



Friday, 21 May 2010

Energy; Climate; Action: What Next in a World of Denial?



**Chris Rapley
Director Science Museum
Prof. Climate Science - UCL Earth Sciences
Visiting Prof. Imperial College
19th May 2010**

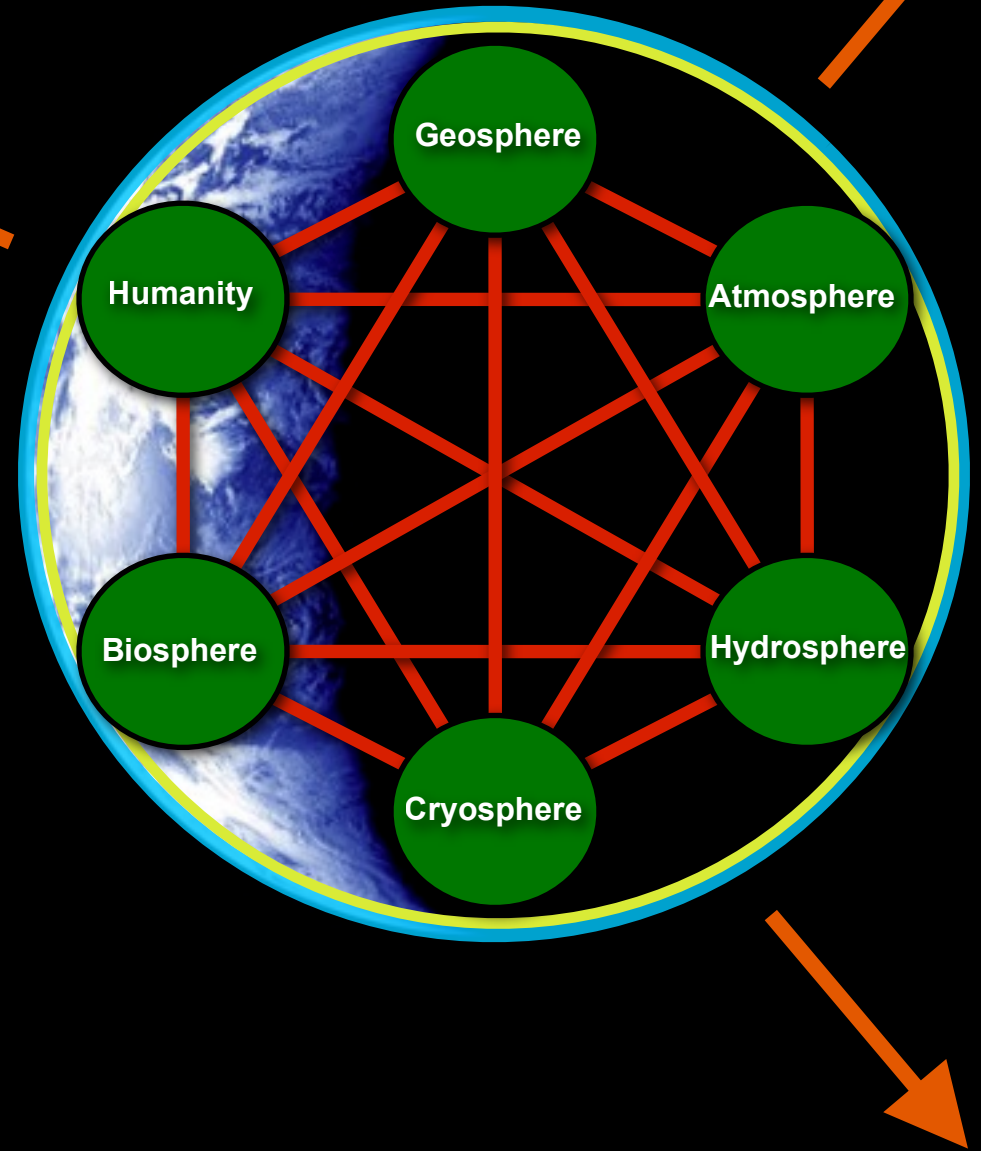
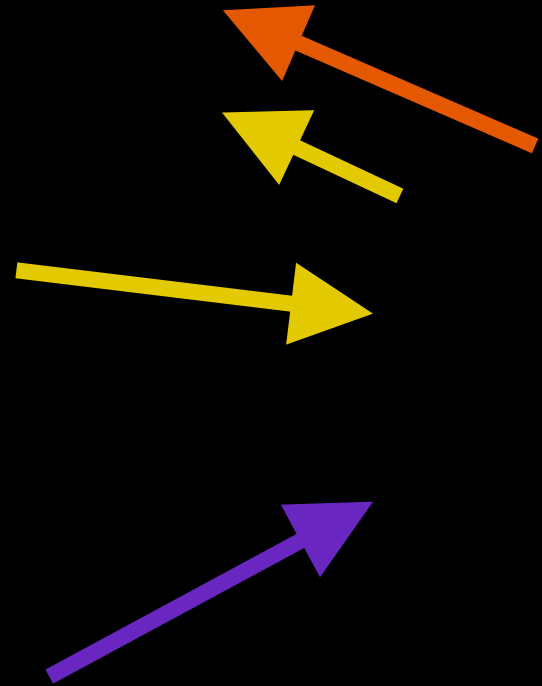


Friday, 21 May 2010

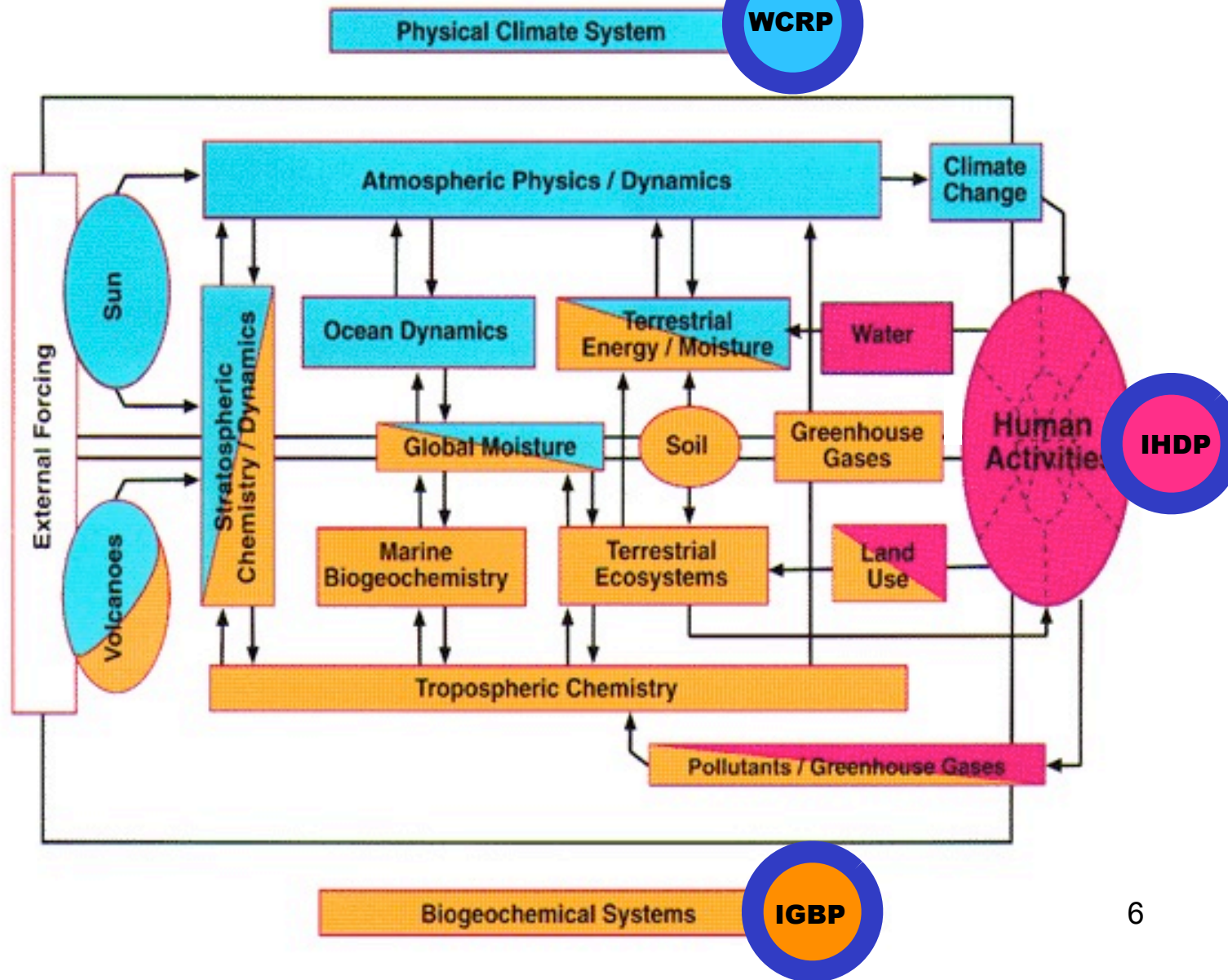
Earth System



Other
Astronomical



Bretherton Diagram



Earth System

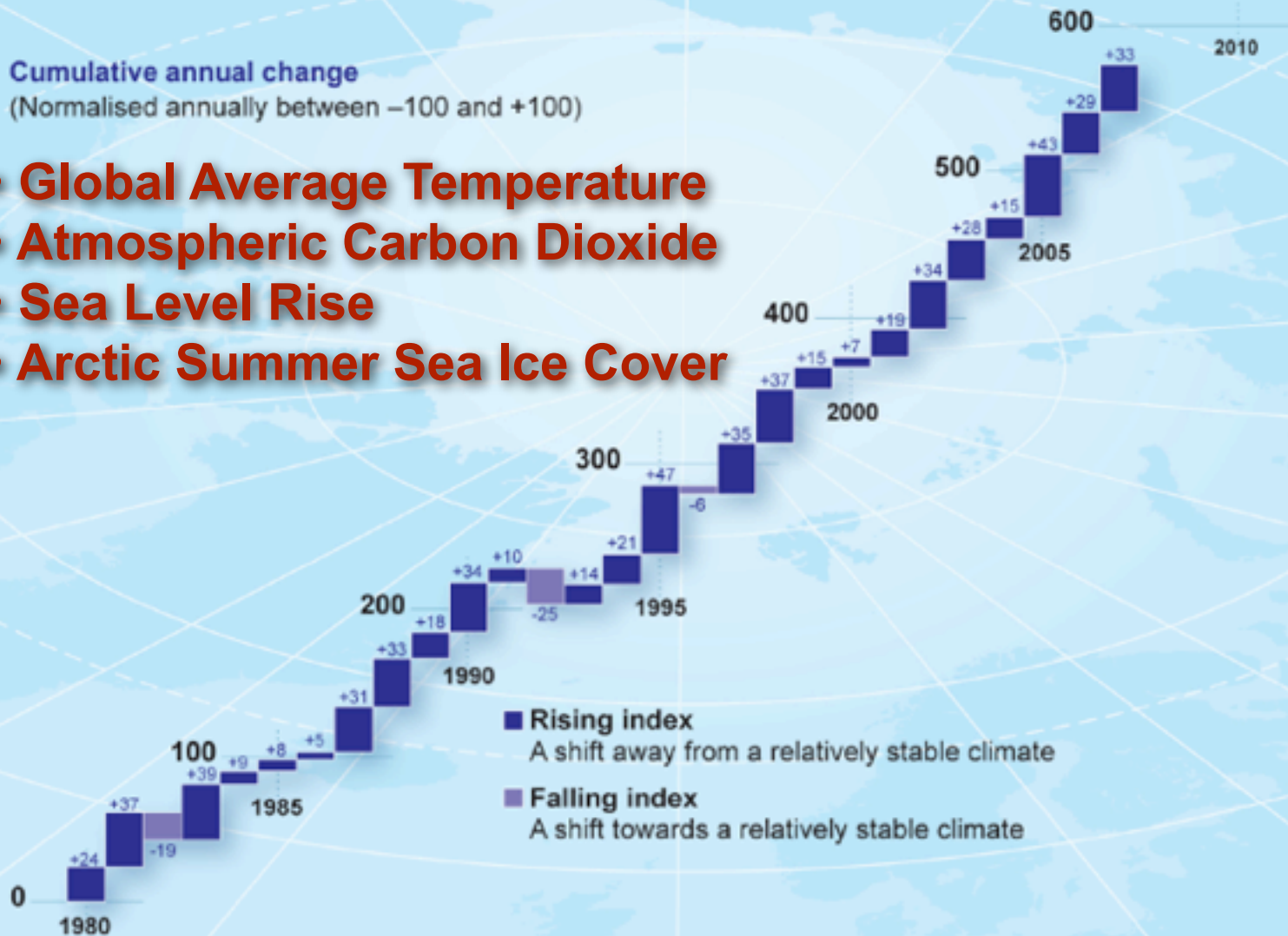
- **Most complex object in the Universe**
- **Challenge to Study & Understand**
- **No User's Manual**
- **Finite - No Spares!**
- **“Ecosystem Services” Essential for Life**
- **“Unhealthy State” - Driven by Humans**

IGBP CLIMATE-CHANGE INDEX

GLOBAL
IGBP International
Geosphere-Biosphere
Programme
CHANGE

Cumulative annual change
(Normalised annually between -100 and +100)

- Global Average Temperature
- Atmospheric Carbon Dioxide
- Sea Level Rise
- Arctic Summer Sea Ice Cover

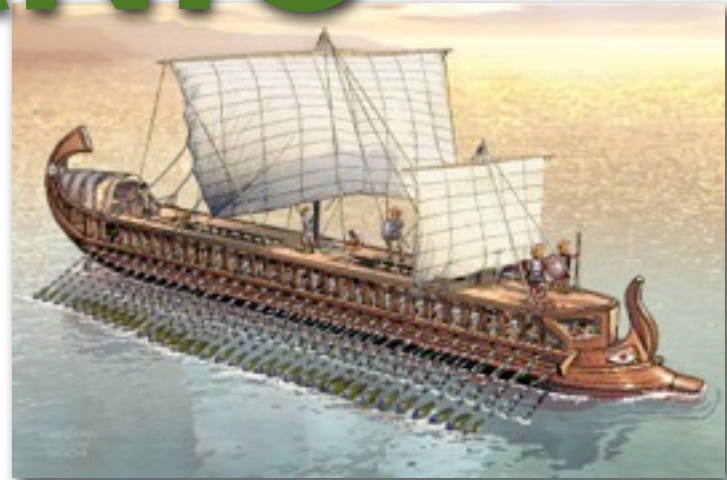


■ Rising index
A shift away from a relatively stable climate

■ Falling index
A shift towards a relatively stable climate



ORGANIC





FOSSIL

3,500 people for 1h



Energy Slaves



Recreation:



16 men. Includes energy for leisure activities plus production of goods and services.



