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Climate Change Scenarios and Possible Impacts for the MENA Region: Hazards, Migration and Conflicts?

Middle East Office
HEINRICH BÖLL FOUNDATION

Green Wars?
Environment between Conflict and Cooperation in the MENA Region

Beirut, Lebanon, 2-3 November 2007

NASA

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1.1 Hypotheses on GEC and Climate Change Impacts for the MENA

- Climate change will affect the Mediterranean more than Central and Northern Europe
- MENA will get much hotter, precipitation will decline, sea level will rise and affect coastlines
- Weather related hazards will rise: heat waves, droughts, forest fires, flash floods, land slides and the yield of many crops will decline
- The public awareness, social vulnerability and the coping capacity differ: Europe & MENA
- Challenges cannot be solved militarily, they require a Euro-MENA climate partnership

2. Link: Environment & Conflict

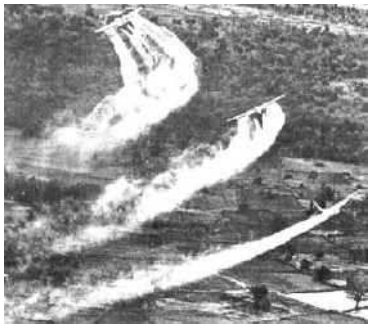
- **Twofold link between environment & conflict**
  - **Conflicts, wars as a cause of environmental damage**
  - **Global Environmental Change as a cause of conflicts**
- **Enviromental conflict impact research**
  - Kadry Said: Impacts of land mines, unexploded ordnance of WW II in North Africa: El Alamein: victims in Egypt
  - Westing: Impacts of burning oil fields in Kuweit (1991)
  - Impact of oil spill in Lebanon after bombing of a plant
  - Environmental impact of Israeli-Palestinian conflict (UNEP)
  - Environmental impacts of wars in Balkans, Afghanistan & Iraq
- **Impacts of GEC & climate change on conflict**
  - **Environmental security research** (Canada & Swiss school)
  - May GEC and climate change cause or trigger societal outcomes that can lead to domestic crises and conflicts or even to international wars?
  - What should be done proactively to prevent such outcomes?

2.1 Link: Environment & Conflict

war > environment

environment > crises/conflicts

Vietnam: Impact of Agent Orange



Climate Change Impacts: Hazards

Burning oil fields in Kuweit (1991)

Drought and Forest Fires

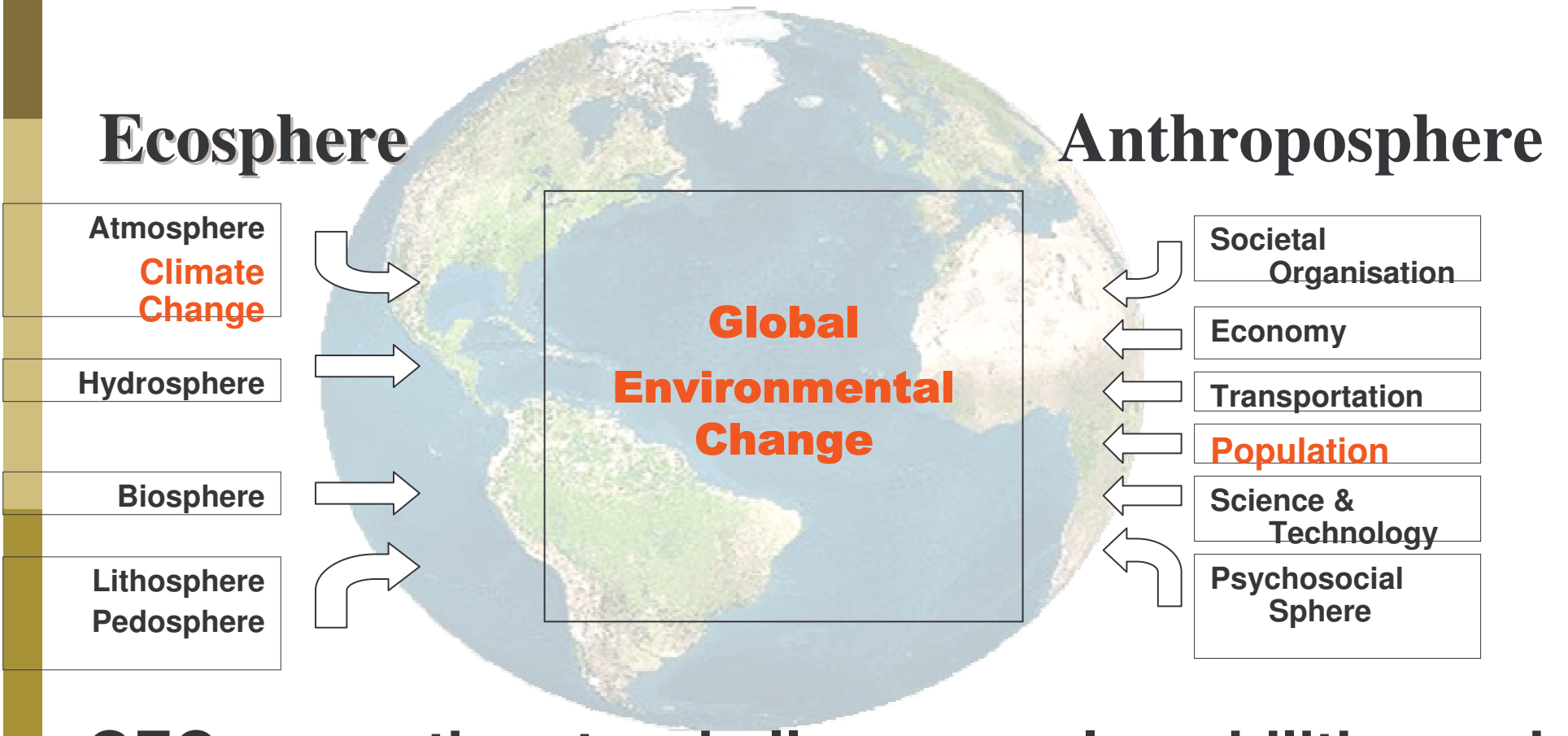
Oil spills at Lebanon Coast (2006)

-Flash Floods in Spain (2007)

3. Global Environmental Change and Climate Change

- Since 1970s & 1980s: '*global environmental change*' (GEC) became a topic in the natural & social sciences
- Since the late 1980s and 1990s policy efforts on:
  - Climate Change: 1988: issue of G7; 1990: UN GA mandate; 1992: Rio summit: UNFCC (1992) and Kyoto Protocol (1997)
  - Desertification: UNCCD (1994)
- Since 2000: both are considered as security issues
  - Almeria Symposia: 1994 and 2006: desertification/migration
  - Valencia: 2003: Desertification as a security issue in Medit.
  - Since 2002: climate change seen as a security threat/risk
    - **2002: BMU study: climate change and conflicts**
    - **2003: Schwartz/Randall: Pentagon Study**
    - **2007: Climate Change was debated by UN Secur. Council**
    - **2007/2008: WBGU: Security Risk Climate Change**

3.1.Global Environmental Change (GEC)

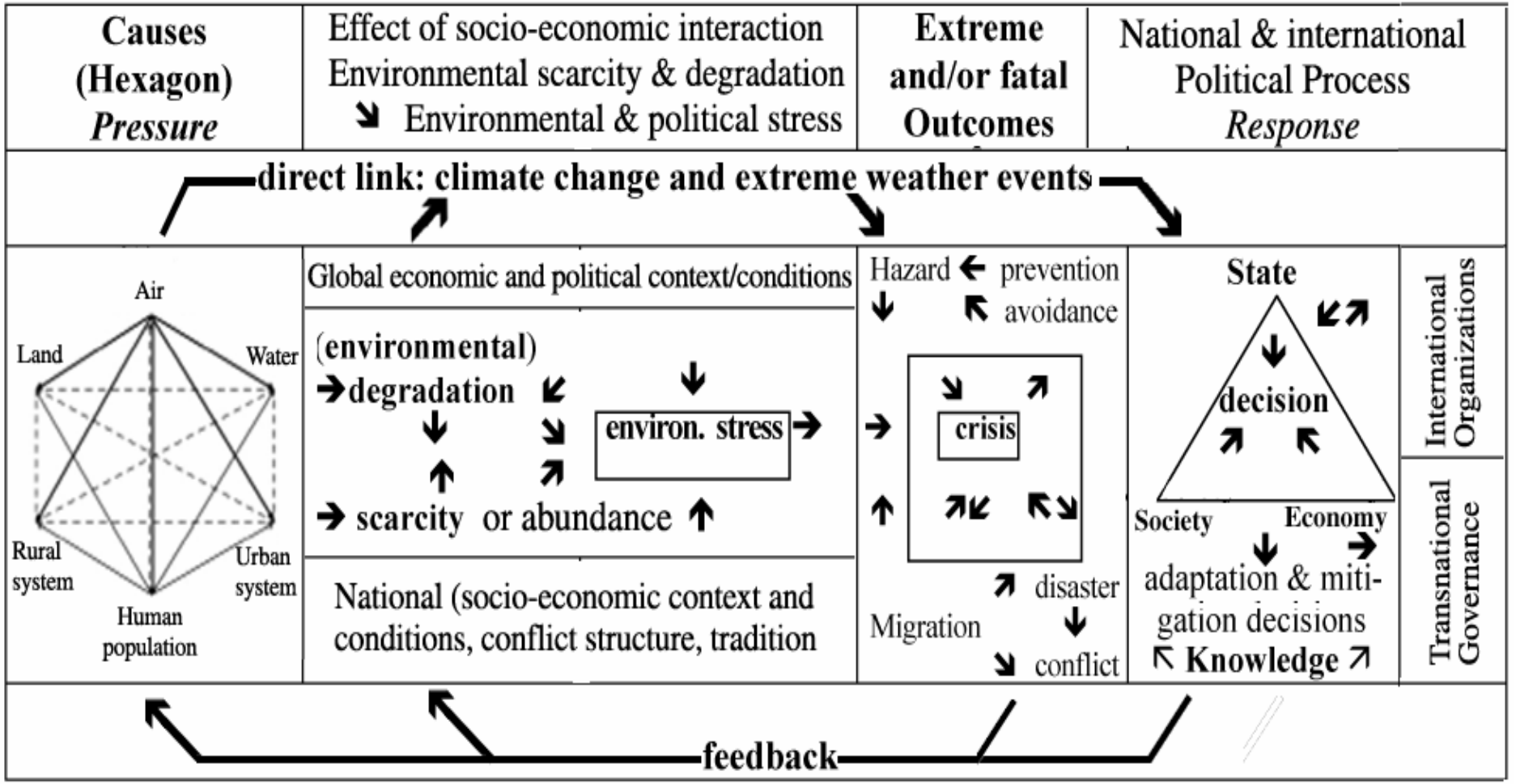


GEC poses threats, challenges, vulnerabilities and risks for global & human security and survival.

4. PEISOR Model on Climate Change Impacts

- **Focus: environment <–> human interaction**
- **Other Models: Environment – Policy Response**
  - **OECD: PSR-Model (pressure, state of env., policy response)**
  - **UN-CSD** (Committee for Sustainable Development)
  - **EEA** (European Environment Agency)
- **PEISOR model distinguishes 5 stages:**
  - **P: Pressure: Causes of GEC: Survival hexagon**
  - **E: Effect: environm. scarcity, degradation & stress**
  - **I: Impact: Extreme or fatal outcomes: natural hazards**
  - **SO: Societal Outcomes: disaster, migration, crisis, conflict etc.**
  - **R: Response by state, society, business and by using knowledge to enhance coping capacity and resilience**

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



4.2 Response: Climate Change as a (Human) Security Danger and Concern

- **A. Wolfers** (1962): 2 sides of 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".
- **Do GEC, CC & hazards pose security dangers?**
  - Global Environmental & Climate Change: pressure & cause
  - **Climate-related natural hazards:** impacts & societal outcome (victims) depend on social vulnerability
- **Policy Response: Reactive vs. proactive**
  - Stern (06) Price of non-acting is higher than two world wars!
  - **Energy resource conflicts**: wars over control of oil and gas
  - **Reactive:** postpone burden on next generations, adaptation
  - **Proactive:** emissions reduction: Shift in consumption, **energy:** from fossil to renewable sources of energy: solar.

