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Presentation Title: Climate Change

Is there any common ground between climate science, social justice and biblical Christian theology? A discussion informed by multidisciplinary perspectives

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Theology on Tap, Sunday 6 November 2016, 4:00pm

The Crown Hotel, 446 Lutwyche Rd, Brisbane

Brought to you by the Theology on Tap team: Charles Ringma, Paul Mercer, Paul Tyson, Sue Greenall, Terry Gatfield & Theo Skordilis

www.theologyontapbrisbane.wordpress.com

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(Theological considerations)

Contents

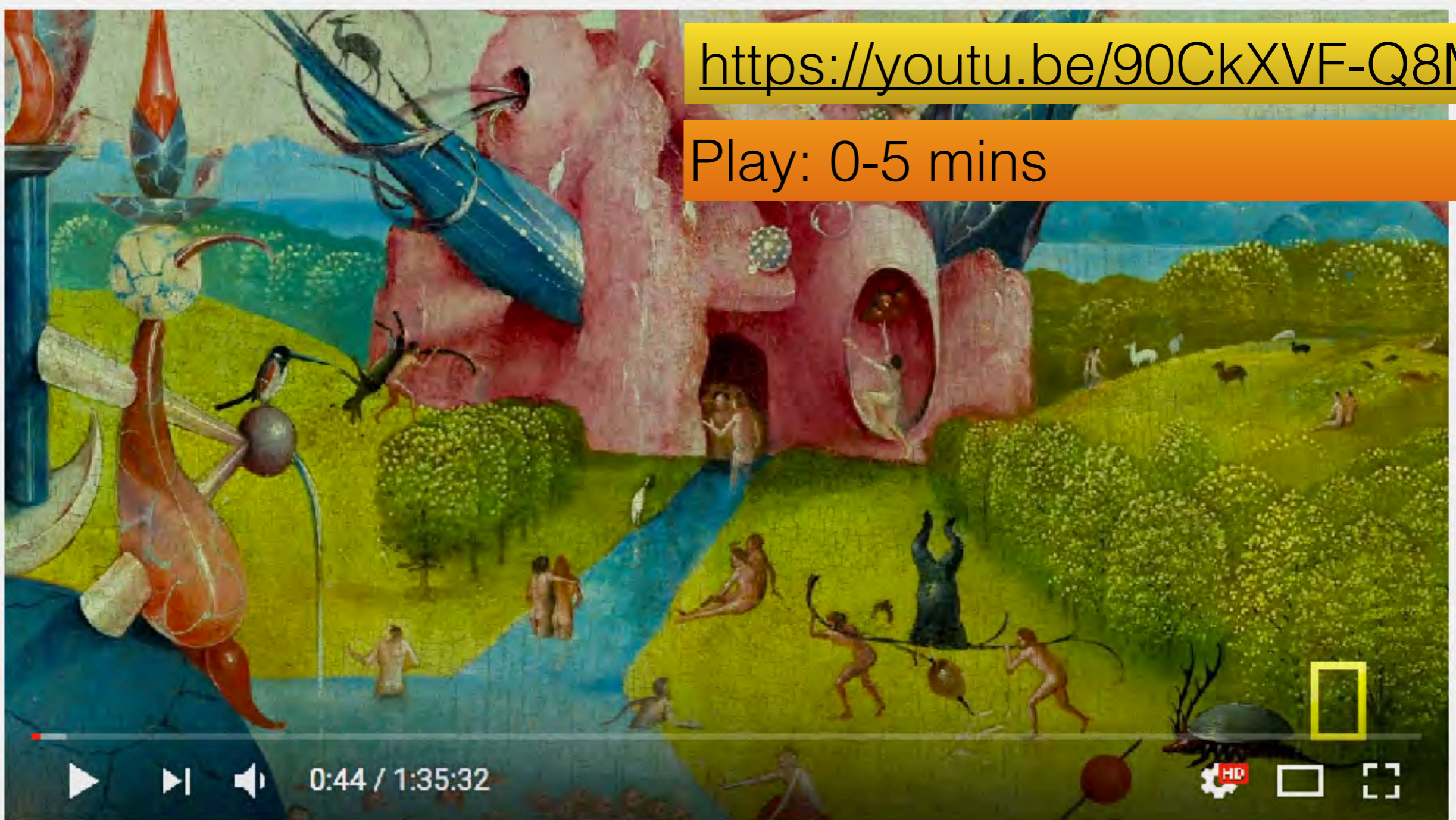
Presentation in three chapters

- Introduction
- Climate Science
- Theological Implications



<https://youtu.be/90CkXVF-Q8M>

Play: 0-5 mins



#5 on Trending

Before the Flood - Full Movie | National Geographic



National Geographic

Subscribe 5,266,008

7,696,454 views

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Johann Wolfgang von Goethe

- “Nothing can be compared to the new life that the discovery of another country provides for a thoughtful person. Although I am still the same I believe to have changed to the bones.”

(Johann Wolfgang von Goethe, Italian Journey)



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Rising seas to push out 500 million

Download audio

show transcript

Saturday 20 July 2013 12:31PM [\(view full episode\)](#)

On average, the seas are expected rise by one metre by the end of the century. This means the relocation of 500 million people whose homes and land will be inundated. There are currently no plans to manage this. Johannes Leutz is studying the best way to tackle these approaching massive problems.



IMAGE: MATSUNGAN ISLAND CHIEF JOHN KELA STANDING ON WHAT



Saturday 12 noon
Repeated: Thursday 9pm

How did I become interested in climate change?

<https://www.science.unsw.edu.au/news/research-slowing-rising-tide>

www.abc.net.au/radionational/programs/scienceshow/rising-seas-to-push-out-500-million/4831836

