

**What is science for?
The Hungarian Academy of Sciences,
and a personal geoscientific view
about the sustainability**

**Mire jó a tudomány?
A Magyar Tudományos Akadémia,
és egy személyes földtudományi vélemény
a fenntarthatóságról**

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Formerly:

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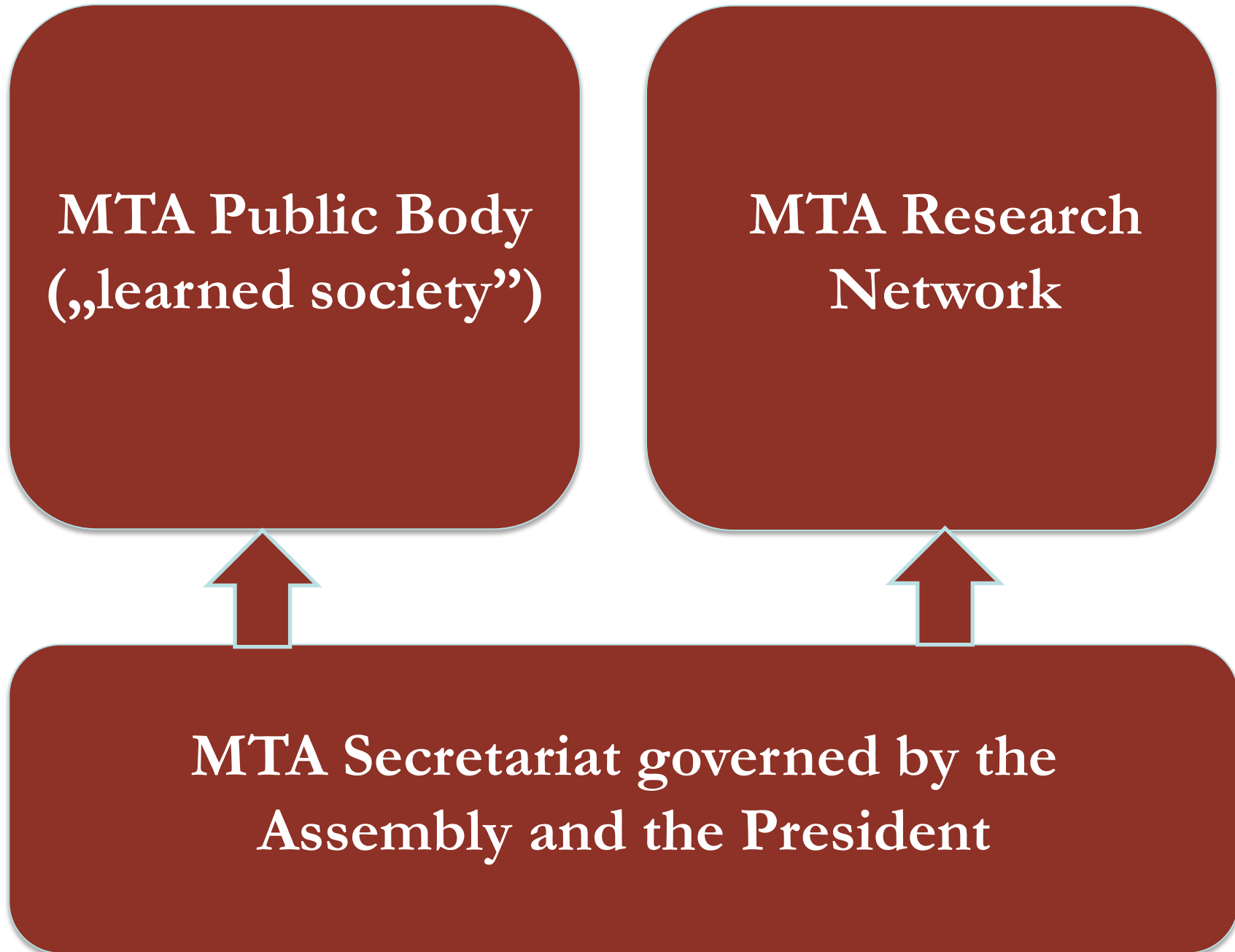
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The structure of the Hungarian Academy of Sciences (MTA):

**MTA Public Body
(„learned society”)**

**MTA Research
Network**

**MTA Secretariat governed by the
Assembly and the President**



Research centres and research institutes of the Hungarian Academy of Sciences from 2012

