Freie Universität Berlin

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Towards a Fourth Sustainability Revolution: Security Policy and Sustainable Peace in the Anthropocene

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AFES-PRESS

Assignation, Dates & Rooms

- **Bachelor Politikwissenschaft** - Studienbereich Aufbau/Master Politikwissenschaft

- **Diplom Politikwissenschaft** (Hauptstudium); Kern-/Vertiefungsmodul Internationale Beziehungen, 3.1 Theorie, Empirie und Geschichte der Internationalen Beziehungen;

- **6. Studienbereich Allgemeine Berufsvorbereitung (ABV)**

- **IX. Masterstudiengang Internationale Beziehungen > Aufbauphase > Vertiefungsmodul**

Dates/Termine & Rooms/Räume

- **Tuesday, 18.10.2011, 14.00-16.00, Ihnestr. 22/UG 2**

- **Friday, 18.11.2011; 18:30 - 20:00, Ihnestr.21/F (Lecture)**

- **Saturday, 19 November 2011; 08:15 - 17:30, Room L 202**

- **Friday, 25.11.2011; 14:00 - 19:45, Ihnestr.21/F**

- **Saturday, 26 November 2011; 08:15 - 17:30, Room L 202**

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7. Role of Knowledge
8. Worldview of Scientists
9. Mindset of Policymakers
10. Political Urgency and Research Agenda: Towards a Fourth Sustainability Revolution
11. On this Seminar and Distribution of Seminar Topics

1. Paul C. Crutzen: Foreword Geology of Humankind:
## From the Holocene to the Anthropocene
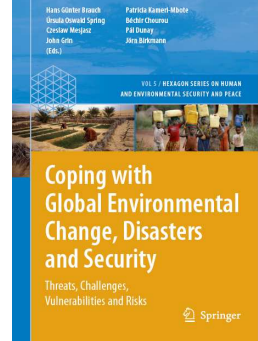
- During 4,5 billion years of Earth history, after a long string of biological processes, only a million years ago, a single species 'homo sapiens' evolved, which grew increasingly capable of influencing the geology of our planet.

- **Holocene:** Since the end of the glacial period (10-12.000 years ago), high civilizations emerged.

- **Anthropocene:** Since 1780 humankind increased GHG concentration in the the tmosphere from 278 ppm to more than 380 ppm today

1.1 History of the Earth

September 10th 2011
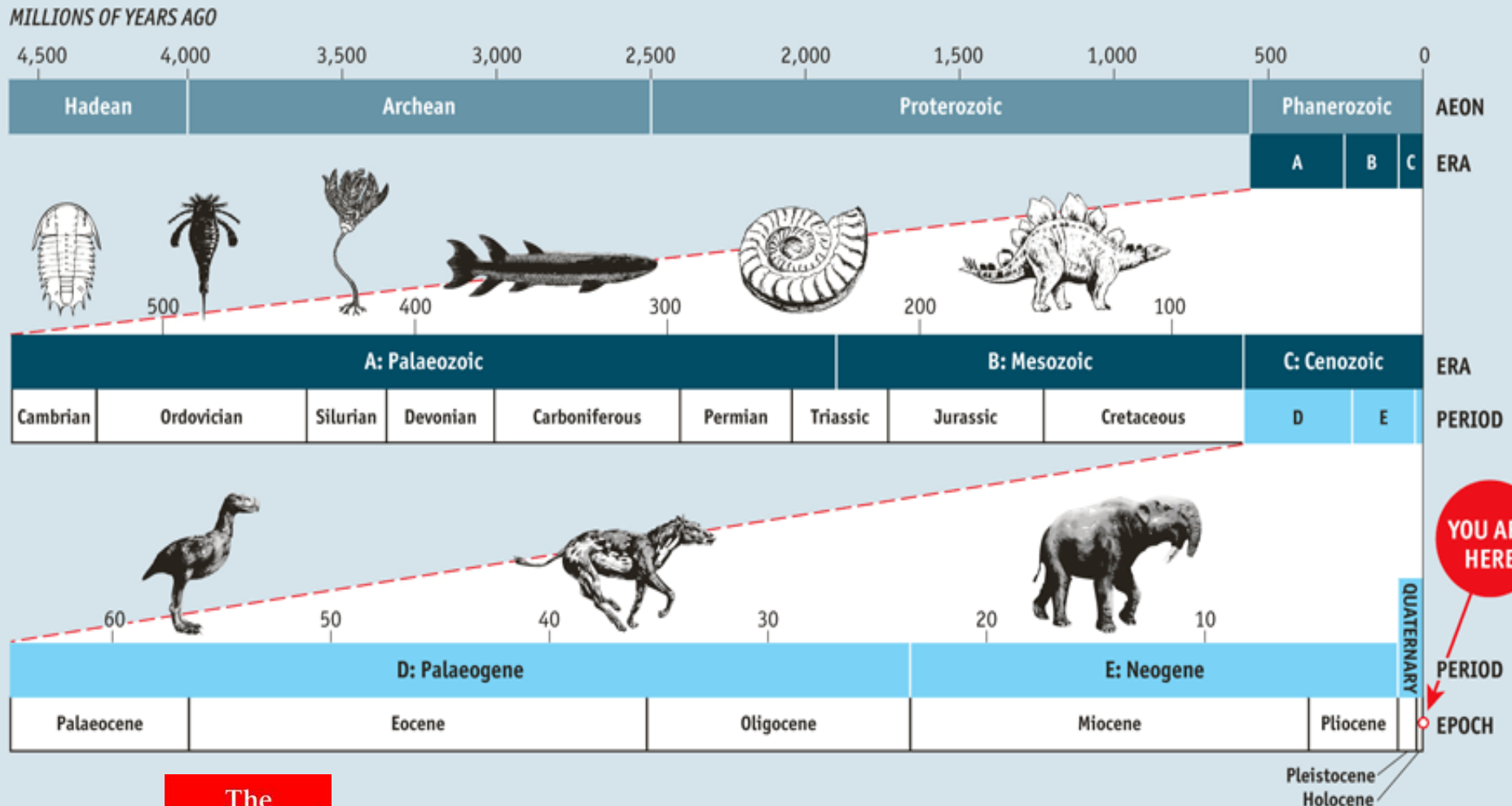
# 1.2. From the Holocene (12.000 years b.p.) to the Anthropocene (1784 AD)
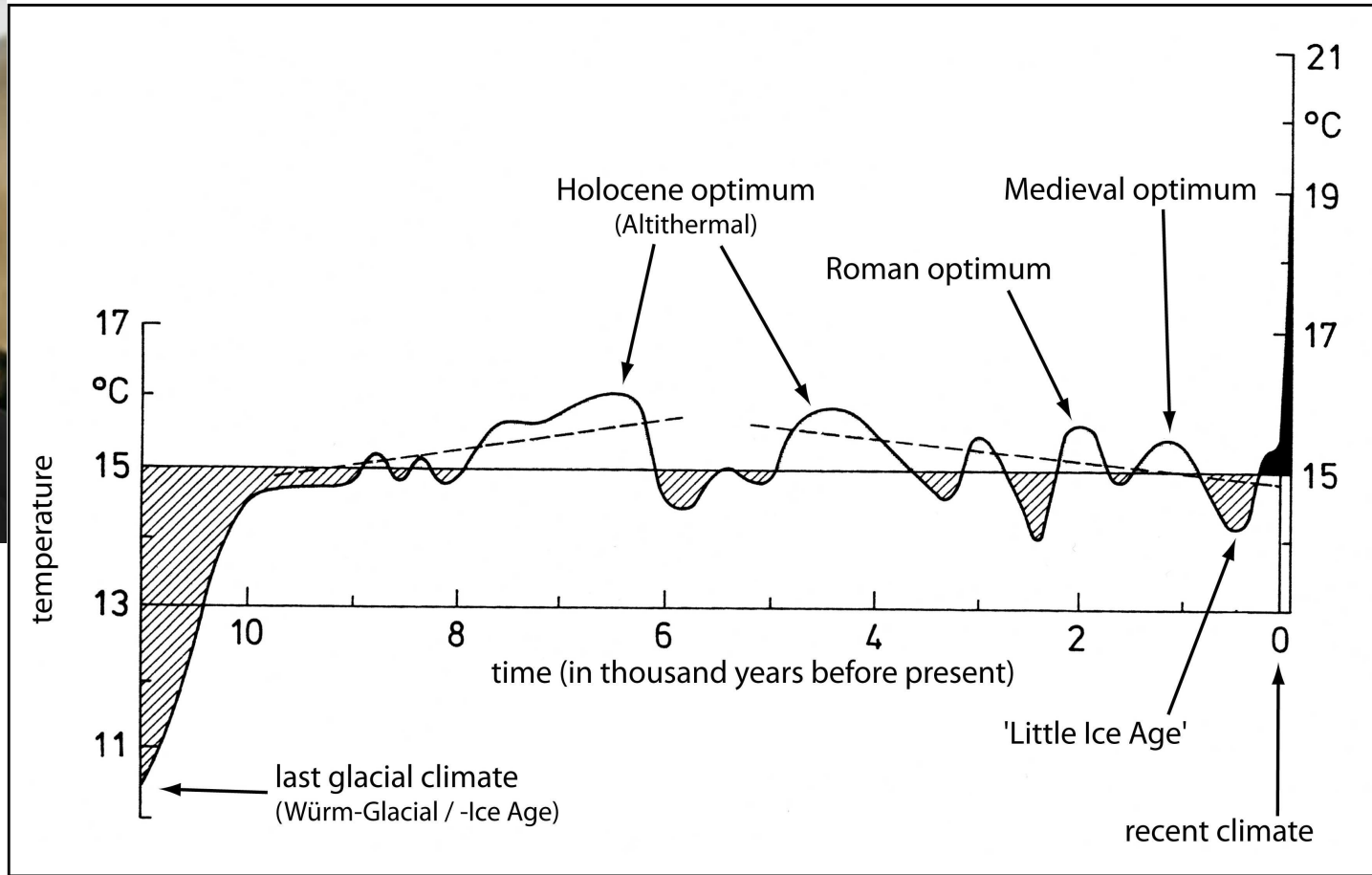
Paul Crutzen, Nobel Laureate for Chemistry (1995)

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 change: burning of coal. oil, gas ➔ GHG increase

1.3. Impacts of Climate Variability: Holocene (12.000 years b.p. to 1750 AD)

End of Roman Empire: massive people's movements : 1st phase, 300-500 AD, Germanic, Turkish & other peoples.
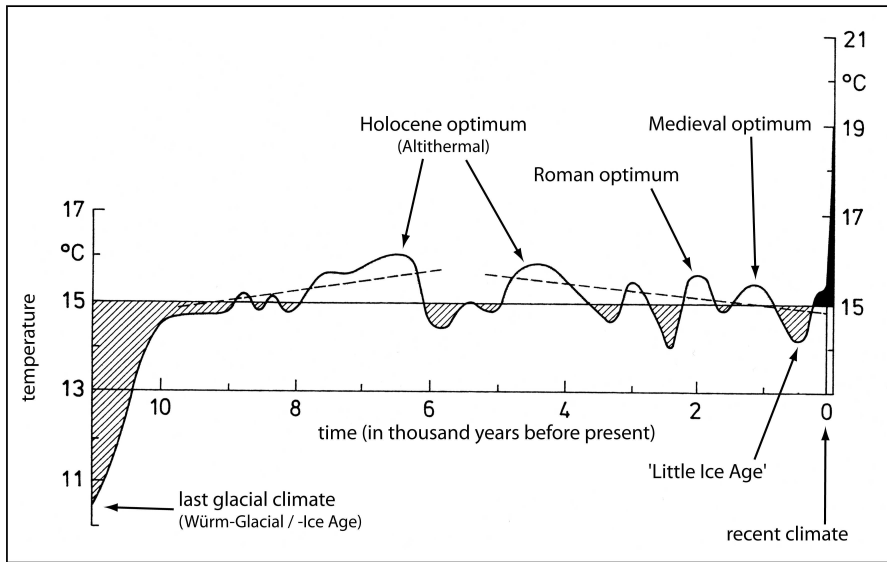
During **Holocene** era both **climate pessima** (cold periods) and **changes in precipitation patterns** and long periods **of drought** were major triggers for **several phases of massive people's movements**:
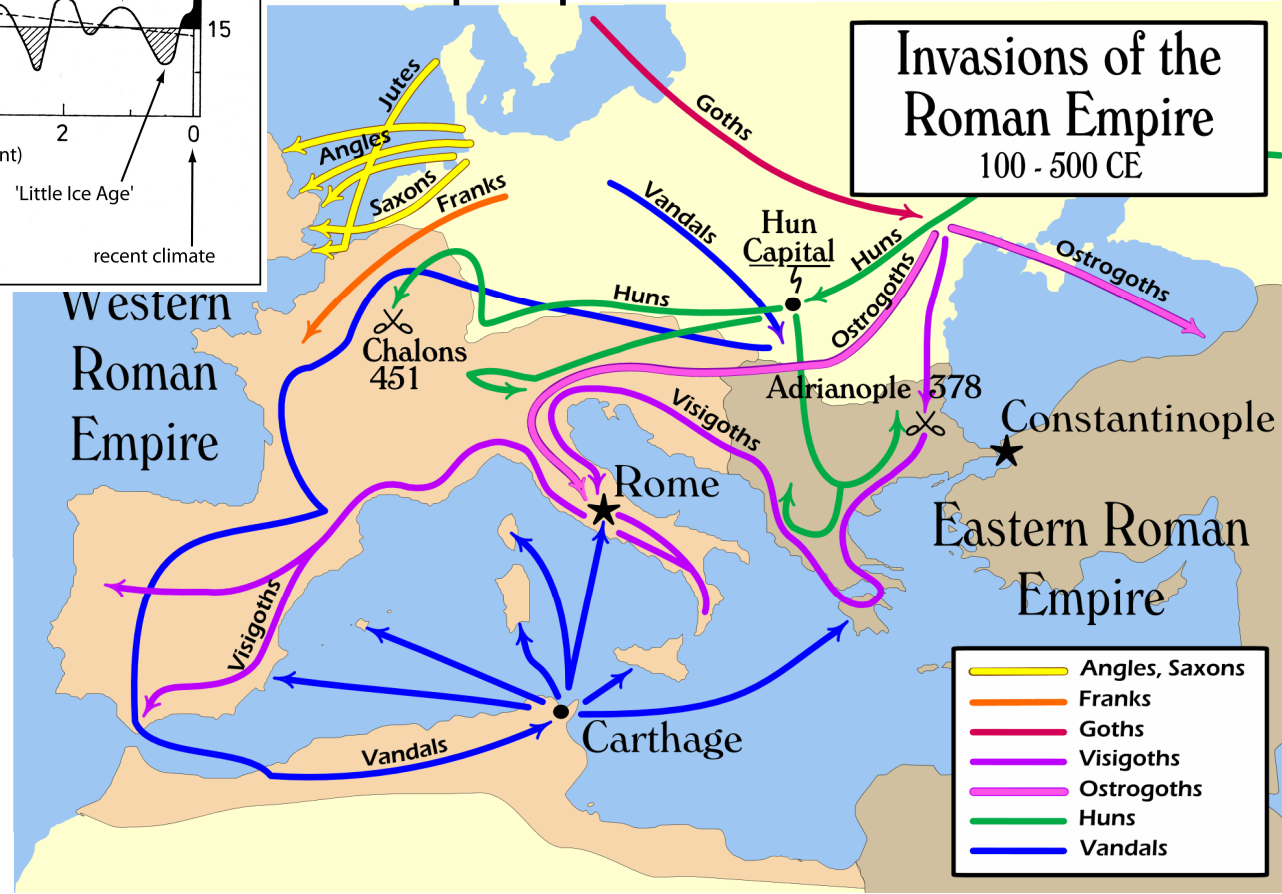
1.4. Anthropogenic Climate Change in the Anthropocene Era (1750 to present)

