溫度真是十分美妙的感覺，看不見，摸不著，可使人心曠神怡，也可以使人痛苦不堪，甚至還能殺人!

倪匡

Climate Change? More Than Just Hot Air.

Leung Wing-mo, HKO, 29 Oct 2007

香港天文台
HONG KONG OBSERVATORY

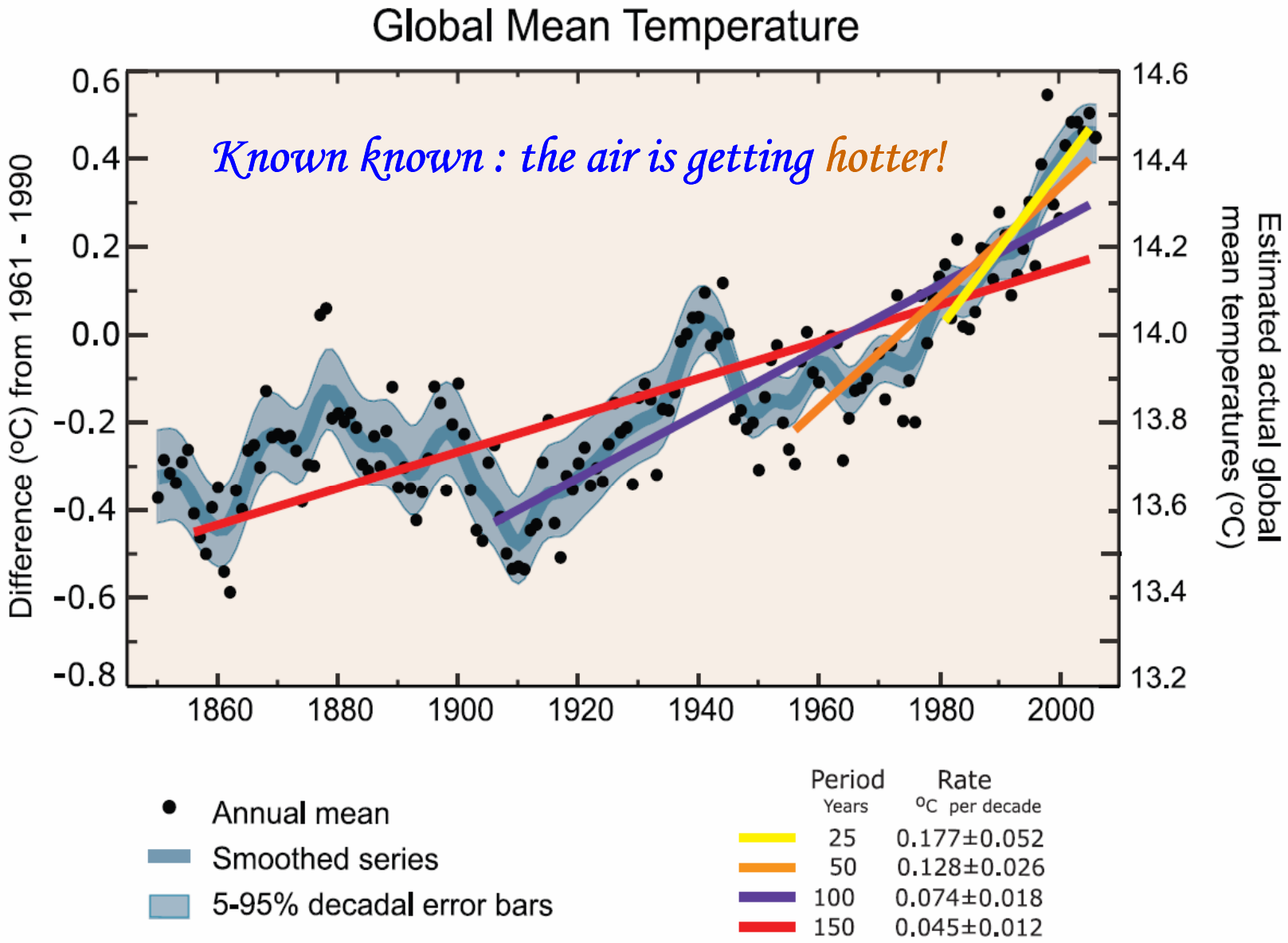
How well do we know about climate change?

- *As we know, there are known knowns; there are things we know we know.*
- *We also know there are known unknowns;*
- *But there are also unknown unknowns -- the ones we don't know we don't know. And if one looks throughout the history of our country and other free countries, it is the latter category that tend to be the difficult ones.*

Donald Rumsfeld, Feb 2002,

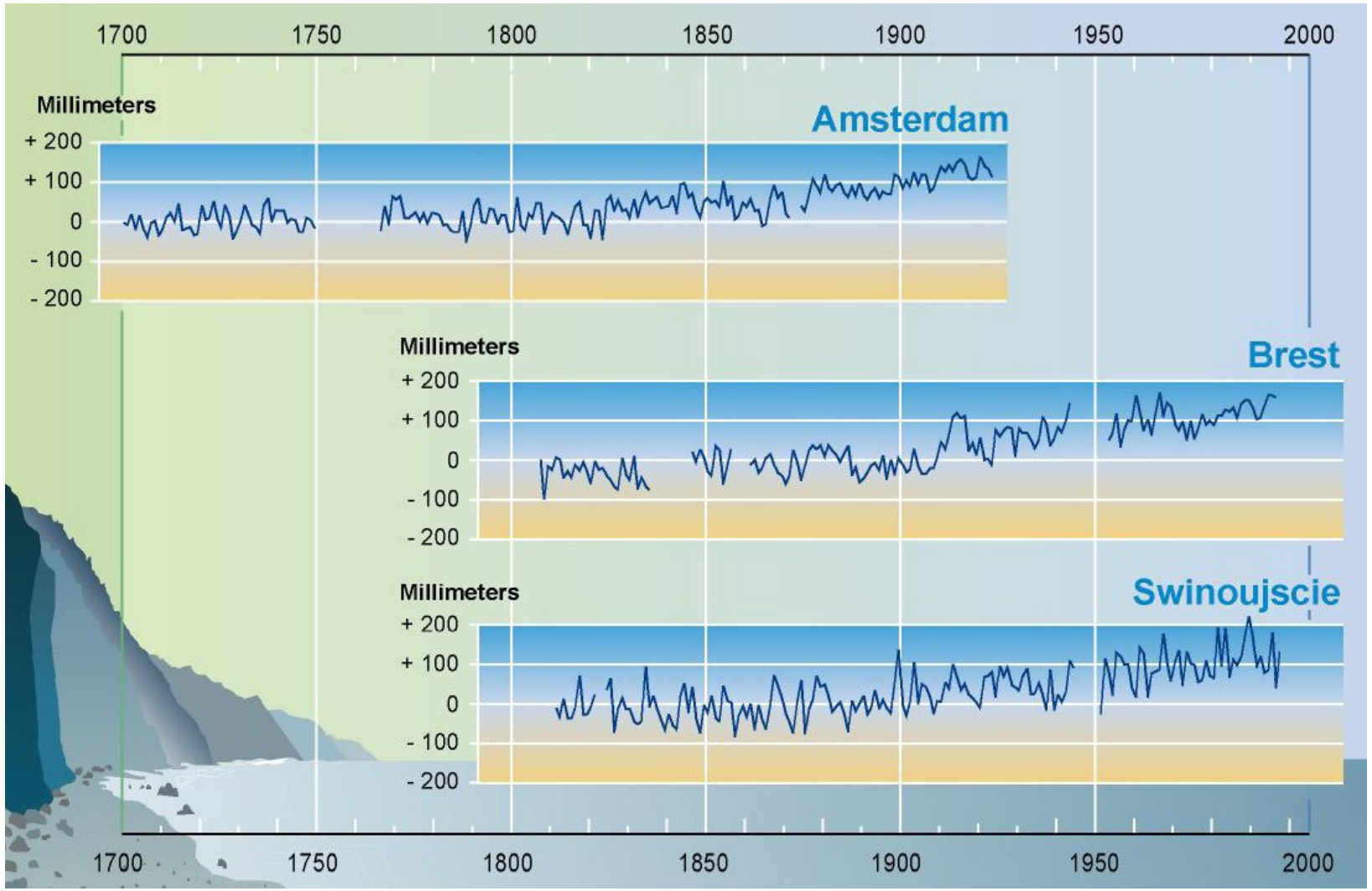
On evidence of a direct link between Baghdad and terrorist organizations