Red: research staff; green: main office

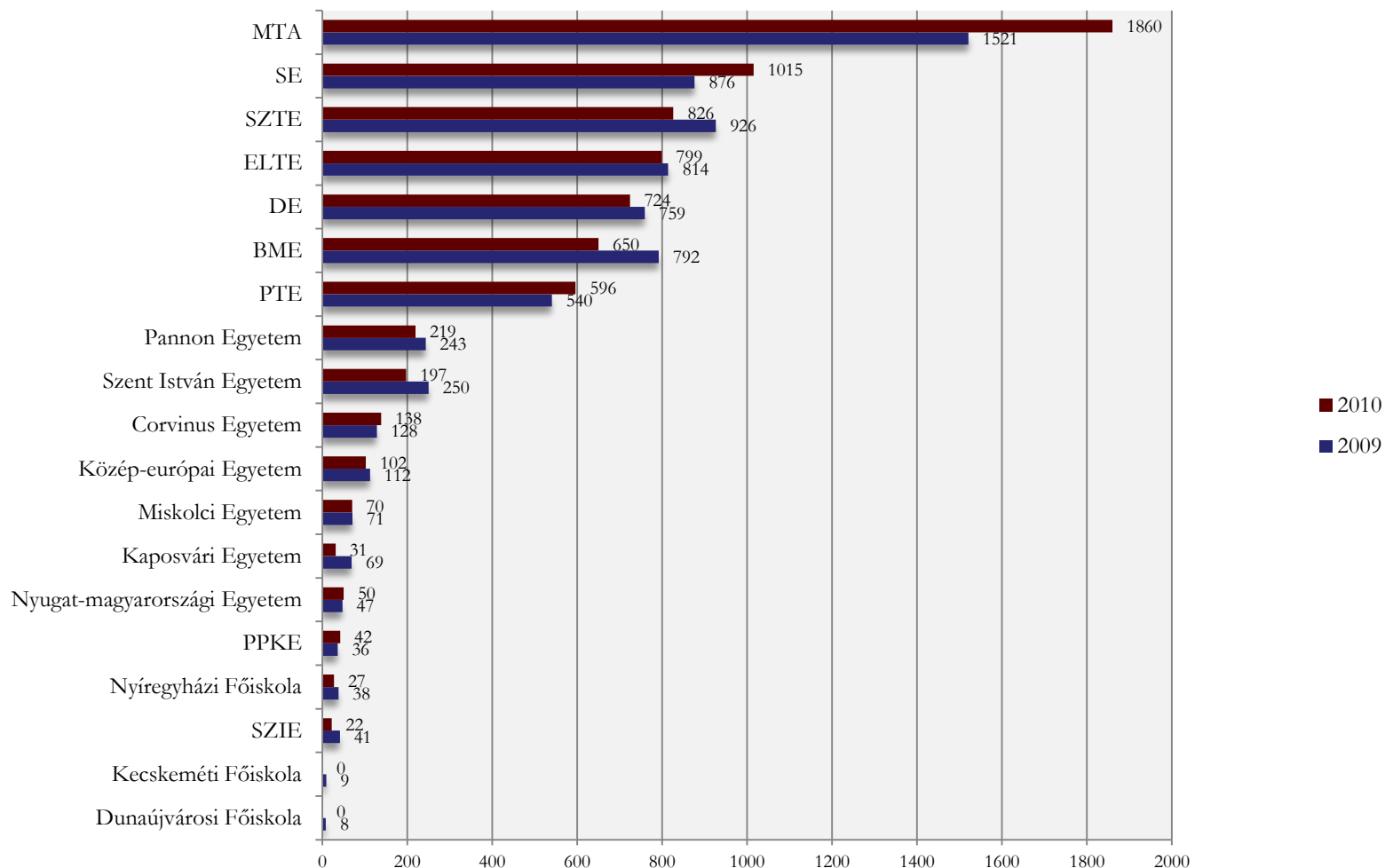
New research centres

ECOLOGY Tihany 91	ENERGY SCIENCE Budapest 92	HUMANITIES AND ARTS Budapest 312
AGRICULTURE Martonvásár 202	NATURAL SCIENCES Budapest 411	SOCIAL SCIENCES Budapest 156
ASTRONOMY AND EARTH SCIENCE Sopron 123	„WIGNER” PHYSICS Budapest 250	ECONOMY AND REG. SCI. Budapest 144

Unchanged research institutions

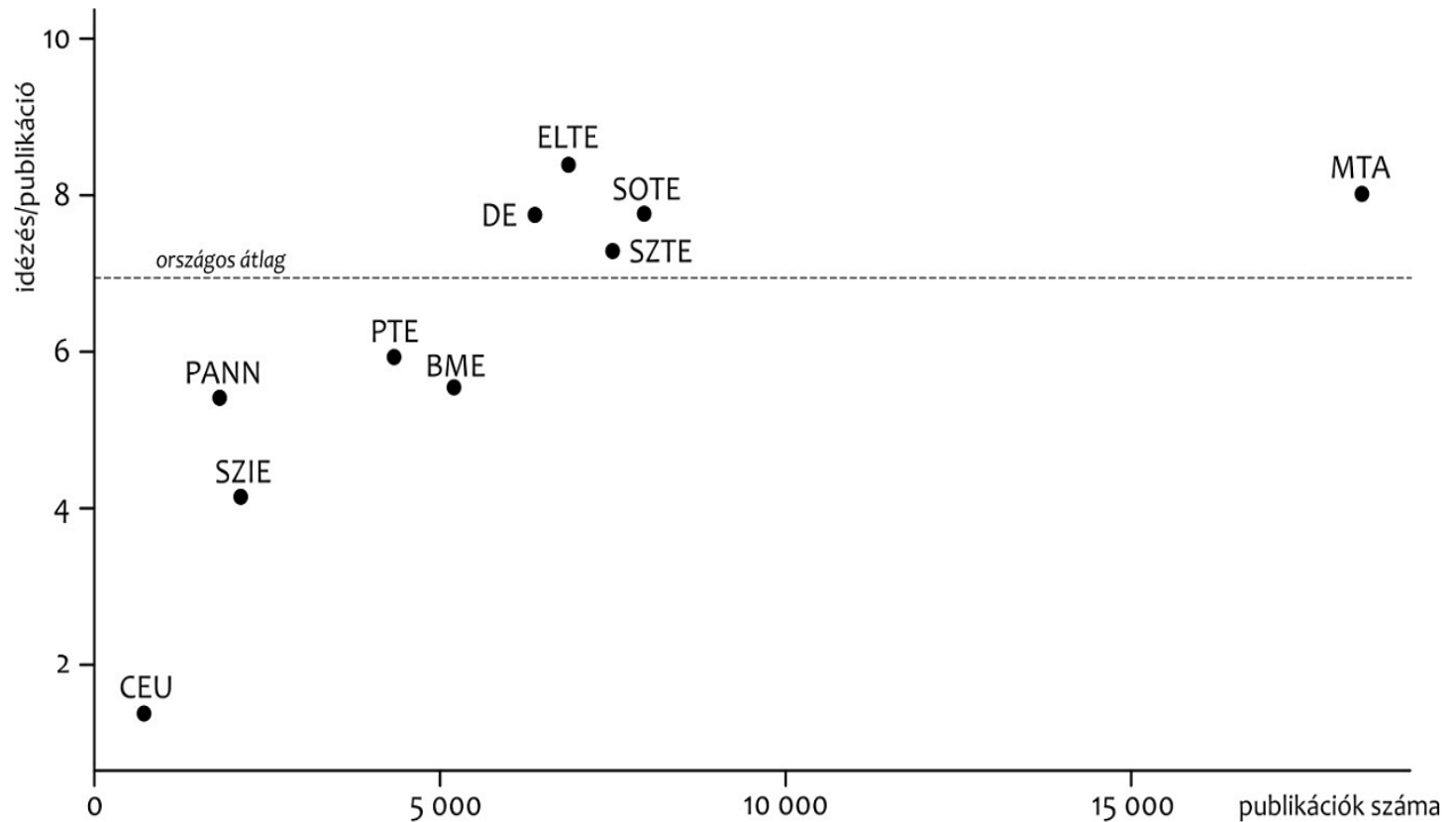
MEDICAL SCIENCE Budapest 81	MATHEMATICS Budapest 81	LINGUISTICS Budapest 94
BIOLOGY Szeged 225	NUCLEAR RESEARCH Debrecen 105	INFORMATICS Budapest 140

The output: Number of publications (Web of Science, 2009-2010)



Output: The role of the Institutes of the Academy in the Hungarian scientific „production”

Publications and average citations



The number of publications and their average citations in the Academy and the ten largest universities (Web of Science 2001-2010)

The winners of the Lendület programme in 2011



„From Brain Drain to Brain Gain”

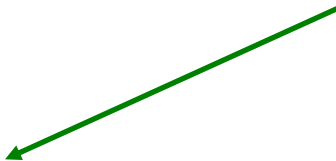
WHAT IS SCIENCE FOR?