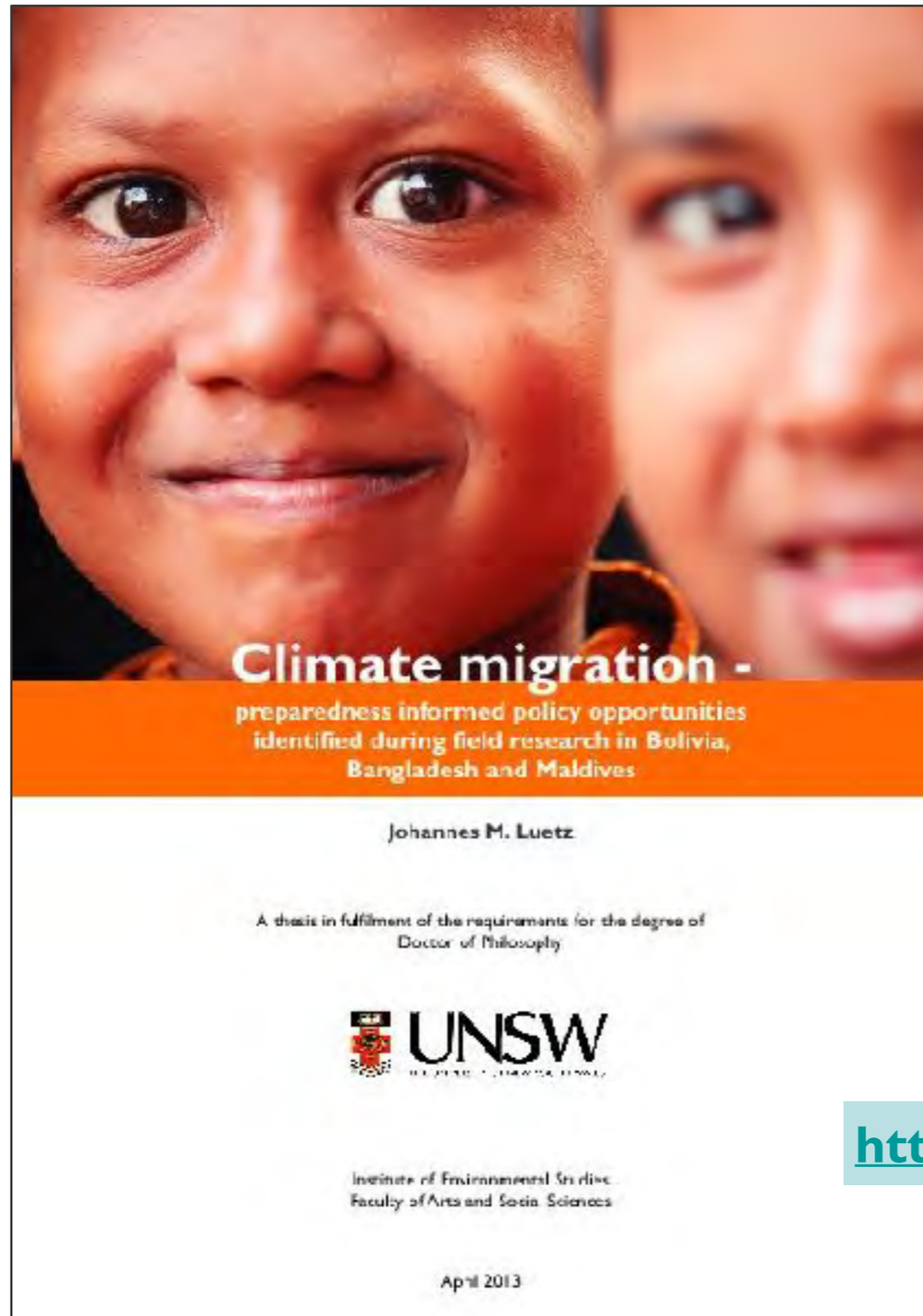
PLANET PREPARE

2008 World Vision
Preparedness Study

Protect Development
Research Priorities
Empower Communities
Partner And Network
Advocate Justice And Change
Reinforce Disaster Defences
Educate Children



http://wvasiapacific.org/downloads/publications/PlanetPrepare_LowRes.pdf



Field research:

Papua New Guinea

Bolivia

Bangladesh

India

Maldives

Philippines

<http://handle.unsw.edu.au/1959.4/52944>

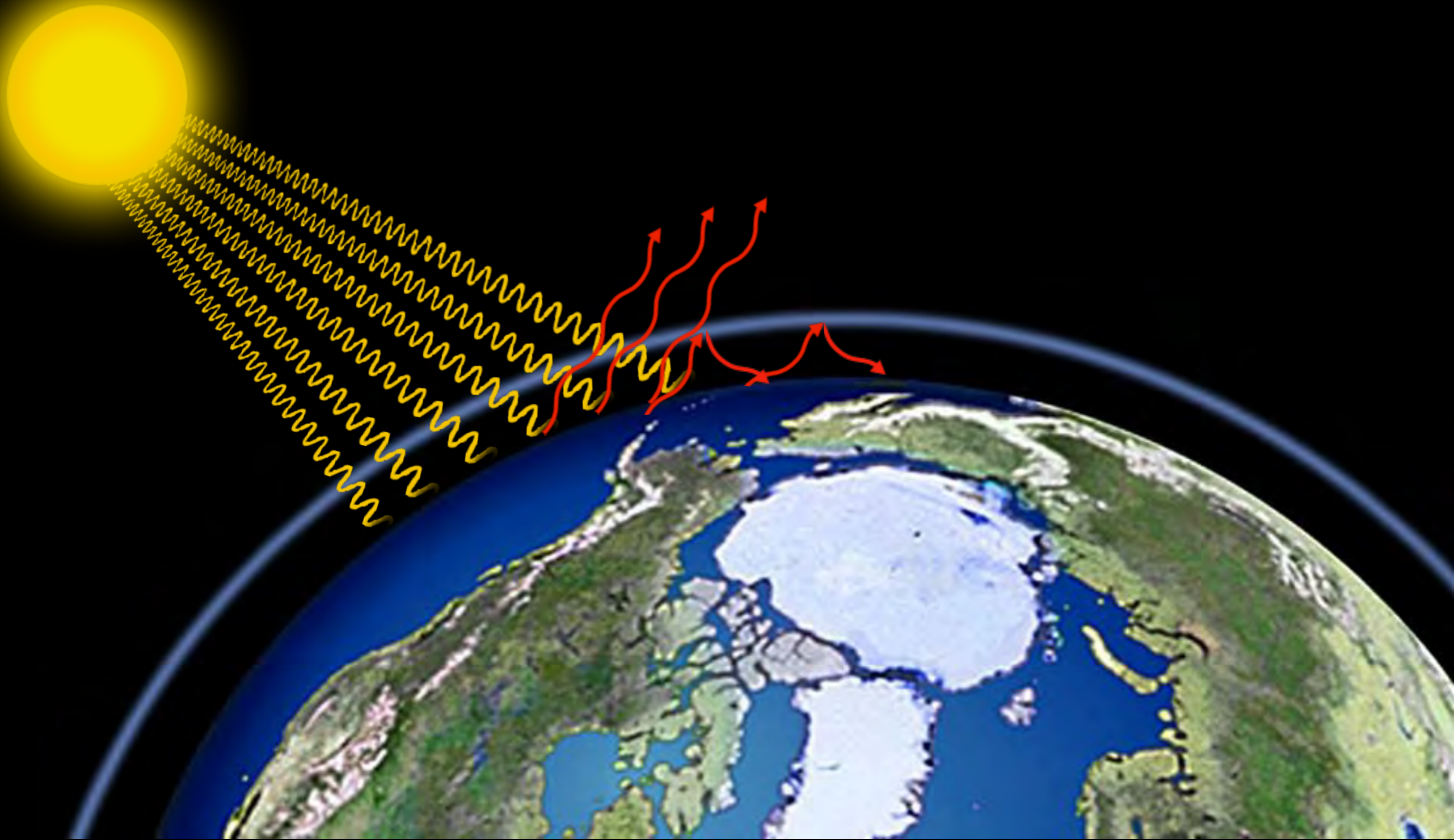
Island of Matsungan, Papua New Guinea

Chief Kela: “What will the future hold for our children and grandchildren?”



Smokestacks spewing greenhouse gases, including water vapor: Many people assume that Earth is too vast to harm through human activity, or that the planet can recover quickly from environmental harm. But multiple lines of evidence point to carbon pollution as the cause of recent climate warming, and indicate that warming has already had an impact on physical and biological systems around the world.

Increased trapping of heat: The atmosphere continues to warm as we add more and more CO₂ and other greenhouse gases to the atmosphere.



Where Do Greenhouse Gases Come From?



