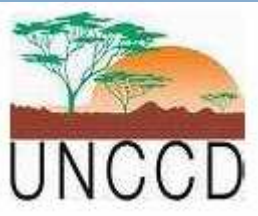




Hans Günter Brauch

Global Environmental Change and Security for the People



ITKNET
International Traditional Knowledge Network Conference



Climate Change, Desertification, Environmental Conflicts and Migrations

An International Network of Experts on
Traditional Knowledge for a Common Strategy

28-20 June 2007, Florence, Italy

Sala Giunta Regione Toscana, Via Cavour 19



REGIONE
TOSCANA



INCO FP6 - RESOURCENET project
Funded by European Commission



Nato Linkage Grant



IPOGEA

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- 9. Security for the People: Them or US?**
- 10. Traditional Knowledge for Security for the People**

1. Introduction: Focus of the Talk

- Link of *Global Environmental Change* as an anthropogenic and natural process with *Security* as a key policy field?
- *Security for the people*: goals & means of
 - Environmental Dimension of Security
 - International and National Security
 - Human Security: four pillars
 - Water, Food, Health & Livelihood Security

1.1 Introduction: Policy Context

■ **UN Charter Preamble:**

- **We the Peoples of the UN determined**
- Focus on: ‘international peace and security’
- No reference to environment & development & security linkage

■ **UNDP 1994: ‘human security’ & ‘development’**

■ **UNESCO: ‘human security’ in strategy (2002-2007)**

■ **UNCCD: topic of CRIC 3 (2005) Third IYCD (2006)**

■ **OSCE, UNDP, UNEP & NATO: ENVSEC initiative**

■ **NATO:**

- **Political Division:** Narrow Military, Political and Economic Security
- **Science programme:** Environmental & human security since 1990’s

■ **EU Research: on Environmental and Human Security**

- **Little in 6th Framework Programme**
- **7th FW Programme: 1 billion: primarily technical research**

1.2 UNCCD Definition of Desertification

- Art. 1 (b) of *UN Convention to Combat Desertification* of 17 June 1994 on “*combating desertification*” aims at:
 - “(i) prevention and/or reduction of land degradation; (ii) rehabilitation of partly degraded land; and (iii) reclamation of desertified land”.
- *Drought* is used for “the naturally occurring phenomenon that exists when precipitation has been significantly below normal recorded levels, causing serious hydrological imbalances that adversely affect land resource production systems.”

2. Global Environmental Change (GEC): Environment & Security Linkages



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

2.1. PEISOR Model: Global Change, Environmental Stress & Extreme Societal Outcomes

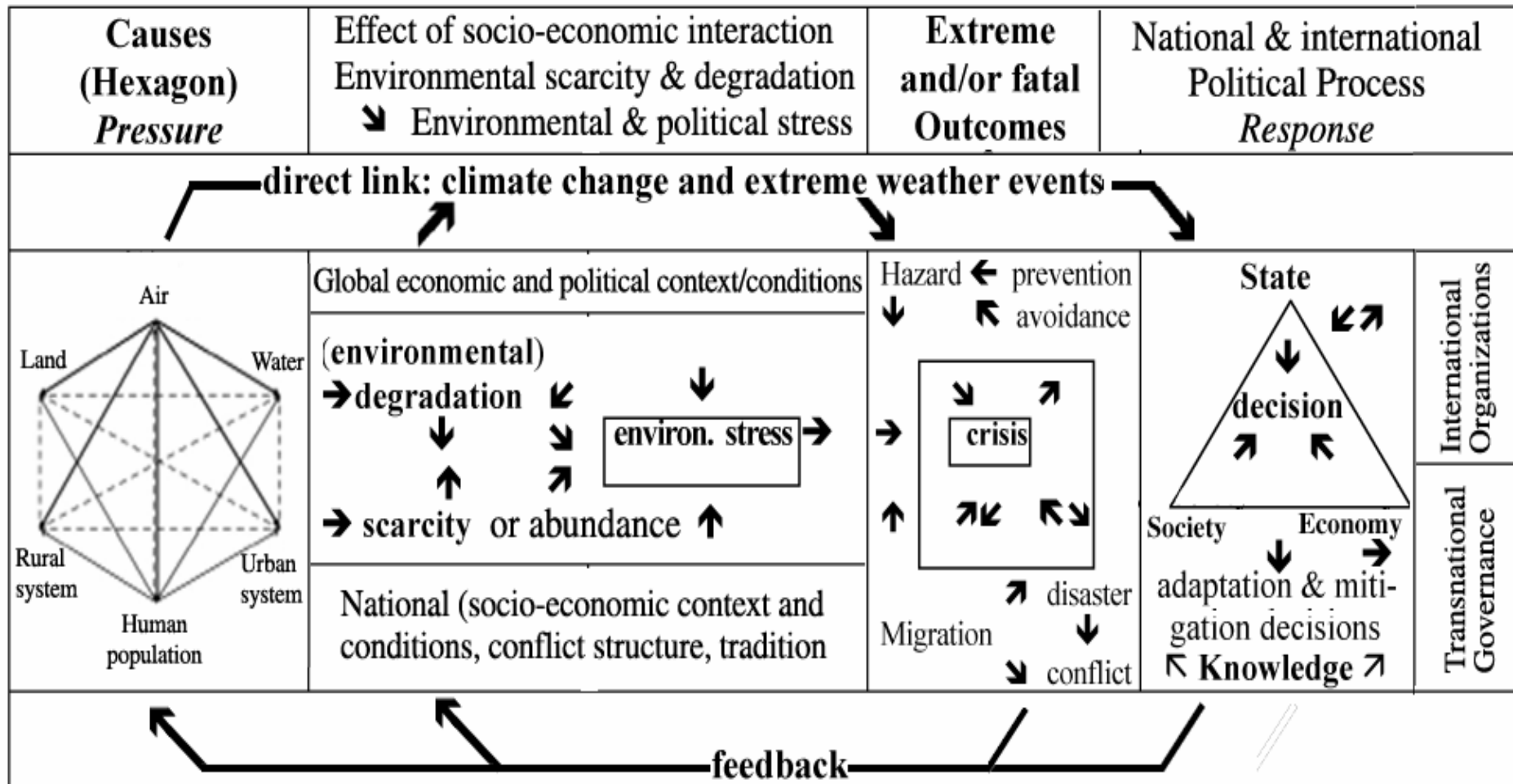
■ Other Models: Environment – Response

- OECD: PSR-Model
- UN-CSD (Committee for Sustainable Development)
- EEA (European Environment Agency)
- PEISOR: Env. Dimension of Human Security: Freedom from hazard impact

■ PEISOR model distinguishes 5 stages:

- **P: Pressure: Causes of GEC : Survival hexagon**
- **E: Effect: environm. scarcity, degradation & stress**
- **I: Impact: Extreme or fatal outcome: hazards**
- **SO: Societal Outcomes: disaster, migration, crisis, conflict etc.**
- **R: Response by state, society, the economic sector and by using *traditional and modern scientific* knowledge to enhance coping capacity and resilience**

2.2. PEISOR Model: Global Change, Environmental Stress and Extreme Societal Outcomes



2.3. Global Climate Change: Temperature Increases & Sea Level Rise

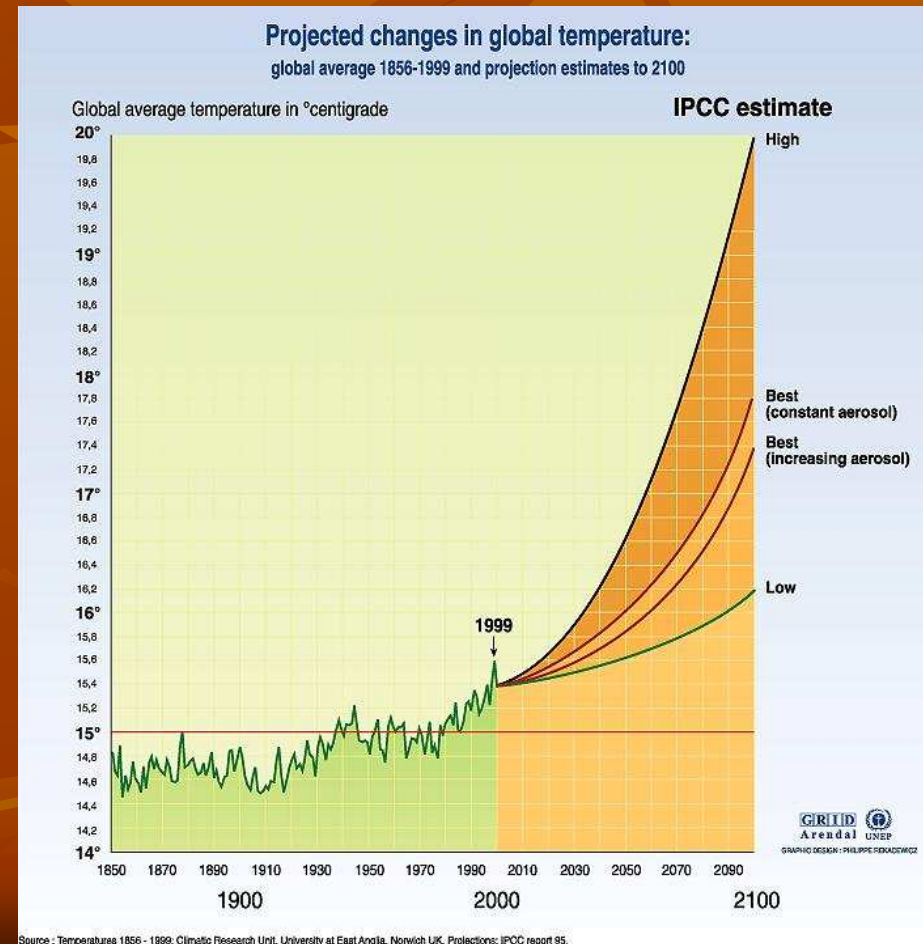
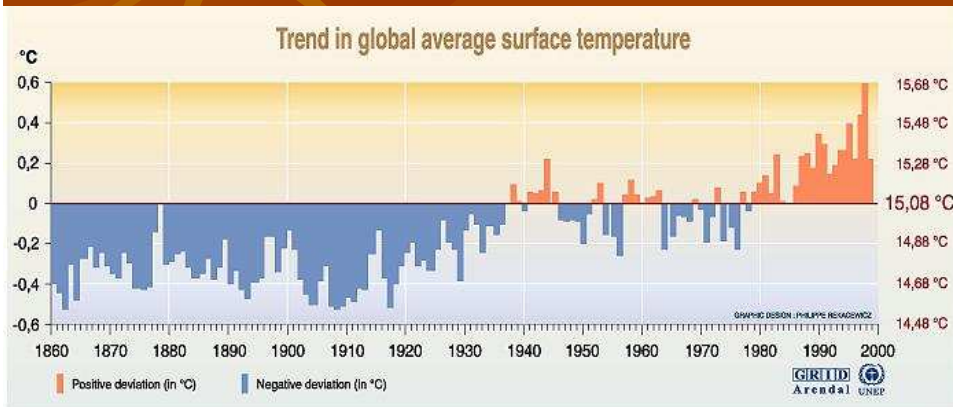
2 Climate Change Impacts: Temperature & Sea level Rise

- ❖ Global average temperature rise in 20th century: **+ 0.6°C**
- ❖ Proj. temperature rise: **1990-2100: +1.4 – 5.8°C**