Enrichment of the human life

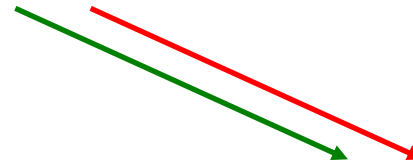


The Humanities and Social Sciences

Natural Sciences



Elongation of the human life



Elongation of the life of the humanity

„SUSTAINABILITY“

A summary from the perspective of the International Year of Planet Earth:

- 1. Earth's resources:** a) fossil energy: decreasing; the renewables are not able to satisfy the present demands; b) rare earth metals in future might be unavailable
 - 2. Groundwater:** the reservoirs are diminishing, since the freshwater consumption is much larger than the refilling of the subsurface reservoirs
 - 3. Soil:** the Earth is hardly able to feed ~9 billion people, predicted for 2040, but on the price of ecosystems and biodiversity, and there is no room for biomass production
- Σ: Earth and Life:** the global ecological system is at risk. We are all at risk!
- **Climate changes:** a) The Earth's history is not else than history of climate changes, b) the Homo sapiens seems to be one of the agents of the environmental change
 - **Geohazards (environmental catastrophes):** the increase of number of catastrophes is of anthropogenic origin
 - **Earth and Health:** a better co-operation between geologists and physicians would be required
 - **Megacities** are not sustainable
 - **Oceans:** the future is full of surprises (1. biology, 2. resources, 3. environmental risk)
 - **Deep Earth:** slow, permanent changes

Critical remarks addressed to climate fanatics and climate skeptics

Climate fanatics

They think the greenhouse-based global warming is the central environmental problem.

They declare the „green economy, based on alternative energies”.

Climate skeptics

They think that there is no (problem with) greenhouse-based global warming.

They declare the „traditional economy, based on fossil energies”

Assume that both climate fanatics and climate skeptics have the same objectives:
sustain (and enhance) the creative comforts of the humanity,
suggesting their own ways

Is it possible to continue without changing, as suggested by climate skeptics? No.

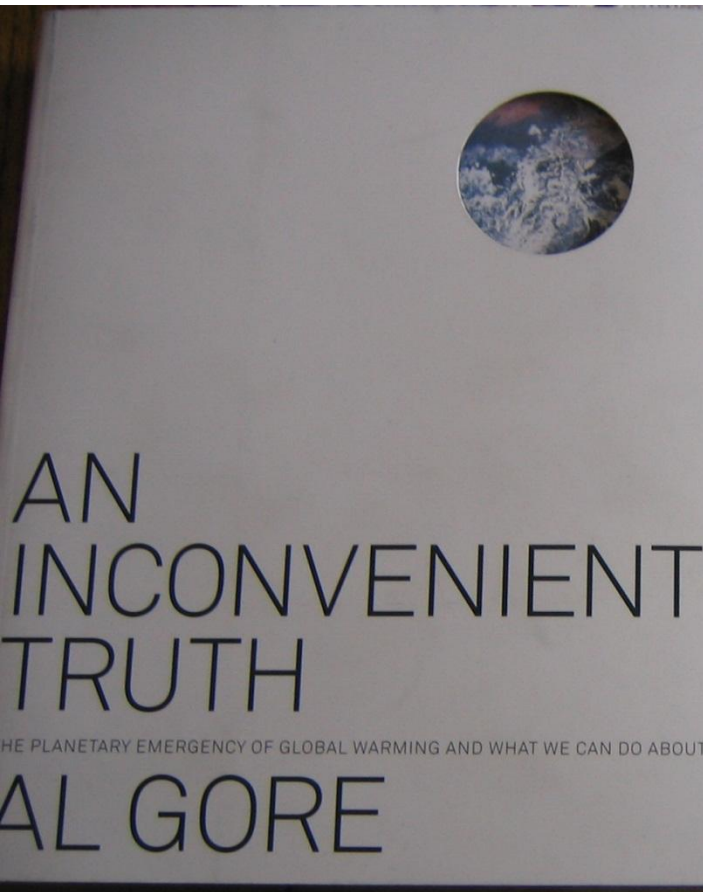
Is it possible to continue with the change suggested by climate fanatics? No.

Why it is impossible?