1958-1974 Scripps Inst. Oceanography
1974-2008 NOAA/ESRL

PARTS PER MILLION

380

360

340

320

NOAA

1960   1970   1980   1990   2000   2010

YEAR
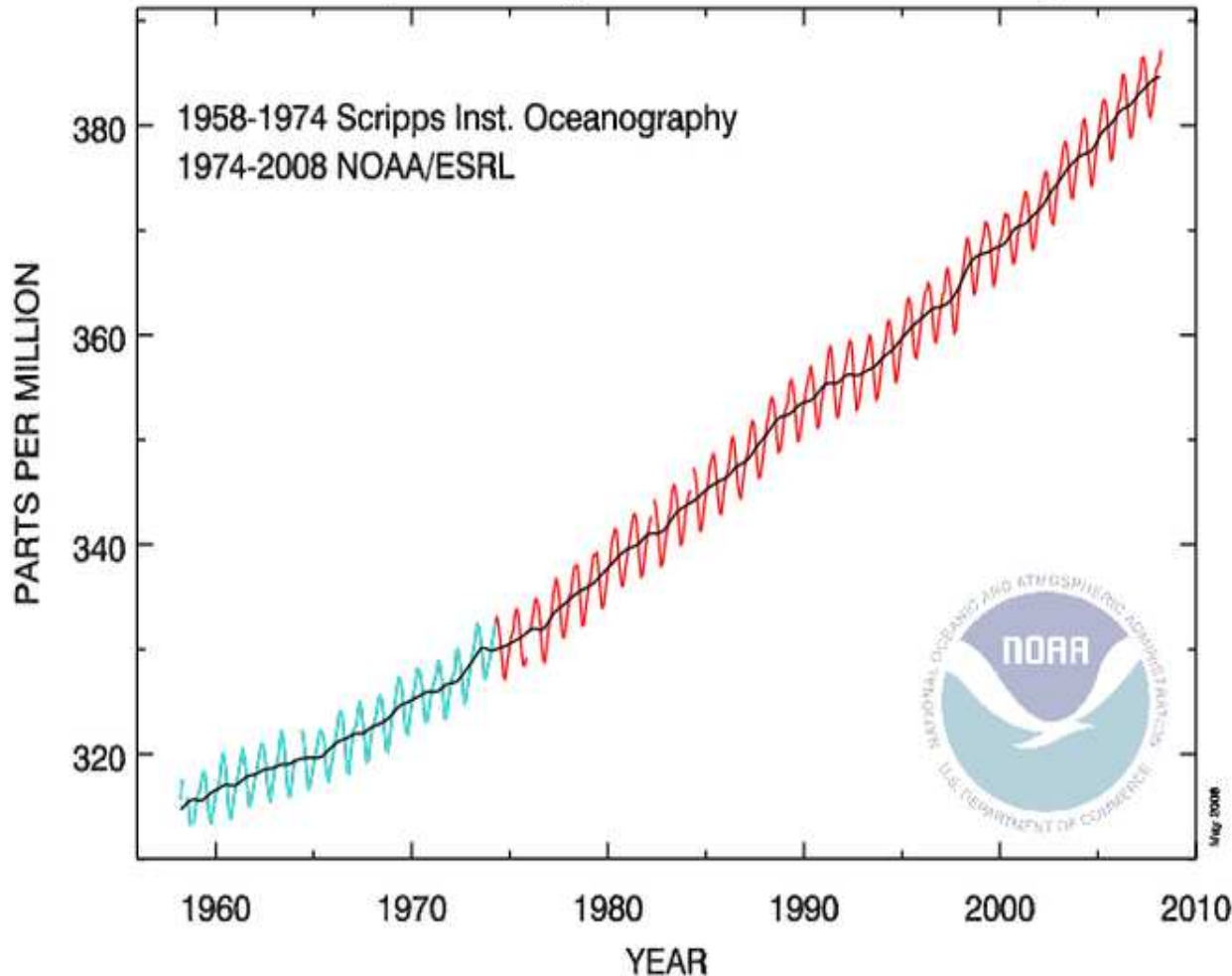
- **GHG concentration in the atmosphere**
- **1750: 279 ppm, 1987: 387 ppm**
- **1/3: 1750-1958: 279 to 315 ppm**
- **2/3: 1958-1987: 315 to 387 ppm**

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1.5. There is a consensus that climate change is largely anthropogenic

IPCC in Assessment Reports (1990, 1995, 2001, 2007): since industrial revolution climate change has been anthropogenic
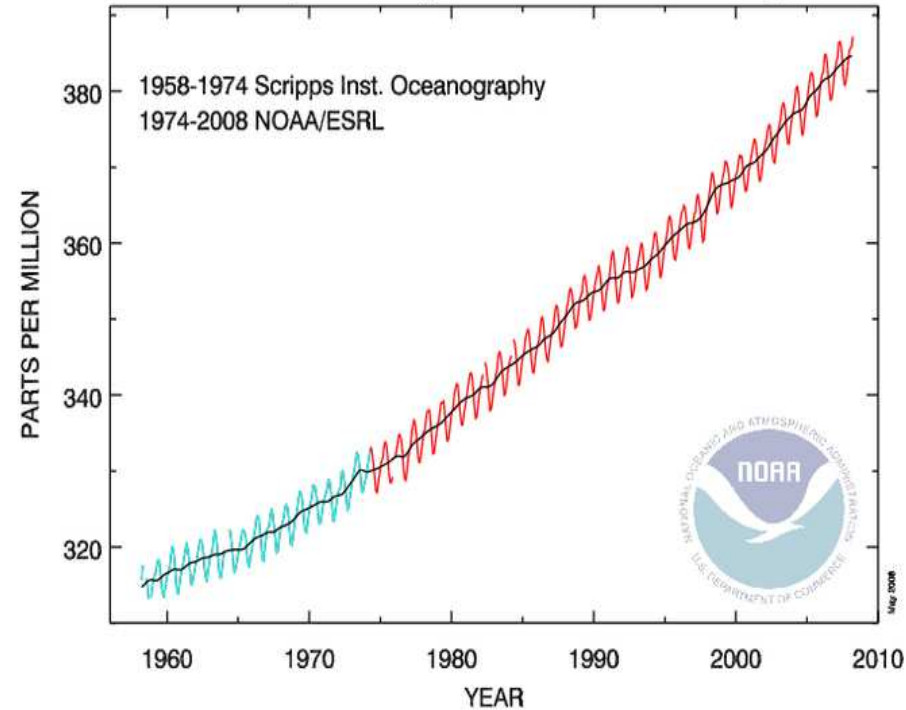
GHG in the atmosphere
1750: 279 ppm, 6/2011: 393 ppm
1/3: 1750-1958: 279 to 315 ppm
2/3: 1958-2011: 315 to 393 ppm 9

1.6. Global Climate Change: 2001-2007
Temperature Increases & Sea Level Rise

Climate Change Impacts: Temperature & Sea level Rise

❖ **Global average temperature rise in 20th century: + 0.6°C**

Projected temperature rise:

❖ **TAR (1990-2100):+1.4-5. 8°C**

❖ **AR4 (07):+1.1-6.4 (1.8-4)°C**

Sources: IPCC 1990,1995,2001,2007

Sea level Rise:

❖ **20th cent.: +0,1-0,2 metres**

❖ **TAR: 21st century: 9-88 cm**

❖ **AR4 (2000-2100): 18-59 cm**
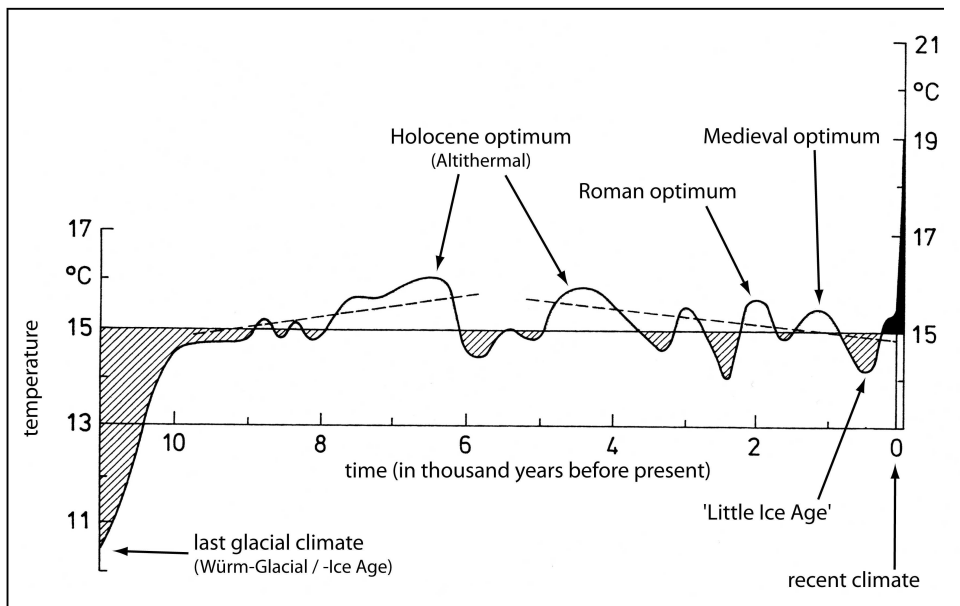
Trend in global average surface temperature

°C

0,6	15,68 °C
0,4	15,48 °C
0,2	15,28 °C
0	15,08 °C
-0,2	14,88 °C
-0,4	14,68 °C
-0,6	14,48 °C

1860 1870 1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000

Positive deviation (in °C)   Negative deviation (in °C)

GRID Arendal UNEP

Source: School of environmental sciences, climatic research unit, university of East Anglia, Norwich, United Kingdom, 1999.

Projected changes in global temperature:
global average 1856-1999 and projection estimates to 2100

Global average temperature in °centigrade   IPCC estimate

20° 19,8 19,6 19,4 19,2 19° 18,8 18,6 18,4 18,2 18° 17,8 17,6 17,4 17,2 17° 16,8 16,6 16,4 16,2 16° 15,8 15,6 15,4 15,2 15° 14,8 14,6 14,4 14,2 14°

High
Best (constant aerosol)
Best (increasing aerosol)
Low

1999

1850 1870 1890 1910 1930 1950 1970 1990 2010 2030 2050 2070 2090
1900   2000   2100

GRID Arendal UNEP

Source : Temperatures 1856 - 1999: Climatic Research Unit, University at East Anglia, Norwich UK. Projections: IPCC report 95.

