Climate change and health

a new vision for health
November 2007 - March 2008

Tanja Wolf, Bettina Menne
WHO Regional Office for Europe
European Centre for Environment and Health, Rome Division

Content

- **Climate change is happening**
- Climate change affects health
- Action is needed “now”

The Intergovernmental Panel of Climate Change (IPCC) (and Nobel Piece price winner)

2500 scientific expert reviewers

900 contributing authors

450 lead authors from

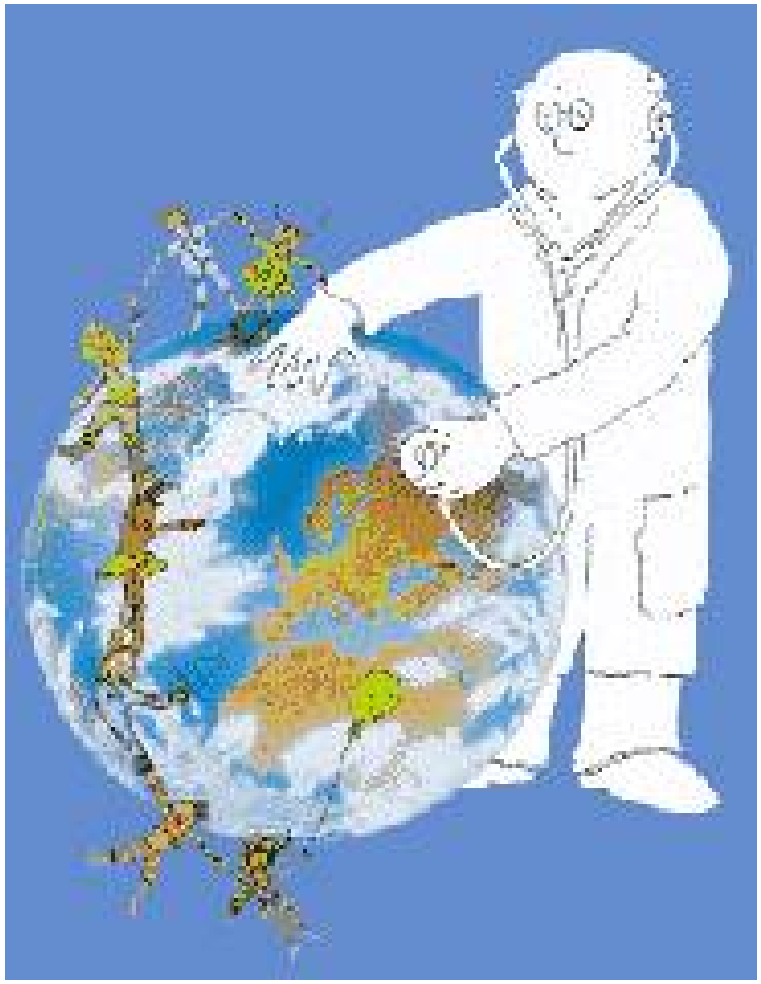
130 countries

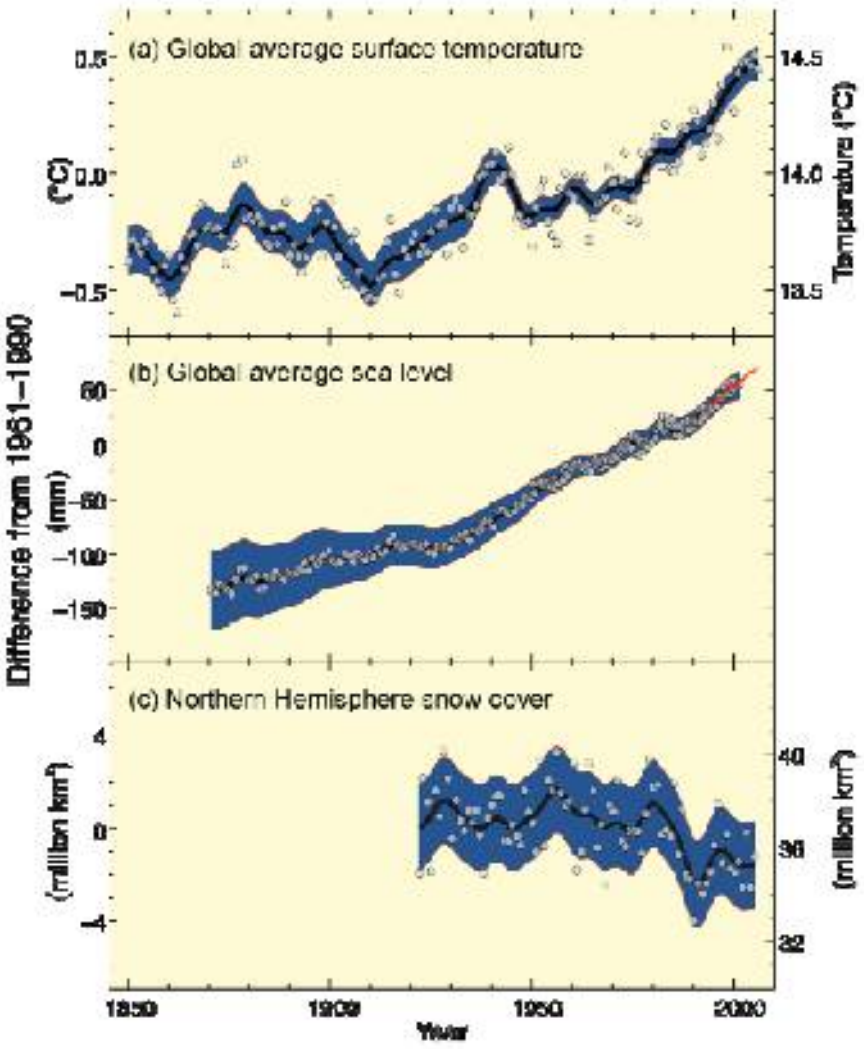
6 years

1 report

4 governmental approval sessions

Global temperature breaks record





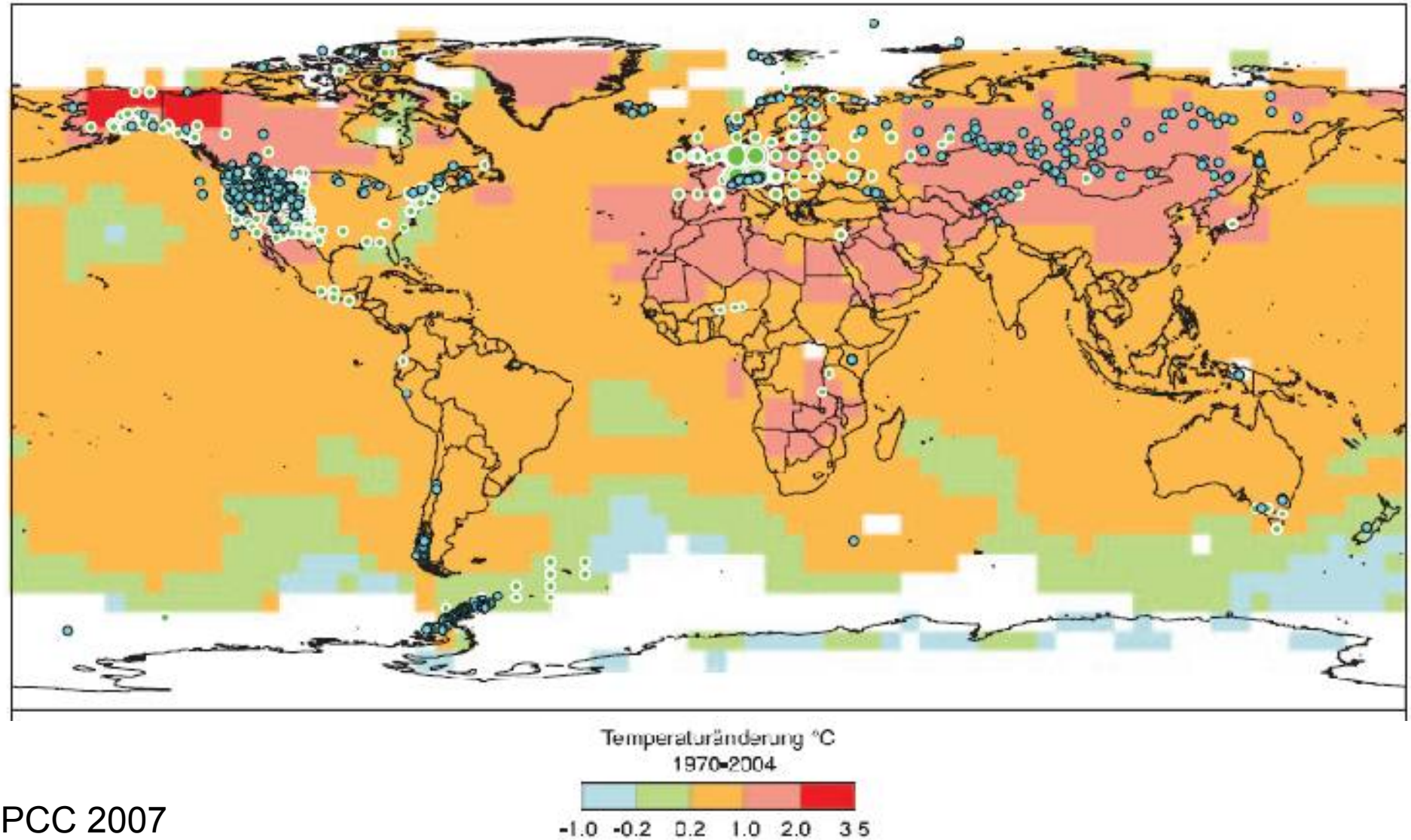
IPCC 2007

Temperature increases everywhere

Extreme weather events increase

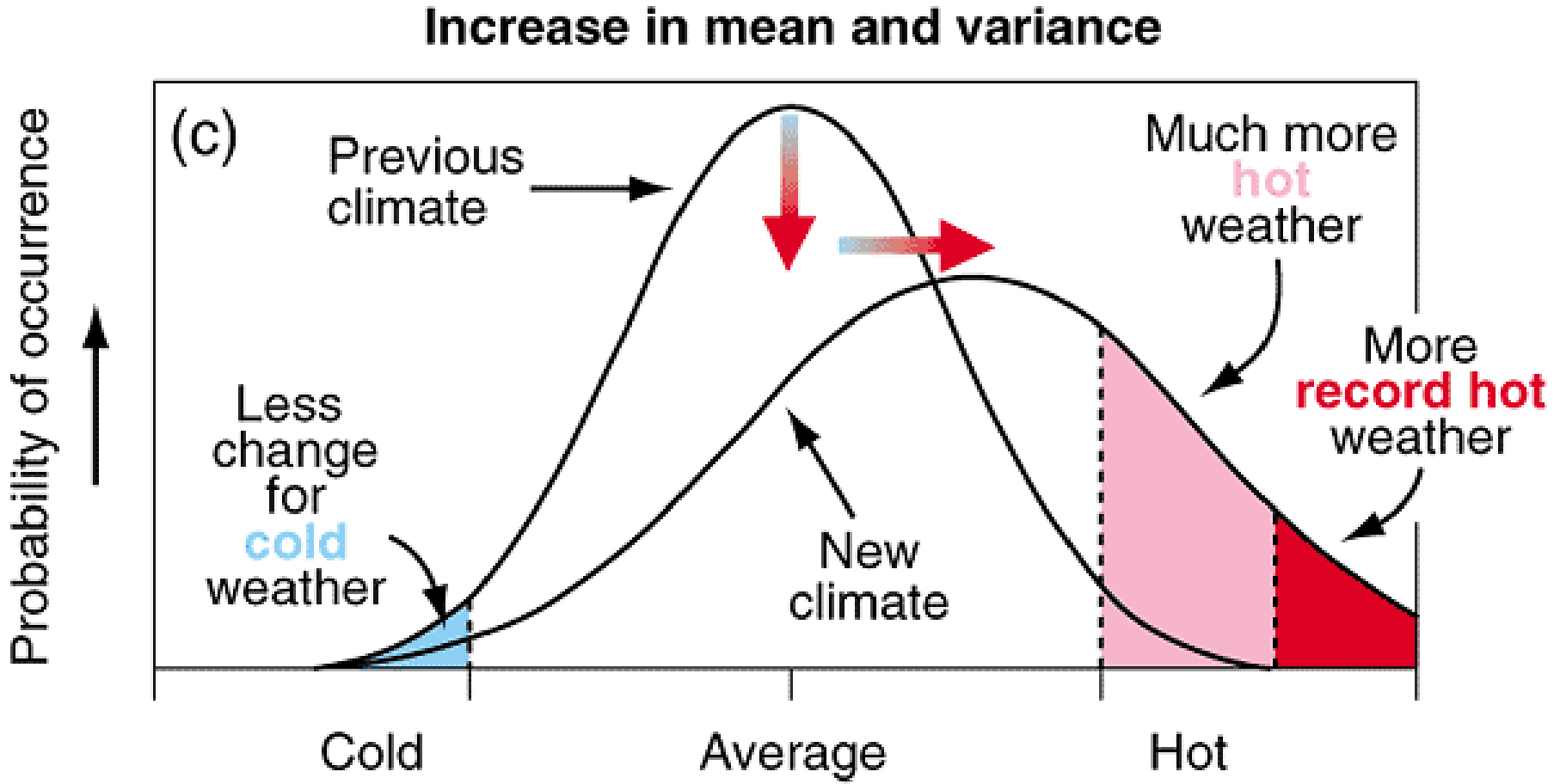
Adapted from IPCC (2007) Summary for Policymakers. IN SOLOMON, S., D. QIN, M. MANNING, Z. CHEN, M. MARQUIS, K.B. AVERYT, M.TIGNOR AND H.L. MILLER (Ed.) *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge, United Kingdom and New York, NY, USA, Cambridge University Press.