**Until we concentrate on the climate change issue,
we'll never find out what is the problem.**

Illustration

a typical climate fanatic



Both ones focuss on climate

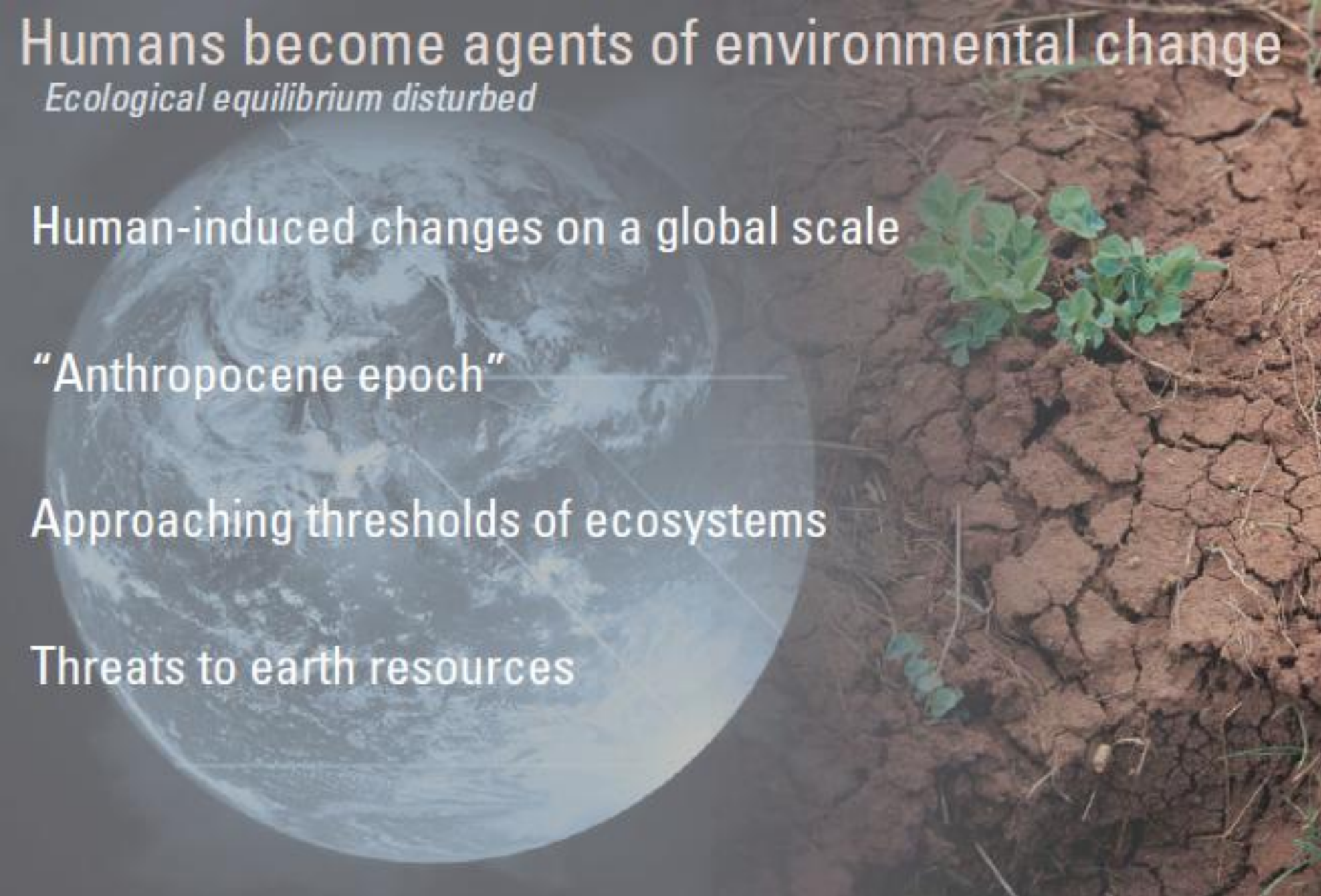


a typical climate skeptic



So far in the Anthropocene...

- Humans have already transformed 40-50% of the ice-free land surface on earth.
- Humans now use 54% of the available fresh water on the globe.
- Humans are now an order of magnitude more important at moving sediment than the sum of all other natural processes operating on the surface of the planet.



Humans become agents of environmental change

Ecological equilibrium disturbed

Human-induced changes on a global scale

“Anthropocene epoch”

Approaching thresholds of ecosystems

Threats to earth resources

Energy and Mineral Resources

Global competition

Growing population, expanding economies heighten demand

Environmental consequences of development, extraction, use

Living for the Future

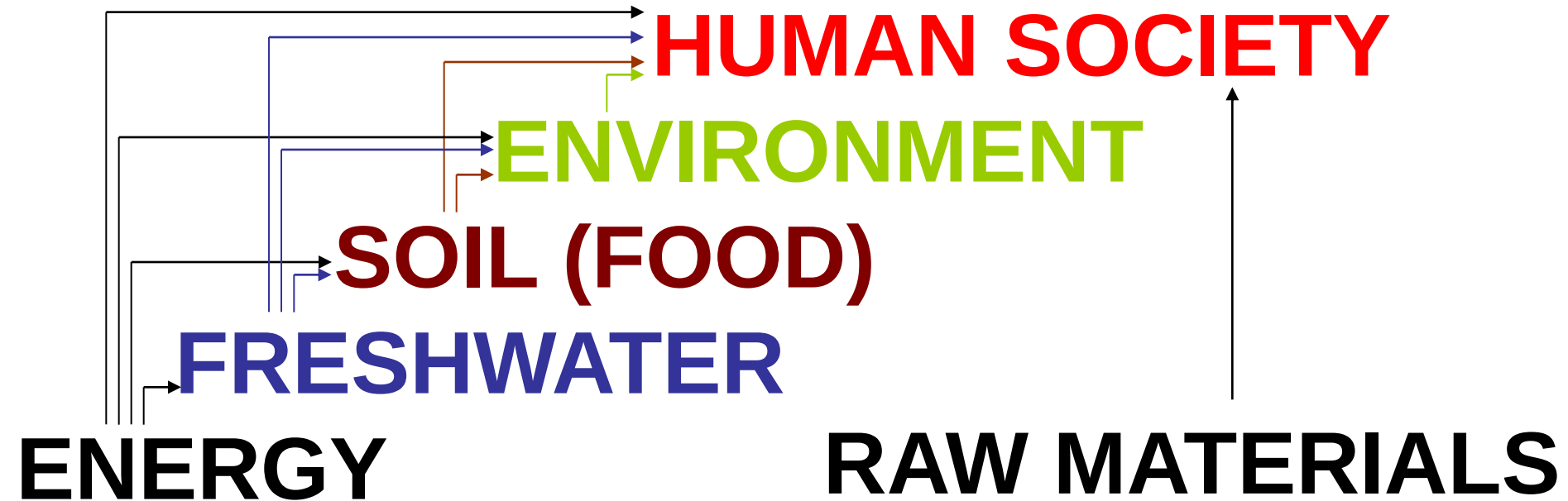
Systems approach helps reveal nature of earth systems

