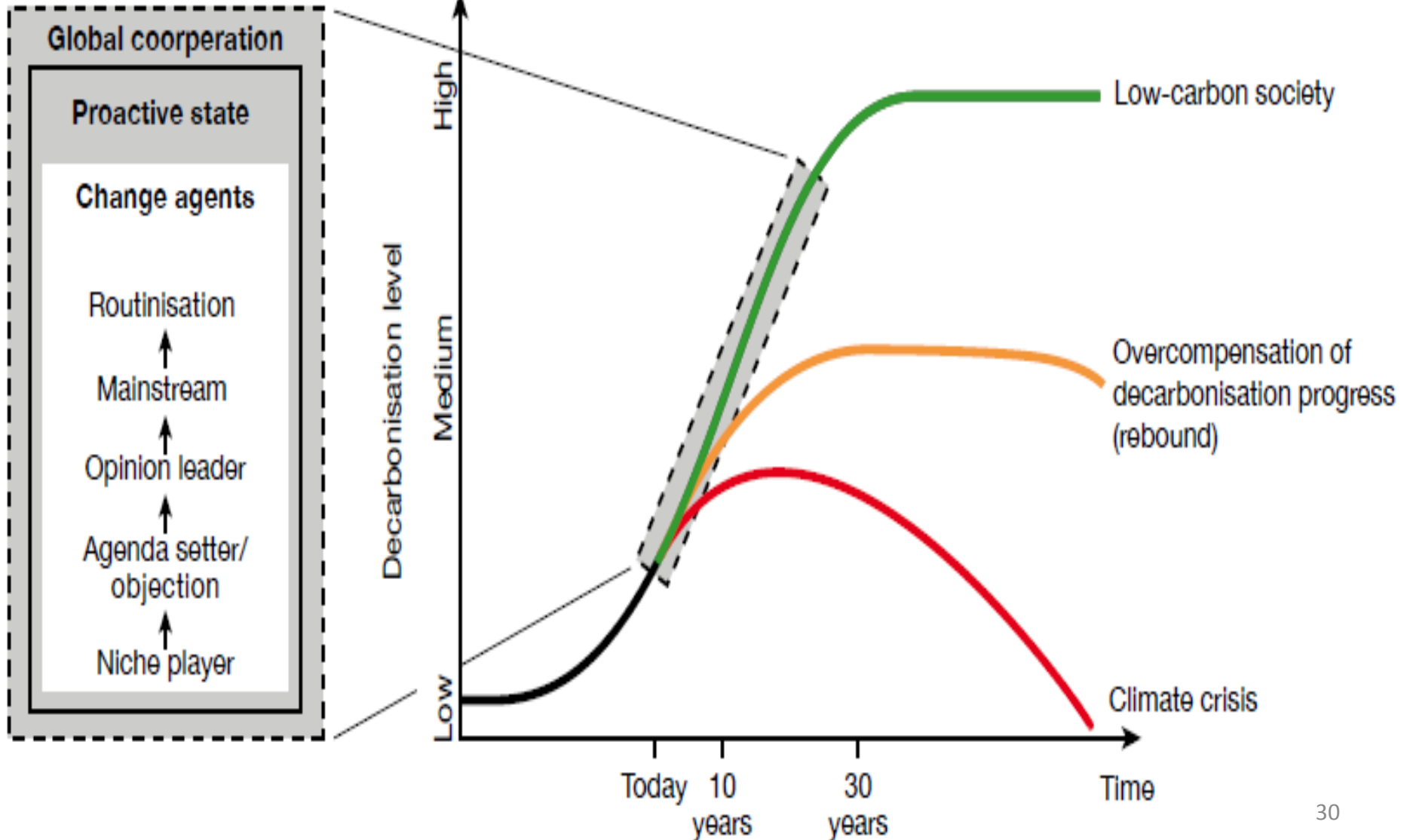
4.5. WBGU: Global Transformation of Values
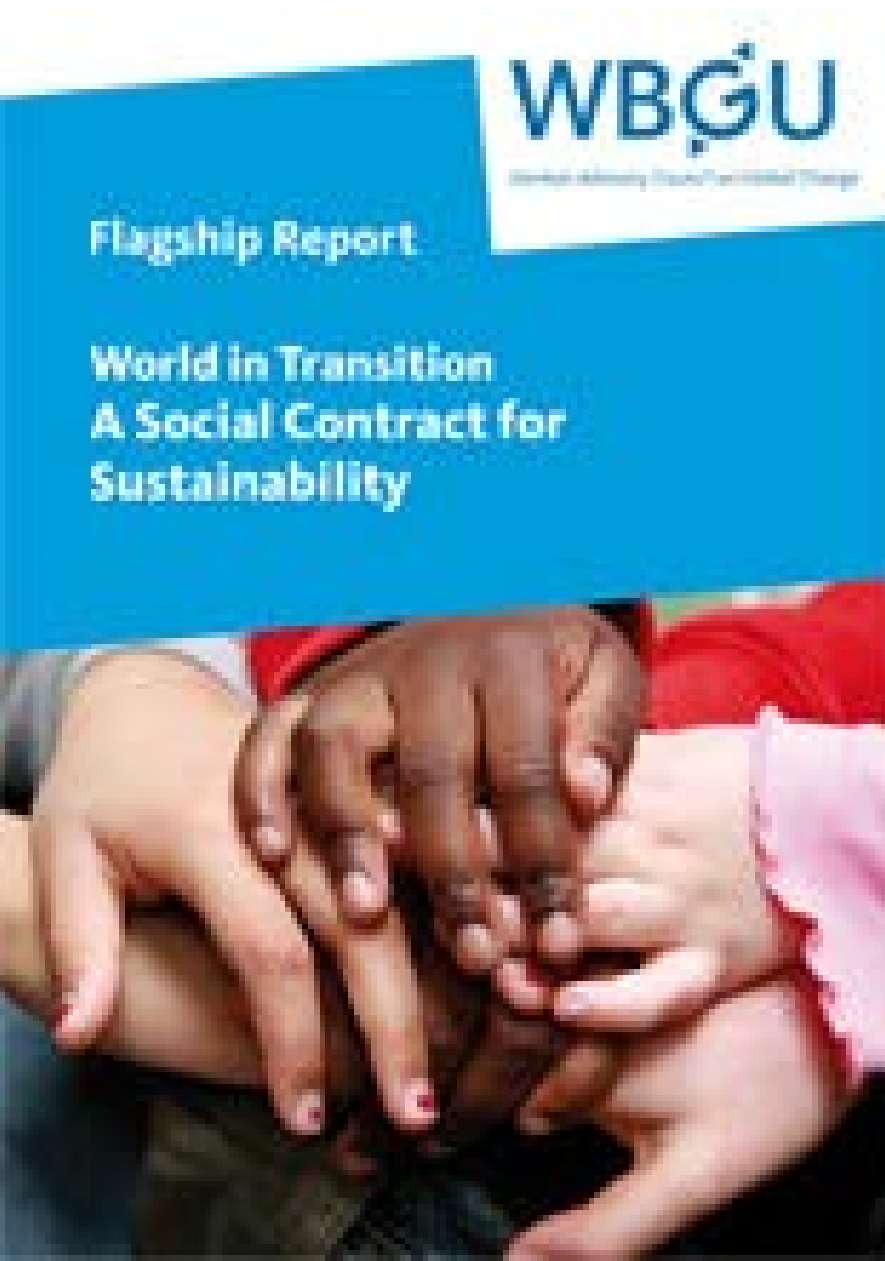
Ch. 2: Global Transformation of Values has already begun

2.1 Values & Value Change

2.2 Changing Values & Environ-mental Consciousness

- Postmaterialist values?
- Attitude to Environment & sustainability in countries & world religions
- Openness to innovation

2.3 GDP: Changing Values

2.4 Gap between Attitutes and Values

- No Longterm orientation
- Path Dependency

2.5 Share Global Transformation vision

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4.6. Theoretical Approaches to Demand Side:
Anthropology, Social Psychology, Sociology, Religion

We are the threat, the victims and may be the solution!

- **We as consumers have a different carbon footprint (2012):**

  - **Australia (18.8), USA (16.4),** S. Arabia (16.2), **Canada (16.0),** S.Korea (13.0), **Russia (12.4), Japan (10.4), Germany (9.7),** China (7.1), Mexico (4.0), Brazil (2.3), Indonesia (2.0), India (1.6) **tons CO2/cap.**

- **Are the people aware of the linkage: beteween energy consumption and greenhouse gas effects -> disasters?**

- **Focus: human values, attitudes, preferences, behaviour as consumers & voters**

- **The analysis of the demand side of sustainabiltiy transition requires the insights of scholars from many disci-plines: anthropology, social psychology, sociology, religion**

5. Policies, strategies and measures aiming at sustainable development & sustainability transition

DECOUPLING 2
TECHNOLOGIES,
OPPORTUNITIES AND
POLICY OPTIONS

- **UNEP – International Resource Panel:** We must decouple econ. growth from energy consumption and of fossil energy sources

- **EU Commission:** We must reduce GHG emissions by 20% by 2020 and by 80% until 2050 (1990 b.y.)

- **Enhancing energy & resource efficiency** (factor 4, 5 or 10)

- We must **reduce** our **individual carbon & eological footprint**

- We need: **sustainable production & consumption strategies**

5.1 Failure of international efforts

- Failure of international efforts to address, face & cope with impacts of global environmental change and global climate change
- Major industrialized & democratic countries **are unable or unwilling to comply with their global legally binding commitments** they adopted at Earth Summit in Rio de Janeiro in June 1992 with UNFCC

This failure is reflected in

- inability of the international community represented by the world of states to agree on legally binding follow-up regime to the Kyoto Protocol by end if 2012;
- in the relative failure of the Conference of Parties (COP) to the UNFCCC at
- in the failure of most G8 countries to initiate measures to implement their announced goal (2007-2011) to reduce their GHG emissions by 80% by 2050 that decided on 18-19 May 2012 at their summit in the USA not to repeat in their Camp David Declaration previous commitments;
- in the failure of the G20 meeting in Los Cabos (Mexico) on 18-19 June 2012 to adopt any legally binding agreement on financing climate change activities in developing countries in their *G20 Leaders Declaration*
- in the failure of the *United Nations Conference on Sustainable Development* (Rio+20) in Rio de Janeiro on 20-22 June 2012 to adopt any new and legally binding decisions at besides the declaratory statement: *Outcome of the Conference: The future we want*.
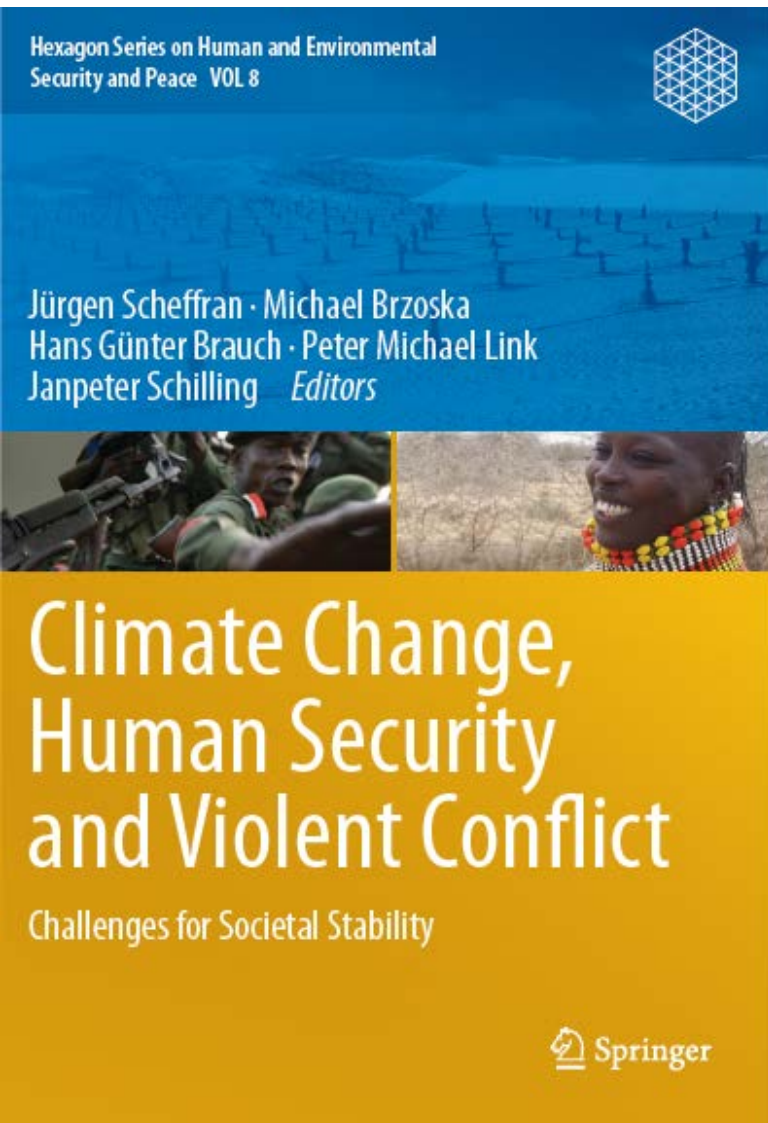- Efforts to downgrade the CO2 reduction and Renewable Energy Goals of the EU