Heating:

12.2 men. Self explanatory



Food:

11.4 men. Energy for cooking, eating and drinking, including food miles and production of raw materials



Household:

11.2 men. This includes non-heating energy consumed in the home by appliances, furnishings and from the construction of the building itself



Hygiene:

11 men. Includes energy for the NHS and from individuals bathing and washing



Clothing:

8.2 men. Energy for producing, transporting and cleaning clothes and shoes.

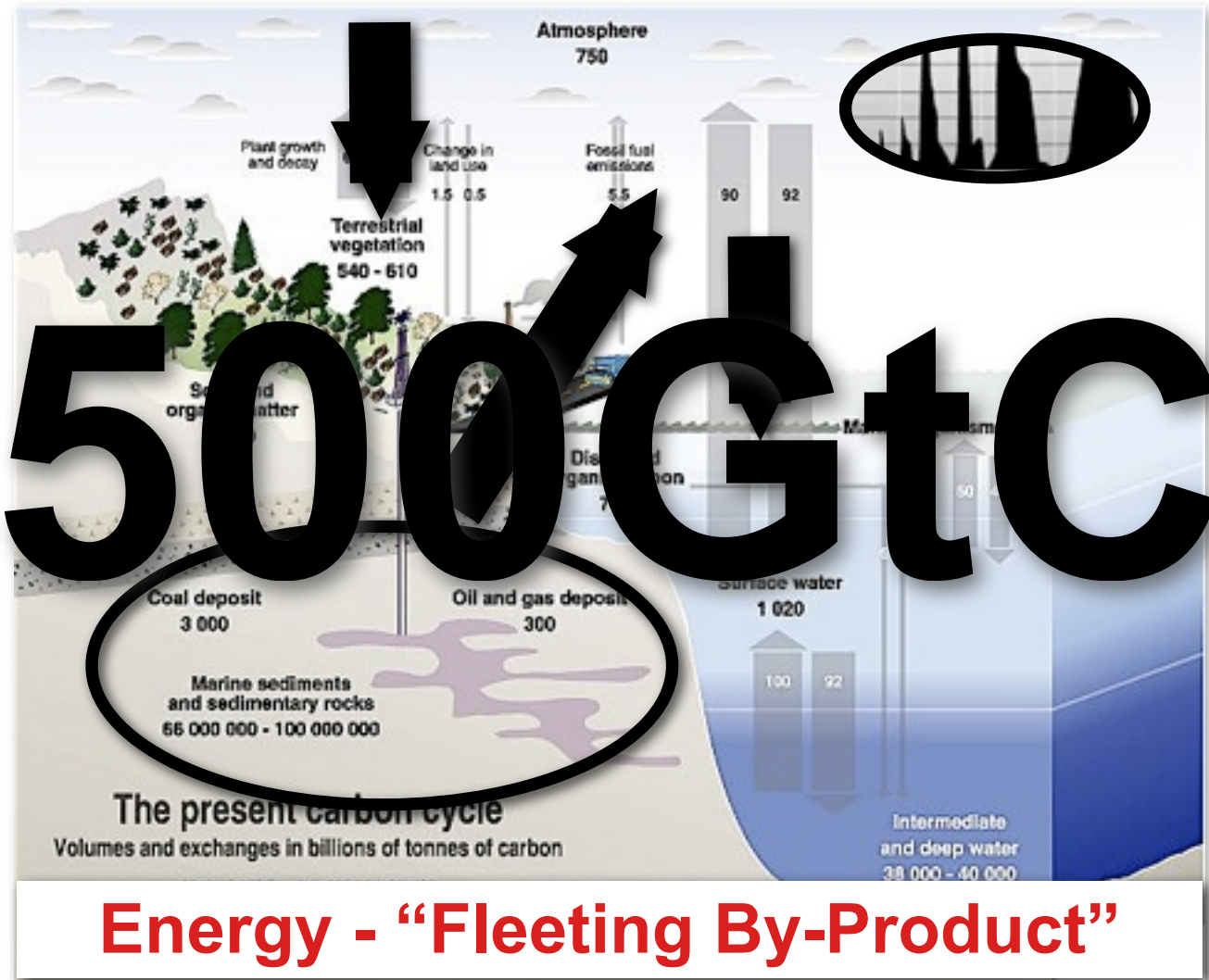
87

We are all carbon slaves!!



Impact of 8-day strike by petrol tanker drivers in Sep 2000 was to bring UK to a halt

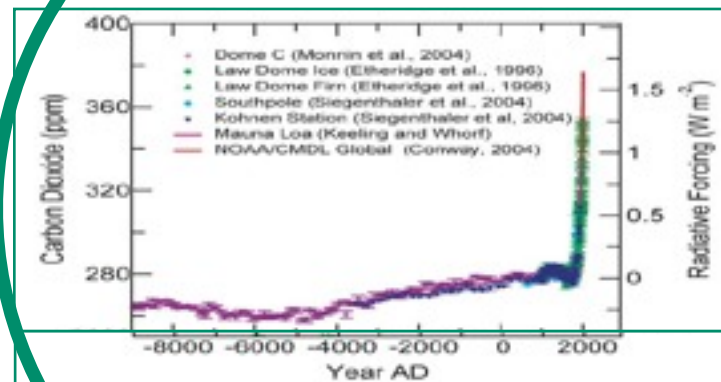
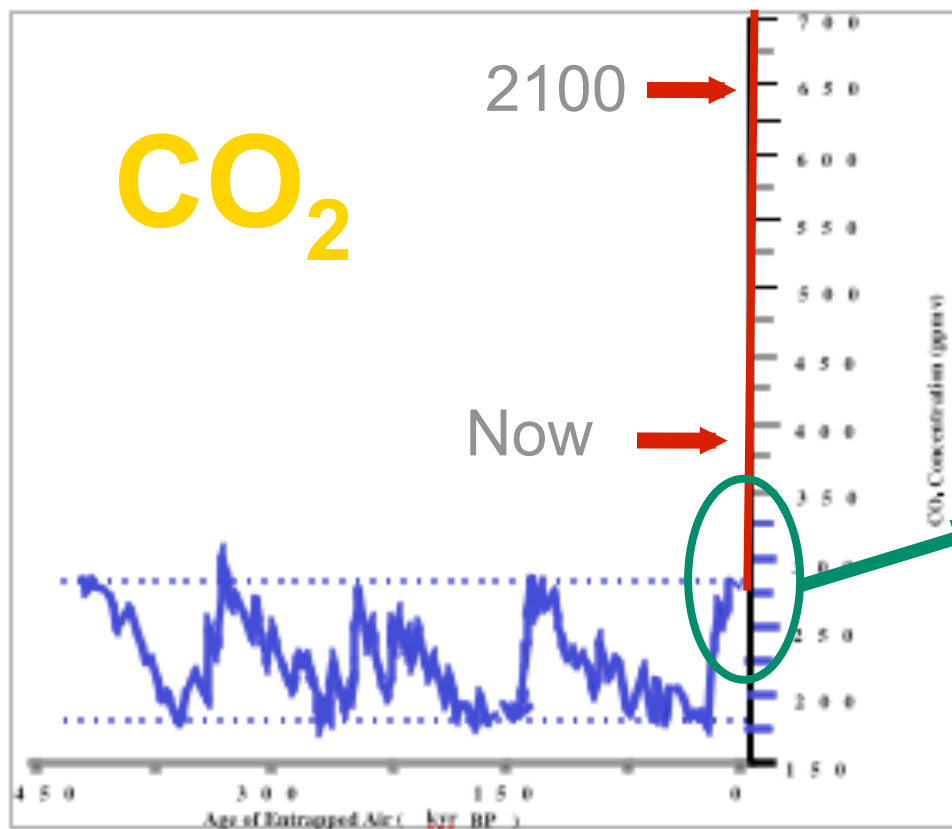
Carbon Reservoirs & Transfers



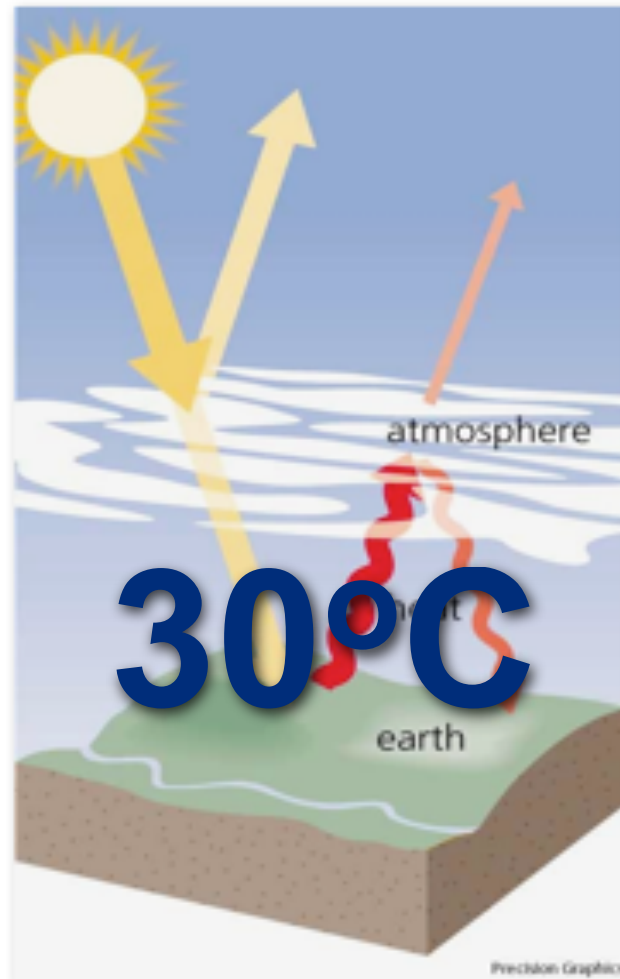
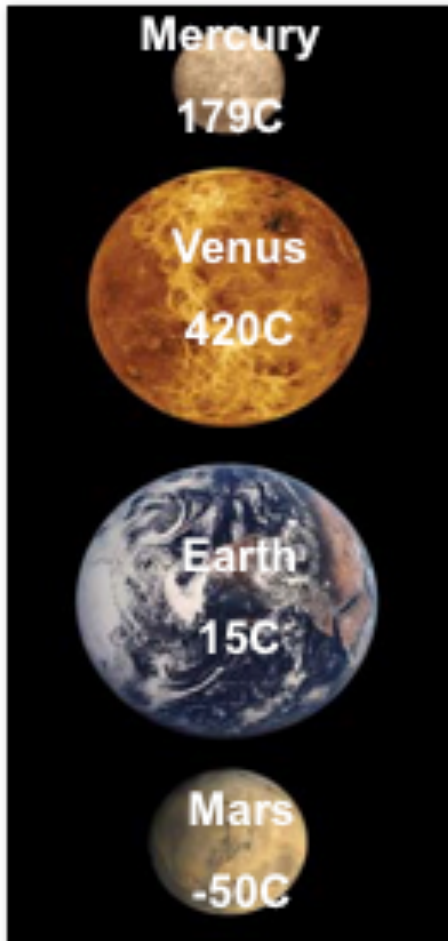