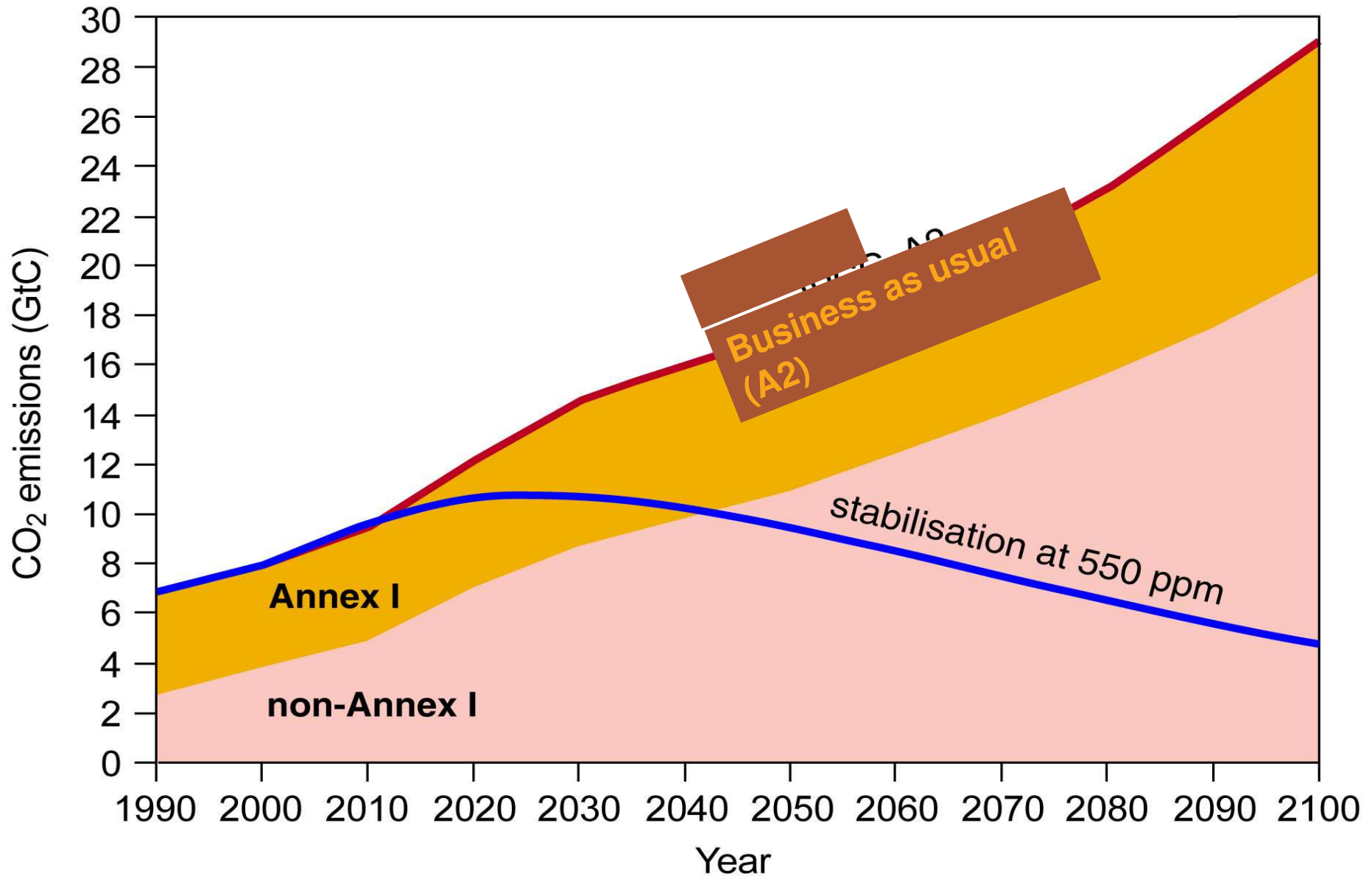
Sources: IPCC 1990, 1995, 2001, 2007

Sea level Rise:

- 20th cent.: **+0,1-0,2 m**
- 21st century: **9-88 cm**

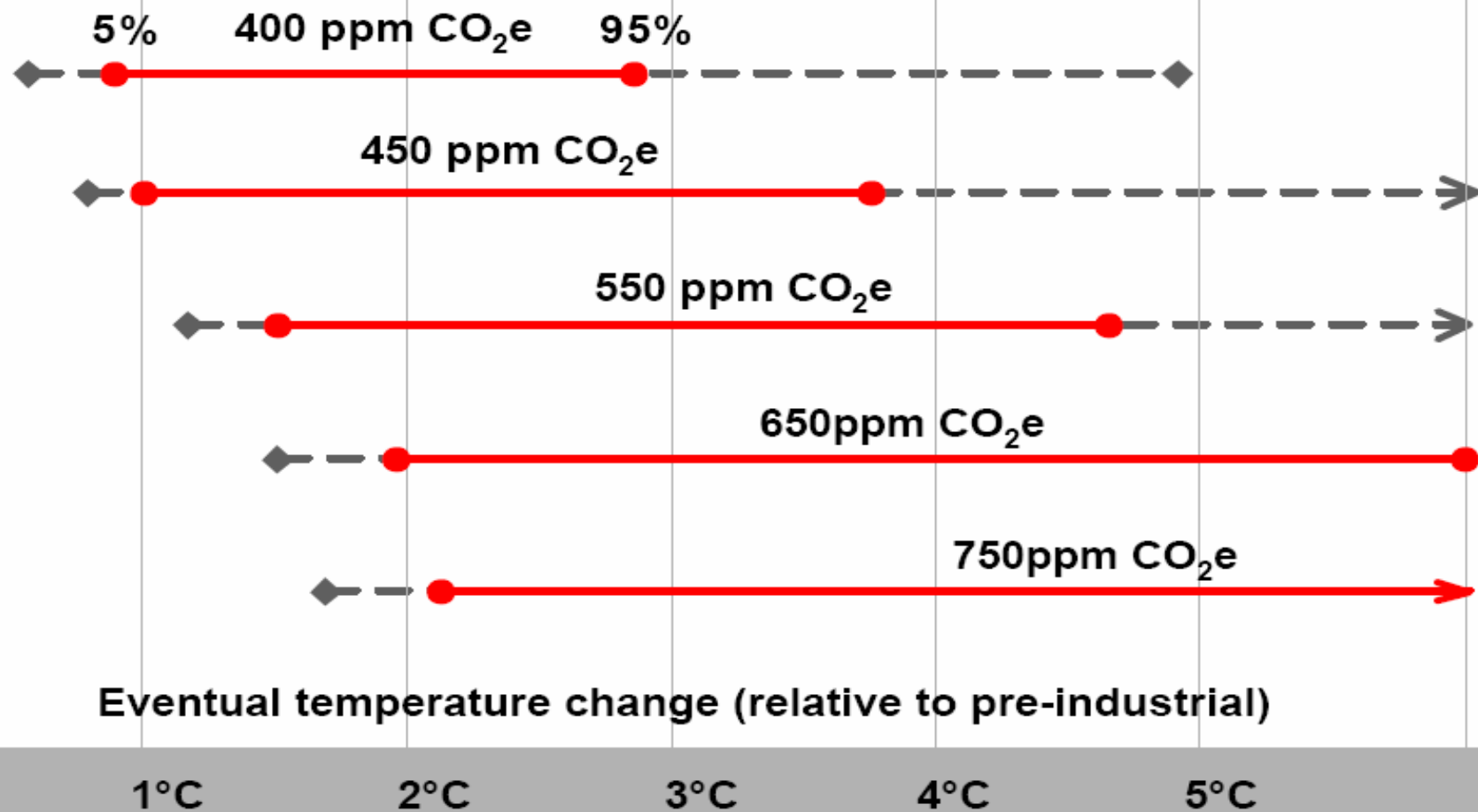


2.4. Projection: Stabilization at 550 ppm



2.5. Stabilization and Temperature Increase

Stabilisation and Commitment to Warming



2.6. Projected Impacts of Climate Change

Projected Impacts of Climate Change

Global temperature change (relative to pre-industrial)

0°C

1°C

2°C

3°C

4°C

5°C

Food

Falling crop yields in many areas, particularly developing regions

Possible rising yields in some high latitude regions

Falling yields in many developed regions

Water

Small mountain glaciers disappear – water supplies threatened in several areas

Significant decreases in water availability in many areas, including Mediterranean and Southern Africa

Sea level rise threatens major cities

Ecosystems

Extensive Damage to Coral Reefs

Rising number of species face extinction

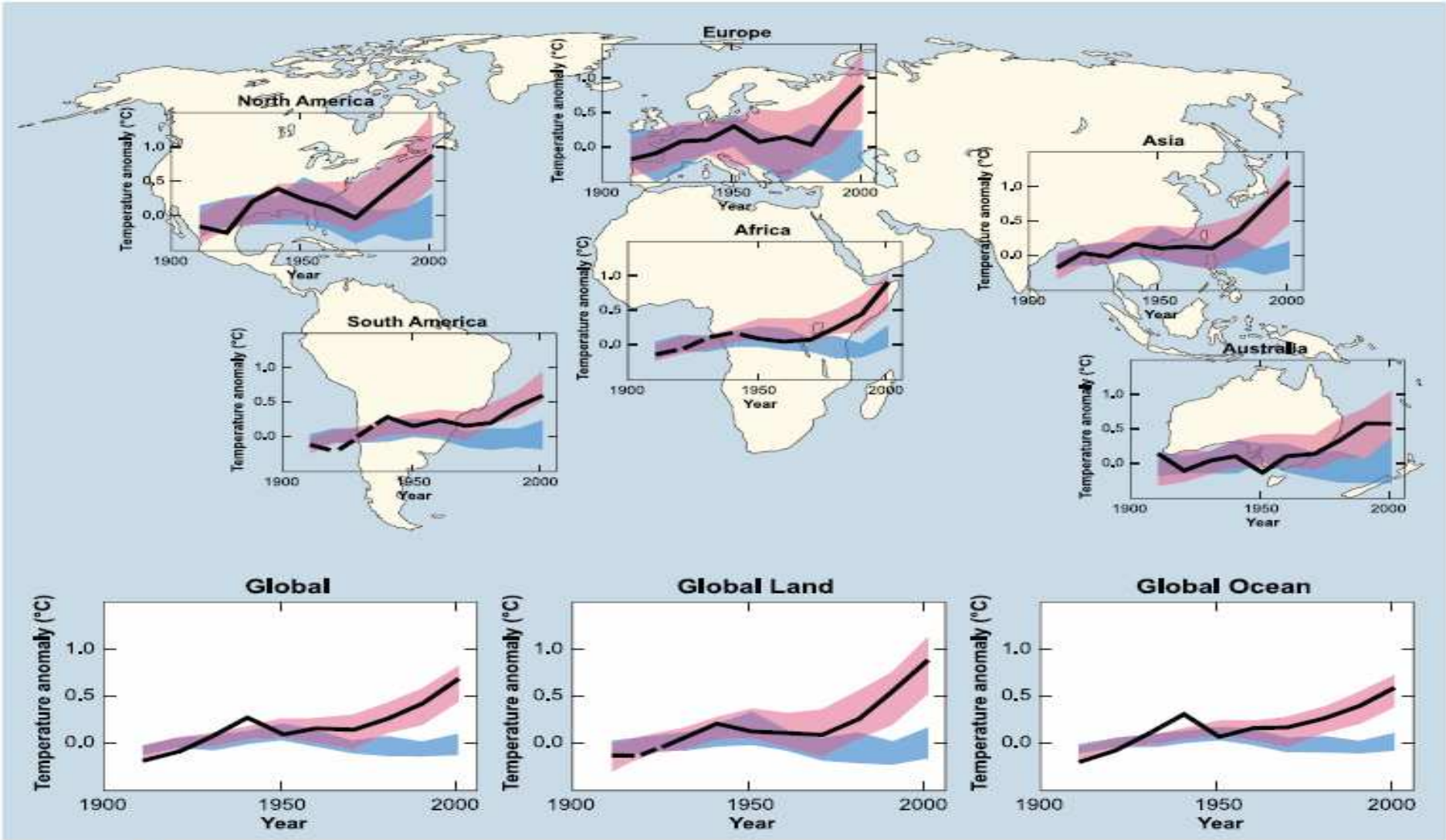
Extreme Weather Events

Rising intensity of storms, forest fires, droughts, flooding and heat waves

Risk of Abrupt and Major Irreversible Changes

Increasing risk of dangerous feedbacks and abrupt, large-scale shifts in the climate system

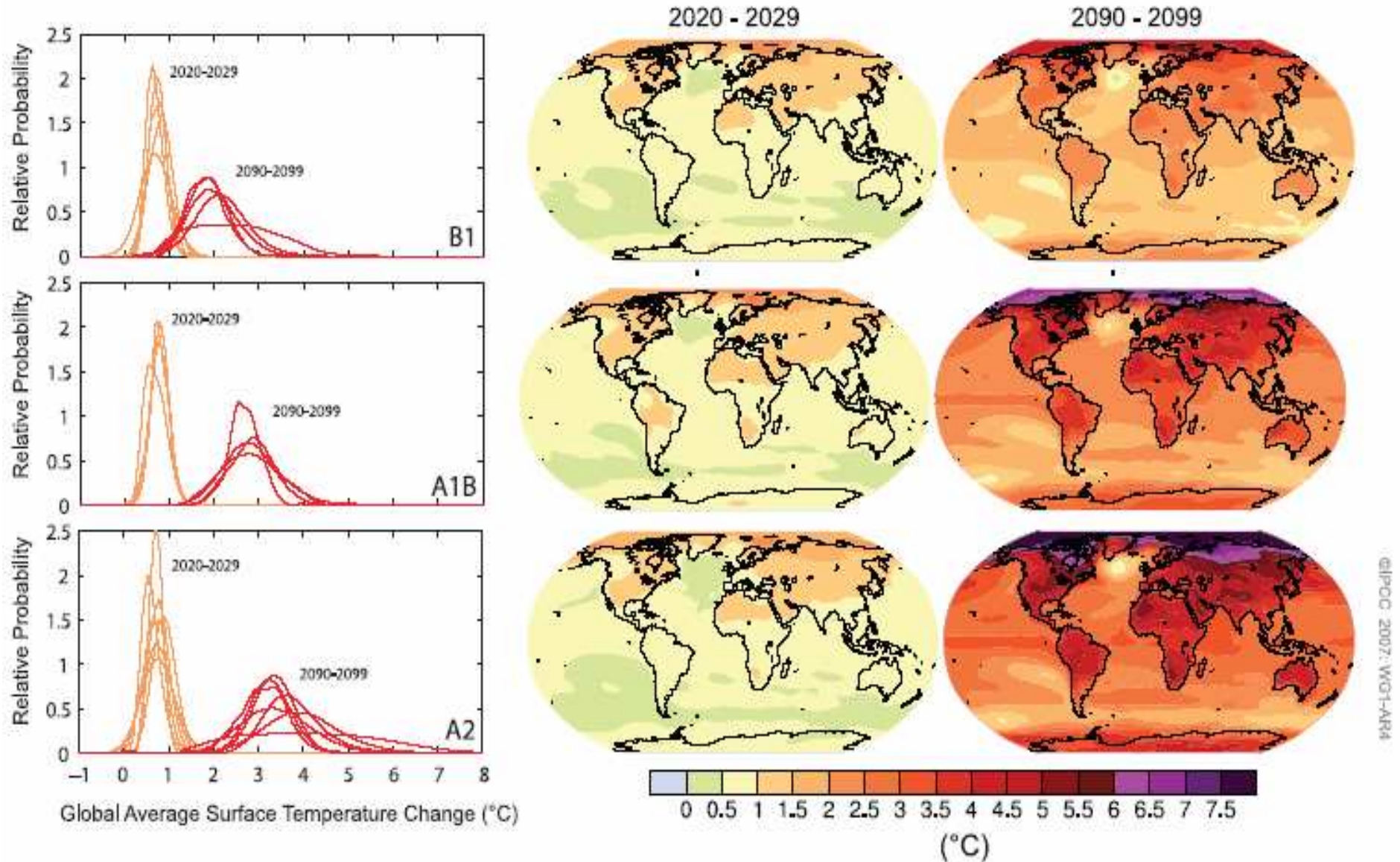
2.7. Global and Regional Change in Temperature (IPCC 2007, WG 1, AR4, S. 11)