From 2007 Nobel Peace Prize Winner, IPCC, 4th Assessment Report



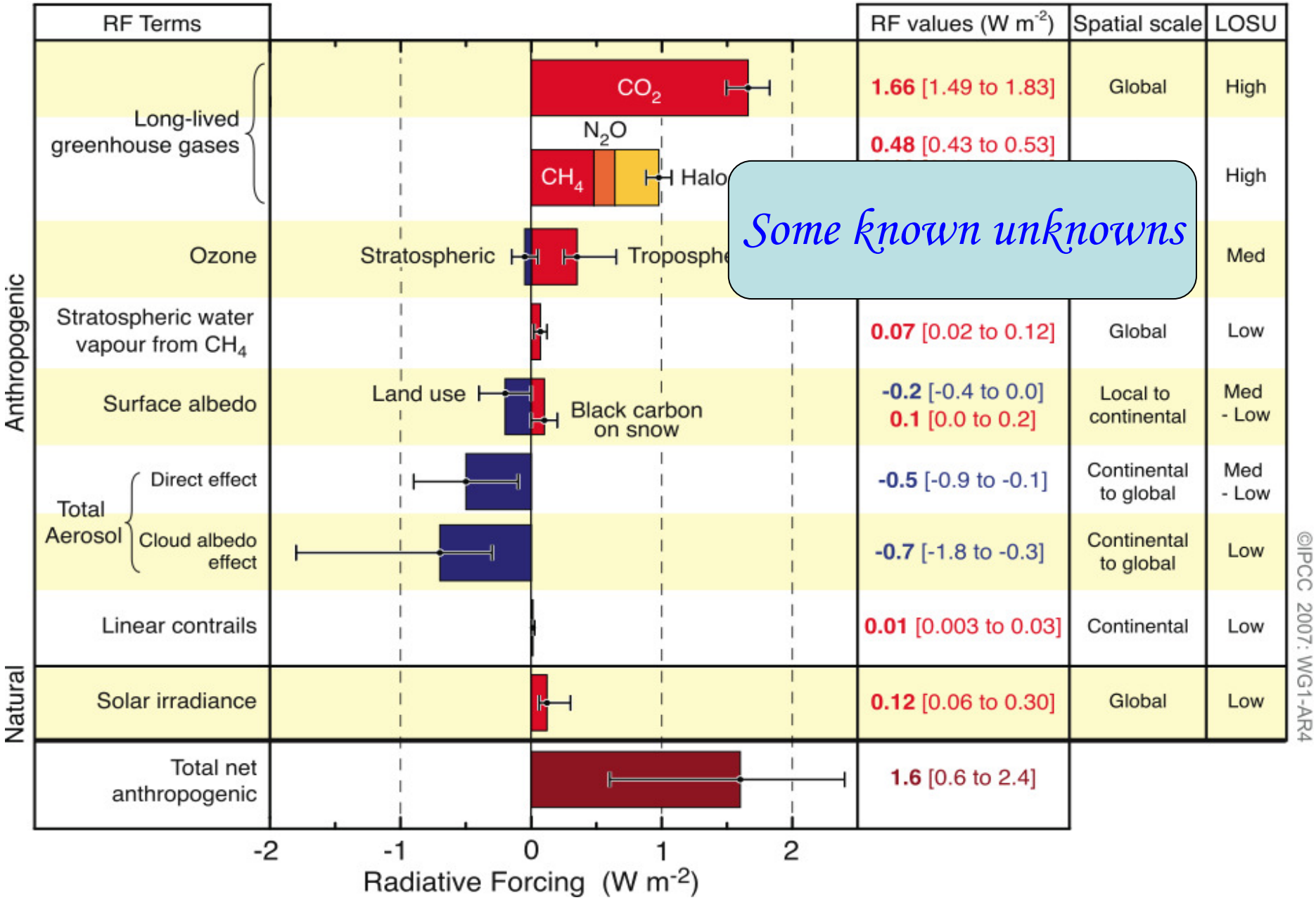
Known known - Relative Sea Level in the Last 300 Years

(Source: IPCC)



Globally averaged sea level rose by 1 to 2 mm per year in the 20th century, with large regional differences