5.2. Two Different Responses

- **This skeptical diagnosis refers to two different approaches on international security and environmental policy:**
  - a ***business-as usual policy*** that the market, economic initiatives and military power will be able to cope with its consequences;
  - a **willingness to move towards a *sustainability transition*** that requires multiple efforts to move towards a long-term transition towards sustainability.

- This is also reflected in different policy debates (see the *Report of the UN Secretary General on Climate change and its possible security implications. Report of the Secretary-General*. A/64/350 of 11 September 2009 (New York: UN) and the scientific discourses that are so far not conceptually linked:
  - on the *securitization of the impacts of global environmental and climate change* due to this international inability and a lack of political will to act in a proactive manner by postponing policy decisions to the successors and to the next generations of citizens who will have to pay the price;
  - on the need to initiate strategies, policies and measures aiming at a *sustainability transition during* the 21st century.

6. Two Debates: Climate Change & Security vs. Sustainability Transition
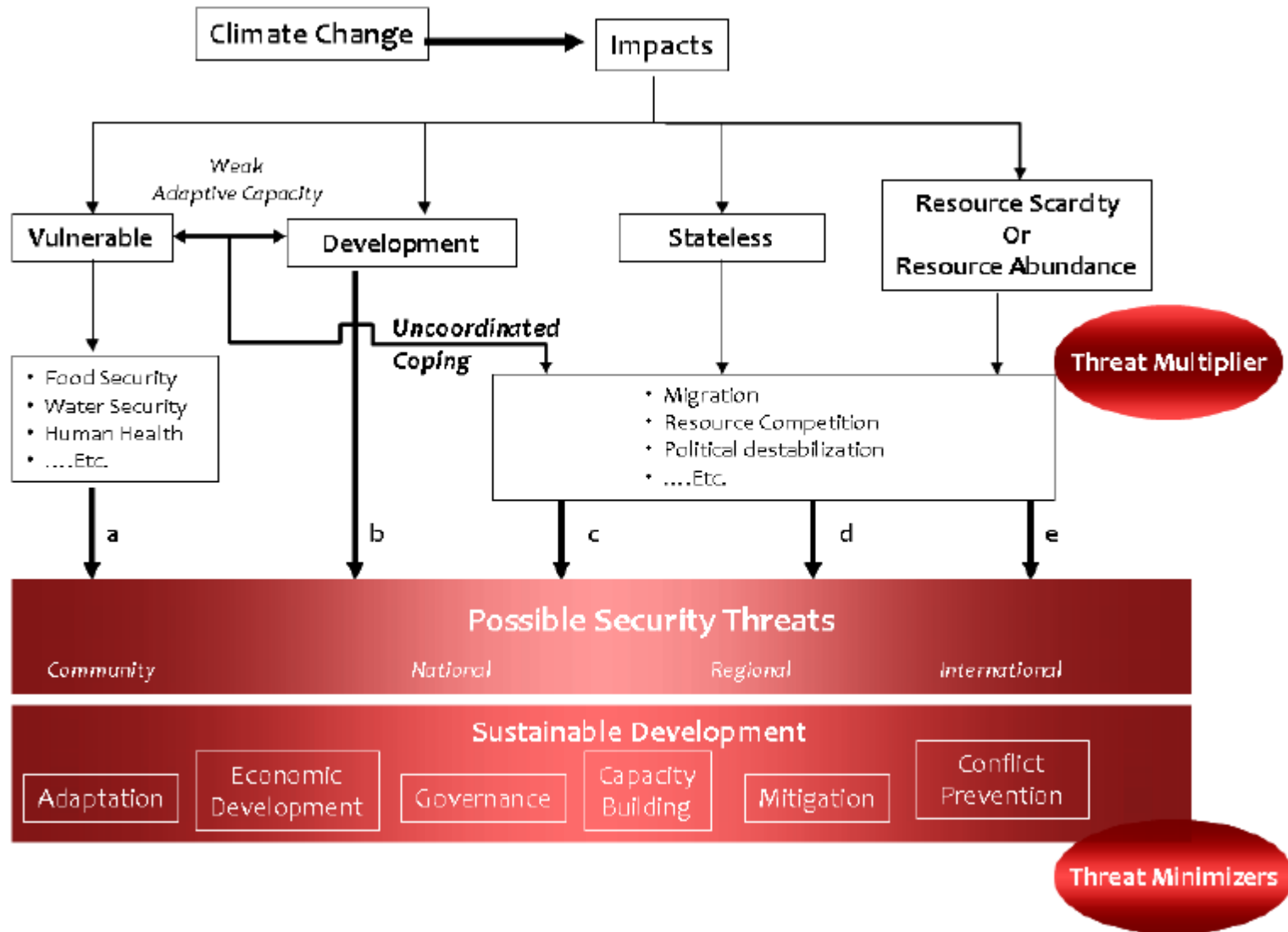
6.1. Two Policy Debates & Scientific Discourses: Climate Change & Security vs. Sustainability Transition

Hexagon Series on Human and Environmental Security and Peace VOL 8

Jürgen Scheffran · Michael Brzoska
Hans Günter Brauch · Peter Michael Link
Janpeter Schilling *Editors*

Climate Change, Human Security and Violent Conflict

Challenges for Societal Stability

Springer

First debate is primarily policy driven and evolved in framework of internat., national and human security.

Scientific discourse:

– Hamburg workshop 11/2009 (Scheffran/Brzoska/ Brauch/Link/Schilling, 2012) has been pursued from different policy and scientific perspectives and with different scientific methods.

– Trondheim workshop, 6/2010 (Gleditsch, 2012, special issue of Journal of Peace Research

S***econd debate*** is partly policy driven, (green gowth, economy by UNEP, OECD & DGs of the European Commission.

– S*cientific discourse* on sustainability transition evolved in Europe since confer. in Amsterdam (2009); Lund (2011), Copenhagen (2012) within

– *Sustainability Transitions Research Network* (STRN) & is documented in a journal on *Environmental Innovation and Sustainability Transition* (EIST) & *Routledge Book Series in Sustainability Transitions.´*

6.2. Second Debate: Sustinable development (goal) Sustainability Transition (process)

- Parallel discourse on 'sustainability transition' addresses both the causes and impacts of GEC and GCC by facing & coping with both and avoiding the projected societal conse-quences of dangerous or catastrophic climate change and of possible tipping points in the climate system.

- From this perspective the goal of 'sustainable development' and the perspective on **'sustainability transition' refer to a much wider research agenda than the relatively narrow focus on environmental and technological innovations that is a primary focus of many researchers in the STRN.**

- The process of 'transition' refers to multiple long-term evolutio-nary and revolutionary transformative changes that point to five different historical times, with different transformative results

- These must be distinguished since they have different transformative results. We may address them in 4 hypotheses:

6.3. Alternative Visions & Strategies

- **Both visions refer to totally different strategies for coping with Global Environmental Change (GEC):**
  - In the first vision of **business-as-usual,** Cornucopian perspectives predominate that suggest primarily market mechanisms, technical fixes, and the defence of economic, strategic and national interests by adaptation strategies that are in the interests of OECD countries.
  - In the alternative vision of a **comprehensive transforma-tion, a sustainable perspective** has to be implemented and developed into effective new strategies and policies with different goals and using different means, based on global equity and social justice.

6.4. Consequences of Both Visions

- The consequences of both opposing scientific visions and the competing policy perspectives are:

  - **The vision of business-as-usual** with minimal reactive adaptation and mitigation strategies will most likely increase the probability of a '**dangerous climate change' or catastrophic GEC** with both linear and chaotic changes in the climate system and their sociopolitical consequences. This represents a high-risk approach.

  - To avoid these consequences the **alternative vision and sustainability perspective requires a change in culture (thinking on the human-nature interface), world views (thinking on systems of rule, e.g. democracy vs. autocracy, and on domestic priorities and policies, as well as on interstate relations in the world), mindsets** (strategic perspectives of policymakers), and **new forms of national and global governance.**

6.5. Alternative Vision

- This alternative vision refers to the need for a "**new paradigm for global sustainability**" and for a **"transition to [a] much more sustainable global society" aimed at peace, freedom, material well-being, and environmental health**.

- **Changes in technology and management systems** alone will not be sufficient, but "**significant changes in governance, institutions and value systems**" are needed, resulting in a fourth major transformation following "the stone age, early civilization and the modern era".

- These **alternative strategies should be "more integrated, more long-term in outlook, more attuned to the natural dynamics of the Earth System and more visionary"**.

- These many changes suggested by natural scientists require a '**Fourth Sustainability Revolution**' or a comprehensive and manifold **process of sustainability transition**.

6.6. Three Obstacles & Alternative

Results of Business as Usual: The Climate Paradox

- Canada, USA, Japan and rapidly industrializing threshold countries (G-20) that account for more than 80 % of GHG emissions, have faced a **climate paradox** due to their **inability or lack of political will to implement their legal commitments or policy declarations**.
- Different performance of the climate laggards and new climate change leaders show that it is not the 'system of rule' but rather the **different political cultures in Europe and in North America that have influenced different policy performance**.

Neo-Malthusian Dead End: Securitization to Militarization

- Hobbesian pessimists, concerned about the national security implications of global environmental and climate change that are being interpreted by the dominant realist policy mindset, have used this argument to adjust their force structure and military means to be able to cope with these major challenges. From this, primarily US-focused, national security perspective on climate change, the securitization of the impacts of climate change as a force multiplier may result in militarization.