models using only natural forcings
models using both natural and anthropogenic forcings

observations

2.8. Projection of Surface Temperature (IPCC 2007, WG 1, AR4, p. 15)



2.9. Average Value of Surface Temperature (IPCC 2007, WG 1, AR4, p. 14)

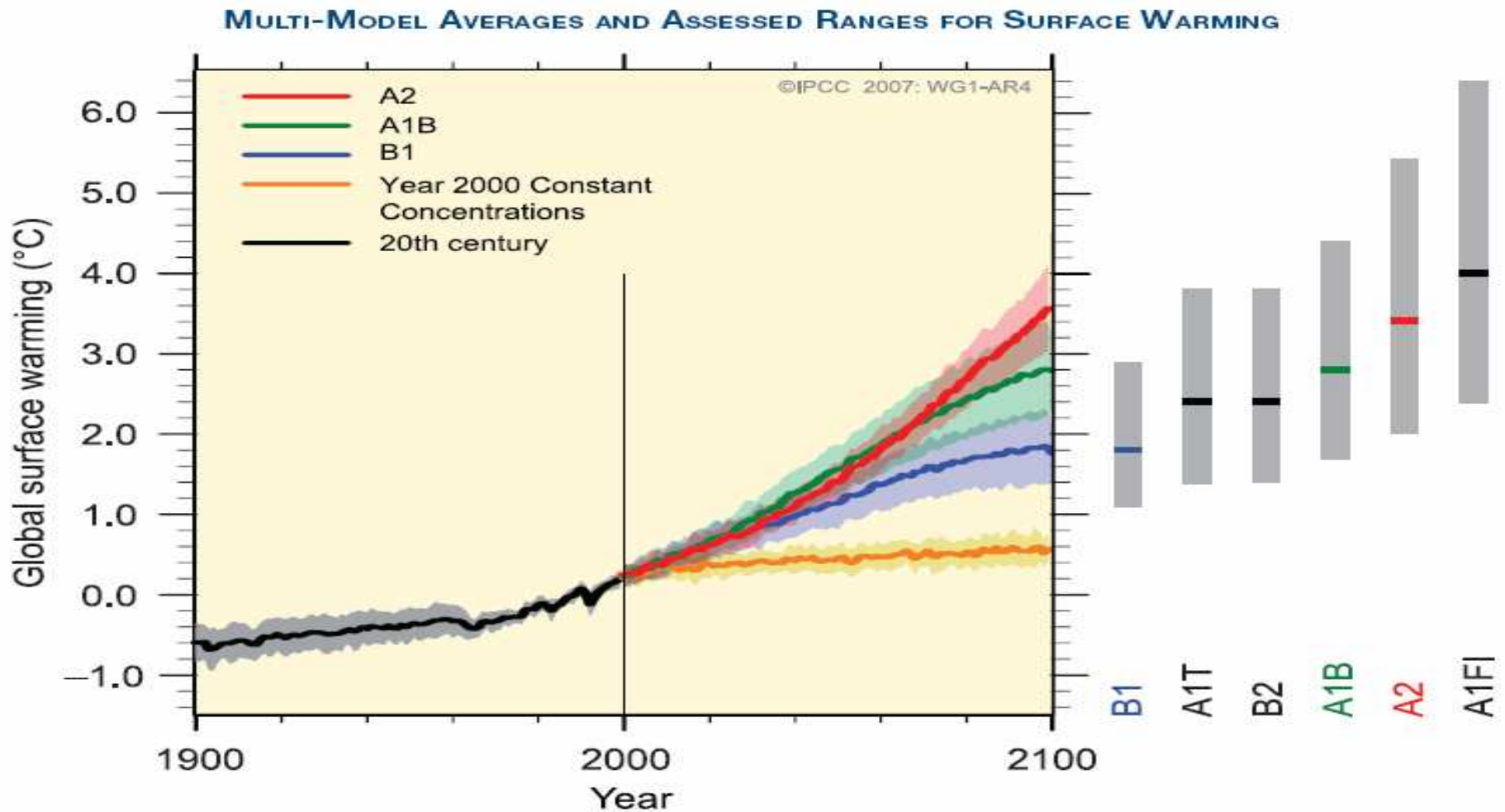


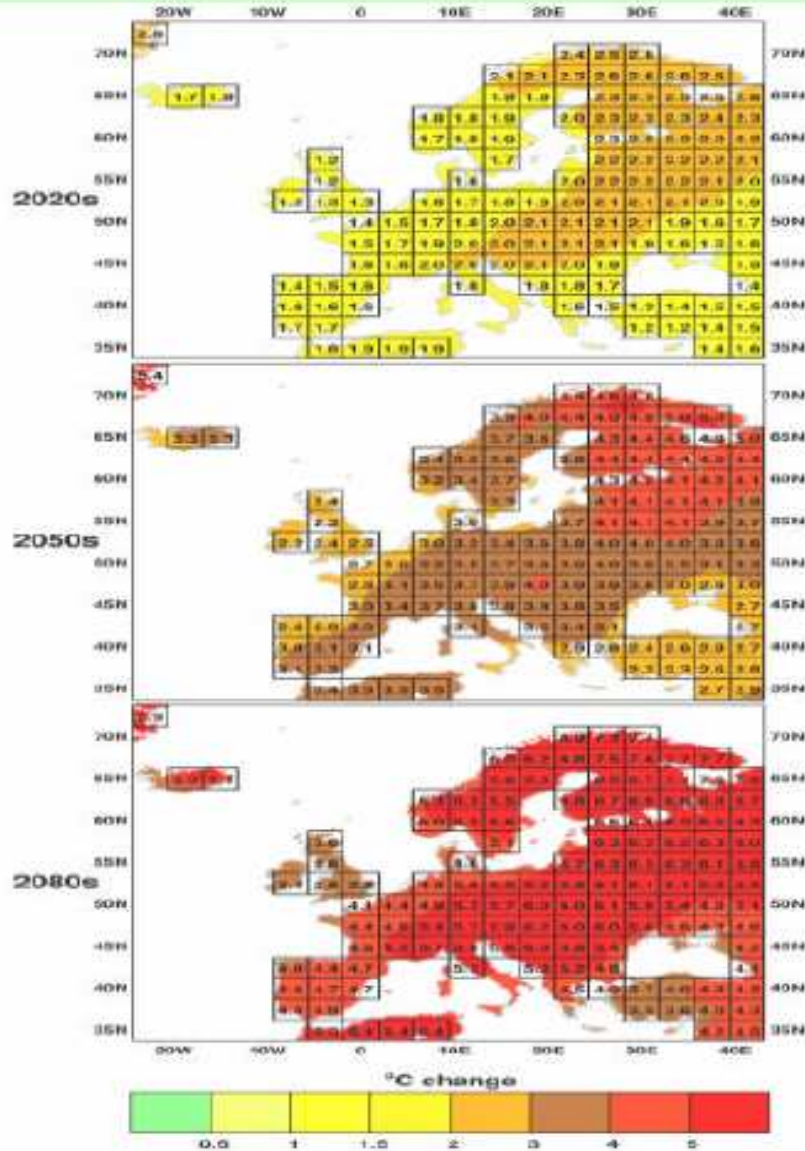
Figure SPM.5. Solid lines are multi-model global averages of surface warming (relative to 1980–1999) for the scenarios A2, A1B and B1, shown as continuations of the 20th century simulations. Shading denotes the ± 1 standard deviation range of individual model annual averages. The orange line is for the experiment where concentrations were held constant at year 2000 values. The grey bars at right indicate the best estimate (solid line within each bar) and the likely range assessed for the six SRES marker scenarios. The assessment of the best estimate and likely ranges in the grey bars includes the AOGCMs in the left part of the figure, as well as results from a hierarchy of independent models and observational constraints. [Figures 10.4 and 10.29]

2.10. Human Influence on Extreme Weather Events (WG I, AR4, Februar 2007: p. 8)

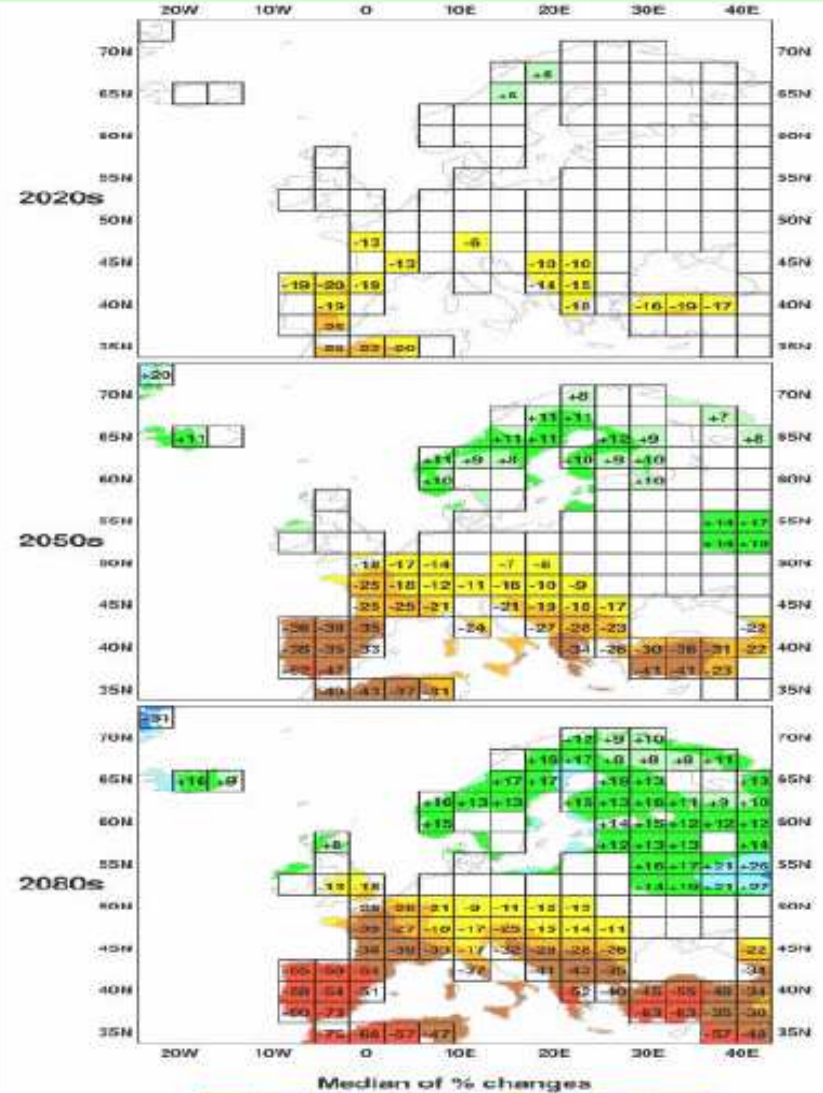
Phenomenon ^a and direction of trend	Likelihood that trend occurred in late 20th century (typically post 1960)	Likelihood of a human contribution to observed trend ^b	Likelihood of future trends based on projections for 21st century using SRES scenarios
Warmer and fewer cold days and nights over most land areas	<i>Very likely^c</i>	<i>Likely^d</i>	<i>Virtually certain^d</i>
Warmer and more frequent hot days and nights over most land areas	<i>Very likely^e</i>	<i>Likely (nights)^d</i>	<i>Virtually certain^d</i>
Warm spells/heat waves. Frequency increases over most land areas	<i>Likely</i>	<i>More likely than not^f</i>	<i>Very likely</i>
Heavy precipitation events. Frequency (or proportion of total rainfall from heavy falls) increases over most areas	<i>Likely</i>	<i>More likely than not^f</i>	<i>Very likely</i>
Area affected by droughts increases	<i>Likely in many regions since 1970s</i>	<i>More likely than not</i>	<i>Likely</i>
Intense tropical cyclone activity increases	<i>Likely in some regions since 1970</i>	<i>More likely than not^f</i>	<i>Likely</i>
Increased incidence of extreme high sea level (excludes tsunamis) ^g	<i>Likely</i>	<i>More likely than not^{f,h}</i>	<i>Likelyⁱ</i>