Key contributors to global warming, IPCC, AR4

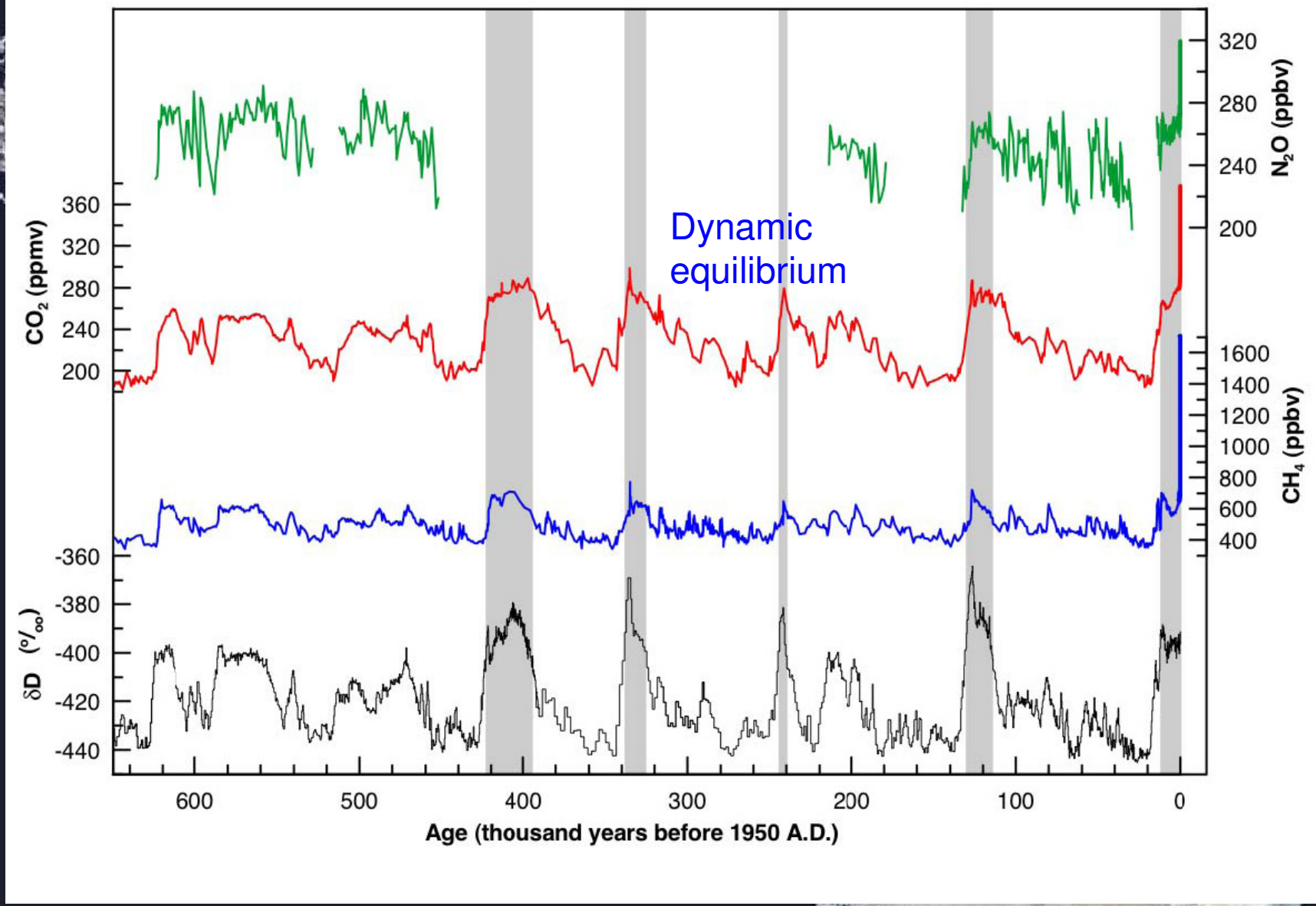


Sequence of Climate Change:

- Chemical: CO_2 , CH_4 , O_3 …;
- Physical: temperature, rain, wind, sea level, environment…;
- Biological: living things, including bacteria, human.

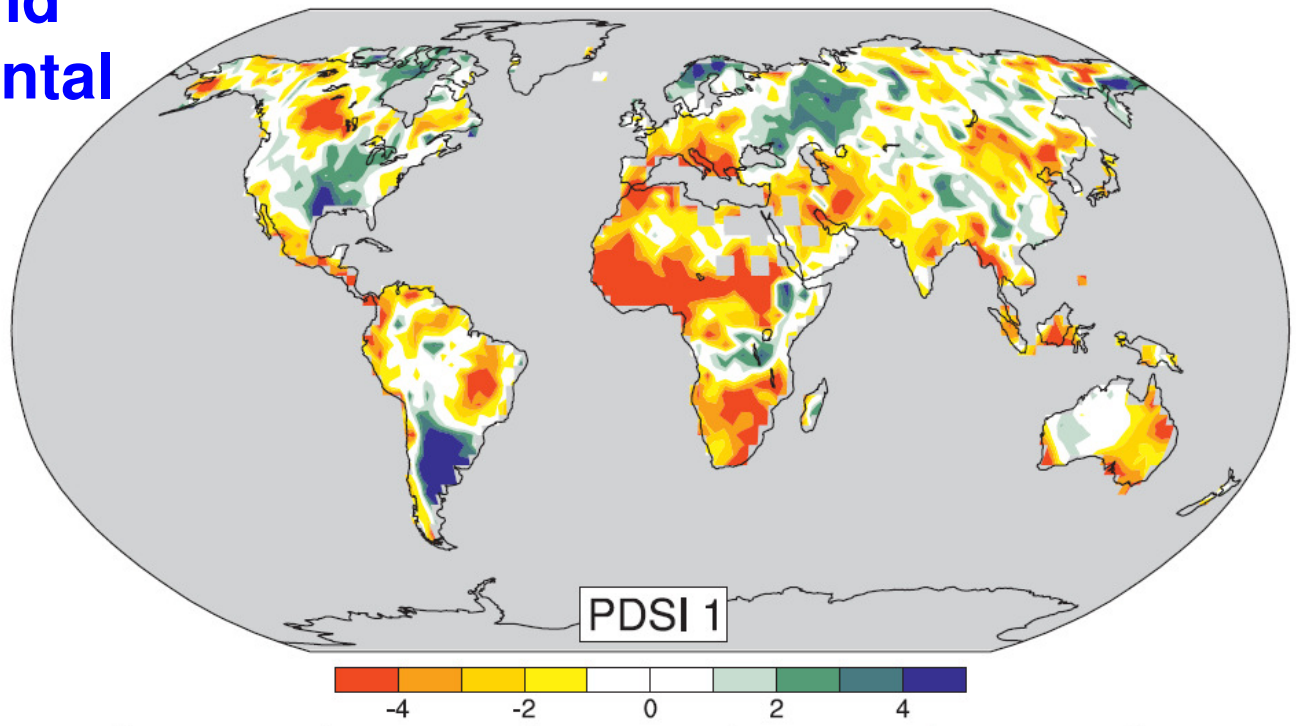
Chemical Changes

Vostok, Antartica (NASA photo)