The Cornucopian Dead End of Geo-engineering

- From the opposite 'Cornucopian' perspective, the solution to the challenges posed by global environmental and climate change may be technical fixes that have been offered by those who call for macro-scale projects of geo-engineering.
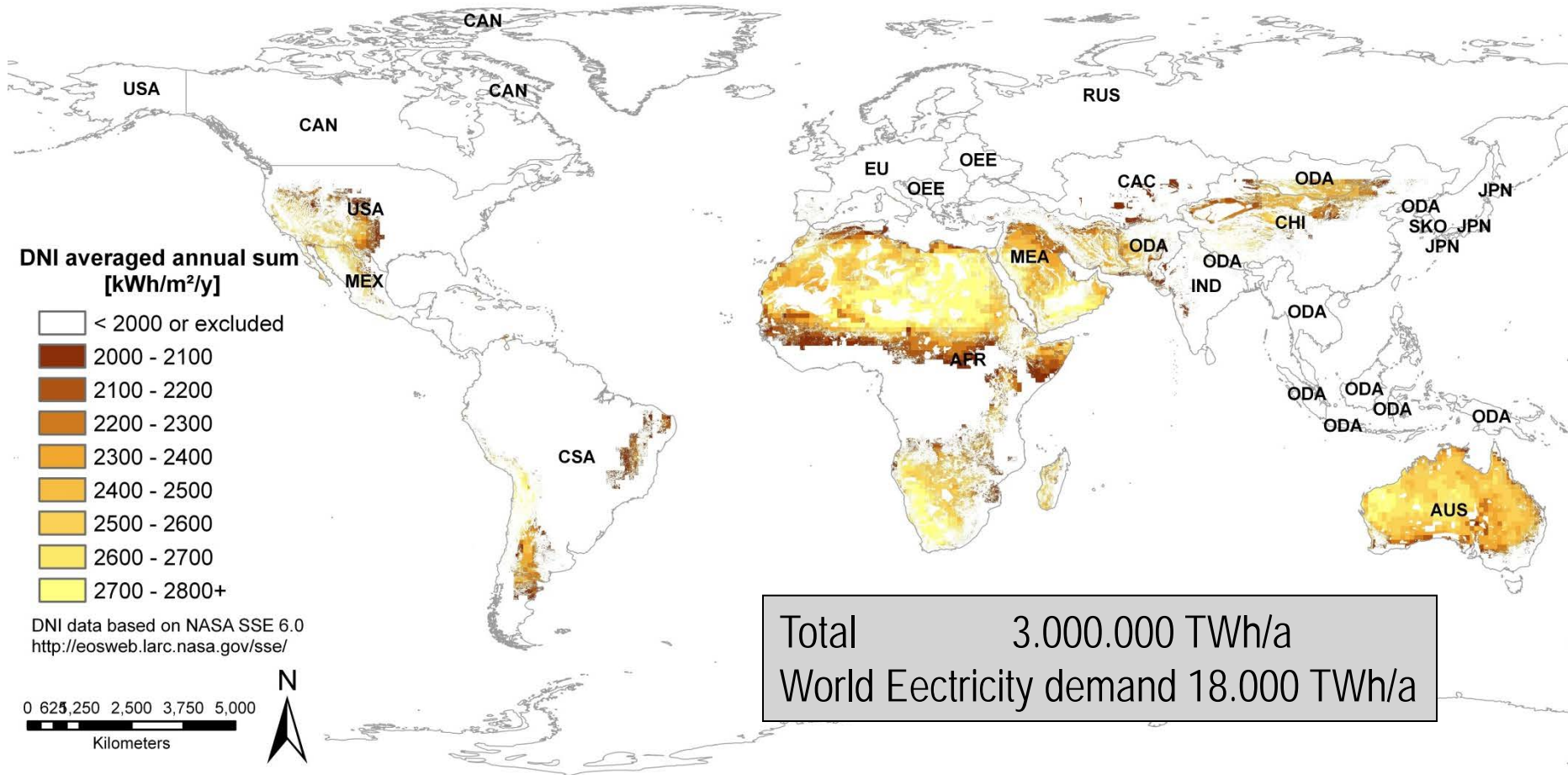
Alternative: Sustainable Development & Sustainability Transition

- **Strategies and policies of Sustainability Transition may offer a process for a decoupling of growth and fossil energy consumption for a decarbonization of our energy sector and our economies and for sustainable production & consumption**

7. Counter Resource Conflicts: Access & Control of Oil, Gas & Coal

- In 1972, a contested Report to the Club of Rome referred to the „Limits of Growth" pointing to major global resource constraints

- The debate on „peak oil" refers to limited reserves of non-renewable fossil energy sources and the model projections on an increasing use of fossil energy resources has pointed to the phsyical and societal effects of both linear & non-linear consequences of global warming

- As a decoupling of growth from energy consumption is possible with energy efficiency improvement by a factor 4,5 or 10 & a replacement of fossile with renewable energy sources, the dependence on energy imports will also gradually decline and resource (oil) wars may decline

- However, the exporters of coal (Australia), oil (Saudi Arabia) and from Tar sands (Canada) and of natural gas from fracking (in USA) these special interest groups Have financed climate sceptics & ideologues

7.1. World Potential of Solar Thermal Power Plants

DNI averaged annual sum [kWh/m²/y]

- < 2000 or excluded
- 2000 - 2100
- 2100 - 2200
- 2200 - 2300
- 2300 - 2400
- 2400 - 2500
- 2500 - 2600
- 2600 - 2700
- 2700 - 2800+

DNI data based on NASA SSE 6.0
http://eosweb.larc.nasa.gov/sse/

0 625,250 2,500 3,750 5,000
Kilometers

Total	3.000.000 TWh/a
World Eectricity demand	18.000 TWh/a

Source: Presentation Dr. Franz Trieb, 24.7.2009
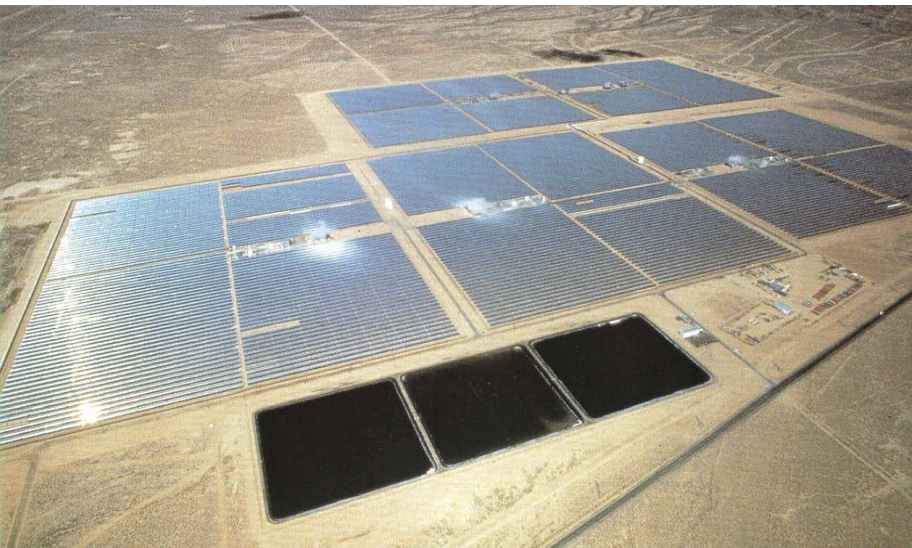
7.21 Solar Electricity Generating System - SEGS, in California, USA (1985), Spain (2009)
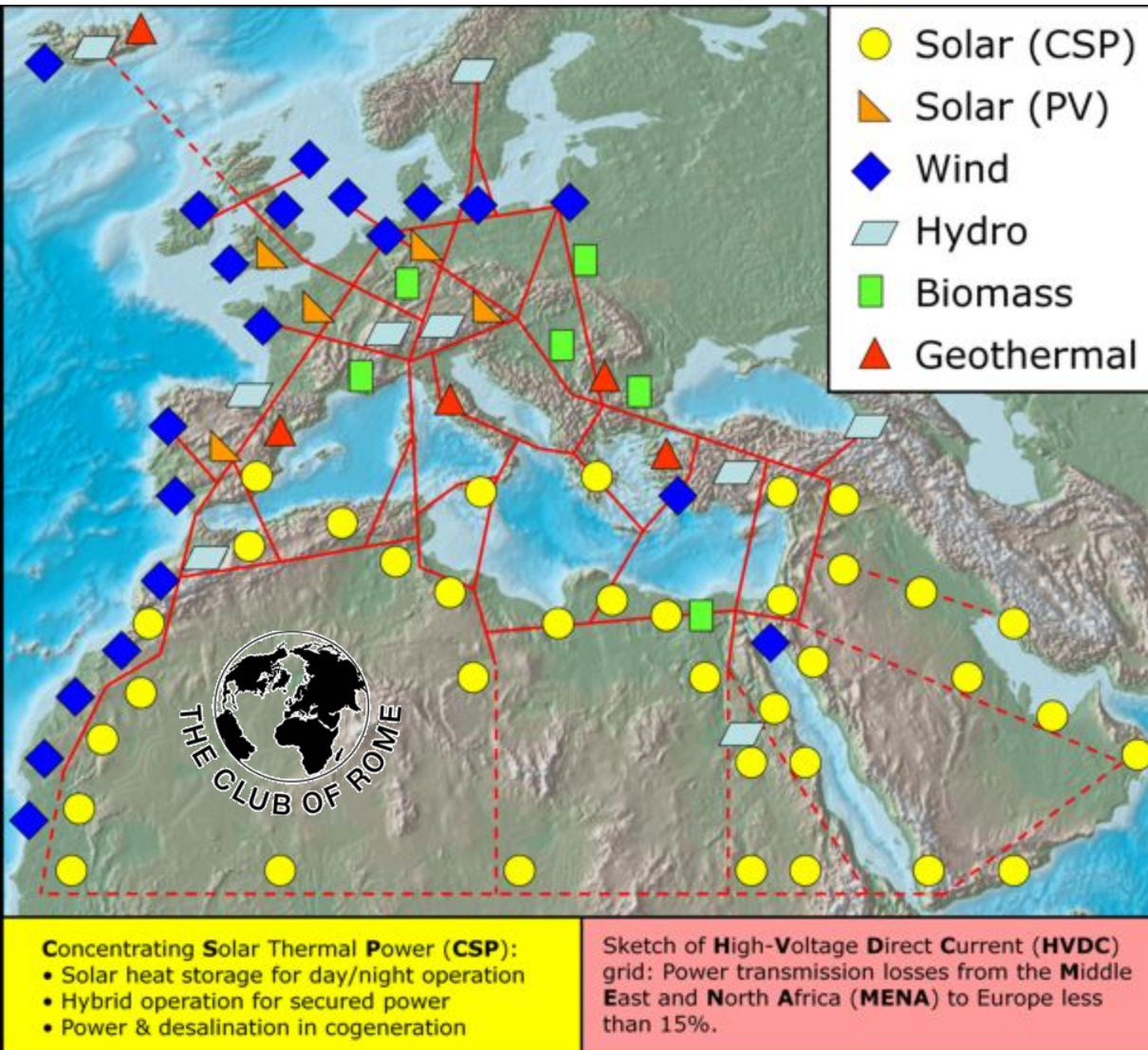

California, USA (354 MW, since 1985)

**ANDASOL 1, Guadix, Spain
(50 MW, 7 h storage, 2009)**
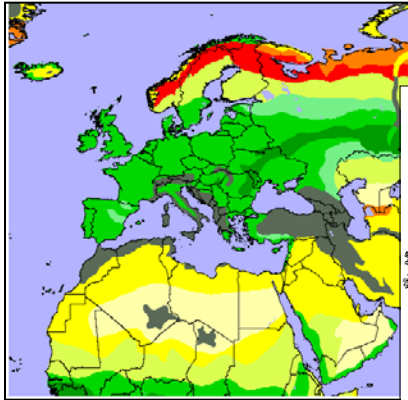
7.3. Mediterranean Renewable Energy Potential

Trans-Mediterranean **R**enewable **E**nergy **C**ooperation (**TREC**) is an initiative that campaigns for the transmission of clean power from deserts to Europe.

Since 2003 TREC has developed the **DESERTEC Con-cept**.

Legend

- ○ Solar (CSP)
- ◿ Solar (PV)
- ◆ Wind
- ▱ Hydro
- ■ Biomass
- ▲ Geothermal

Concentrating **S**olar Thermal **P**ower (**CSP**):
- Solar heat storage for day/night operation
- Hybrid operation for secured power
- Power & desalination in cogeneration

Sketch of **H**igh-**V**oltage **D**irect **C**urrent (**HVDC**) grid: Power transmission losses from the **M**iddle **E**ast and **N**orth **A**frica (**MENA**) to Europe less than 15%.