Friday, 21 May 2010

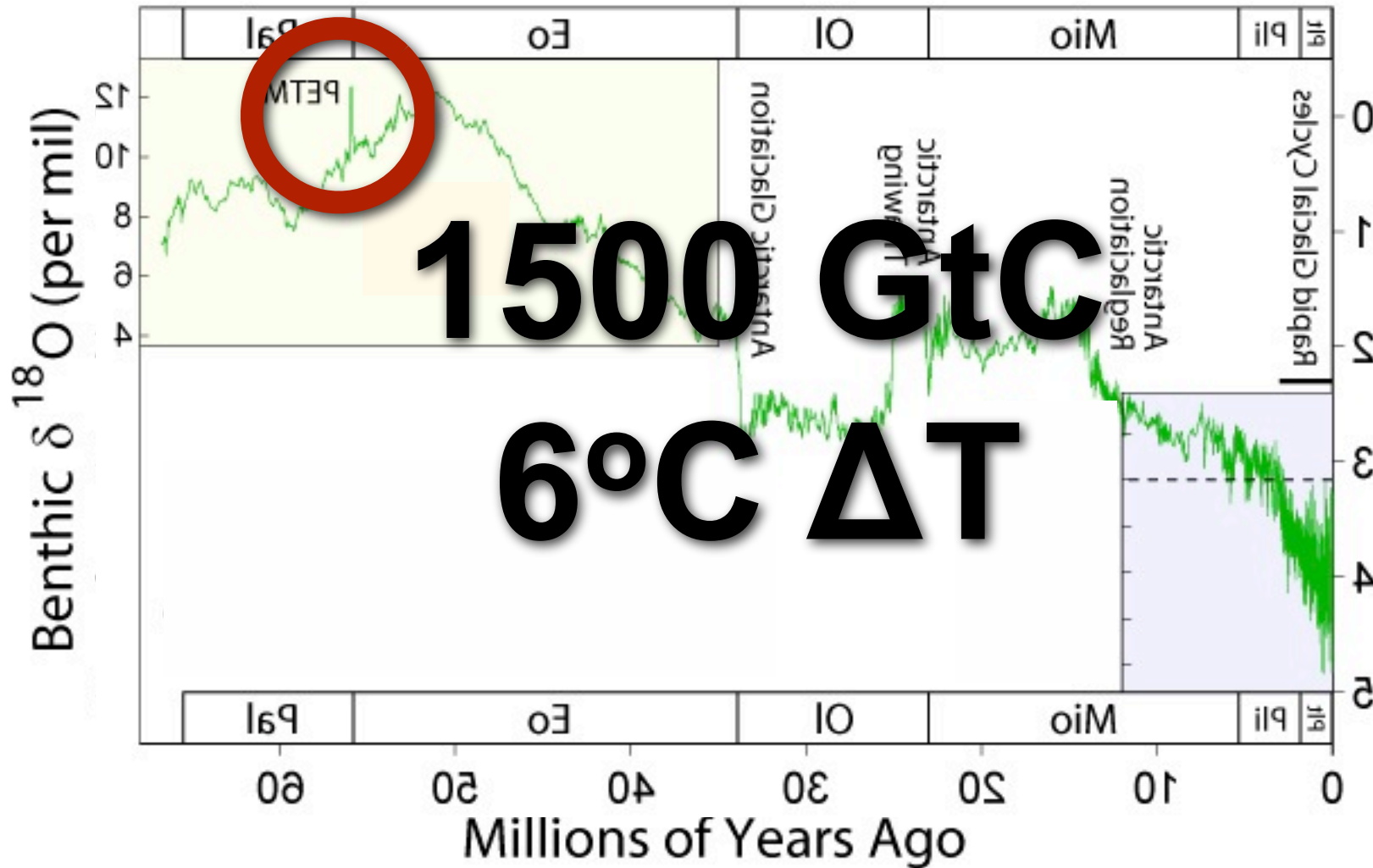
Transforming the Atmosphere



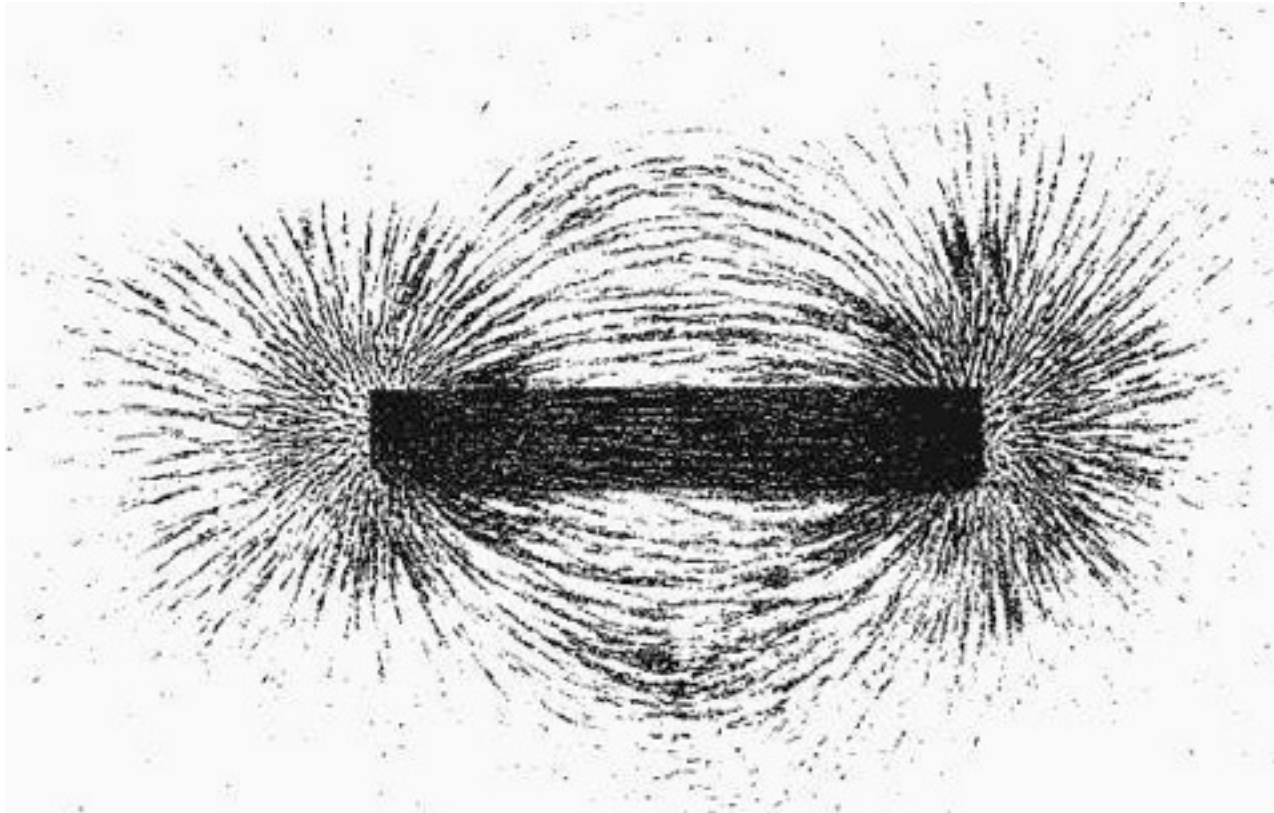
Greenhouse Effect



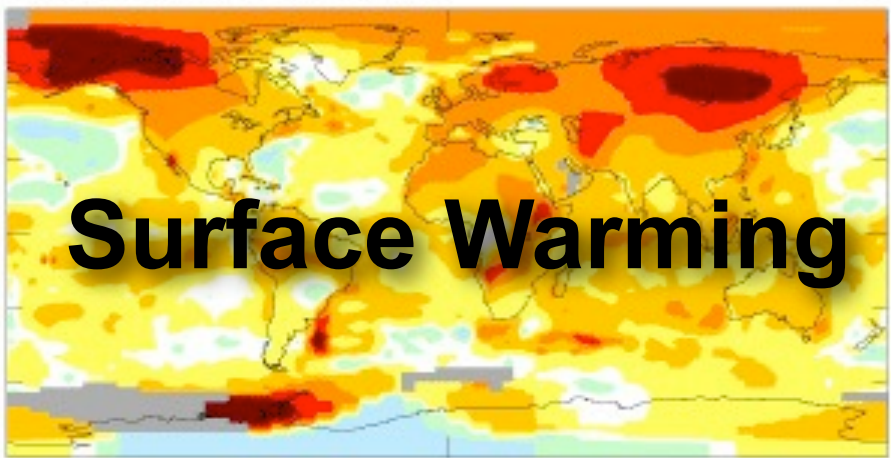
Paleocene-Eocene Thermal Maximum (PETM)



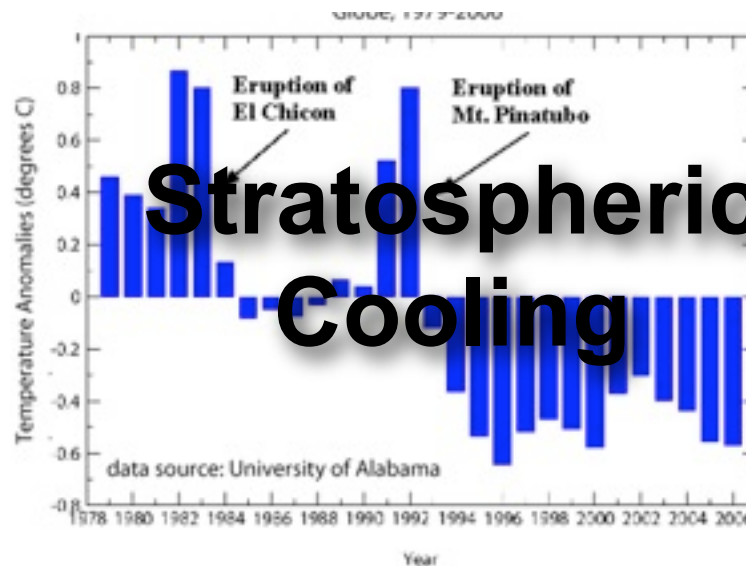
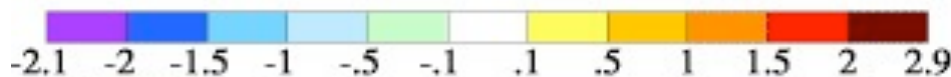
A Pattern of Behaviour



1955->2005 Annual Mean .59



Surface Warming



Stratospheric Cooling

Greenland Ice Mass

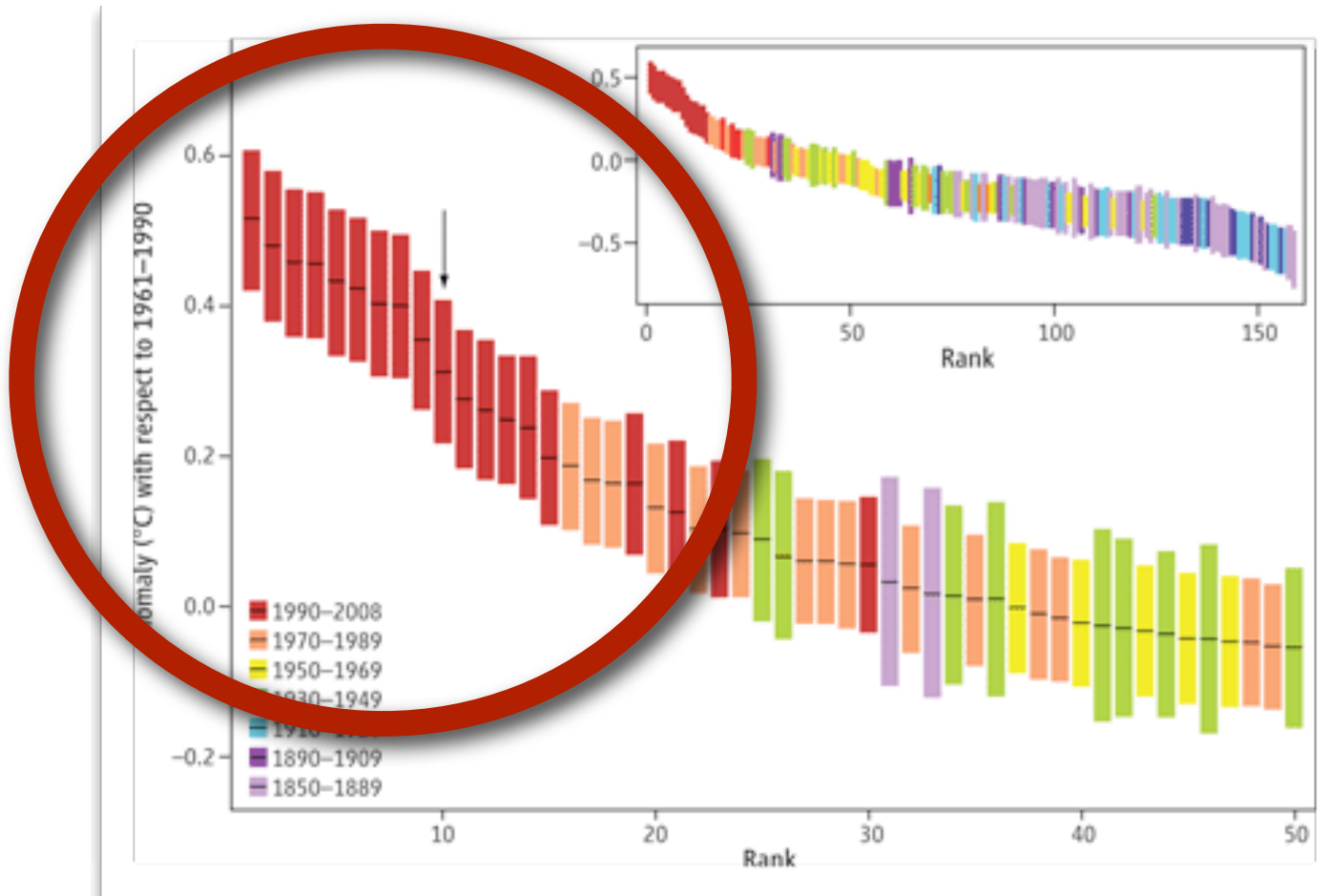


Ice Sheet Mass Loss

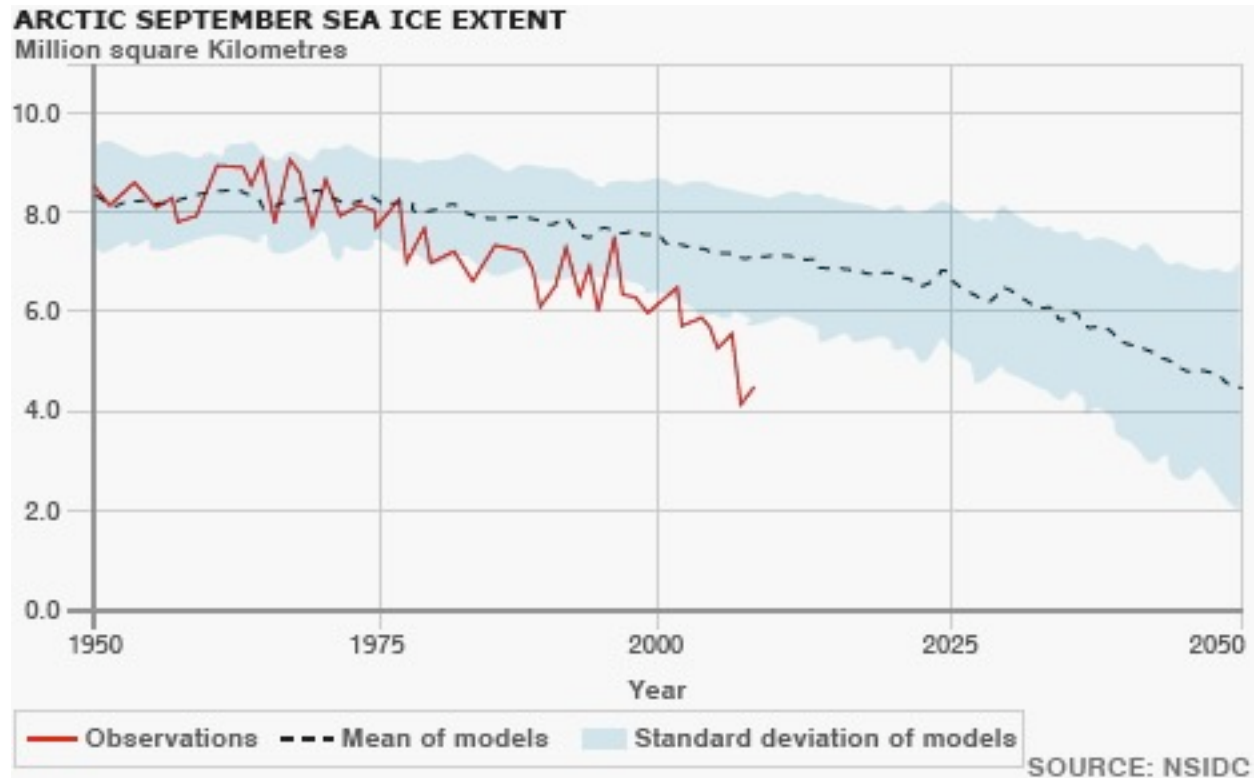
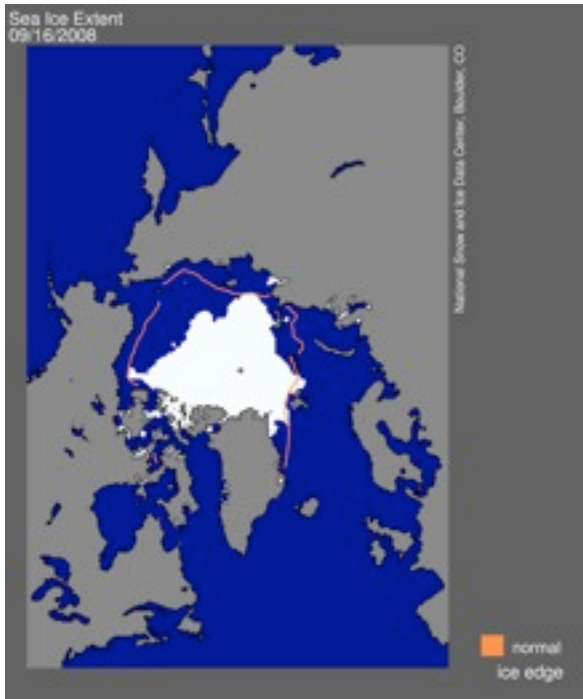
Changing Seasons & Ecosystem Shifts