5. Global Climate Scenarios and Impacts for the MENA Region

- **There is no Climate Impact Assessment for the Mediterranean and the MENA**
- **4 IPCC Reports: 1990, 1995, 2001, 2007**
  - Europe + Mediterranean (most details), Africa,Asia
  - Temperature increase and sea-level rise
  - Impact on hydro-meteorological natural hazards
- **Blue Plan:** Sustainable Future for the Mediterranen (2005);Sec. 2:Determining Factors:
  - Climate change and demographic divergence
  - Med: between globalization and regional integrat.
  - Governance deficit: env./development challenges

5.1. Temperature Increases & Sea Level Rise

Climate Change Impacts: Temperature & Sea level Rise

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

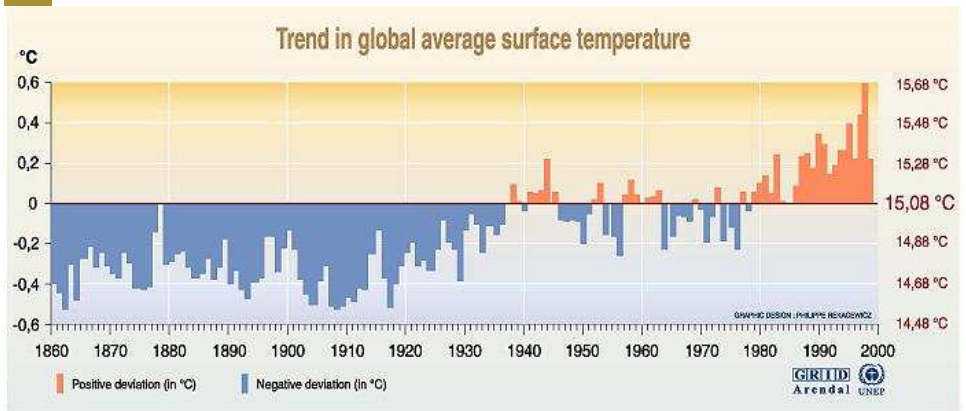
Projected temperature rise:

- TAR (1990-2100):+1.4-5. 8°C
- AR4 (07):+1.1-6.4 (1.8-4)°C

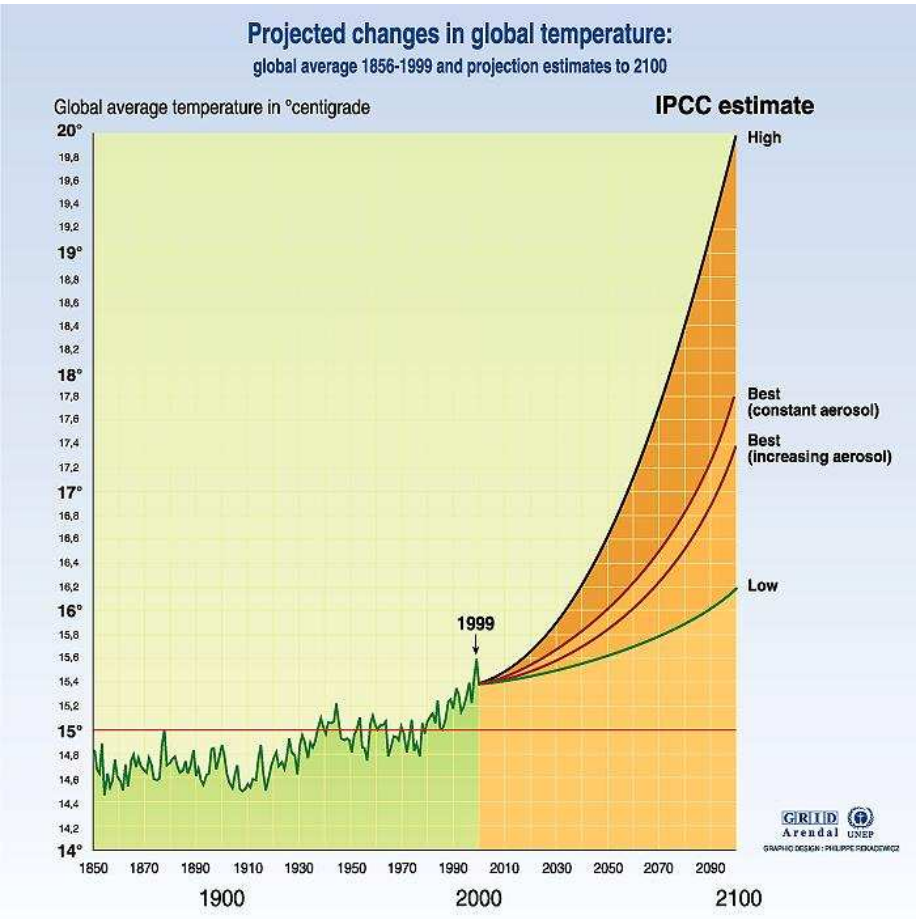
Sources: IPCC 1990,1995,2001,'07

Sea level Rise:

- 20th cent.: +0,1-0,2 metres
- TAR: 21st century: 9-88 cm
- AR4 (2000-2100): 18-59 cm

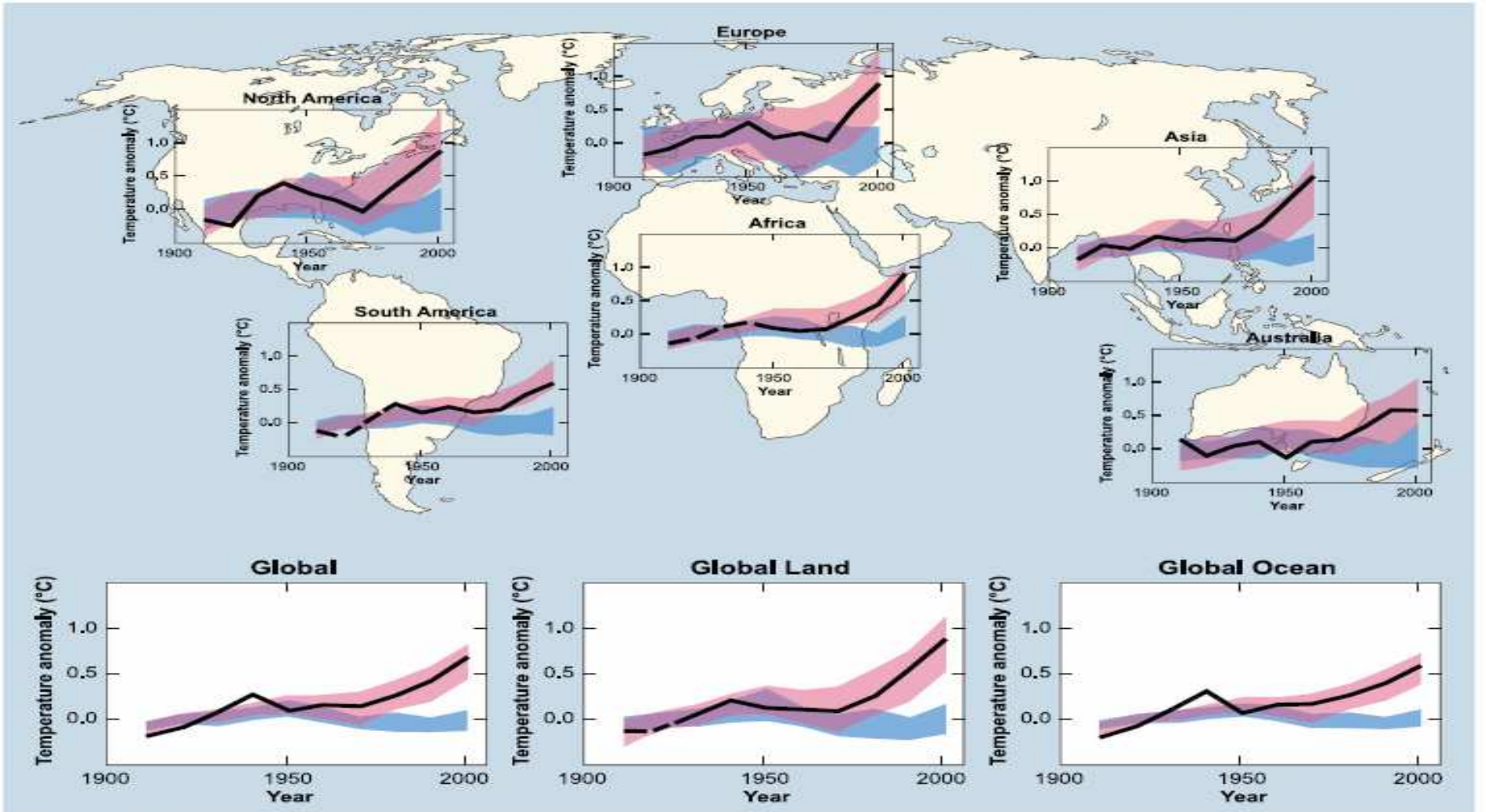


Source: School of environmental sciences, climatic research unit, university of East Anglia, Norwich, United Kingdom, 1999.

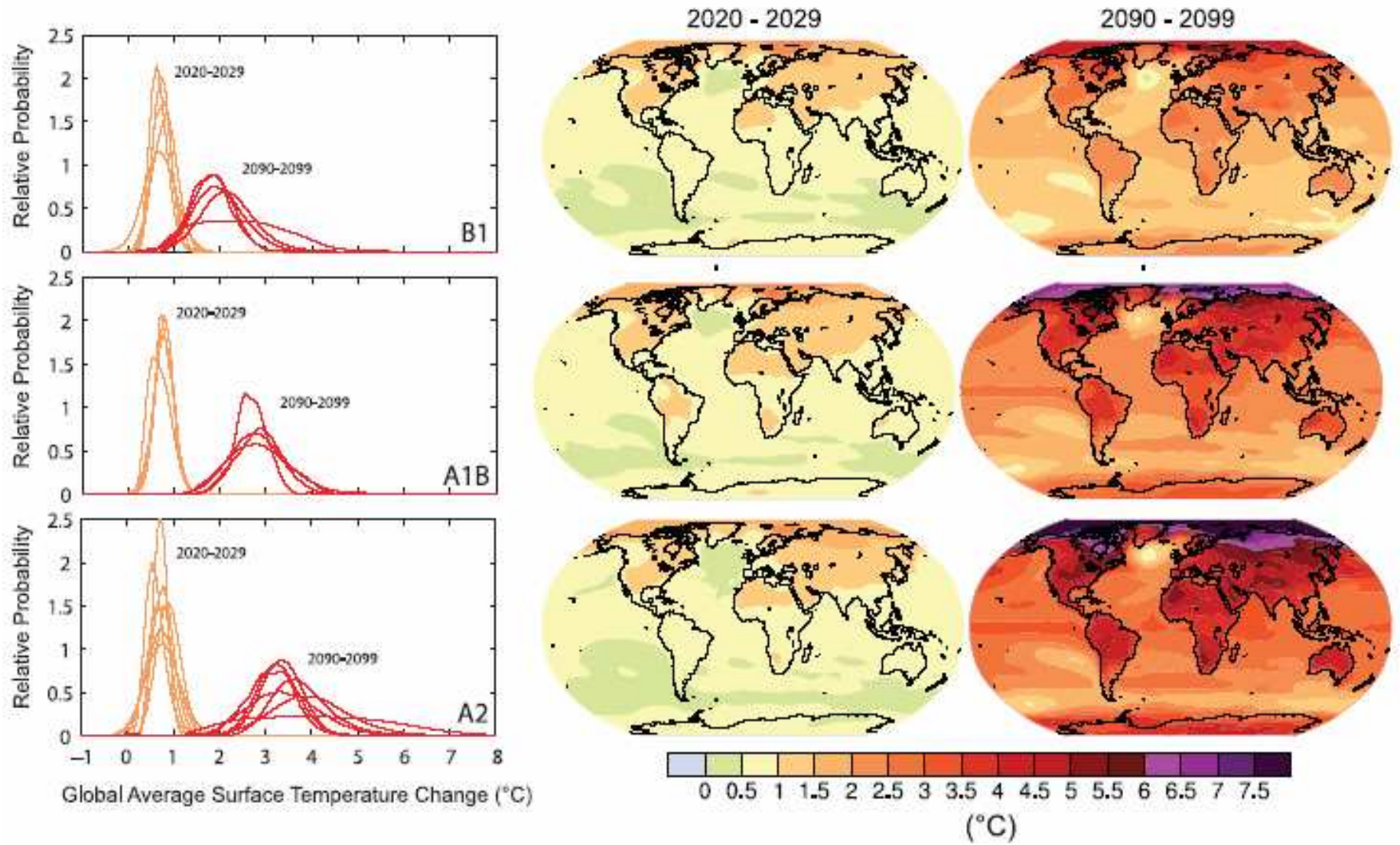


Source : Temperatures 1856 - 1999: Climatic Research Unit, University at East Anglia, Norwich UK. Projections: IPCC report 95.