2.11. Winter Temperature (2020-2080) Winter Precipitation

A2

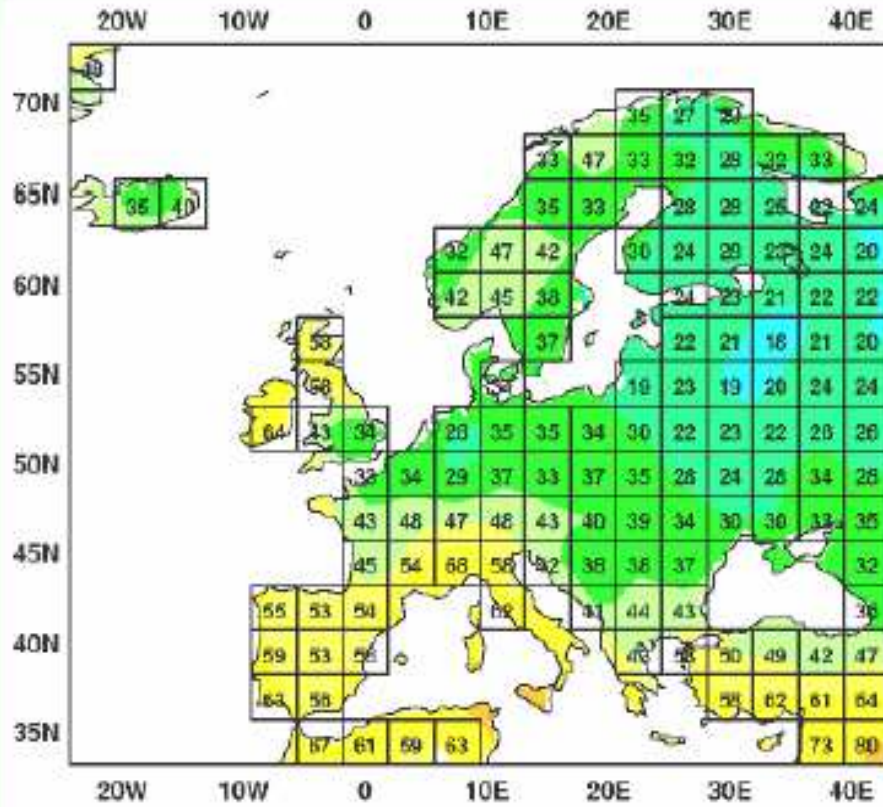


A2

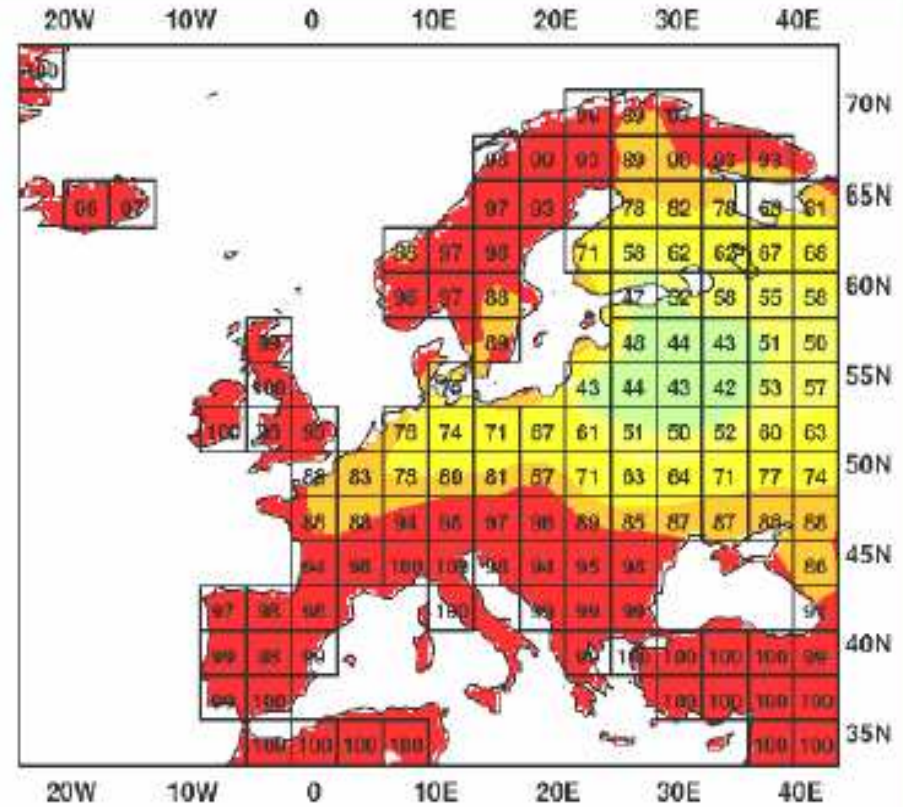


2.12. Probability of Hot Summers (M. Parry, IPCC, London, 2005)

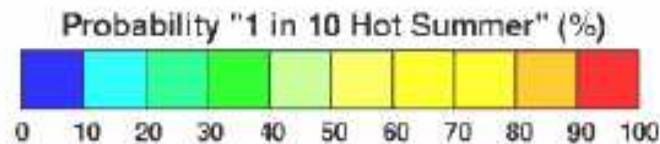
A2



2020

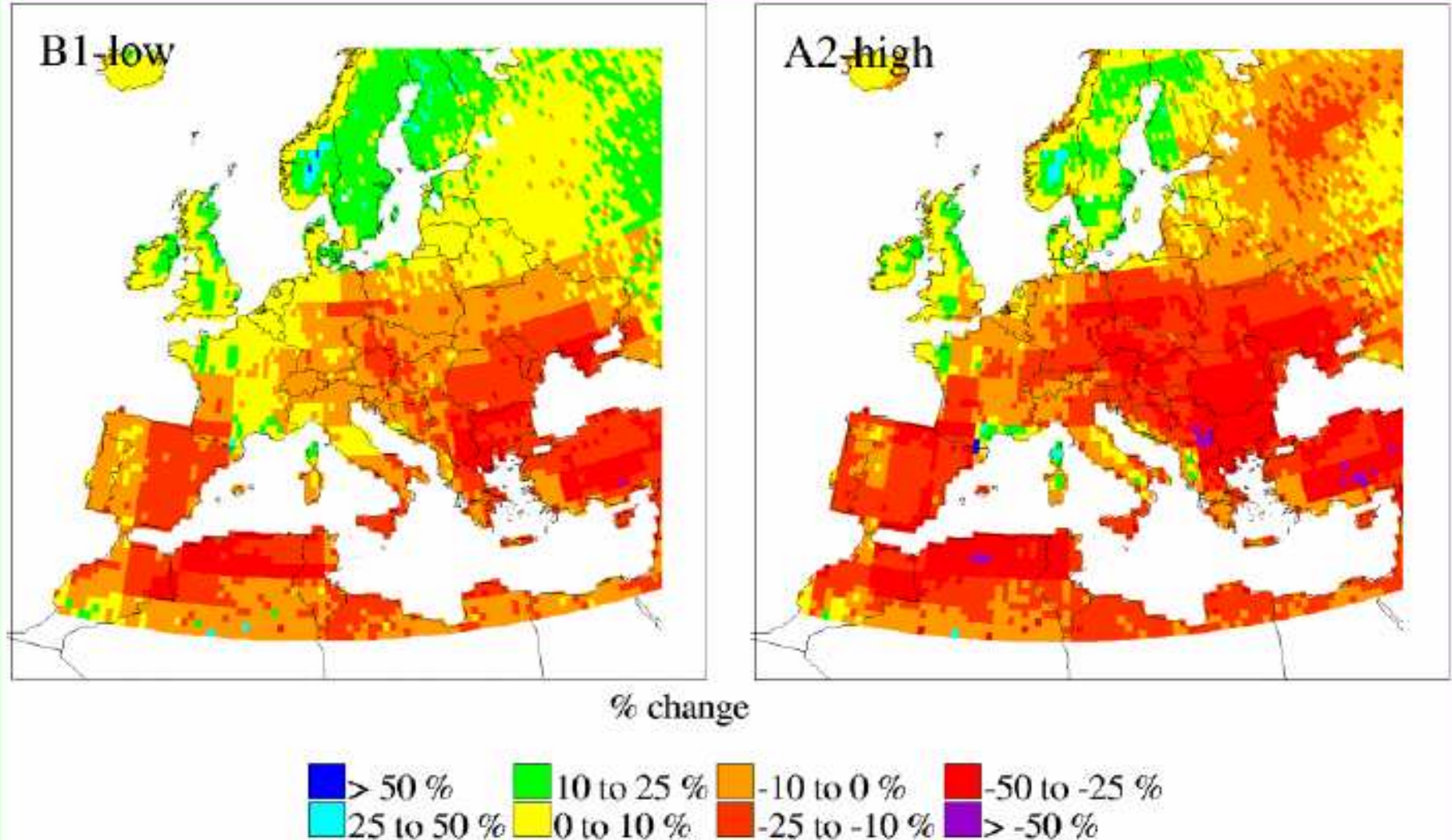


2080



2.13. Water Availability 2050

(M. Parry, IPCC, London, 2005)



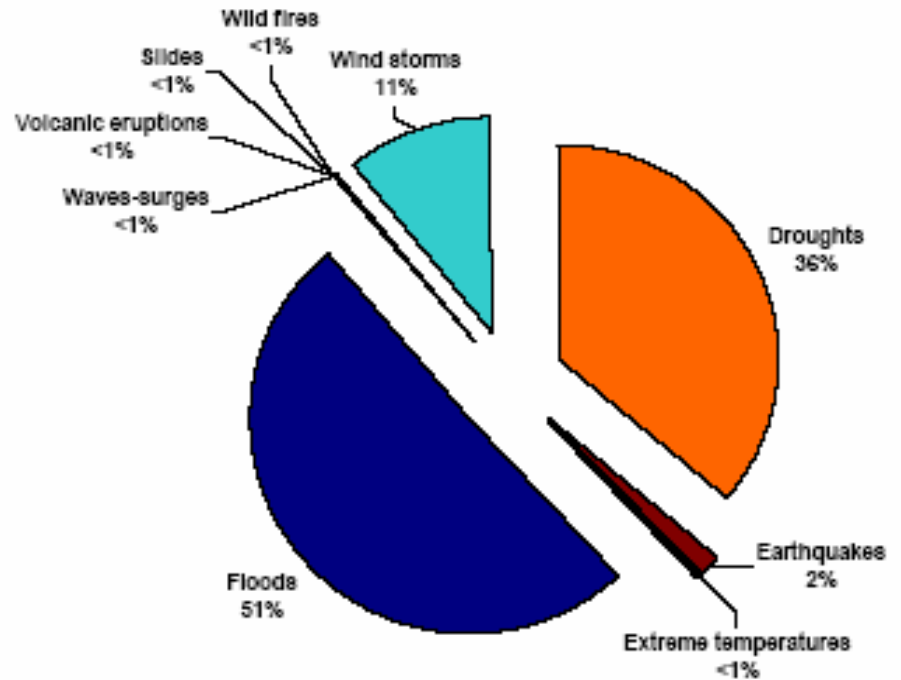
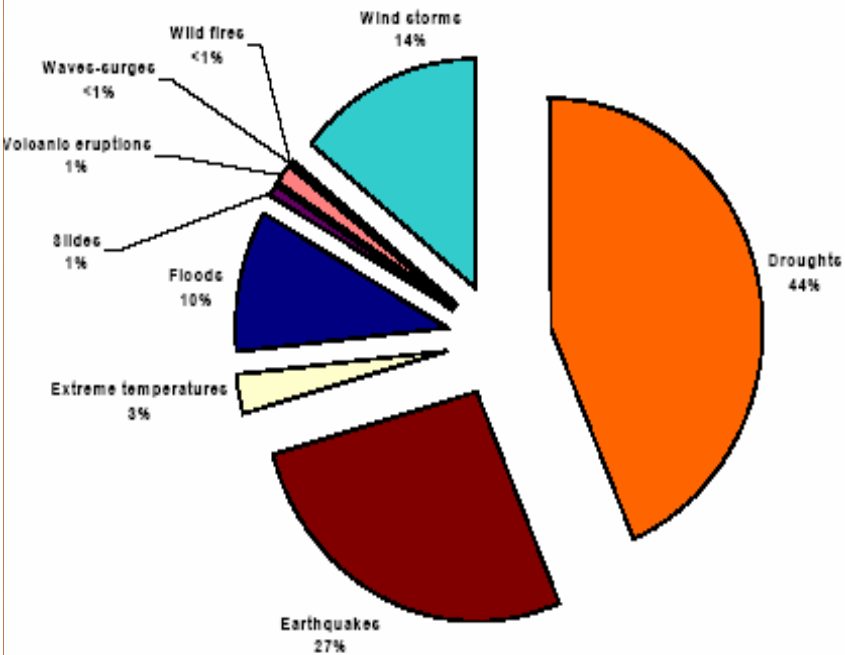
2.14. Climate Change & Desertification: Human & Environmental Security

- **Both climate change and desertification pose „soft security“ threats, challenges, vulnerabilities and risks for environmental, human security & national security).**
- **New environmental threats, challenges, vulnerabilities & risks require non-military coping strategies:**
 - **Effective policies & implementation to cope with climate change: by reducing greenhouse gas emissions in all countries;**
 - **A shift from fossil energy fuels to renewable energy sources;**
 - **Development & implementation of strategies of reforestation & combatting soil erosion & desertification;**
 - **Effective strategies of integrated water management**

2.15. Impacts of Drought (1974-2003)

Reported Death of Natural Hazards globally: 2.066.273

- Affected persons of Natural Hazards: 5 076 494 541 .