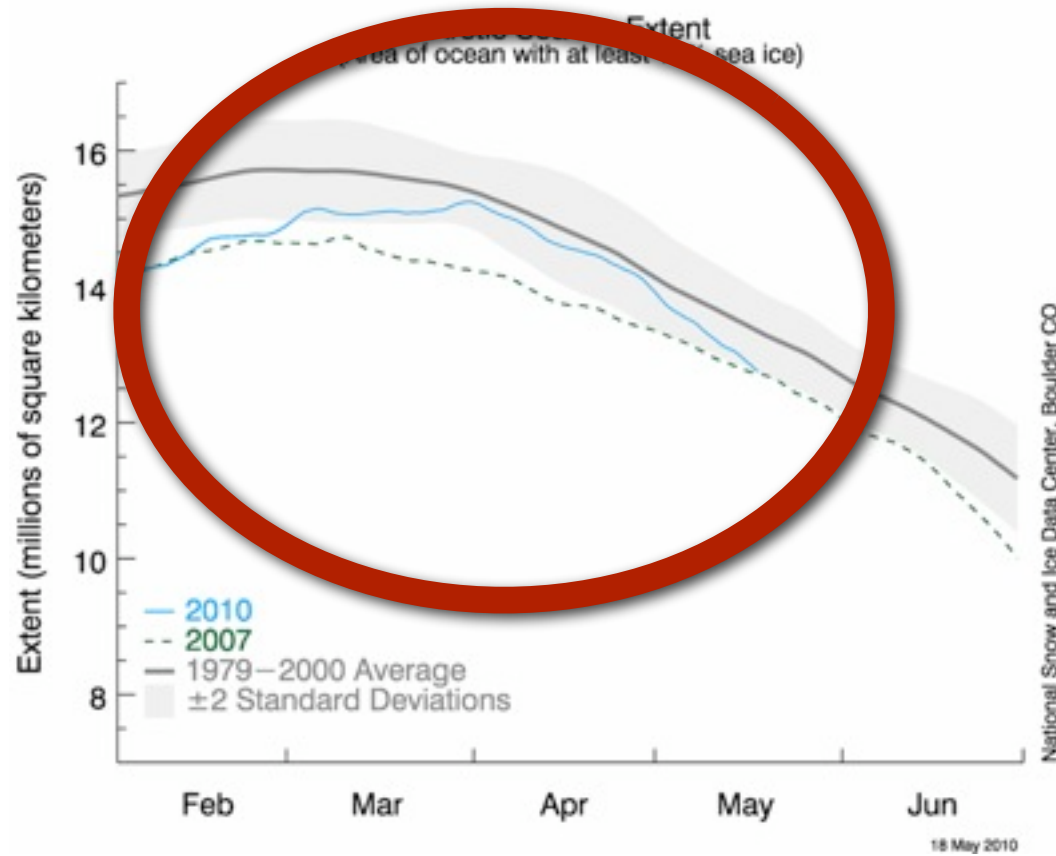
Ranking of Years by Temperature



Arctic Sea Ice Summer Minimum Extent

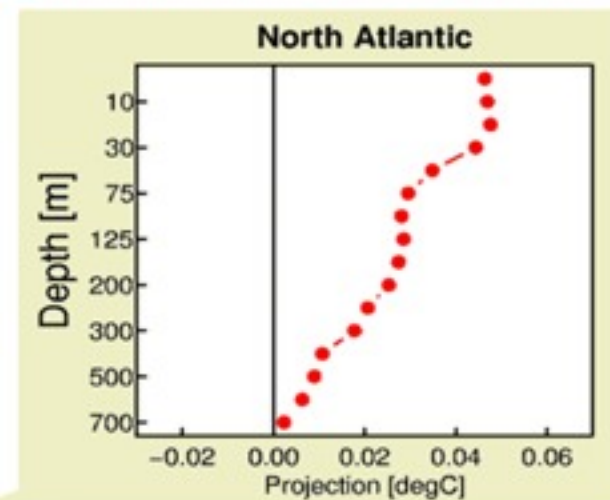
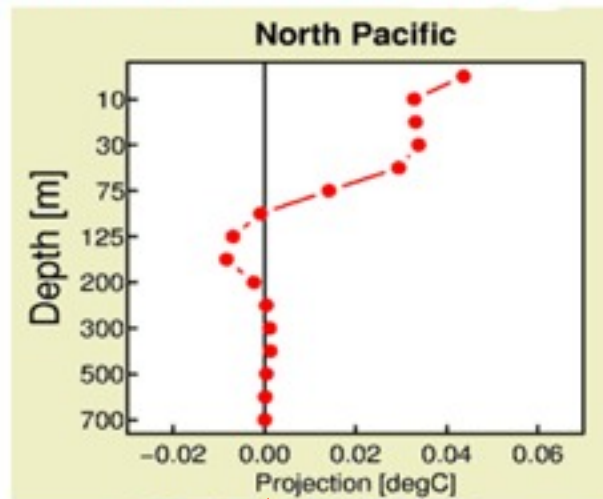
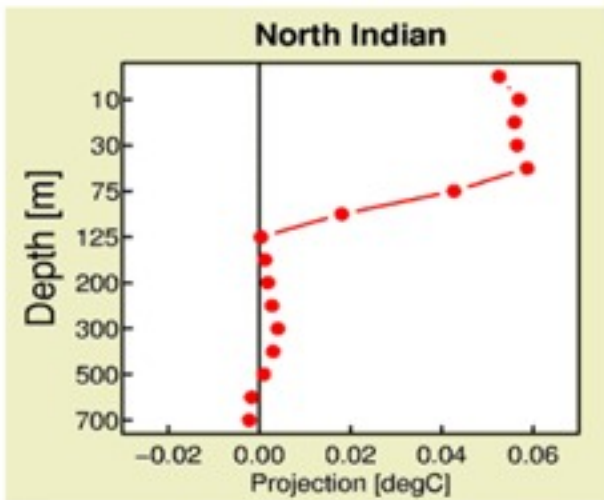


Current Status

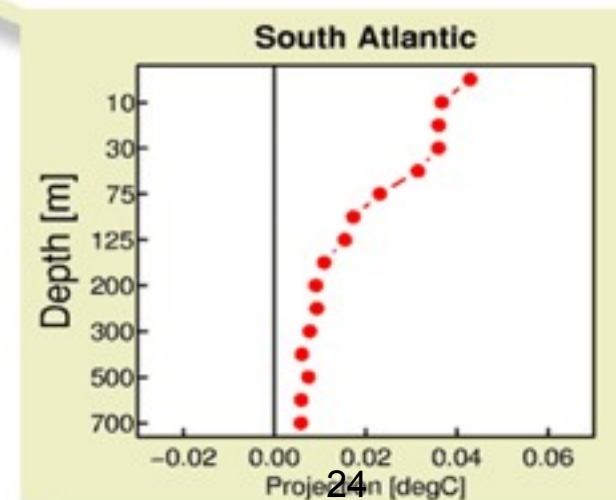
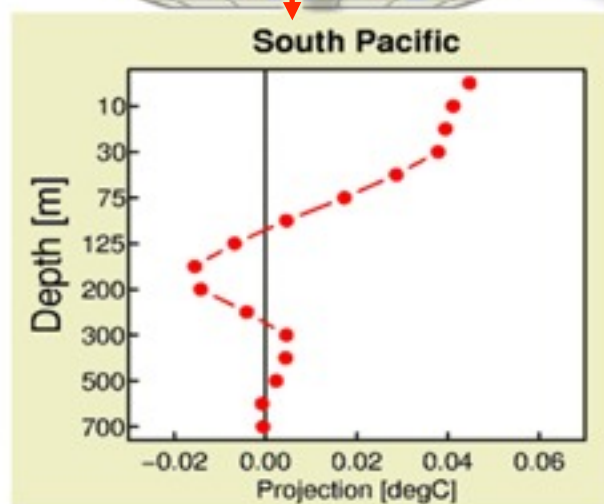
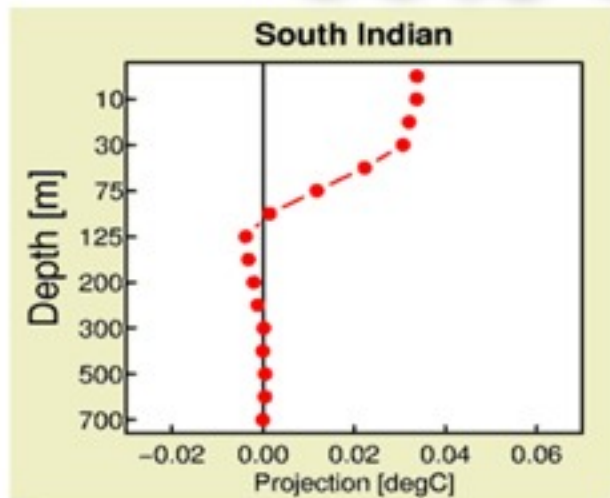
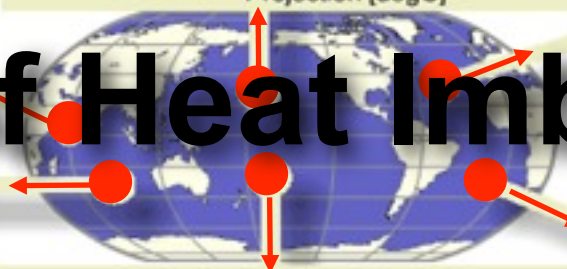


Penetration of Ocean Warming Signal (1955–1999)

Red = Millions of observations from the World's Oceans over 40 years and down to 700 meters.