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



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



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

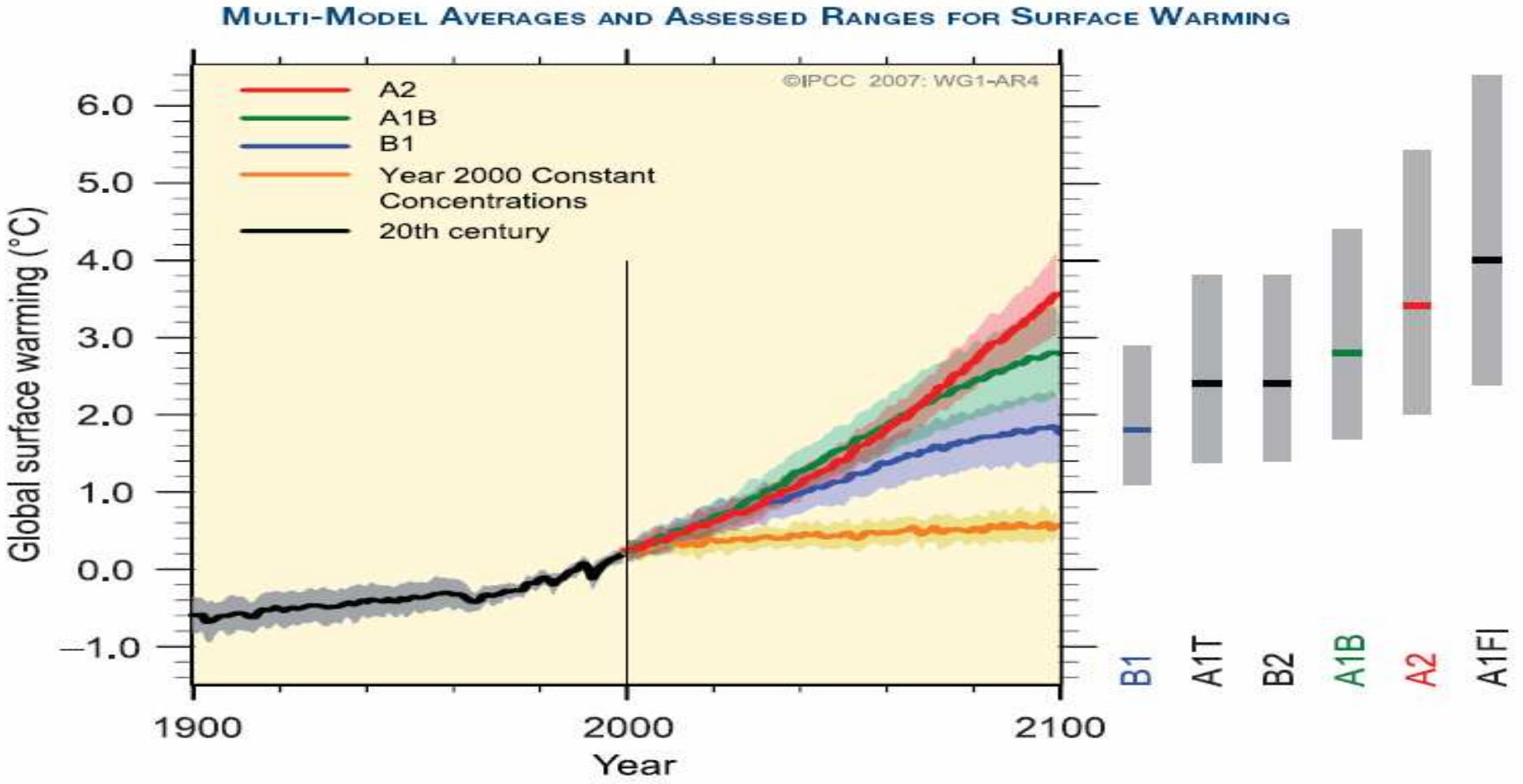


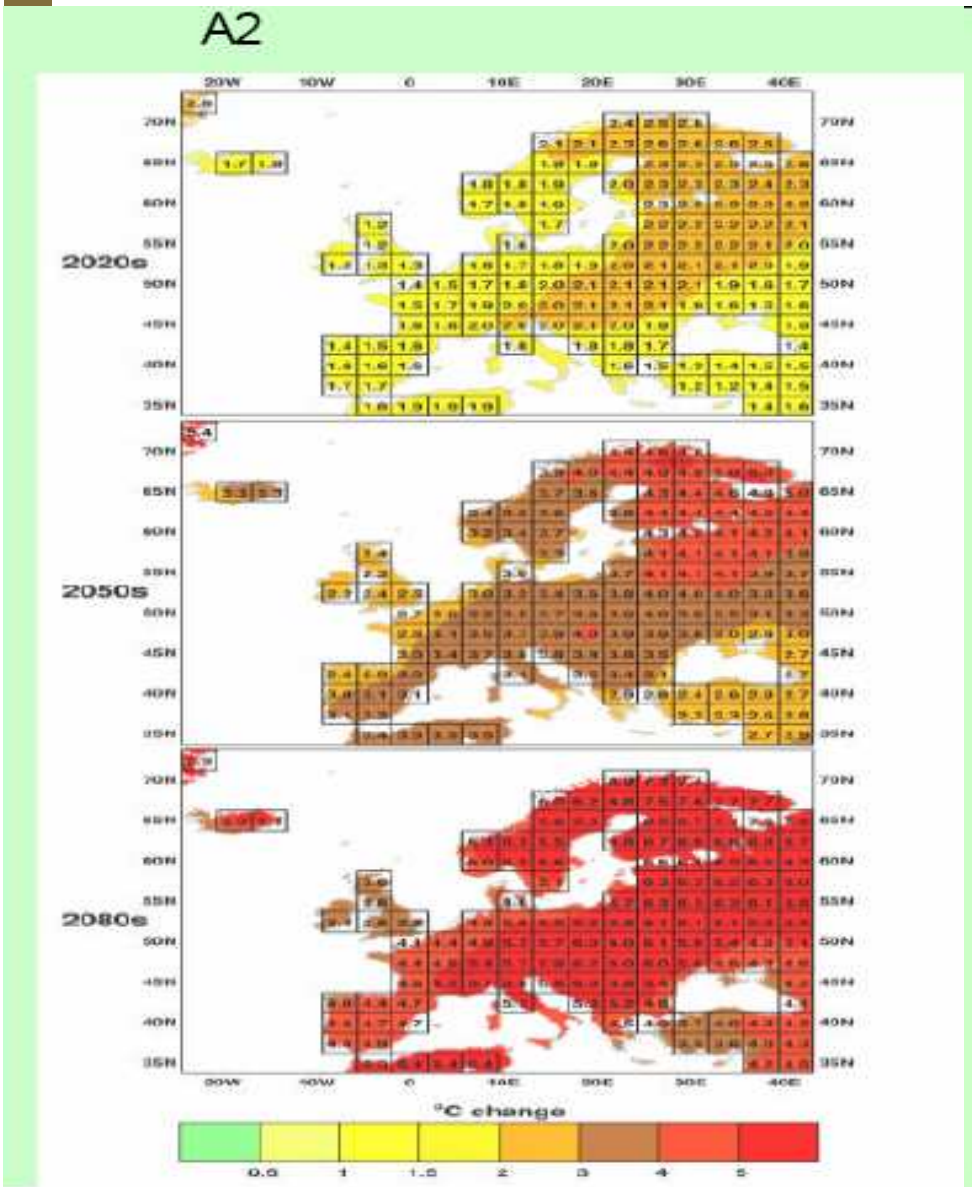
Figure SPM.5. *Solid lines are multi-model global averages of surface warming (relative to 1980–1999) for the scenarios A2, A1B and B1, shown as continuations of the 20th century simulations. Shading denotes the ±1 standard deviation range of individual model annual averages. The orange line is for the 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}*

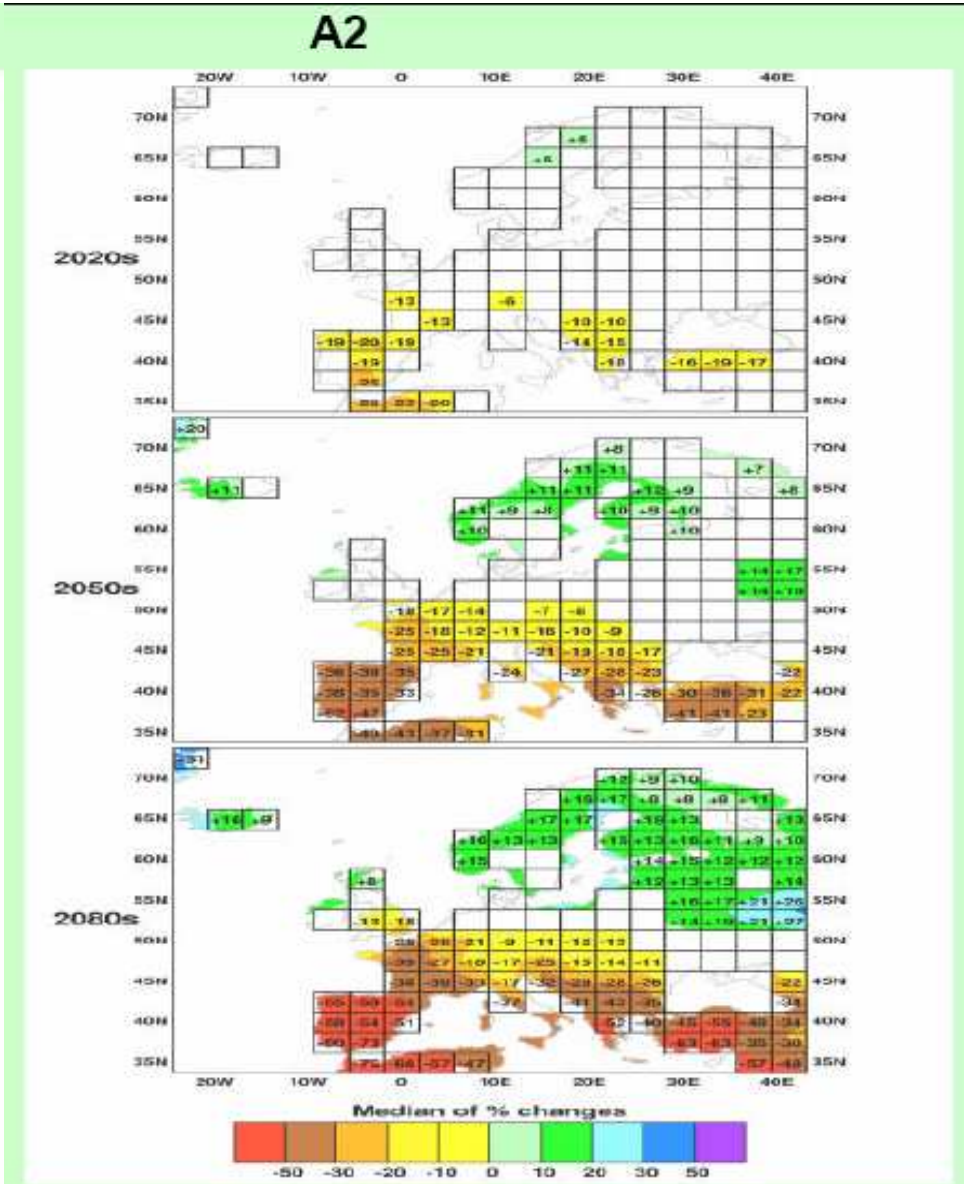
5.5 IPCC, WG I, Regional Climate Projections (AR4, vol. 1, p. 850)

Mediterranean and Europe:

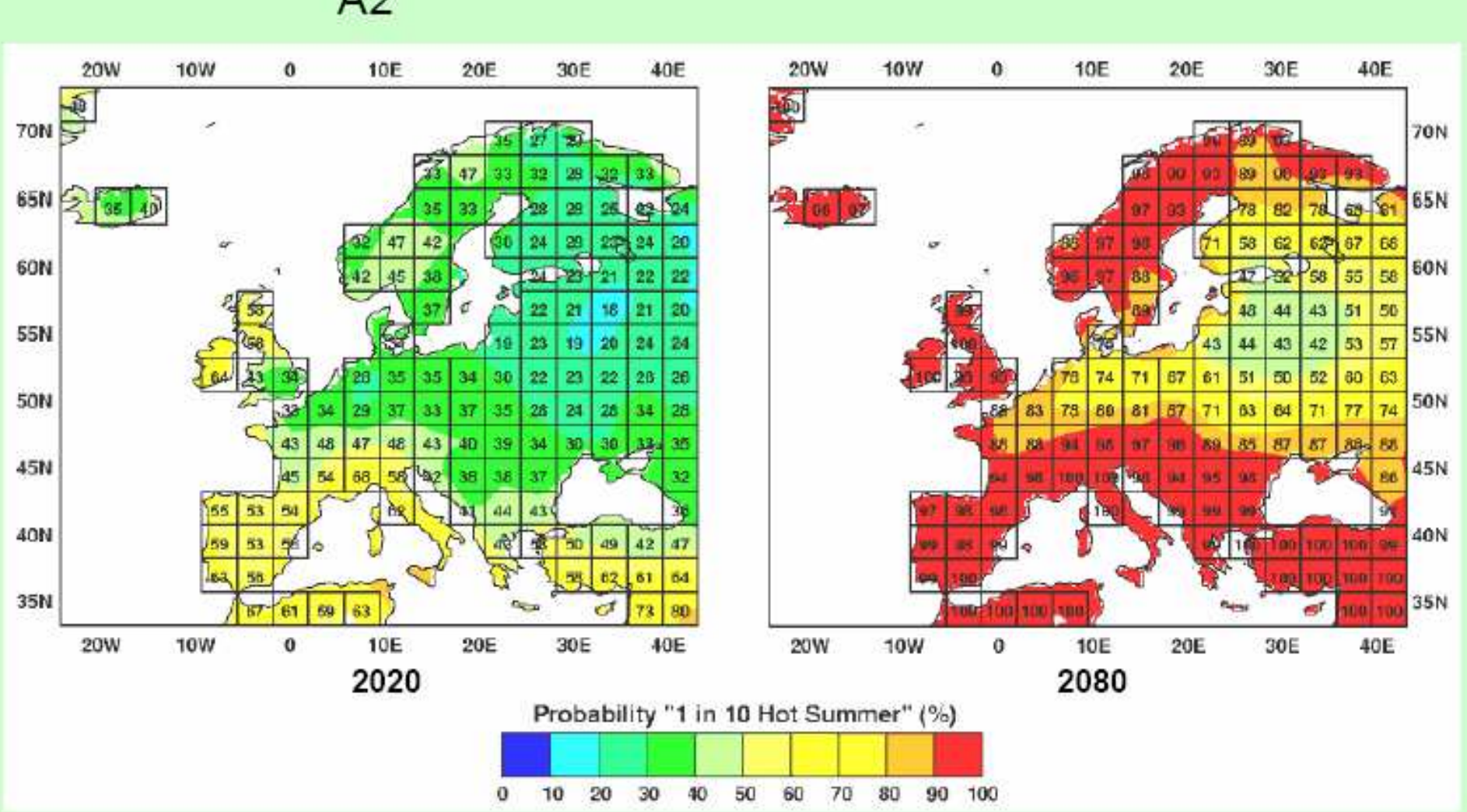
Annual mean temperatures in Europe are *likely* to increase more than the global mean. Seasonally, the largest warming is *likely* to be in northern Europe in winter and in the Mediterranean area in summer. Minimum winter temperatures are *likely* to increase more than the average in northern Europe. Maximum summer temperatures are *likely* to increase more than the average in southern and central Europe. Annual precipitation is *very likely* to increase in most of northern Europe and decrease in most of the Mediterranean area. In central Europe, precipitation is *likely* to increase in winter but decrease in summer. Extremes of daily precipitation are *very likely* to increase in northern Europe. The annual number of precipitation days is *very likely* to decrease in the Mediterranean area. Risk of summer drought is *likely* to increase in central Europe and in the Mediterranean area. The duration of the snow season is *very likely* to shorten, and snow depth is *likely* to decrease in most of Europe.