1.7. Global and Regional Change in Temperature (IPCC 2007, WG 1, AR4, p. 11)
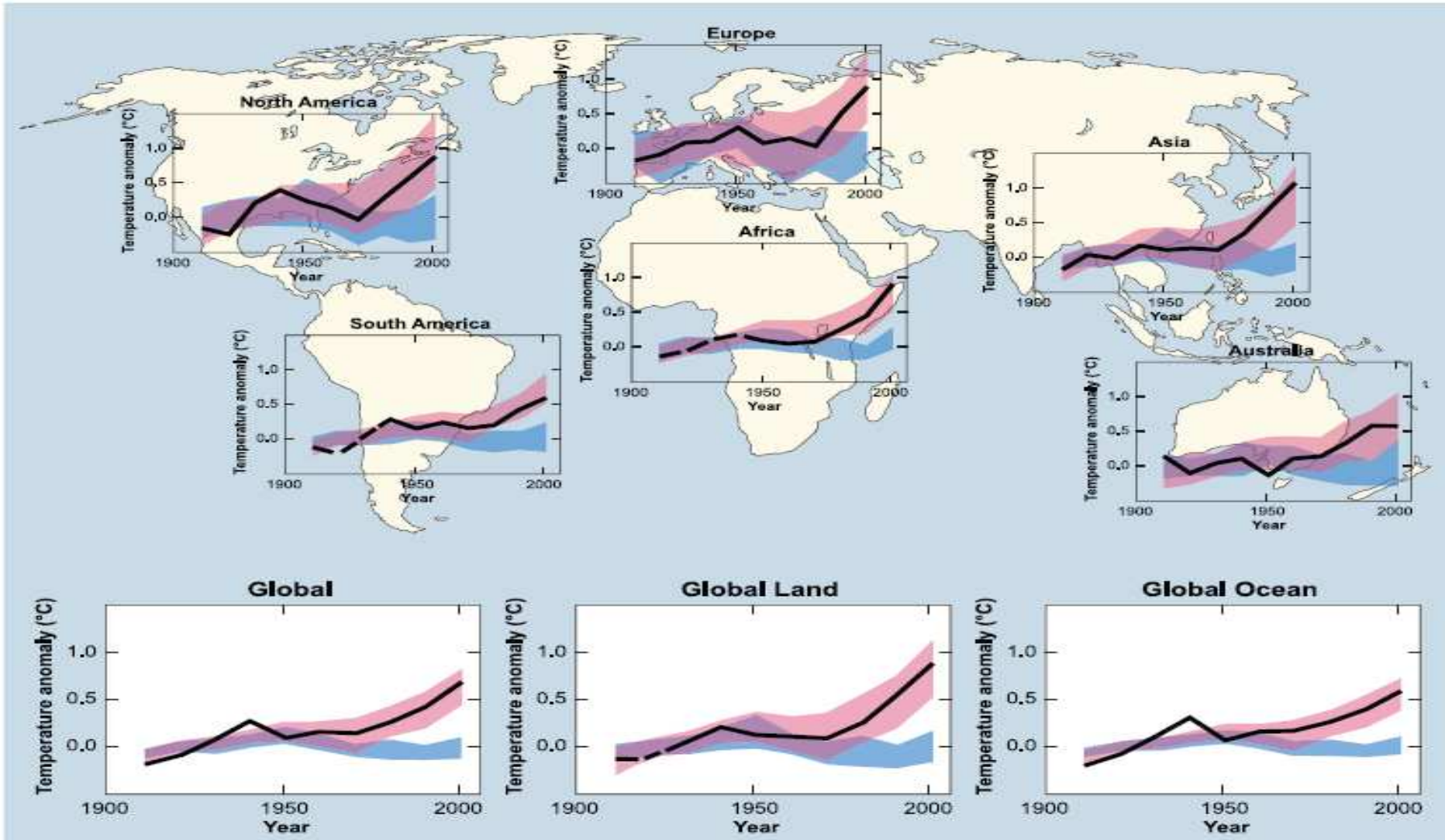
1.8. Anthropogenic Climate Change in the Anthropocene (1900-2100)
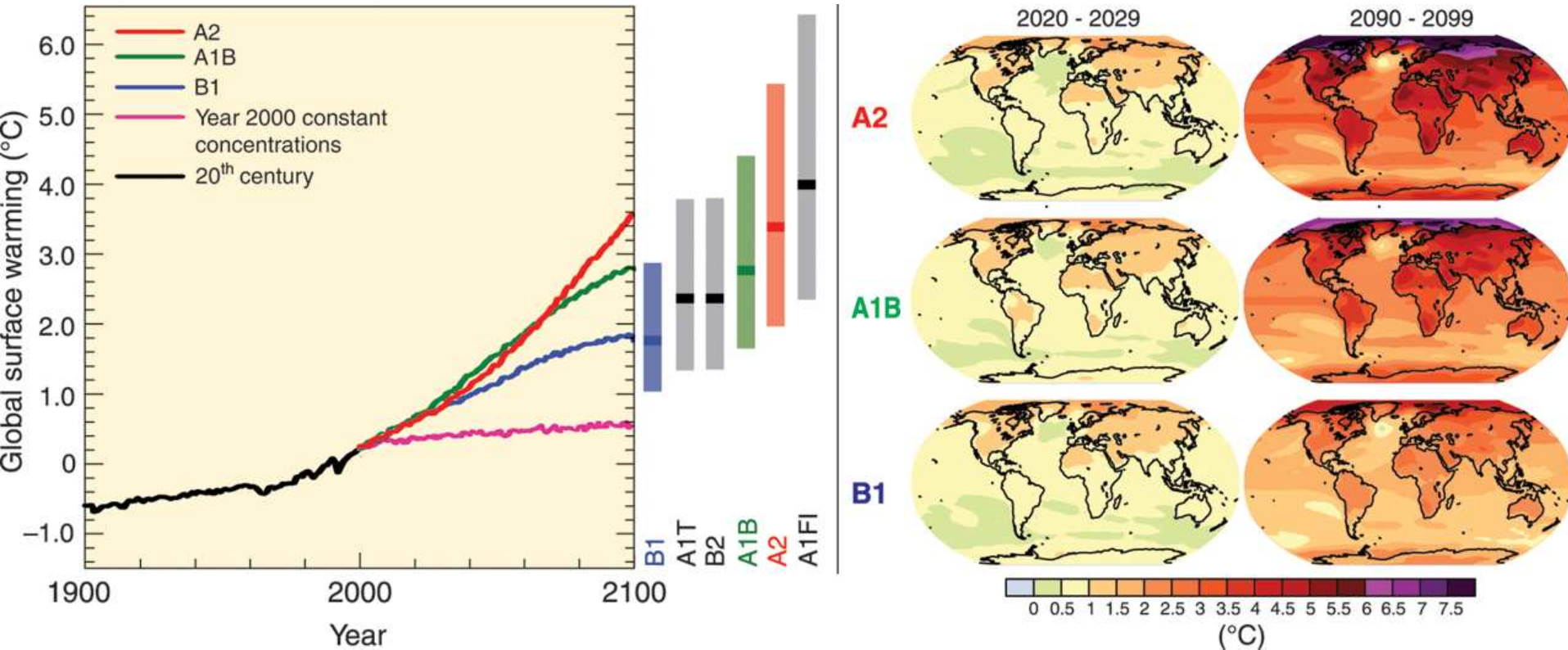
- **Three Regimes for Temperature Increase**
  - +2℃: **certain**: EU Stablization goal (**decision in Copenhagen COP 15)**
  - +4℃: **probable, without immediate Stabilizartion Measures**
  - +6℃: **possible** (business as usual) **(catastrophe scenario)**

1.9. Population Projection (2010)
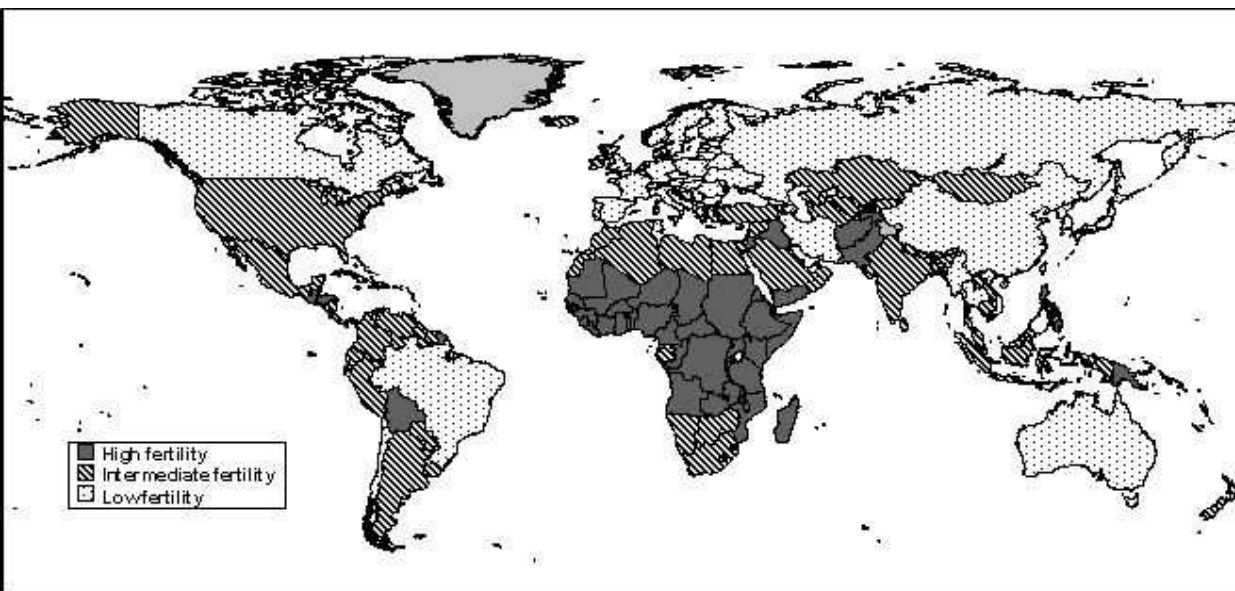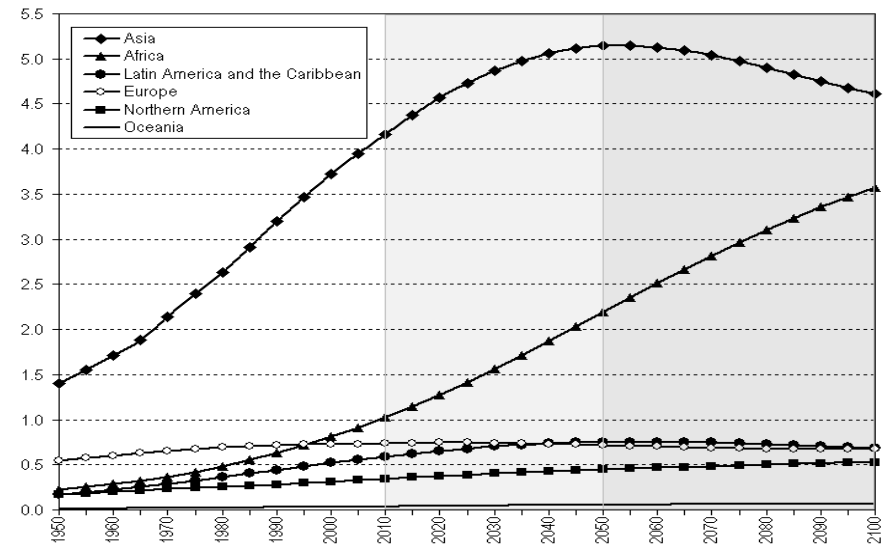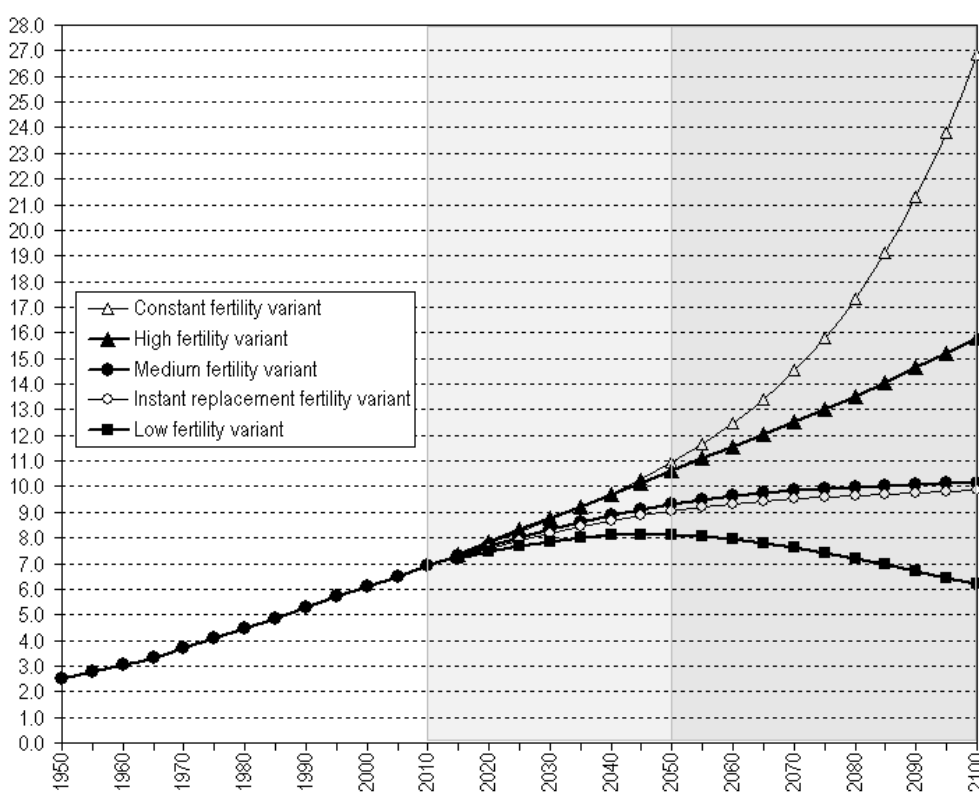
- Med. projection: 2050: 9 b, 2100: 10 b
- Asia & Africa highest increase
- Highest fertility rate in environ-mental hotspots

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1.10. Global Environmental Change (GEC)

Ecosphere

Anthroposphere

| Atmosphere |
| **Climate Change** |

| Hydrosphere |

| Biosphere |

| Lithosphere Pedosphere |

Global Environmental Change

| Societal Organisation |

| Economy |

| Transportation |

| **Population** |

| Science & Technology |

| Psychosocial Sphere |
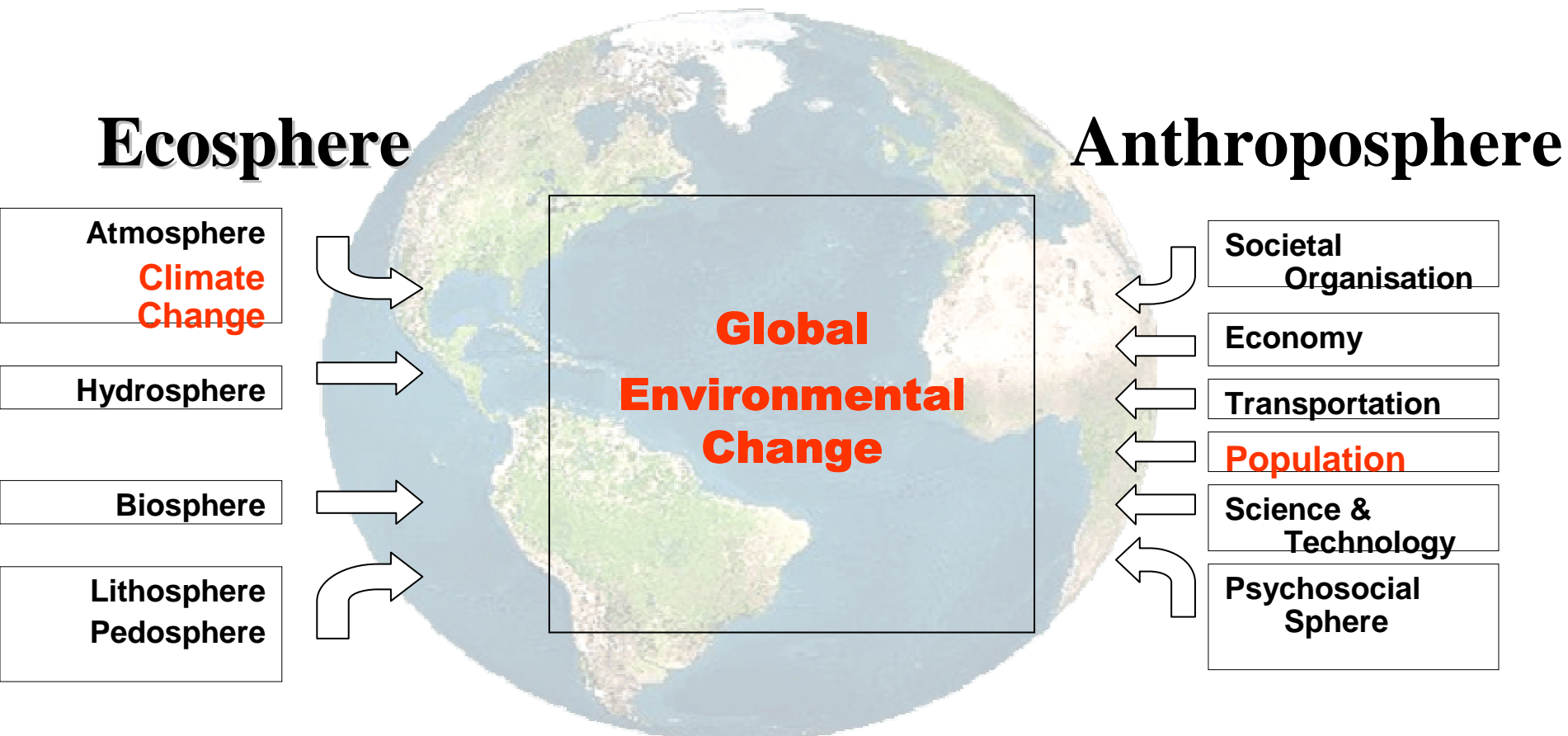
GEC poses a threat, challenge, vulnerabilities and risks for human security and survival.