Climate change, population growth are difficult issues

We are all at risk

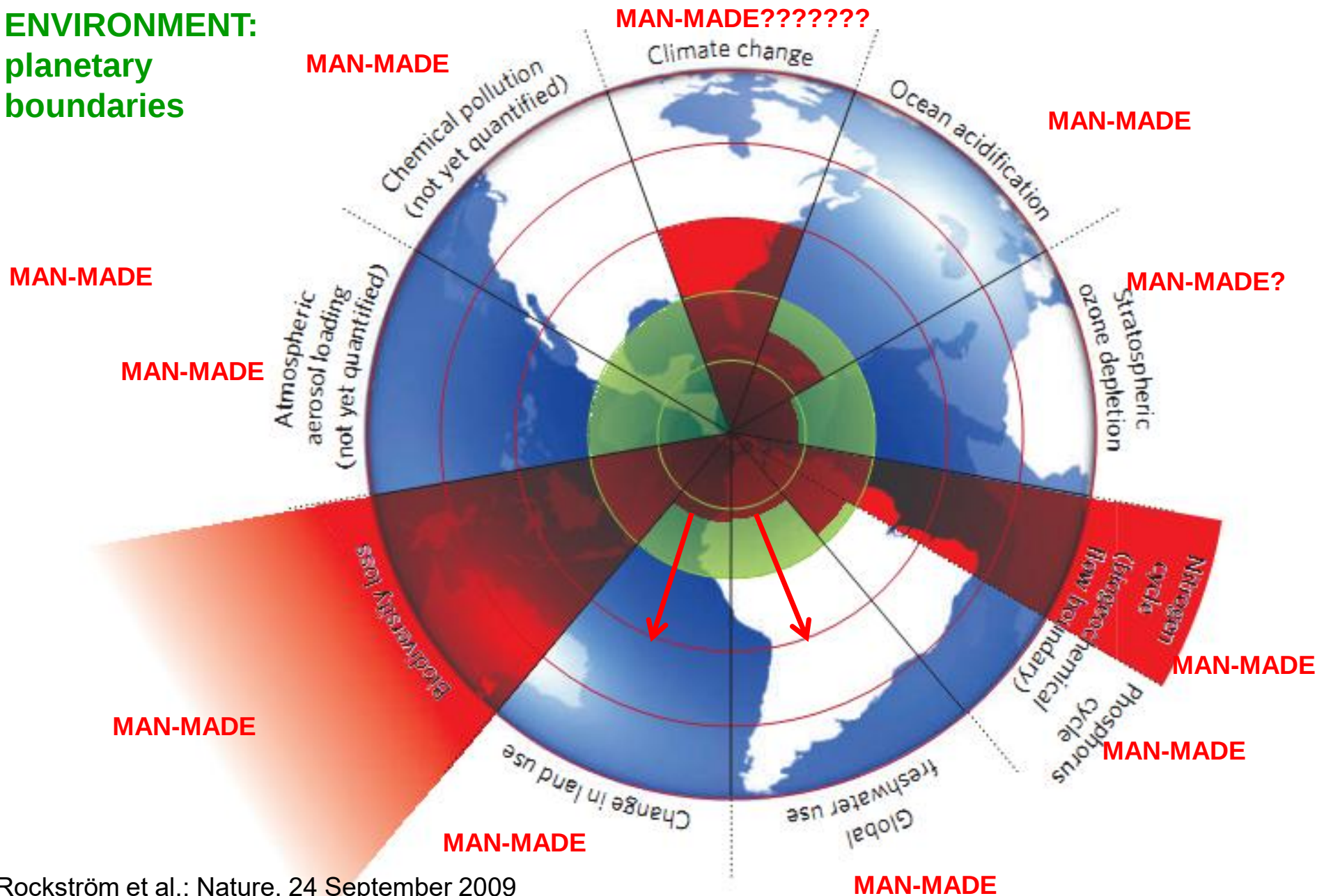
Many near-term decisions will influence the future health of the planet

ORDER OF IMPORTANCE



Smalley's classification (Dinya, 2010) is similar to the conclusions of those of the International Year of Planet Earth

