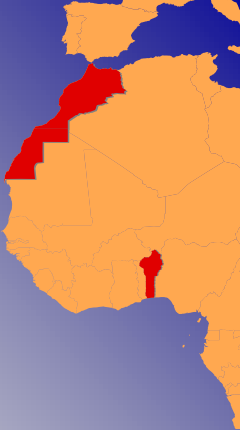




"International conference on integrated water ressource management of tropical river basins"

Cotonou (Benin), 4. – 6. 10. 2004



Climate Change Impacts, Adaptations and Vulnerabilities of Regions

- Methodological Framework for the IMPETUS Project

Gunter Menz

Department of Geography, University of Bonn (Germany)

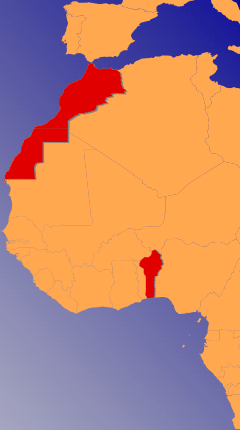


University of Cologne



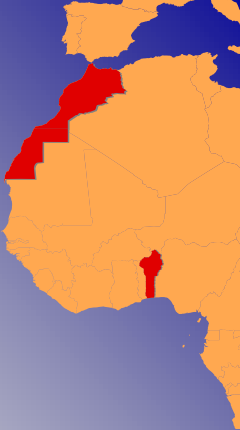
University of Bonn





- A Earth System & Human Impacts
- B Climate Change Impacts
- C Adaptation and Vulnerability
- D IMPETUS as a regional case study





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The Earth System – an overview

- Earth is unique among the planets of our solar system
- Abundance of water in three phases
- Atmospheric composition and climate are intimately tied to biological processes
- Earth System is regarded as two subsystems:
I) **physical climate** and ii) **biogeochemical system**
linked by the **global hydrological cycle**

The Earth System – an overview

- **Natural change in the Earth system is accelerated by human intervention**
- **Planet Earth faces the possibility of rapid environmental change -> profound impact on all nations**
- **We do not fully understand the short-term effects of our activities - or their longterm implications**
- **National and international scientific research community is on the way to establish a sound scientific basis to address these critical issues (e.g. IGBP, IHDP, WCRP, HELP, etc.)**

The Earth System – an overview

- Development an understanding of how the Earth system functions in response to interactions among land, oceans and atmosphere
- Critical challenge that must be met if we are to predict the impacts of human activities on local, regional and global climate change
- Naturally occurring and human-induced global climate changes must be understood to determine how to alter human behaviour appropriately to avoid, mitigate, or adapt to human-induced global climate changes.



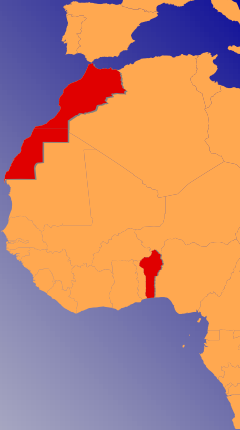
Automobiles

Human Impacts

- Since 1850 atmospheric carbon dioxide has increased by about 30 %, atmospheric methane by more than 100 %.
- Changes in land use management, water pollution, and industrial inputs in the atmosphere have affected cycles of essential elements within ecosystems.
- Ninety percent of the population in the developing countries lives in urban areas which will triple in population in 2025 according to the late 1990s.

Refrigerants

Transportation

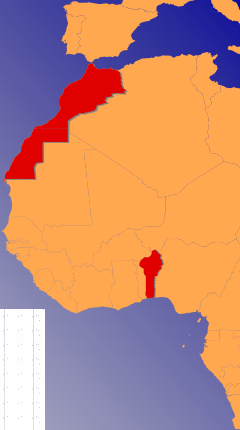


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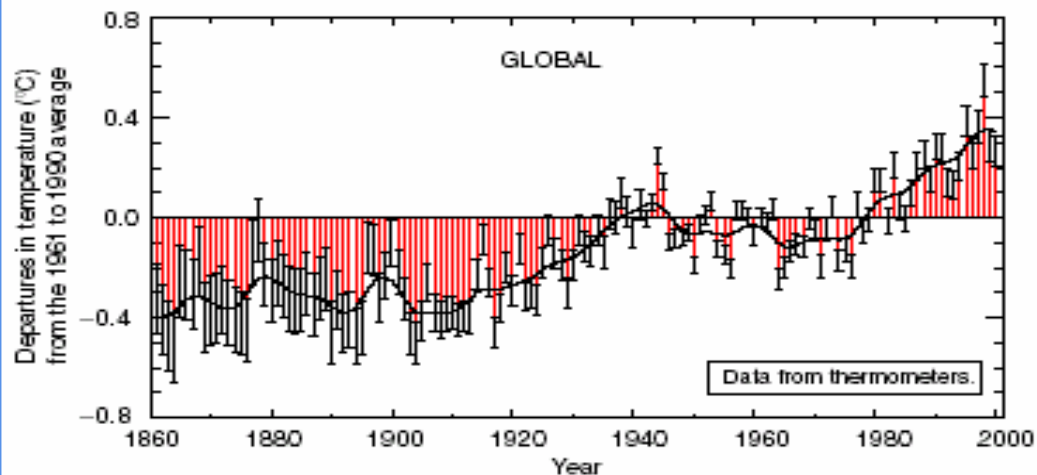
IPCC - Key Questions:

- **Has the Earth's climate changed as a result of human activities?**
- **In what ways is climate projected to change in the future?**
- **What are the technical, economic, and market potential of options to adapt to climate change or to reduce emissions of the gases that influence climate?**
- **How vulnerable are agriculture, water supply, ecosystems, coastal infrastructure, and human health to different levels of change in climate and sea level?**

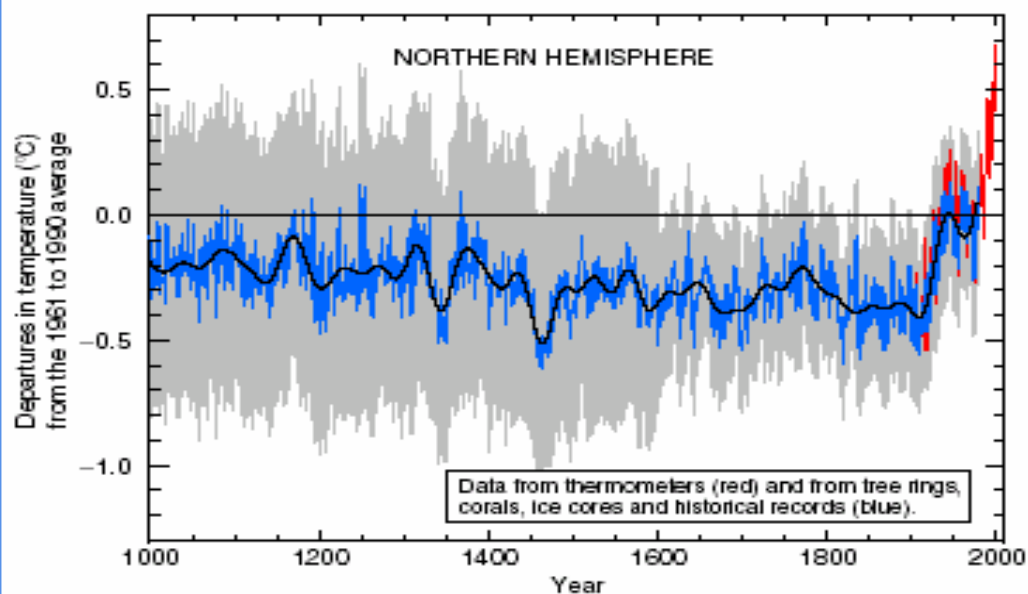


Variations of the Earth's surface temperature for:

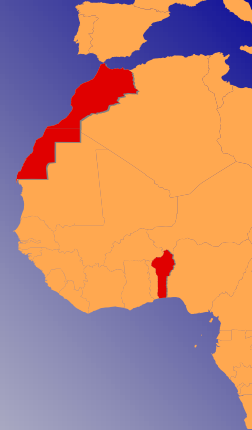
(a) the past 140 years

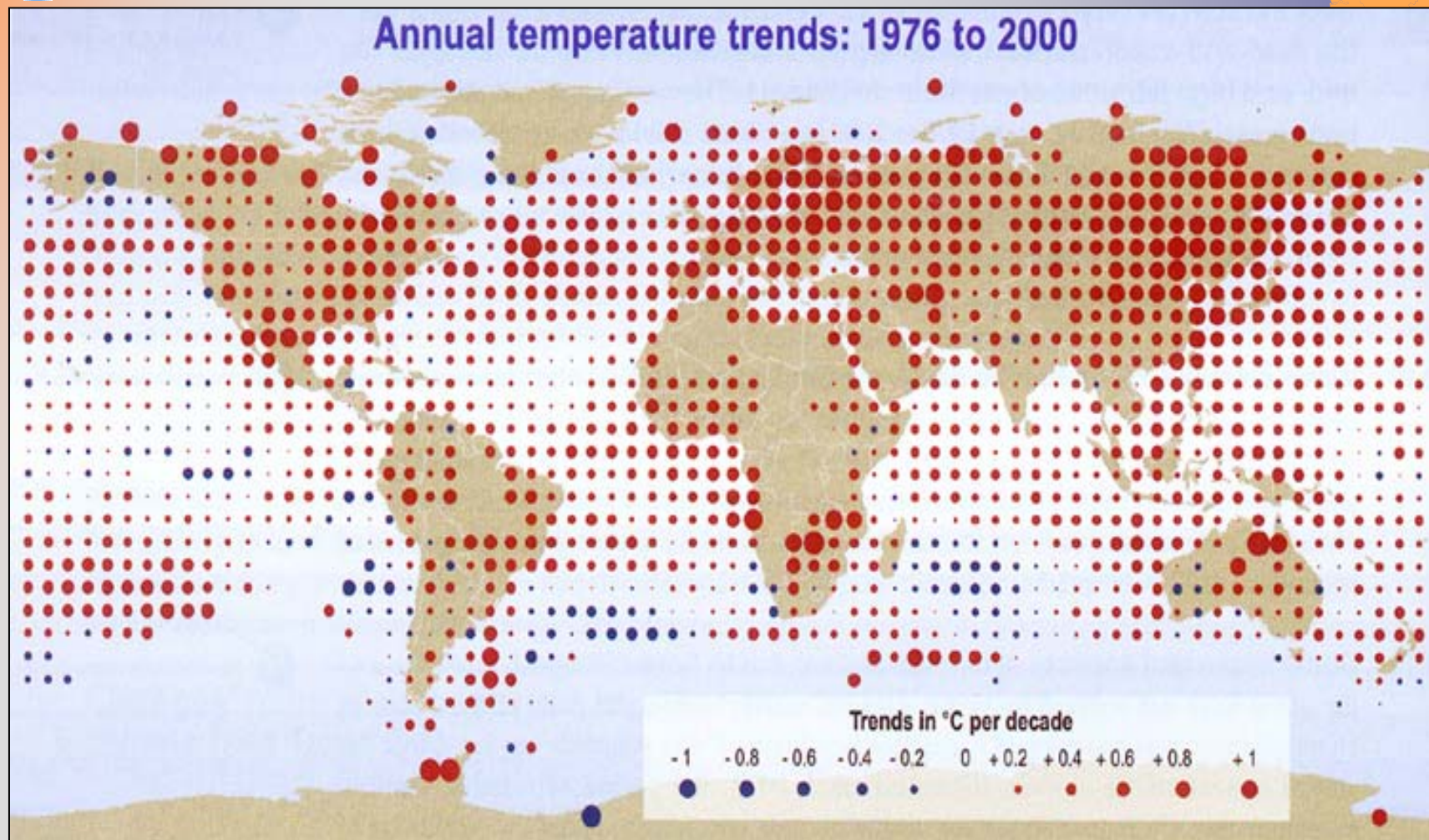


(b) the past 1,000 years