5.6. Projected Winter Temperature and Winter Precipitation (2020-2080)



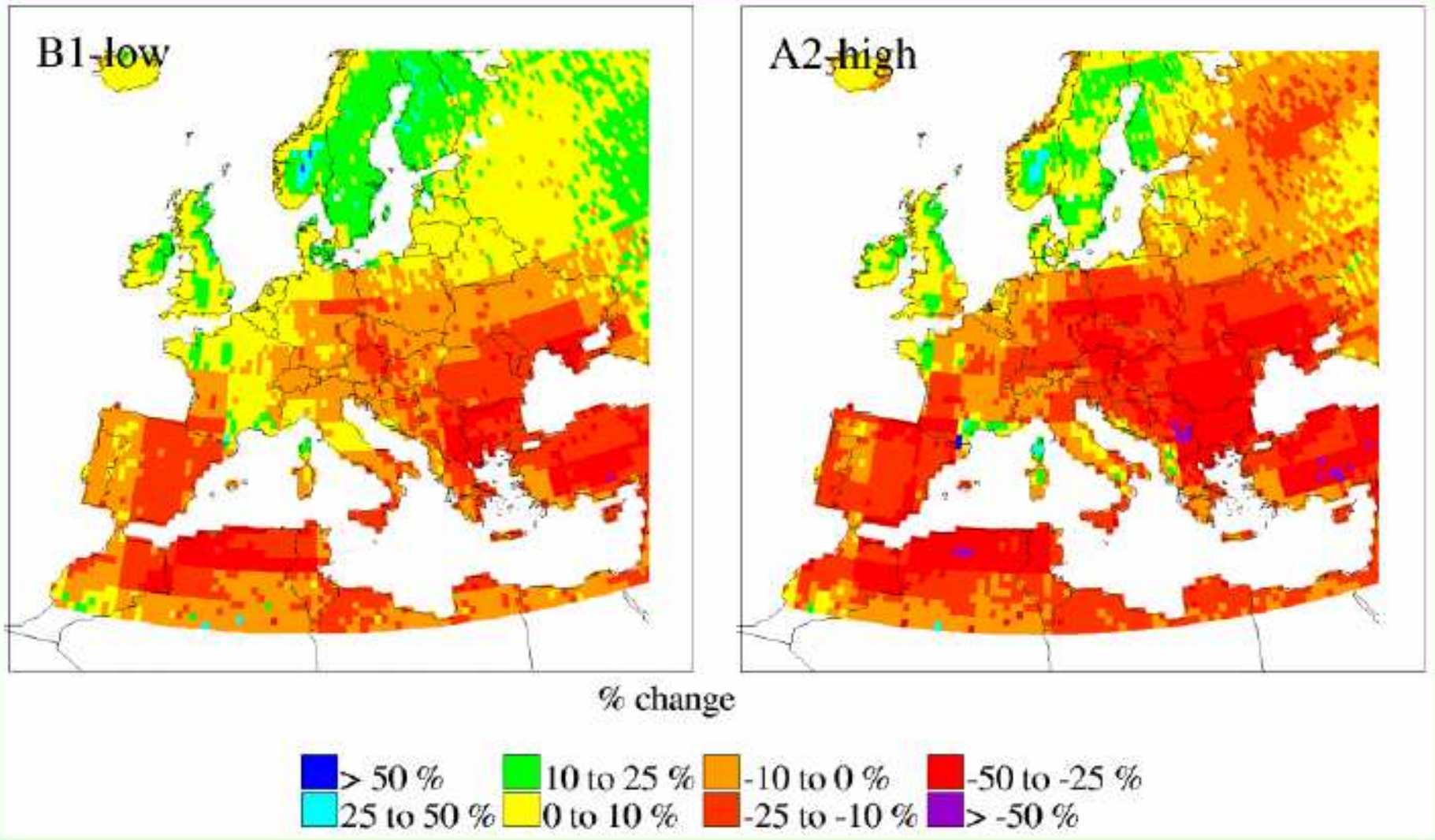


5.7. Probability of Hot Summers (M. Parry, IPCC, London, 2005)



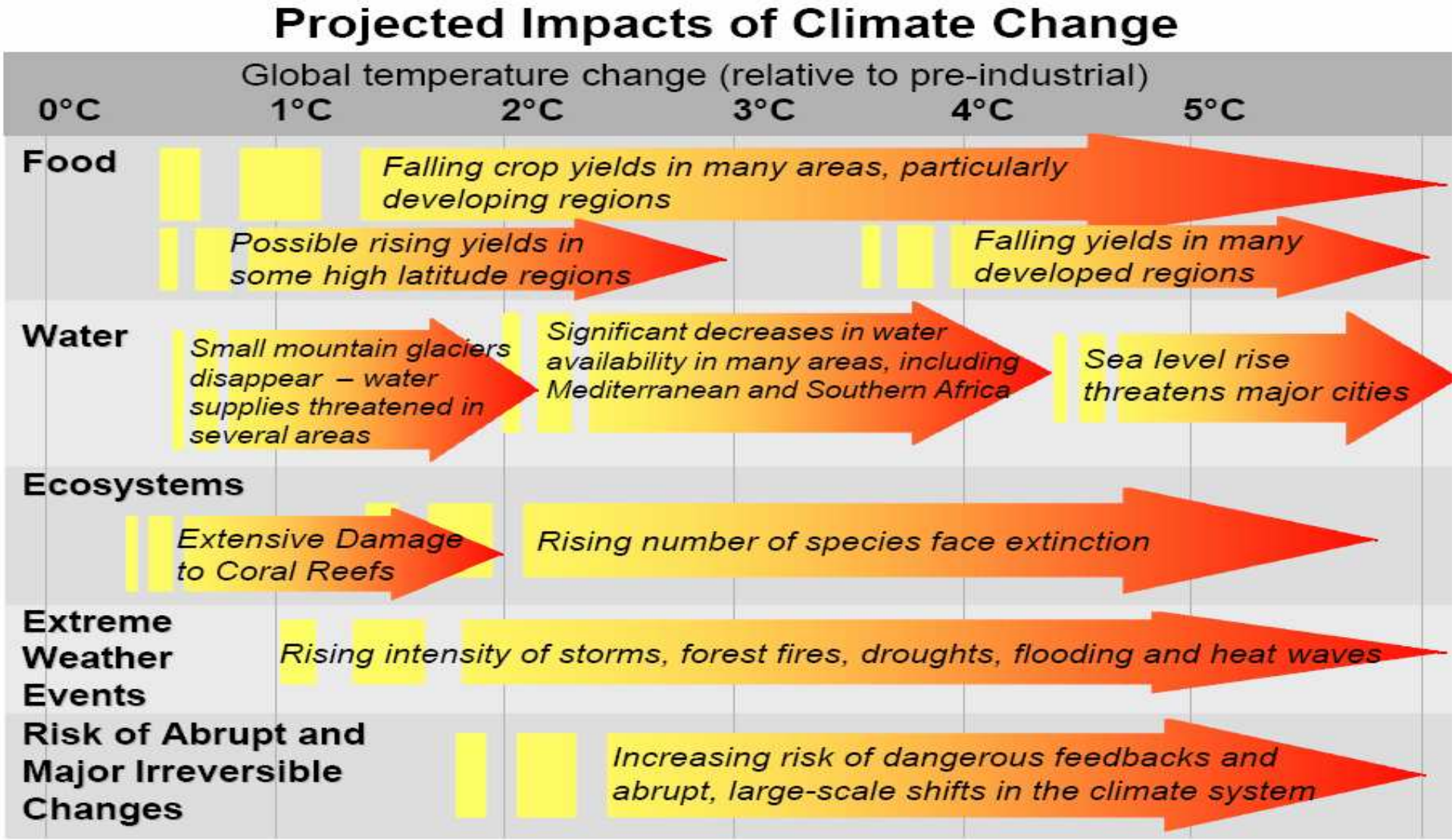
5.8. Water Availability 2050

(M. Parry, IPCC, London, 2005)



5.9. Projected Impacts of Climate Change

STERN review ON THE ECONOMICS OF CLIMATE CHANGE



5.10 Mediterranean Impact & Response

- **Impact of climate change on the Mediterranean**
  - **Summers get hotter and dryer**
  - **Droughts, forest fires, flash floods, landslides rise**
- **Obligations of five EU Mediterranean countries**
  - Italy(-6.5),France (0%),Spain (+15),Greece (25),Portugal(27
- **Performance of five EU Mediterranean countries**
  - **France, Greece, Portugal, Italy, Spain**
  - **All countries have a suboptimal performance**
  - **The country with the highest projected CC impact, lowest performance**
  - **Lack of public awareness**
- **MENA countries: no GHG reduction obligations**
- **MENA countries; have huge untapped and underdeveloped solar energy potential**

6. Environmental & Social Impacts of Climate Change for the MEDA until 2100

IPCC Chair Pachauri: Projections of future climate

- Sea ice is projected to shrink in both the Arctic & Antarctic. This will affect sea-level in Mediterranean
- In some projections, Arctic late-summer sea ice disappears almost entirely by the latter part of the 21st century
- *Very likely* that hot extremes, heat waves, and heavy precipitation events will continue to become more frequent
- *Likely* that future tropical cyclones will become more intense, with larger peak wind speeds and more heavy precipitation
- Drying in the Sahel, the Mediterranean, southern Africa and parts of southern Asia.
- More intense and longer droughts observed since the 1970s, particularly in the tropics and subtropics.

6.1. IPCC, AR4, WG 2, Europe: p. 9

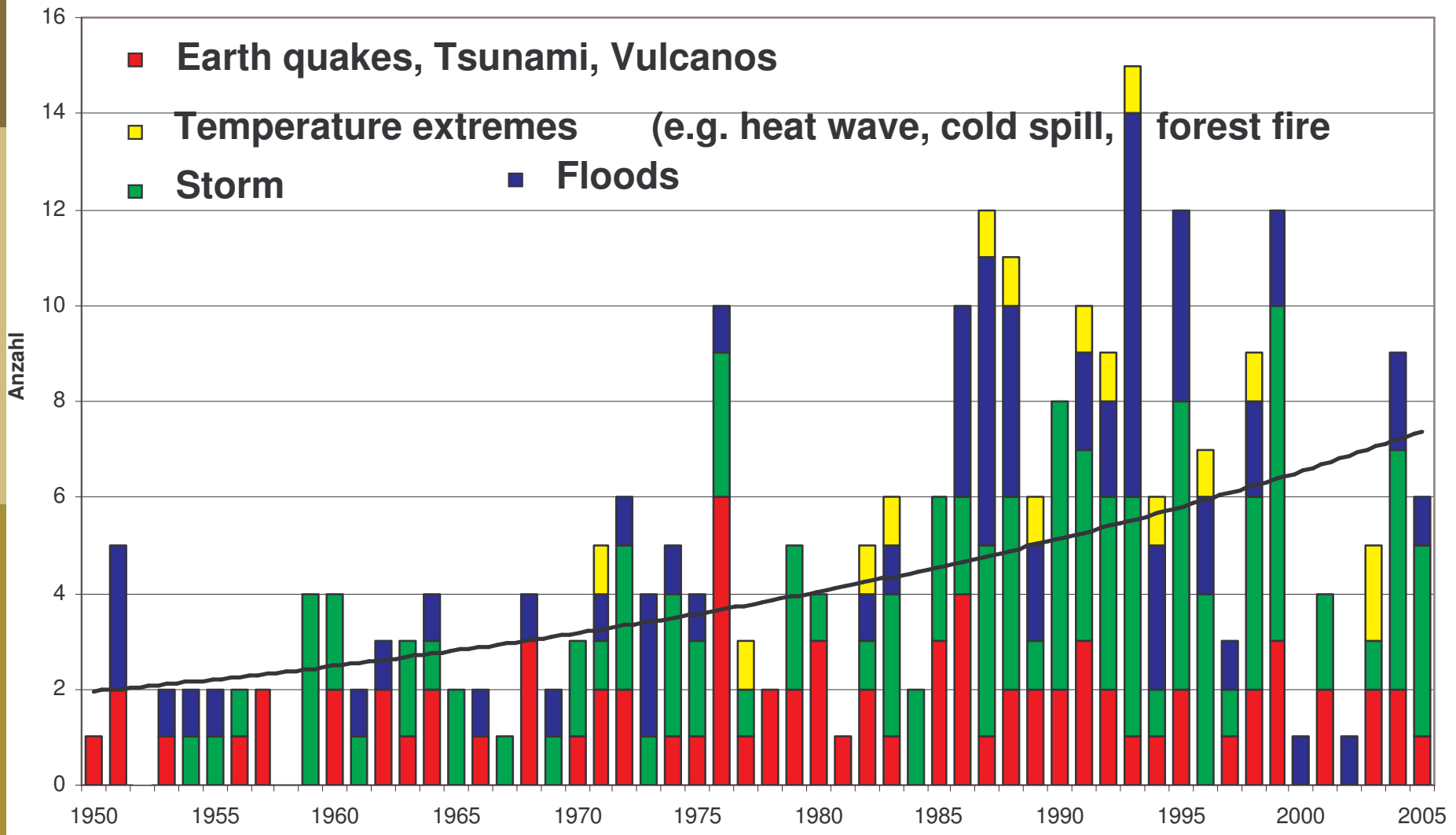
Nearly all European regions are anticipated to be negatively affected by some future impacts of climate change and these will pose challenges to many economic sectors. Climate change is expected to magnify regional differences in Europe's natural resources and assets. Negative impacts will include increased risk of inland flash floods, and more frequent coastal flooding and increased erosion (due to storminess and sea-level rise). The great majority of organisms and ecosystems will have difficulties adapting to climate change. Mountainous areas will face glacier retreat, reduced snow cover and winter tourism, and extensive species losses (in some areas up to 60% under high emission scenarios by 2080). *** D [12.4]