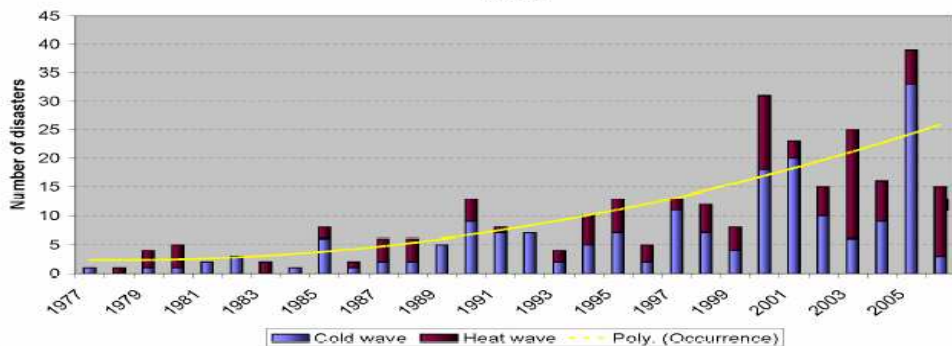


Source: Hoyois/Guha-Sapir (2004)

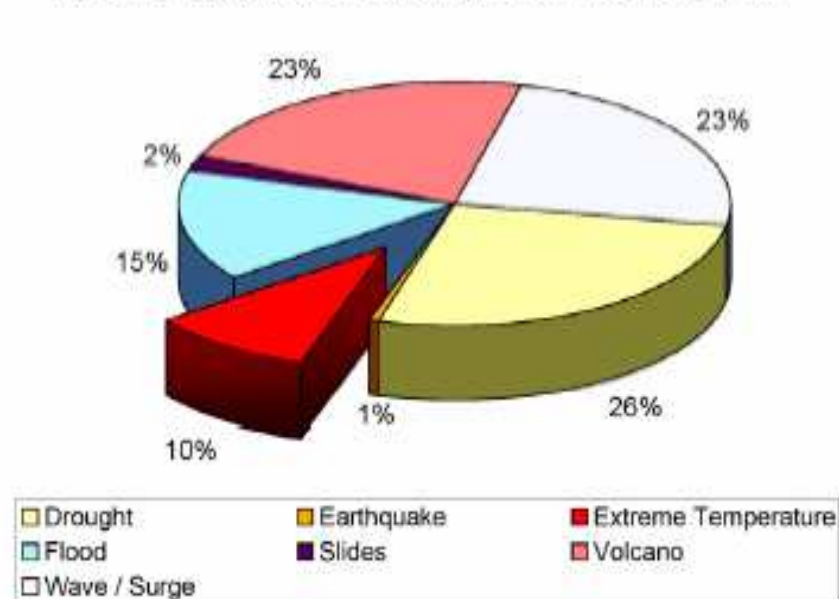
(†) injured + homeless + affected

2.16. Extreme Temperature Disasters

Extreme temperature disaster occurrence from 1977 to 2006



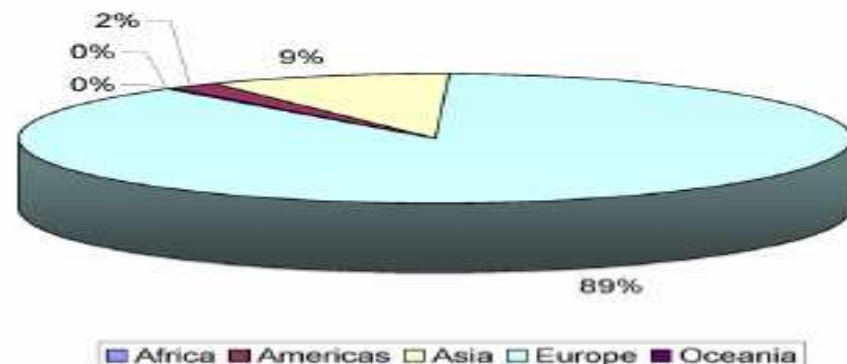
Natural disasters mortality from 1987 to 2006



Extreme temperature disasters: Summary

	1987-1996	1997-2006	1987-2006
All Events			
Occurrence	79	207	286
Number of killed	6.999	91.497	98.496
Average disaster mortality	88,6	442,5	344,4
Cold Wave			
Occurrence	50	131	181
Number of killed	2.600	8.250	10.850
Average disaster mortality	52,0	63,2	59,9
Heat wave			
Occurrence	29	76	105
Number of killed	4.399	83.212	87.611
Average disaster mortality	151,7	1.094,9	834,4

Heat wave mortality



2.17. Heat Wave of 2003 in Europe

10 Most Deadly Disasters (1987-2006)

Year of occurrence	Disaster type	Region / Country	Number of killed
2003	Heat wave	Europe	72,210
2006	Heat wave	Western Europe	3,392
1998	Heat wave	India	2,541
2003	Heat wave	Indian Subcontinent	1,472
2005	Cold wave	Europe	1,330
2002	Heat wave	India	1,030
1987	Heat wave	Greece	1,000
2002	Cold wave	India	900
2002	Cold wave	Bangladesh	700
1995	Heat wave	United States	670

2003 heat wave mortality	
Country	Number of killed
Italy	20,089
France	19,490
Spain	15,090
Germany	9,355
Portugal	2,696
Belgium	1,175
Switzerland	1,039
Netherlands	965
Croatia	788
Czech Rep	418
Austria	345
United Kingdom	301
Slovenia	289
Luxembourg	170

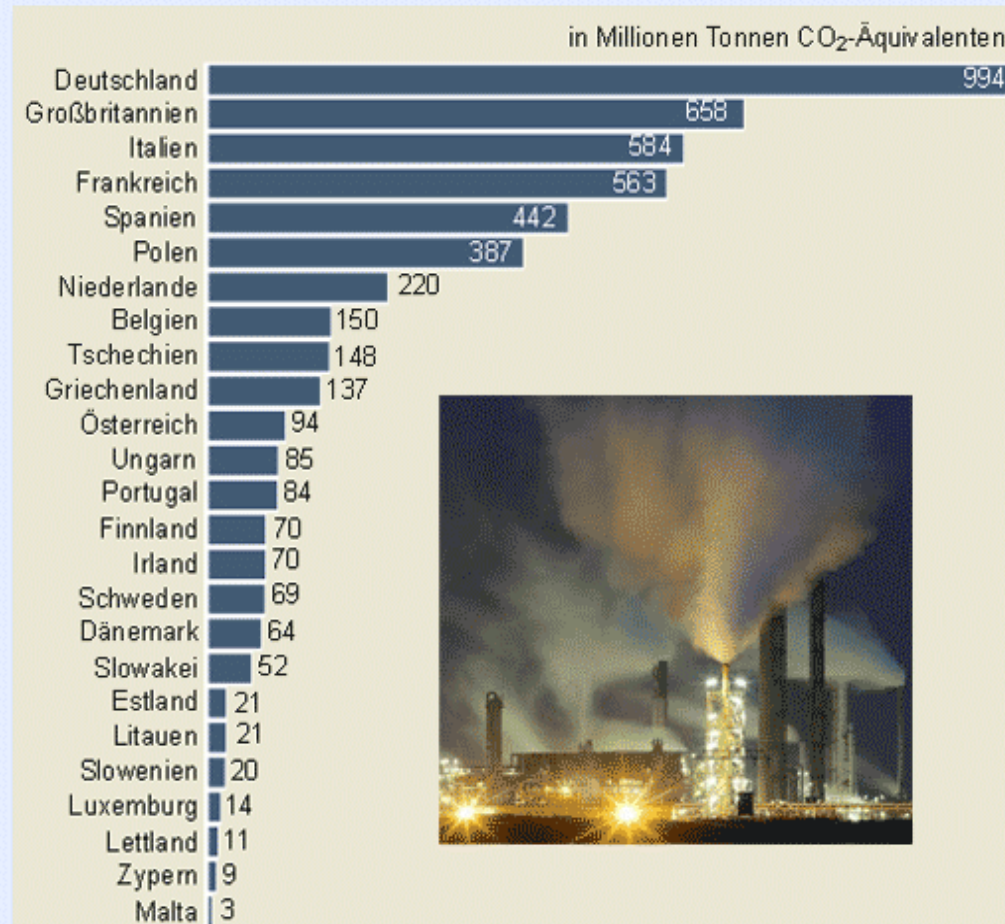


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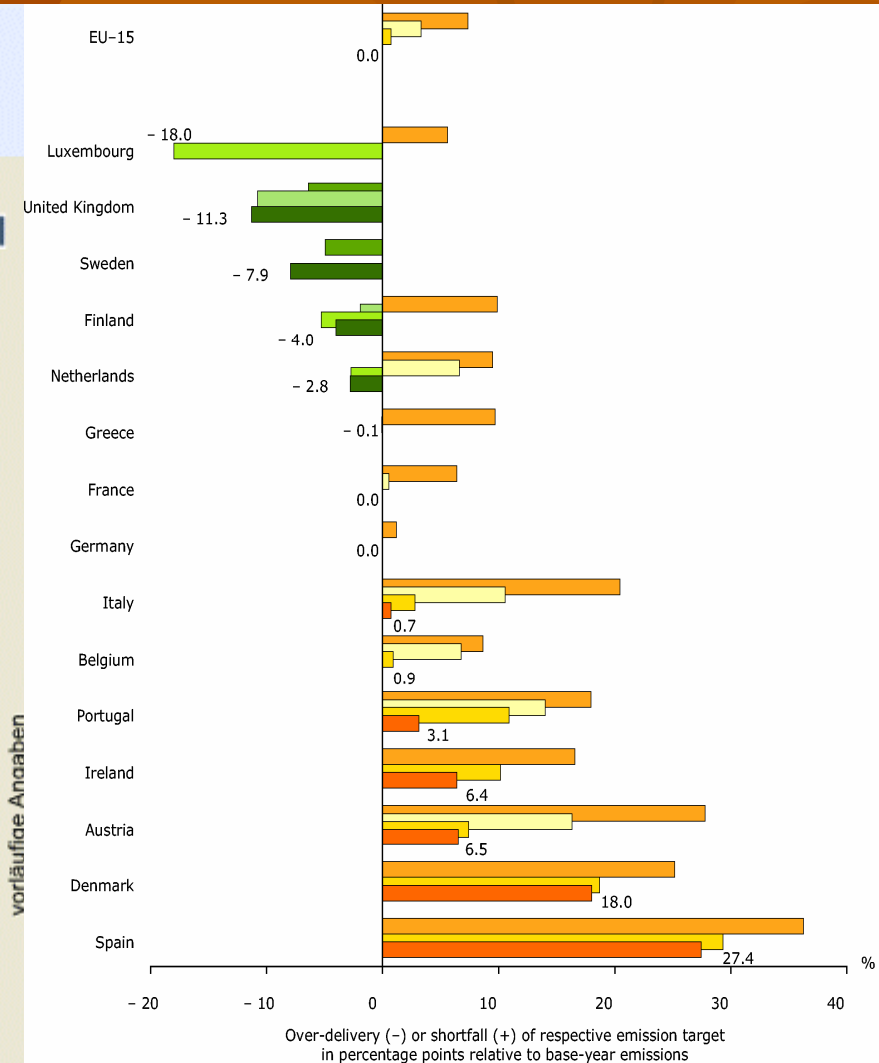
2.18. Greenhouse Gases of EU-Staates (2005)

Treibhausgase in der EU

Emissionen der sechs wichtigsten vom Menschen verursachten Treibhausgase* im Jahr 2005



vorläufige Angaben



Quelle: DIW Berlin

*u. a. Kohlendioxid (CO₂), Methan (CH₄), Lachgas (N₂O)

■ With existing domestic measures ■ With all measures and Kyoto mechanisms

■ With additional domestic measures ■ With all measures, Kyoto mechanisms and carbon sinks

3. GEC as a Security Danger and Concern for the People

- **Wolfers (1962):** two sides of the security concept:
"Security, in an *objective* sense, measures the absence of threats to acquired values, in a *subjective* sense, the absence of fear that such values will be attacked".
- **GEC & hazards pose new security dangers?**
 - Global Environmental Change: pressure & cause
 - Water-related natural hazards: impacts & societal outcome (victims) depend on social vulnerability

3.1. Widening of Security Concepts: Towards Environmental & Human Security

4 trends in reconceptualisation of security since 1990:

- **Widening** (dimensions, sectors), **Deepening** (levels, actors)
- **Sectorialisation** (energy, food, health),
- **Shrinking** (WMD, terrorists)

Dimensions and Levels of a Wide Security Concept

Security dimension ⇒ ↓ Level of interaction	Military	Political	Economic	Environmental ↓	Societal
Human individual ⇒			Food sec. Health sec.	Cause & Victim	Food sec. Health sec.
Societal/Community				↓↑	
National	shrinking		Energy se.	↓↑	Food,,health
International Regional			Water security	↓↑	Water security
Global/Planetary ⇒				GEC	

3.2. Environmental & Human Security

Expanded Security Concepts (Møller, '03; Oswald '01,'07)

Label	Reference object	Value at risk	Source(s) of threat
National security	The State	Territ. integrity	State, substate actors
	Societal groups	Nation. identity	Nations, migrants
Human security	Individual, mankind	Survival	Nature, state, global.
Environmental sec.	Ecosystem	Sustainability	Humankind
Gender security (Oswald Spring)	Gender relations, indigenous people, minorities	Equality, identity, solidarity	Patriarchy, totalitarian in- stitutions (governments, churches, elites) intoler.