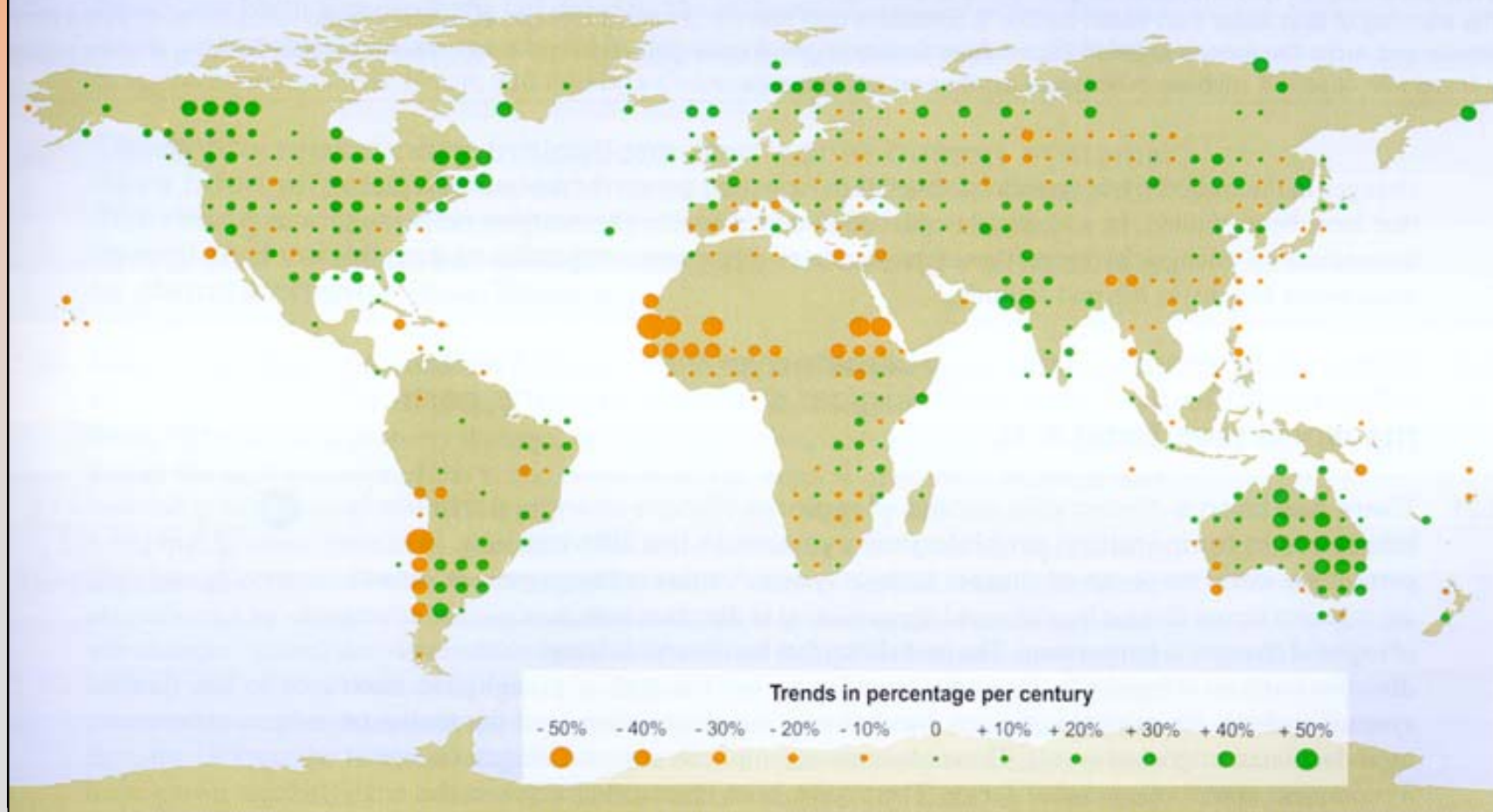
(IPCC, 2001)





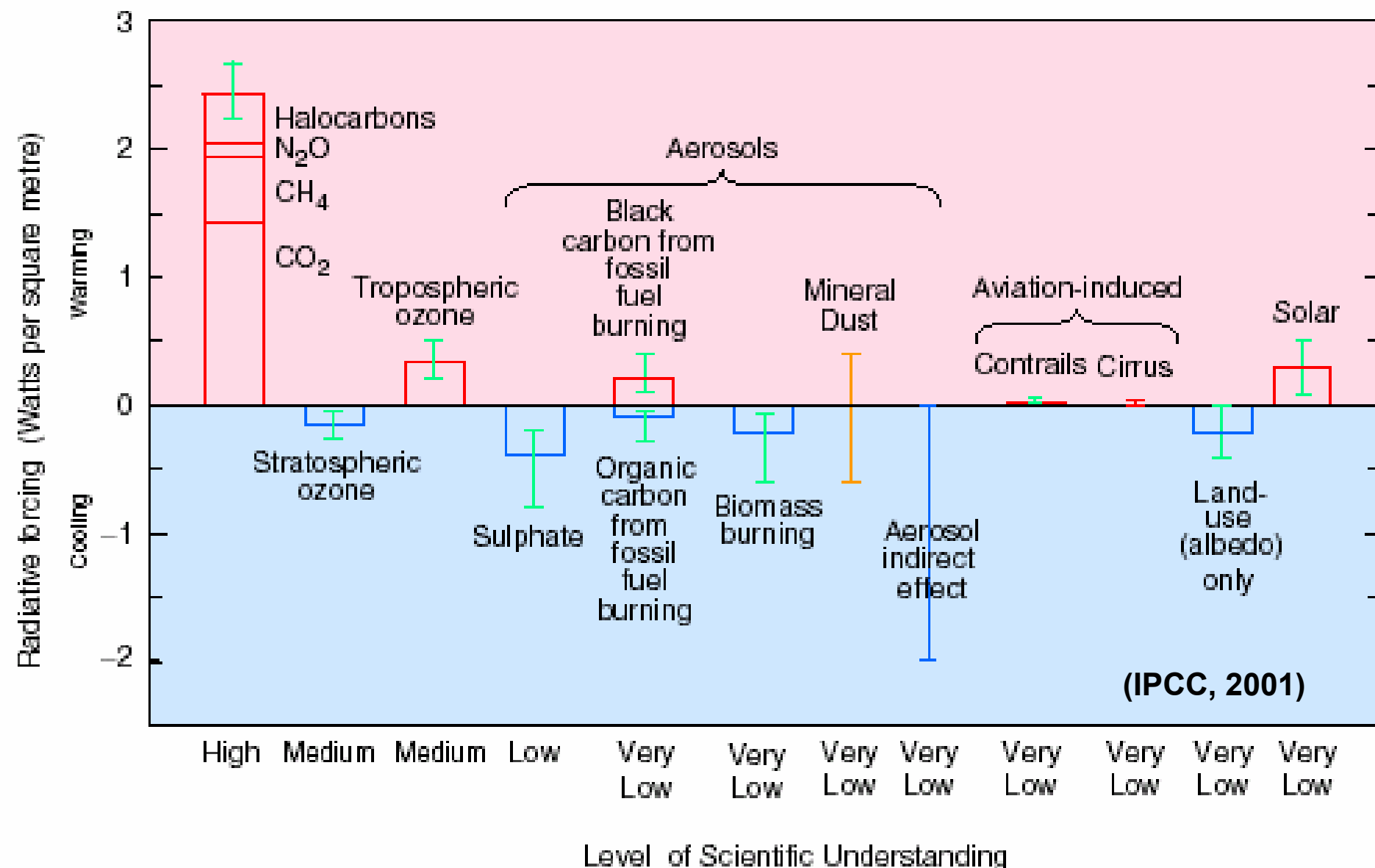
(IPCC, 2001)