In Southern Europe, climate change is projected to worsen conditions (high temperatures and drought) in a region already vulnerable to climate variability, and to reduce water availability, hydropower potential, summer tourism and, in general, crop productivity. It is also projected to increase health risks due to heat waves and the frequency of wildfires. ** D [12.2, 12.4, 12.7]

7. Environmental Impacts of Climate Related Natural Hazards

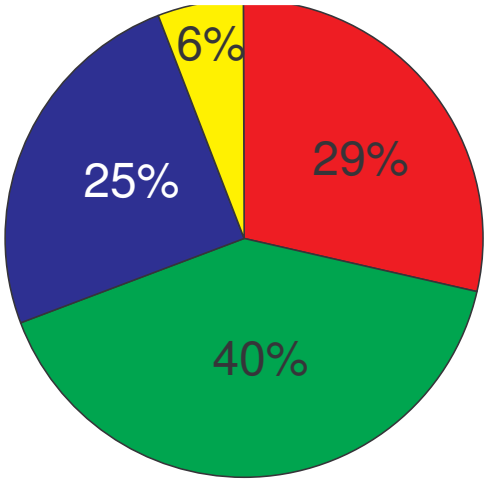
- During the 20th Century climate related natural hazards have increased:
  - Drought (water scarcity and degradation)
  - Heat waves (impact on human beings, agriculture)
  - Forest fires
  - Flash floods and landslides
- During the 21st Century climate change will
  - increase temperature and reduce precipitation
  - droughts may intensify and desertification may become irreversible in some regions
  - heat waves will increase
  - In some areas agricultural yields will decline.

7.1. Major Natural Hazards (1950 – 2005)



7.2. Major Natural Hazards (1950-2005). Source: Munich Re Research Div., 2006

267 Events



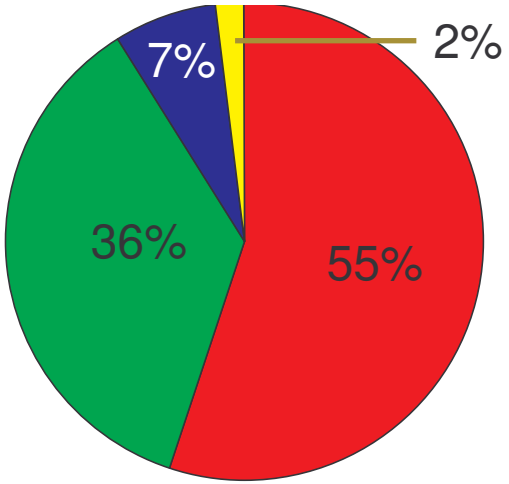
Geological events

- Earthquake/Tsunami, Volcano

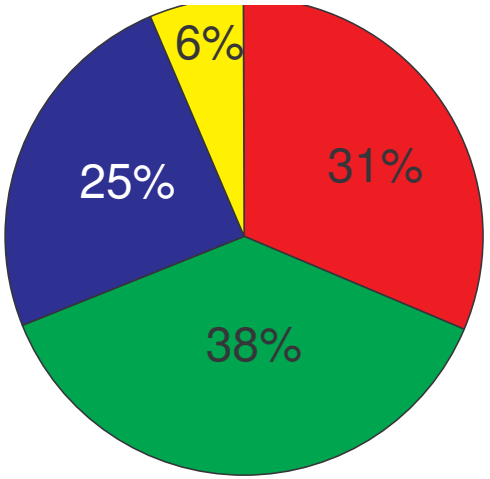
Weather-related events

- Storm
- Floods
- Extreme temperatures

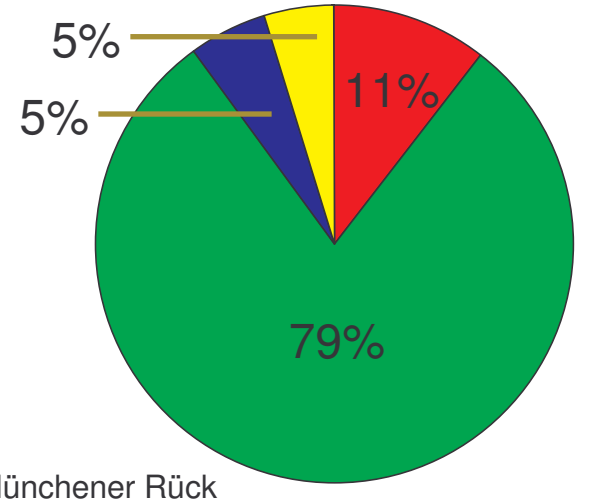
1,75 Million Deaths



Economic damage: 1.400 billion US$



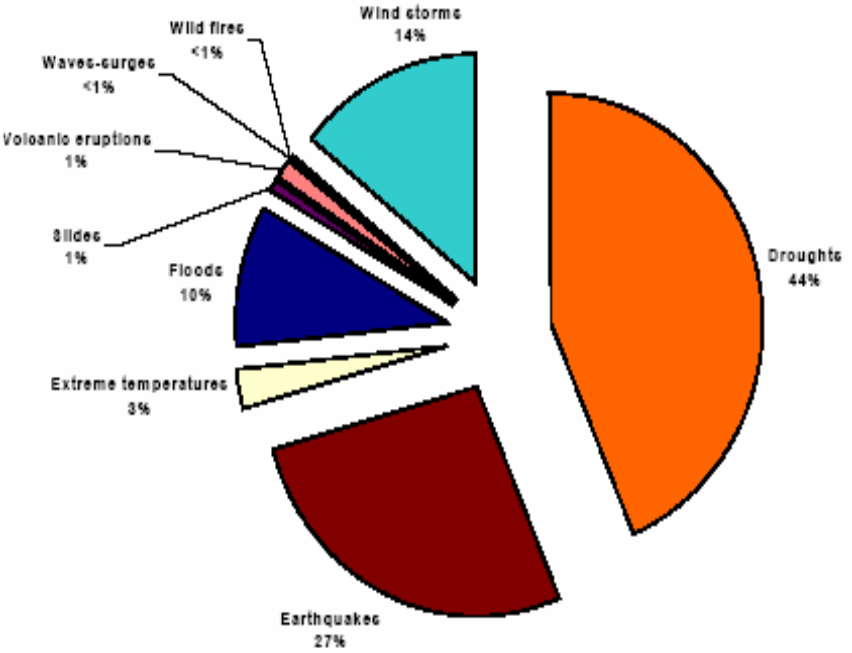
Insured damage: 340 billion US$



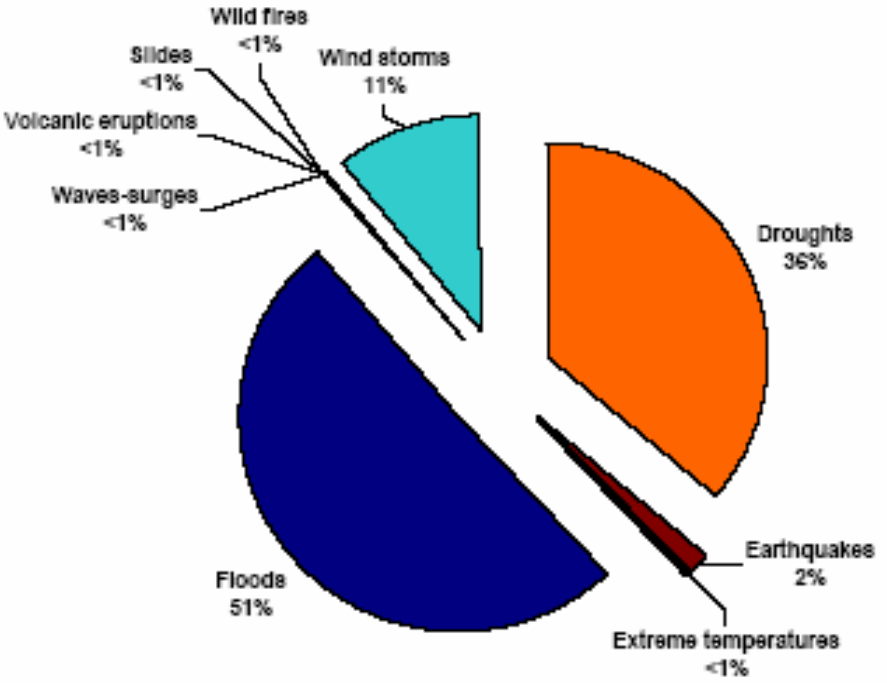
*in Werten von 2005

7.3. Impacts of Hazards (1974-2003)

Reported Deaths from Natural Hazards globally: 2.066.273 persons



Affected persons of Natural Hazards: 5 076 494 541



(1) injured + homeless + affected

Source: Hoyois/Guha-Sapir (2004)

7.4.Heatwave of 2003, IPCC AR4, WG II, p. 562

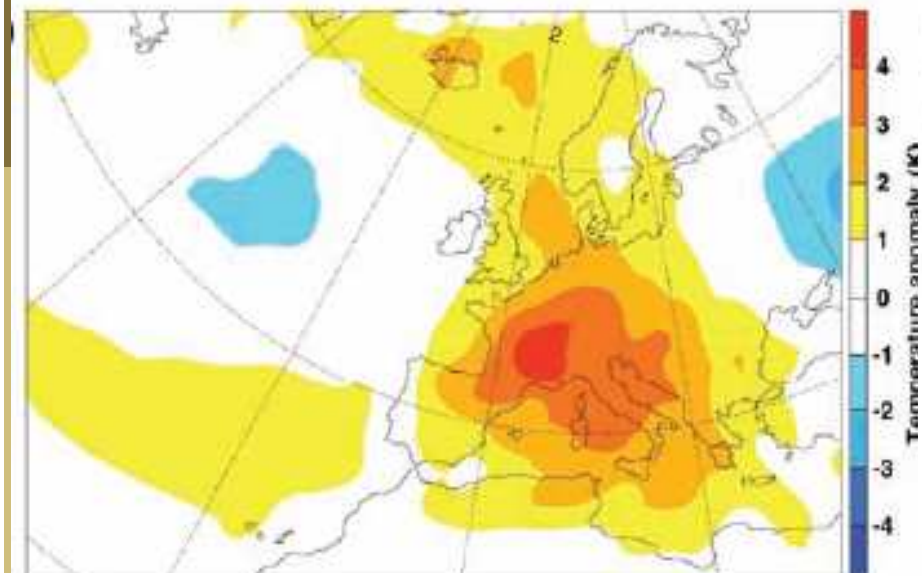
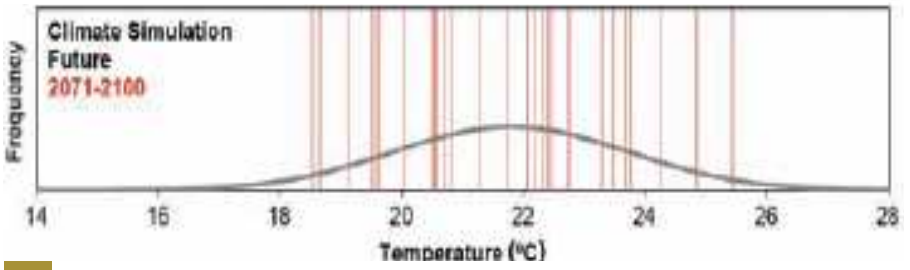


Figure 12.4. *Characteristics of the summer 2003 heatwave (adapted from Schär et al., 2004). (a) JJA temperature anomaly with respect to 1961 to 1990. (b) to (d): JJA temperatures for Switzerland observed*



the period 1961 to 1990 (c) and simulated for 2071 to 2100 under the A2 scenario using boundary data from the HadAM3H GCM (d). In

12.6.1 Heatwave of 2003

A severe heatwave over large parts of Europe in 2003 extended from June to mid-August, raising summer temperatures by 3 to 5 °C in most of southern and central Europe (Figure 12.4). The warm anomalies in June lasted throughout the entire month (increases in monthly mean temperature of up to 6 to 7°C), but July was only slightly warmer than on average (+1 to +3°C), and the highest anomalies were reached between 1st and 13th August (+7°C) (Fink et al., 2004). Maximum temperatures of 35 to 40°C were repeatedly recorded and peak temperatures climbed well above 40°C (André et al., 2004; Beniston and Díaz, 2004).