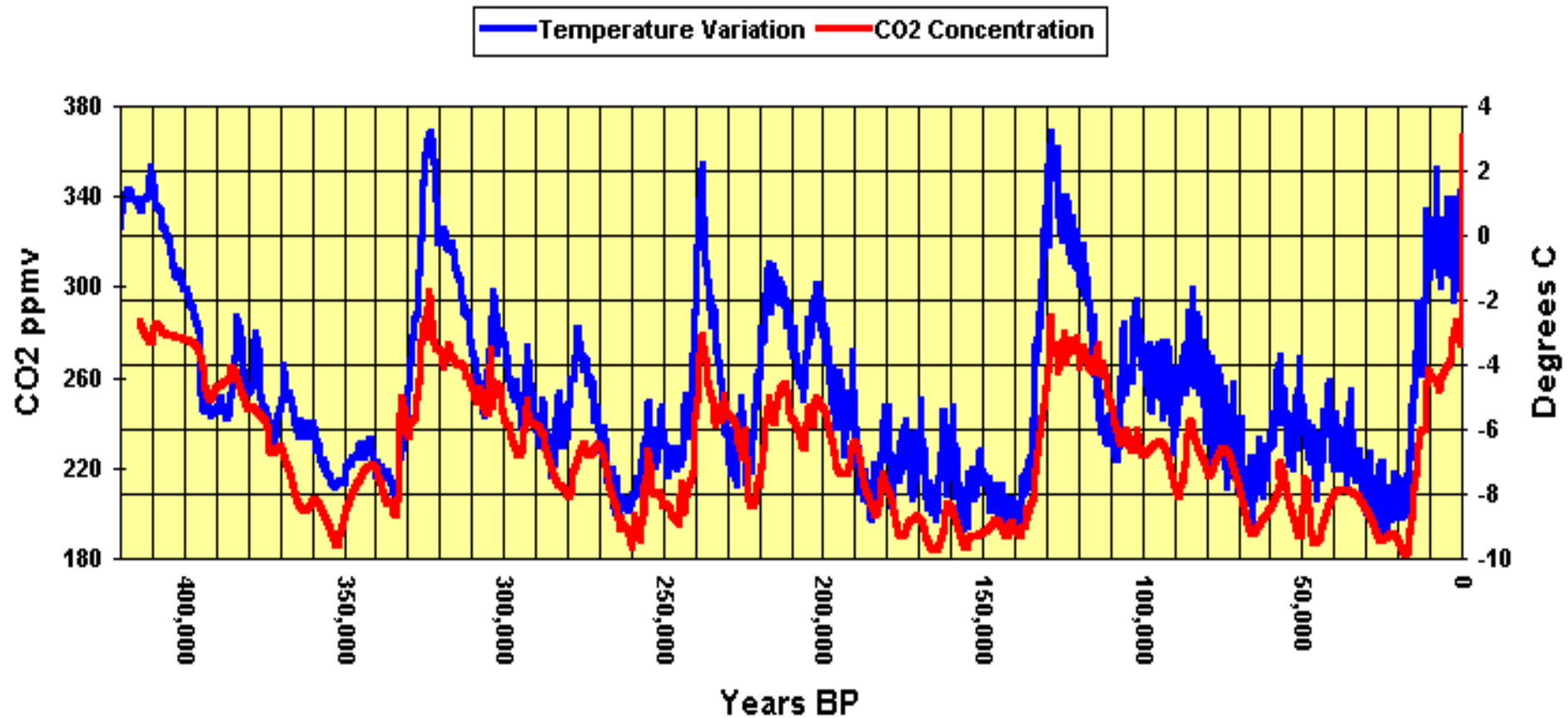
**ENVIRONMENT:
planetary
boundaries**



Rockström et al.: Nature, 24 September 2009

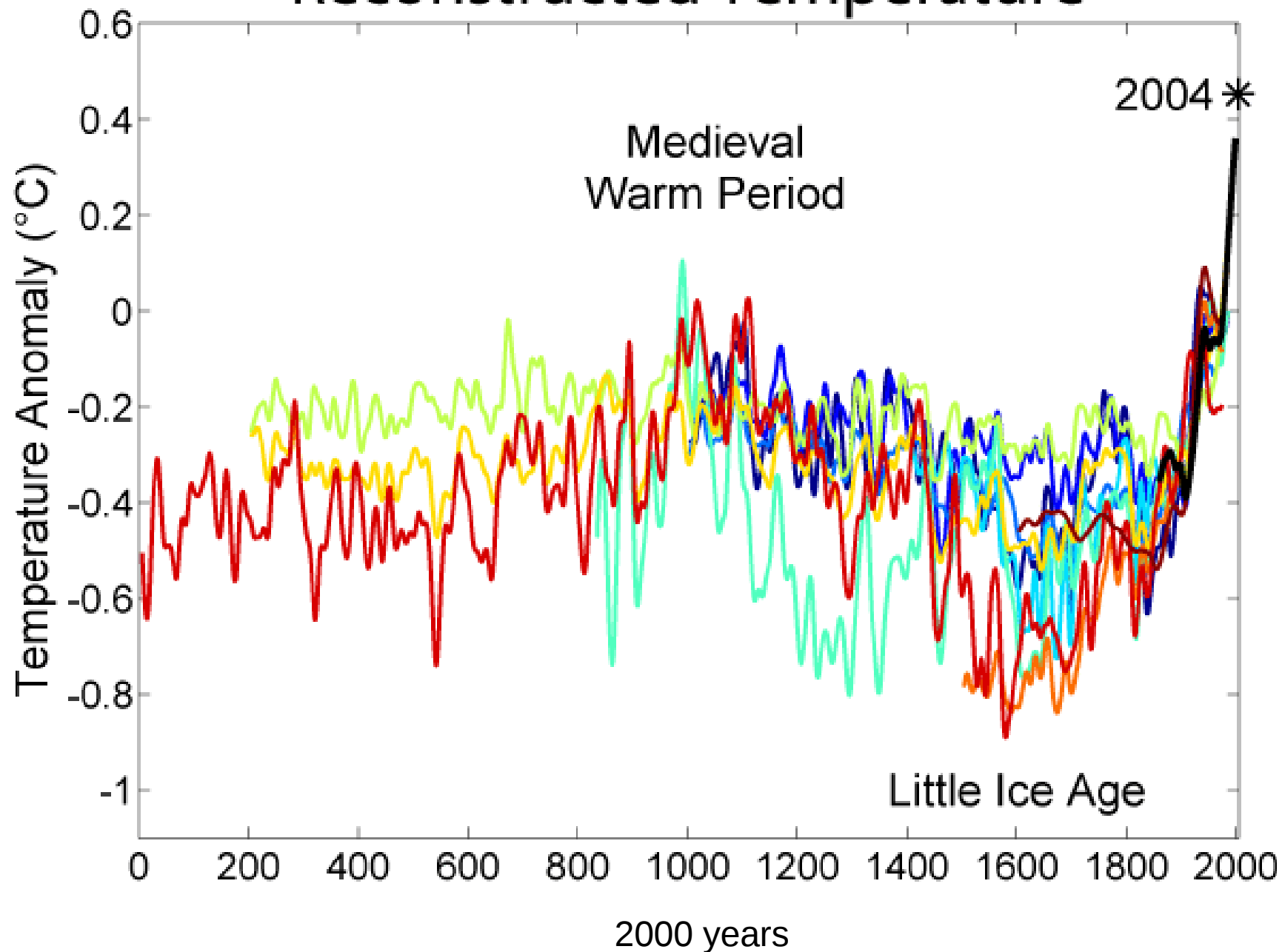
Critics: the diminishing Earth's resources (energy and matter) are missing