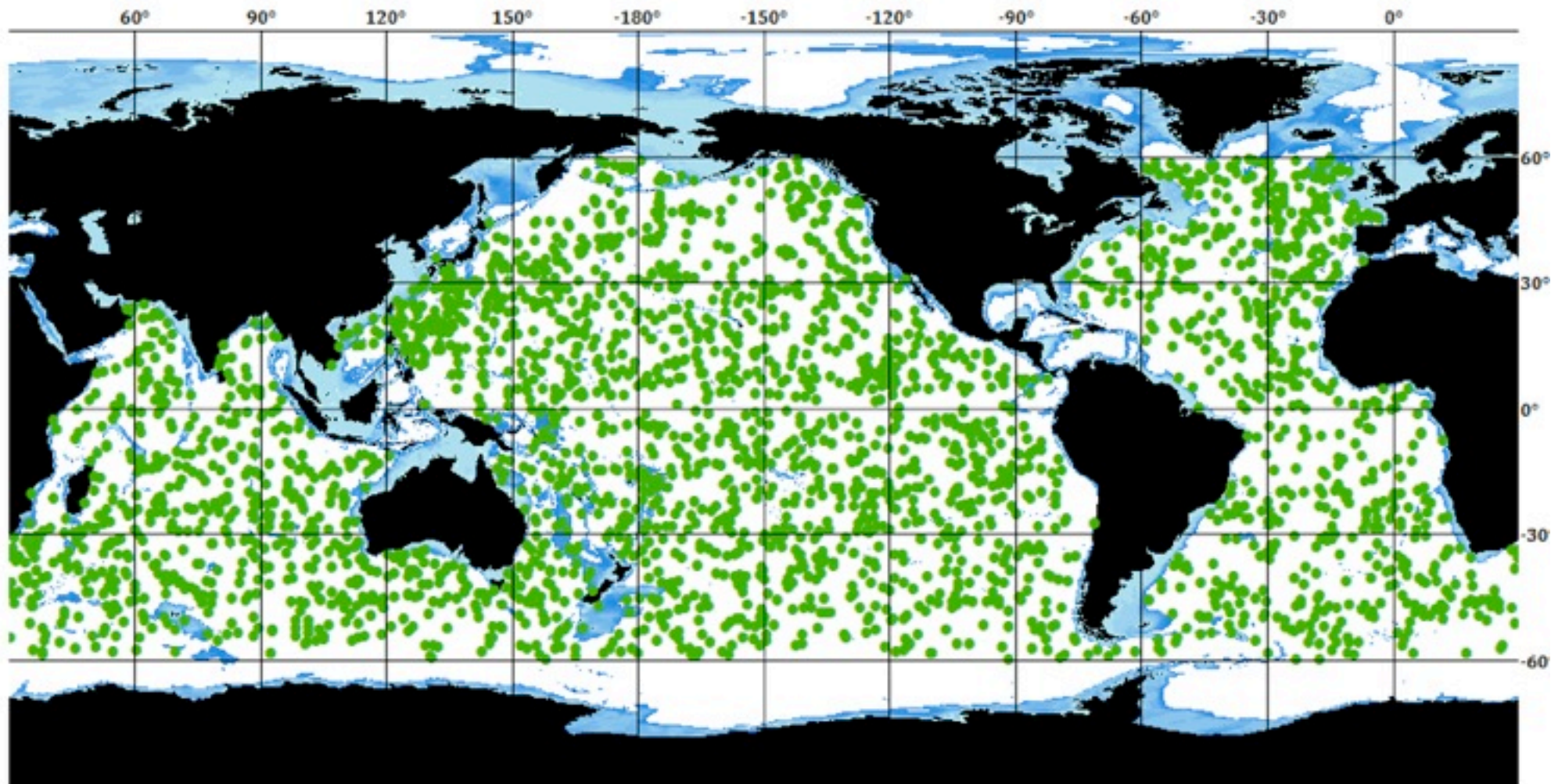


90% of Heat Imbalance





© Ifremer - 2009 - Mamaca/Dugornay



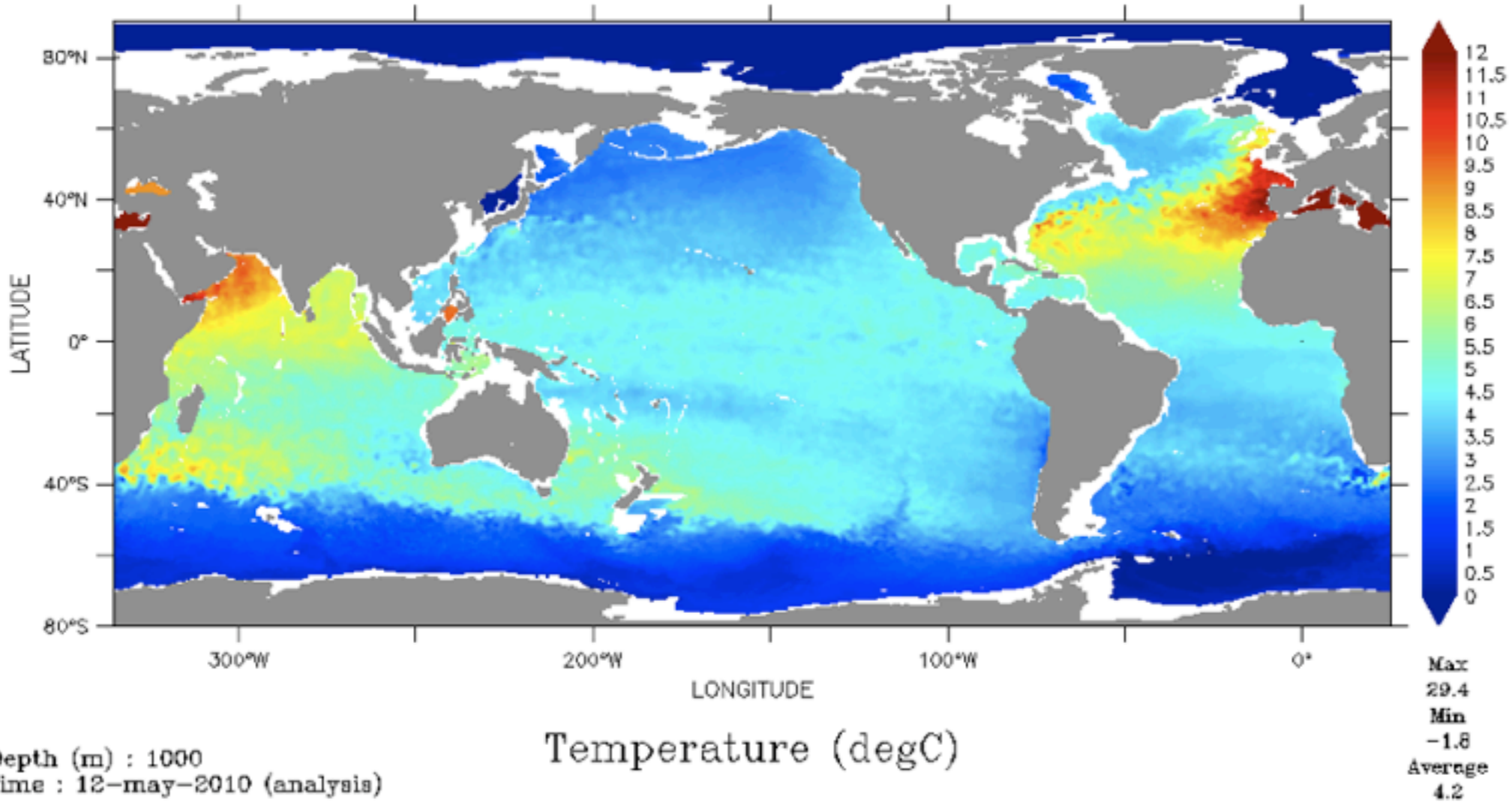
Argo Core Mission
2796 Operational Floats