Human security: Referent: **individuals and humankind.**

❖ **Values at risk:** survival of human beings and their quality of life.

❖ **Major sources of threat:** nature (global environmental change), globalisation, nation state with its ability to cope with this dual challenge.

Environmental Security: Referent: **Ecosystem;** Value at risk is **sustainability.**

❖ **Major challenges:** global environmental change & humankind,

❖ **Focus:** Interactions of ecosystem & humankind, impact of **GEC** on environmental degradation, increasing demand on environmental scarcity & environmental stress.

4. Securitization of GEC in Policy

- UN context
 - UNDP 1994
 - UNESCO: Human Security Programme (1996-2001,2002-2007)
 - UN-GA Resolution September 2005: Human Security
 - UN-SC Discussion: 17 April 2007 on Climate Change
- North Atlantic and European context:
 - NATO: Environmental Security: 1990's
 - OSCE/UNDP/UNEP/NATO: ENVSEC initiative Central Asia
 - NATO: Desertification as a Security Issue (Valencia, 2003)
- GEC and security for the people: as a human security issue
 - Project GECHS of IHDP (1999: Science Plan)
 - UNU-EHS (2003): Strategic Plan, Intersection 2, Source 1
 - Human Security Network: *Greek Presidency (2007-2008): Climate Change & Human Security*

5. Desertification as a Security Danger and Concern

- Security danger posed by whom?
 - Anthropogenic climate change as a security multiplier
 - Anthropogenic desertification
 - Human caused water scarcity and desertification
- Security concern for whom?
 - Victims of climate change desertification
 - Recipients of environmentally induced migration
- Effects: Internal Displacement & Migration
 - The *Survival* Dilemma of the Victims
 - The *Security* Dilemma of the Recipients
- Problem of global Equity: Cause & victims differ

6. Desertification: Security Problem for People in human, food, water, health, national and international security

- **Securitization of desertification: 2003**
 - Valencia Conference 2003: Challenge for the Mediterranean: Spain/Italy: published in 2006 by Springer
 - UNCCD: CRIC 3 (2005) in Bonn and IYCD during 2006
 - Almeria Symposia: 1994 and 2006: Desertification & Migration
- Desertification as a security & survival issues for people
 - for human security
 - for water, food, health and livelihood security
 - for international and national security
- Different actors, policies and measures:
 - **Reactive:** Humanitarian aid (OCHA, ECHO, IFRC-RCS, NGOs)
 - **Proactive:** development, environment policies (less defence, internal security)

6.1. Desertification as a Human Security Issue

- Security danger posed by whom? Individual/Humankind
- Security concern for whom?
 - Victim: Desertification poses for victim a survival dilemma
 - Recipient of displaced persons/migrants: resource competition (water/food)
- Four Pillars of Human Security: Implications for Both
 - Freedom from want" human development agenda: poverty (UNDP 1994; Ogata/Sen, 2003;
 - "Freedom from fear": hum. agenda: violence, conflicts, weapons (Human Security Network)
 - "Freedom to live in dignity": Kofi Annan: *In Larger Freedom* (March 2005)
 - "Freedom from hazard impact": environmental (GEC) & natural hazard agenda: Bogardi/Brauch 2005: "environment" (GEC as pressure); "natural hazards" as impact
- Proactive Policies & Measures:
 - Bottom-up: Human empowerment and resilience building
 - Top down: sustainable development and environment policy

6.2. Desertification as a Sectoral Security Issue

Desertification as a Food Security Issue

- ❖ Desertification (cause) & drought (impact: hydro-meteorologic. hazard) > famine > migration: force people to leave their home (livelihood);
- ❖ Major actors & concept users: FAO, WFP, OCHA, ECHO, human. NGOs
- ❖ Solution: short-term: food aid & long-term: sustainable agriculture

Desertification as a Health Security Issue

- ❖ Famine: undernourishment, malnutrition, high vulnerability to disease, higher rate of death among children > becomes as health security issue
- ❖ Major actors & concept users: WHO, OCHA, ECHO, humanit. NGOs
- ❖ Solution: short-term: medical aid & long-term: sustainable developm.

Desertification as a Livelihood Security Issue

- ❖ Desertification, drought & famine: force people to leave their livelihoods, homes, villages, provinces, in search for indiv. & group survival
- ❖ Major actors & concept users: in South Asia, UK, US: disaster managers, OCHA, ECHO, humanit. NGOs
- ❖ Solution: enhancement of resilience & sustainable development

6.3. Desertification as a National and International Security Issue

- Desertification, drought and famine (primarily in the South; e.g. in Nile Basin and in the Sahel Zone)
 - coexist with internal displacement, refugee, environmentally induced migration
 - In countries affected by drought low level conflicts have occurred in communities, regions, countries, below war level
 - Environmental factors, ethnic and religious factors (e.g. Darfur)
- Desertification no national security issue for the military
- Desertification (drought, famine, displacement, migration) poses international security problems, societal outcomes may trigger involvement of military as humanitarian actors

7. Desertification & Environmental Migration as Security Problems

	1975	1980	1985	1990	1995	2000	2005
Italy	1 006 374	1 108 852	1 221 764	1 346 174	1 483 253	1 634 290	2 519 040
Spain	299 953	240 906	405 869	765 585	1 009 021	1 628 246	4 790 074
France	5 571 664	5 890 633	5 956 948	5 906 752	6 089 154	6 277 189	6 471 029

For Recipient countries: World Migrant Stock: Revision Population Database: three Mediterranean recipient states: Source: Population Division of UN Departm. of Economic and Social Affairs, Trends in Total Migrant Stock: 2005 Revision, 26.6.07

- Statistical Difficulty: quantify environmentally (desertification) induced migration

- **Reactive: internal security: National police, border gard, EU-Frontex**

For migrants: pull vs. environmental, economic et other push factors

- Internal displacement

- International and intercontinental migration

Proactive: convention for environmentally induced migrants

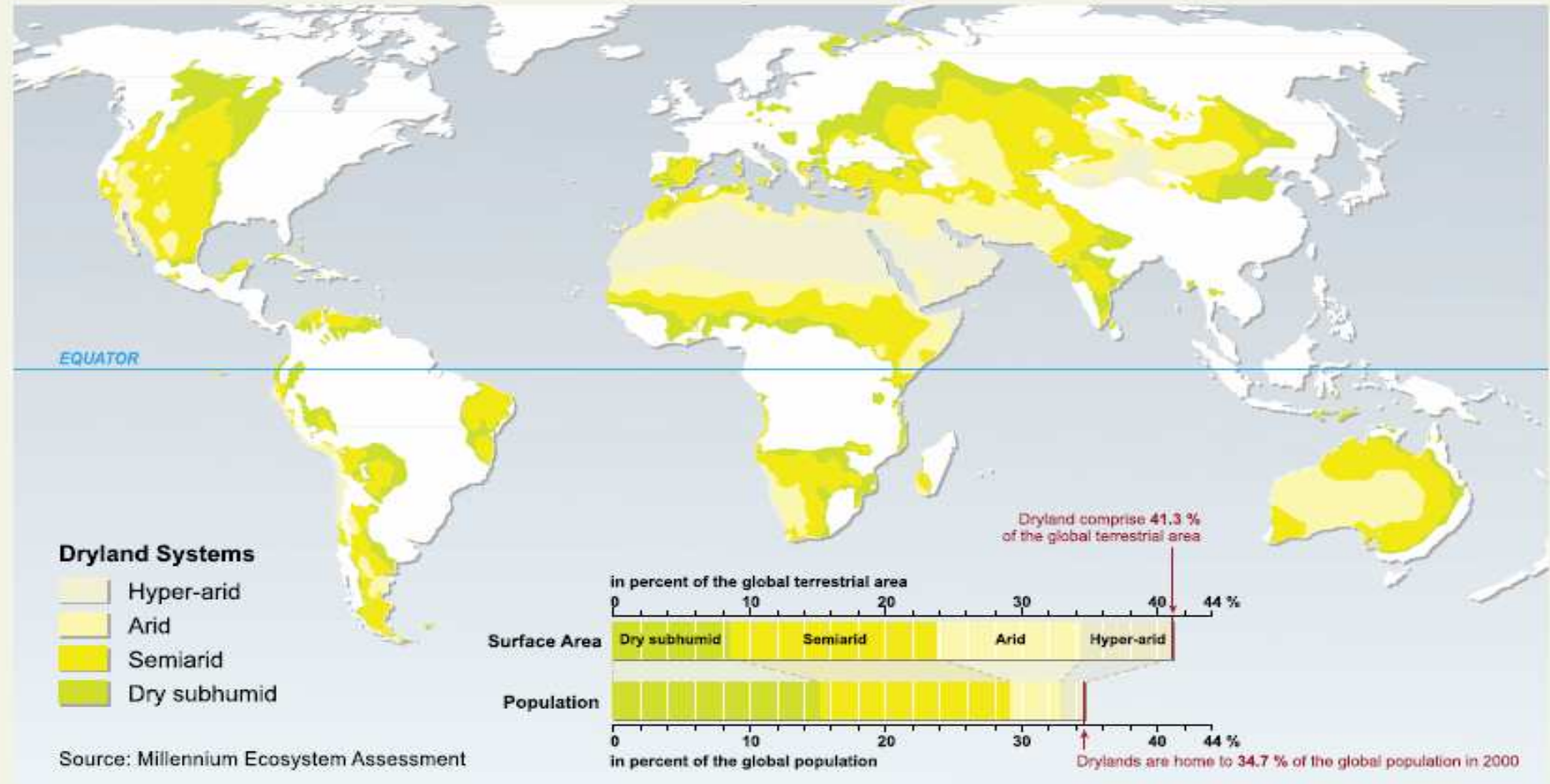
8. Desertification & Environmental Conflicts

Globally and in Africa

- Desertification may be one of several triggers of environmental conflicts
 - Small scale conflicts: nomads and resident farmers
 - Internal conflicts on the division of water
- WBGU World Map of Environmental Conflicts (1980-2005) based on Expert study by Adelphi Consult (2006) distinguished four triggers of environmental conflicts:
 - Water
 - Land/soil
 - Fish
 - Biodiversity

8.1. Drylands Vulnerable to Desertification (Mill. Ecosystem Assessm., Adeel/Safriel (2005: 23)

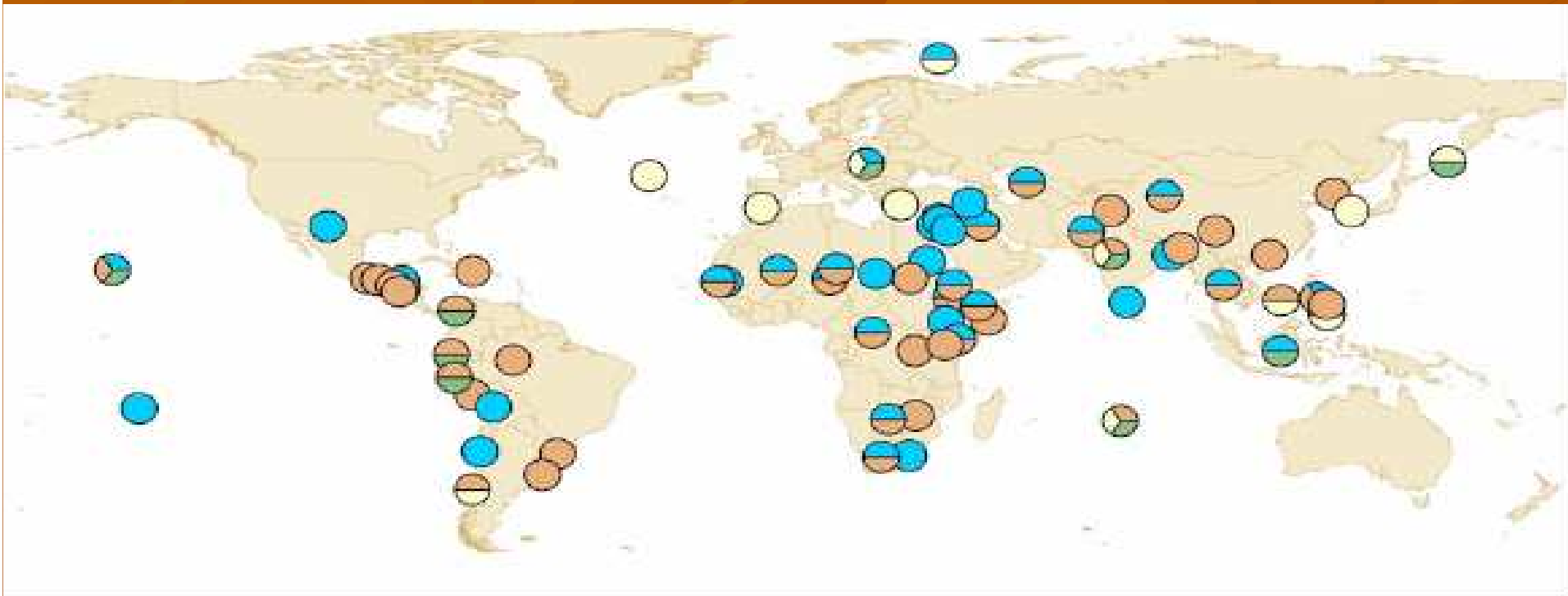
Drylands include all terrestrial regions where the production of crops, forage, wood and other ecosystem services are limited by water. Formally, the definition encompasses all lands where the climate is classified as dry subhumid, semiarid, arid or hyper-arid. This classification is based on Aridity Index values[†].