Changes in systems are evident

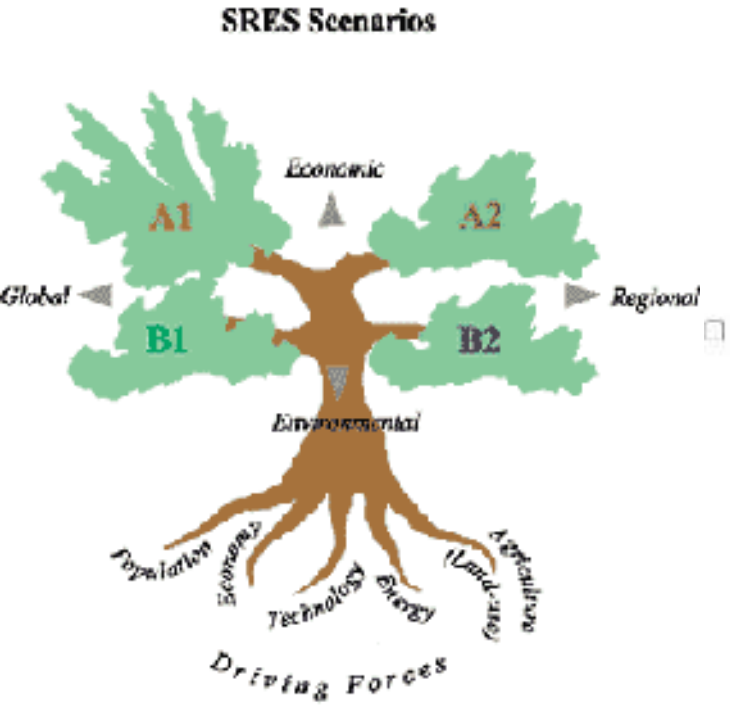


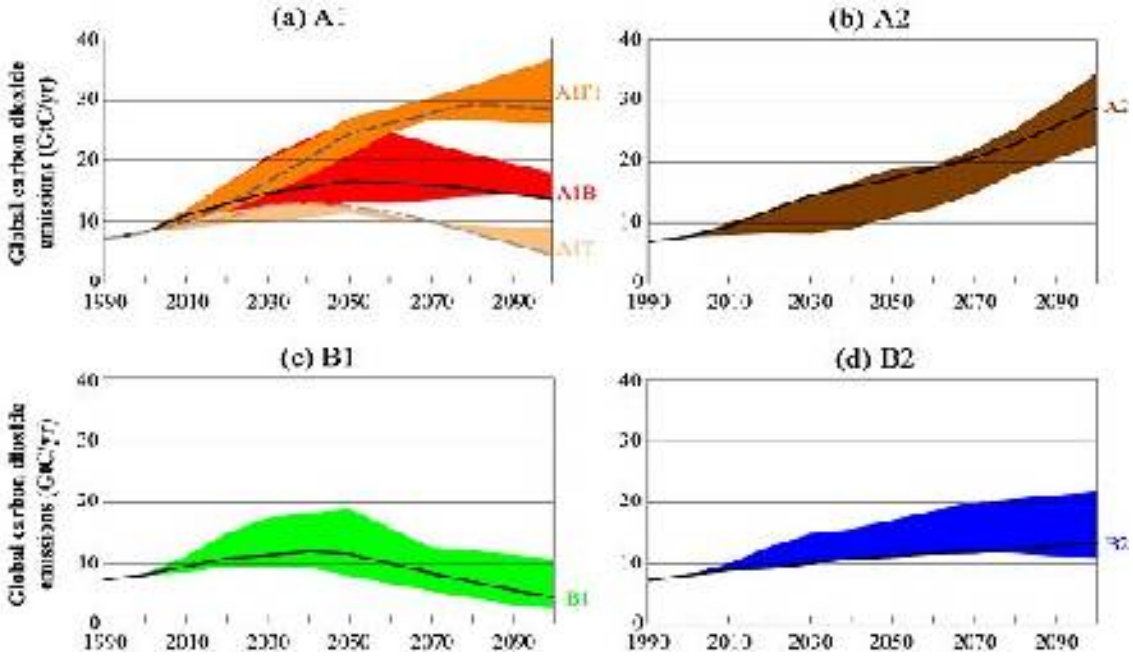
IPCC 2007

Not just warmer, but more variable



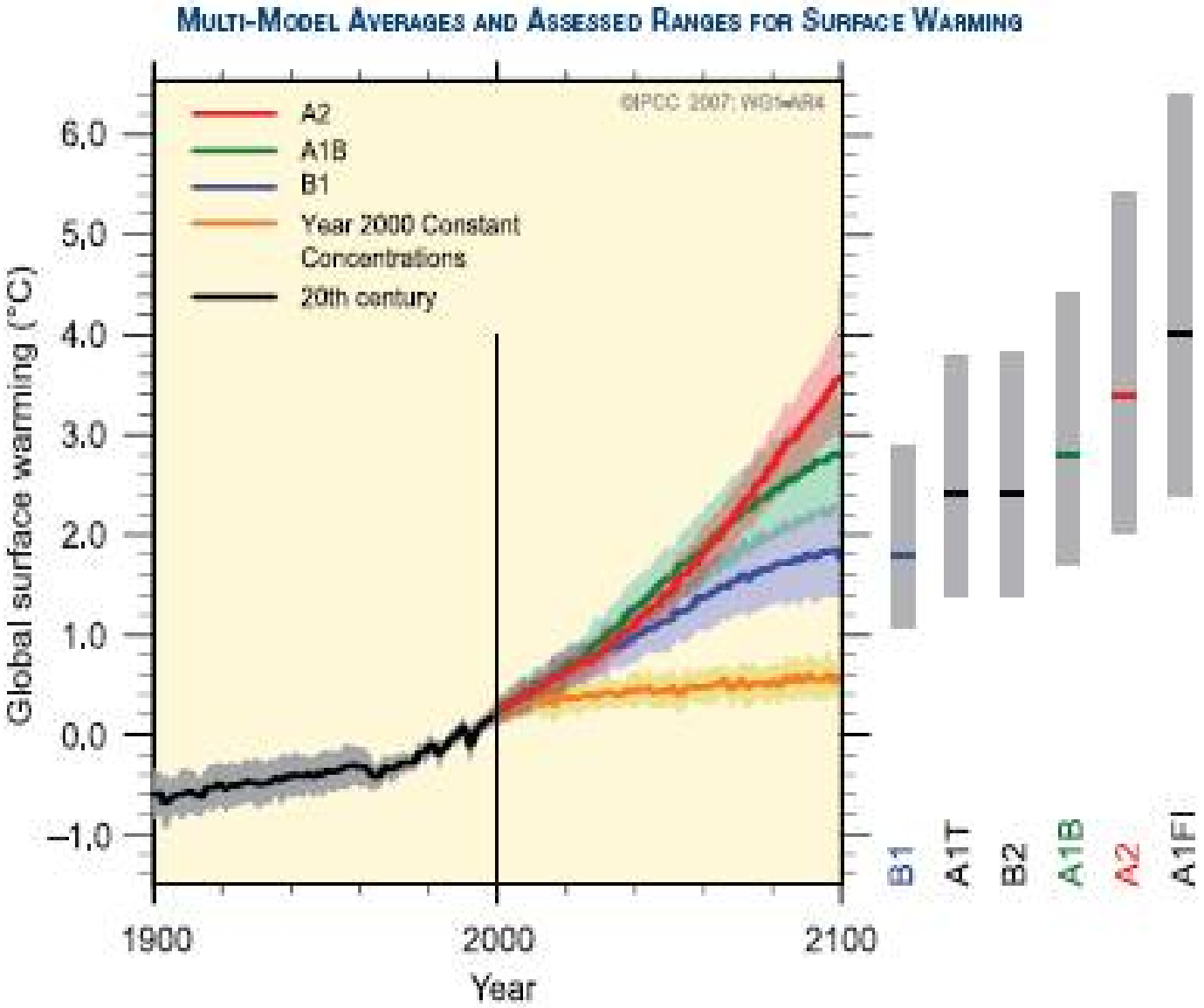
IPCC scenarios





Source: NAKICENOVIC, N. & SWART, R. (Eds.) (2000) *Emissions scenarios. A special report of working group III of the Intergovernmental Panel on Climate Change.*, New York, Cambridge University Press.

IPCC scenarios forsee warming



Likelihood of extremes increasing

Phenomenon, increase of	*Likelihood that trend occurred post 1960*	*Likelihood of continuation of trend based on projections for 21st century using SRES scenarios.*
days / nights with low temperatures	Very likely	Very likely
days / nights with high temperatures	Very likely	Very likely
warm spells / heat waves	Likely	Very likely
heavy precipitation events	Likely	Very likely
area affected by droughts	Likely in many regions since 1970s	Likely
number of intense tropical cyclones	Likely, since 1970	Likely
mid- & high-latitude cyclones	Likely	Likely
incidence of extreme high sea level	Likely	Likely

Projected exposures

- Water: By 2050, water availability is projected to decrease by 10-30% over some dry regions at mid-latitudes and in the dry tropics.