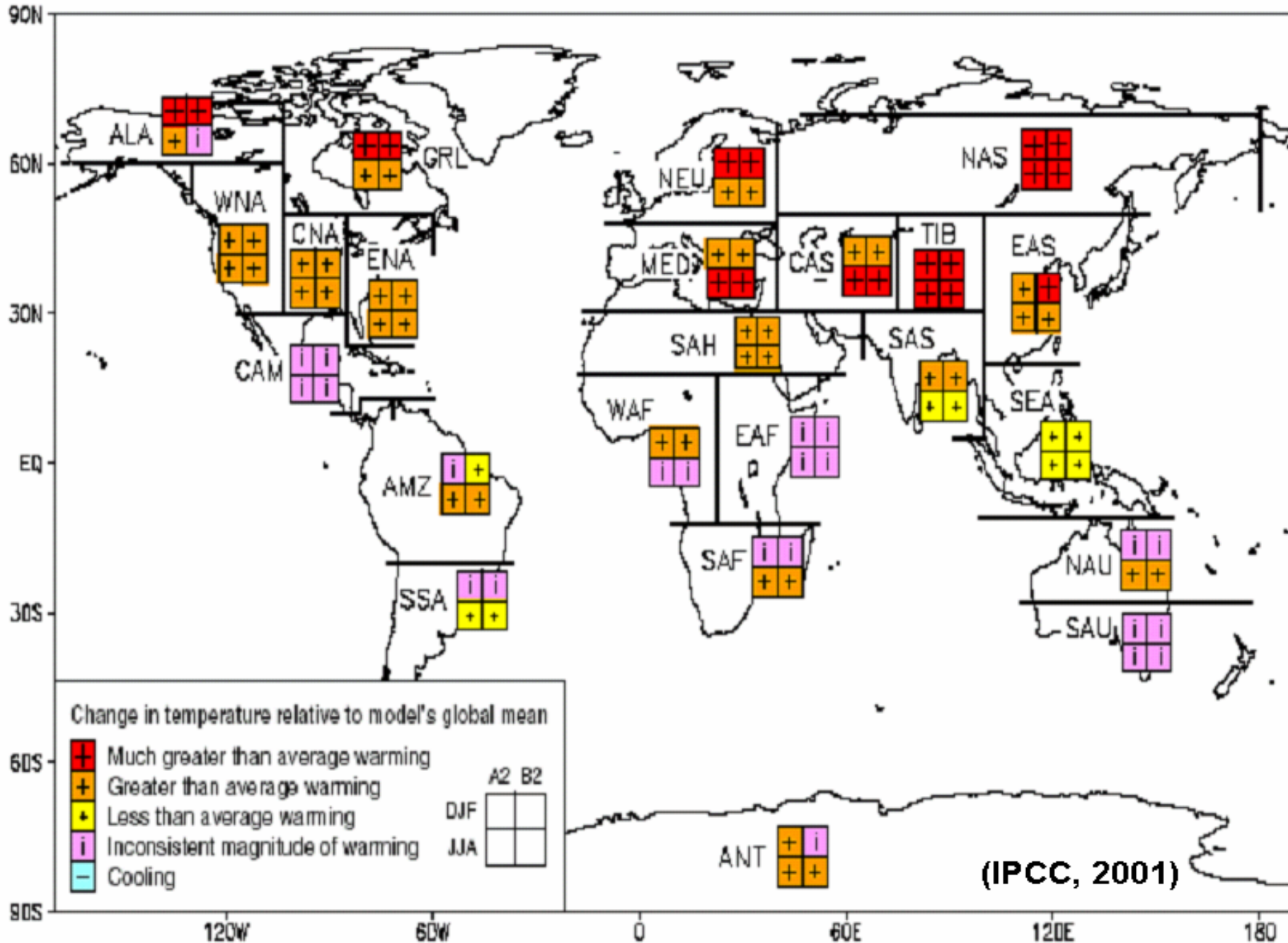
Annual precipitation trends: 1900 to 2000

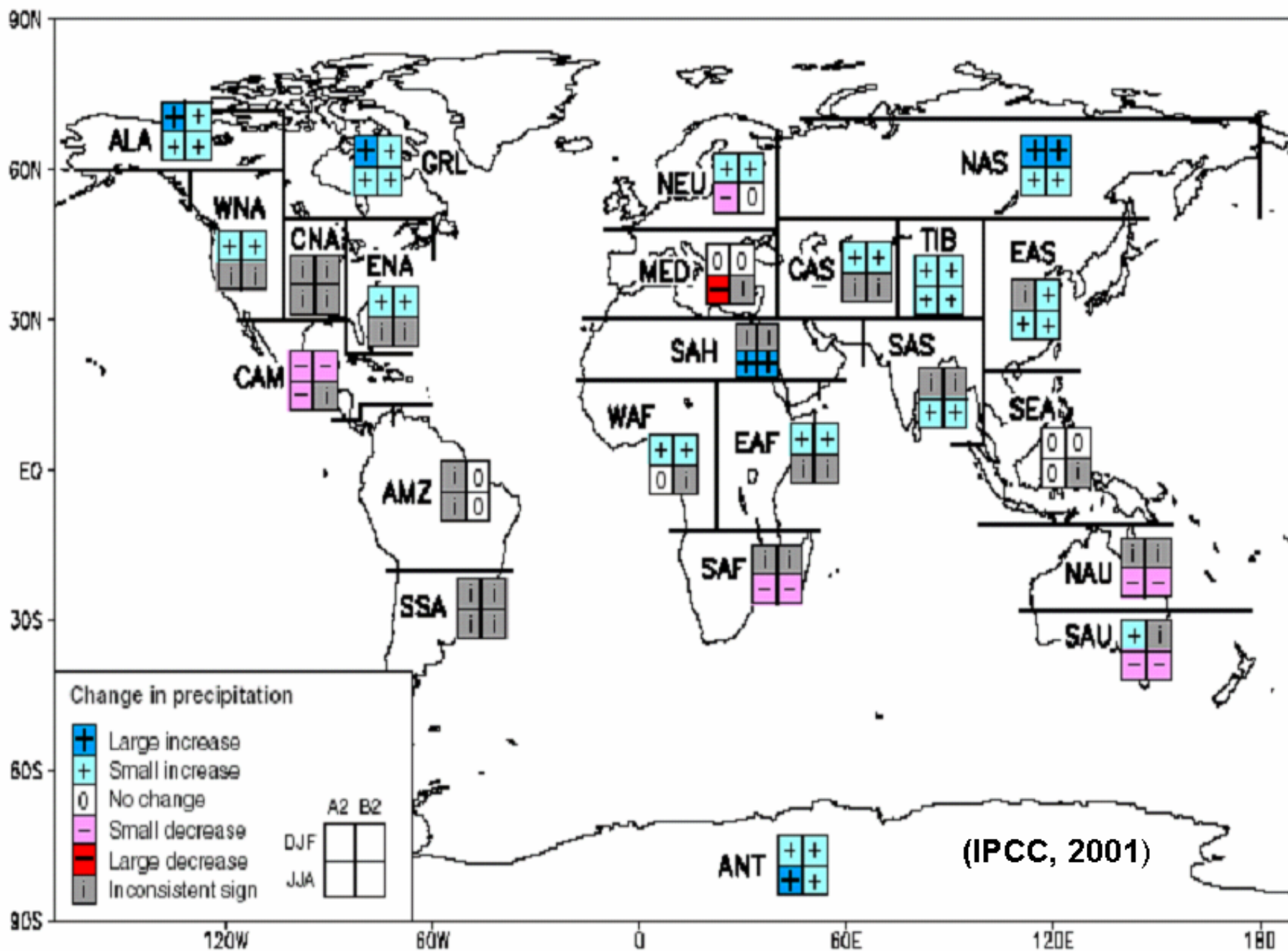


(IPCC, 2001)