THAWING PERMAFROST

AIR
TRANSPORT

COAL MINING

COAL PLANTS

OIL PRODUCTION

INDUSTRIAL PROCESSES

CROP BURNING

FERTILISATION

FOREST BURNING

INDUSTRIAL AGRICULTURE

LAND
TRANSPORTATION

LANDFILLS

Climate Change:

“ **Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use. Note that the United Nations Framework Convention on Climate Change (UNFCCC), in its Article 1, defines climate change as: ‘a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods’. The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition, and climate variability attributable to natural causes. See also Climate variability; Detection and Attribution.**

”

—Intergovernmental Panel on Climate Change, 2007:
Fourth Assessment Report; Synthesis Report, p. 78.

UNSW-produced video scripted for Leadership Networks for Climate Change (LNCC) explains that climate change cannot be stopped overnight; early action is therefore urgent.



<https://youtu.be/d0Je8ZkGYA8>

<http://tv.unsw.edu.au/video/hit-the-brakes>

Stopping distance

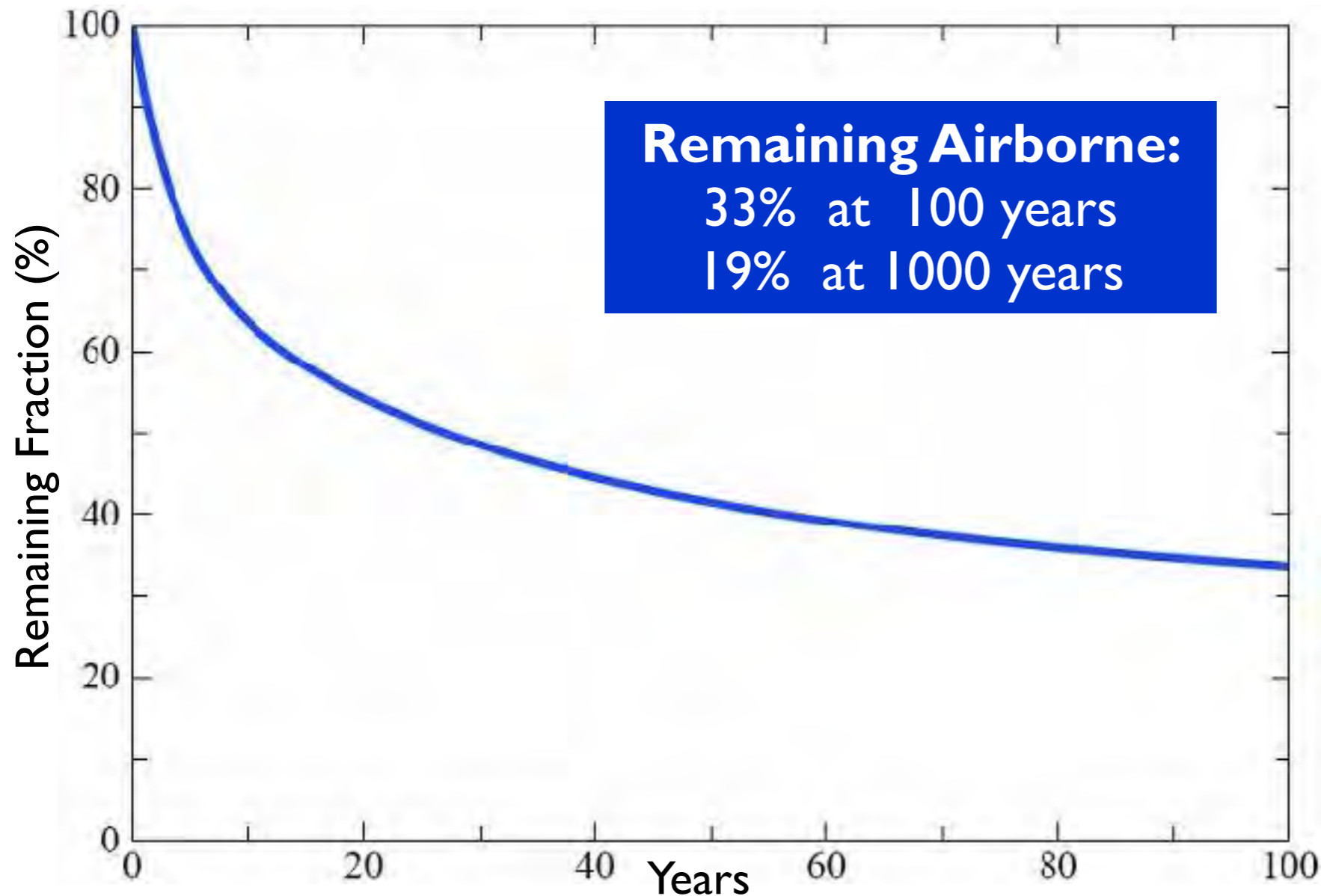


“ There is a window of opportunity for avoiding the most damaging climate change impacts, but that window is closing: the world has **less than a decade** to change course. Actions taken – or not taken – ...will have a profound bearing on the future.

”

2007/2008 United Nations Human Development Report

Slow decay of fossil fuel CO₂ emissions



The fraction of CO₂ remaining in the air, after emission by fossil fuel burning, declines rapidly at first, but 1/3 remains in the air after a century and 1/5 after a millennium.

(Hansen, J, 2007, *Atmos. Chem. Phys.* **7**, 2287-2312).

**Example calculation:
Canada trip (2010)
Boeing 767-300**



**1t Jet Fuel Burned
= 3.157t CO₂ Emissions**

(Photo: Adrian Pingstone)

Longevity of CO₂

Top of Atmosphere as seen from space at 335km altitude
(Photo: NASA Earth Observatory)