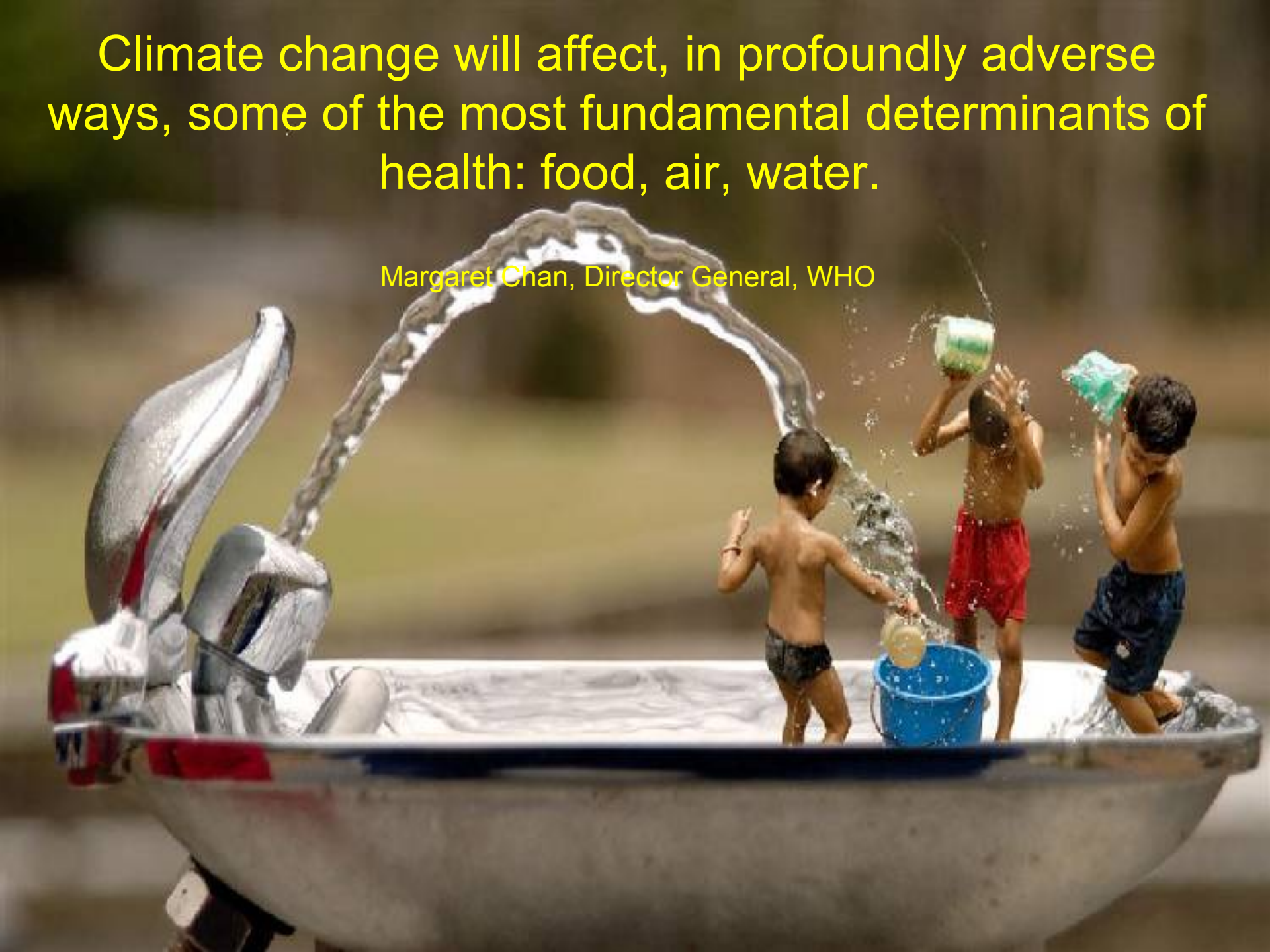
- Food: At lower latitudes, especially seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1-2°C), which would increase risk of hunger.

- Air quality: Future climate change may cause significant air quality degradation by changing the dispersion rate of pollutants, the chemical environment for ozone and aerosol generation and the strength of emissions from the biosphere, fires and dust.

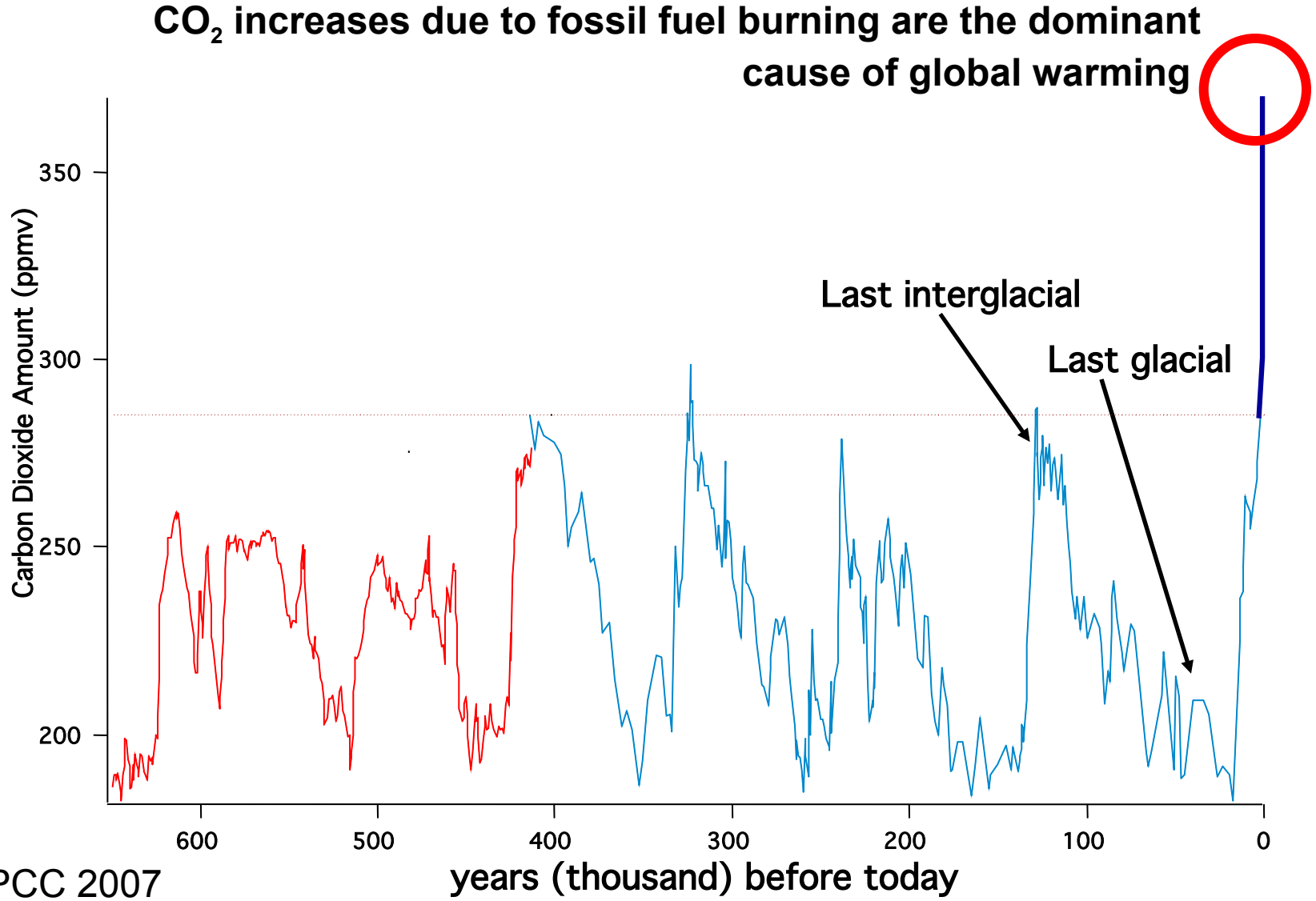
IPCC, wg II SPM, 2007

Climate change will affect, in profoundly adverse ways, some of the most fundamental determinants of health: food, air, water.

Margaret Chan, Director General, WHO



CO2 concentration breaks record



IPCC 2007

Greenhouse gas emission increases

Content

- Climate change is happening
- **Climate change affects health**
- Action needed

Thanks to the authors of the chapter on human health (WG II)

- Ulisses Confalonieri (Brazil),
- Bettina Menne (WHO Europe/Germany)

- Rais Akhtar (India),
- Kristie L. Ebi (USA),
- Maria Hauengue (Mozambique),
- R. Sari Kovats (UK),
- Boris Revich (Russia)
- Alistair Woodward (New Zealand)

- Susanna Curto (Argentina)
- Anthony McMichael (Australia)

- Tarakegn Abeku (Ethiopia),
- Mozaharul Alam (Bangladesh),
- Paul Beggs (Australia),
- Bernard Clot (Switzerland),
- Chris Furgal (Canada),
- Simon Hales (New Zealand),
- Guy Hutton (UK)
- Sirajul Islam (Bangladesh),
- Tord Kjellstrom (New Zealand/Sweden)
- Nancy Lewis (USA),
- Anil Markandya (UK),
- Glenn McGregor (New Zealand),
- Kirk R. Smith (USA),
- Christina Tirado (Spain),
- Madeleine Thomson (UK),
- Tanja Wolf (WHO Europe/Germany)

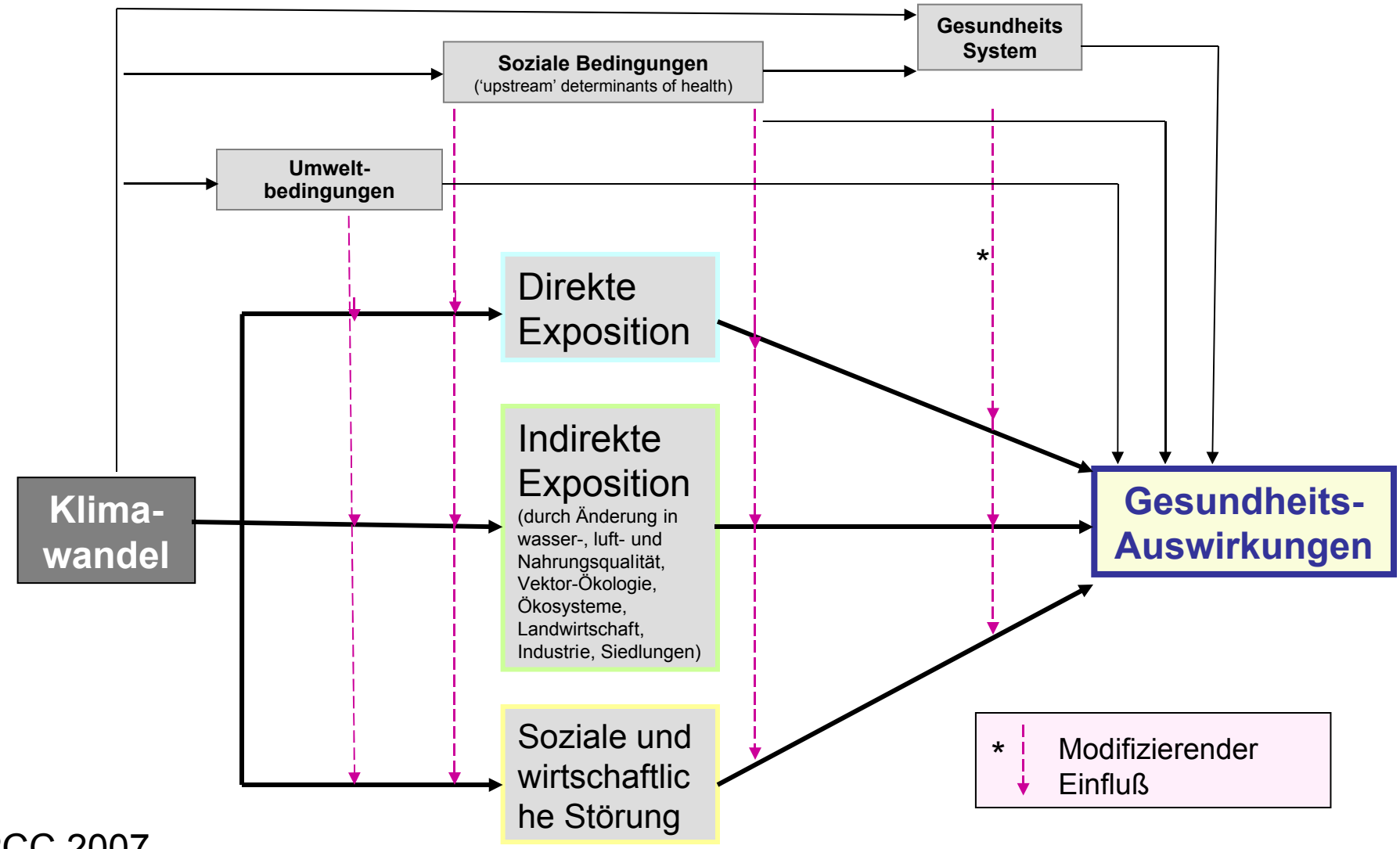
Health topics in AR4

- Effect of heat and cold
- Windstorms and floods
- Drought, food security

- Vectorborne and other infectious disease
- Occupational health
- UV radiation
- Migration, refugees