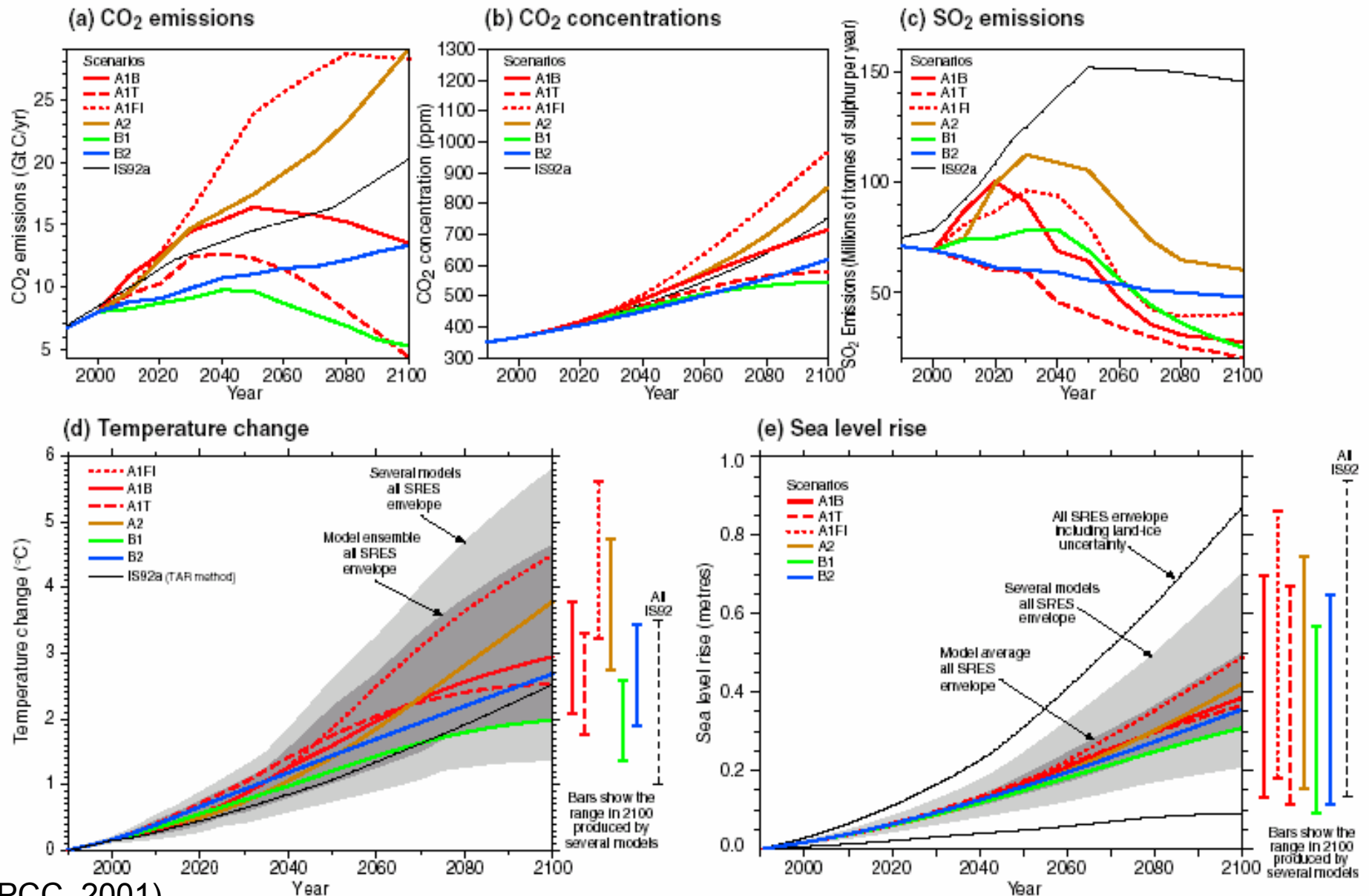
The global mean radiative forcing of the climate system for the year 2000, relative to 1750



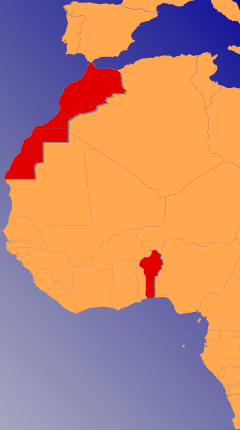




The global climate of the 21st century



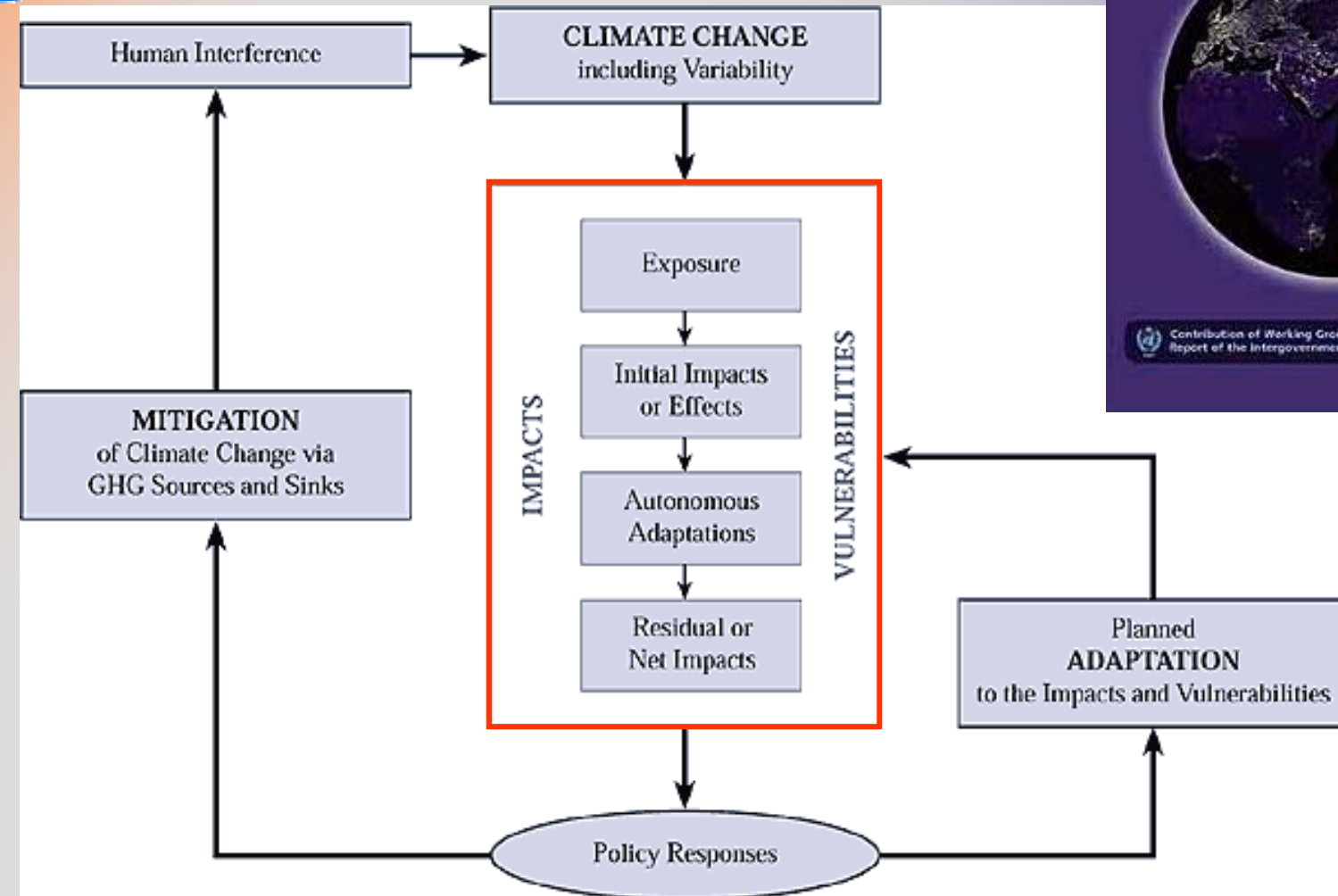
(IPCC, 2001)