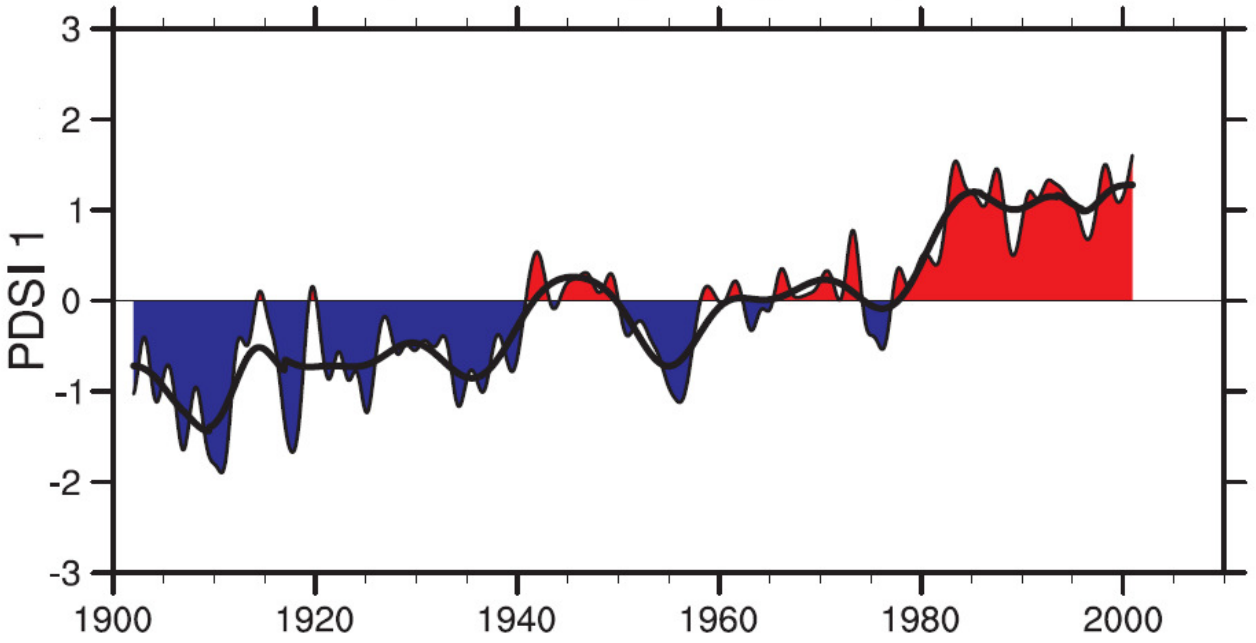


Physical and Environmental Changes

Palmer drought severity index: 1900 – 2002 (top)



Time series of Palmer drought severity index: 1900 – 2002 (bottom)