- Food quality
- Water and health
- Air quality

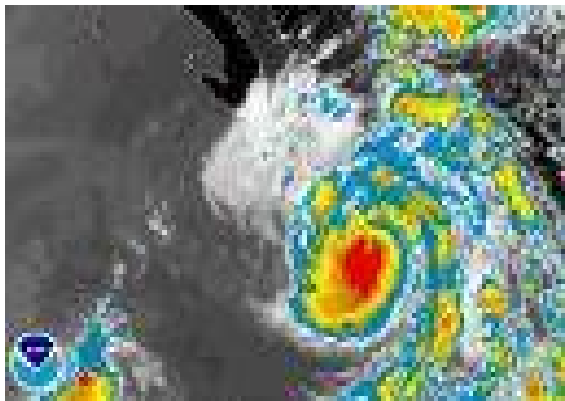
Pathways of climate change influencing human health



IPCC 2007

Complexity: different types of evidence for health impacts

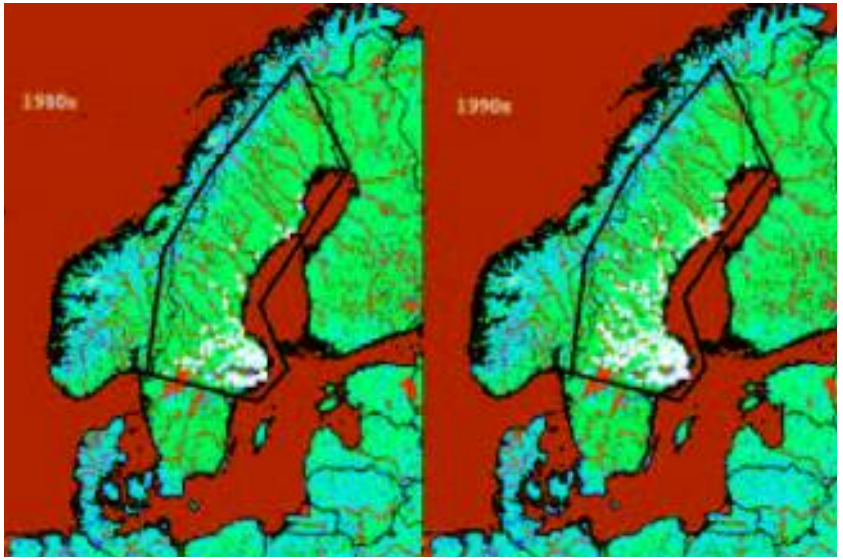
- Health impacts of single extreme weather events (heatwaves, floods, storms, droughts);
- Spatial (ecological) studies with climate as explaining factor for distribution of diseases or their vectors
- Cohort studies,
  - Variability from year to year,
  - Shortterm weather changes
  - Longterm climate changes.
- Experiments in the field or the lab



Health impacts have already been observed

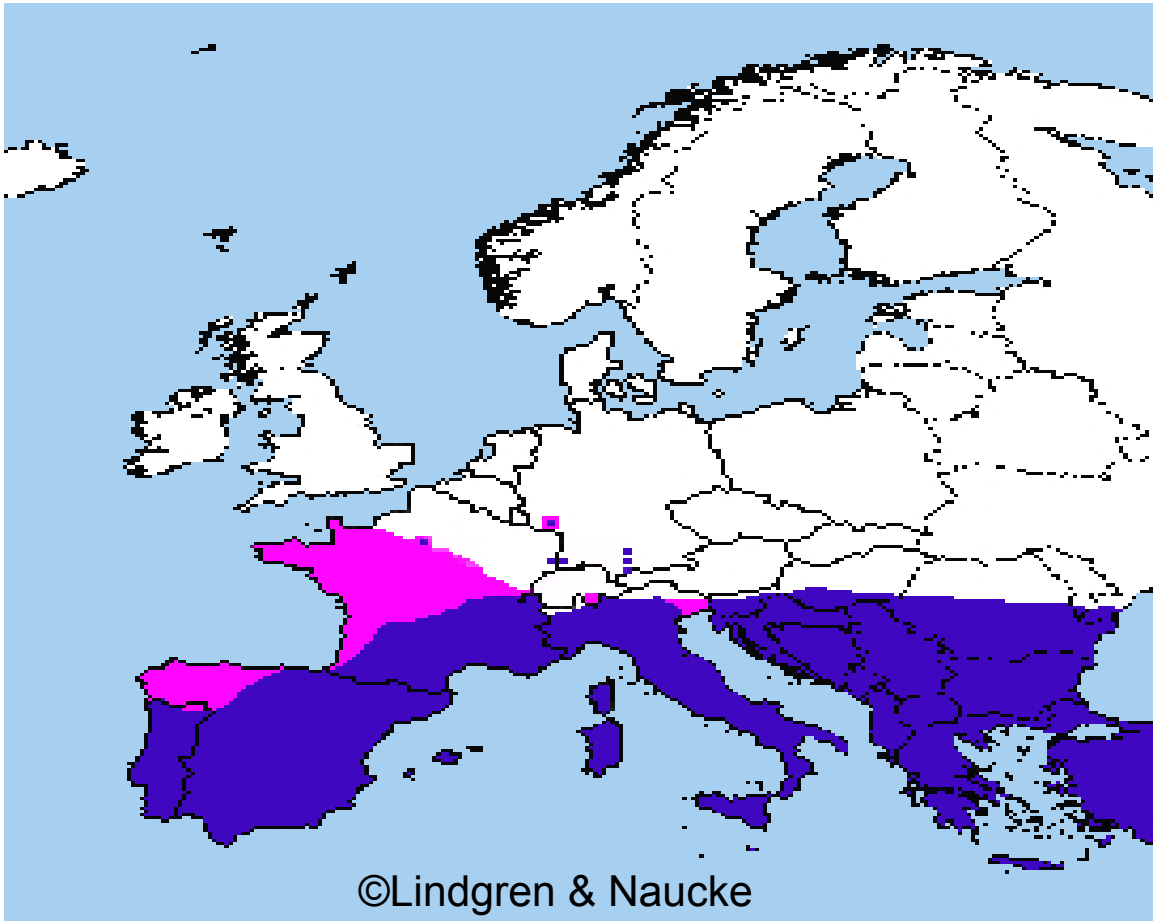
… gradually through INDIRECT impacts:
Infectious diseases, allergies, food, water,….

Allergies:
Earlier, longer, more intensive



Ticks in higher latitudes and altitude

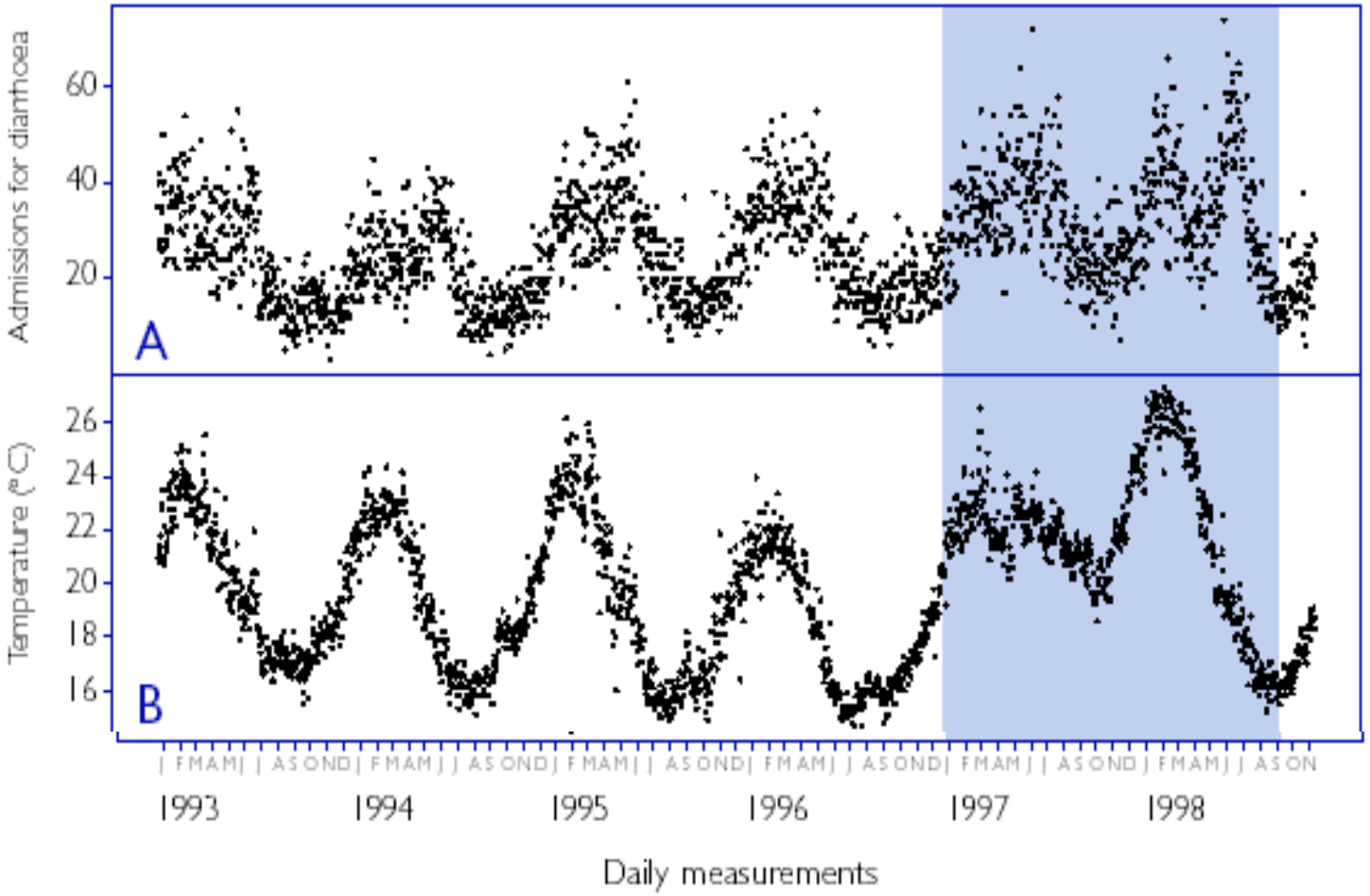
Some examples for indirect health impacts