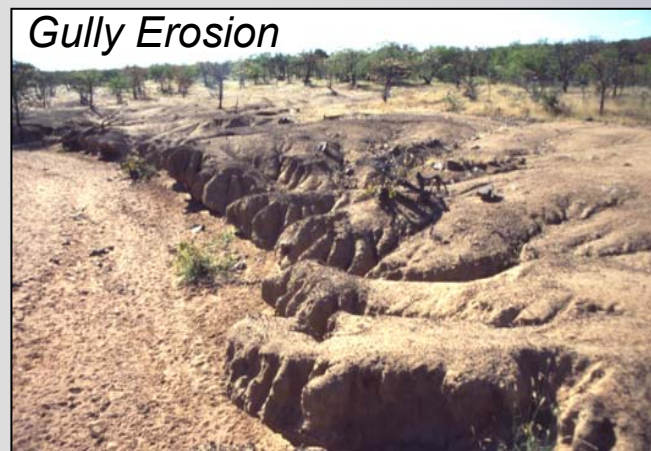
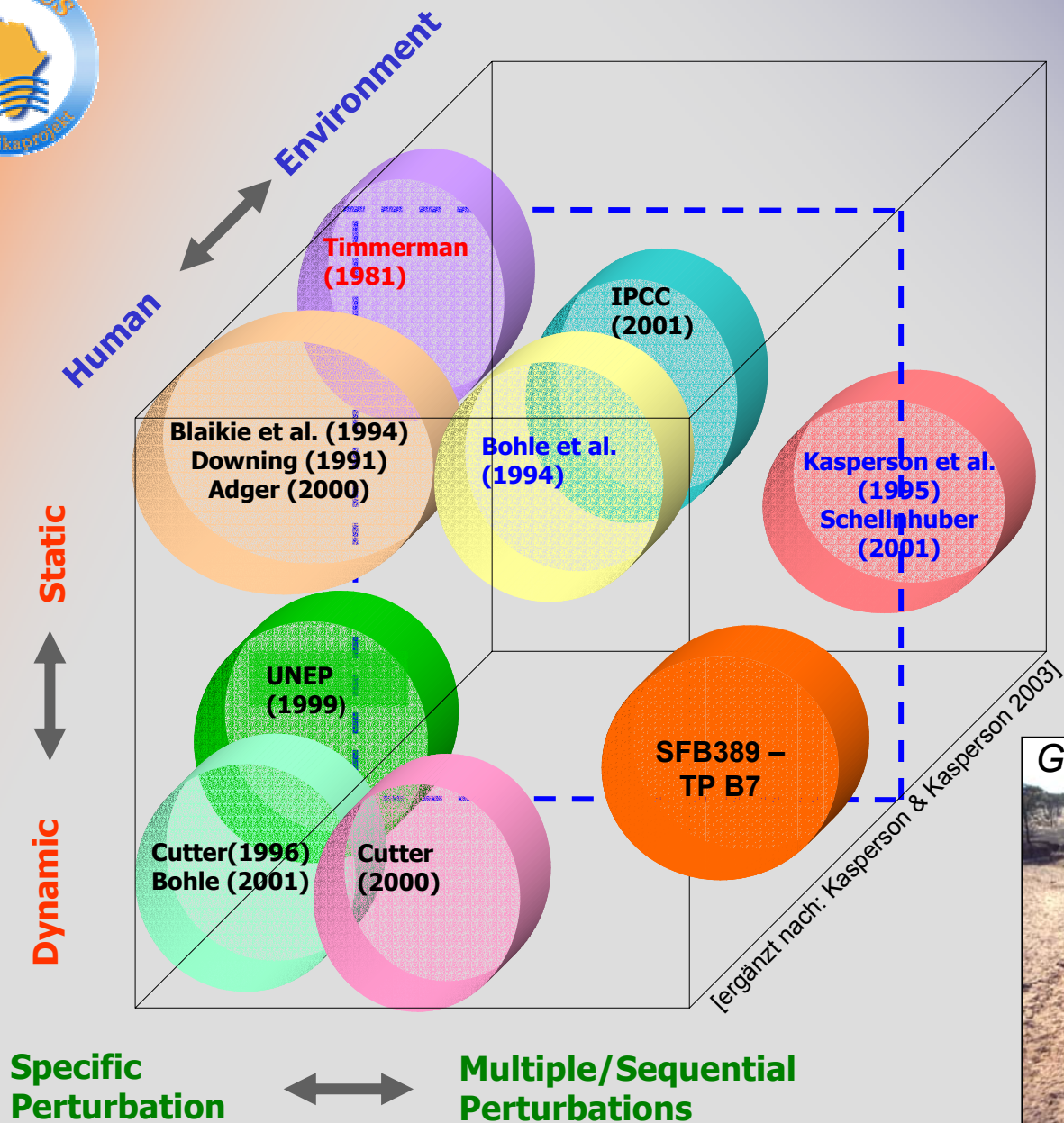
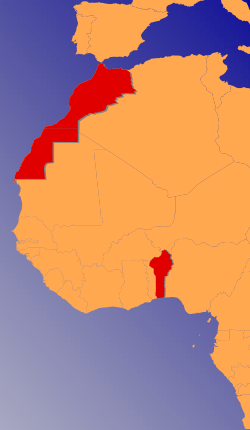
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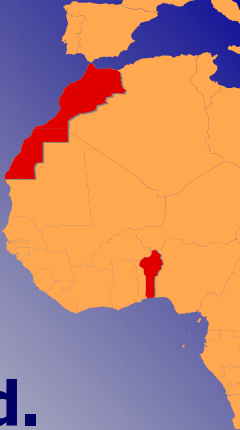
Vulnerability as a Concept