National Geographic

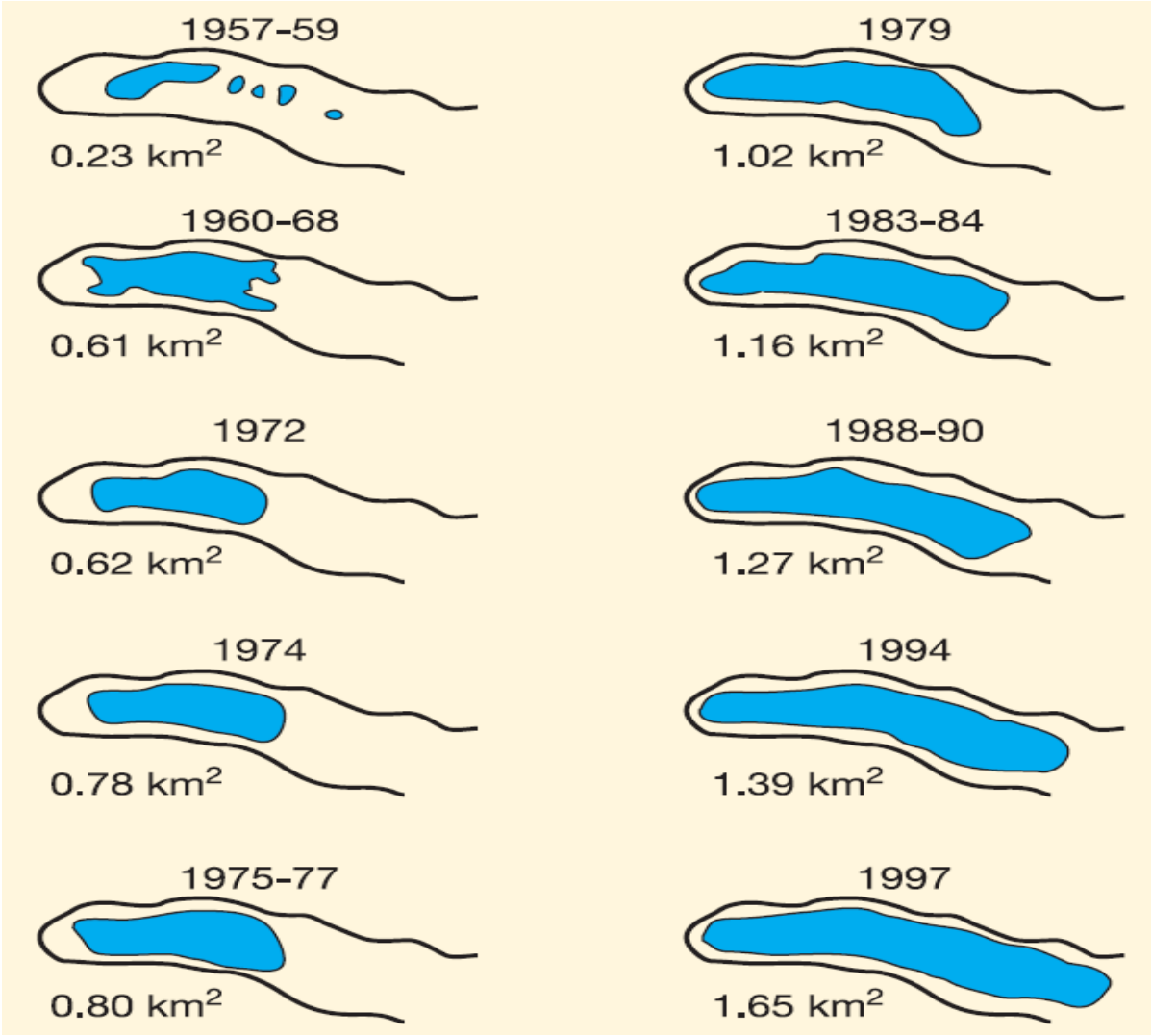
June 2007

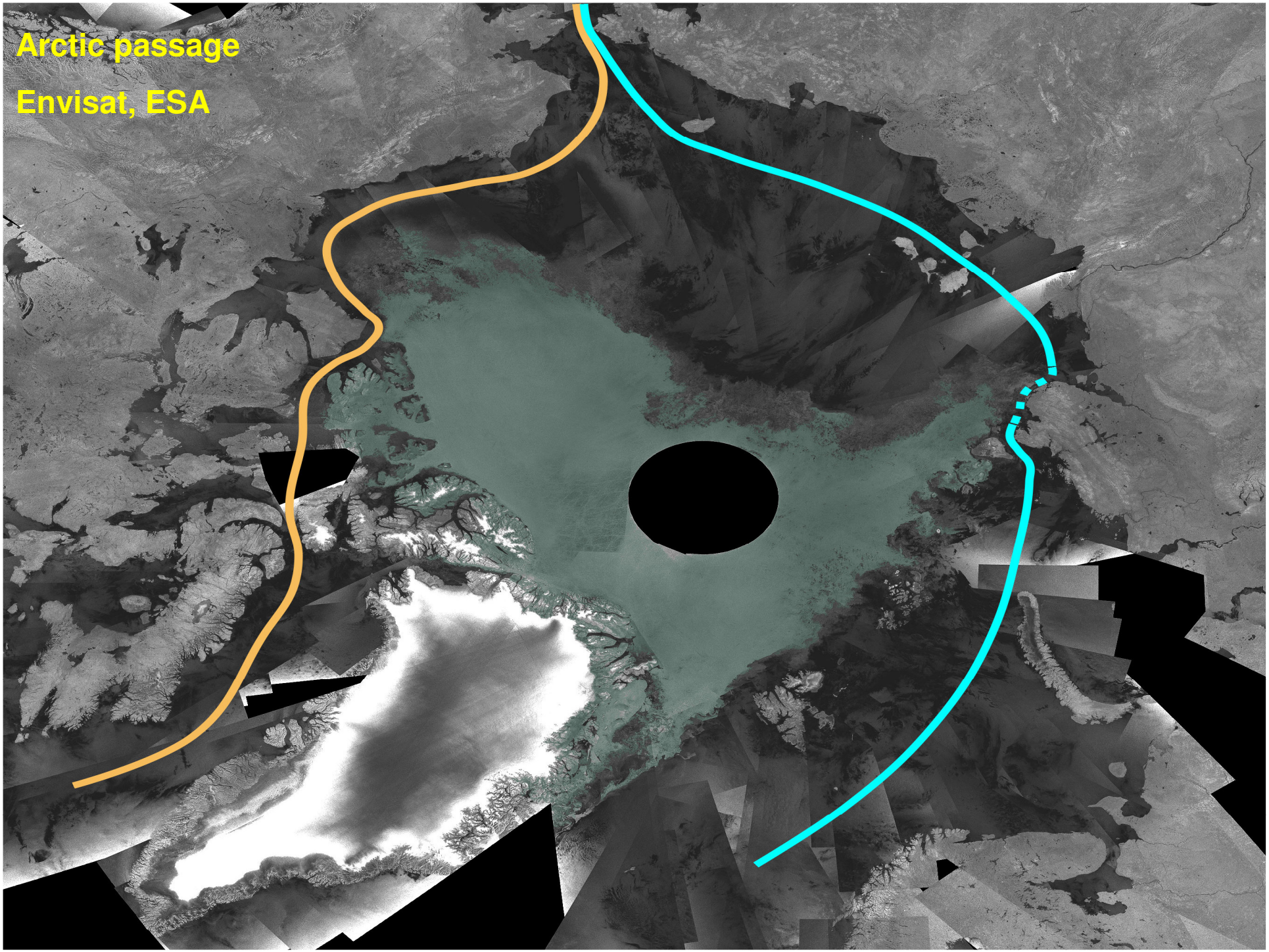
Iceland

National Geographic
June 2007

Bolivia

Expansion of Tsho Rolpha Glacial Lake, Nepal



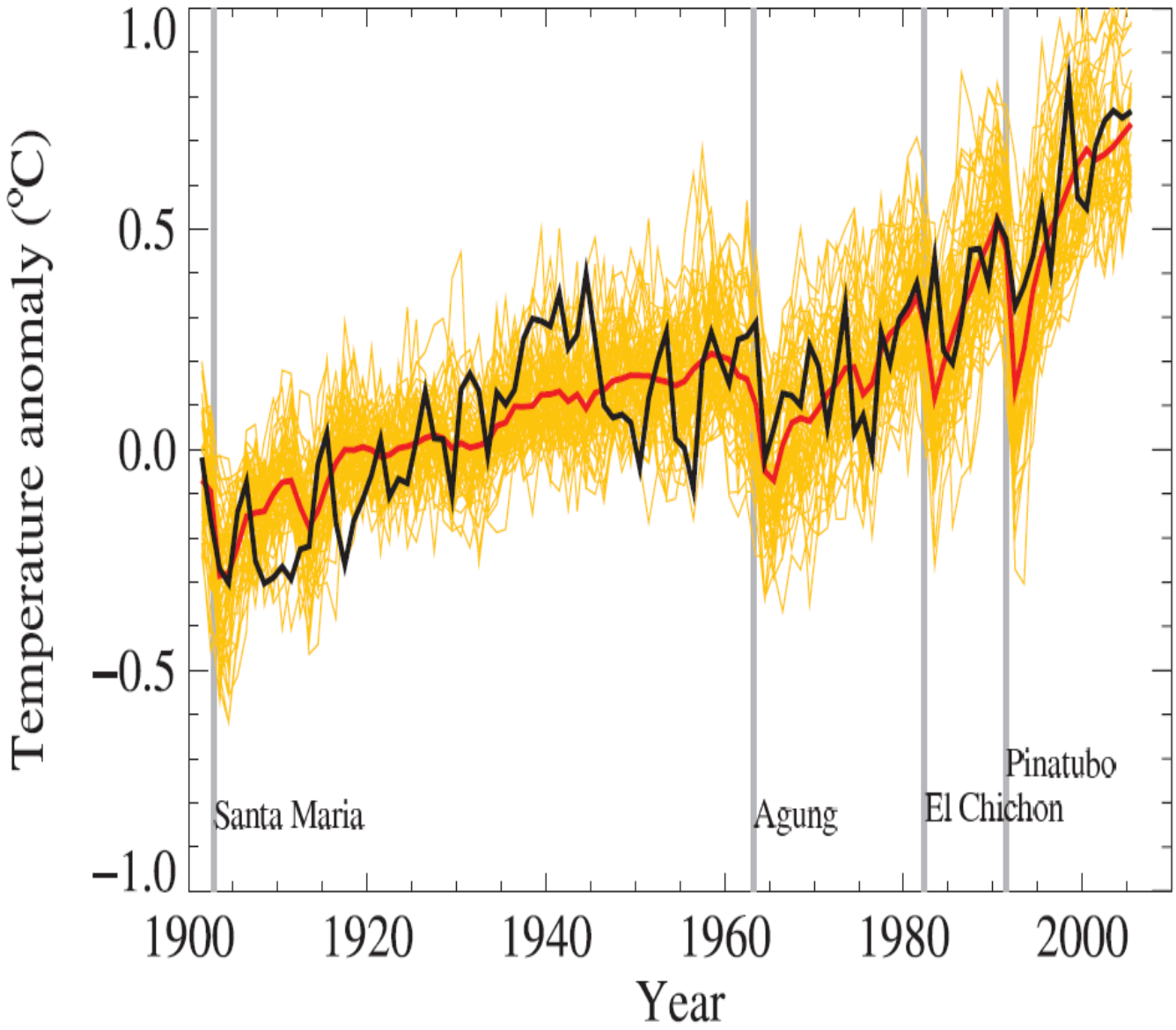

Arctic passage
Envisat, ESA

Future changes

Case	Temperature Change (°C at 2090-2099 relative to 1980-1999)[a]		Sea Level Rise (m at 2090-2099 relative to 1980-1999)
	Best estimate	*Likely* range	Model-based range excluding future rapid dynamical changes in ice flow
Constant Year 2000 concentrations[b]	0.6	0.3 – 0.9	NA
B1 scenario	1.8	1.1 – 2.9	0.18 – 0.38
A1T scenario	2.4	1.4 – 3.8	0.20 – 0.45
B2 scenario	2.4	1.4 – 3.8	0.20 – 0.43
A1B scenario	2.8	1.7 – 4.4	0.21 – 0.48
A2 scenario	3.4	2.0 – 5.4	0.23 – 0.51
A1FI scenario	4.0	2.4 – 6.4	0.26 – 0.59