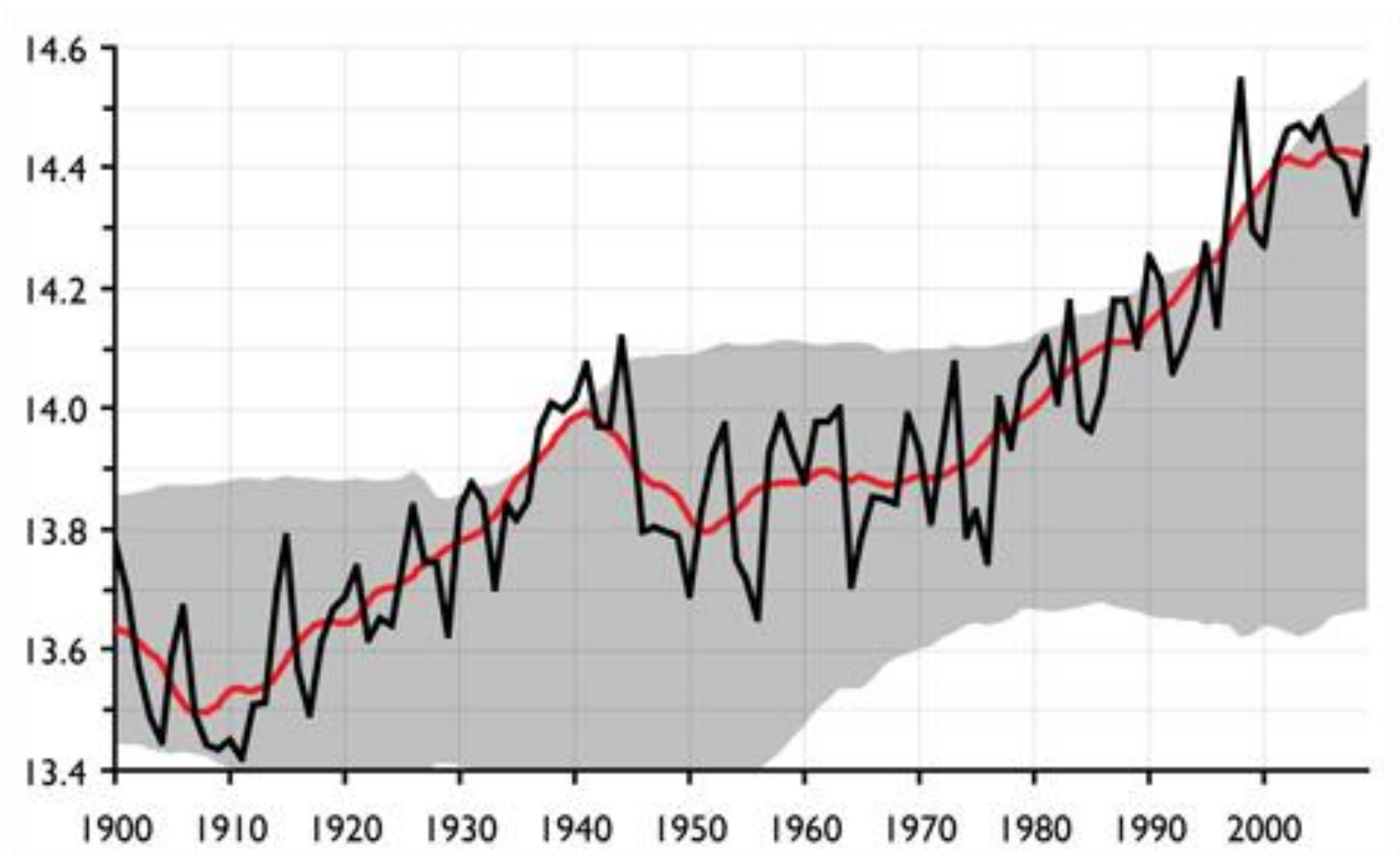
Antarctic Ice Core Data 1



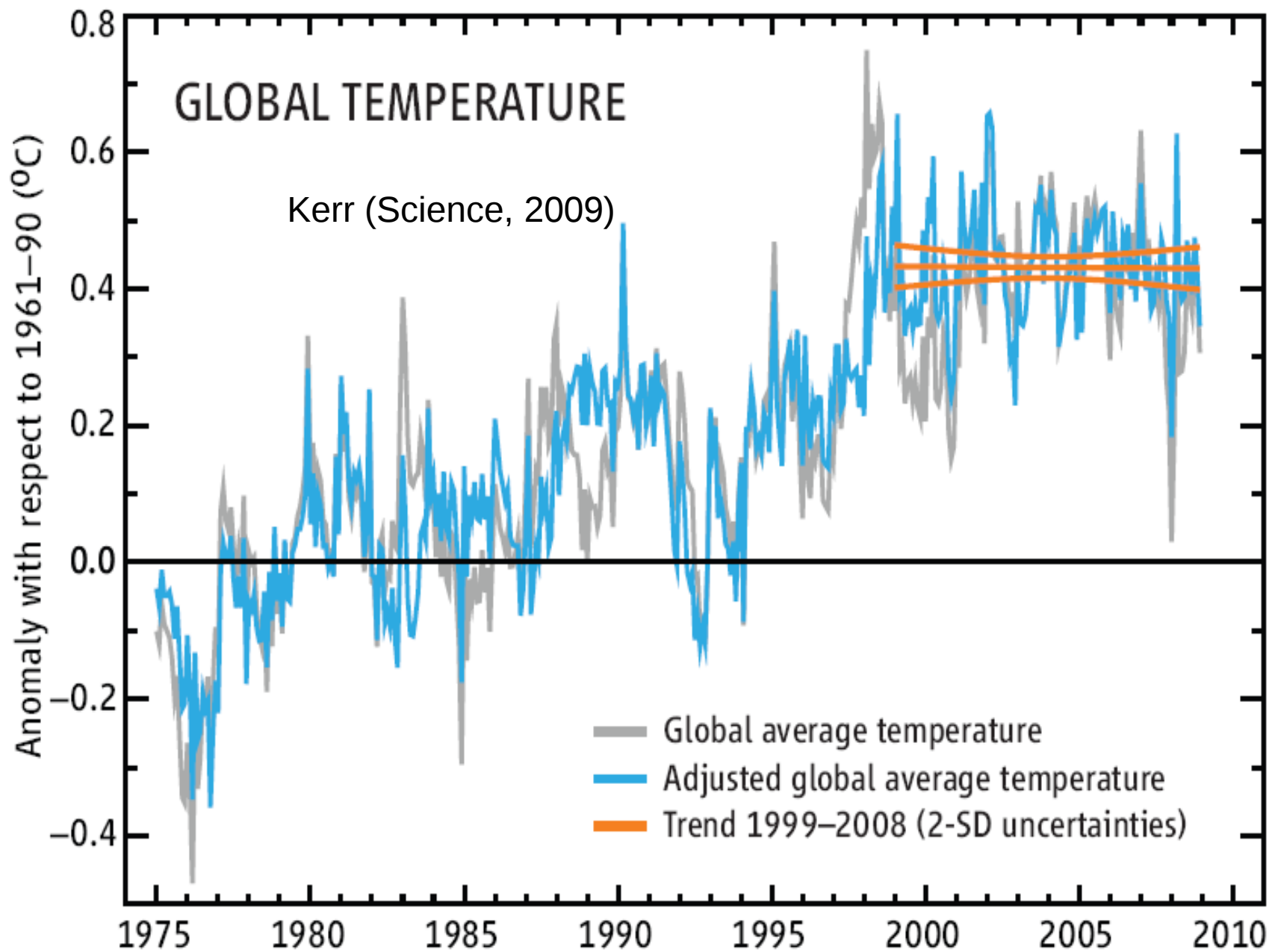
450 000 years

Reconstructed Temperature





110 years



35 years

Climate change related assumptions:

- future tendency
- causes

(There are only hypotheses, no proves!)

Proven facts:

- diminishing fossil energy,
- diminishing freshwater,
- diminishing soil,
- diminishing rare earth elements
- +
- biodiversity loss,
- Nitrogen cycle problems,
- pollutions,
- etc, etc.