1.11. IPCC: AR4, 2007 (Synthesis Report)

1.12. Global Environmental Change & Impacts: PEISOR Model

Pressure	Effect	Impact	Societal Outcome	(Policy) Response
Causes of *Global Environmental Change (GEC)*	Socio-economic interaction Environmental scarcity, degradation and stress	Natural and human-induced hazards	Individual choice (*survival dilemma*) Societal response	National and international political process, state, societal and economic actors and knowledge

Direct natural link: climate change and extreme weather events

GLOBAL ECONOMIC AND POLITICAL CONTEXT AND CONDITIONS
(*security dilemma between states in the international system*)

EARTH SYSTEMS
Water   Soil   Biodiversity

HUMAN SYSTEMS
Climate Change   Population   Rural Systems   Urban Systems   Socio-economic process

(environmental)

Degradation (soil, water, biodiversity)

Stress

Scarcity (soil, water)

Natural hydro-meteoro-logical hazards
- storm (hurricane, cyclone)
- floods, land slides
- drought, forest fire
- heat wave

Geophysical hazards
- earth quakes
- tsunamis
- volcano eruption

Technological and human-induced hazards
- accidents
- deliberate acts (terrorism)

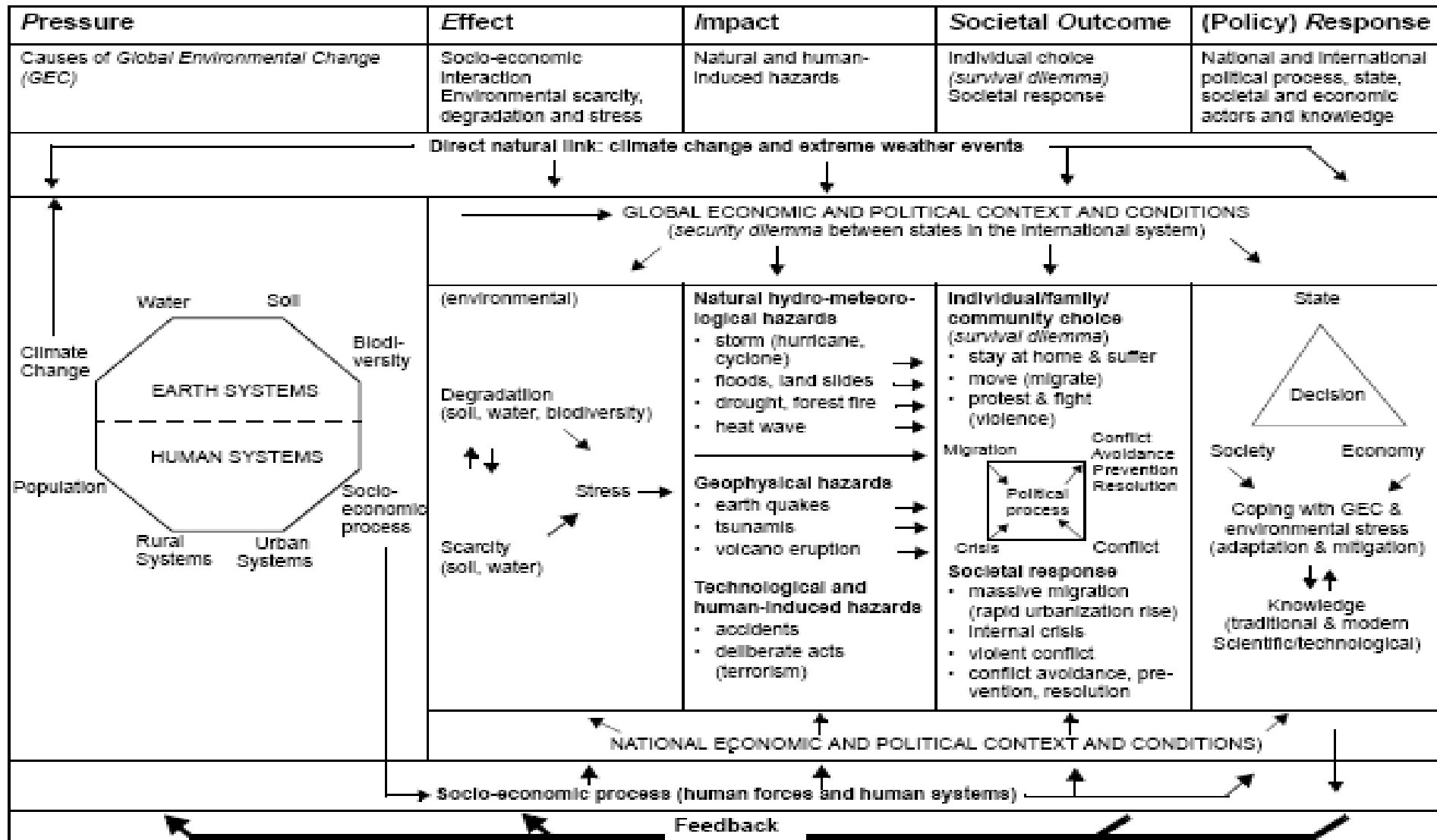**Individual/family/community choice** (*survival dilemma*)
- stay at home & suffer
- move (migrate)
- protest & fight (violence)

Migration   Conflict Avoidance Prevention Resolution
Political process
Crisis   Conflict

Societal response
- massive migration (rapid urbanization rise)
- internal crisis
- violent conflict
- conflict avoidance, prevention, resolution

State
Decision
Society   Economy

Coping with GEC & environmental stress (adaptation & mitigation)

Knowledge (traditional & modern Scientific/technological)

NATIONAL ECONOMIC AND POLITICAL CONTEXT AND CONDITIONS)

Socio-economic process (human forces and human systems)

Feedback

Effect	Impact
Socio-economic interaction	Natural and human-induced hazards
Environmental scarcity, degradation and stress	

Direct natural link: climate change and extreme weath[...]

GLOBAL ECONOMIC AND POLITI[...]
(*security dilemma* between sta[...])

(environmental)

Degradatiion (soil, water, biodiversity)

Stress →

Scarcity (soil, water)

Natural hydro-meteoro-logical hazards
- storm (hurricane, cyclone) →
- floods, land slides →
- drought, forest fire →
- heat wave →

Geophysical hazards
- earth quakes →
- tsunamis →
- volcano eruption →

Technological and human-induced hazards
- accidents
- deliberate acts (terrorism)

NATIONAL ECONOMIC AND POLITI[...]

1.13. E: Effect & I: Impact

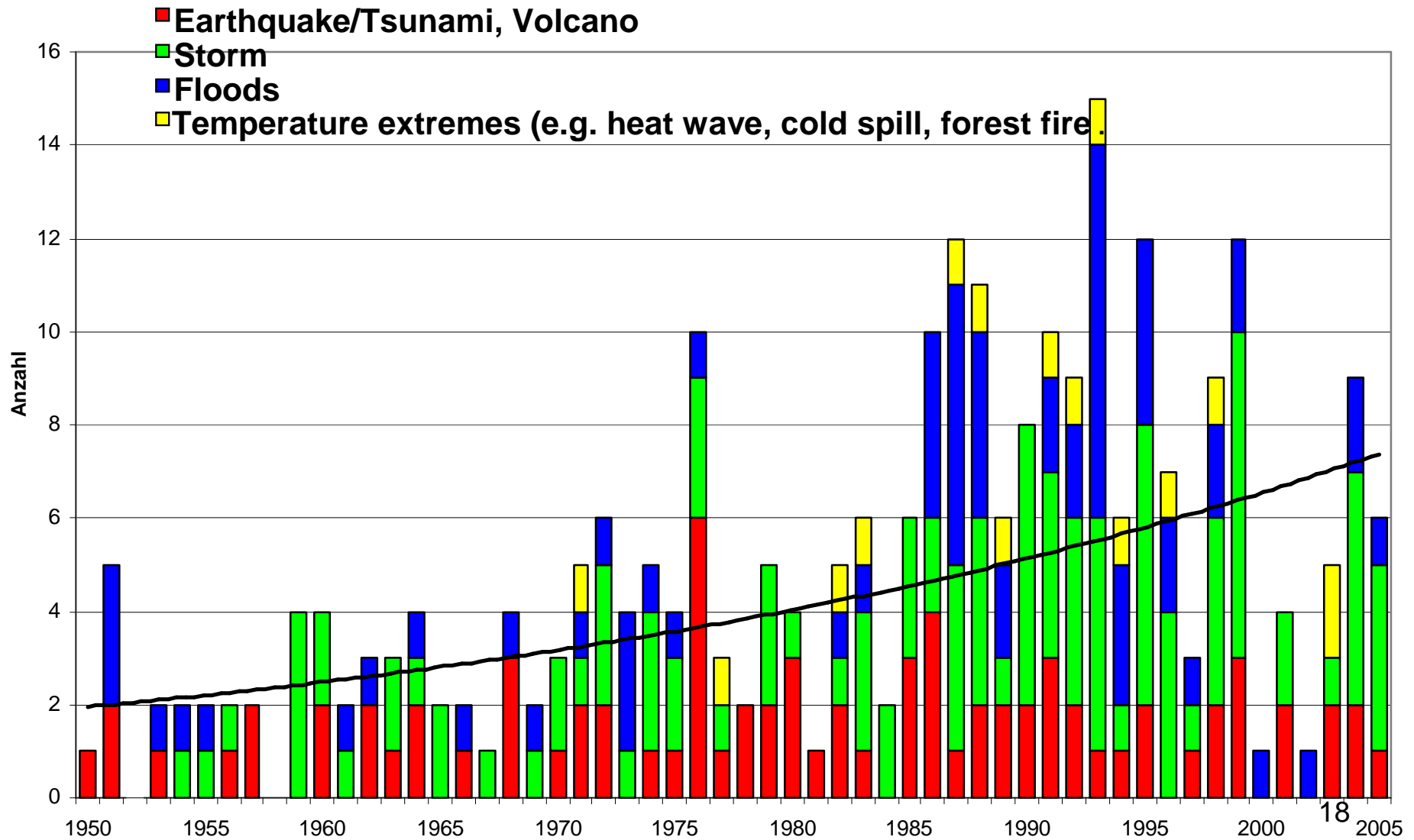- **E: Environmental security debate of 1990s**
  - Toronto school
  - Swiss school (ENCOP):
  - **Soil scarcity > degradation > environmental stress**
- **I: climate change -> extreme weather events**
  - Hydrometeorological hazards
    - **Drought (wind erosion)**
    - Heatwaves
    - Forest fires
    - Storms (hurricanes)
    - **Flash floods & landslights (wind & water erosion)**

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# 1.14. Global Impacts: Major Natural Disasters 1950 – 2005. Source: MunichRe, 2006

© 2006 NatCat*SERVICE*, GeoRisikoForschung, Münchener Rück

Legend:
- ■ Earthquake/Tsunami, Volcano (red)
- ■ Storm (green)
- ■ Floods (blue)
- □ Temperature extremes (e.g. heat wave, cold spill, forest fire.) (yellow)

Y-axis: Anzahl (0–16)

X-axis: 1950, 1955, 1960, 1965, 1970, 1975, 1980, 1985, 1990, 1995, 2000, 2005

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1.15. of Natural Hazards Globally (1974-2003):
Reported Death: 2.066.273 persons
## Affected persons: 5 076 494 541 persons
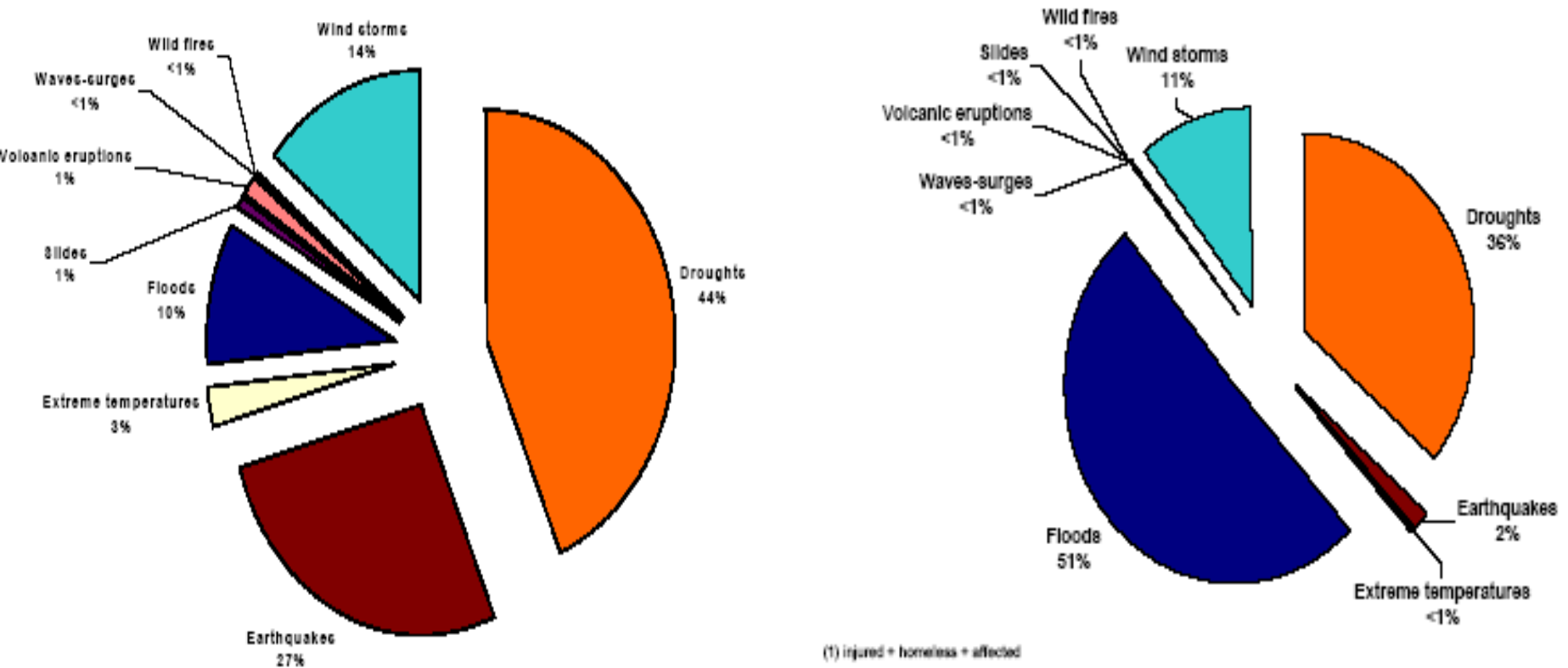
Source: © Hoyois und Guha-Sapir (2004)