12.4). As such, the 2003 heatwave resembles simulations by regional climate models of summer temperatures in the latter part of the 21st century under the A2 scenario (Beniston, 2004). Anthropogenic warming may therefore already have increased the risk of heatwaves such as the one experienced in 2003 (Stott et al., 2004).

The heatwave was accompanied by annual precipitation deficits up to 300 mm. This drought contributed to the estimated 30% reduction in gross primary production of terrestrial ecosystems over Europe (Ciais et al., 2005). This

7.5 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

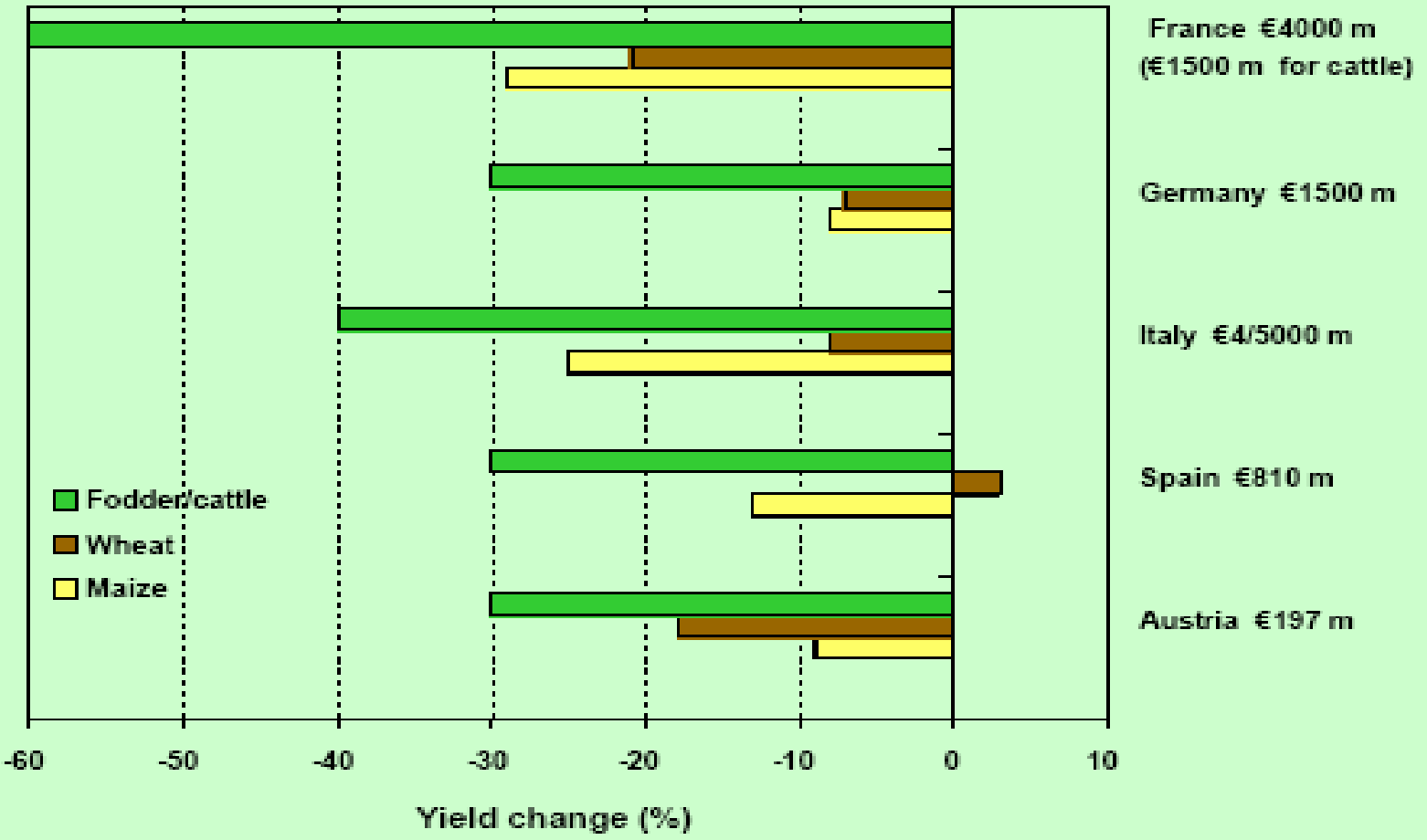
(EMDAT)

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

7.6. Effects of 2003 Summer Heat Wave on Agricultural Yield in Five EU Countries

COPA

Effects of 2003 summer heat wave on EU agriculture



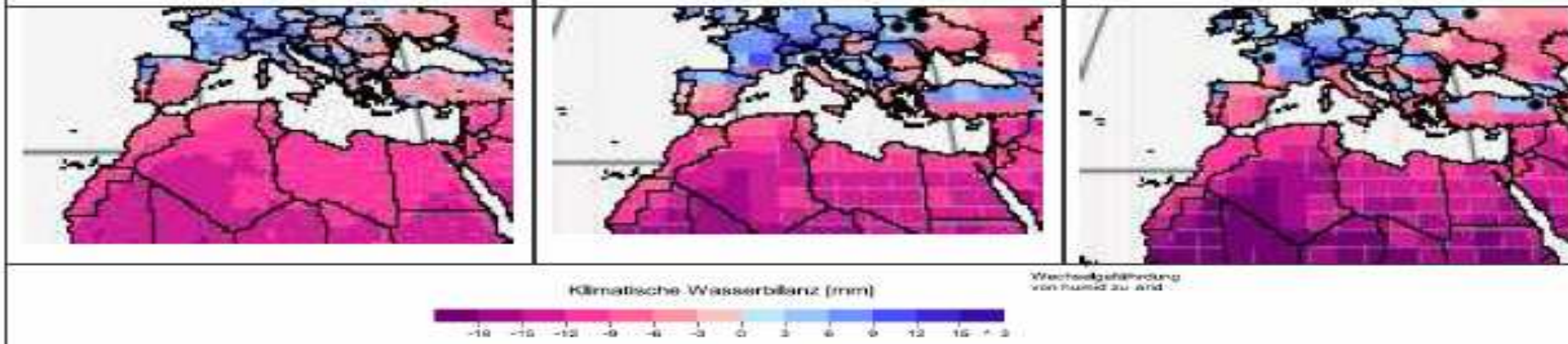
7.7. Potential Danger of Drought

Source: extracted from WBGU 2006

4A: Potential danger of drought by country, 1975-2004 (observations) (Climatic water balance)

4B: Potential danger of drought by country, 2050 (2040-2069) (Climatic water balance)

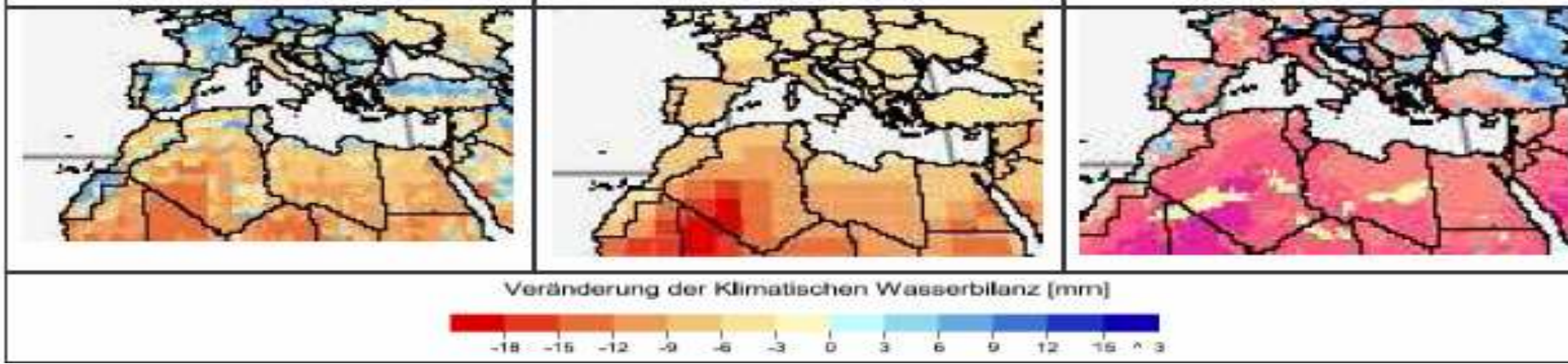
4C: Potential danger of drought by country, 2080 (2070-2099) (Climatic water balance)



4D: Potential danger of drought by country, difference between 2040/2069 and 1975/2004, changes in climatic water balance

4E: Potential danger of drought by country, difference between 2070/2099 and 2040/2069. changes in climatic water balance

4F: Potential danger of drought by country, trends in the climatic water balance 1975-2004



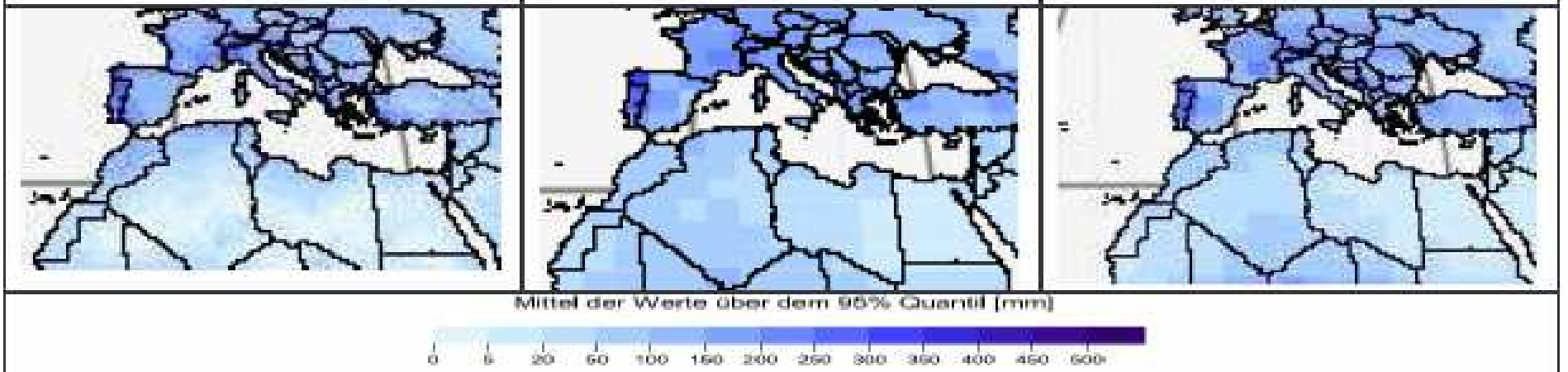
7.8. Potential Danger of Flash Floods

Source: WBGU 2006

3A: Potential flash floods by country, 1975-2004

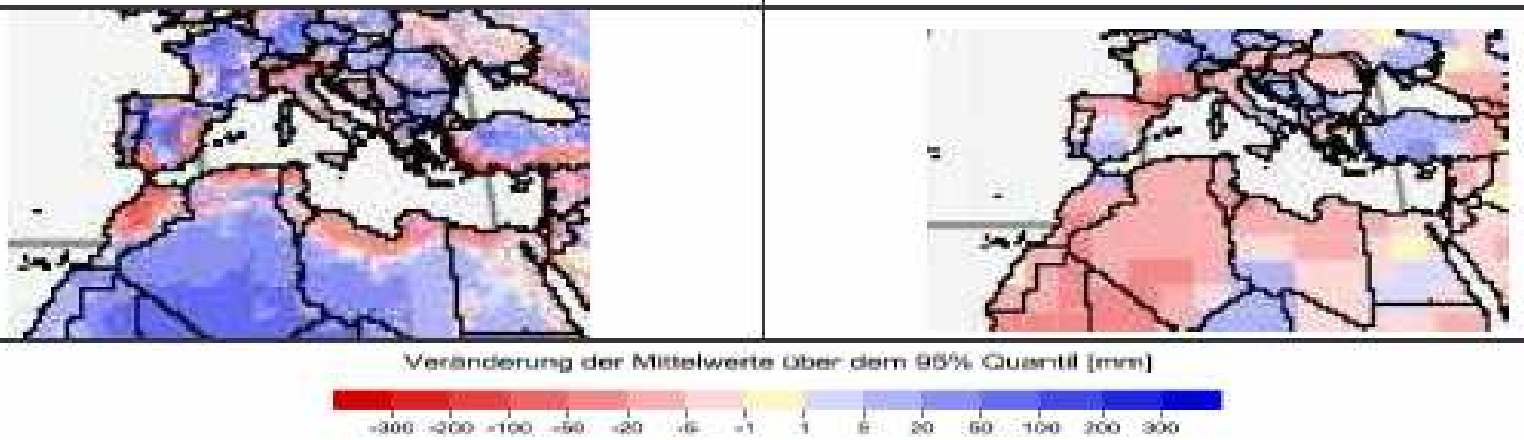
3B: Potential flash floods by country by 2050 (2040-2069)

3C: Potential flash floods by country by 2080 (2070-2099)