Power generation with CSP and transmission via future **EU-MENA** grid: 5 - 7 EuroCent/kWh
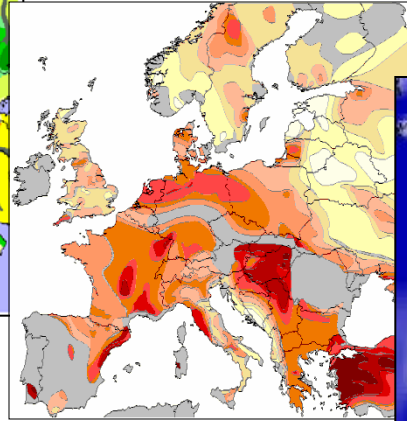Various studies and further information at **www.DESERTEC.org**

7.4. Renewable Energy Potentials in EU-MENA. Source: Trieb, Krewitt, May, in: Brauch et al. (2009)

in brackets (Electricity in GWh/km²/a)

Biomass (0-1)

Geothermal (0-1)

Wind Energy (5-50)
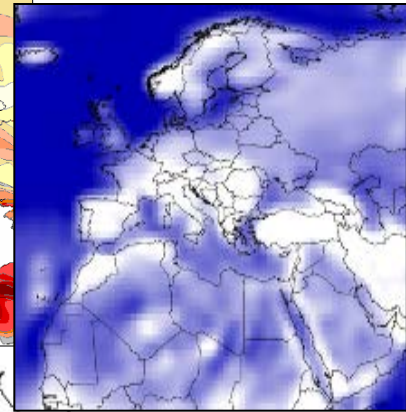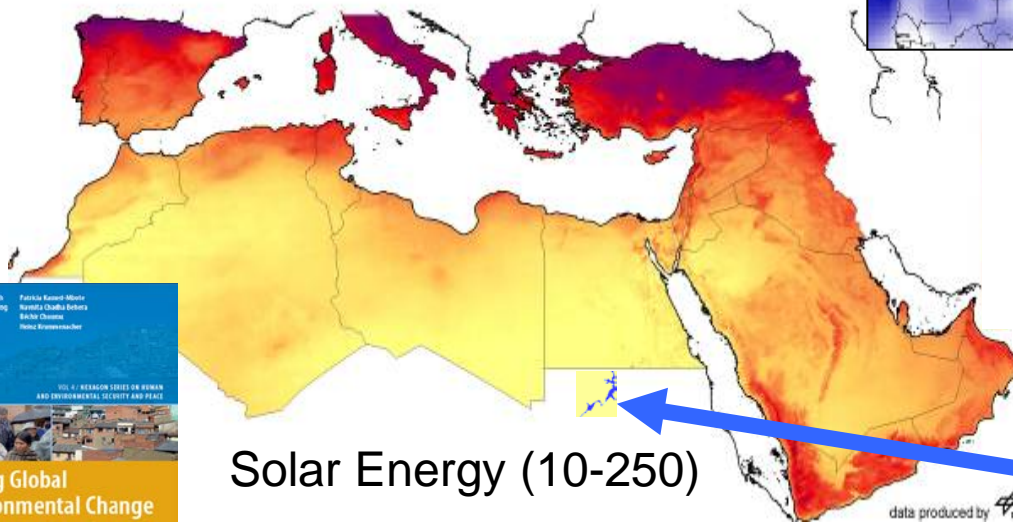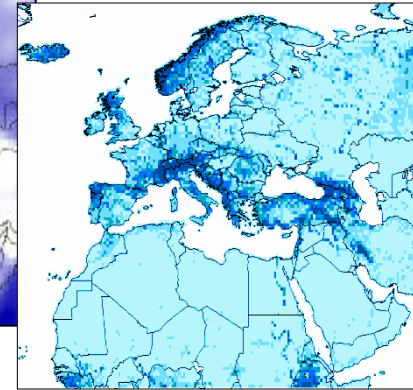
Hydropower (0-50)

A solar thermal power plant of the size of the Assuan Dam would produce 120 times as much energy, i.e. about 30% of the total European energy demand.

Solar Energy (10-250)

Facing Global Environmental Change

Environmental, Human, Energy, Food, Health and Water Security Concepts

data produced by DLR

www.dlr.de/tt/med-csp

7.5. Annual electricity demand & generation within the countries analysed in the MED-CSP scenario

Legend (map):
- Southern Europe
- Western Asia
- Arabian Peninsula
- North Africa

Chart legend:
- Photovoltaics
- Wind
- Wave / Tidal
- Geothermal
- Biomass
- Hydropower
- CSP Plants
- Oil / Gas
- Coal
- Nuclear

Y-axis: Electricity Production [TWh/a]

X-axis: Year
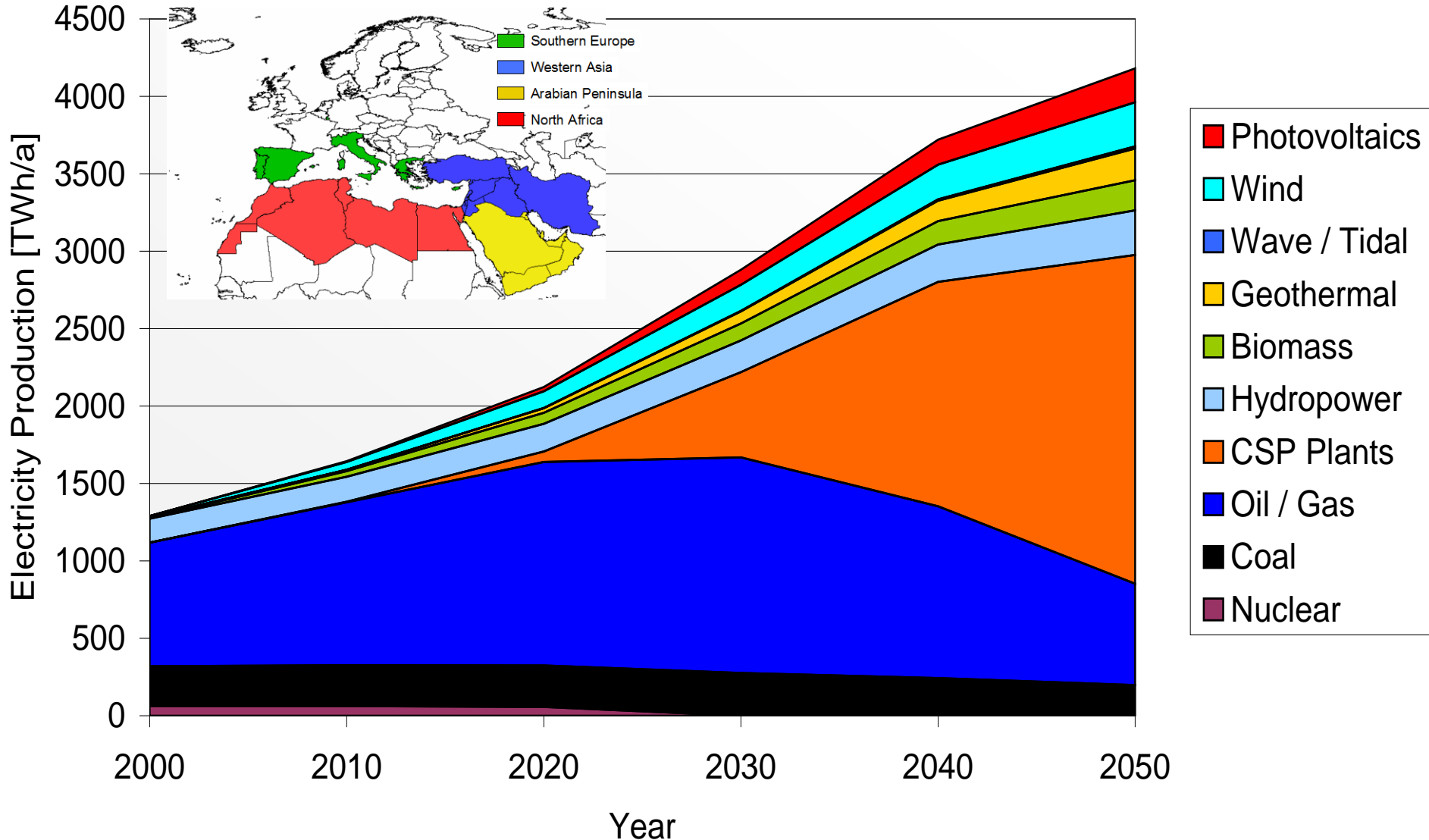
7.6. Deserts of North America

Figure 9: Deserts of North America. **Source:** "deserts of North America"; at: <http://instruct.uwo.ca/biology/320y/ namdes.html>.
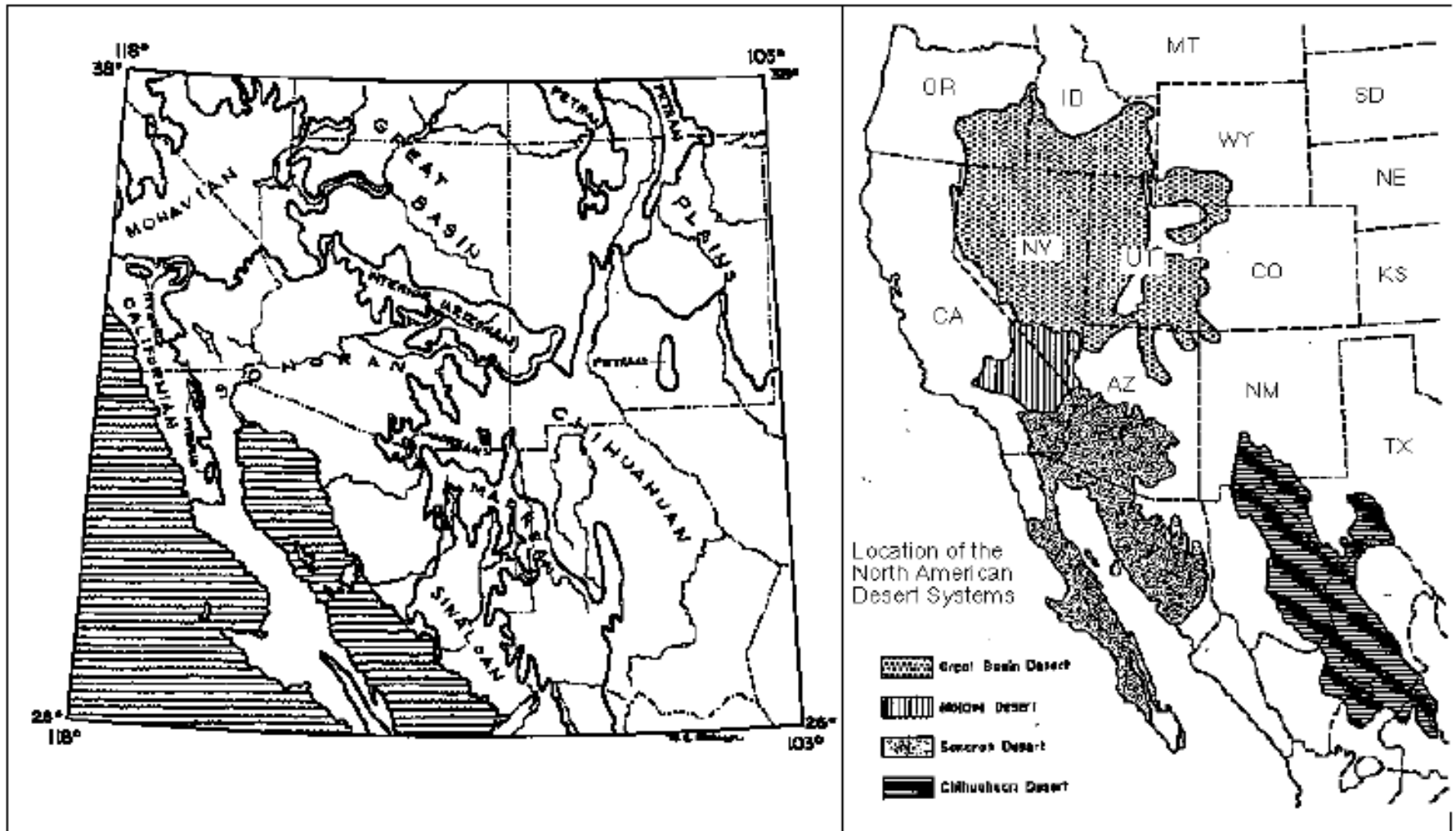
7.7. Deserts & Solar & Wind Potential of North America: USA & Mexico

Figure 9: Deserts of North America. Source: "deserts of North America": at: <http://instruct.uwo.ca/biology/320y/ namdes.html>.