1.16. A Silent Killer: Most severe droughts (1900-2008)

By the number of people killed on the country base			By the number of people affected on the country base		
Country	**Date**	**Killed**	**Country**	**Date**	**Affected (million)**
China P R.	1928	3,000,000	India	1982	300
Bangladesh	1943	1,900,000	India	2002	300
India	1942	1,500,000	India	1972	200
India	1965	1,500,000	India	1965	100
India	1900	1,250,000	India	Jun 82	100
Sov. Union	1921	1,200,000	China P. R.	Jun 94	82
China P R.	1920	500,000	China P. R.	April 2002	60
Ethiopia	May 83	300,000	India	April 2000	50
Sudan	April 83	150,000	China P. R.	June 1988	49
Ethiopia	Dec 73	100,000	China P. R.	Jan. 2003	48

Societal Outcome	(Policy) Response
Individual choice (survival dilemma) Societal response	National and international political process, state, societal and economic actors and knowledge
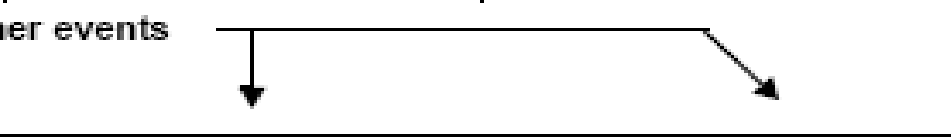
...er events

...CAL CONTEXT AND CONDITIONS
...tes in the international system)

Individual/family/ community choice (*survival dilemma*)
- stay at home & suffer
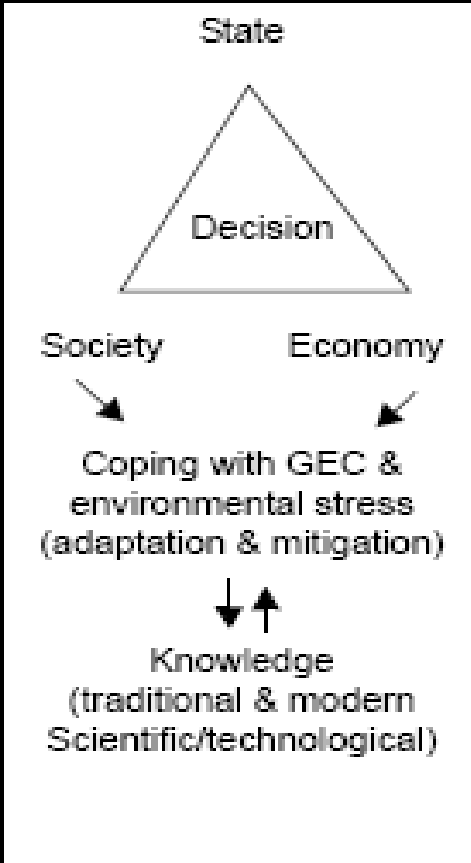- move (migrate)
- protest & fight (violence)

Migration

Conflict Avoidance Prevention Resolution

Political process

Crisis   Conflict

Societal response
- massive migration (rapid urbanization rise)
- internal crisis
- violent conflict
- conflict avoidance, prevention, resolution

State

Decision

Society   Economy

Coping with GEC & environmental stress (adaptation & mitigation)

Knowledge (traditional & modern Scientific/technological)

- **Individual level (choice)**
  - Human security perspective
  - Survival dilemma of humans
- **State/society level**
  - Hunger, famine
  - Migration to urban slums
  - Rural-rural migration
  - Transborder migration
    - Seasonal (labour,nomads)
    - Permanent
  - Crises: domestic
  - Conflicts:
    - Peaceful protests
    - Violent clashes
  - Complex emergencies

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1.18. Global Hunger Index 1990 & 2008
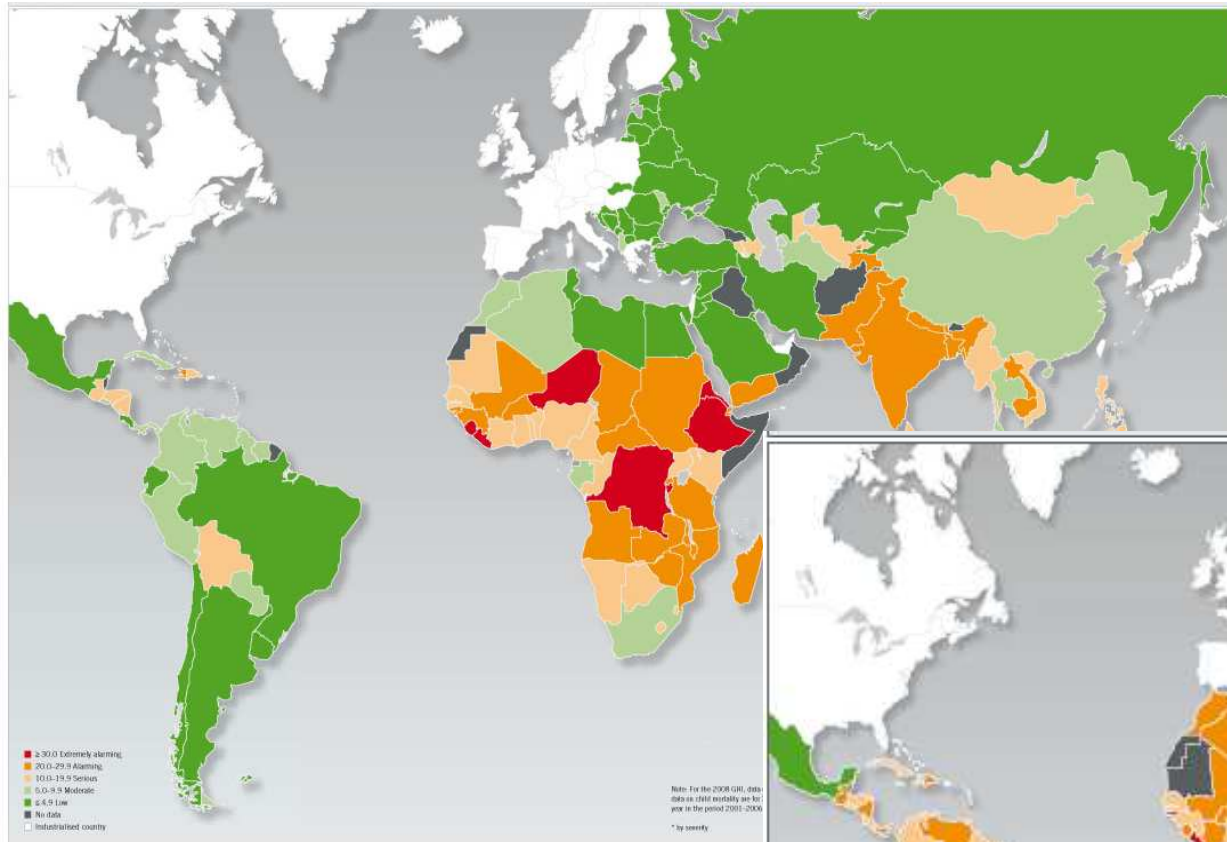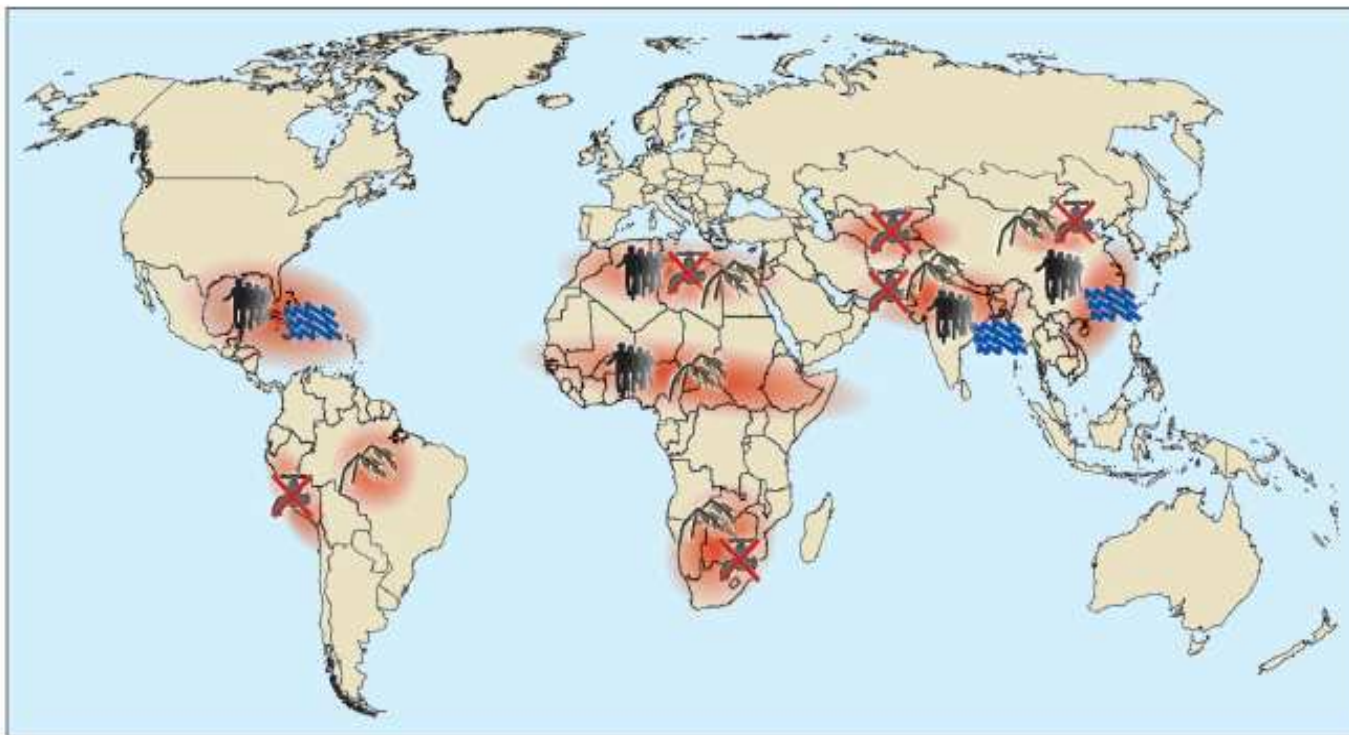

←2008 Global Hunger Index.
Country progress in reducing the Global Hunger Index between 1990 and 2008 ↓
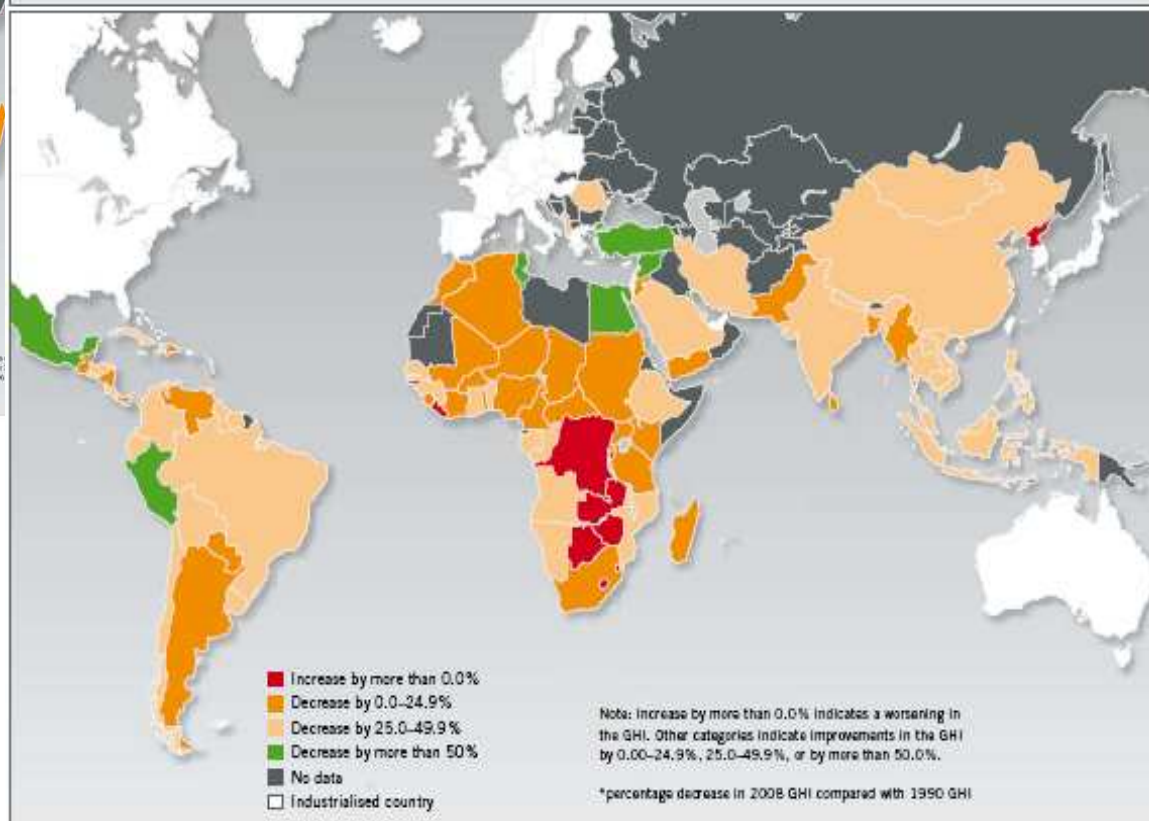
Source: IFPRI, 2008

1.19. WBGU-study: Climate ‚Hotspots': 4 Conflict Scenarios

World in Transition
Climate Change as a Security Risk

Figure 4.7: Regional hotspots and security risks associated with climate change. **Source:** WBGU (2008: 4). Reprinted with permission.