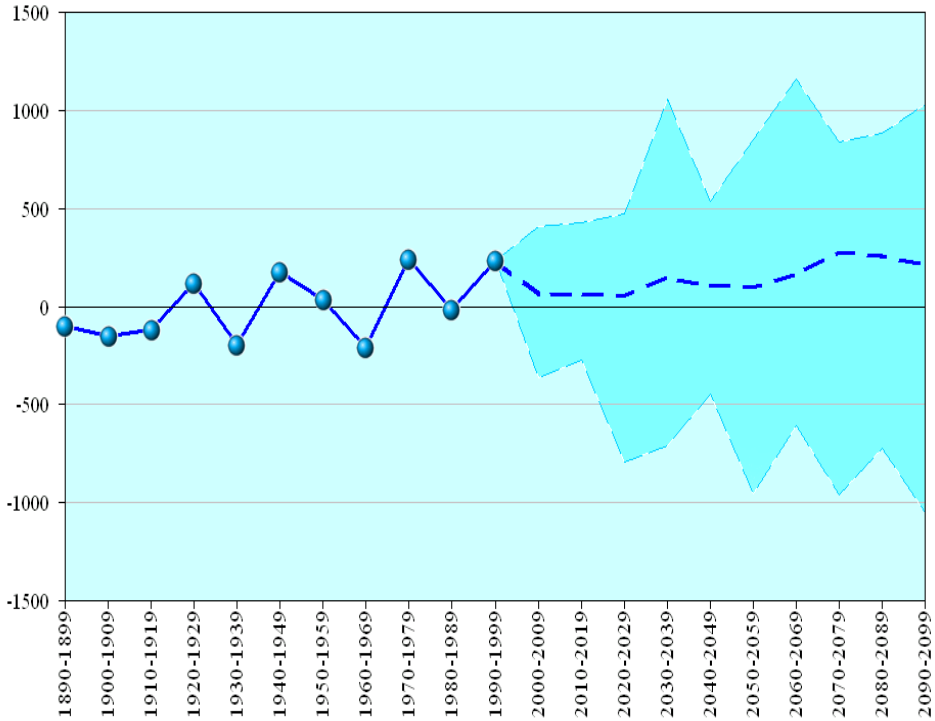
How confident are we about projection?

FAQ 8.1, Figure 1. *Global mean near-surface temperatures over the 20th century from observations (black) and as obtained from 58 simulations produced by 14 different climate models driven by both natural and human-caused factors that influence climate (yellow). The mean of all these runs is also shown (thick red line). Temperature anomalies are shown relative to the 1901 to 1950 mean. Vertical grey lines indicate the timing of major volcanic eruptions. (Figure adapted from Chapter 9, Figure 9.5. Refer to corresponding caption for further details.)*



More heavy rain and droughts in Hong Kong

- 901 mm in the year 1963 (3 times in 21st century)
- 3343 mm in the year 1997 (6 times in 21st century)