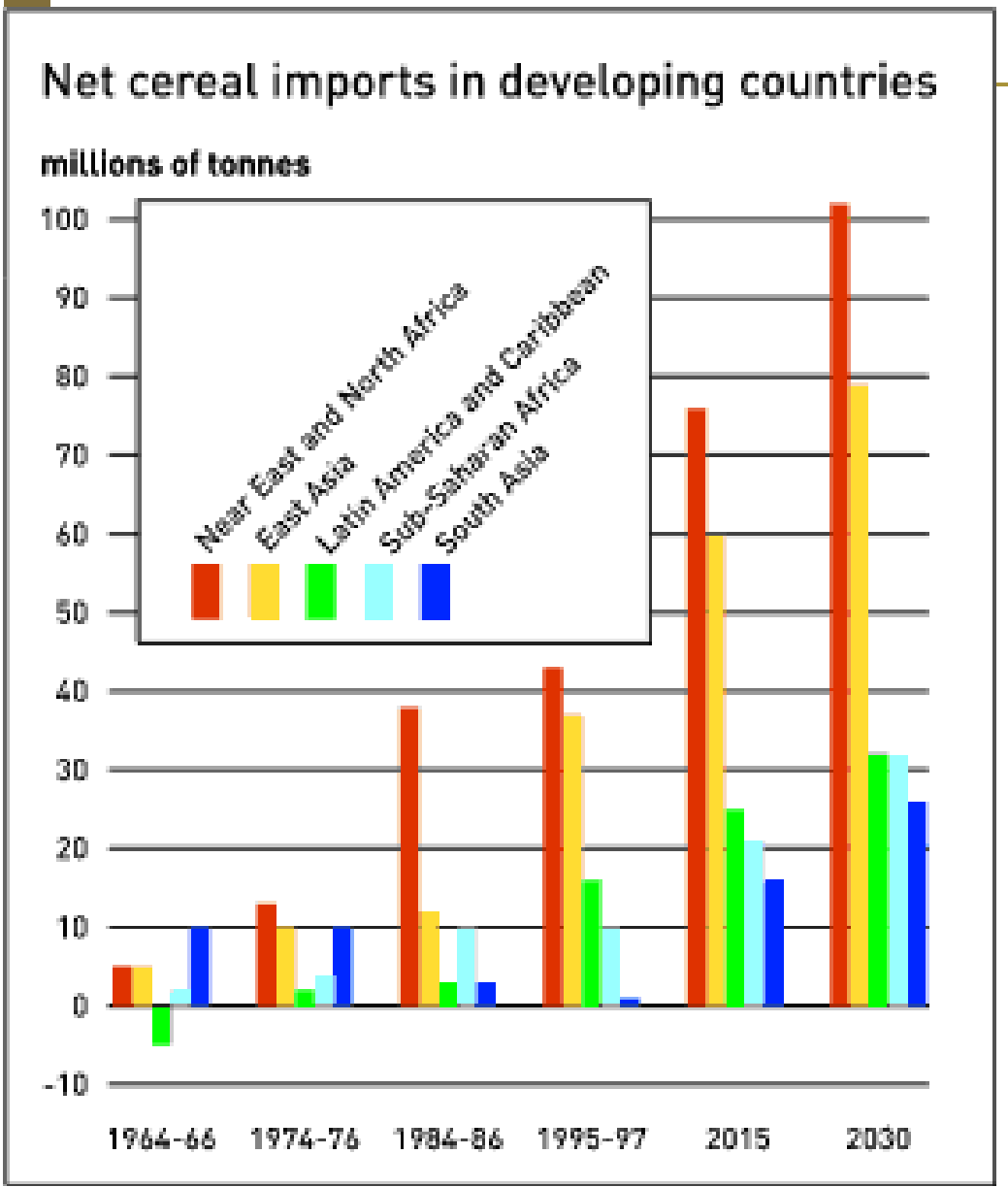


3D: Potential flash floods by country by, difference between 1990 and 2050 (2040-2069 -1975/2004)

3E: Potential flash floods by country by, difference between 2050 and 2080 (2070/2099 -2040/2069)



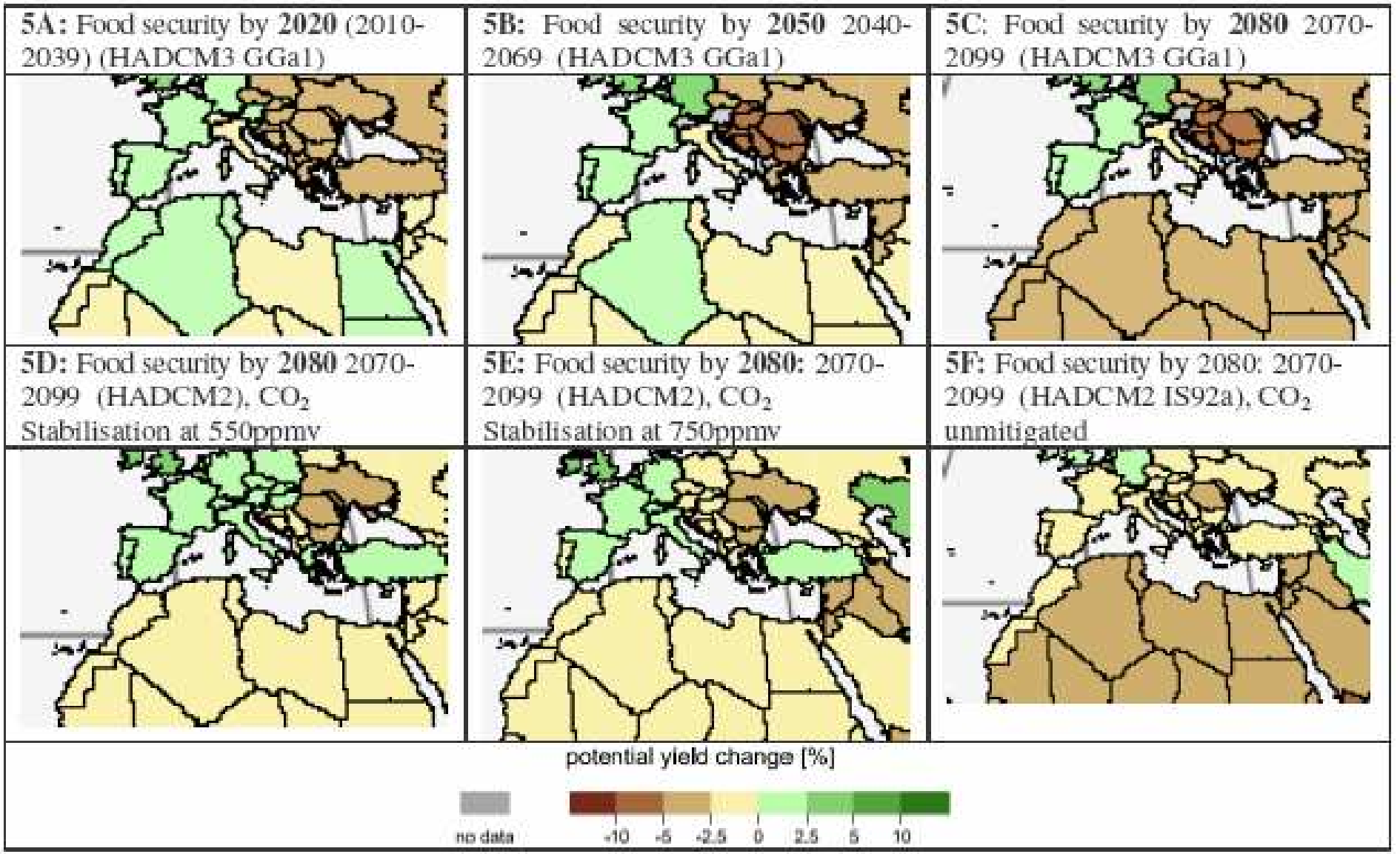
7.9. FAO (2000) Increase in Cereal Imports



- **FAO: 4 March 2003, Rome**
  World's population will be better fed by 2030, **but hundreds of millions of people in develo-ping countries will remain chronically hungry**.
- Parts of South Asia may be in a difficult position and **much of sub-Saharan Africa** will not be significantly better off than at present in the absence of con-certed action by all concerned.
- Number of hungry people is expected to decline from 800 million today to 440 million in 2030.
- **The target of the World Food Summit (1996) to reduce the number of hungry by half by 2015, will not be met by 2030.**

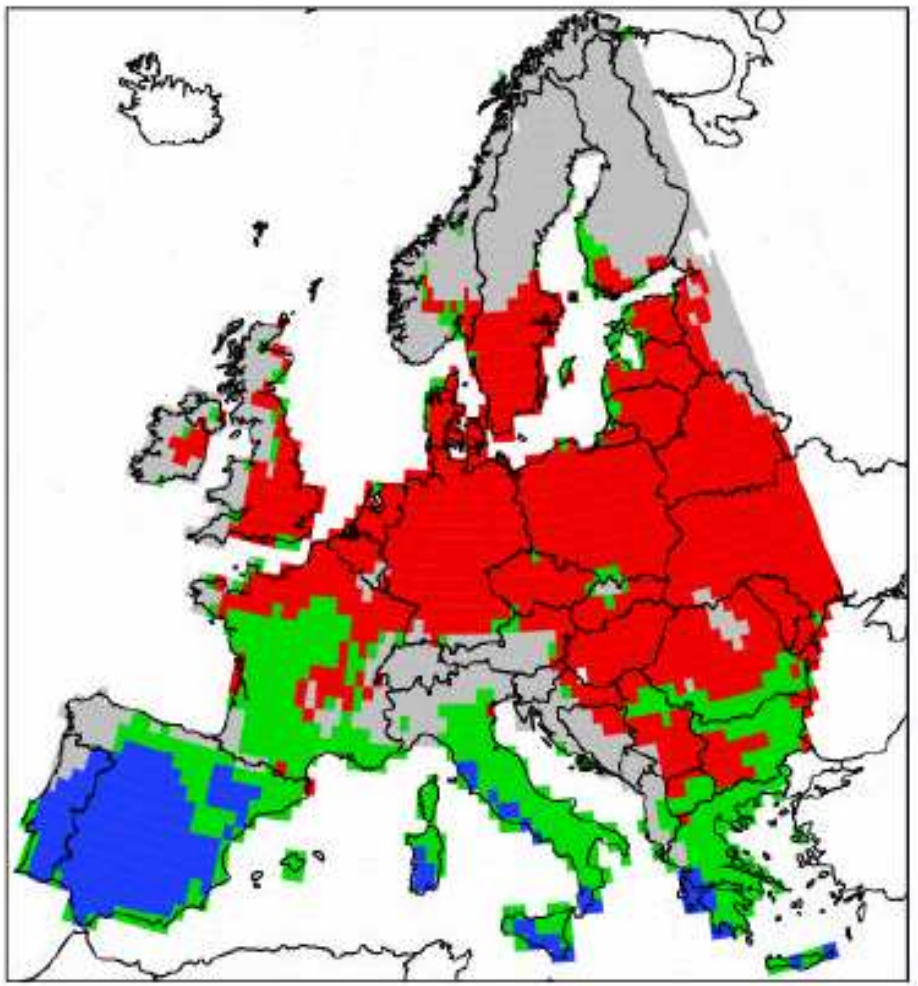
7.10. Climate Change and Food Security

Source: WBGU 2006



7.11. Yields of Wheat by 2080

(M. Parry, IPCC, London, 2005)



Reduced yield in all models

Increased yield in all models

Models do not agree

8. Social Impacts for the MENA until 2050: Migration & Conflicts

- Climate Change affects the supply side of water (stress), soil (deserticiation), food yield
- The demand side will also change due to major demographic changes
  - Population will continue to grow in MENA region
  - Population will grew significantly in the Mashreq
  - Population decline in Southern Europe will be less severe due to immigration: Spain and Italy
- What are the political impacts for the MENA
  - Governance structure & Coping Capacities
  - Education, Innovation and Competitiveness
  - Emigration, Domestic Instability, Crises & Conflicts

8.1.Population Projection for Narrow Middle East

Table 37.3: Population Growth in the Near East Countries, 1850-2050. **Source:** UN (2001, 2005) and Brauch (2002, 2006b).

	Real population development						Projection Med. var.		Changes	
	1850	1900	1950	1980	2000	2025	2050		1950-2050	2000-2050
					2000 Rev.	2000 Rev.	2000 Rev.	2004 Rev.	2000 Rev. [2004 Rev.]	
Egypt	5.5	10.0	21.834	43.749	67.884	94.777	113.840	125.916	92.006	**45.956**
Jordan	0.25	0.3	1.237	2.923	4.913	8.666	11.709	10.225	10.472	**6.796**
Israel			1.258	3.879	6.040	8.486	10.065	10.403	8.807	**4.025**
Palestine	0.35	0.5	1.005	?	3.191	7.145	11.821	10.058	10.816	**8.630**
Lebanon	0.35	0.5	1.443	2.669	3.496	4.581	5.018	4.702	3.575	**1.522**
Syria	1.5	1.75	3.495	8.704	16.189	27.410	36.345	35.935	32.850	**20.156**
Narrow Middle East	7.95	13.05	30.272		101.713	151.065	188.798	197.239	156.566 [166.967]	**87.085 [95.526]**
Eastern Med.	**12.45**	**16.05**	**29.247**	**62.613**	**89.497**	**142.899**	**173.776**		**144.529**	**84.279**
Only North Africa	**13.1**	**22.3**	**44.099**	**91.362**	**142.802**	**199.832**	**239.426**	**244.293**	**195.327**	**96.624**
Total (MENA)	**25.83**	**38.77**	**74.152**	**154.910**	**233.473**	**344.048**	**414.512**		**340. 360**	**181.039**
South Europe	**83.0**	**103.5**	**132.913**	**167.265**	**177.304**	**172.492**	**154.065**	**178.034**	**21.152**	**-23.239**

8.2. Lebanon: Vulnerability to Climate Change
Source: National Communication to UNFCCC (1999)

4 EXPECTED IMPACTS OF CLIMATE CHANGE AND ADAPTATION MEASURES

4.1 BIOCLIMATIC ZONES

As a result of this study, we can make the following comments:

- The predicted changes in climatic parameters, i.e. decrease in precipitation amounts combined with an increase in temperature values, reflect clearly on the spatial distribution of the bioclimatic levels.