60°N - 60°S, no marginal sea, data available, no greylist

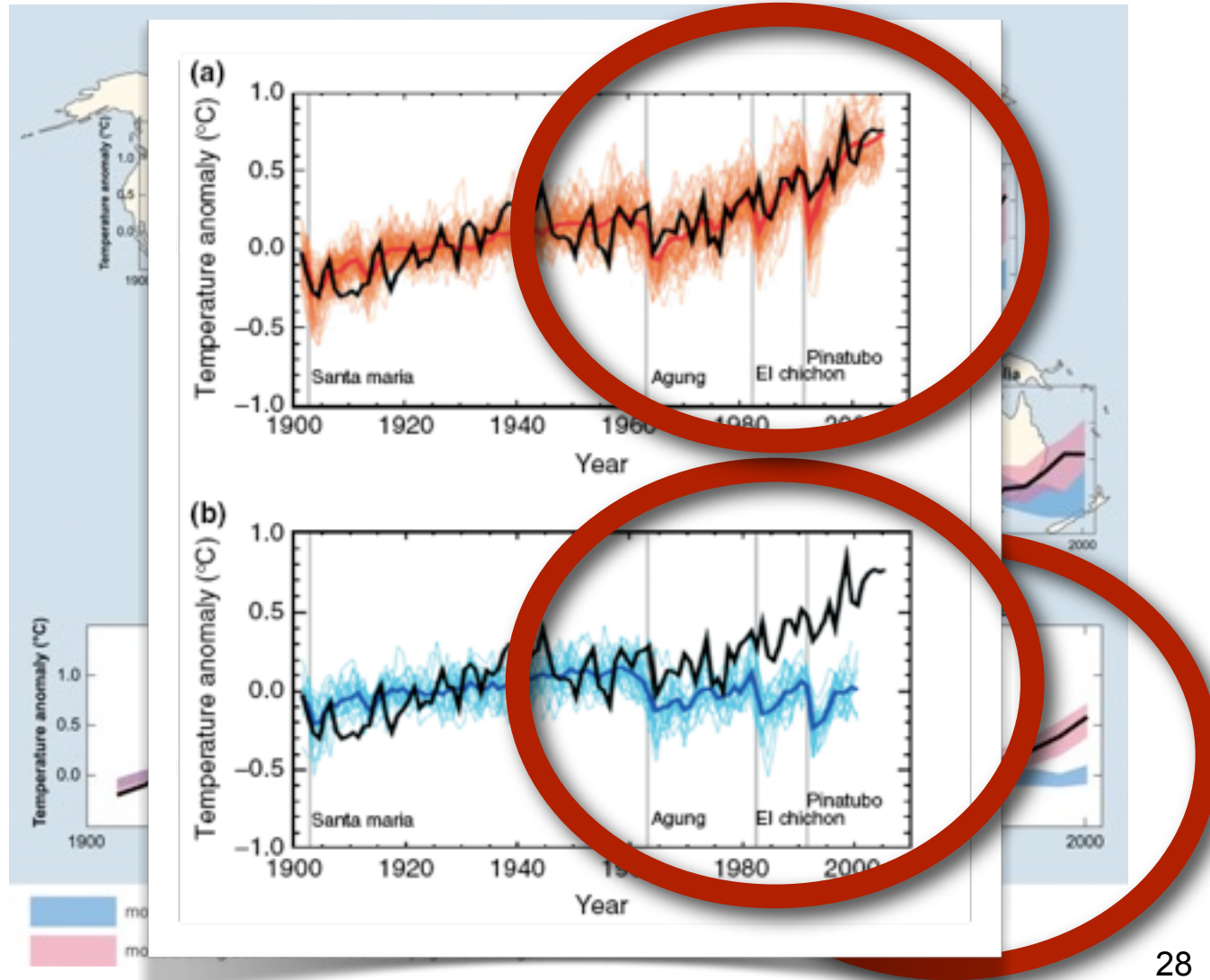
February 2010

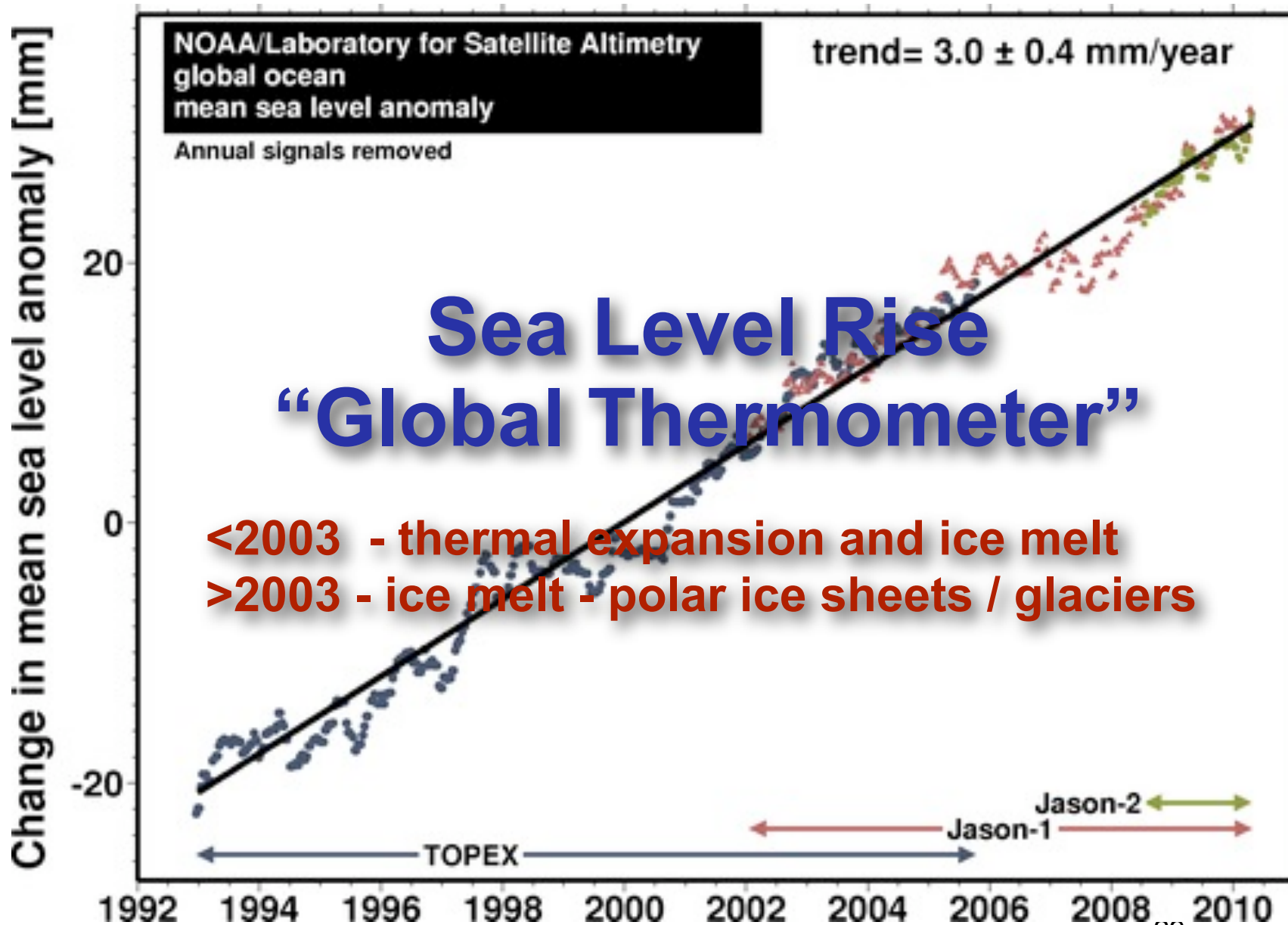


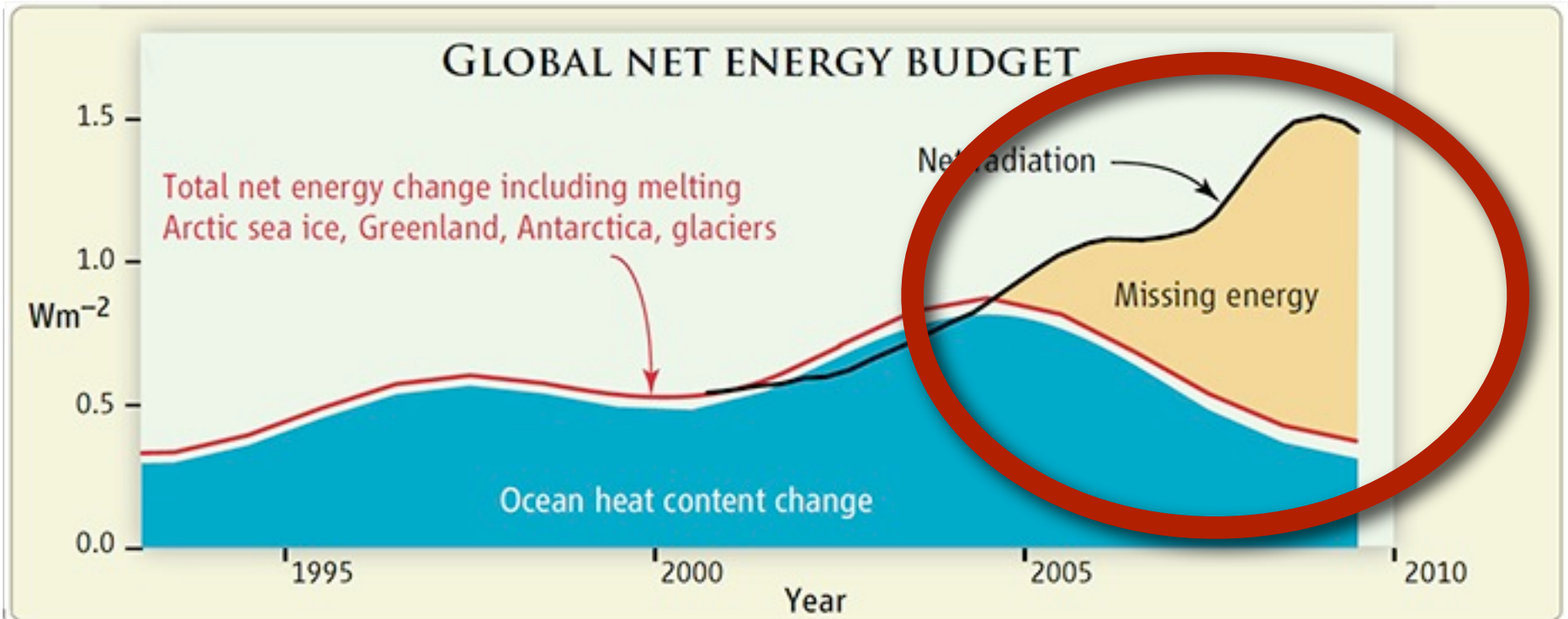
Mercator_Ocean_PSY3V2 1/4 deg
Global



Attribution







mysteries still to solve

IPCC Fourth Assessment Report Climate Change 2007

Climate Warming Unequivocal

Climate forcing primarily Human

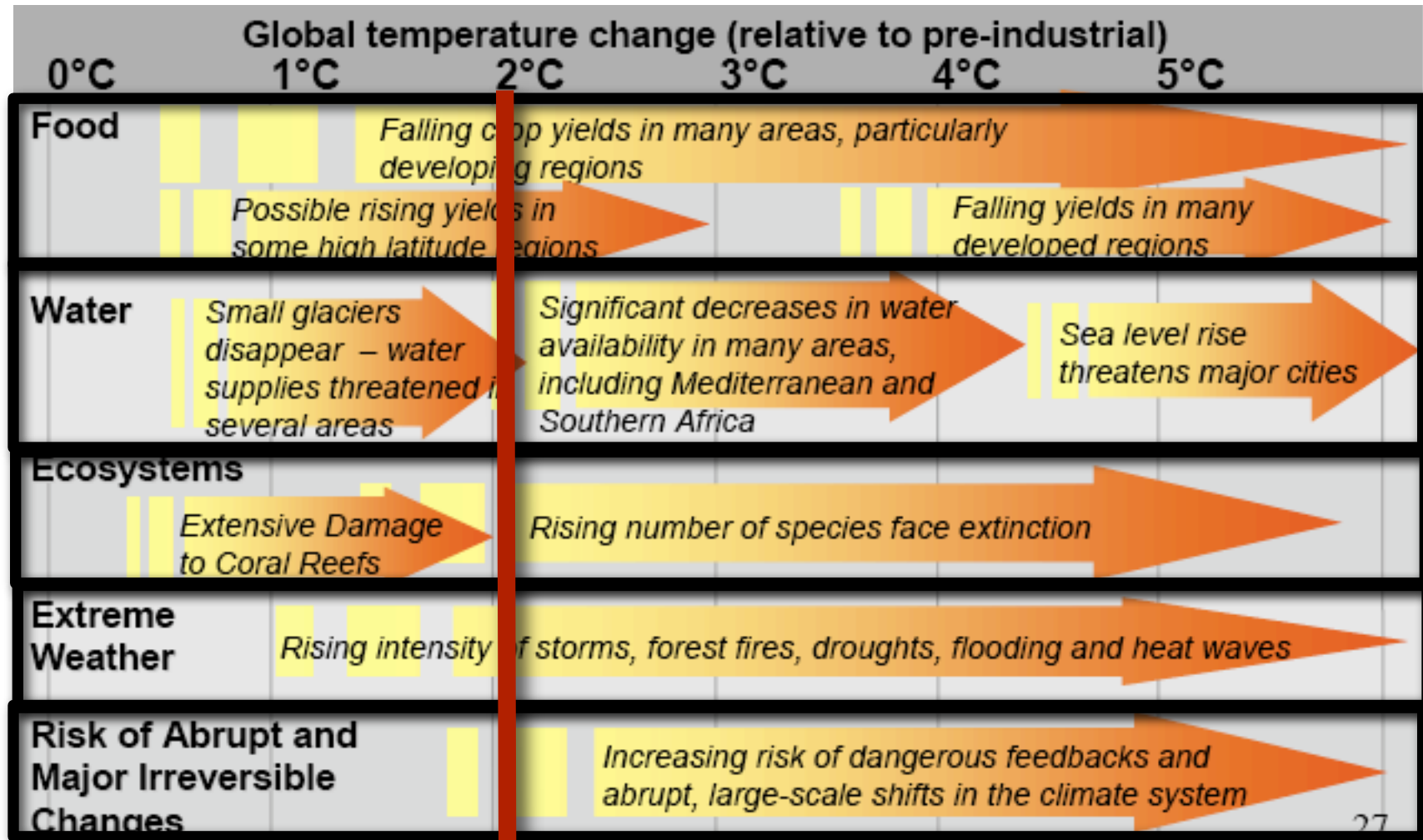
**Serious - Water, Food Supply, Ecosystems,
Global Stability**

Scientists Submit Letter Defending Conclusion that Climate Change Is Accelerated By Human Activity

In a [letter](#) from 255 members of the National Academy of Scientists, published in [Science Magazine](#), they claim that climate change is a fact, as is the contribution of human activity to global warming. In a sharply worded letter decrying "McCarthy-like threats" the letter states in part:

"But there is nothing remotely identified in the recent events that changes the fundamental conclusions about climate change:

- (i) The planet is warming due to increased concentrations of heat-trapping gases in our atmosphere. A snowy winter in Washington does not alter this fact.
- (ii) Most of the increase in the concentration of these gases over the last century is due to human activities, especially the burning of fossil fuels and deforestation.
- (iii) Natural causes always play a role in changing Earth's climate, but are now being overwhelmed by human-induced changes.
- (iv) Warming the planet will cause many other climatic patterns to change at speeds unprecedented in modern times, including increasing rates of sea-level rise and alterations in the hydrologic cycle. Rising concentrations of carbon dioxide are making the oceans more acidic.
- (v) The combination of these complex climate changes threatens coastal communities and cities, our food and water supplies, marine and freshwater ecosystems, forests, high mountain environments, and far more."











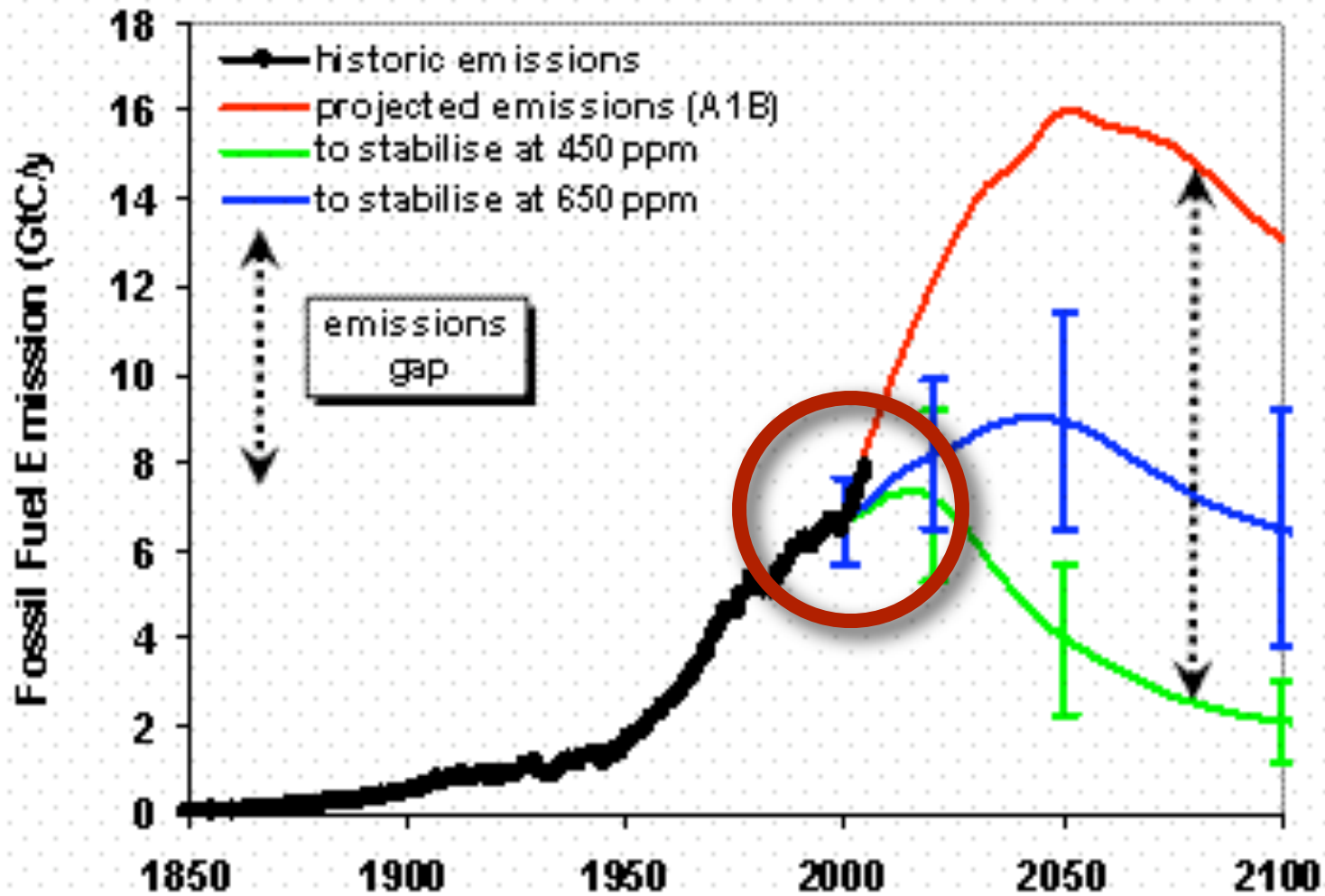
- **Climate has always changed**
- **Greenhouse Effect is 30°C**
- **Natural carbon balance disturbed by humans**
- **Increasing GHGs will increase warming**
- **Warming will alter atmospheric circulation and climates**
- **Pattern of evidence reveals human component of change**
- **Modern world assumes the climate we inherited**

Safe Climate Change?

**450ppm CO₂ equivalent
gives a 50:50 chance of 2°C**

1000GtC limit

Human Carbon Emissions



Decarbonising Humankind

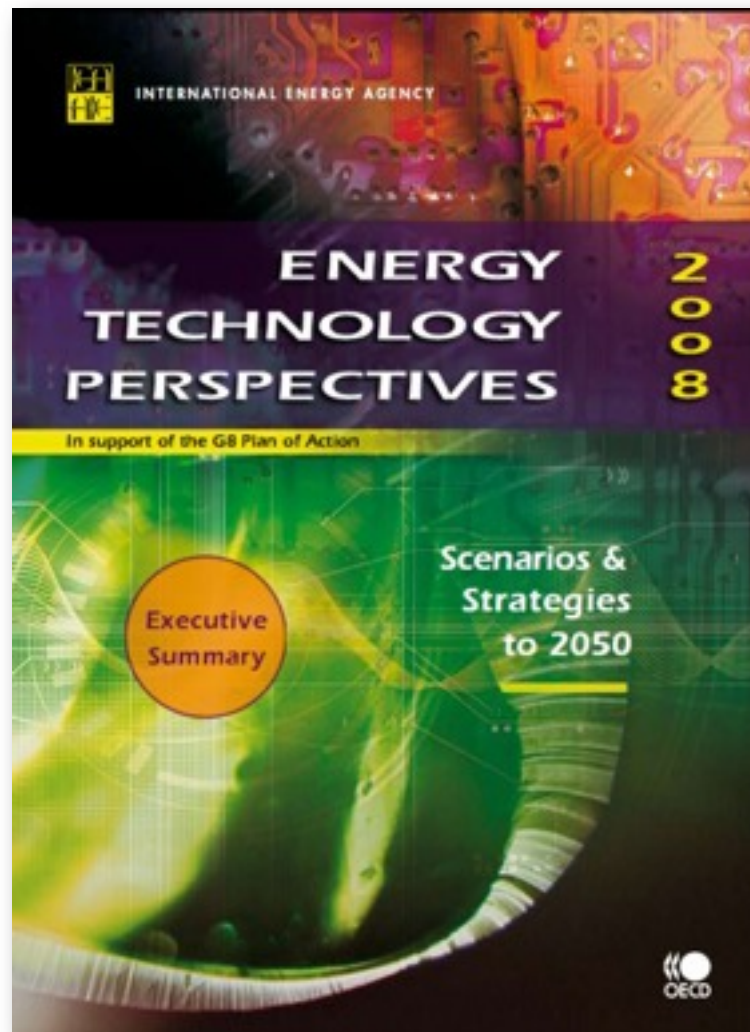


Decarbonising Humankind

\$

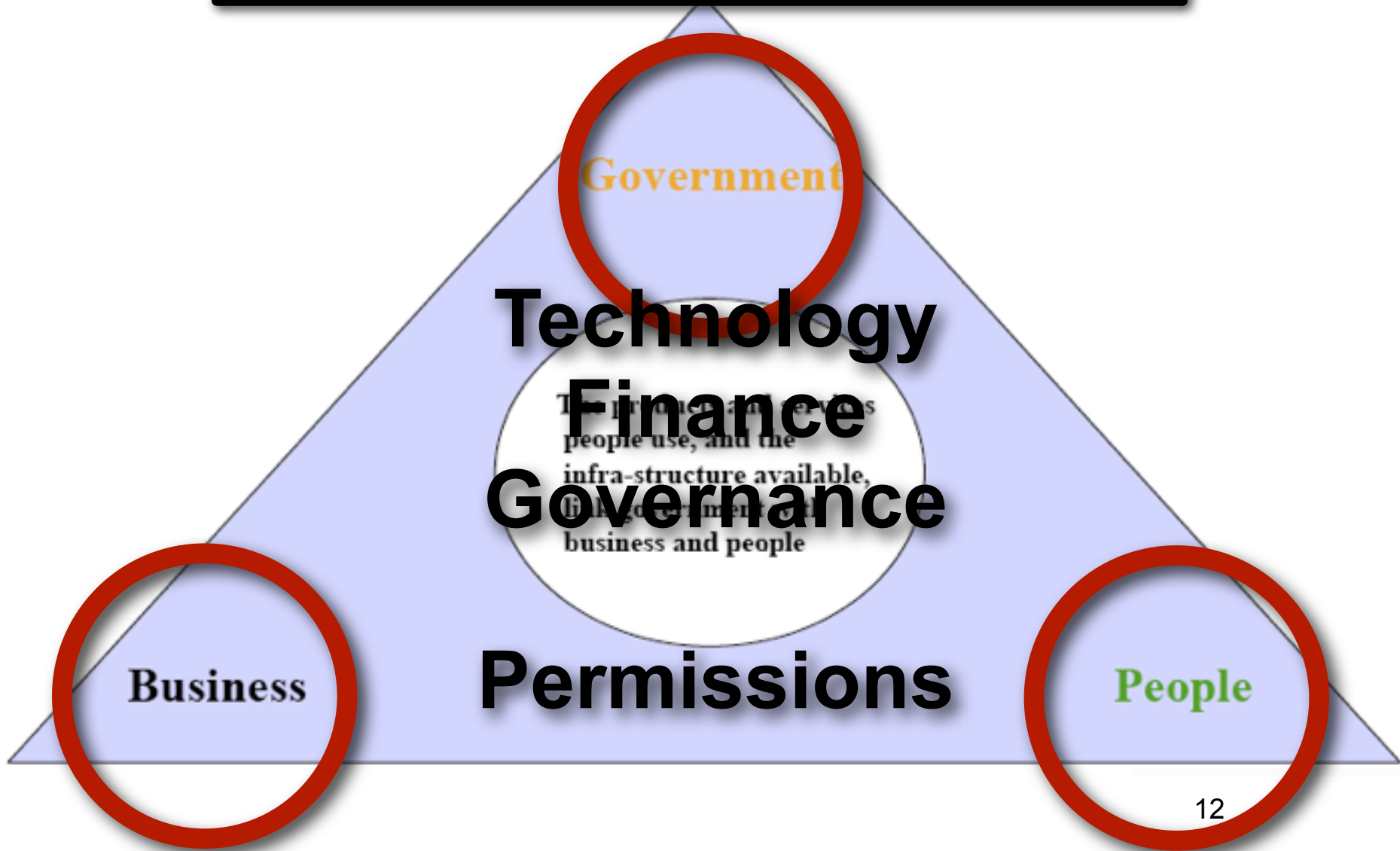


Improve Global Equity
Maintain Social Stability - Flourish
Transition to Low-C World