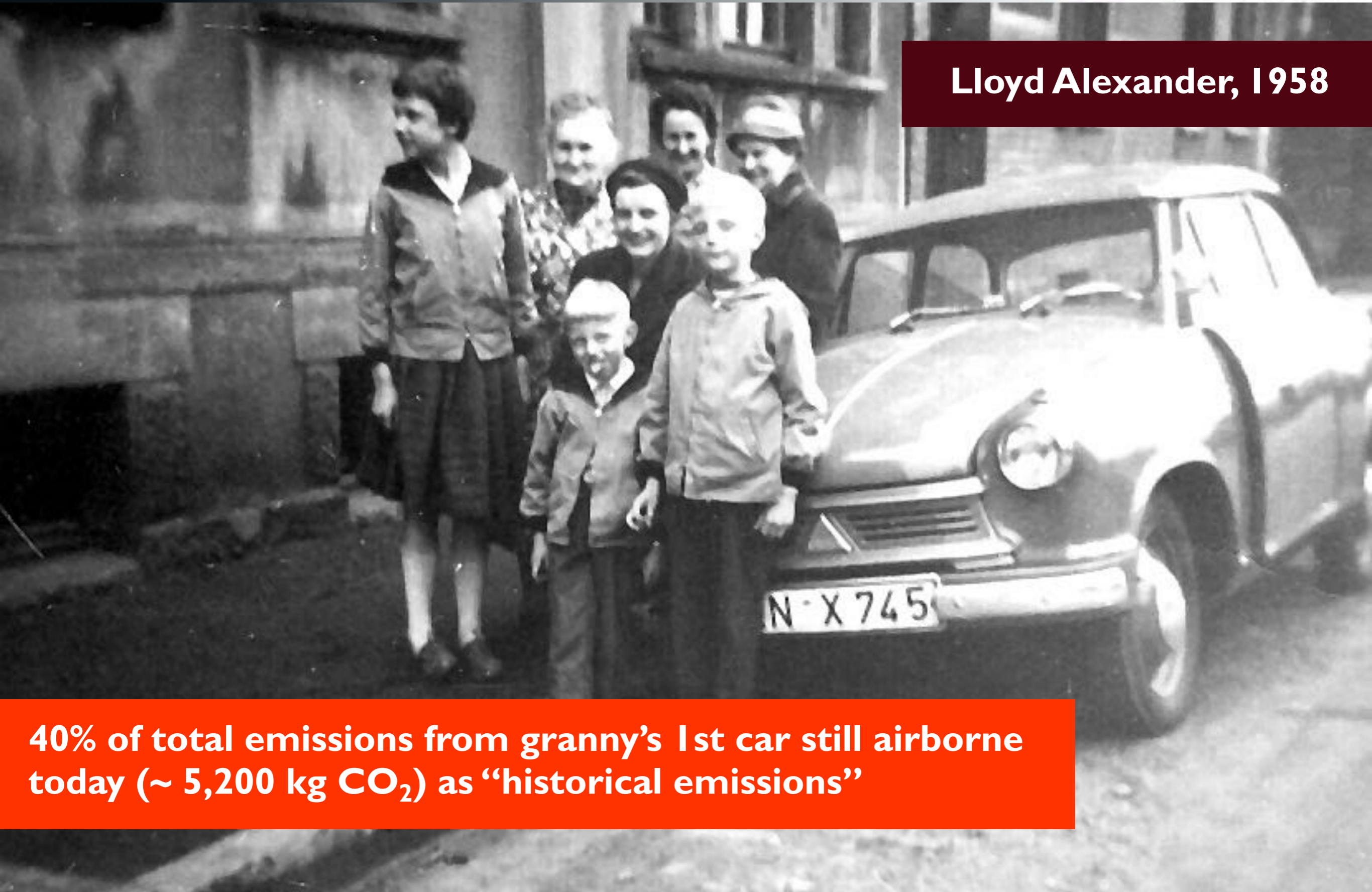
**Per-capita emissions for
Canada trip in 2010: 1.4t CO₂
(2110: 460kg, 3010: 260kg)**

*** 2.7 (Radiative Forcing
Index, RFI) = ~ 3.8t CO₂**



“Granny Maria” – 1958

Lloyd Alexander, 1958



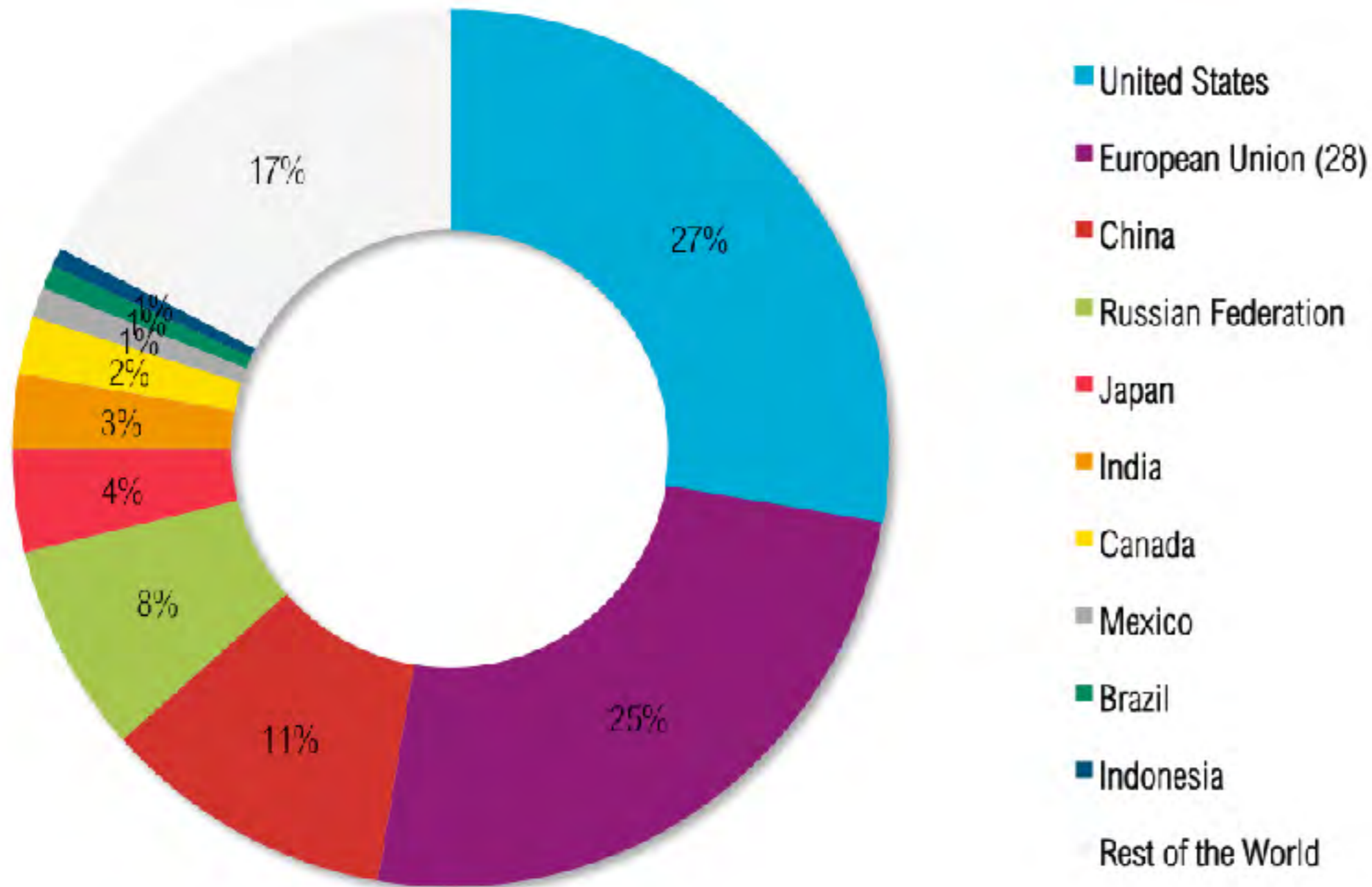
40% of total emissions from granny's 1st car still airborne today (~ 5,200 kg CO₂) as "historical emissions"

Cumulative CO₂ Emissions 1850-2006

Rank	Country	Mt CO ₂ e	% of World Total
1	United States of America	333,747.8	29.00%
2	European Union (27)	305,750.1	26.57%
3	China	99,204.2	8.62%
4	Russian Federation	93,081.6	8.09%
5	Germany	[80,377.0]	[6.99%]
6	United Kingdom	[68,235.8]	[5.93%]
7	Japan	44,535.2	3.87%
8	France	[32,278.6]	[2.81%]
9	India	27,433.6	2.38%
10	Canada	25,133.1	2.18%
Top 10	Cumulative Total	928,886	80.71%

Cumulative CO₂ Emissions 1850–2011 (% of World Total)