Sandfly and leishmania

Some examples for indirect health impacts

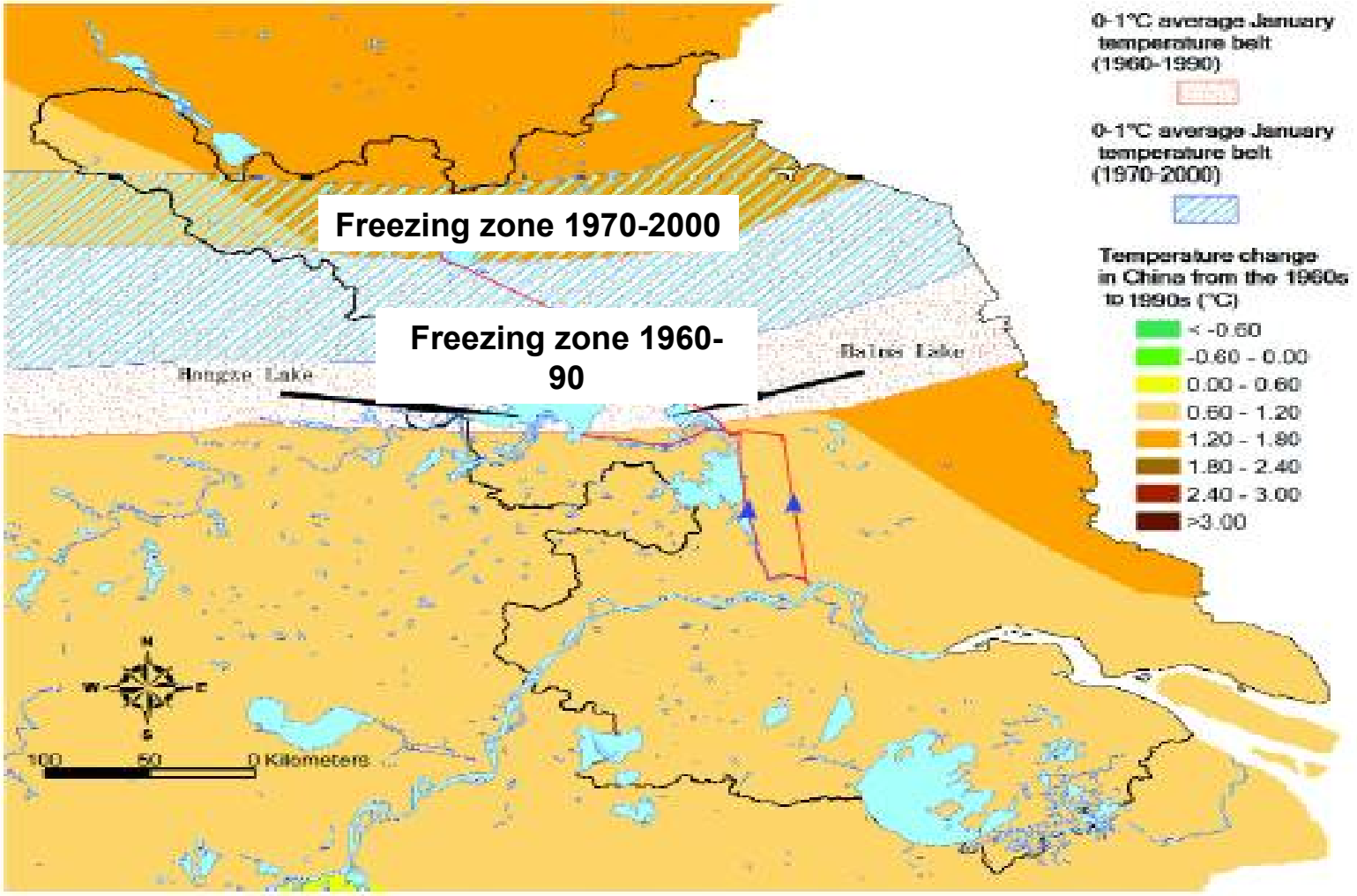
Diarrhea diseases



Source: Checkley et al, Lancet, 2000

Some examples for indirect health impacts

Schistosoma japonicum

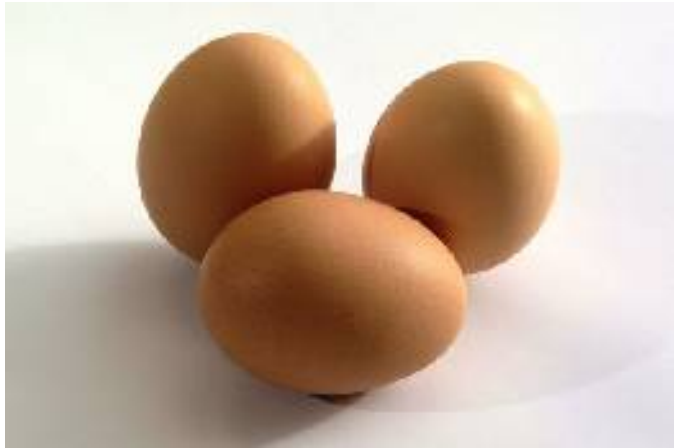


Source: Yang, Vounatsou, et al. 2005

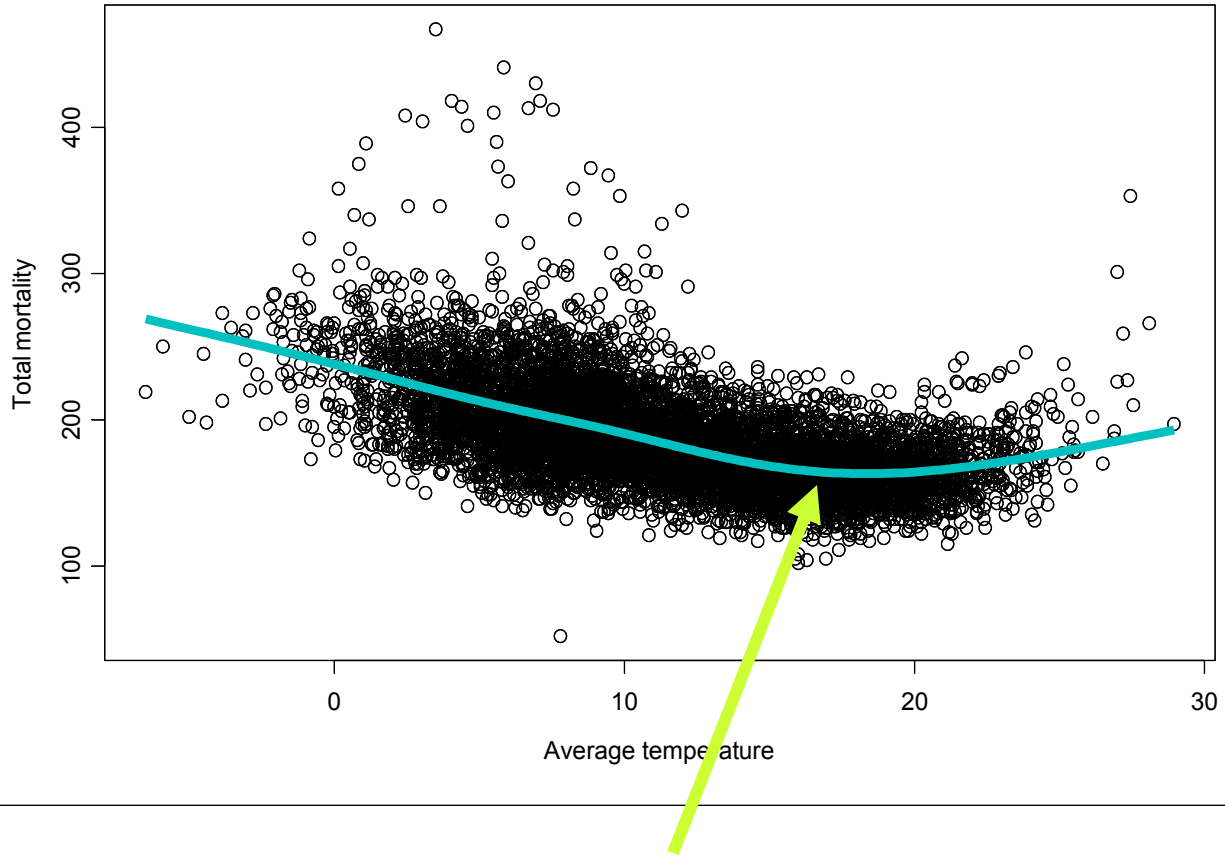
Some examples for indirect health impacts: Food safety

% increase in salmonella cases per degree increase in ambient temperature in Wales

- Temperature influences the transmission of salmonella in 35% of the cases in UK, Poland, the Netherlands, Czech Republic, Switzerland and Spain (Kovats et al).
- In some countries the total number of cases in decrease: prevention measures are effective!