United States - Wind Resource Map

Photovoltaic Solar Resource of the United States

Concentrating Solar Resource of the United States
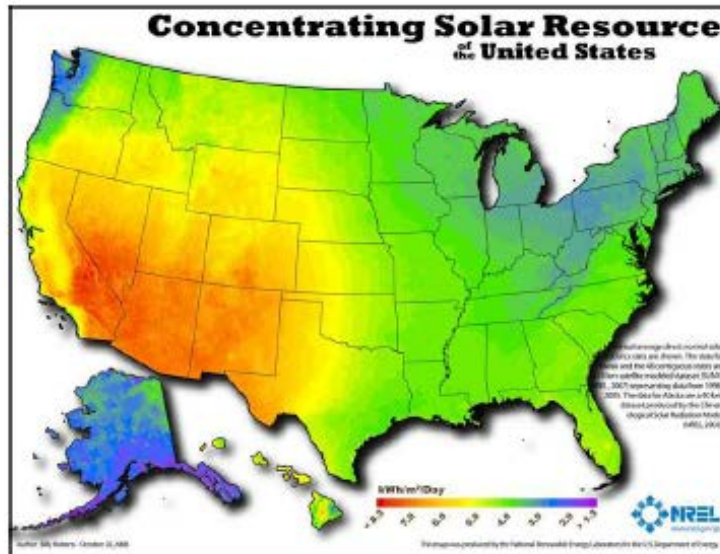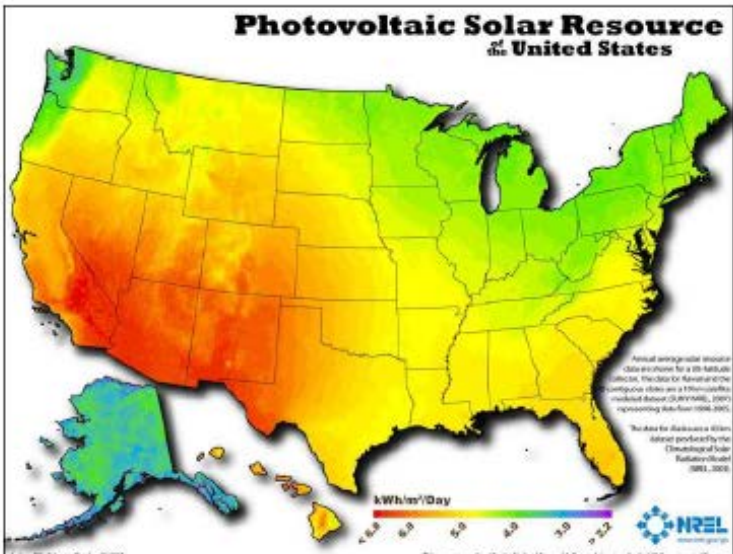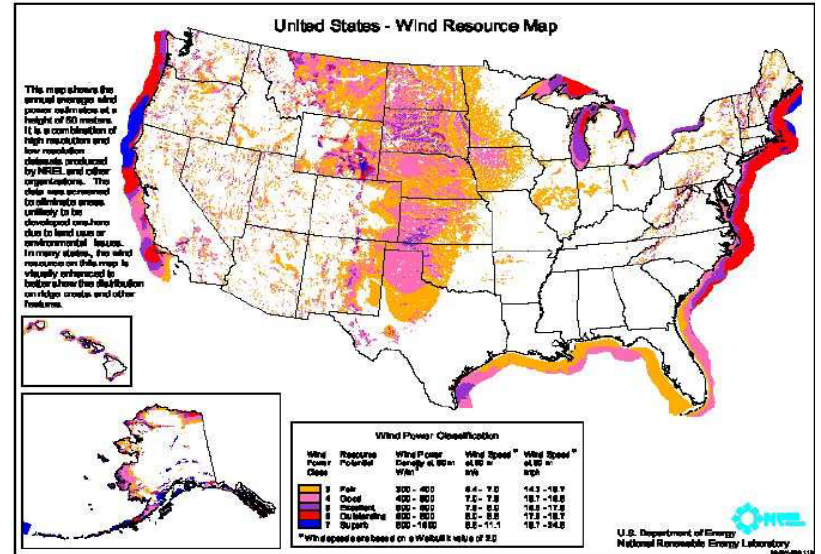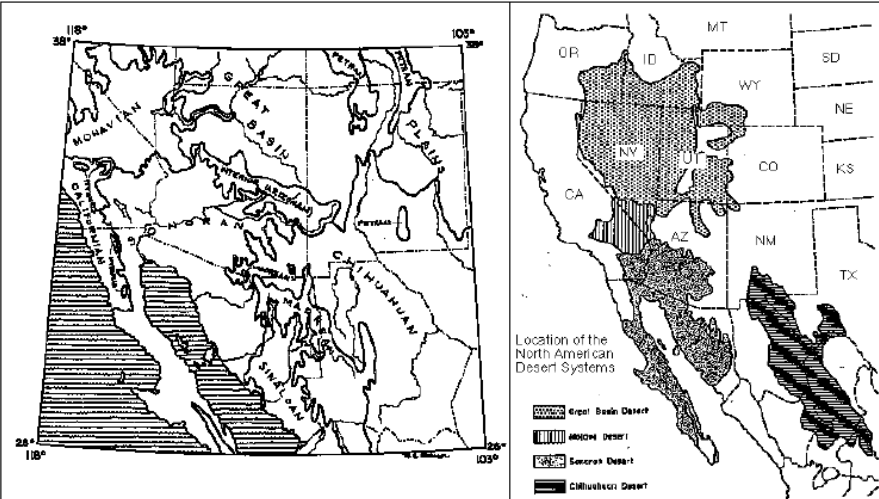
While physical solar potential is better in Sahara, geopolitical situation for NAFSOLTEC project is better than in MENA because only two or three countries would cooperate

7.8. Drylands, Solar & Wind Potential of Brazil

DRYLAND CLIMATES
OF SOUTH AMERICA
(AFTER MEIGS)

- **Northeast of Brazil: Major Drylands, social effects: poveerty, unemplyoment, labour migration to S.P.**
- **Northeast has high solar & wind potential**
- **Adaptation strategy for the state of Ceara:**
  - Address: environmental vulnerability: **Exploit potential**
  - Address social vulnerability: **Create employment**
- **Goals of a Proactive Soil Security Strategy**
- **Simultaneous policy: respond to dual vulnerability**
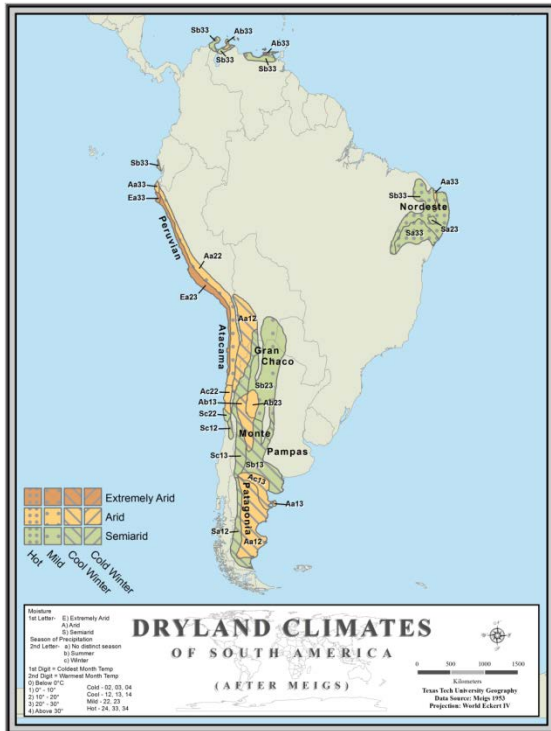
Figure 1.13 Variation of Solar Radiation in Brazil (MJ/m²/day)

Source: BRASIL, 2007.

Agosto de 1995 - Radiação Global

Radiação Global - W m²

Mapa de ventos do Brasil

> 8,5 m/s
7,0 - 8,5 m/s
6,0 - 7,0 m/s
5,0 - 6,0 m/s
< 5,0 m/s

Centro Brasileiro de Energia Eólica
(resultados preliminares em 1998)
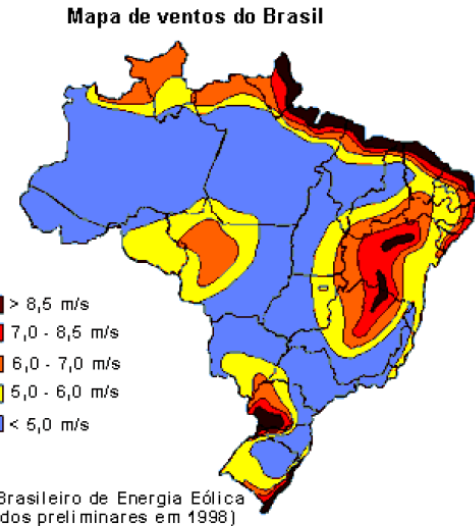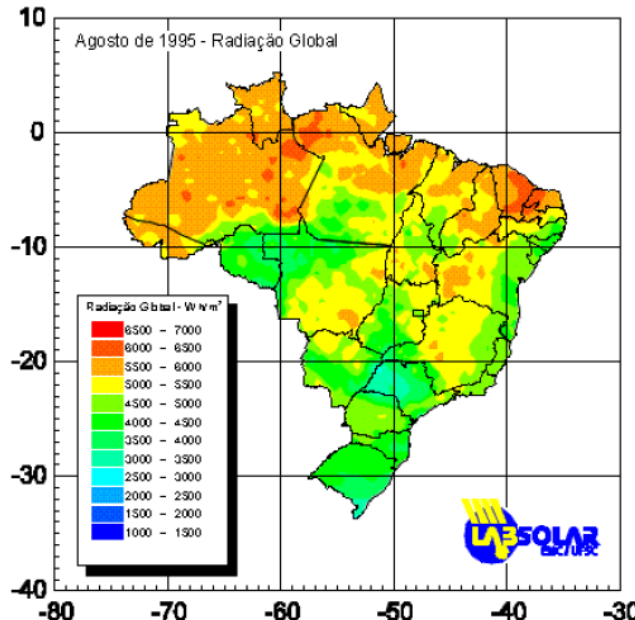
FIGURE 28: WIND MAP OF BRAZIL

7.9. Global Development of Renewables

Global Development of Renewable Energy
Renewable Energy Consumption by Region, Millions of Tons Equivalent, 2001–11

Regional Growth of Renewable Energy

Region	Share of Global Consumption 2011	Growth of Consumption CAGR 2001-11
Europe	42.8%	17.5%
North America	26.6%	9.7%
Asia-Pacific	24.0%	14.7%
Central/South America	5.8%	9.4%
Middle East/Africa	0.7%	13.3%