<http://www.wri.org/blog/2014/11/6-graphs-explain-world%E2%80%99s-top-10-emitters>

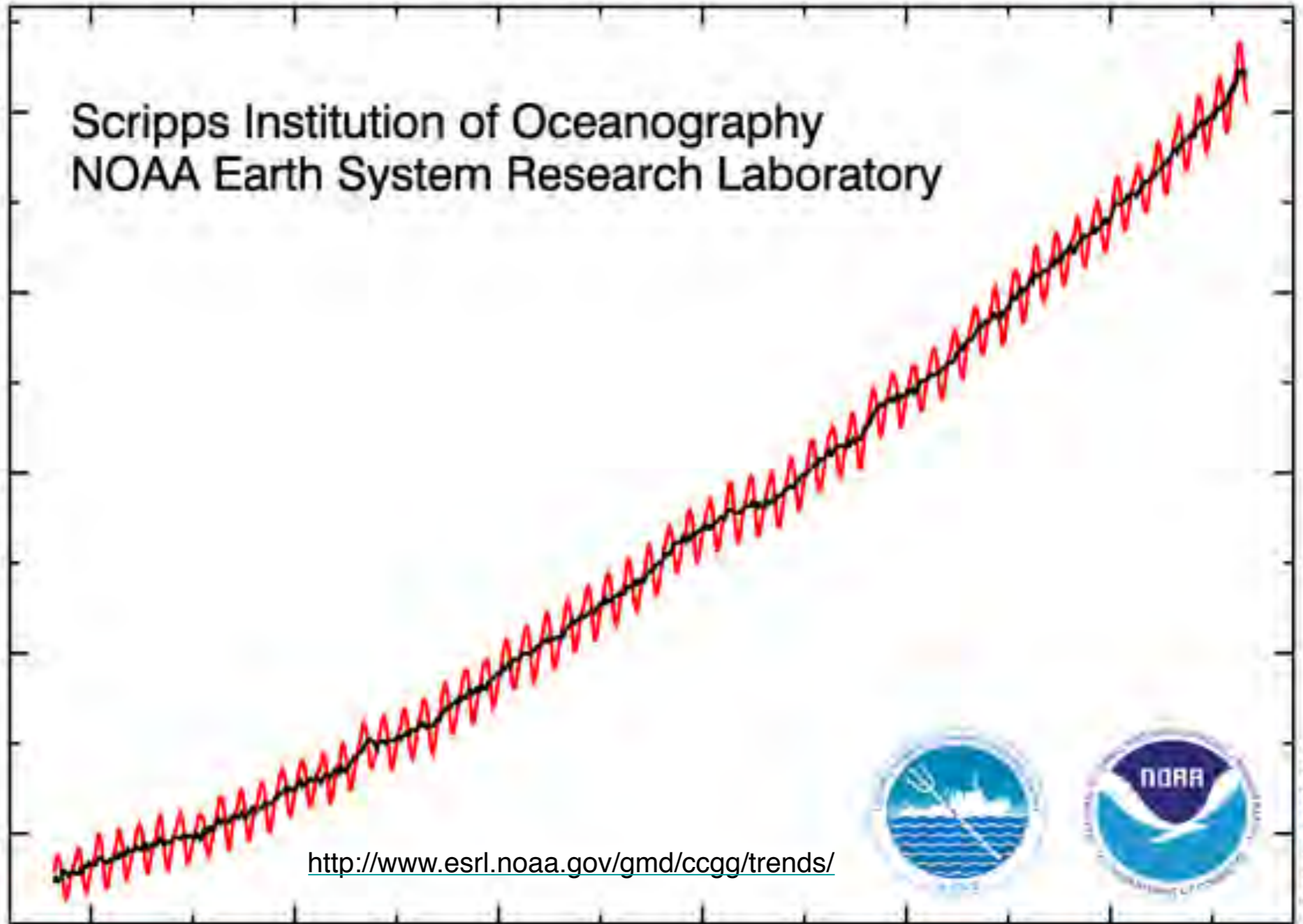


Atmospheric CO₂ at Mauna Loa Observatory

Scripps Institution of Oceanography
NOAA Earth System Research Laboratory