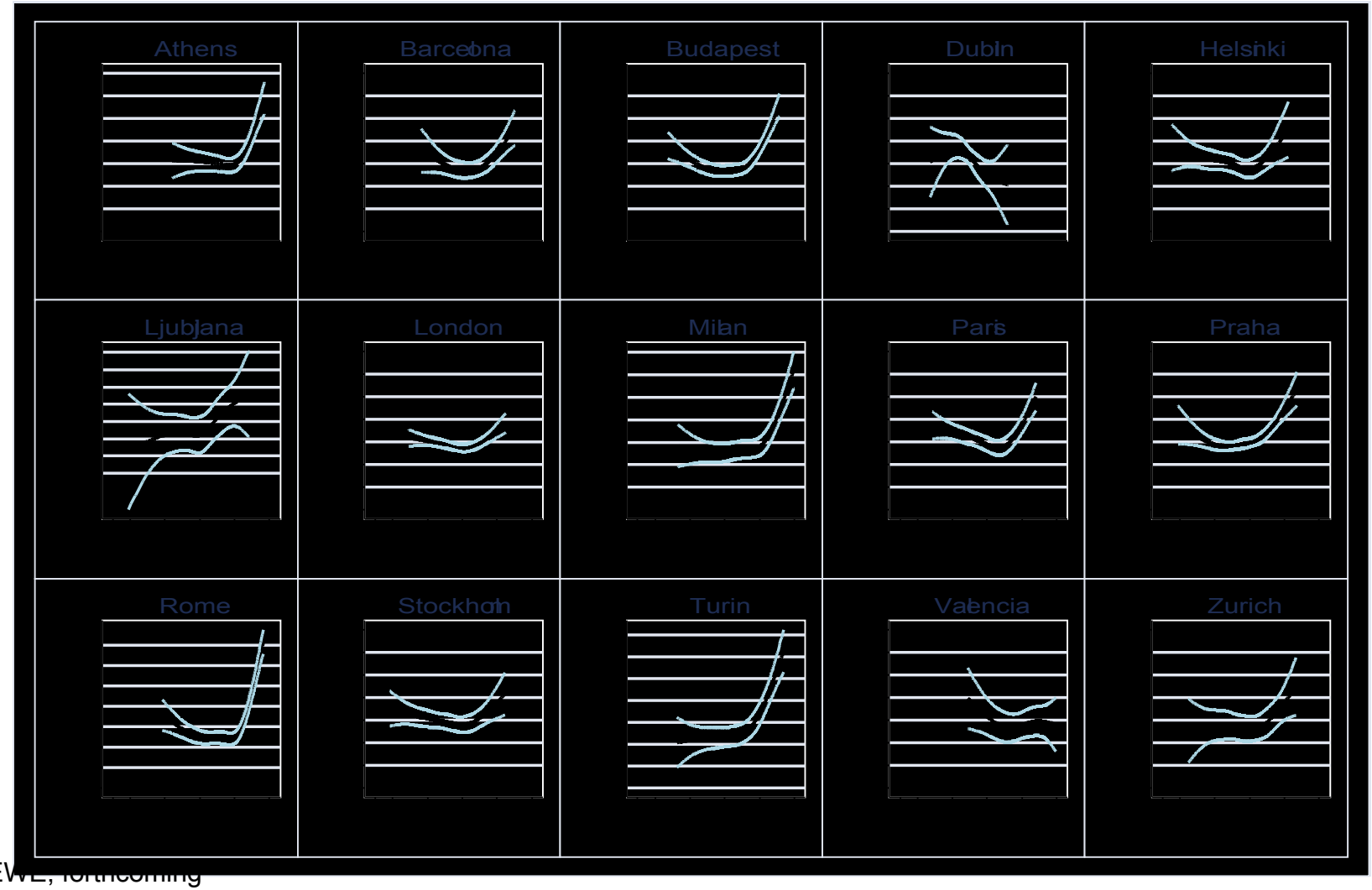
“Direct” effect: temperature



Optimum temperature

“Direct” effect: temperature

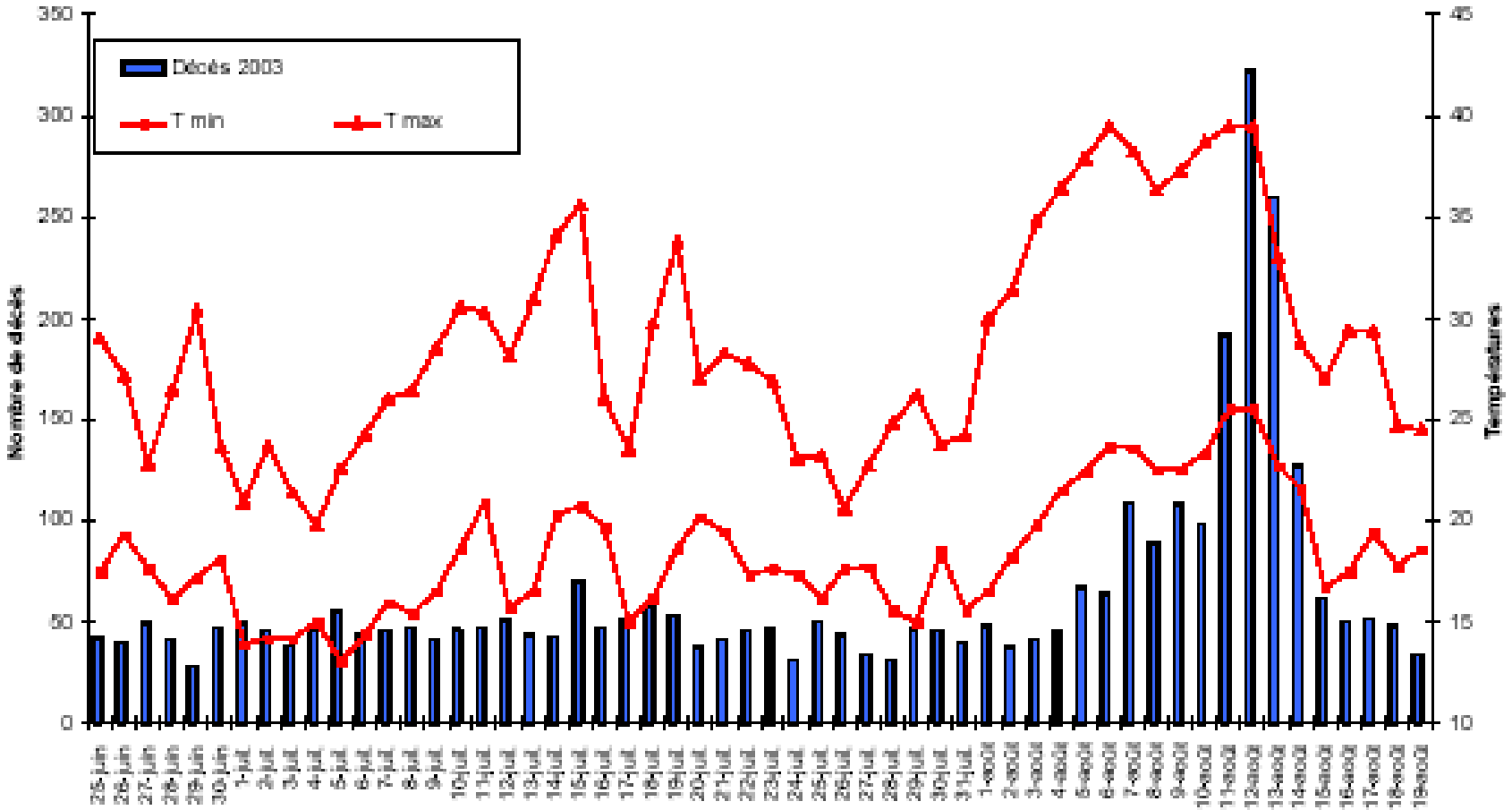
Time series: Maximum Apparent Temperature lag 03, All natural deaths - Summer analysis



PHEWE, forthcoming

The heatwave 2003

Graphique n°1 : Nombre de décès journaliers à Paris et températures minimales et maximales entre le 25 juin et le 19 août 2003



INVS 2003

Other extreme weather events

www.spiegel.de (8. Oktober 2007)

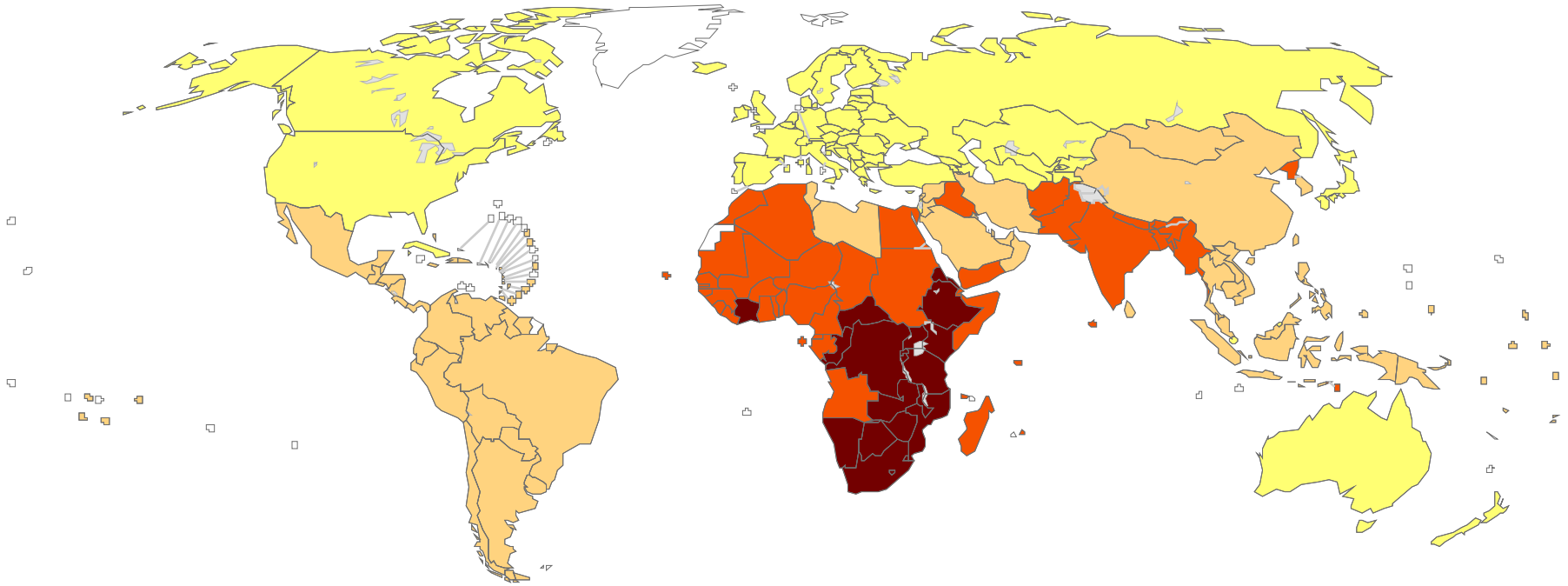
Main causes of deaths globally are climate sensitive

- **Each year people are killed:**
  - 3.7 million from malnutrition
  - 1.8 million from diarrhoea
  - 1.1 million from malaria

These diseases react to changes in temperature and precipitation

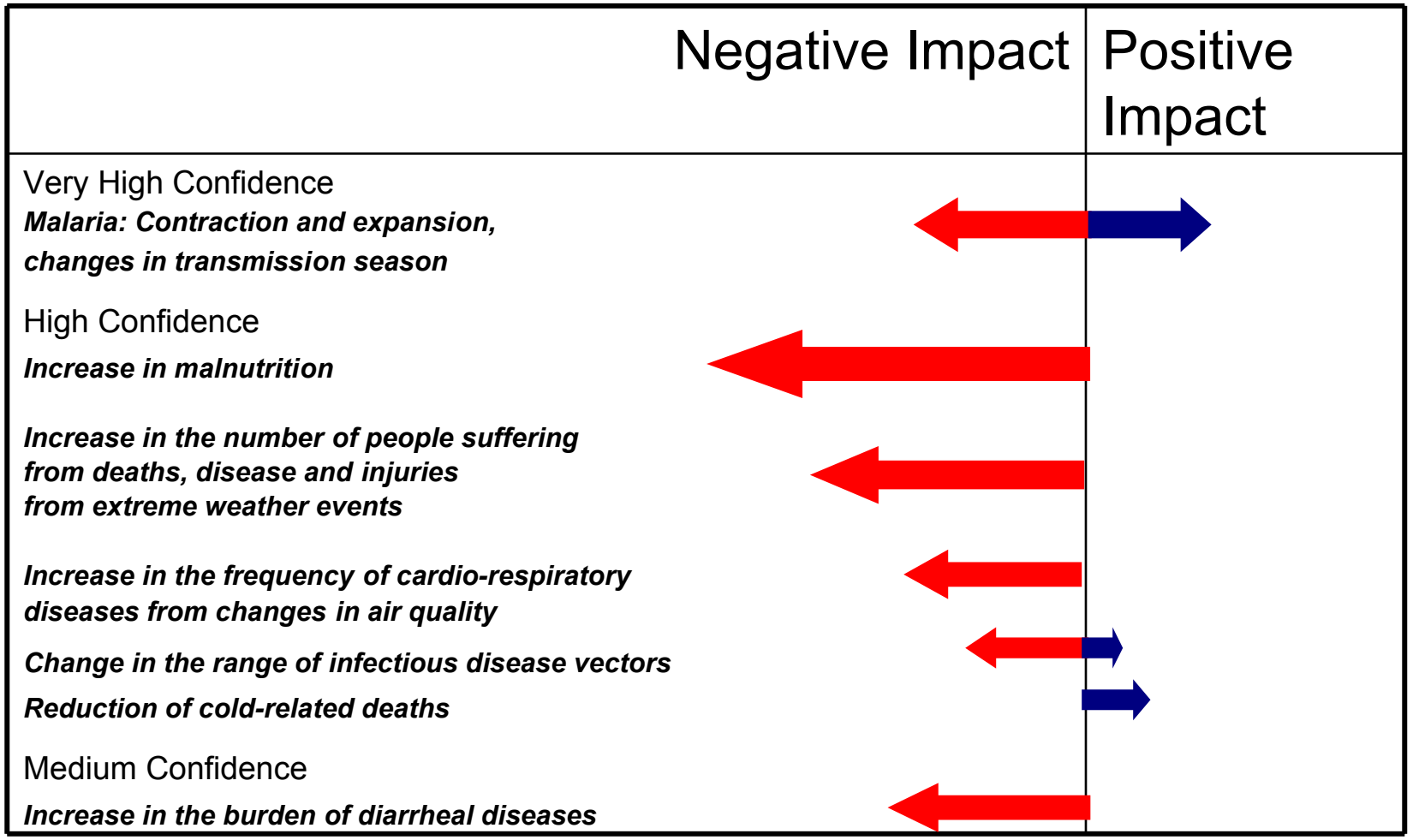
Contribution of climate change to morbidity and mortality by 2000

150.000 deaths and more than 5 million DALYs

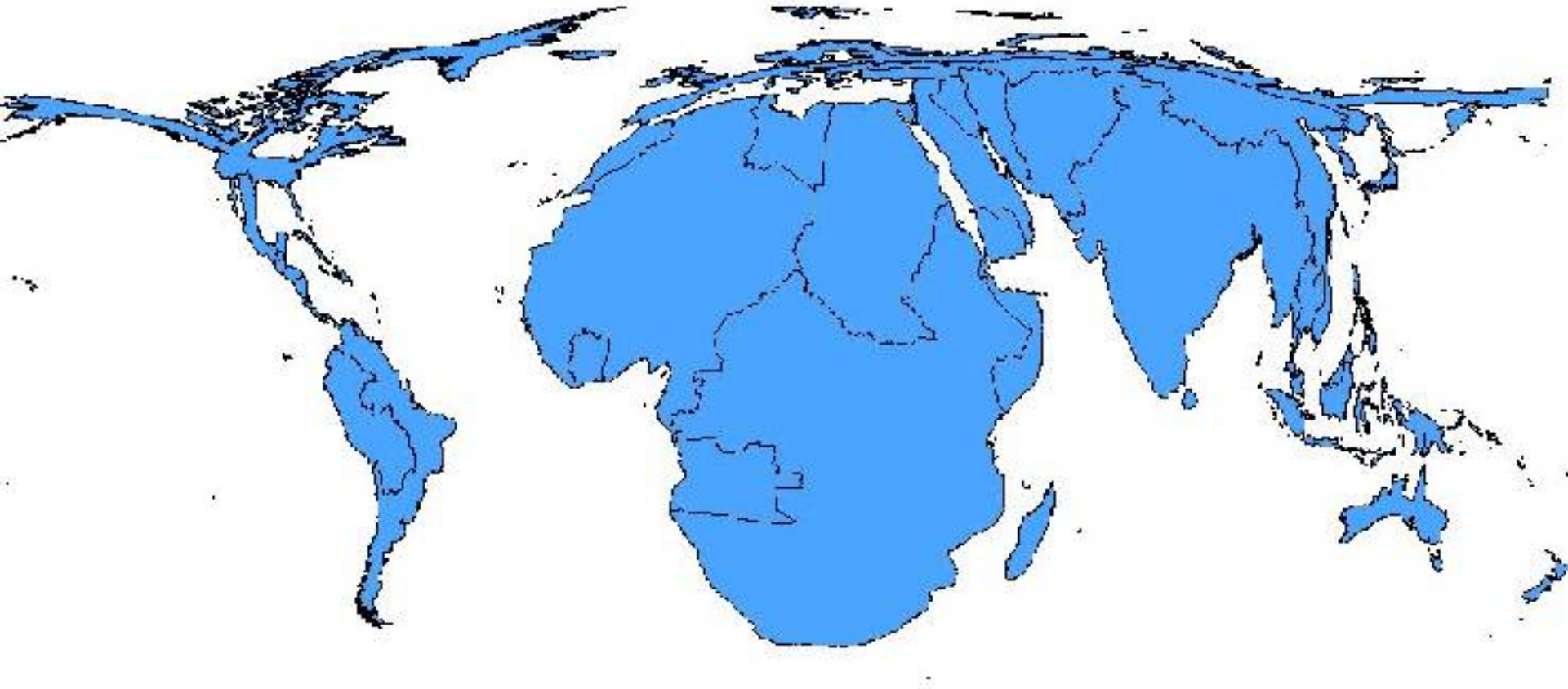


Estimates by WHO sub-region for the year 2000
(WHO, 2002; McMichael, Campbell-Lendrum et al, 2004)