A global revolution is needed in the ways energy is supplied and used

Partnership Required

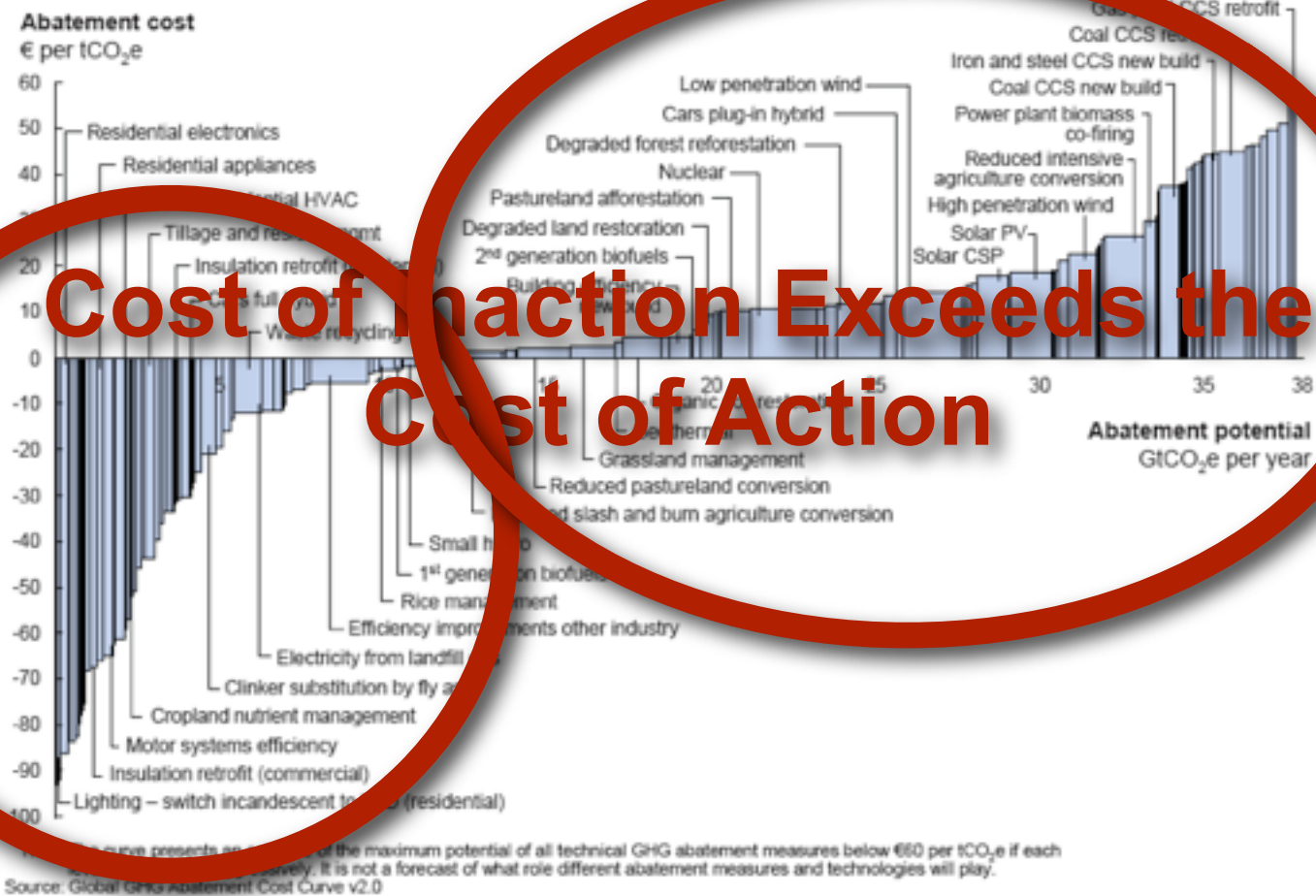


Human Ingenuity Unbounded?



Cost-Benefit Analyses

Global GHG abatement cost curve beyond business as usual



McKinsey II



\$20-65Tn to 2050
0.4-1.5%GDP

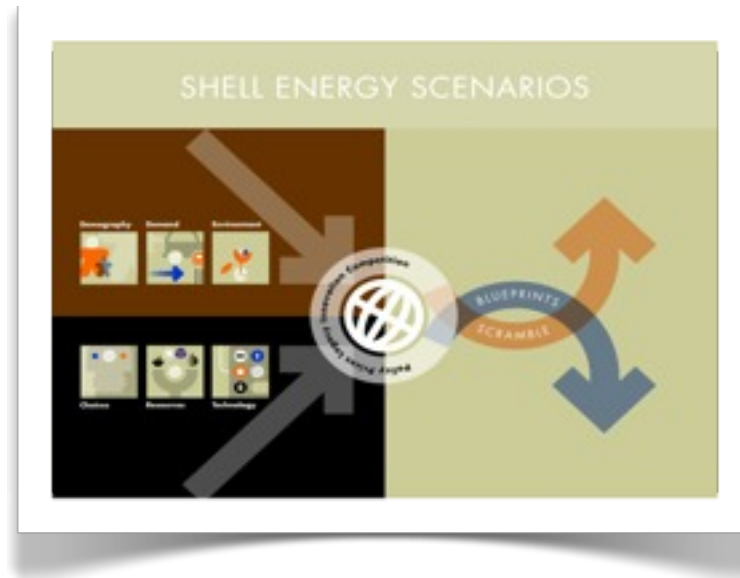
Leadership and Governance



Leadership and Governance

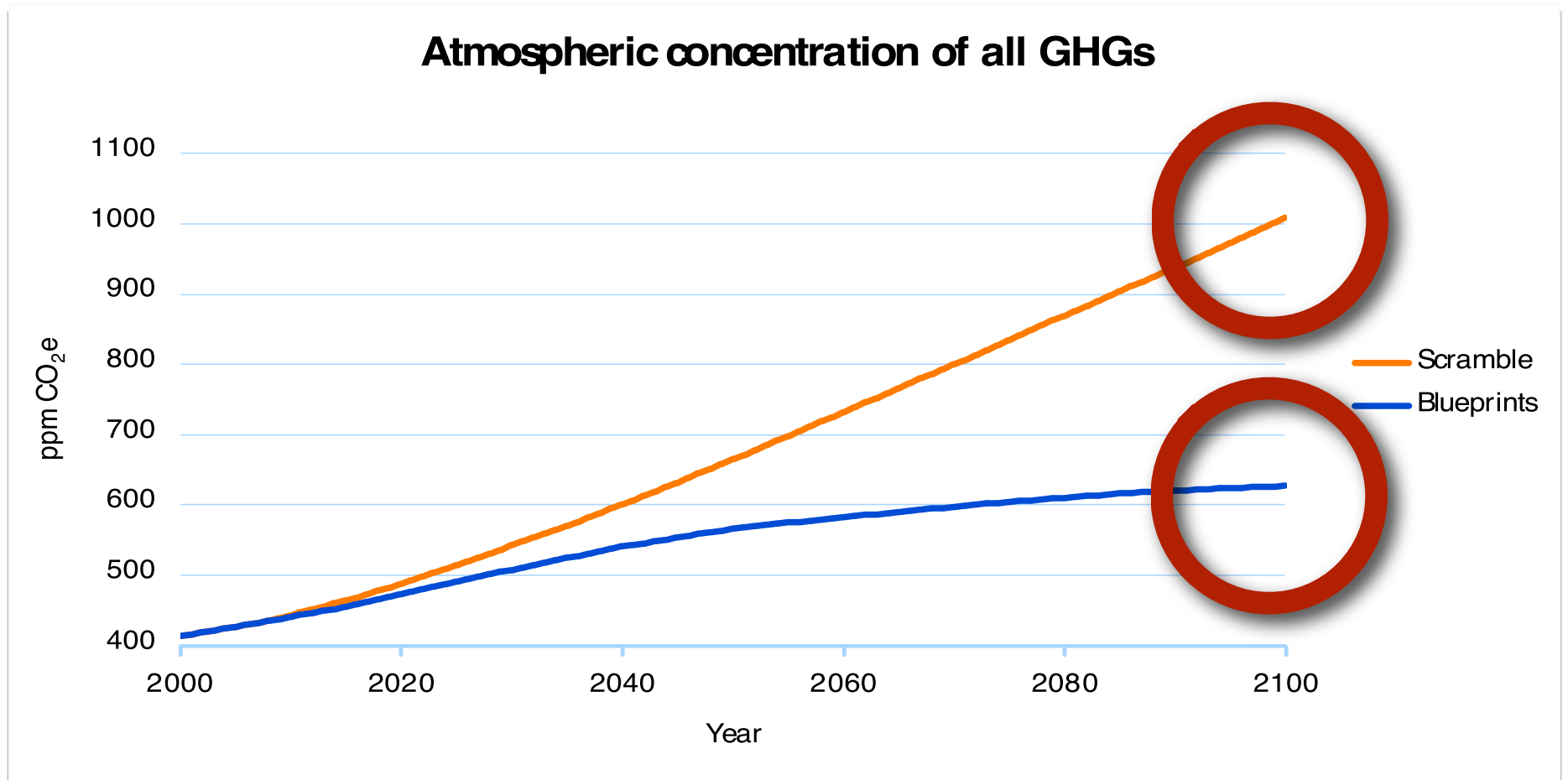


Governance is critical



- **Scramble - Events Outpace Actions**
- **Blueprints - Actions Outpace Events**

“Blueprints” stabilises at 630 ppm CO₂e
“Scramble” passes 1000 ppm CO₂e in 2100



Source: MIT

What people believe matters

Climate scepticism 'on the rise', BBC poll shows

The number of British people who are sceptical about climate change is rising, a poll for BBC News suggests.

The Populus poll of 1,001 adults found 25% did not think global warming was happening, an increase of 10% since a similar poll was conducted in November.

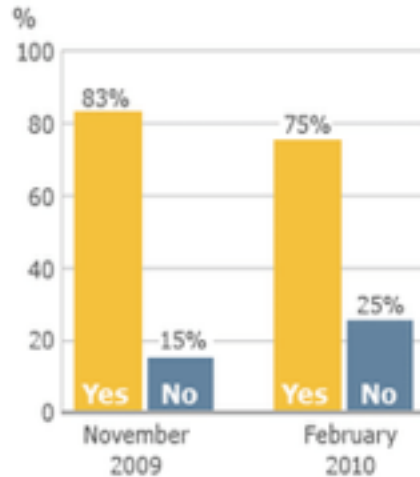
The percentage of respondents who said climate change was a reality had fallen from 83% in November to 75% this month.

And only 26% of those asked believed climate change was happening and "now established as largely man-made".

The findings are based on interviews carried out on 3-4 February.

In November 2009, a similar poll by Populus - commissioned by the Times newspaper - showed that 41% agreed that climate change

Do you think global warming is taking place?



Source: BBC/Populus

CLIMATE CHANGE

KEY STORIES

- ▶ Embattled climate chief
- ▶ Climate body admits gl
- ▶ India attacks UN climat
- ▶ Climate data row man s
- ▶ Key powers in climate c
- ▶ World media reacts to c

ANALYSIS



Profile: Rajendra K. Pachauri
Climate change pressure over

- ▶ What 'ClimateGate' mea
- ▶ Harrabin: Reforming the
- ▶ Why did Copenhagen fa

BACKGROUND

- ▶ Atmospheric change ov

30p GET YOUR DAILY EXPRESS FOR JUST 30p
SAVE 50p A WEEK ON YOUR DAILY & SUNDAY EXPRESS

DAILY EXPRESS

How to eat, drink and stay healthy



12 DAYS OF CHRISTMAS CHAOS IN BA STRIKE

100 REASONS WHY GLOBAL WARMING IS NATURAL

'No proof that human activity is to blame'

CLIMATE CHANGE is a natural process, according to a new report by a group of scientists. Global warming is caused by natural fluctuations in the Earth's climate system, and not by human activity. The report, published in the journal Nature, says that the current debate about climate change is based on a misunderstanding of the science. It says that the Earth's climate has always changed, and that there is no evidence that human activity is causing any significant change. The report also says that the current debate about climate change is based on a misunderstanding of the science. It says that the Earth's climate has always changed, and that there is no evidence that human activity is causing any significant change.

THE NEW CLIMATE CHANGE SCANDAL



Monday January 18, 2010

By Anil Dawar

Have your say(46)

FRESH doubts were cast over controversial global warming theories yesterday after a major climate change argument was discredited.

The International Panel on Climate Change is expected to admit its key claim that global warming would melt by 2100 a 1999 magazine article was based on an Indian scientist's little-known views. The scientist said his views were based on a 1999 magazine article.

Telegraph.co.uk

 SEARCH

- Home
- News
- Sport
- Finance
- Lifestyle
- Comment
- Travel
- Culture
- Technology
- UK
- World
- UK Politics
- Celebrities
- Obituaries
- Weird
- Earth
- Science
- Health News
- Education

BLOGS HOME » NEWS » ENVIRONMENT » JAMES DELINGPOLE

James Delingpole



James Delingpole is a writer, journalist and broadcaster who is right about everything. He is the author of numerous fantastically entertaining books including *Welcome To Obamaland: I've Seen Your Future And It Doesn't Work*, *How To Be Right*, and the Coward series of WWII adventure novels. His website is www.jamesdelingpole.com.

Climategate: the final nail in the coffin of 'Anthropogenic Global Warming'?

By James Delingpole Politics Last updated: November 20th, 2009



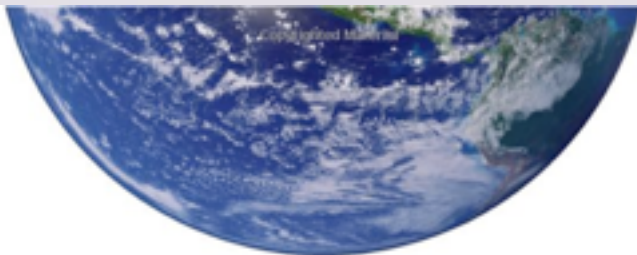
553 Comments

AN APPEAL
TO REASON
A COOL LOOK
AT GLOBAL
WARMING
WITH A NEW AFTERWORD



cool it
the skeptical

HEAVEN
AND EARTH



The *Really* Inconvenient Truths

Seven Environmental Catastrophes
Liberals Don't Want You
To Know About—
Because They Helped
Cause Them



IAIN MURRAY



AIR CO
THE INCONVENIENT
ABOUT GLOBAL W

SCARED TO DEATH

From BSE to Global Warming:
Why Scares Are Costing Us the Earth



Copyrighted Material



Page last updated at 19:40 GMT, Monday, 21 December 2009

E-mail this to a friend

Printable version

News Front Page

World

UK

England

Northern Ireland

Scotland

Wales

Business

Politics

Health

Education

Science & Environment

Technology

Entertainment

Also in the news

Video and Audio

Have Your Say

Magazine

In Pictures

Country Profiles

Special Reports

Related BBC sites

Sport

Snowfall leads to traffic chaos

Traffic was severely disrupted and all buses have been suspended in Reading as heavy snow swept across Berkshire for the second time in four days.