PARTS PER MILLION

400
380
360
340
320



1960

1970

1980

1990

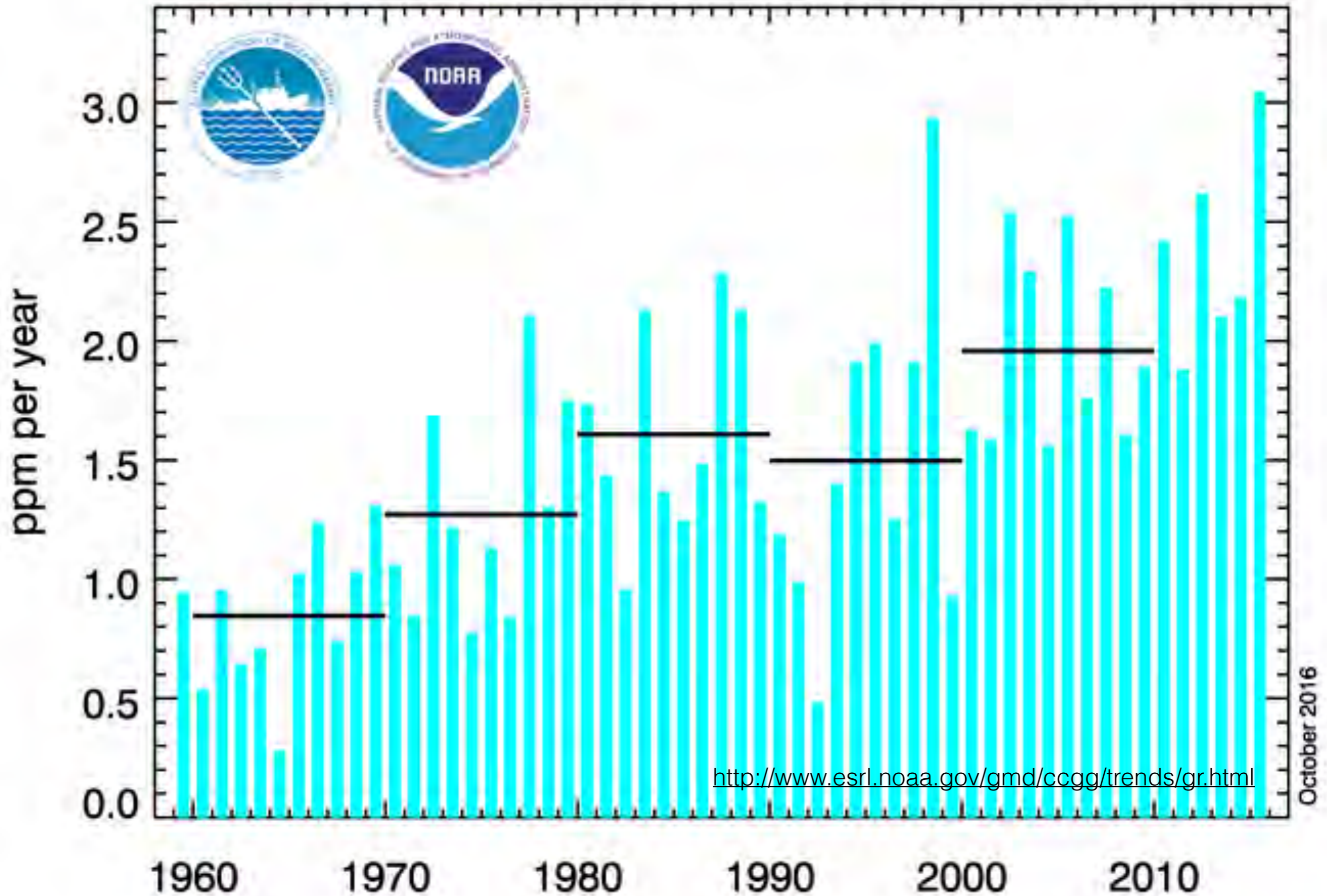
2000

2010

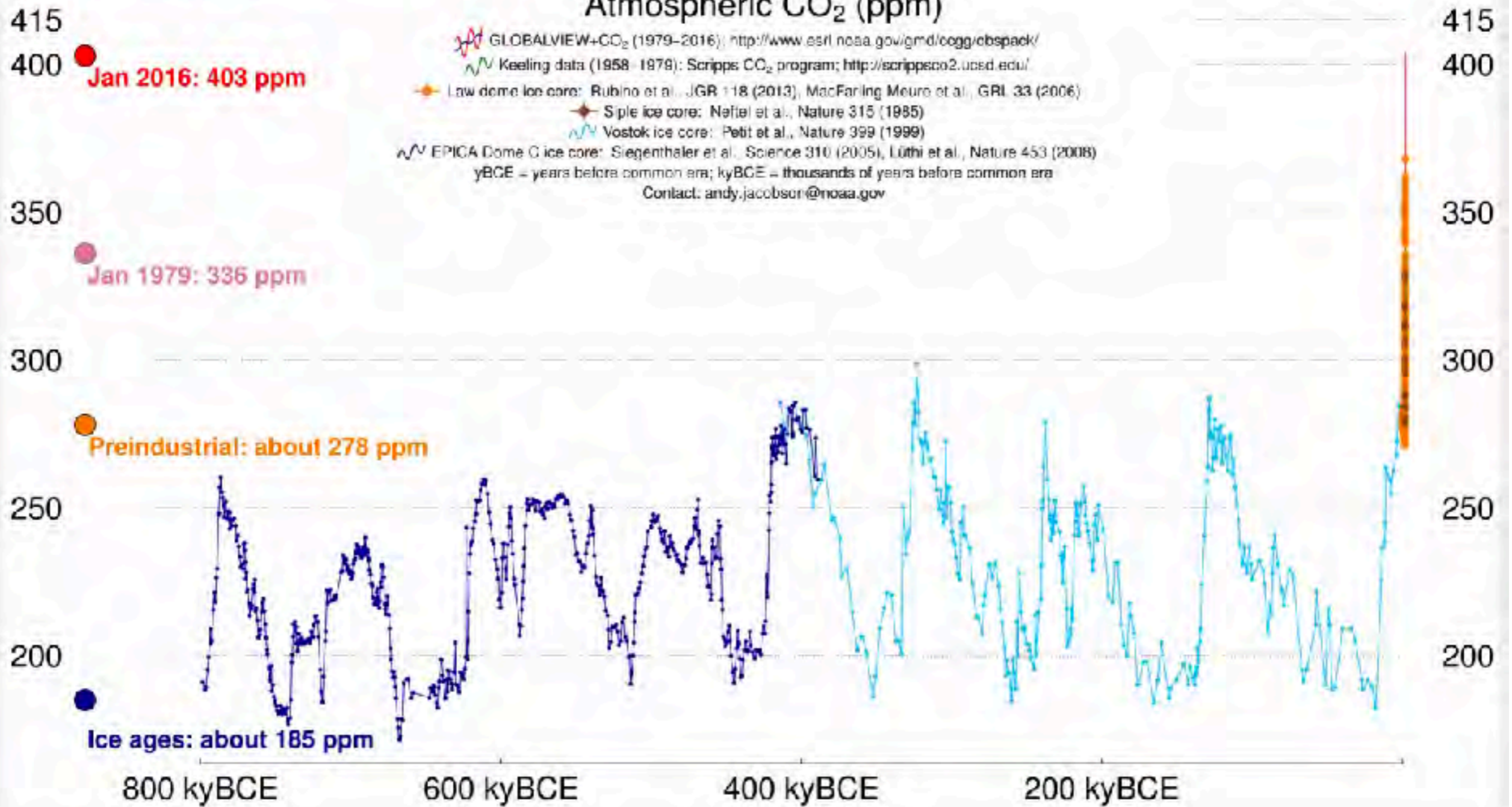
YEAR

October 2015

annual mean growth rate of CO₂ at Mauna Loa



Atmospheric CO₂ (ppm)