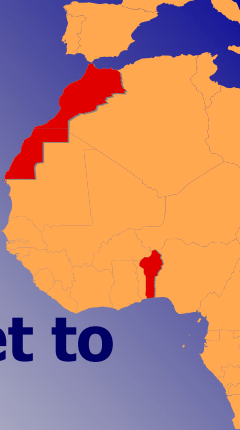
(IPCC, 2001)



IPCC Conclusions:



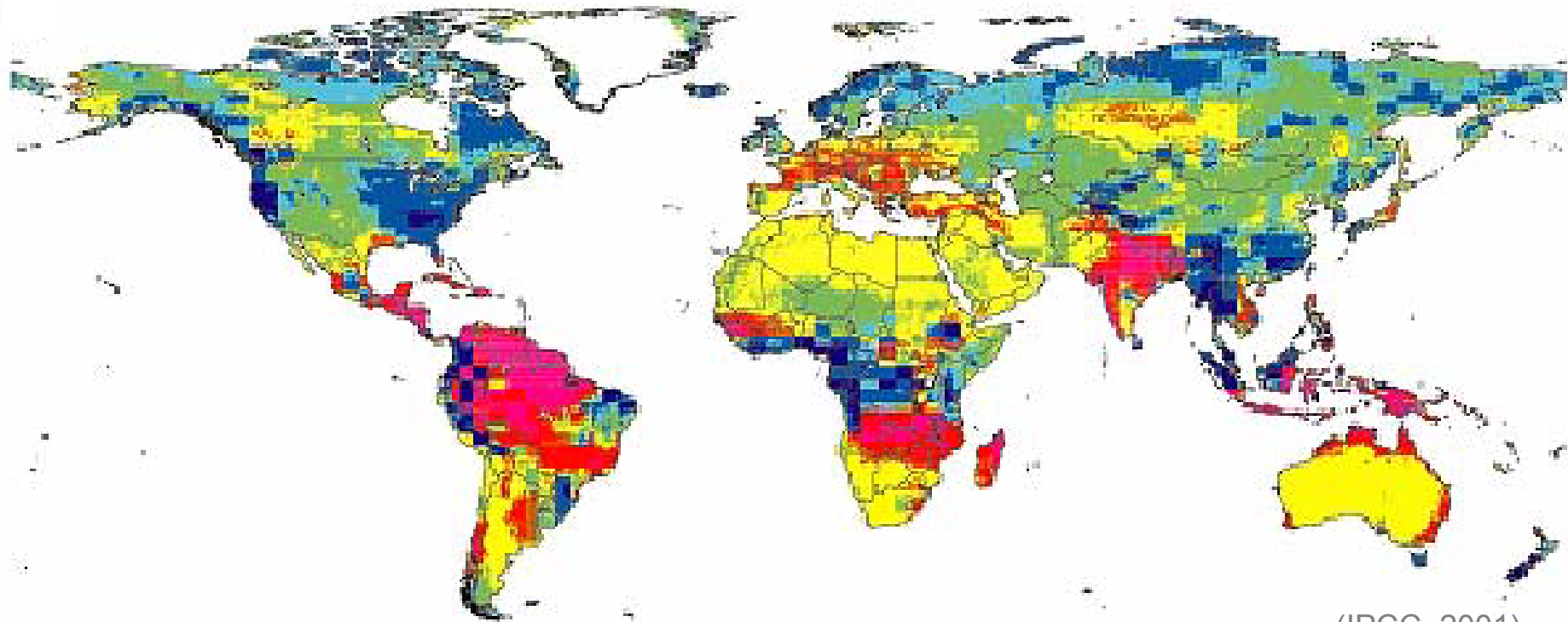
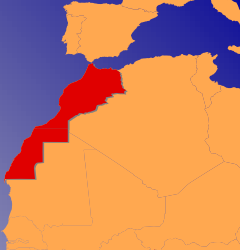
- I. Natural Systems are Vulnerable to Climate Change, and some will be Irreversibly Damaged.**
- II. There are Preliminary Indications that Some Human Systems have been Affected by Recent Increases in Floods and Droughts.**
- III. Many Human Systems are Sensitive to Climate Change, and some are Vulnerable.**
- IV. Recent Regional Climate Changes, particularly Temperature Increases, have Already Affected Many Physical and Biological Systems.**



- V. The Potential for Large-Scale and Possibly Irreversible Impacts Poses Risks that have yet to be Reliably Quantified (e.g. temperature, precipitation, drought, floods, etc.).**
- VI. Adaptation is a Necessary Strategy at All Scales to Complement Climate Change Mitigation Efforts.**
- VII. Those with the Least Resources have the Least Capacity to Adapt and are the Most Vulnerable.**
- VIII. Effects on and Vulnerability of Natural and Human Systems (Agriculture and Food Security, ... , Ecosystems, Human Health & Settlements, ..., Energy, Hydrology and Water Resources, Insurance and other Financial Services)**

Change in Annual Runoff

Vulnerability in the Context of Water Supply



(IPCC, 2001)



Indicators of regional agricultural vulnerability in Africa (WRI, 2001)

- > vulnerability in the context of food security

<i>Region^a</i>	Pop Density (pop. km ⁻²)	Pop Growth (%)	Crop Land (% of total)	Irrigated Land (% of total)	Avg Yield of Cereals (kg ha ⁻¹)	Ferti lizer Use (kg yr ⁻¹)	Food Prod Index (1970= 100)	GNP per Capita (US\$)	GNP in Agri culture (%)	GNP Growth Rate (% yr ⁻¹)	Public Agri- cultural Invest ment (US\$)
-Northern	226	2.25	5	27	1,973	94	115	1,285	17	3.60	25
-Sudano- Sahelian	106	2.72	4	7	727	5	90	860	34	2.36	7
-Gulf of Guinea	891	2.83	21	2	892	6	100	760	39	1.87	15
-Central	145	2.70	4	1	923	2	87	760	22	2.15	5
-Eastern	451	2.88	10	2	1,363	12	92	593	47	3.05	13
-Indian Ocean	262	1.96	5	23	1,988	140	98	280	22	3.85	6
-Southern	208	2.56	6	7	929	27	76	333	21	3.38	7
<i>Total</i>	253	2.65	6	8	1,098	25	92	355	30	2.75	11
<i>Comparison Country</i>											
-Bangladesh	9,853	2.18	72	31	2,572	101	96	205	37	4.20	68
-Thailand	1141	0.92	45	19	2,052	39	109	1,697	13	7.80	78
-Mexico	491	1.55	13	21	2,430	69	100	2,971	8	1.50	129
-Greece	795	0.07	30	31	3,700	172	101	6,530	17	1.60	25
-UK	2,404	0.19	28	2	6,332	350	112	33,850	2	2.80	347

ReliefWeb Search Results

Here are the results of your search. If there is no document matched your search criteria. We suggest you change your browser and change your criteria.