Conflict constellations in selected hotspots

Climate-induced degradation of freshwater resources

Climate-induced increase in storm and flood disasters

Climate-induced decline in food production

Environmentally-induced migration

Hotspot

- **Mediterranean**
  - Water
  - Food product.
  - **Migration**
- **South, Central and East Asia**
  - Water
  - Food product.
  - **Migration**
  - cyclone
- **Latin America & Caribbean** Wasser
  - Water
  - Food product.
  - **Migration**
  - hurricanes

1.20. Migration currents

Distance no object

Some of the world's more important current migration routes

ATLANTIC OCEAN

PACIFIC OCEAN

INDIAN OCEAN
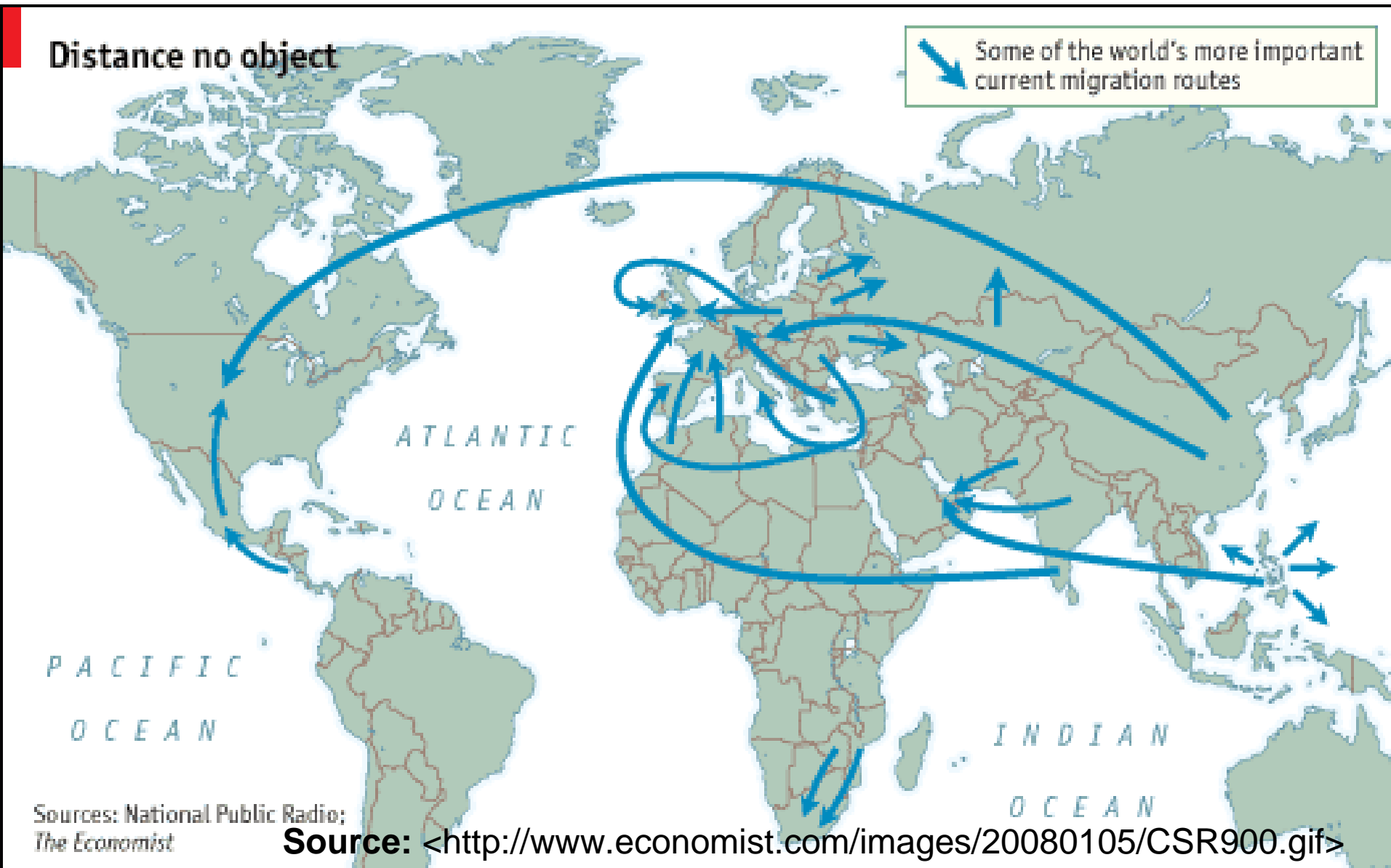
Sources: National Public Radio; *The Economist*

Source: <http://www.economist.com/images/20080105/CSR900.gif>

1.21. Global net migration
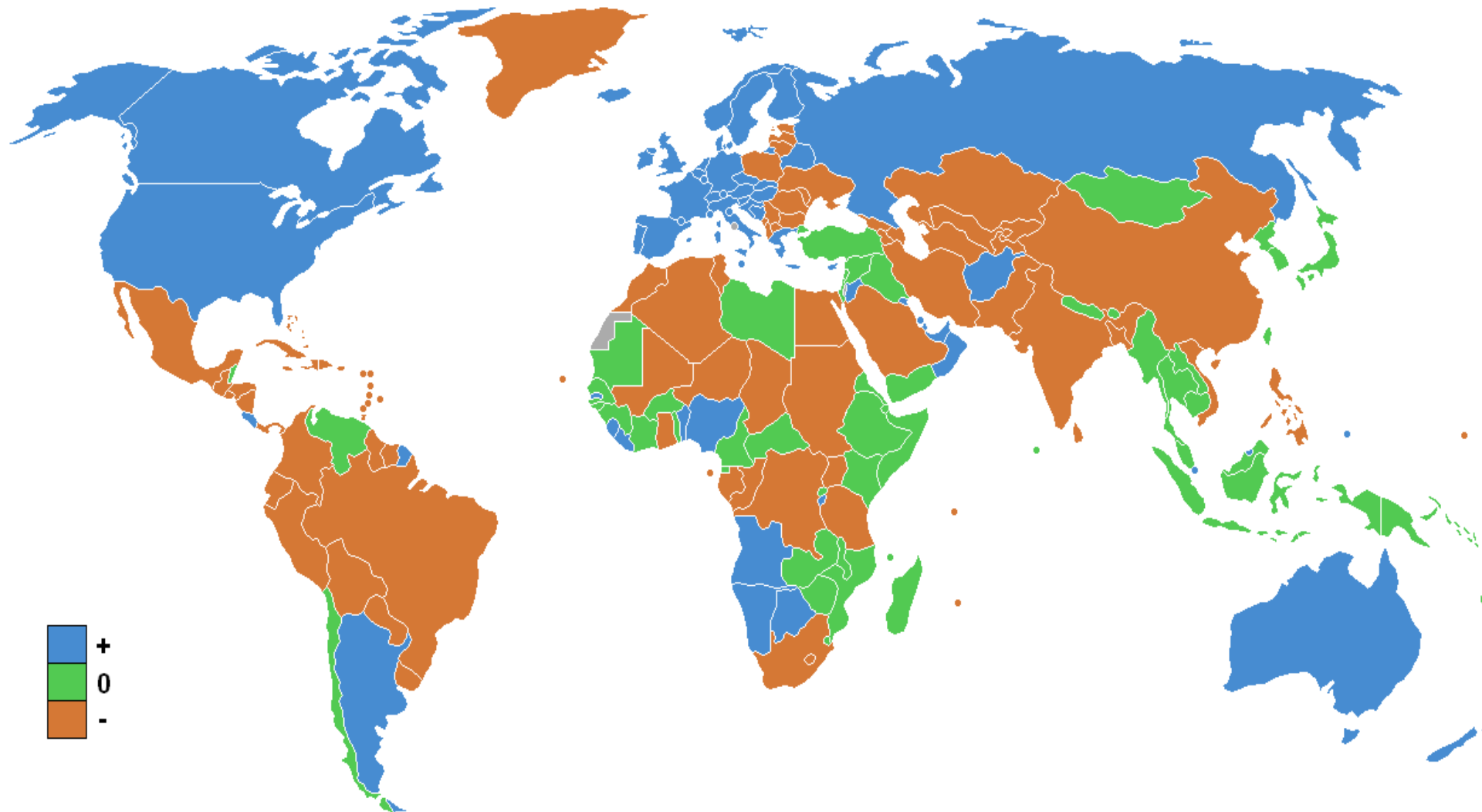
positive (blue), negative (orange). **Source:** Wikipedia, 2009

2. Climate Paradox and Policy Response

There is a scientific & political consensus

- **Global climate change is anthropogenic** (IPCC, 2007)
- **Global average temperature is projected to rise until 2100** AR4 (2007):+1.1-6.4 (1.8-4)°C
- **Sea-level will rise**: AR4 (2000-2100): 18-59 cm – Pachauri (2008): 0.6-2.4 metres
- **Major precipitation changes in climate hotspots**
- **Hazards will rise in number & intensity** (AR4)
- **Global population will rise** (med. project, UNPD, PR 2010): 9.3 bn by 2050 and above 10 bn by 2100

2.1. Legal Obligations: UNFCCC & KP

There is a weak not very specific legal commitment

- **UNFCCC (1992): Art. 2, Objective:**

  The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, **stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system**. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

- **Kyoto Protocol (1997): Art. 3,1:**

1. The Parties included in Annex I shall, individually or jointly, ensure that their aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A do not exceed their assigned amounts, calculated pursuant to their quantified emission limitation and reduction commitments inscribed in Annex B and in accordance with the provisions of this Article, with a view to reducing their overall emissions of such gases by **at least 5 % below 1990 levels in the commitment period 2008 to 2012.**

2.2. Policy Declaration: G-8 Countries G-8 agreed to reduce GHG emissions by 2050 for industrial countries by 80 %

- G8 (Britain, Canada, France, Germany, Italy, Japan, Russia, US) agreed in 2007 (Germany):
  - **50% reduction of GHG emissions by 2050**
- in 2008 (Italy), 2009 (Japan), 2010 (Canada)
  - **80% reduction of GHG by 2050 for ind. countries**
  - US$ 10 billion/year climate technology & research.
- They differed on year of reference 1990 or later
- But no agreement on legally binding targets

2.3. Policy consensus to stabilize temperature rise 2℃ above preindustrial levels by 2100

Copenhagen Accord agreed (COP 15, 2009)

„…we shall, recognizing the scientific view that the **increase in global temperature should be below 2 degrees Celsius**, on the basis of equity and in the context of sustainable development, enhance our long-term cooperative action to combat climate change."

But legally nonbinding reduction obligations

Cancun Agreements (COP 16, 12.12.2010):

- 10. *Realizes* that addressing climate change requires a **paradigm shift towards building a low-carbon society** that offers substantial opportunities and ensures continued high growth and sustainable development, based on innovative technologies and more sustainable production and consumption and lifestyles, while ensuring a just transition of the workforce that creates decent work and quality jobs;
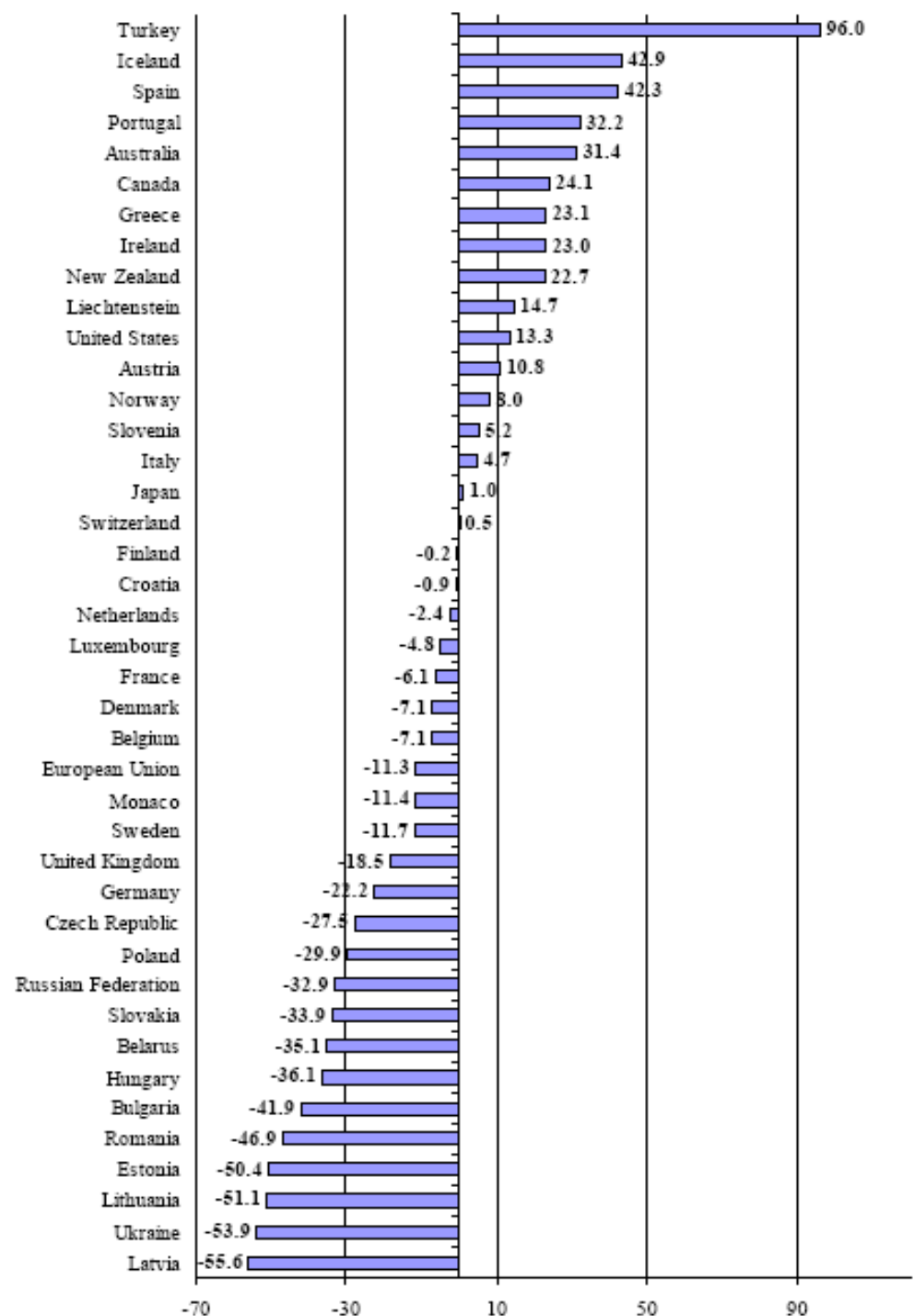
2.4. GHG Reduction Implementation Gap