Pumphandle 2016



CarbonTracker

Abonnieren 500

<https://youtu.be/gH6fQh9eAQE>

7.381 Aufrufe

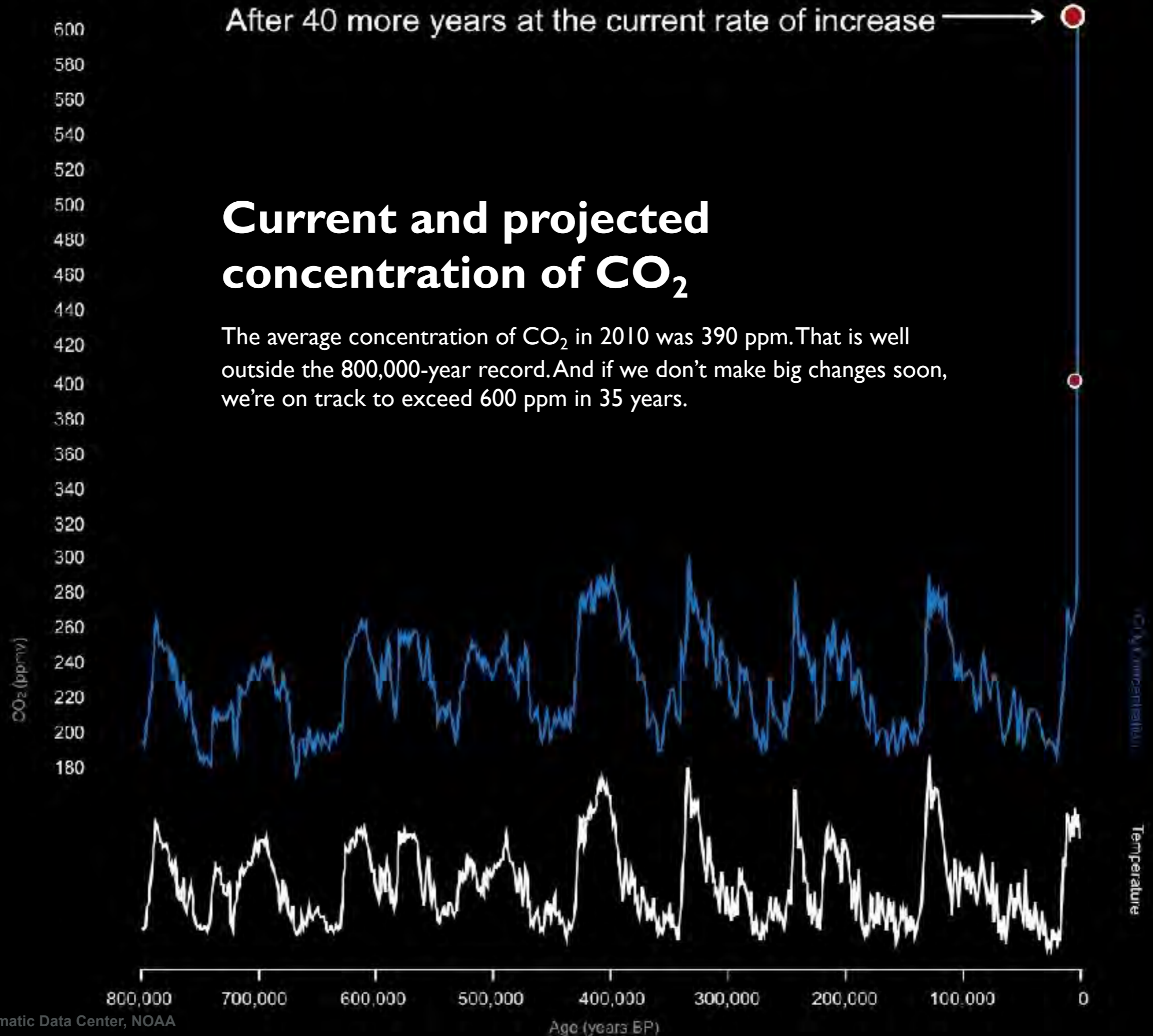
Hinzufügen Teilen Mehr

48 0

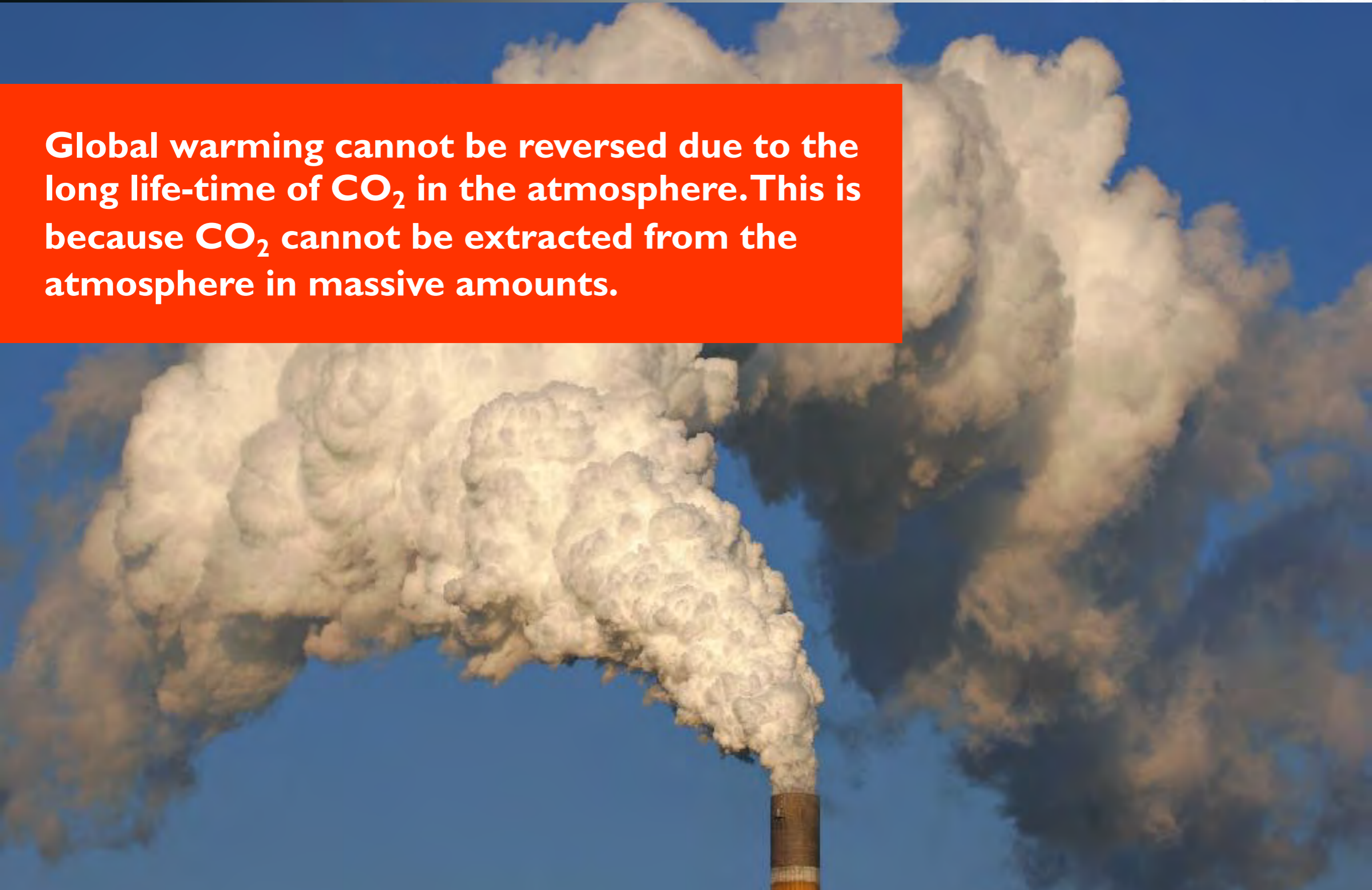
After 40 more years at the current rate of increase →