Exhibit 2

BP Statistical Review of World Energy, June 2012

52
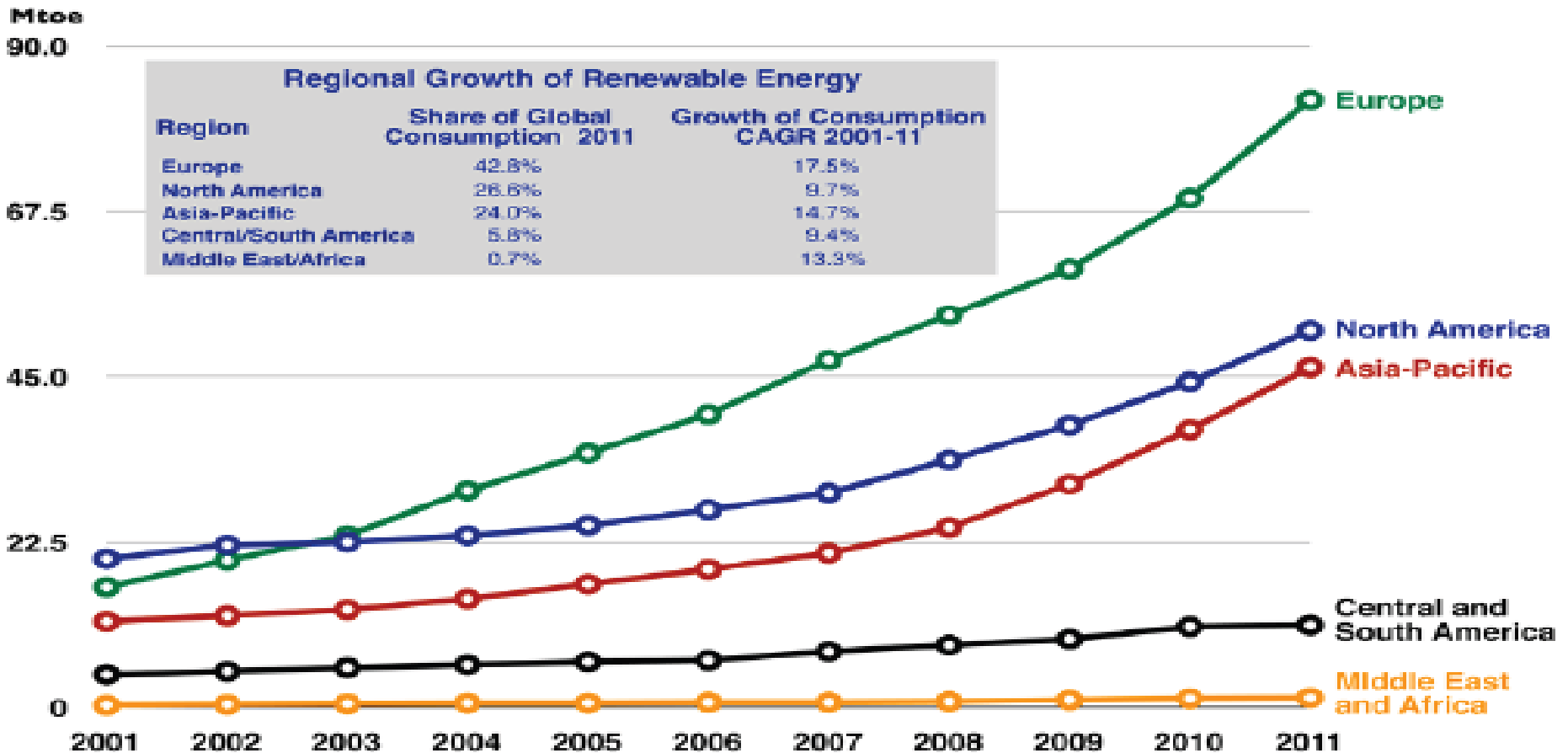
7.10. Global Wind Power Capacity

- Until 1997: USA was in the lead; until 1993: Denmark was in the lead in Europe, from 1997-2007: Germany in the lead, 2008-2009: USA & since 2010 China had highest installed capacity of wind power

Global Wind Power Cumulative Capacity (Data: GWEC)
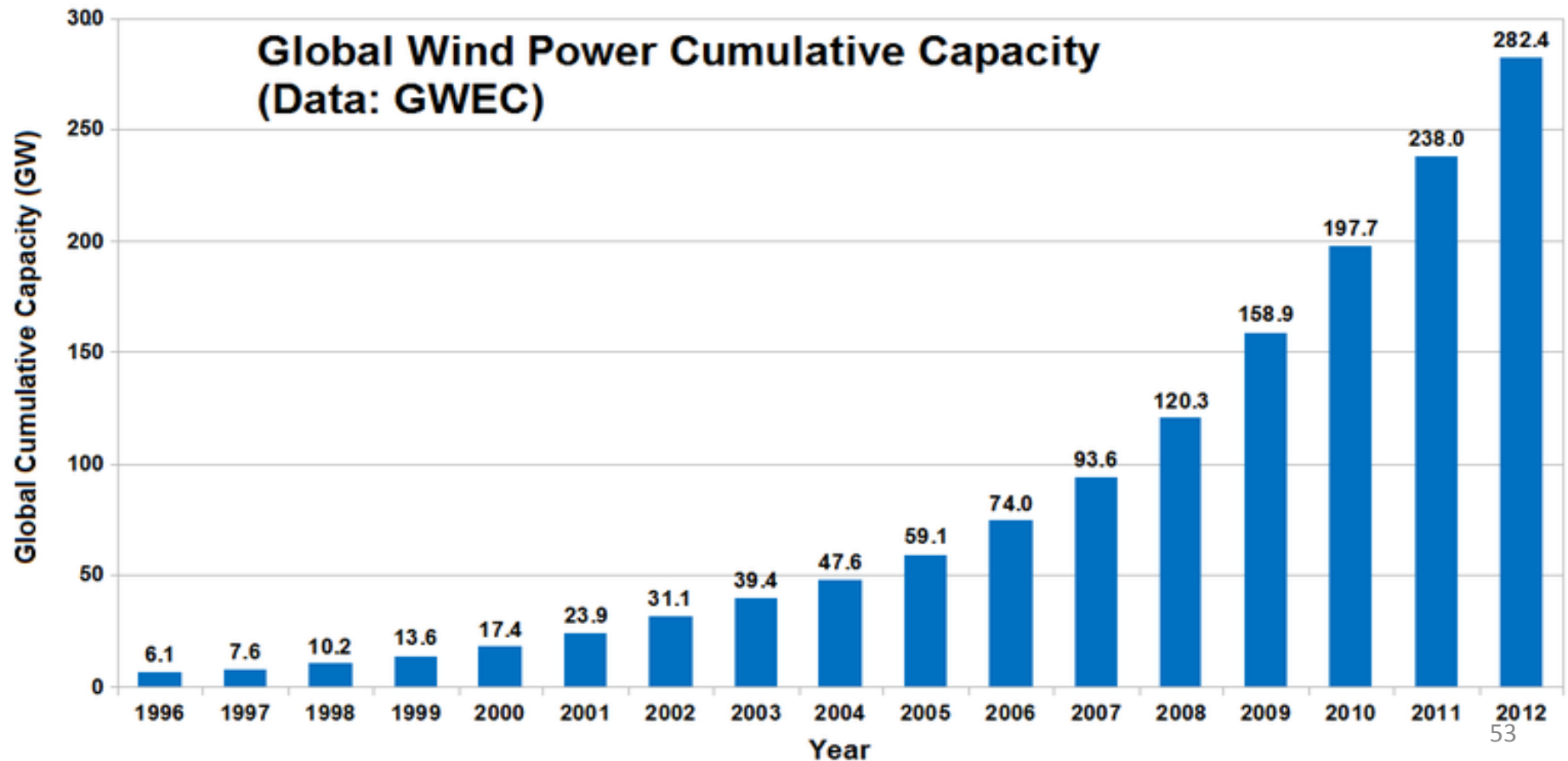
7.11. Renewable Energy Investments
Source: David Bartlett, Economic Advisor, RSM (BP)

Leading Recipients of Clean Energy Investments
Billion USD, 2012

Rank	Country	Amount	Change from 2011
# 1	China	$ 65.1	+ 20.3%
# 2	United States	35.6	− 37.3%
# 3	Germany	22.8	− 27.2%
# 4	Japan	16.3	+ 75.3%
# 5	Italy	14.7	− 51.2%
# 6	United Kingdom	8.3	− 17.0%
# 7	India	6.9	− 44.8%
# 8	South Africa	5.5	+ 18,233%
# 9	Brazil	5.3	− 32.1%

7.12 Global Leaders in Renewables
Source: David Bartlett, Economic Advisor, RSM (BP)

Total Installed Capacity
Gigawatts, 2012

#	Country	
# 1	China	152 GW
# 2	United States	133 GW
# 3	Germany	71 GW
# 4	Spain	34 GW
# 5	Italy	31 GW
# 6	India	30 GW
# 7	Japan	27 GW
# 8	Brazil	16 GW
# 9	United Kingdom	15 GW
#10	France	14 GW

Installed Solar Capacity
Megawatts, 2011

#	Country	
# 1	Germany	24,820 MW
# 2	Italy	12,782 MW
# 3	Japan	4,914 MW
# 4	United States	4,389 MW
# 5	Spain	4,270 MW
# 6	China	3,000 MW
# 7	France	2,576 MW
# 8	Czech Republic	1,959 MW
# 9	Belgium	1,820 MW
#10	Australia	1,345 MW

Installed Wind Capacity
Megawatts, 2011

#	Country	
# 1	China	62,412 MW
# 2	United States	47,084 MW
# 3	Germany	29,075 MW
# 4	Spain	21,726 MW
# 5	India	16,078 MW
# 6	France	6,836 MW
# 7	Italy	6,743 MW
# 8	United Kingdom	6,470 MW
# 9	Canada	5,278 MW
#10	Portugal	4,214 MW

Biofuels Production
Thousand Tons of Oil Equivalent, 2011

#	Country	
# 1	United States	28,251 TOE
# 2	Brazil	13,196 TOE
# 3	Germany	2,839 TOE
# 4	Argentina	2,233 TOE
# 5	France	1,720 TOE
# 6	China	1,149 TOE
# 7	Canada	961 TOE
# 8	Thailand	915 TOE
# 9	Spain	775 TOE
#10	Belgium	503 TOE