11-Aug-2004	AFP	Life returning to Liberia after Taylor exile
02-Sep-2003	UN GA	Implementation of the Report of the Secretary-General
05-Jun-2003	IRIN	Guinea: Water and power shortages blamed on drought
12-May-2003	AFP	Climate change to shape Africa
14-Jan-2003	UN SG	Transcript of press conference with Kofi Annan at UN Headquarters
29-Nov-2002	WFP	WFP Emergency Response Plan for DRAFT Strengthening of the Secretary-General's humanitarian assistance
14-May-2002	OCHA	General Assembly, children, adopts outline of Children's Rights
10-May-2002	UN GA	As Assembly continues to address negative impact of HIV/AIDS
09-May-2002	UN GA	As Assembly continues to address negative impact of HIV/AIDS
31-Mar-2000	IRIN	IRIN-WA Weekly Roundup



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Source: Integrated Regional Information Networks

Date: 5 Jun 2003

Guinea: Water and power shortages blamed on drought

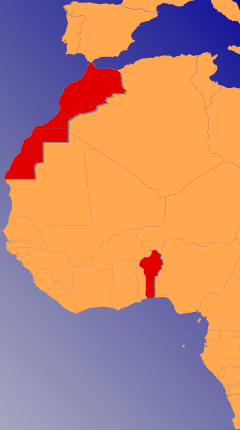
[This report does not necessarily reflect the views of the United Nations]

CONAKRY, 5 June (IRIN) - A year after the most severe drought in Guinea's recorded history, the two hydro-electric dams that supply the capital with water and electricity are nearly dry. Most of the city's two million inhabitants have been without light or water for the past six months.

At night Conakry hums to the sound of private generators providing electricity for those wealthy enough to afford them. But most of the city's tumble-down houses have to make do with the dancing flames of small paraffin lamps.

By day children totter along the streets with buckets of murky well water balanced on their heads, since the taps are often dry for several days at a time. And by night, unable to read at home, some of them gather to study under the floodlights of petrol stations.

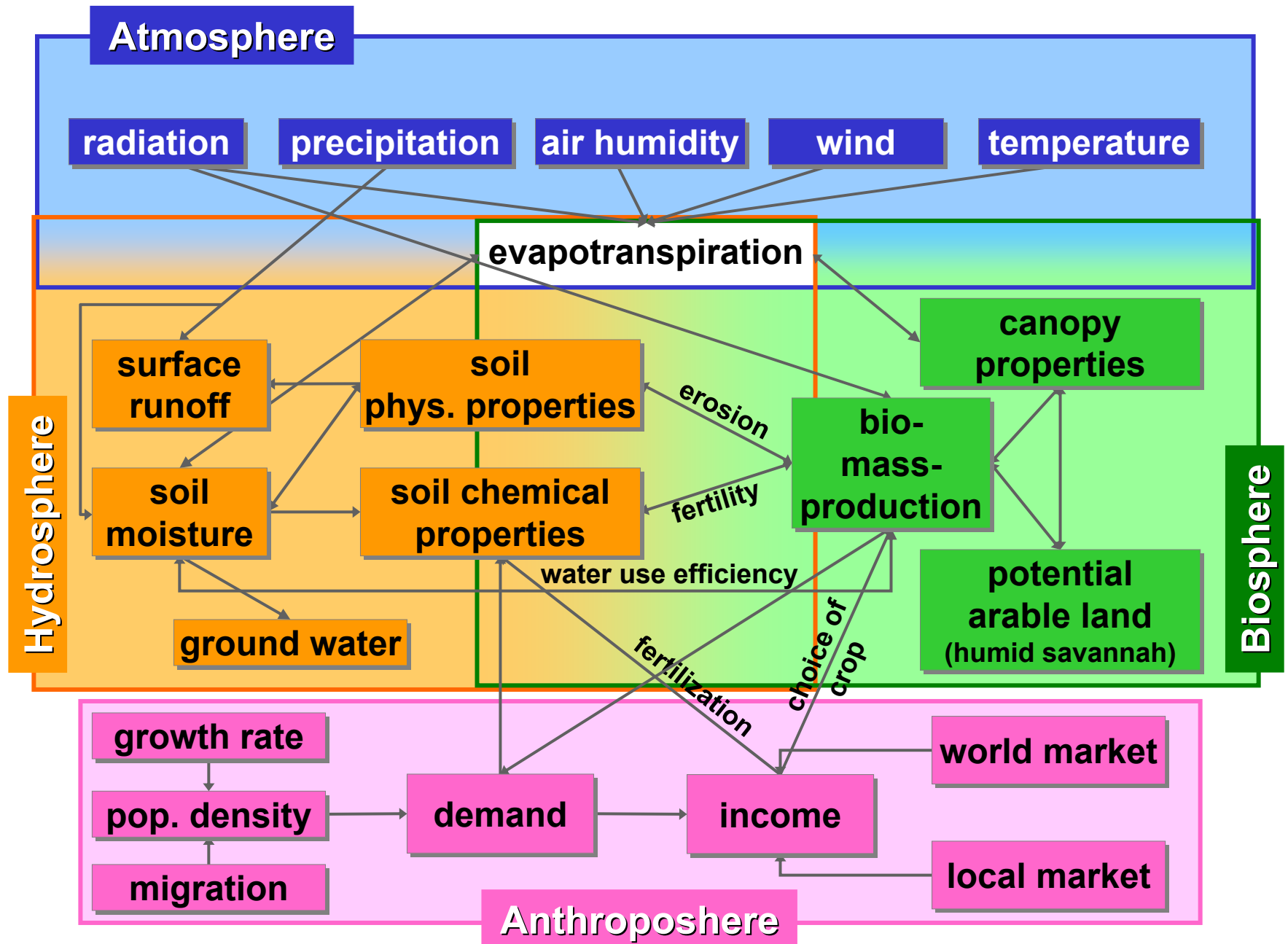
The crisis has made the government of President Lansana Conte a sudden convert to environmental issues. It blames the drought and climate change for the calamity which has befallen Conakry. An ageing and poorly maintained thermal power station still provides electricity on a more or less regular basis for the city centre and the diplomatic quarter, but it burns imported oil which this impoverished West African country can ill afford.



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Integrated Modell Concept for „Satisfaction of food demand on the local scale in Benin“





Future Needs

Data Needs

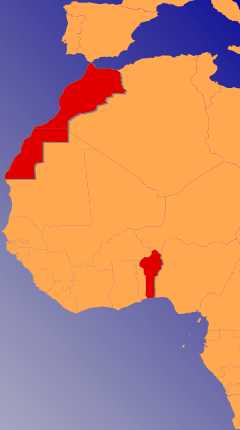
Current impact assessment models are limited by input data, limiting their use to fairly general questions.


Human Capacity

There is great need for increased African capacity to study the more fundamental science issues of global change and its impacts.

Integrated Analysis

It is becoming increasingly clear that most environmental problems such as climate change require integration of many disciplines and methods of analysis.





**“In the end we will
conserve only what
we love; we will love
only what we understand;
and we will understand
only what we are taught.”**

- Baba Dioum (Senegal)