[†] The long-term mean of the ratio of an area's mean annual precipitation to its mean annual potential evapotranspiration is the Aridity Index (AI).

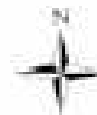
Notes: The map is based on data from UNEP Geo Data Portal (<http://geodata.grid.unep.ch/>). Global area based on Digital Chart of the World data (147,573,196.6 square km); Data presented in the graph are from the MA core database for the year 2000.

8.2. World Map of Environmental Conflicts



Konfliktursache

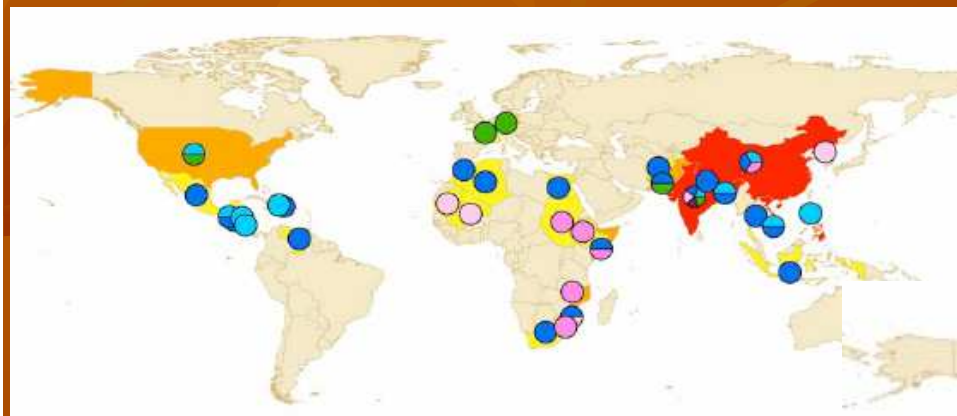
-  Biodiversität
-  Wasser
-  Land / Boden
-  Fisch



Alexander Carius 2008
(Entwickelt von Anja Gundel und Katja Friebel)
Kartengrundlage: ESRI

Alexander Carius, Dennis Tänzler,
Judith Winterstein:
Weltkarte von Umweltkonflikten –
Ansätze zur Typologisierung

8.3. Intensity of Extreme Weather Events and Intensity of Environmental Conflicts



Formen extremer Wetterereignisse

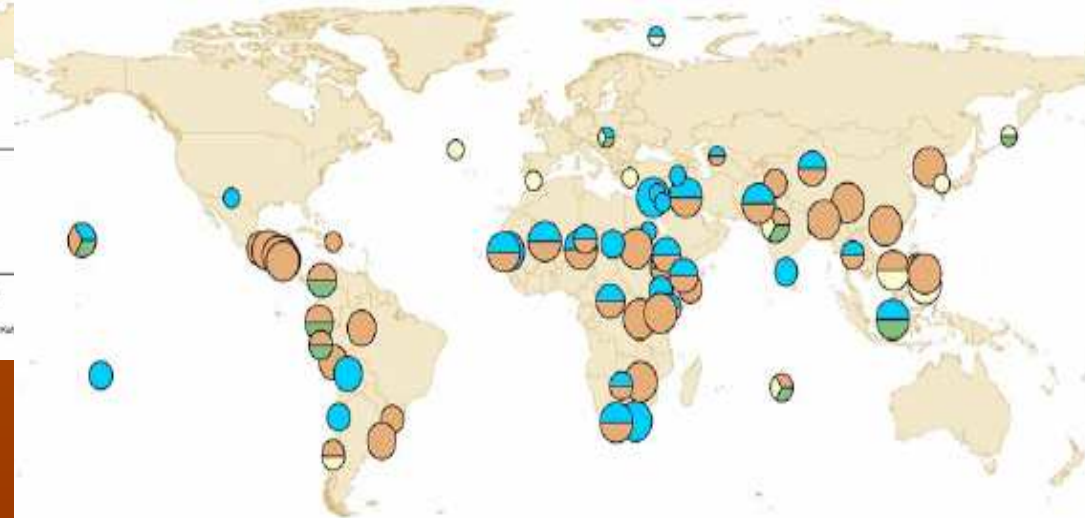
- Sturm
- Flut
- Dürre
- Hungersnot
- Kältewelle
- Hitzewelle

Häufigkeit extremer Wetterereignisse

- (ab 500 Todesopfern)
- 1
 - 2 - 5
 - ab 5



Adelphi Consult 2006
(Erschell von Anja Gundel und Kai Kattengrundlage: ESRI)



Konfliktursache

- Wasser
- Land / Boden
- Fisch
- Biodiversität

Konfliktintensität

- Diplomatische Krise
- Proteste (teilweise gewaltförmig)
- Gewalteininsatz (nationale Tragweite)
- Systematische / kollektive Gewalt

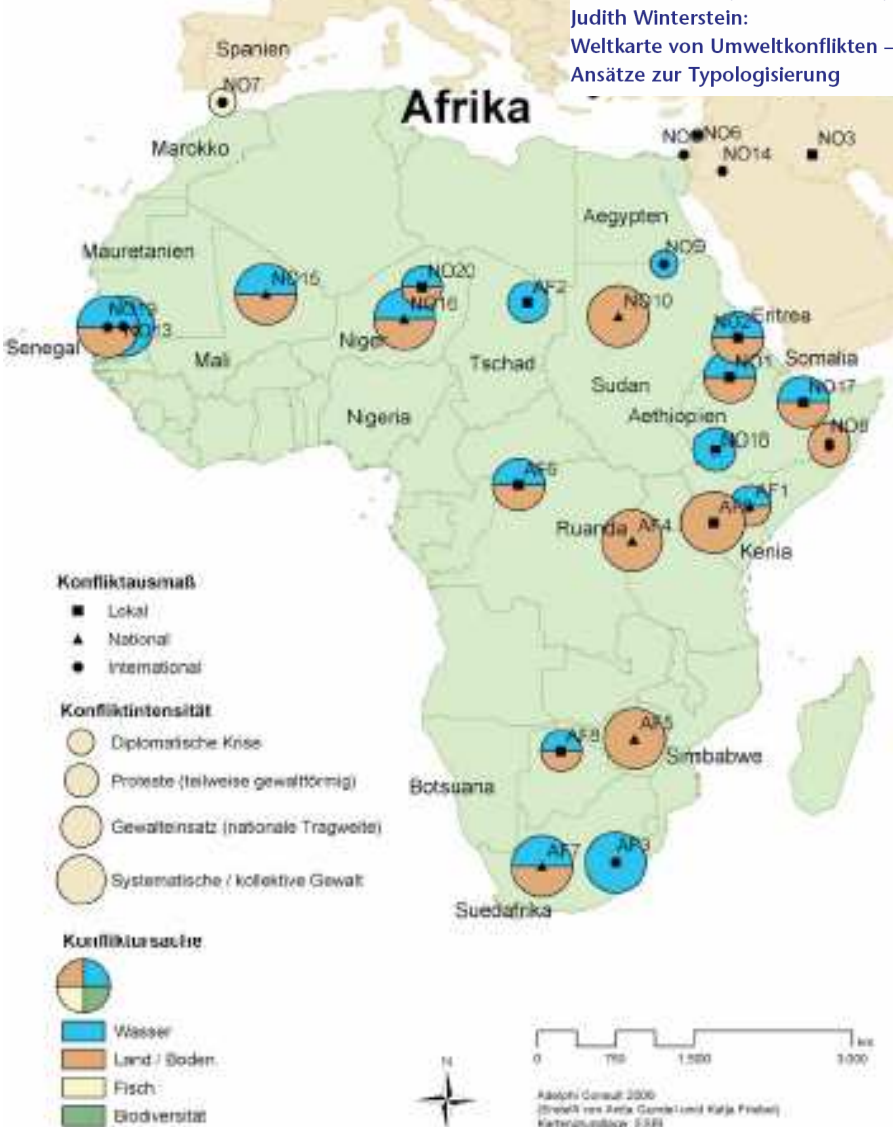


Adelphi Consult 2006
(Erschell von Anja Gundel und Kai Kattengrundlage: ESRI)

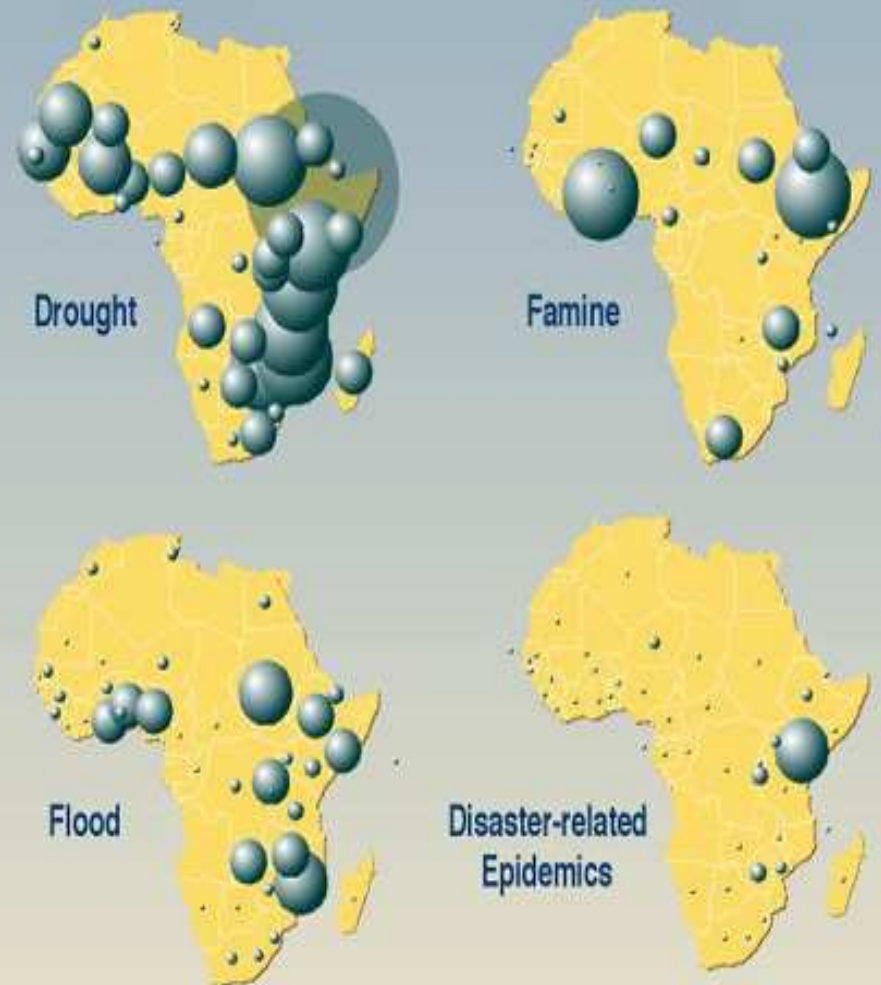
Alexander Carius, Dennis Tänzler,
Judith Winterstein:
Weltkarte von Umweltkonflikten –
Ansätze zur Typologisierung