QELRO, Kyoto Prot.
- **EU countries: -8%**
- **Canada: -6%**
- **USA: - 7% (no party KP)**
- **Japan: -6%**
- **Australia: +8%**

Changes in GHG Emissions: Annex I Part., 1990–2008 (exc. [incl.] LULUCF (%).
- **EU countries:-11.3 [-13.3]**
- **Canada: + 24.1 [+33.6]**
- **USA: +13.3 [+15.3]**
- **Japan: +1% [-0.2]**
- **Australia: +31.4 [+33.1]**
- **Turkey: +96.0 [101.1]**

Country	Value
Turkey	96.0
Iceland	42.9
Spain	42.3
Portugal	32.2
Australia	31.4
Canada	24.1
Greece	23.1
Ireland	23.0
New Zealand	22.7
Liechtenstein	14.7
United States	13.3
Austria	10.8
Norway	8.0
Slovenia	5.2
Italy	4.7
Japan	1.0
Switzerland	0.5
Finland	-0.2
Croatia	-0.9
Netherlands	-2.4
Luxembourg	-4.8
France	-6.1
Denmark	-7.1
Belgium	-7.1
European Union	-11.3
Monaco	-11.4
Sweden	-11.7
United Kingdom	-18.5
Germany	-22.2
Czech Republic	-27.5
Poland	-29.9
Russian Federation	-32.9
Slovakia	-33.9
Belarus	-35.1
Hungary	-36.1
Bulgaria	-41.9
Romania	-46.9
Estonia	-50.4
Lithuania	-51.1
Ukraine	-53.9
Latvia	-55.6

2.5. Failure of Climate Negotiations to Adopt Post Kyoto Regime

- **Obstacles in major industrialized countries due**
  - Economic opposition of interest groups (lobbies)
  - Short-term interest of policy makers (re-election)
  - Lack of public awareness partly due to manipulation of media
- **Lack of political will of parliaments and governments to implement policies (in USA)**
  - Bush Administration adopted 50-80 reduction goals
  - But no legally binding reduction targets for US
  - Obama: proposal -17% (now), -5% (1990) until 2020[31]

3. Two Opposite Visions

Anthropocene Two Ideal Type Future Visions:

- *Business-as-usual* where economic and strategic interests and behaviour prevail leading to a major crisis of humankind, in inter-state relations and destroying the Earth ('security' and 'market first' scenarios, UNEP 2007)

- The need for a *transformation* of global cultural, environmental, economic (productive and consumptive patterns) and political (with regard to human and interstate) relations ('sustainability first' scenario, UNEP 2007).

3.1. Two Alternative Strategies

Both visions refer to different coping strategies :

- Vision of ***business-as-usual*** suggests primarily technical fixes (such as geo-engineering, increase in energy efficiency or renewables), defence of economic, strategic and national interests with adaptation strategies that are in the interest of and affordable for the 'top billion' of OECD countries.

- Alternative vision of **comprehensive transformation** a ***sustainable perspective*** has to be developed and implemented into effective new strategies and policies with different goals and means based on global equity and social justice. ³³

3.2. Perspectives: Security & Environment

Worldviews/Traditions on security (→)	Hobbes, Morgenthau, Waltz (neo)realist (pessimist) *Power matters*	Grotius liberal pragmatist *Cooperation matters*	Kant Neo-liberal institutionalist (optimist) *International law matters and prevails*
Standpoints on environmental issues (↓)			
Neomalthusian pessimist *Resource scarcity*	I	II	III
Equity-oriented pragmatist *Cooperation will solve problems*	IV	V International organisations and regimes	VI
Cornucopian neo-liberal optimist. *Technological ingenuity will solve problems*	VII	VIII	IX

Business as usual
- Hobbesian
- Neo-Malthusian
- Cornucopian
- Neoliberal

Alternative
- Kantian
- Grotian
- Equity-orien-ted pragmat.
- Sustainability transition

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4. Coping Strategies: Business-as-Usual

- **Instant Response: Discredit the message & attack the messenger: 2009: Attack on IPCC**

- **Coping with Climate Change Impacts:**
  - **Market will provide means** for coping with physical climate change effects: **Washington neoliberal consens.**
  - **Military Protection:** Adjust military strategies, missions and tools to be able to operate under conditions of dangerous climate change („militarization"): **Hobbesian**
  - **Develop the technologies:** Geo-engineering schemes, strategy of energy independence: **Cornucopian**

- **No Need for a Sustainability Revolution**

4.1 Business-as-Usual: Hobbesian World

- *Business-as-usual* in a **Hobbesian world** where economic and strategic interests and behaviour prevail leading to a major crisis of humankind, in inter-state relations and destroying the Earth as the habitat for humans and ecosystems putting the survival of the vulnerable at risk.

- In this vision of ***cornucopian perspectives*** prevail that suggest primarily technical fixes (geo-engineering, increase in energy efficiency or renewables), defence of economic, strategic and national interests with adaptation strategies that are in the interest of and affordable for the 'top billion' of OECD countries in a new geopolitical framework, possibly based on a condominium of a few major countries.

- This vision with minimal reactive adaptation and mitigation strategies will increase the probability of a '**dangerous climate change' or catastrophic GEC** with both linear and chaotic changes in the climate system and their socio-political consequences that represent a high-risk approach.

5. Fourth Sustainability Revolution

- 2nd vision for a *transformation* of global cultural, environmental, economic (productive and consumptive patterns) and political (with regard to human & interstate) relations

- In the alternative vision of a comprehensive transformation a *sustainable perspective* has to be developed and implemented into effective new strategies and policies with different goals and means based on global equity and social justice.

5.1 Alternative Vision

- The alternative sustainability perspective requires a change in *culture* (thinking on the human-nature interface), ***worldviews*** (thinking on the systems of rule, e.g. democracy vs. autocracy and on domestic priorities and policies, interstate relations), ***mindsets*** (strategic perspectives of policy-makers) and new forms of national and global *governance*.

- This alternative vision refers to the need for a "**new paradigm for global sustainability**" (Clark/Crutzen/Schellnhuber 2004), 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 after "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"

5.2. WBG (2011): New Social Contract for a "Global Transformation"

- **WBGU explains reasons for a ‚post fossil-nuclear metabolism' concluding that the transition to sustainability is achievable.**

A New Social Contract

- **Transformation into a sustainable society requires a modern framework for nine billion people for living with each other, and with nature: a new Contrat Social.**

- **This virtual social contract relies on each individual's self-concept as a responsible global citizen. This contract is also a contract between generations.**

- **Science plays an essential role here, as for the first time in history, a profound transition is not caused by imminent necessity, but by precaution and well-founded insight. In this respect, the social contract also represents a special agreement between science and society.**

- **A new culture of democratic participation through the appointment of ombudsmen … to ensure the protection of future-oriented interests. Sustainability-oriented approach can be given a secure, firm footing through the inclusion of 'climate protection' in the constitution as a national objective, and through establishing a climate protection law.**

- **A low-carbon transformation can only be successful if it is a common goal, pursued simultaneously in many of the world's regions.**

- **Therefore, the social contract also encompasses new ways of shaping global political decision-making and cooperation beyond the nation state.**

5.3. WBG (2011): 2 Strategies

WBGU sees two ideal, typical transformation options

- **Polycentric strategy:** The current climate protection endeavours in different sectors & levels are bundled and considerably stepped up. Measures which, taken on their own, have little transformative impact can, through clever mixing and skilful combination, have a far greater impact and generate unexpected movement. A societal tipping point can be reached, beyond which resistance to the transformation significantly decreases, the requisite political willingness grows, and the acceleration gains considerable momentum.

- **Focused strategy:** on concentrating on just a **few major course changes** that can have **high transformative impact** – but which a great number of the protagonists currently view as unrealistic, because they would need to be pushed through in the face of **powerful forces insistent on preserving the status quo.** Some major course changes are necessary to achieve the scale & speed the transformation into a low carbon society needs to reach.

Both polycentric and focused transformation strategy are aiming for a 'Great Transformation', though, hence both differ from the incremental politics of short-term crisis management and the ever-procrastinating negotiation of compromises.

5.3 Ten Packages of Measures

GHG emissions are primarily caused by the energy industry & land-use, related to rapid global urbanisation. 3 key fields requiring transformation. 10 packages of measures that are particularly suitable for accelerating and extending the transition to sustainability.

- **The state** should show conscious awareness of its **enabling and proactive** role to advance **global decarbonisation**. This must offer citizens extensive opportunities for participation.

- **GHG CO2** should globally be given an 'commensurate' **global price** as soon as possible.

- A **European energy policy** aiming for a fully **decarbonized energy system by 2050** at the latest should be developed and implemented at once. A direct objective should be the promotion of partnerships with North Africa.

- **Feed-in tariffs for renewable energies** should be introduced worldwide.

- A top priority for any development policy should be to provide access to **sustainable energy to 2.5 to 3 billion people in developing countries** currently living in energy poverty.

- A huge effort to steer the world's **accelerating urbanisation towards sustainability**.

- **Land-use can and should become climate-friendly**, in particular forestry and agriculture.

- **Financing of the transformation** and the massive investments required should increasingly rely on **new business models** that help to overcome current investment barriers.

- Within international climate policy, **states should continue to work towards an ambitious global treaty**. Multilateral energy policy promote global transfer of low-carbon technolog.

- The **UN** should be brought into a position where they can make effective contributions to the transformation. **Development organisations** should be reorganised into transformation agencies for sustainable development. The **G2**0 should draft a road map for economic development that takes into account the planetary boundaries. **The Rio+20 conference** in 2012 is a unique chance to set the global course towards low-carbon development.

6. Policy Response – Four Actors:
State, Society, Economic Sector, Knowledge

- Key actors for development and implementation are:
  - **States:** initiate, fund and implement strategies, policies & measures for a fourth sustainability revolution
  - **Society** (parties, interest & pressure groups, NGOs, lobbyists): public awareness, discourse, social movements for sustainability transformation
  - **Economic sector & business community:** develops and offers technical and economic solutions
  - **Knowledge** (generation & education): source for innovation

7. Role of Knowledge

- The fourth sustainability revolution must be knowledge-based!

- The great transformation of the industrial revolution relied on new innovative scientific and technological knowledge that is either the result of inventions or resulted in new innovations.

- Despite its already widely accepted objectives and the many viable low-carbon technologies already available to us, the transformation is a joint quest.

- Research and education are tasked with developing sustainable visions, in co-operation with policy-makers and citizens; identifying suitable development pathways, and realising low-carbon and sustainable innovations.

- The WBGU recommends intensified refocusing of national and international research towards the Great Transformation, and the provision of the requisite funds. The relevant scientific findings must also be made accessible and understandable to allow people to accept the change and to participate democratically in the transformation.

7.1. Four Knowledge-based Concepts of for Alternative Vision

- Key concepts of the alternative vision of a new fourth 'sustainable revolution' are a radical change in *culture, worldview, mindset* and *participative governance* in the thinking and action on sustainability laying out an alternative development path with a total transformation of productive and consumptive processes aiming at equity, social justice, and solidarity with the most vulnerable and marginal people and the poorest countries.

- This lays out an alternative development path with a **total transformation of productive and consumptive processes** aiming at equity, social justice, and solidarity with the most vulnerable and marginal people and the poorest countries.

8. Worldview of Scientists

- *Worldview* concept evolved from 'Weltanschauung' that refers to a wide world perception and to a **framework of ideas and beliefs through which individuals interpret the world &** interact with it.

- A comprehensive worldview includes the **fundamental cognitive orientation of a society, its values, emotions, and ethics** through which a society or a group interprets the world in which it interacts.

- Worldview is the **fundamental cognitive, affective, & evaluative presupposition a group of people makes about the nature of things**, & which they use to order their lives.

- The **'construction of integrating worldviews'** begins from fragments of worldviews offered to us by different scientific disciplines and various systems of knowledge to which different perspectives contribute in the world's cultures.

- **Gert Krell** used this concept for distinguishing among several macro-theoretical approaches in international relations.

9. Mindset of Policymakers

- The concept of *mindset* includes a fixed mental attitude or disposition that predetermines a person's responses to and interpretations of situations by referring to different patterns of perceiving and reasoning.

- Fisher used it as 'cultural lenses' that filter our view of and reaction to the world. With regard to the 'Fourth Sustainable Revolution' this concept refers to a discussion of a post-carbon society, where solidarity, equity, and social justice are the key drivers instead of the maximization of profits and the destruction of the Earth without thinking of the next generations or of the collapse of ecosystems.

- **Ken Booth** mindsets "freeze international relations into crude images, portray its processes as mechanistic responses of power and characterize other nations as stereotypes". Many mindsets have survived the fundamental global contextual change of 1989/1990, as the Cold War "exists as our living past, and it exerts a powerful presence by being both remembered and forgotten in complex ways".

10. Political Urgency and Research Agenda: Towards a Fourth Sustainability Revolution

Glooming Prospects for Post-Kyoto Regime: Paralysis

- Prospects for Post-Kyoto climate regime at COP 17 in Durban are low

- At present it becomes increasingly unlikely to realize the 2°C world

- Probability of 'dangerous climate change' increases dramatically

- This increases the probability that thresholds in the climate system may be crossed, that tipping points may be unleashed, triggering cascading processes as: 'Arabellion' and 'Fukushima nuclear disaster'

Business-as-usual paradigm prevails in politics & media

- In light of global financial crisis, the sense of urgency for proactive climate action has declined since 2009 prior to Copenhagen (COP 15)

- The US government is paralyzed due to ideological confrontation within the US Congress and between the Senate & the House

- Lack of urgency among BASIC countries to accept commitments. [47]

10.1 Emerging Research Agendas

Strategy for Sustainable Transition Requires Changes in the Scientific System of Knowledge Production

- **Edward O. Wilson (1998)** noted a growing *consilience* (interlocking of causal explanations across disciplines) in which the "interfaces between disciplines become as important as the disciplines themselves" that would "touch the borders of the social sciences and humanities."