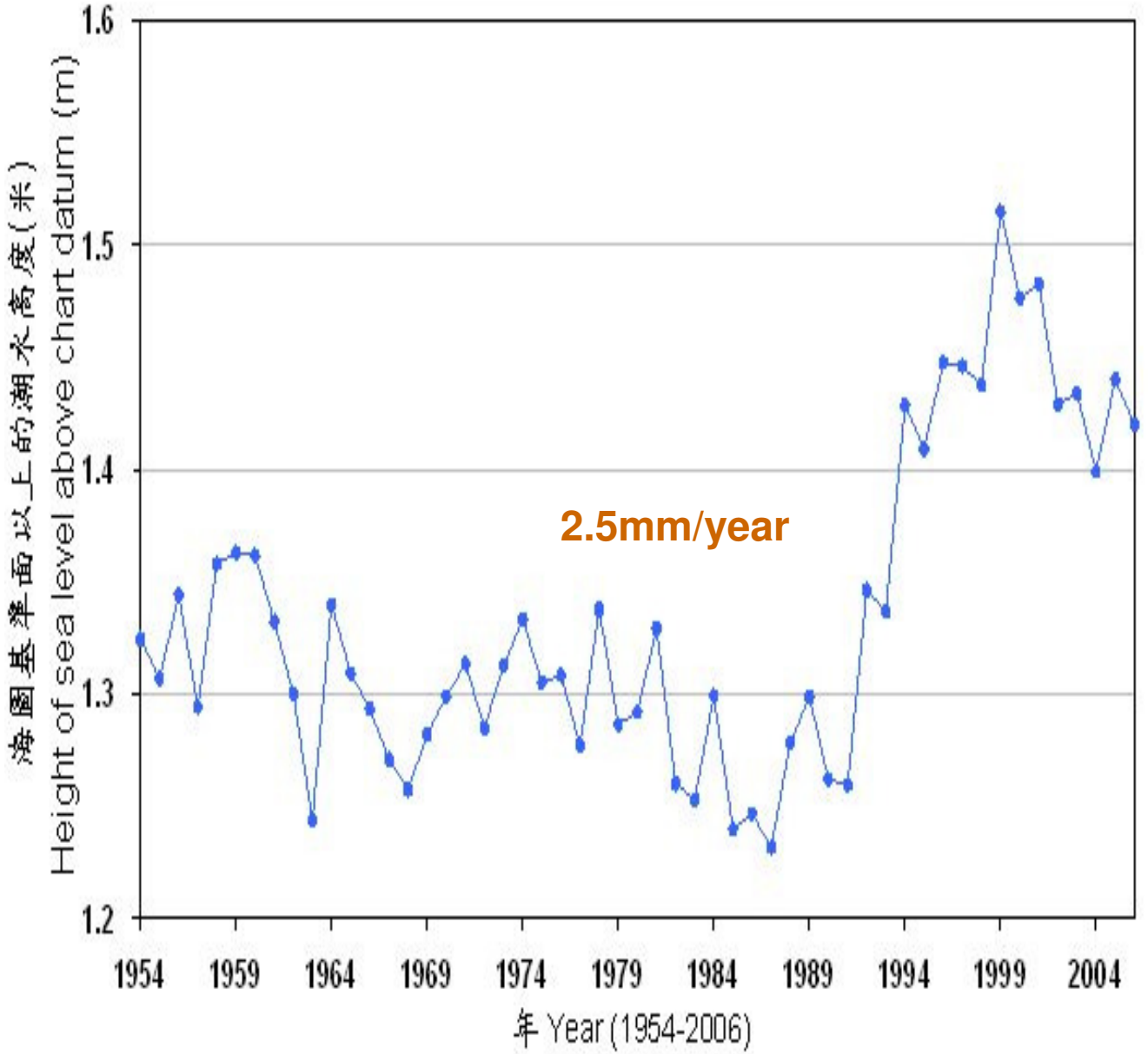


Pressing problem - water resources in China

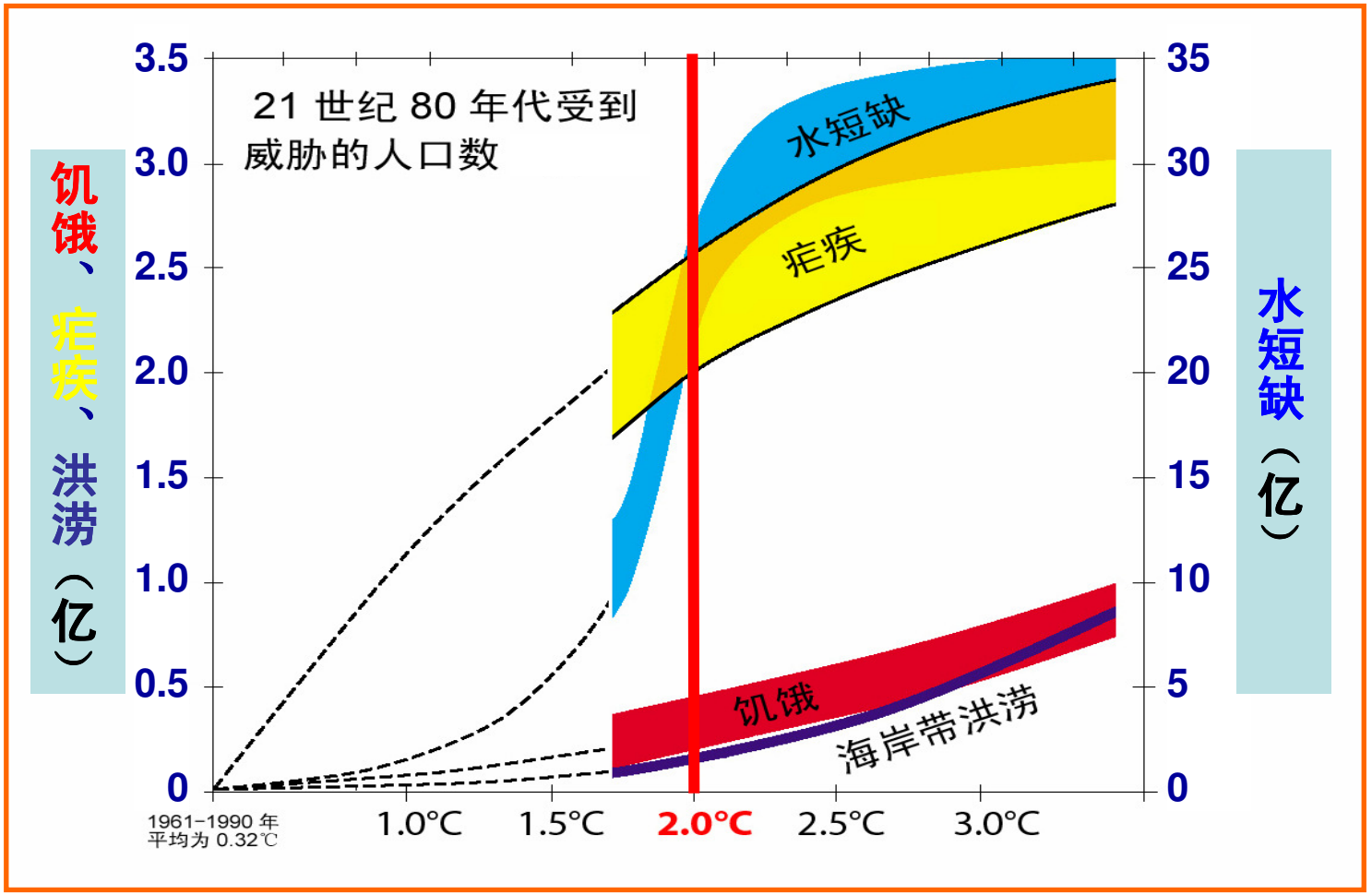
- *Since 1950, significant flow rate reduction in 6 major rivers in China. Haihe (海河) being worst affected :*
  - 3.7% per year.

Mean Sea Level Rise in Hong Kong

- **Rise by 0.18m – 0.59m by 2100, IPCC 2007;**
- **Return period of storm surges greatly reduced, e.g. from 100 yrs to 4 yrs; from 300 to 10 yrs;**
- **Saline tide – impact on water resource;**