All Reading Buses services were suspended and traffic on the M4 motorway and many other roads were "at a standstill".

The Met Office issued a severe weather warning and more snow is expected.

It said accumulations of up to 10cm (4in) of snow were expected in places, especially on higher ground.

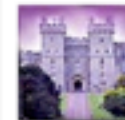
Reading Buses said: "All roads in the area are at a standstill. We apologise for any inconvenience caused to customers."

'Extreme caution'

Traffic on the M4 motorway was "very slow traffic with severe delays both ways" due to the snow.



The snow caused traffic chaos in many parts of the county



BBC Berkshire

Sport, travel, weather, things to do, features and much more

SEE ALSO

- ▶ [In pictures: Berkshire snow chaos](#)
22 Dec 09 | Nature & Outdoors
- ▶ [Video: snow chaos in Berkshire](#)
21 Dec 09 | Nature & Outdoors
- ▶ [In Pictures: Having fun in snow](#)
21 Dec 09 | People & Places
- ▶ [Heavy snow falls across Berkshire](#)
18 Dec 09 | Berkshire
- ▶ [Heavy snow falls across Berkshire](#)
18 Dec 09 | Berkshire

RELATED INTERNET LINKS

- ▶ [Met Office](#)

WEATHER Paul Hudson

[« Previous](#) | [Main](#)

January 2010 warmest on record. Yes really!

Paul Hudson | 22:11 UK time, Thursday, 4 February 2010

It may come as a surprise to many of you, shivering through the coldest British winter for decades, but data released this evening shows that global temperatures, as measured by satellites, rocketed in January to a new record.

The global-average lower tropospheric temperature anomaly rose to +0.72 deg. C in January 2010 on the UAH satellite measure. This is the warmest January in the 32-year satellite-based data record.

The global-average warmth is approaching the warmth reached during the 1997-98 El Nino, which peaked in February of 1998. 1998 on most measures was the hottest year on record.

This measure is important to sceptics who question the validity of land based measurements, which, they say, may be compromised to some extent by the urban heat island effect. The UAH satellite data has shown some warming since it began measurements in the late 1970's - but not as much as land based thermometers show. These satellite measurements are not calibrated to surface thermometer data in any way.

Of interest was the Northern hemisphere which rose sharply on this measure from December's levels - and gives a graphic illustration that despite many populated areas of

[Jump to more content from this blog](#) ▼

About this blog



Hello, I'm Paul Hudson, weather presenter and climate correspondent for BBC Look North in Yorkshire and

Lincolnshire. I've been interested in the weather and climate for as long as I can remember, and worked as a forecaster with the Met Office for more than ten years locally and at the international unit before joining the BBC in October 2007. Here I divide my time between forecasting and reporting on stories about climate change and its implications for people's everyday lives.

Subscribe to Paul Hudson's Blog

You can stay up to date with Paul

Temperature Anomalies January 2010

(with respect to a 1971-2000 base period)

National Climatic Data Center/NESDIS/NOAA

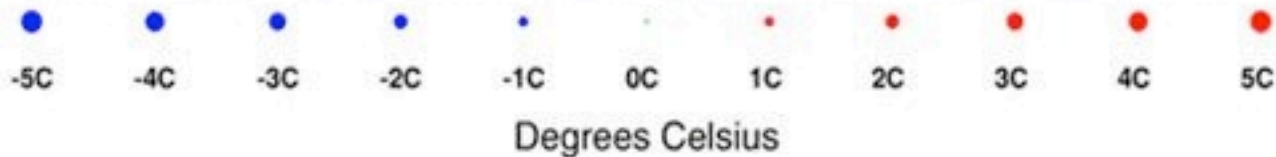
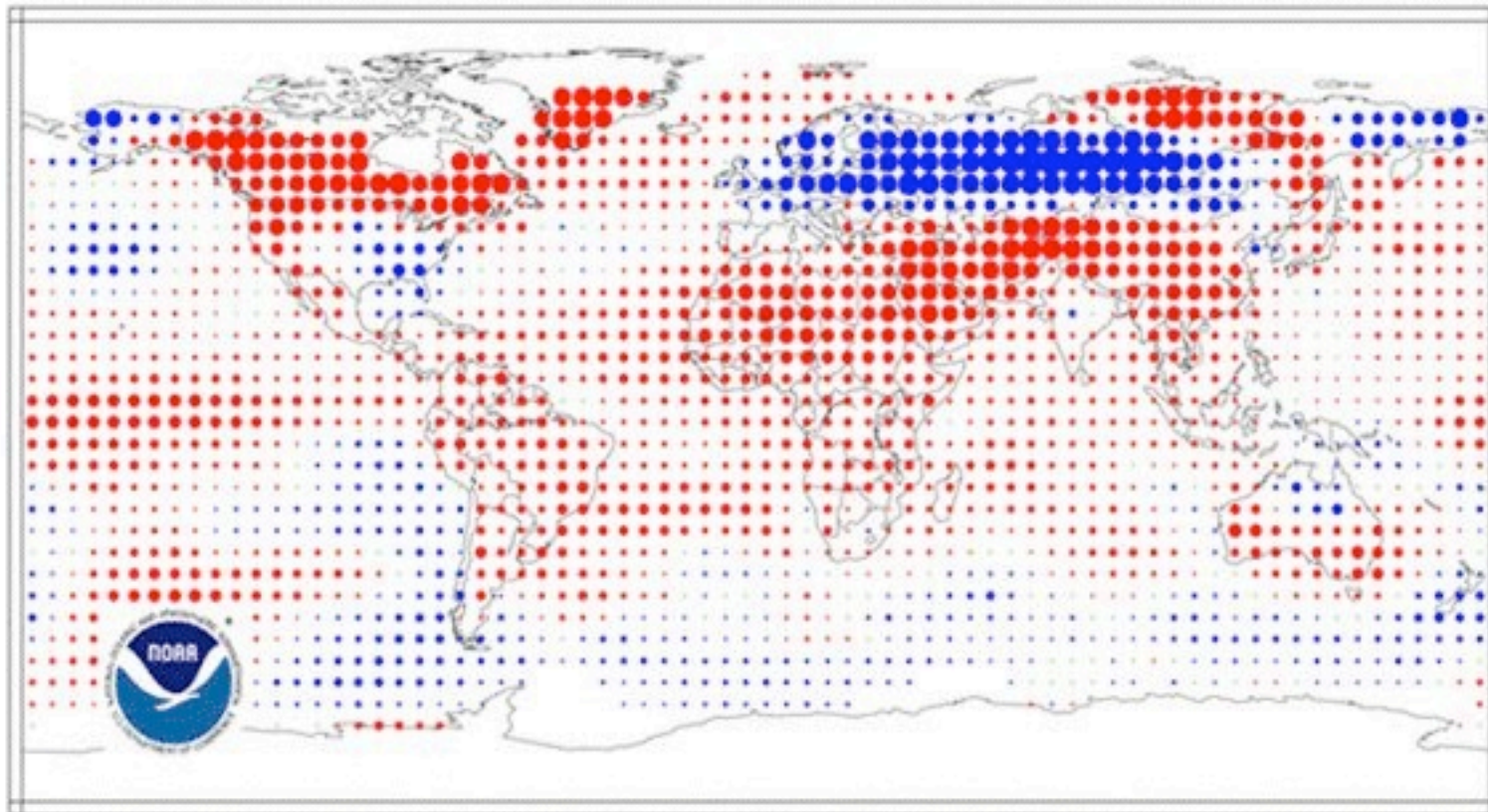


Table 1: Impact of allegations against climate science

Issue		...on the science					...on public perception				
CRU/ UEA emails	Data manipulation	●	●	●	●	●	●	●	●	●	●
	Withholding data	●	●	●	●	●	●	●	●	●	●
	Scientific fraud	●	●	●	●	●	●	●	●	●	●
	Muzzling of opponents	●	●	●	●	●	●	●	●	●	●
Hockey stick controversy		●	●	●	●	●	●	●	●	●	●
Himalayan glaciers		●	●	●	●	●	●	●	●	●	●
Climate risk in the Netherlands		●	●	●	●	●	●	●	●	●	●
Natural disasters		●	●	●	●	●	●	●	●	●	●
Amazon rainforest loss		●	●	●	●	●	●	●	●	●	●
Snow		●	●	●	●	●	●	●	●	●	●
Aggregate		●	●	●	●	●	●	●	●	●	●

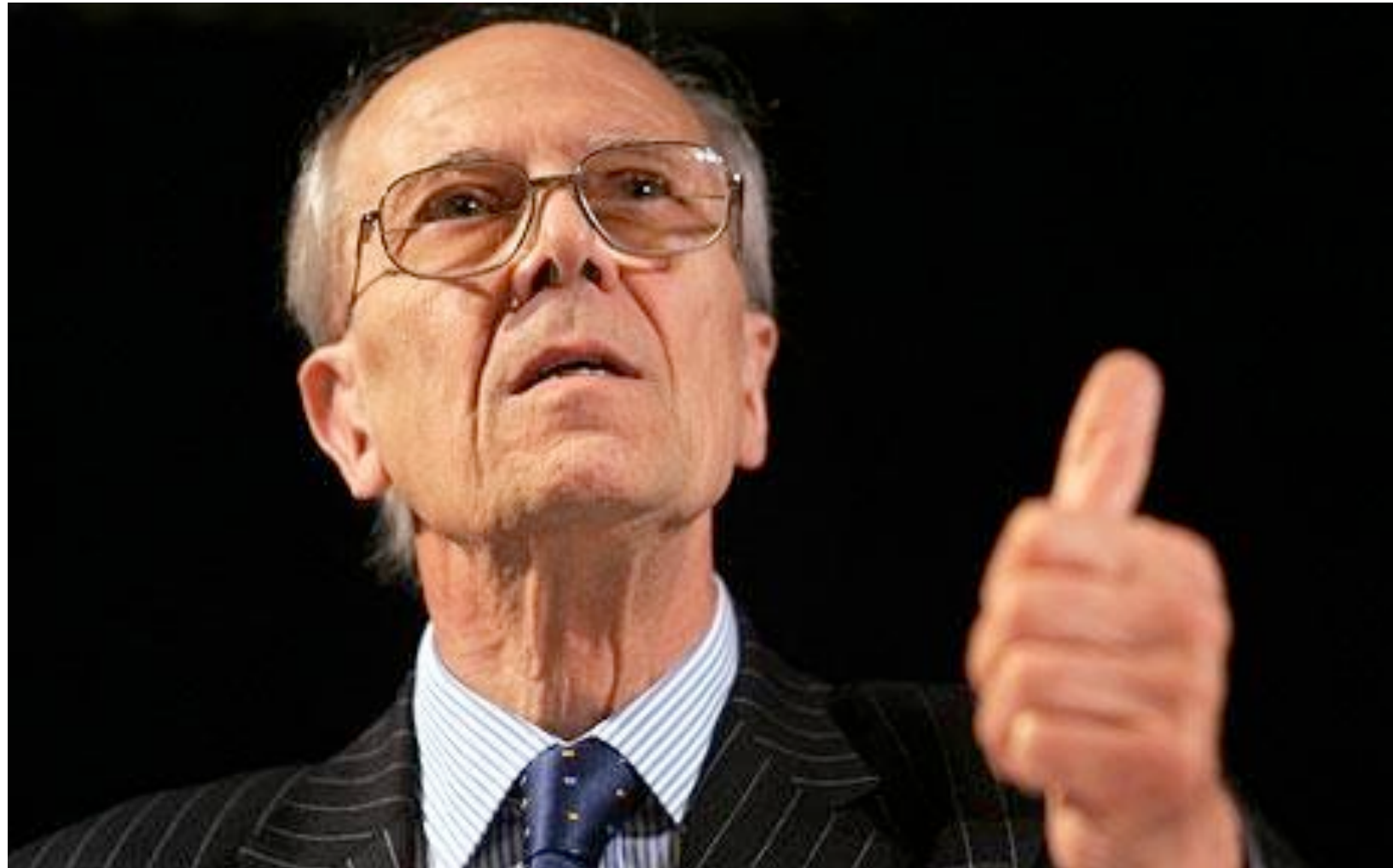
Source: Bloomberg New Energy Finance



Evidence is not the issue

**People react to information based
on their deeply held beliefs**

**They endorse the position shared
by those with whom they identify
and whose esteem they seek**









- **Denial**

- *closed-minded*
- *position staked out in advance*
- *confirmation bias*
- *driven by ideology or religious belief*

- **Scepticism**

- *open-minded*
- *examine claims*
- *consider evidence*
- *follow the facts*

Denial

- *closed-minded*
- *position staked out in advance*
- *confirmation bias*
- *driven by ideology or religious belief*

Scepticism

- *open-minded*
- *examine claims*
- *consider evidence*
- *follow the facts*

- **Tribalism**
- **Rules of Engagement**
- **“Wild-West” of the Web**
- **Sowers of Doubt**
- **Positive vs Normative issues**
- **Probability and Risk**
- **Who to believe?**

Mode of Discussion

Debate/Advocacy

- assuming there is one right answer
- combative
- about winning
- listening for flaws
- defending assumptions
- pursuing your outcome

Dialogue

- assuming others have pieces of the answer
- collaborative
- about finding common ground
- listening to understand
- exploring assumptions
- discovering new possibilities

Uniquely Vexed Issue

- **Evidence Complex & Technical**
- **Disconnect**
- **Inertias**
- **Vested Interests**
- **Inadequate Instruments and Institutions**
- **Challenges foundations of modern world**

- **Trust**

Science Needs to Address

Observations - What is happening?

Understanding - How and Why?

Prediction - What will happen Where/When?

to underpin

Analysis - What could we do?

Ethics - What should we do?

Policy/Politics - What can/will we do?

Also ...

- **Raise Interest**
- **Deepen Understanding**
- **Maintain vigilance over accuracy**
- **Build Trust in Science and its Process**

Opinion Formers



Really



We need to take this seriously



**If the climate system were a bank, governments would have rescued it
by now**

**Kofi Annan following
Hugo Chavez**



Friday, 21 May 2010