8.4. Drought, Famine and Conflicts in Africa

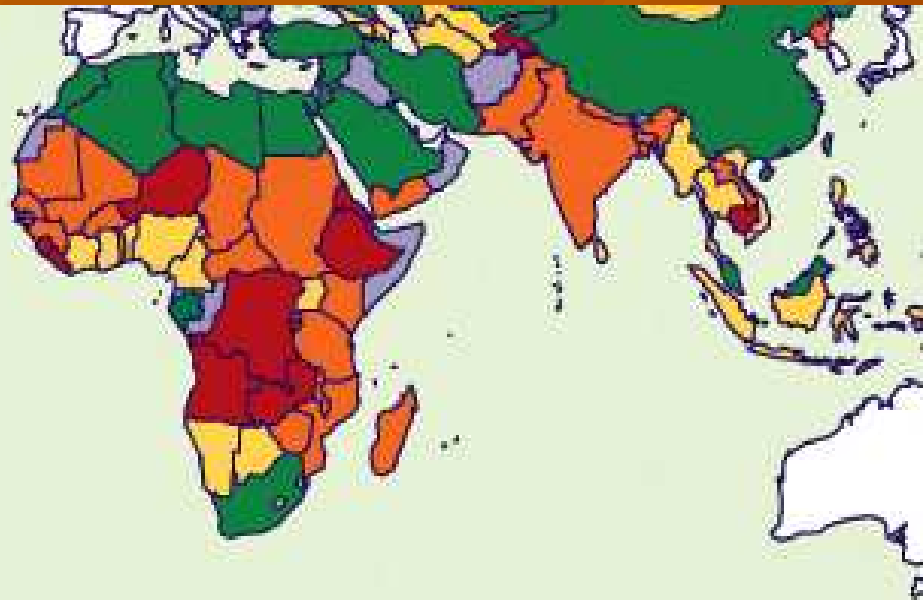
Alexander Carius, Dennis Tänzler,
Judith Winterstein:
Weltkarte von Umweltkonflikten –
Ansätze zur Typologisierung



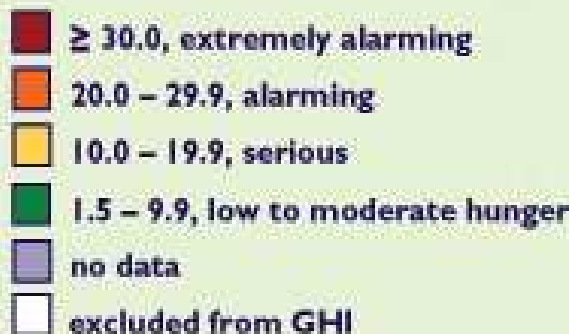
People Affected by Natural Disasters



8.4. IFPRI: Global Hunger Index: Oct. 2006



Global Hunger Index



- Global Hunger Index of Internat. Food Policy Research Institute
- Of 12 countries with highest hunger levels, **nine** were affected by **civil wars or violent conflicts**.
- The 10 worst cases are all in **Sub-Saharan Africa**.
- Among **most affected** are countries in Nile Basin (**Eritrea, Ethio-pia**), in Sahel (**Niger**)
- In all other countries: **alarming**.
- **Situation may get worse:**
 - demand increase and
 - supply decline due to impacts of **Global environmental change**.

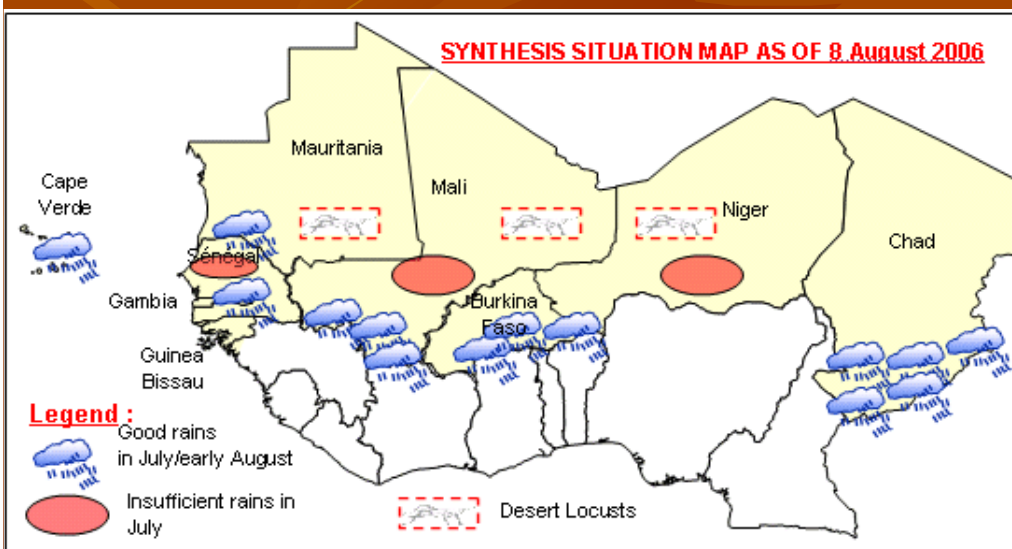
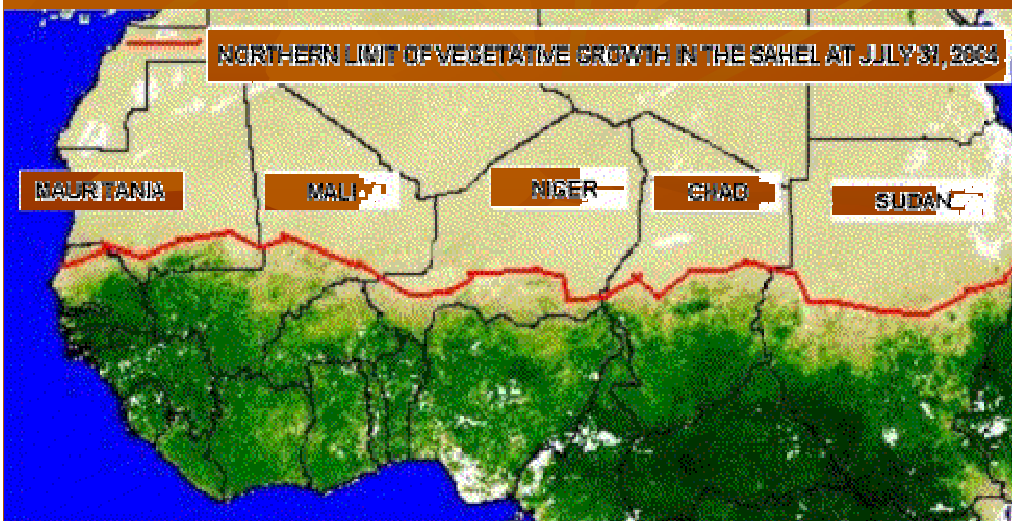
8.5. Population Change in Nile Basin Countries

IBRD 30785



NB countr.	1950	2000	2025	2050	2005-2050
Burundi	2,5	6,4	13,9	22,9	15,1
D.R.Congo	12,2	51,0	108,0	183,2	122,4
Egypt	21,8	67,9	101,1	125,9	51,9
Eritrea	1,1	3,7	7,2	10,2	5,5
Ethiopia	18,4	62,9	118,4	170,2	92,8
Kenya	6,3	30,7	49,4	64,8	31,0
Rwanda	2,1	7,6	12,9	17,4	8,7
Sudan	9,2	31,1	61,3	84,2	44,0
Tanzania	7,9	35,1	52,6	71,4	34,9
Uganda	5,2	23,3	55,8	130,9	104,0
Total	86,7	280,8	580,6	881,1	510,3

8.6. Population Change in Sahel Countries



Sahel	1950	2005	2025	2050	2005-2050
Mauretania	0,8	3,1	5,0	7,5	4,5
Mali	3,5	13,5	24,0	42,0	28,5
Niger	2,5	14,0	26,4	50,2	36,2
Chad	2,7	9,7	17,0	29,5	19,8
Senegal	2,5	11,7	17,3	23,1	11,4
Guinea	2,5	9,5	15,8	28,7	19,2
Burkina Faso	4,0	13,9	22,5	39,5	25,6
Total	18,5	75,4	128,0	220,5	145,2
Nigeria	29,8	131,5	190,3	258,1	126,6

8.7. Population Change in Horn of Africa

Eastern Africa: IGAD, Horn



Horn of Africa.	1950	2005	2025	2050	2005-2050
Eritrea	1.1	4.7	7.2	10.2	5.5
Ethiopia	18.4	77.4	118.4	170.2	92.8
Kenya	6.3	33.8	49.4	64.8	31.0
Sudan	9.2	40.2	61.3	84.2	44.0
Uganda	5.2	26.9	55.8	130.9	104.0
Djibouti		0.8	1.1	1.5	0.7
Somalia		8.6	14.9	25.5	16.9
Total	86.7	192.9	308.1	487.3	294.9

9. Security for the People: Them or US?

- Security for them?
 - Reactive task: ECHO: food aid, water and health support in camps
 - Proactive task: EU Development commission: A Task for international environment and development policy of EU members and EU Commission
- Security for us? Implementing the Schengen Regime
 - Frontex
 - Italian and Spanish border police
 - Humanitarian organizations

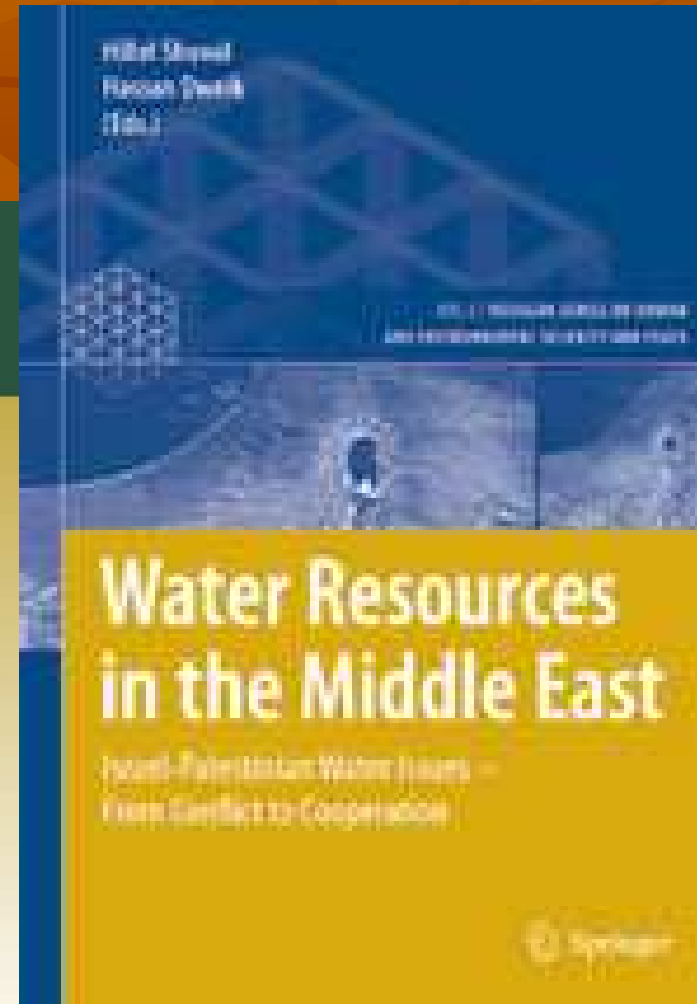
10. Developing and Implementing Security for the People?

- Need for more Systematic Research: on the Linkages of Desertification and Environmental Conflict and cooperation
 - WBGU.
- Need for proactive environmental security strategies for coping with Causes contributing to desertification
- This includes an analysis of the interactions among: climate change, desertification and precipitation.
- This requires both
 - Modern Scientific Knowledge: on the Causes
 - Traditional Knowledge of Indigenous Societies as a key factor of coping strategies that relies on the empowerment of the people and on strategies of resilience building.

11. Bibliographic References

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

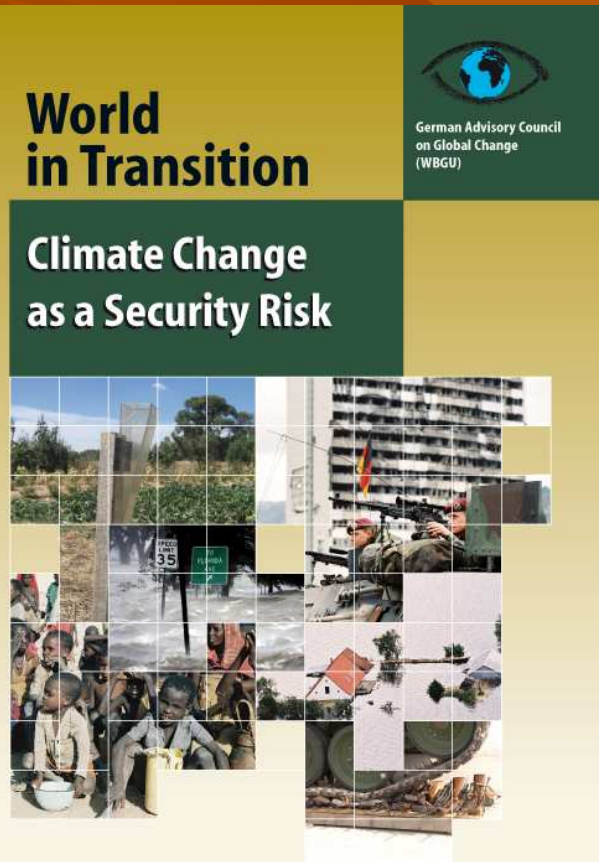
http://www.wbgu.de/wbgu_jg2007_engl.html



http://www.afes-press-books.de/html/hexagon_02.htm



http://www.afes-press.de/html/bk_book_of_year.html





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