7.139. A Projection of Fossil, Wind & Solar Power

Wind and Solar Power
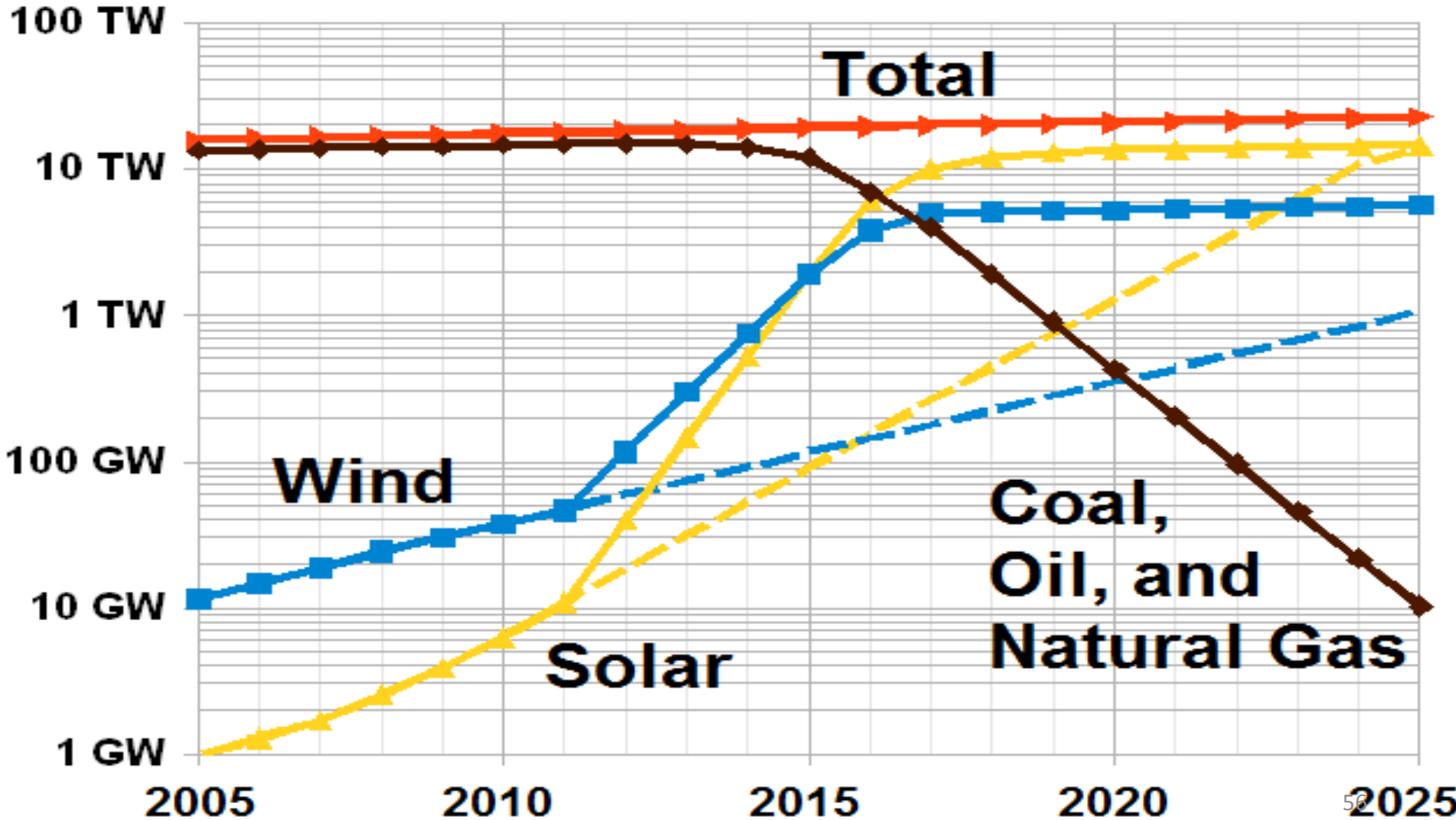
8. Strategies & policies of sustainability transition for a 'sustainable peace' in the Anthropocene

- **Sustainable Development Goal**
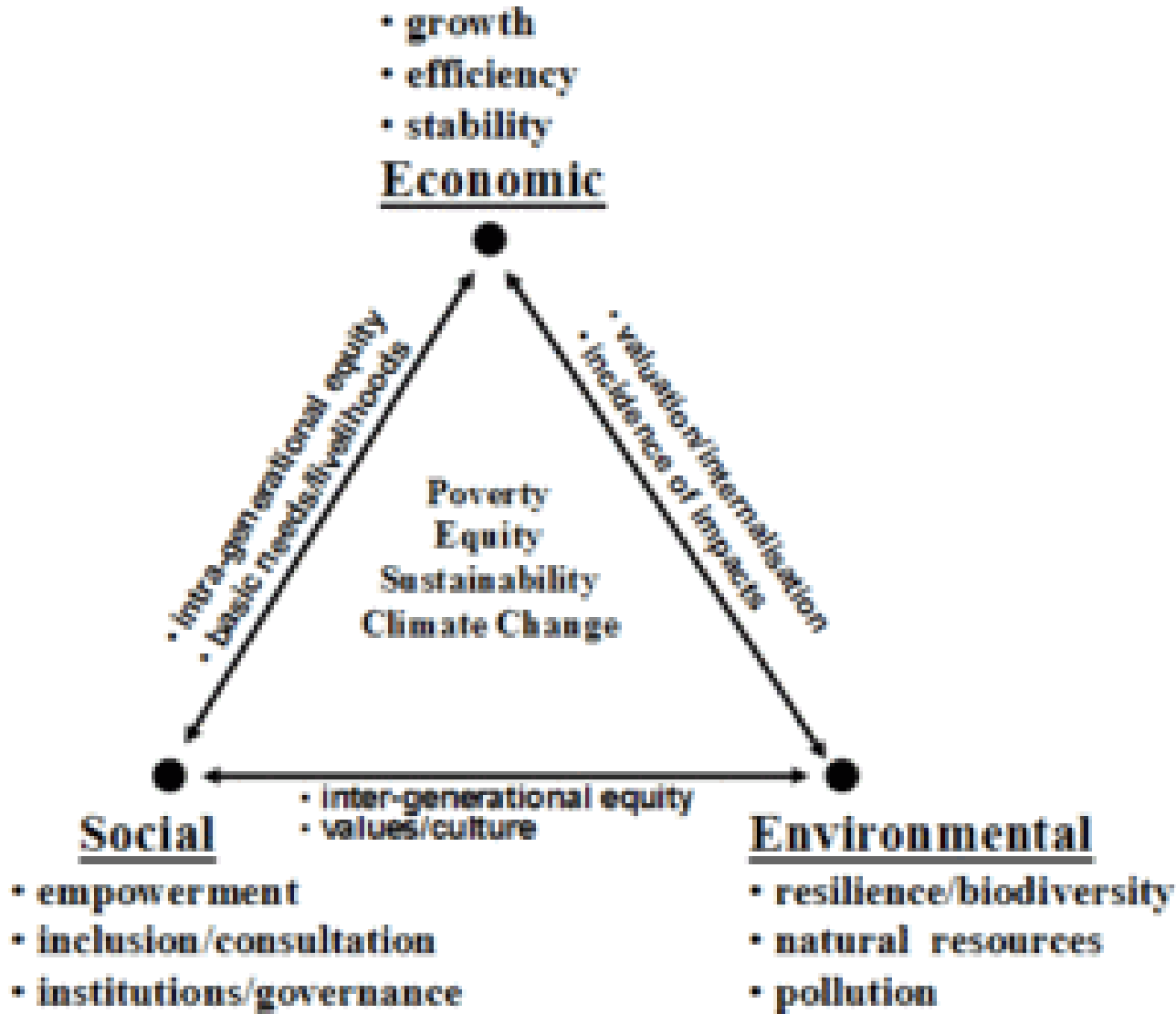
- **Sustainable develop-ment** is an [organising principle] for human life on a finite planet.

- **It posits a desirable future state for human societies in which living conditions and resource-use meet human needs without undermining the sustainability of natural systems and the environment,** so that future generations may meet their needs.

- **Combines 3 -4 dimensions:**
  - social
  - economic,
  - environ mental
  - cultural (or institutional, as good governance)

8.1. Sustainable Development Strategy
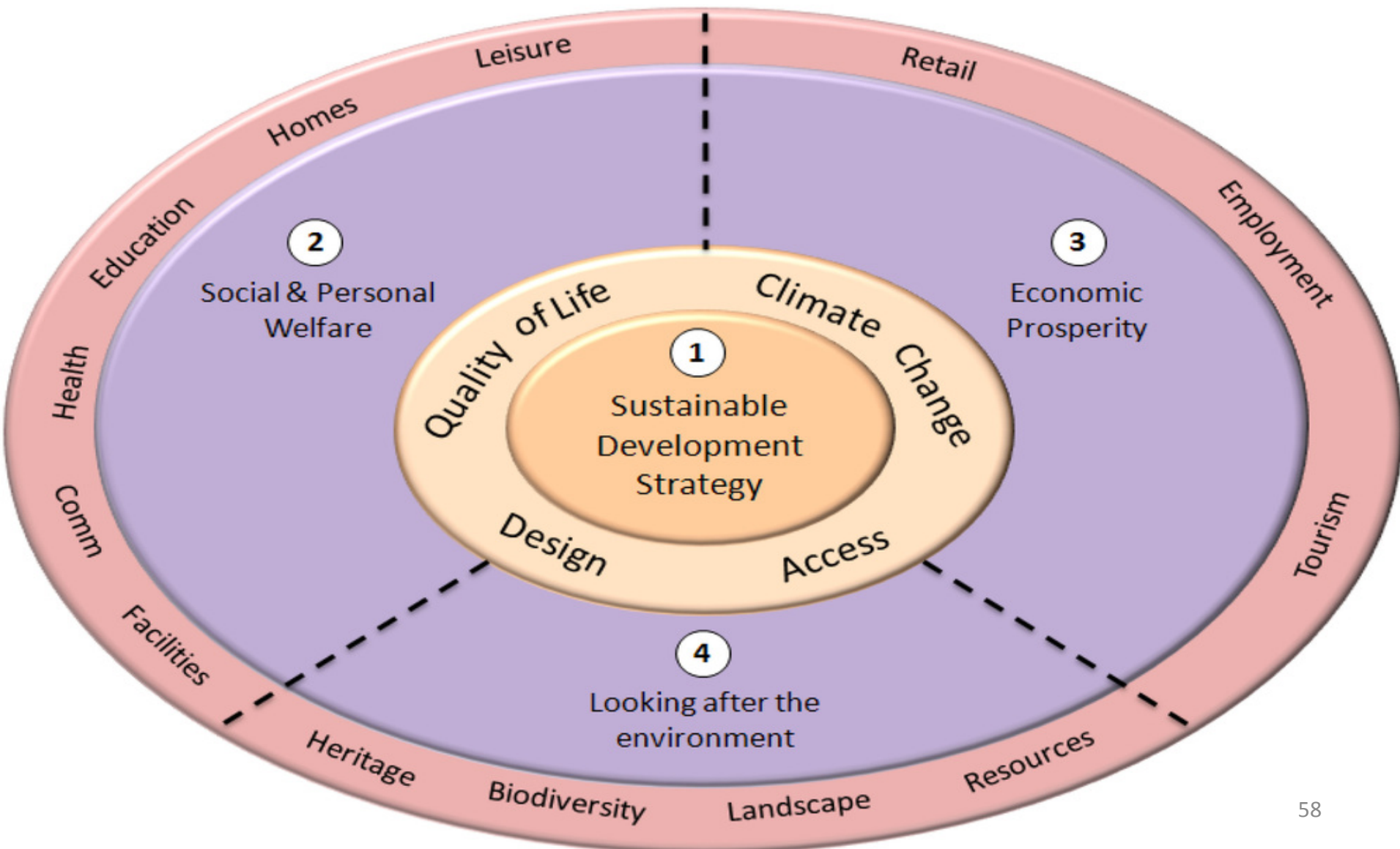
8.2. Scientific Debates on Sustainable Development and on Sustainability

- **Today an ambiguous, disputed & essentially contested concept**
- IUCN–World Conservation Union, in a report on *Caring for the Earth* **(1980),** defined SD as "improving the **quality of human life** while living **within** the **carrying capacity** of **supporting ecosystems**", where sustainability is understood as "a characteristic of a **process that can be maintained indefinitely**"
- **Trzyna (1995)** SD: multidisciplinary, social process, moral principle
- **Neoclassical & ecological perspectives** differ in assessment of likelihood of sustainable outcomes from real/world market economies.
- **US National Research Council** **(NRC 1999)** on *Our Common Journey: A Transition toward Sustainability* tried to
  - "**reinvigorate the essential strategic connections between scientific research, technological development & societies' efforts to achieve environmentally sustainable improvements in human well-being**" focus on: 1) common concerns and differing emphases on SD, 2) trends and transitions, 3) exploring the future, 4) environmental threats and opportunities, 5) on reporting on transition, and 6) integrating knowledge and action.
- **No study discussed the linkages between SD and ST and war, crises, conflict and world peace or sustainable peace.**
- **Goal of our Handbook: Sustainability Transitions and Sustainable Peace (40-60 chapters) in the Hexagon Book Series (2015)**