Direction and magnitude of change in the future

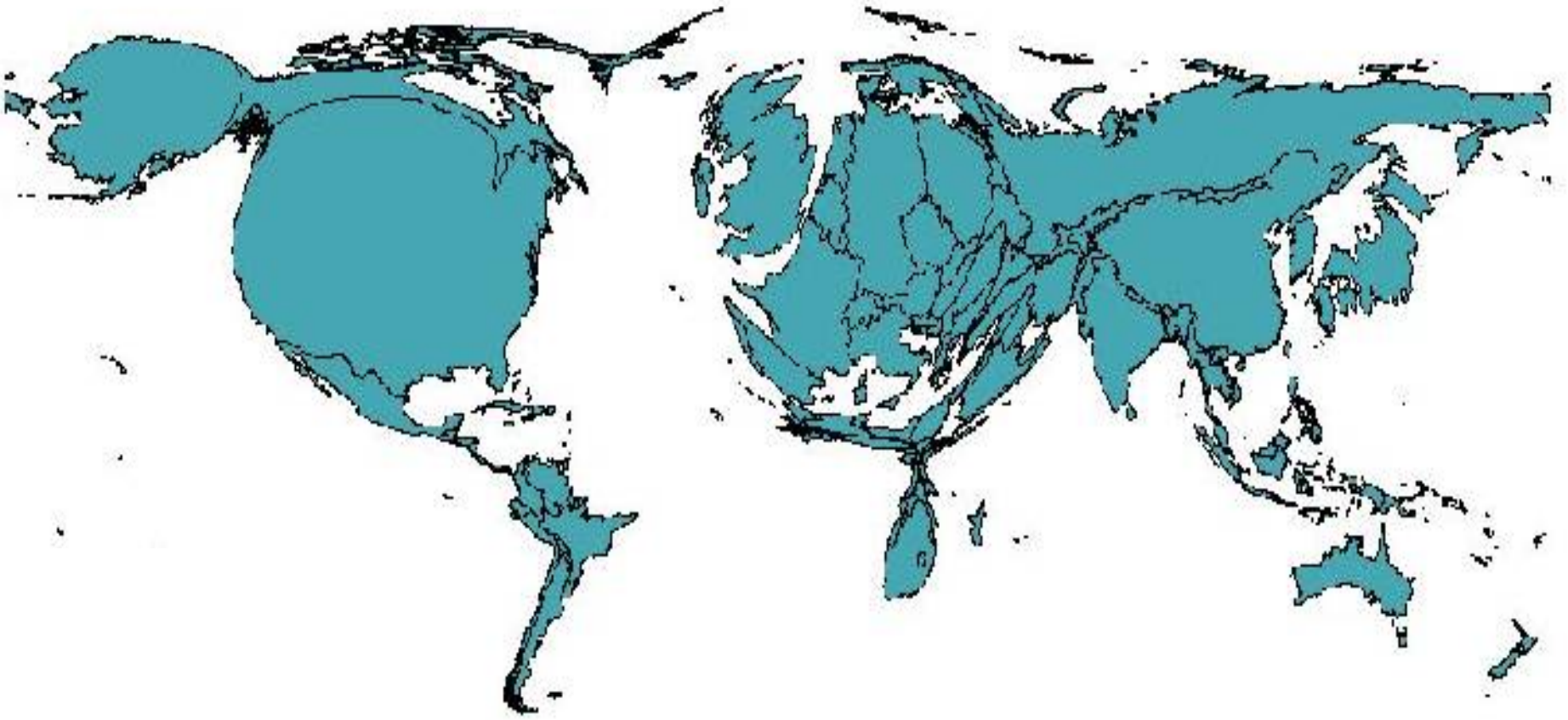


Health impacts of climate change



Density equalling cartogram. WHO regions scaled according to estimated mortality (per million people) in the year 2000, attributable to the climate change that occurred from 1970s to 2000. Gibbs et al, in prep.

Emission of greenhouse gases



Density equalling cartogram. Countries scaled according to cumulative emissions in billion tonnes carbon equivalent in 2002. Gibbs et al, in prep.

Content

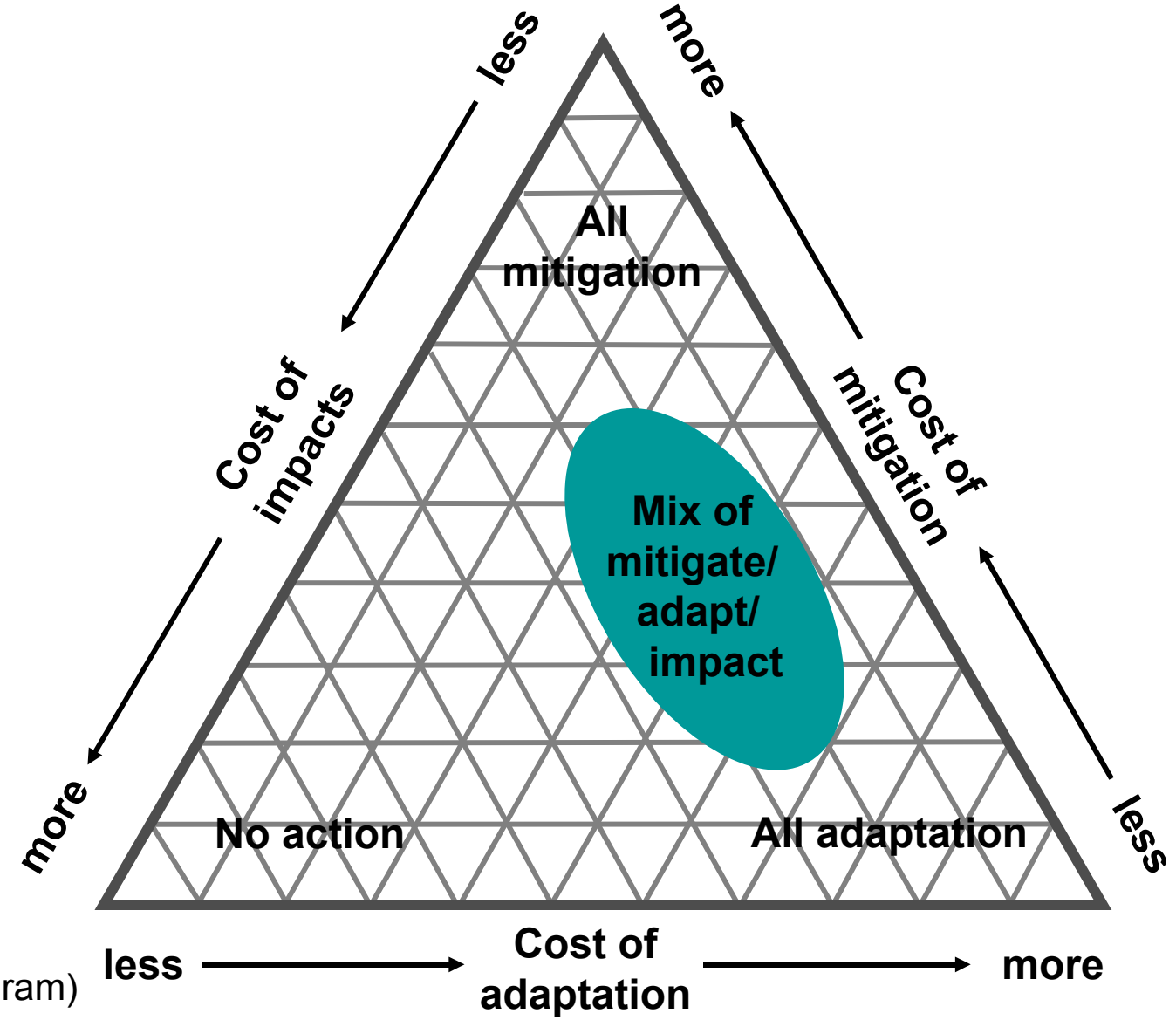
- Climate change is happening
- Climate change affects health
- **Action needed**

Key messages

- Health models and scenarios show: the Age of diseases from man made climate change has arrived

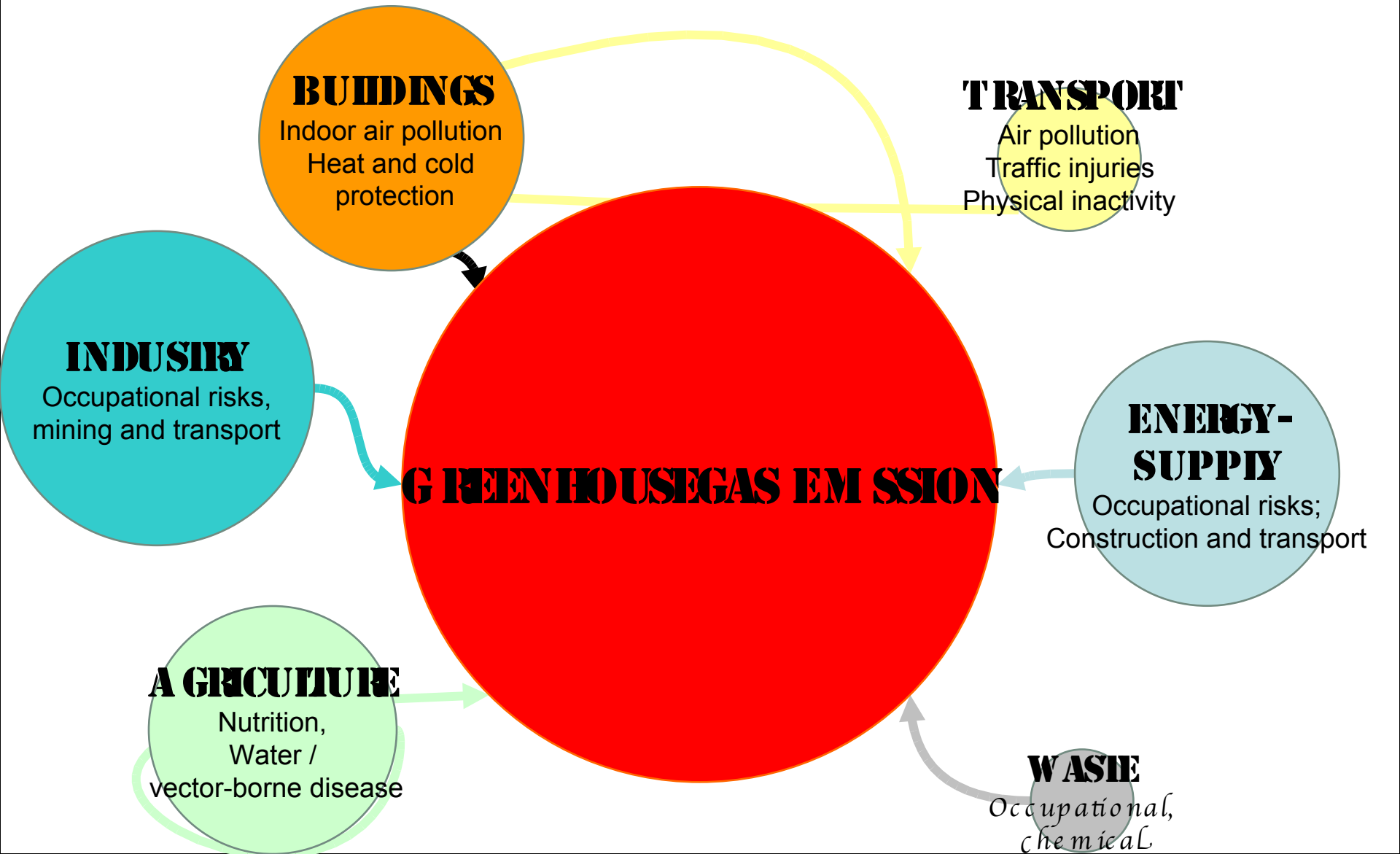
- Besides sustainable mitigation, adaptation is necessary everywhere;
  - education
  - health system development, access to health services, water and sanitation
  - information, surveillance, early warning
  - new partnerships