- **Clark, Crutzen and Schellnhuber (2004)** called for a 'second Copernican Revolution in earth systems science' & a 'new paradigm of sustainability' and new 'Contract for a Planetary Stewardship'

- **Grin, Rotmans and Schot (2010)** reviewed "Transitions to Sustainable Development: New Directions in the Study of Long Term Transformative Change"

- **Huff (2011)** discussed past "Intellectual Curiosity and the Scientific Revolution" in Western and Non-western Cultures (Confucianism, Hinduism and Islam)

- **Brauch, Dalby and Oswald Spring (2011)** suggested a new 'Political Geo-ecology for the Anthropocene" by bringing politics and security into Earth Systems Science and its key results into the social sciences

- **WBGU (2011)** proposed a new "Social Contract for a Global Transformation" [48]

10.2. WBGU (2011): Knowledge Society in the Transformation Process: Recommendations for Research and Education

transformation research (Tr)

transformation education (Te)

transformative research (tR)

transformative education (tE)

Transformation Research
– The WBGU proposes a new scientific 'transformation research', which addresses the future challenge of transformation realisation. This discipline explores transitory processes in order to come to conclusions on the factors and causal relations of transformation processes.

Transformative Research
– The WBGU uses the expression transformative research (tR) to describe research that actively advances the transformation. Transformative research supports transformation processes with specific innovations in the relevant sectors.

10.3 WBGU (2011): Research Proposals

- Science and research should dedicate themselves even more to the low-carbon transformation within the context of sustainability.

- Research should focus more on transformation-relevant issues and subjects and the new field of transformation research.

- It should increasingly meet a number of structural demands, such as, for example, a systemic, long-term, cross- and transdisciplinary direction.

- It should develop technological and social low-carbon innovations, evaluate these, and assess the required conditions for their global diffusion.

- This also includes the development, evaluation, and public discussion of strategies and policy options. Accordingly, research programmes should reflect these demands.

10.4 WBGU (2011): Research Proposals (2)

- The WBGU calls for a new, **'transformation research', on transformation processes & social preconditions** within the scope of planetary boundaries. WBGU proposes a joint societal research & discussion process.
- **Additional R&D funding is required** & should be consolidated at EU and international level.
- The WBGU suggests direct public spending in the industrialised countries on R&D in the **energy field tenfold**, largely through reallocation.
- The current funds for the BMBF **sustainability research**, particularly the framework programme '**Research for Sustainable Development', and 'Socio- Ecological Research' (SÖF**) should be significantly increased, and SÖF's global perspectives should be considerably extended.
- **Interdisciplinary research** should be supported by concrete measures. This requires changing existing incentive systems, & introducing new ones.
- In the **8th EU Framework Programme for Research**, the German federal government should lobby for a stronger focus on the transformation; environment and energy research should be given particular weight.
- Internationally, **Germany and the EU should forge stronger research alliances with research centres in emerging economies**. Germany should step up the promotion and support of education, science and research capacities in the less developed countries.

10.5. Implications for the Social Sciences

- The challenge of research on the societal impacts of global environmental change in the Anthropocene requires an understanding of the **observed and projected changes** within the **earth system** and its **physical and societal impacts for the human systems, i.a. an analysis of earth systems sciences.**

- This requires increased funding for multi-, inter- and transdisciplinary research to address the '**consilience**' of the sustainability paradigm.

- Research on sustainability transition may not be limited to a research agenda of the priorities, pathways & strategies towards sustainability

- For **sociology and political science** it requires to address 'cascading processes' in the 'world risk society' stimulated by the ‚principle of *precaution through prevention*' (Ulrich Beck, 2011).

- For international relations, security and peace research this requires conceptual research on the conditions and possibilities of a sustainable peace as a global political framework for a sustainable transition. [52]

10.6 Implications for International Relations

- **Is transformation research - suggested by WBGU - relevant for IR and specifically for security & peace research?**
- Previous WBGU report: Security Risk Climate Change (2007): impact on securitization of CC in EU (2008), UN (2007, 2009, 2011) in the contact of international security (goal conflict prevention), but in the US primarily in the context of national security (as new tasks for the adaptation of the US military)
- 2 types of policy response: concepts matter
  - Reactive policies. Discourse on national security
  - Proactive polices: discourse on international, human, environmental security
- Goal: link transition towards sustainability with goal of a sustainable peace requiring a proactive peace policy to address potential climate-induced causes of conflicts and wars.
- **Task of value-oriented or normative conceptual and policy-relevant peace and security research.**

11. Seminar Description

- **25 years after the publication of the Brundtland Report (1987).**
- **20 years after the first UN Conference on Environment and Development (UNCED) in Rio de Janeiro (1992)**
- **15 years after the adoption of the Kyoto Protocol (1997)**
- **Rio+20:** governments are scheduled to assess the achievements since 1992 and to pass decisions for the next 2 decades (Rio+20) including a re reassessment of the policy goals and institutions. However, the international community is confronted with a major implementation and credibility gap.
- While the G-8 (Canada, France, Germany, Italy, Japan, Russia, UK, USA) have announced since 2007 that they aim at a global reduction of greenhouse gases by 50% and for themselves by 80% until 2050 compared with 1990, however, many of them have failed to implement their commitments under the UNFCCC (1992) and the Kyoto Protocol (1997) **and it is uncertain whether until December 2012 a legally binding post-Kyoto agreement will be adopted**.
- Humankind is confronted with a **climate paradox** to continue strategies of business as usual determined by political short-termism and prevailing economic interests or to move towards another fundamentally different sustaina-bility paradigm.
- In 2003, leading natural scientists called at a **Dahlem conference** for a new **"Copernican Revolution" (Clark/Crutzen/ Schellnhuber 2004),** while social scientists sugge-sted to move towards a **"fourth sustainability revolution" (Oswald Spring/Brauch 2011)** that would require a fundamental change in the worldview of scientists, of the mindsets of policy-makers, in the way of life and consumption patters of people as well as in the production processes that would require a gradual decarboniza-tion of economic production processes.

11.1 Obligatory Reading

1. *WBGU: Welt im Wandel: Gesellschaftsvertrag für eine Große Transformation* **(Berlin 2011),** free download (in German) at:
   http://www.wbgu.de/veroeffentlichungen/hauptgutachten/ hauptgutachten-2011-transformation/

   Figures: <http://www.wbgu.de/veroeffentlichungen/hauptgutachten/hauptgutachten-2011-transformation/hauptgutachten-2011-abbildungen/>

1. **World in Transition – A Social Contract for Sustainability** - A contribution to the Rio+20 conference 2012 (free download in English) at: <
   <http://www.wbgu.de/fileadmin/templates/dateien/veroeffentlichungen/hauptgutachten/jg2011/wbgu_jg2011_en.pdf />.

2. **Clark, W.C. /P.J. Crutzen/H.J. Schellnhuber: "Science and Global Sustainability: Toward a New Paradigm", in: Schelln- huber/Crutzen/Clark/Claussen/Held (Eds.):** *Earth System Analysis for Sustainability*, **2004: 1-28.**

3. **Ursula Oswald Spring – Hans Günter Brauch:** "Coping with Global Environ- mental Change – Sustainability Revolution and Sustainable Peace", in: Brauch et al. (eds., 2011): *Coping with Global Environmental Change:* 14875-1504.

11.2 Observing the Rio+20 Process

- Please subscribe to free list of the International Institute for Sustainable Development (IISD): ***Sustainable Development Policy & Practice*** - A Knowledgebase of International Activities Preparing for UN Conference on Sustainable Development (Rio +20) <http://uncsd.iisd.org/>

- You will receive many Emails on the global debate in the Preparation of Rio+20 that will result in a summit in June 2012 that will set the goals & agenda for the next 20 years until 2032.

11.3 Seminar Plan (WS 2011/2012)

- **Friday, 18.11., 18.30-20.00: From the Holocene to the Anthropocene: The Great Global Transition: Towards a Fourth Sustainability Revolution (WBGU Report 2011)**

- **Saturday, 19.11., 8.15-17.15: Global Environmental Change & Sustainability Revolution**

- **Friday, 25.11., 14.00-20.00: Fourth Sustainability Revolution: Changing worldviews & mindsets, culture & governance?**

- **Saturday, 26.11., 8.15-17.15: Implementing the Fourth Sustainability Revolution (2050)**
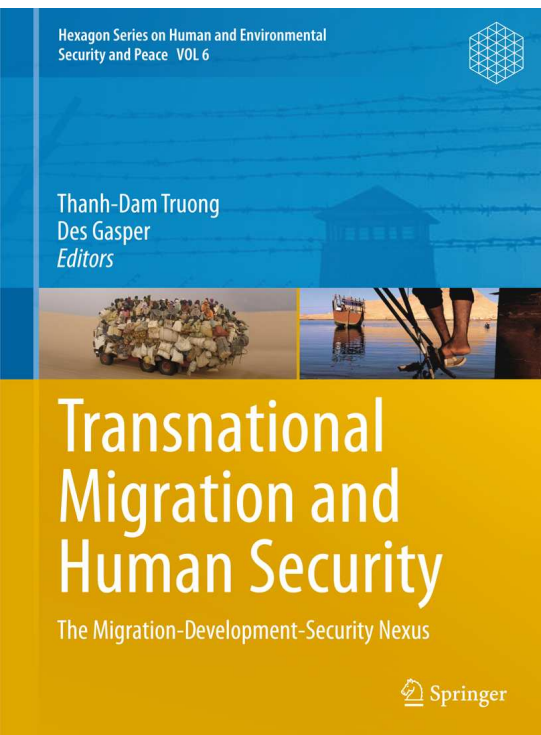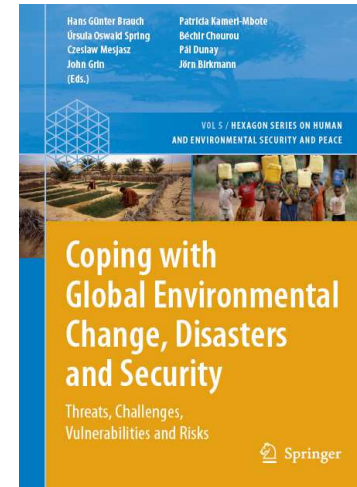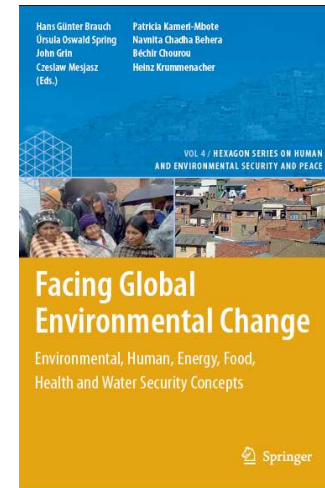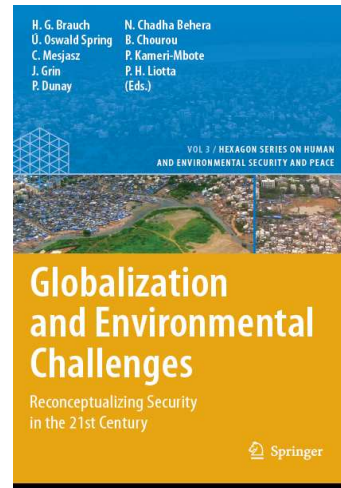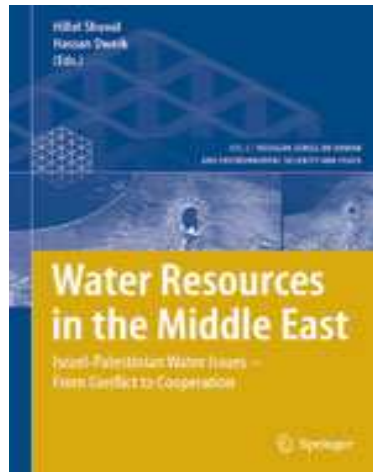
11.4: 16 Seminar Sessions

1. **18.10.** Brauch Opening lecture:

2. **18.11.:** Brauch lecture: From Holocene to Anthropocene: Change in earth history & political geo-ecology for the Anthropocene: Relevance for international relations (IR)

3. **19.11.:** Kuhn's structure of scientific revolutions: the theoretical argument

4. First three revolutions: agricultural, industrial, and communication (IT) revolutions

5. Global environmental change: Impacts on political revolutions of 1789, 1848, 1911, 1917 and 2011 (Arab revolution): Deficits of theories of revolution in political science

6. The climate policy paradox: Promises without commitment: G8's credibility gap

7. The call of natural scientists for a new 'Copernican Revolution' of the knowledge

8. **25.11.:** Perspective of the WBGU: A new social contract for a new global transformation

9. Elements of a 'Fourth Sustainability Revolution'

10. Changing worldviews of scientific disciplines, of political science and IR

11. Changing the mindsets of policy makers

12. **26.11.:** Implementing the 'fourth sustainability revolution' until 2050

13. The goal of a sustainable transformation of the world economy: UNEP & OECD vision

14. Changing energy policies: Decarbonization of the global economy

15. Sustainable development with a sustainable peace

16. Implementing the goal of a sustainable peace: Action goals for the EU and the UN

11.5 Seminar presentations & written seminar papers (Hausarbeiten)

- The seminar presentations will offer an **overview of an emerging scientific and policy debate** on the need to move from *business-as usual strategies* towards a transition towards *strategies for transition towards sustainability* and offer scientific **tools for assessing** the global policy process on Rio+20 that will start in November in the UN context and result in the decisions to be adopted at the Earth summit in Rio de Janeiro in June 2012. **Two types of seminar papers are possible:**

- a) **development of the topic of the oral presentation into a seminar paper of ca. 5000 words;**

- b) application of tools & new knowledge to analyse the Rio+20 process. These topics can be arranged with me according to your specific interests but they must be approved by me.

- **Submission dates: 30 April 2012 (first deadline) and 30 August 2012 (second deadline).**

Hexagon Series: Free Bibliography

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

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

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H. G. Brauch, Ú. Oswald Spring, C. Mesjasz, J. Grin, P. Dunay, N. Chadha Behera, B. Chourou, P. Kameri-Mbote, P. H. Liotta (Eds.)
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Coping with Global Environmental Change, Disasters and Security
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The Migration-Development-Security Nexus

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

Forthcoming Volumes

Scheffran, Jürgen; Brzoska, Michael; Brauch, Hans Günter; Link, Peter Michael; Schilling, Janpeter (Eds.): *Climate Change, Human Security and Violent Conflict: Challenges for Societal Stability*. Hexagon Series on Human and Environmental Security and Peace, vol. 8 Berlin – Heidelberg – New York: Springer-Verlag, 2011).

Czeslaw Mesjasz: *Stability, Turbulence or Chaos? Systems Thinking and Theory and Policy of Security*. Hexagon Series on Human and Environmental Security and Peace, vol. 9 (Berlin – Heidelberg – New York: Springer-Verlag, 2011), in planning.