8.3. Thesis: Four Conceptual Pillars of 70 Years of Peace in Europe

- **After centuries of permanent & repeated conflicts & wars in Europe four conceptual thinkers & key operational ideas have contributed to a basic change resulting in 60 years of peace in Europe & in a reunification of Europe after the cold war.**

- **Mitrany's functionalist working peace system;**

- **Marshall's conditionalised aid;**

- **Monnet's functional institution-building;**

- **Gorbachev's break out of deterrence syndrome.**

8.3. Where are the Visions for Peace in the Anthropocene?

- **After Copenhagen (COP 15): Lack of Global Political Leadership**
  - Small economic interests have blocked and paralyzed in many democracies any political progress: Electoral setback: USA, Canada, Japan & Australia
  - Hobbesian geostrategic & geo-economic practice: occupation & annexation
- **We neeed new practical visionaries: Knowledge to action**
  - **New Mitrany :** Sustainable Peace: A New working Peace System for the Anthropocene
  - **New Marshall :** New Marshall Plan & global Strategy for a Sustainable Transition but at Copenhagen not even 1% of bail out costs for banks for helping third world for adaptation and mitigation!
  - **New Gorbachev :** Physicists Call for a New Copernican Revolution: New Perestroika: Fourth Sustainable or Green Revolution with a Decarbonization of the Economy
  - **New Monnet :** Implementing the Vision of Sustainable Transition with a Decarbonization of the Economy: Factor 4 (E.U. v. Weizsäcker) & Energetic Imperative (Scheer's Legacy)
- **We need a new ecological economic peace policy aiming at a sustainable peace in the Anthropocene based on a process of sustainability transition**

8.4 Alternative Vision

- This alternative vision refers to the need for a "**new paradigm for global sustainability**" and for a **"transition to [a] much more sustainable global society" aimed at peace, freedom, material well-being, and environmental health**.

- **Changes in technology and management systems** alone will not be sufficient, but "**significant changes in governance, institutions and value systems**" are needed, resulting in a fourth major transformation following "the stone age, early civilization and the modern era".

- These **alternative strategies should be "more integrated, more long-term in outlook, more attuned to the natural dynamics of the Earth System and more visionary".**

- These many changes suggested by natural scientists require a '**Fourth Sustainability Revolution**'.

8.5. Scientific Output:

– **IPRA EPC book:**

- **Expanding Peace Ecology (published) ESDP No. 12**

  <http://afes-press-books.de/html/SpringerBriefs_ESDP_12.htm>

– **Brauch-Oswald Spring-Grin-Scheffran: Hand-book on Sustainability Transition & Sustainable Peace (2015)**

- **See more at: <http://afes-press-books.de/html/hexagon.htm>**

- **Goal: Audience and Themes**

- **Structure of the book: 52 chapters**

- **Text book for graduate seminars globally**

– **Publication on Thai winter school is planned:**

- **ESDP 28: Oswald/Arunotai/Middleton/Brauch (2015/2016)**

– **ESDP Subs.: Sustainable Development & Sustainability Transition**

  <http://www.afes-press-books.de/html/SpringerBriefs_ESDP_SDST.htm>

8.6. Peer-reviewed Publication Project: Sustainability Transition and Peace

Vol. 10, Hexagon Book Series: Peer-reviewed

Hans Günter Brauch, Úrsula Oswald Spring, John Grin, Jürgen Scheffran (Eds.): *Sustainability Transition and Sustainable Peace Handbook.* Hexagon Series on Human and Environmental Security and Peace 10 (Cham - Heidelberg – New York – Dordrecht – London: Springer, 2015), in planning.

8.7. Structure of the Book

53 chapters: 67 authors from 20 countries & 5 continents

I: Introduction: Moving towards Sustainability Transition

II: Aiming at Sustainable Peace based on Sustainable Development

III: Challenges of the 21st Century: The Negative Nexus of Environmental Destruction, Development and Violent Conflict

IV: Towards a Positive Nexus of Sustainable Development and Peace

V: Theories and Models of Sustainability Transition and Practice

VI: National and Regional Debates on Sustainability Transition

VII: Transition towards a Sustainable Economy, Society and Urbanization

VIII: Sustainability Transition in the Water, Soil, Food and Health Sectors

IX: Sustainability Transition in the Energy and Transportation Sectors

X: National, International and Transnational Governance and Strategies, Policies and Measures towards Sustainability Transition:

Conclusions and Mapping Future Research Needs

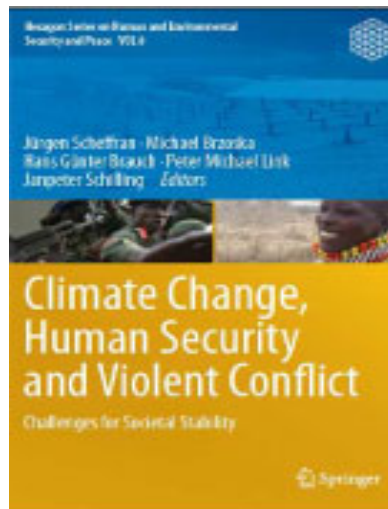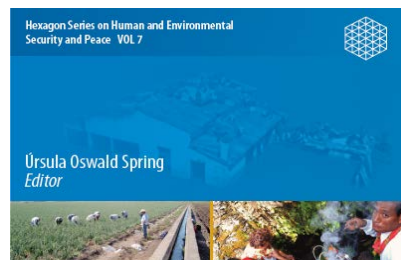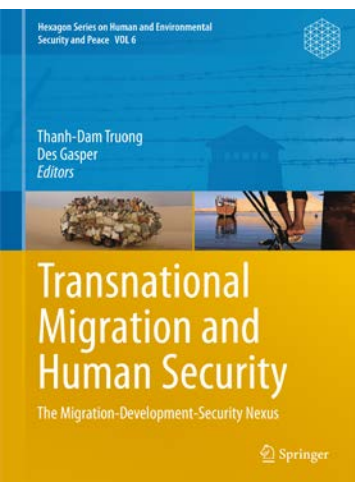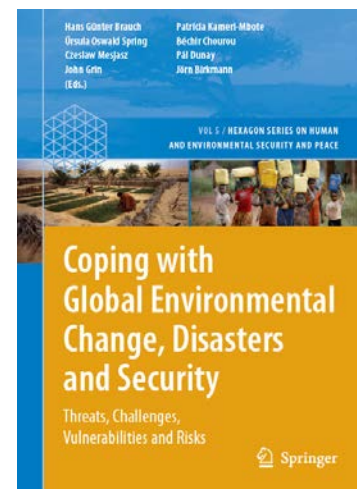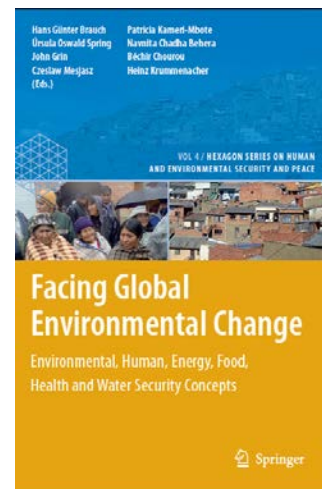**Chapters are arriving & peer review process has started**

Thank you
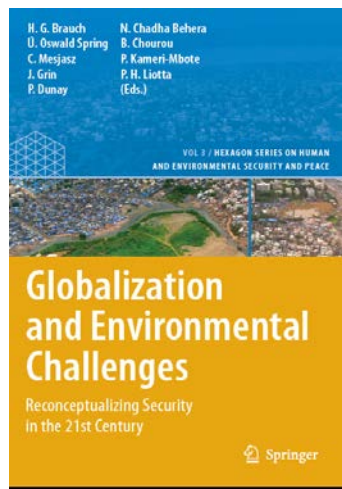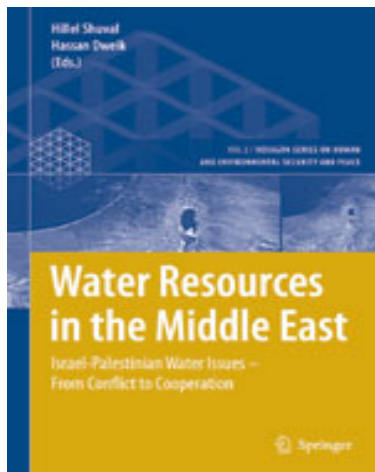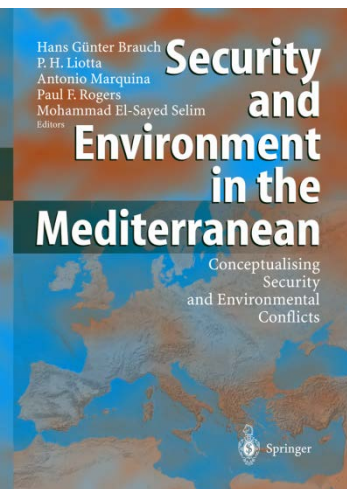# for your attention
and patience.

Text for download at:
http://www.afes-press.de/html/download_hgb.html
Contact: <brauch@onlinehome.de>

2.1. Hexagon Series: Volumes I-X

Hans Günter Brauch, P. H. Liotta, Antonio Marquina, Paul F. Rogers, Mohammad El-Sayed Selim, Editors
Security and Environment in the Mediterranean
Conceptualising Security and Environmental Conflicts

Hillel Shuval, Hassan Dweik (Eds.)
Water Resources in the Middle East
Israel-Palestinian Water Issues – From Conflict to Cooperation

H. G. Brauch, Ú. Oswald Spring, C. Mesjasz, J. Grin, P. Dunay, N. Chadha Behera, B. Chourou, P. Kameri-Mbote, P. H. Liotta (Eds.)
Globalization and Environmental Challenges
Reconceptualizing Security in the 21st Century

Hans Günter Brauch, Úrsula Oswald Spring, John Grin, Czeslaw Mesjasz, Patricia Kameri-Mbote, Navnita Chadha Behera, Béchir Chourou, Heinz Krummenacher (Eds.)
Facing Global Environmental Change
Environmental, Human, Energy, Food, Health and Water Security Concepts

Hans Günter Brauch, Úrsula Oswald Spring, Czeslaw Mesjasz, John Grin, Patricia Kameri-Mbote, Béchir Chourou, Pál Dunay, Jörn Birkmann (Eds.)
Coping with Global Environmental Change, Disasters and Security
Threats, Challenges, Vulnerabilities and Risks

Hexagon Series on Human and Environmental Security and Peace VOL 6
Thanh-Dam Truong, Des Gasper, Editors
Transnational Migration and Human Security
The Migration-Development-Security Nexus

Hexagon Series on Human and Environmental Security and Peace VOL 7
Úrsula Oswald Spring, Editor
Water Resources in Mexico
Scarcity, Degradation, Stress, Conflicts, Management, and Policy

Hexagon Series on Human and Environmental Security and Peace VOL 8
Jürgen Scheffran, Michael Brzoska, Hans Günter Brauch, Peter Michael Link, Janpeter Schilling, Editors
Climate Change, Human Security and Violent Conflict
Challenges for Societal Stability

Hexagon Series on Human and Environmental Security and Peace VOL 9
Thanh-Dam Truong, Des Gasper, Jeff Handmaker, Sylvia I. Bergh, Editors
Migration, Gender and Social Justice
Perspectives on Human Insecurity

Forthcoming Volume:

H. G. Brauch, Ú. Oswald Spring, J. Grin, J. Scheffran (Eds.):

Sustainability Transition and Sustainable Peace Handbook. Hexagon Series 10 (Springer, 2015),