Table 4.2. Area percentage for the bioclimatic levels, along the different milestone years

Bioclimatic level	Baseline scenario	Climate change scenario		
		Year 2020	Year 2050	Year 2080
Extreme arid	—	—	—	2.762
Arid	4.856	4.919	4.920	13.270
Semi-arid	19.321	23.838	23.871	15.223
Subhumid	45.166	49.575	50.652	60.757
Humid	25.903	19.728	19.442	7.470
Perhumid	4.522	1.765	1.115	0.518
Oromediterranean	0.232	0.175	—	—

8.3. Environmental Change and Conflict in North Africa and the Middle East

- For states in North Africa (2005-2020) **it is unlikely** that **GEC** (climate change, soil erosion, water scarcity) and **their impacts** (declining agricultural yields, weather hazards) **will lead to green wars** among states of North Africa or with states in Europe.
- **Climate change, desertification & water scarcity does not pose military threats but environmental challenges that cannot be solved militarily.**
- However, the **societal impacts of GEC** may pose a "**survival dilemma**" for **affected people** and force the most vulnerable to leave their homes and livelihoods to the cities or to other countries.

8.4. Changes in MENA: Population, Urbanization. Demand for Water, Food & Energy

- **Between 2000-2050 the population in North Africa will grow by 100 mio. persons** and all growth **will live in the big cities**.The population of the **narrow ME** will grow by **87-96 million** people.
- **The population of Syria, Lebanon, Jordan, Palestine and Israel is projected to grow from 33.8 mio (in 2000) to 71.3 mio (2050).**
- **Lebanon may grow: 3.5 mio.(2000) by 1.2 to 4.7 mio. (2050)**
- This poses **major challenges** for societal, environmental and human security in all **neighbouring countries**: **Syria (+20,2), Jordan (+6,8), Palestine (+8,6) and Israel (+4.0) mio. people.**
- **Agriculture** will be in crises & rural population will be seriously affected.
- With **population growth**, **chaotic urbanization** the need for **water** and **food** will **grow** but simultaneously due to climate change and desertification **crop yields may drop** as will the **self-sufficiency in food production** and the dependence on virtual water will rise.
- **Internal conflicts on access to drinking water will grow between urban centres & rural areas where water for irrigation may drop.**

8.5 Climate Change Impacts for Levant

- The projected impacts of regional climate change may be **less serious for Lebanon** due to relatively high water resources and lower population growth
- But also for Lebanon, changes in the **bio-climate** are projected, precipitation will decline, agriculture and rural population will be affected, urbanization rises
- For all neighboring countries: **Jordan, Syria and Palestine the situation will become very serious**
- Due to the focus on the Middle East conflict by all parties these **dangers posed by GEC and climate change are not yet perceived as challenges** for regional, national, **environmental, food, health and human security** and survival especially for the socially highly vulnerable and poor strata of society.

9. From Reactive to Proactive Responses to Climate Change

Rajendra Pachauri (IPCC), to UNGA Climate Summit Sep. 2007:

> A technological society has two choices. First it can wait until catastrophic failures expose systemic deficiencies, distortion and self-deceptions…
>
> Secondly, a culture can provide social checks and balances to correct for systemic distortion prior to catastrophic failures.

- **Climate Change Impacts will be severe for Mediterranean and especially for the Middle East and North Africa,**
- **In Europe we have seen that there seems to be difference in perception of the urgency of the problem: where impact is highest, the concern and implementation is the lowest**
- **Knowledge gap on CC impact for MENA region**
  - **Lack of official and public concern on urgency of the challenge**
  - **No key issue of the Euro-Mediterranean partnership**
  - **Lack of means for adaptation and mitigation**

9.1 Three Responses: Ignore, React or Proactive Coping Strategies

- In **some countries** climate change is perceived as a major challenge for humankind & security.
- In **many countries of the Mediterranean** and in the MENA region climate change & desertification are concerns of experts, environment ministries but not most urgent security challenge of the 21st century.
- The longer the challenge is ignored and downgraded the higher the economic and social price will be (Stern Report (2006): estimated costs of non-action)
- To **react when the impacts occur** may be too late and very costly politically, economically & socially.
- There is a need for a **proactive Euro-Mediterranean Climate Partnership** and for a sustainable co-development.

10. Policy Proposals for the MENA for Coping with GEC Impacts

- **GEC & CC do not discriminate, they affect all**
- **Political conflicts have been major obstacles:**
  - **Maghreb:** South Sahara dispute (Morocco/Algeria)
  - **Mashreq:** unresolved Middle East & other conflicts
- **Political** framework for cooperation in a divided and fragmented region
- **Ecological co-development:** policies and measures for coping with CC by adaptation and mitigation

10.1. Environmental Cooperation instead of Environmental Conflicts or 'green wars'

- Control over water resulted in conflicts in the region
- GEC & climate change does not respect national borders
- While national policies and measures for coping with both are inevitable, regional strategies are needed.
- No military solution for climate change & desertification
- There are sustainable regional answers for responding to water scarcity and degradation: solar desalination techn.
- This requires a change in thinking and policies from a power-based national to a cooperation-based regional, environmental, food, health, human & gender security.
- This requires trust as a basis for transborder cooperation
  - Between Syria and Lebanon
  - Among competing factions in Palestine.
  - Among Arab neighbours (Palestine, Egypt, Jordan, Lebanon and Syria) and Israel.

10.2. Policy Proposals: Agenda-Setting of NGOs for Science & Education

- **Europe: after centuries of wars and 2 world wars: wars among EU members is unthinkable**
- **Ideas mattered** to overcome cycle of hate/violence
  - **D. Mitrany (UK):** Functional cooperation of experts
  - **G. Marshall (USA):** aid without discrimination & integration
  - **J. Monet (France):** cooperation France & Germany: EU 27+
  - **M. Gorbachev (SU):** new thinking beyond deterrence
- **Ideas matter & change in thinking is essential:**
  - **Address jointly** the regional impacts of GEC, climate change, water and desertification that will affect the whole region
  - **EU sponsored GEC Research Centre in Cyprus:** study the challenges posed by climate change, desertification, water, urbanization
  - **Technical University in the Gulf of Aqaba with parts in Taba, Eilat and Aqaba:** develop jointly solutions: scientific strategies and technologies, e.g. energy, water & agriculture
- **Shift in security thinking:** from hard to soft security, from military to environmental & human security

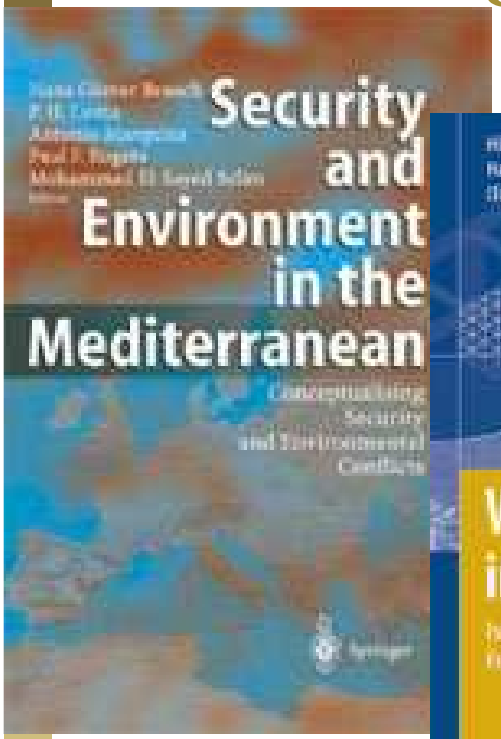
10.3. A Major Mental Change in Thinking on Security is Needed

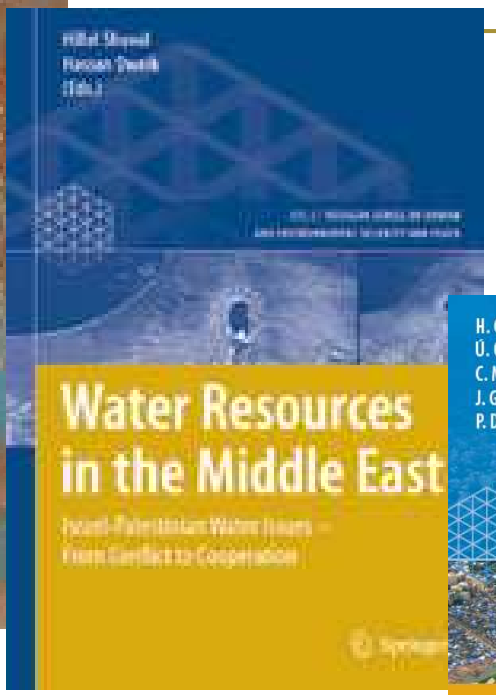
- Over 60 years of peace in Europe was achieved by breaking out of the cycle of hate & violence.
- New ideas and thinking mattered: Mitrany, Marshall, Monnet and Gorbachev
- Reunification of Europe since 1990 is not the result of war nor a victory of the West over East
- Since then there has occurred a major rethinking of security from a Hobbesian power-centred national military security towards human security (UNDP 1994, CHS 2003); environmental energy, food, water, health and livelihood security
- This debate has hardly taken place in the MENA region (e.g. in the Arab world and in Israel, except in Jordan (HSN)
- Rethinking of security leads to other agenda; GEC and CC!

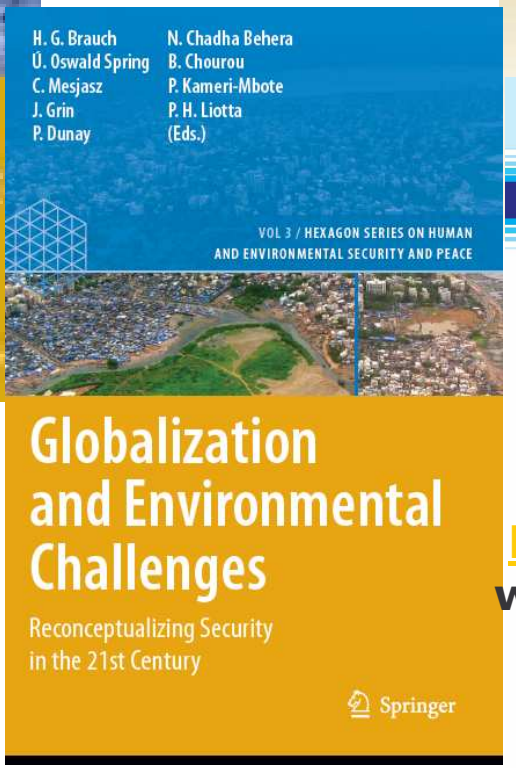
10.4. A Research Proposal: GEC Research at Lebanese Universities

- **Put GEC and climate change on the agenda of Lebanese universities: research & teaching**
- **Put research and development of energy efficiency and renewable energy on the agenda of Lebanese technical universities**
- **Develop a proposal for a EU co-funded Centre in Cyprus with scientists from all countries in the region to research environmental security:**
  - **Regional impact of climate change for Syria, Lebanon, Jordan, Palestine, Egypt and Israel**
  - **Develop proposals for regional strategies, policies and measures for coping with GEC & climate change**
  - **The goal must be to make theys projections obsolete.**
  - **This requires both cooeprative scientfic research and proactive political action in the MENA region.**

11. Bibliographic References







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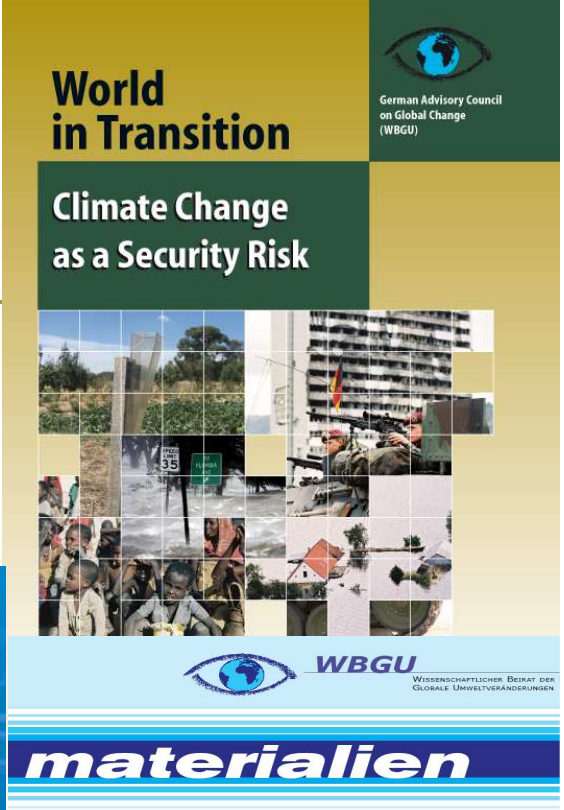

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