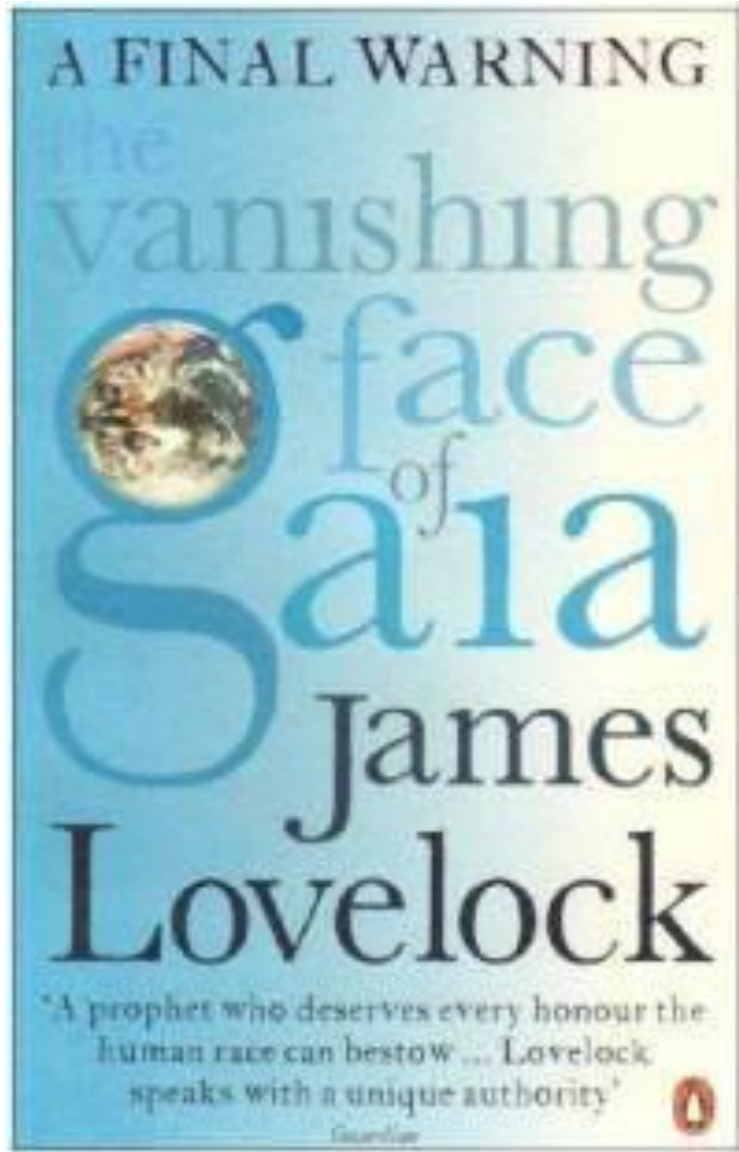
The economic growth will inevitably lead to a catastrophic situation and collapse, Independently of the actual climate tendency.



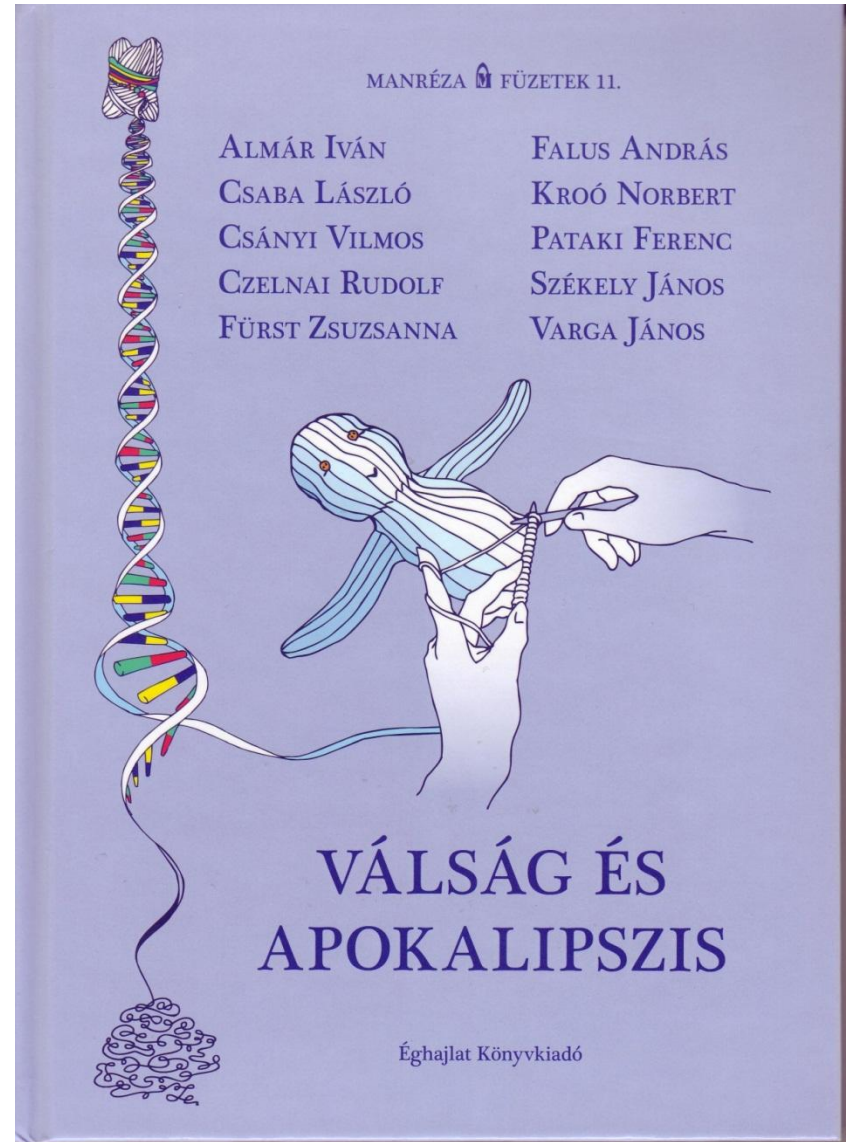
GLOBAL WARMING

(Energy + material) consumption = creature comfort + environmental degradation

To be read:



„The greatest problem is the
urban green ideology” (Lovelock, 2011)



„Manha de Carnaval” (Czelnai, 2012)
(The day after the Carnival)

"Anyone who believes exponential growth can go on forever in a *finite* world is either a madman or an *economist*."

Kenneth Building economist (1910-1993)



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•Policy Forum

ENVIRONMENT AND DEVELOPMENT

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Meeting fundamental human needs while preserving Earth's life support systems will require an accelerated transition toward sustainability. A new field of sustainability science is emerging that seeks to understand the fundamental character of interactions between nature and society and to encourage those interactions along more sustainable trajectories. Such an integrated, place-based science will require new research strategies and institutional innovations to enable them especially in developing countries still separated by deepening divides from mainstream science. Sustainability science needs to be widely discussed in the scientific community, reconnected to the political agenda for sustainable development, and become a major focus for research.