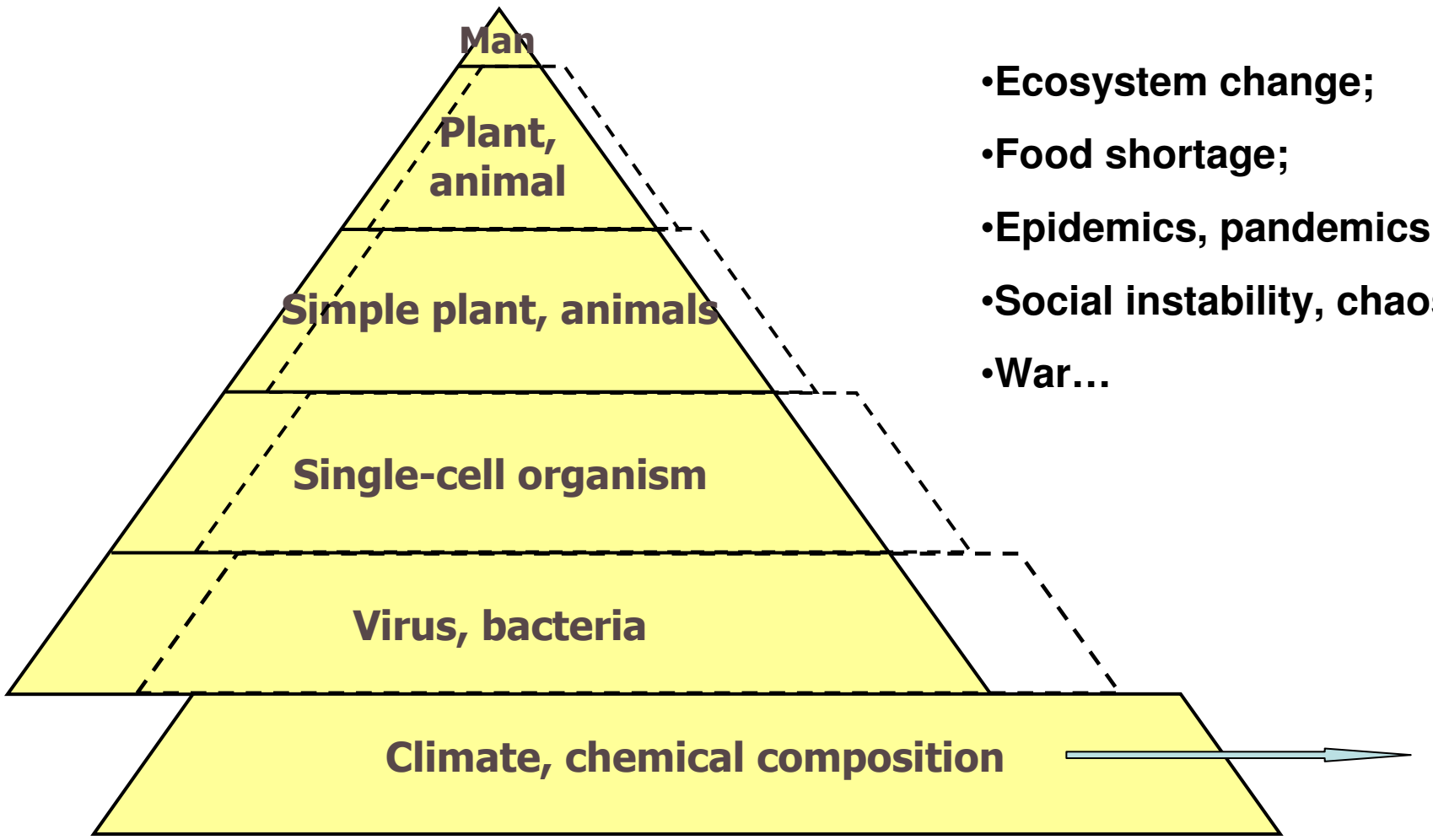


Threats associated with global warming



(IPCC，AR4，2007)

Restructuring of Climate-ecosystem



- **Ecosystem change;**
- **Food shortage;**
- **Epidemics, pandemics;**
- **Social instability, chaos;**
- **War…**

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Fossil record supports evidence of impending mass extinction

Evidence shows that global biodiversity is relatively low during warm 'greenhouse' phases and extinctions relatively high, while the reverse is true in cooler 'icehouse' phases.

Dr Peter Mayhew, University of York, 24 Oct 2007

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HONG KONG OBSERVATORY

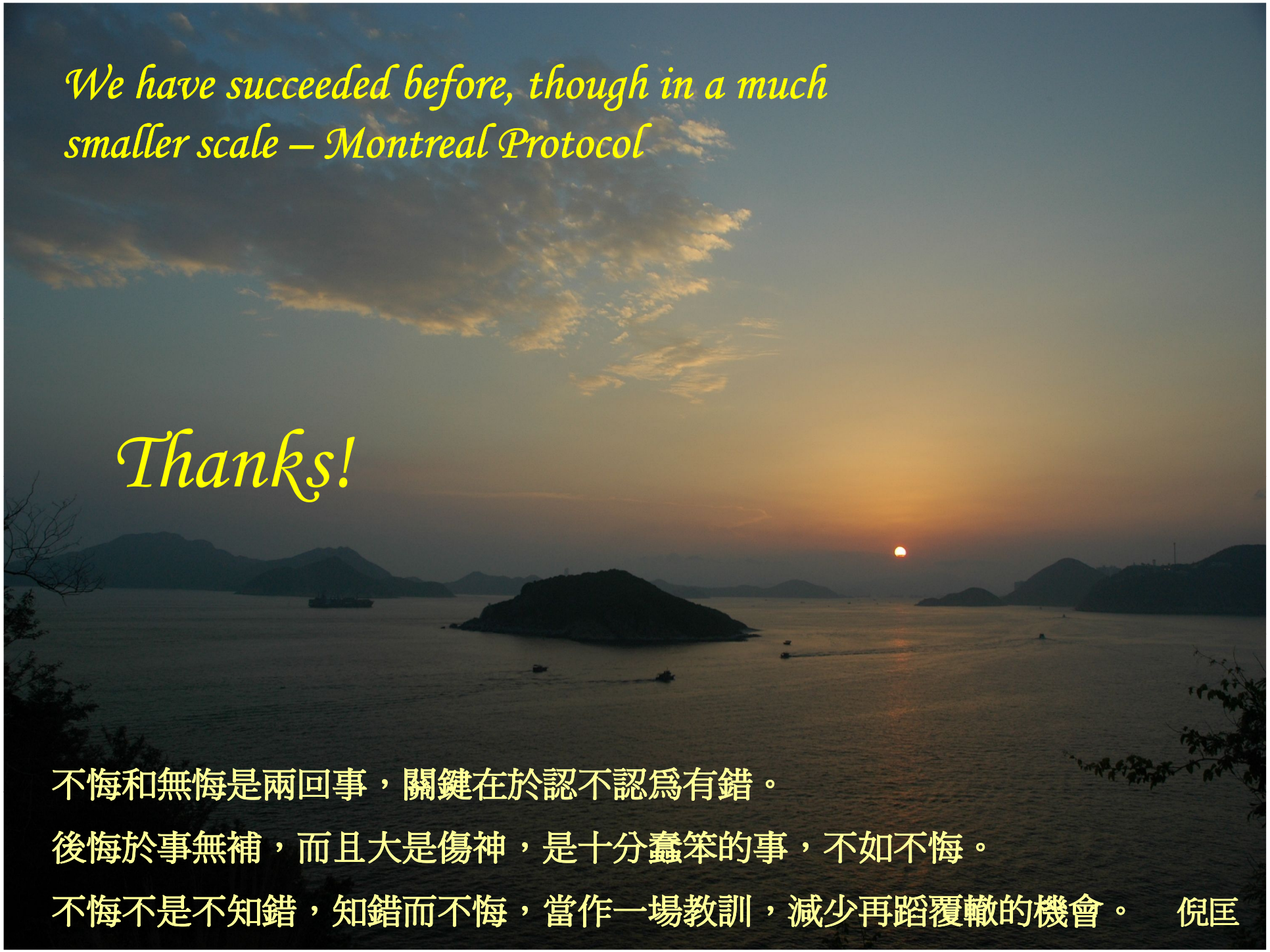
What next ?

- *'Pay now - or later' – General Zinni, former commander of US Central Command.*
- *"It's not hard to make the connection between climate change and instability, or climate change and terrorism."*
- *"We will pay for this one way or another. We will pay to reduce greenhouse gas emissions today, and take an economic hit of some kind."*
- *"Or we will pay the price later in military terms. And that will involve human lives. There will be a human toll."*

***National Security and the Threat of Climate Change*, 2007, CNA Corporation**

Stern Report, 2006

- *A value judgment and risk assessment exercise – decision makers need a richer understanding of the scale and nature of the risks involved;*
- *Biggest risk: abrupt changes with large chances of strong damages, particularly when climate change interacts with other vulnerabilities and tensions;*
- *Sensible range of stabilization of CO_2 : 450 – 550 ppm;*
- *Annual cost of 1% GDP to meet a 550ppm stabilization;*
- *Costs of inaction far exceed the costs of action.*


We have succeeded before, though in a much smaller scale – Montreal Protocol
Thanks!
不悔和無悔是兩回事，關鍵在於認不認爲有錯。
後悔於事無補，而且大是傷神，是十分蠢笨的事，不如不悔。
不悔不是不知錯，知錯而不悔，當作一場教訓，減少再蹈覆轍的機會。 倪匡