Find the mix of mitigation and adaptation



(Holdridge diagram)

Health protection and Mitigation



Mitigation has positive “side effects”

Health options for energy and transport do not only reduce greenhouse gas emission, but could help avoiding some of the

- 800,000 deaths per year from urban air pollution,
- 1.5 million deaths per year from indoor air pollution
- 1.2 million deaths per year from accidents,
- 1.9 million deaths from lack of physical activity

Adaptation to direct and indirect threats

Climate sensitive infectious diseases:

- Surveillance and monitoring
- Microbiological risk assessment
- Risk management
- Risk communication

Extreme events:

Anticipation:	Early warning systems
Early detection:	Real time health information
Prevention:	National plans, structural and non structural measures, etc
Response:	Preparedness planning, guidance on health impact assessment, treatment, ect

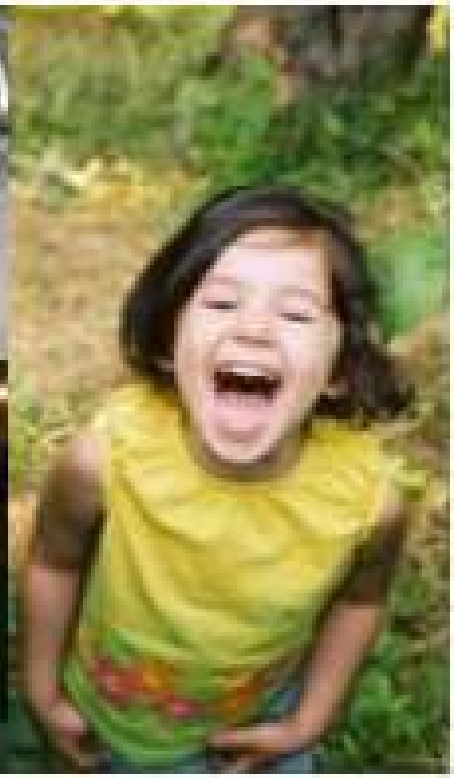
Healthy cities!

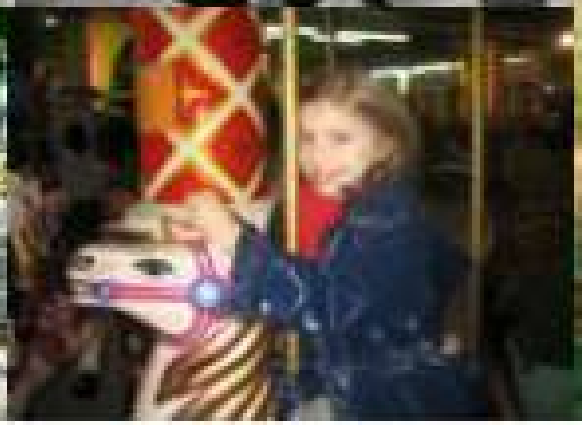
WORLD HEALTH ORGANIZATION
EUROPE

Healthy Cities

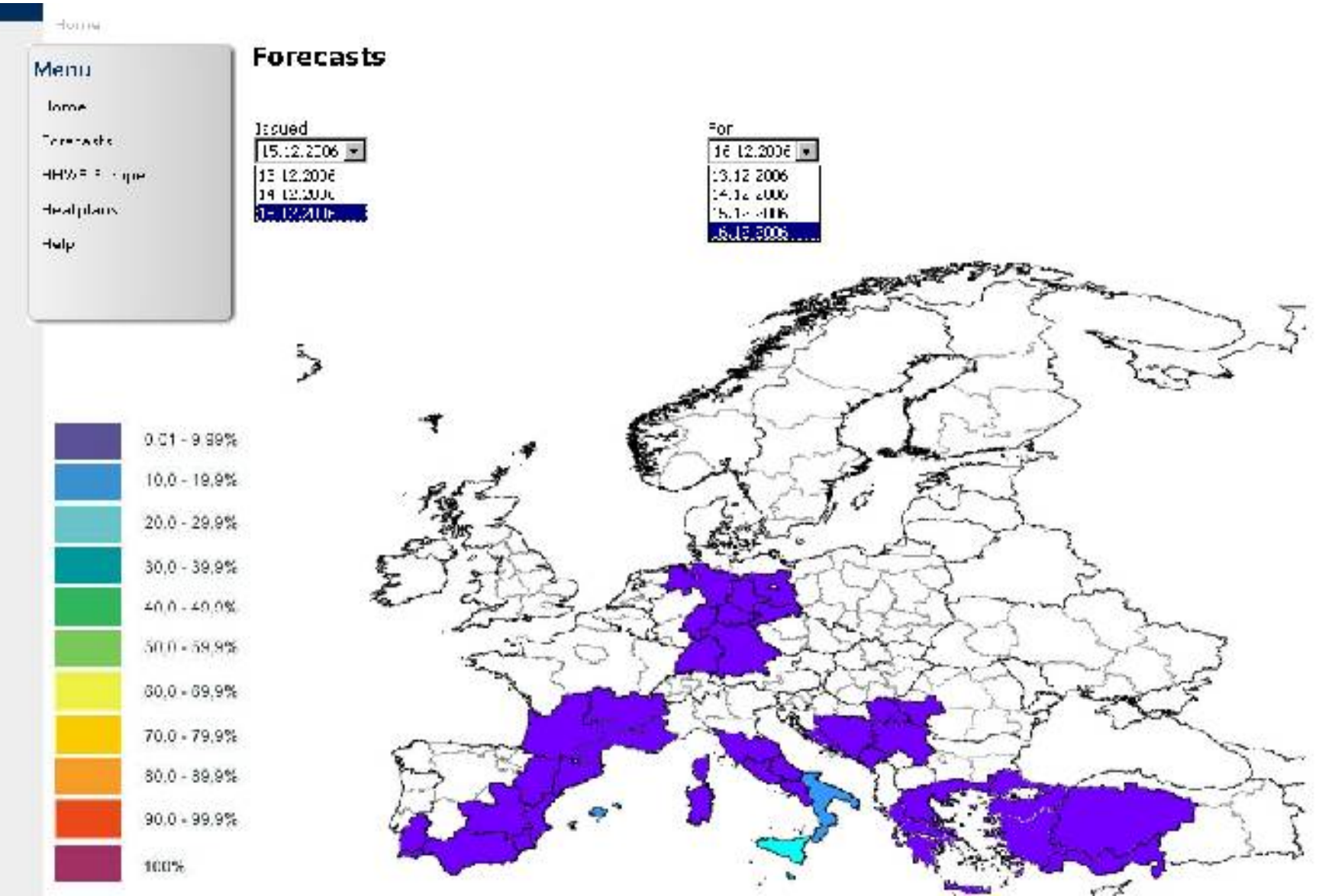
Здравен Градове
Sunde Byer
Gezonde Steden
Healthy Cities
Terveet Kaupungit
Villes santé
Gesunde Städte
Υγιείς Πόλεις
ערים בריאות
Egészséges városok
Città Sane
Города Здоровья
Ciudades saludables
Ciutats Saludables
Friska Städer
Zdravi Grad







Early warning through webtool (EuroHEAT)



What do / do?

Kompensations Code : myclimate_6397245
Datum: 30.01.2008

Kompensation CO2-Emissionen	Menge CO2	Projekt Portfolio	Preis
Flug von Roma (IT) FCO nach Belfast (GB) BFS via London (GB) LHR Retour, Economy Class, 3'897 km , 1 Reisender	0,847 t	myclimate CHF 40.32 / t	CHF 34.00
Total	0,847 t		CHF 34.00

Apply the precautionary principle

"All scientific work is incomplete - whether it be observational or experimental. All scientific work is liable to be upset or modified by advancing knowledge. This does not confer upon us a freedom to ignore the knowledge that we already have, or to postpone the action that appears to demand at a given time"

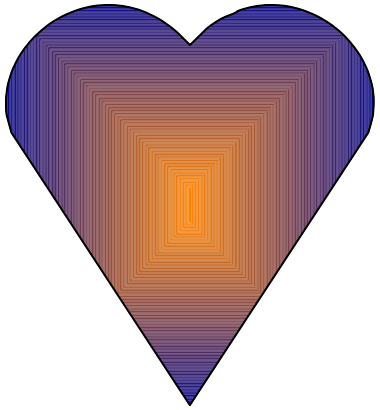
Hill, A.B. The environment and disease: association or causation? Proceedings of the Royal Society of Medicine 58: 295-300 (1965).

"Having unintentionally initiated a global experiment, we cannot wait decades for sufficient empirical evidence to act. That would be too great a gamble with our children's future".

Brundtland, G.H, Ex-Director General, World Health Organization. World Ecology Awards Ceremony, St Louis, Missouri, USA, 27 June 2001.

Health at the heart of prevention

- Health system stewardship: collaboration with climatologists and planners in land use and urban design
- Advocacy of "healthy" adaptation and mitigation measures
- Information and awareness rising (foodborne diseases, allergic disorders, and some vector and rodent-borne diseases)



- Systematic collection of information
- Sharing of lessons learnt
- Political will and support for public health approaches are a prerequisite for reducing any health risks and instability resulting from climate change!

Climate change as next great medical advance!?

- It would not be the first time that environmental policy had substantial benefits for health.
- **Could tackling climate be the next great medical advance?**

EDITORIALS

The economics of tackling climate change

Don't leave health benefits out of the equation

Ian Roberts, BMJ 2008;336:165-166 (26 January)

Key messages

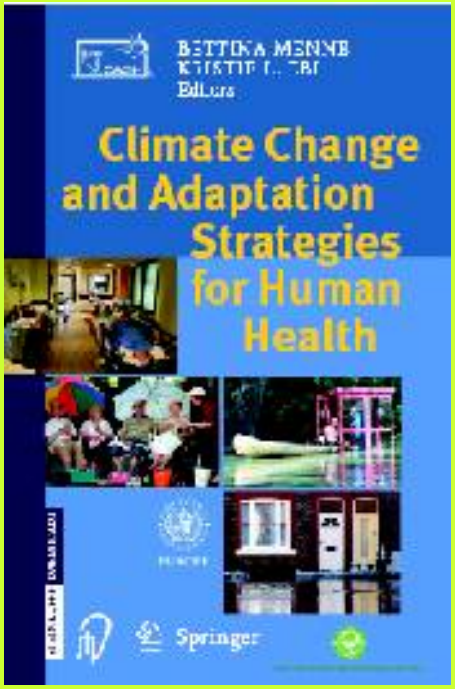
The climate is changing

- It has already affected health;
- All regions in the world are affected;
- Projected climate change-related exposures are likely to affect the health status of millions of people

Adaptive capacity needs to be improved everywhere;

- Critically important will be education, health system development, access, information etc
- Review, development or adjustments of public health activities are necessary

Thanks for your kind attention



Tanja Wolf, Bettina Menne
WHO Regional Office for Europe

European Centre for Environment and Health

globalchange@ecr.euro.who.int
http://www.euro.who.int/globalchange