Current and projected concentration of CO₂

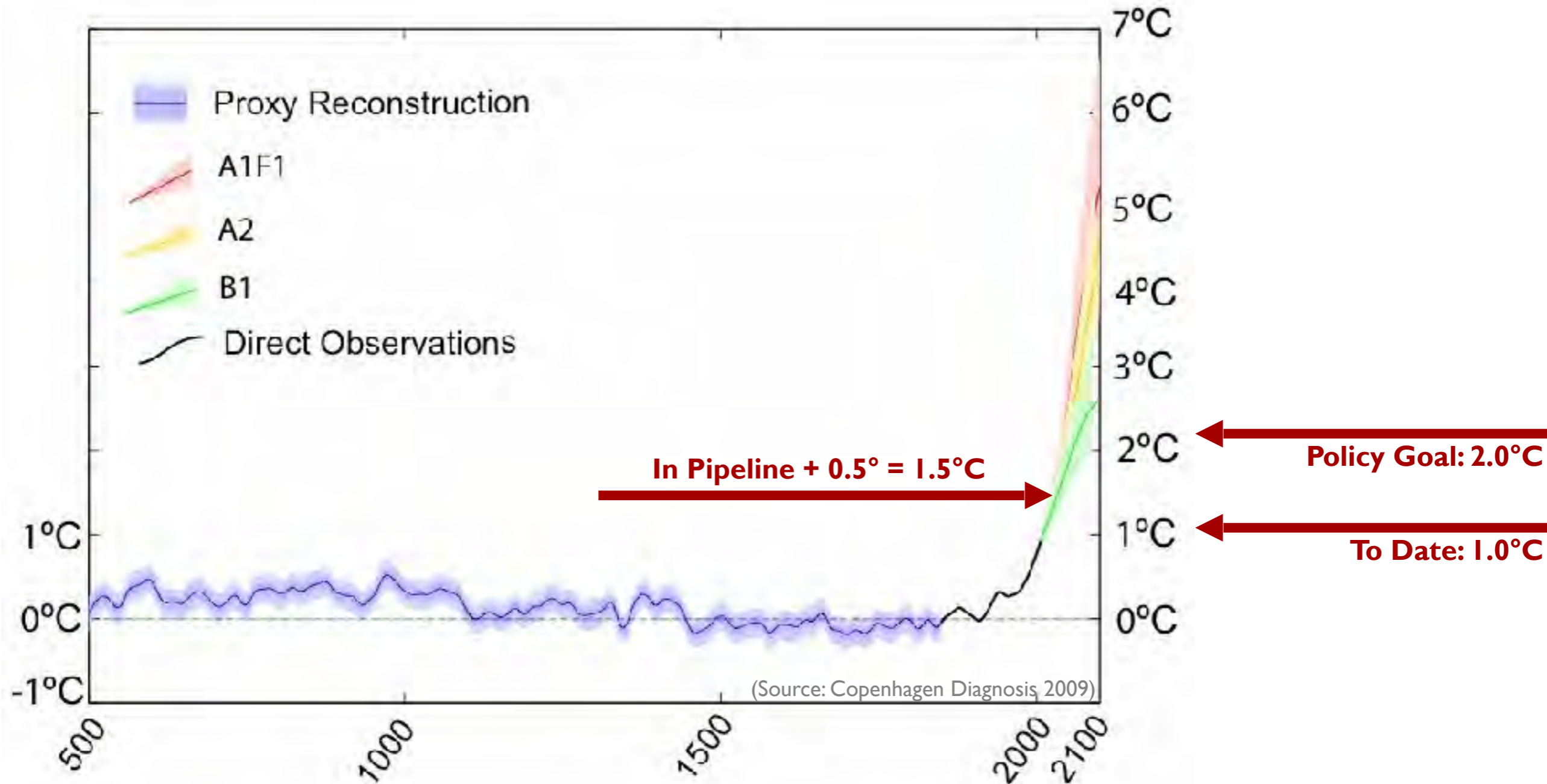
The average concentration of CO₂ in 2010 was 390 ppm. That is well outside the 800,000-year record. And if we don't make big changes soon, we're on track to exceed 600 ppm in 35 years.



Global warming cannot be reversed due to the long life-time of CO₂ in the atmosphere. This is because CO₂ cannot be extracted from the atmosphere in massive amounts.



Reconstructed, observed and future warming projections



Our planet has a fever

Droughts, floods, downpours, storms,
surges, sea level rise, ...

“Climate change will make it harder to manage the world’s water. People will feel many of the effects of climate change through water. The entire water cycle will be affected. While the world as a whole will get wetter as warming speeds up the hydrological cycle, increased evaporation will make drought conditions more prevalent. Most places will experience more intense and variable precipitation, often with longer dry periods in between. The effects on human activity and natural systems will be widespread.”

—*World Bank, World Development Report 2010*

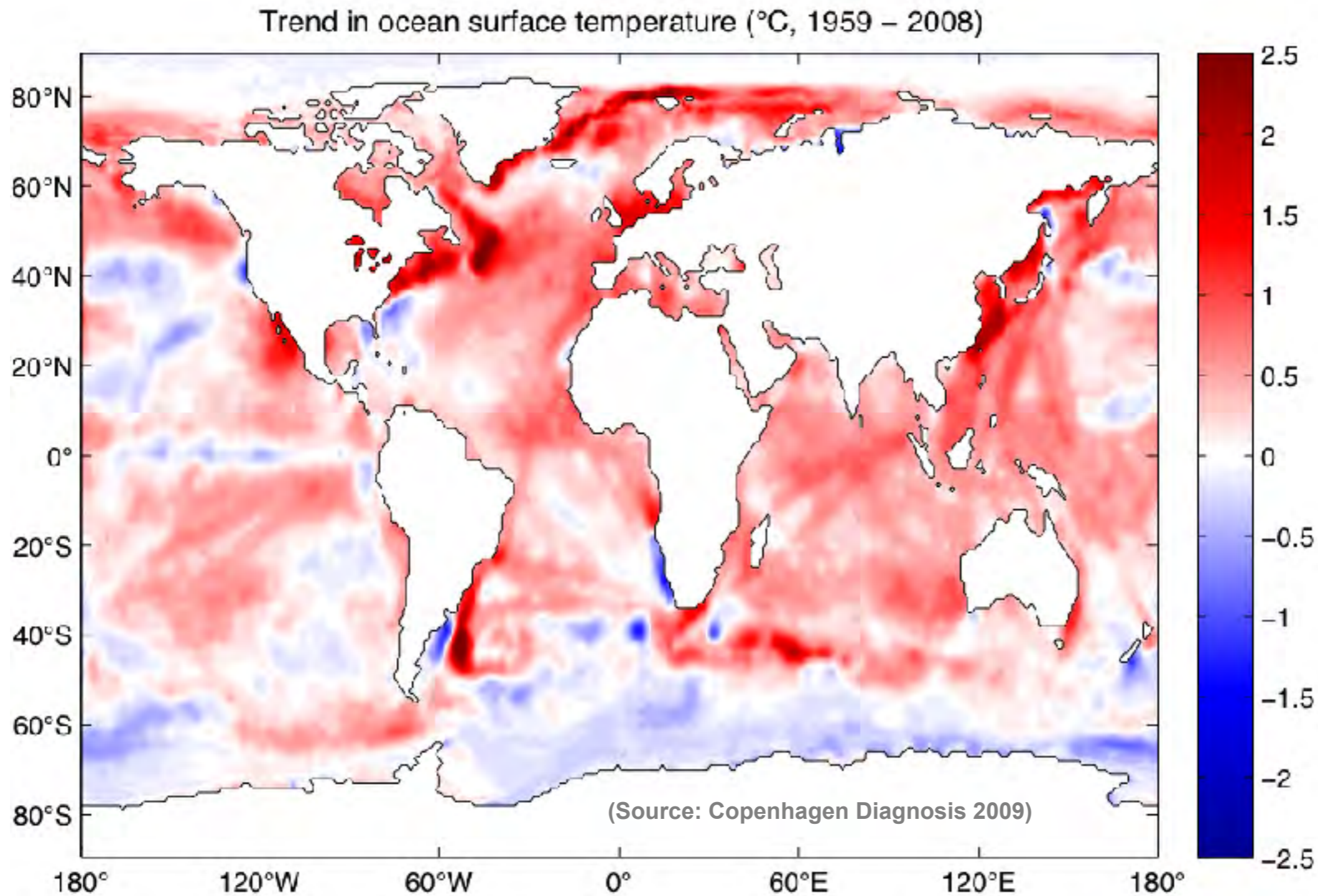
Tropical Storm Ketsana over the Philippines, 26 September 2009

Study: 1°C global warming = 30% increase in tropical cyclones?

(Copenhagen Diagnosis 2009)

Photo: National Oceanic and Atmospheric Administration (NOAA)

Ocean heat uptake 50% higher than previous calculations



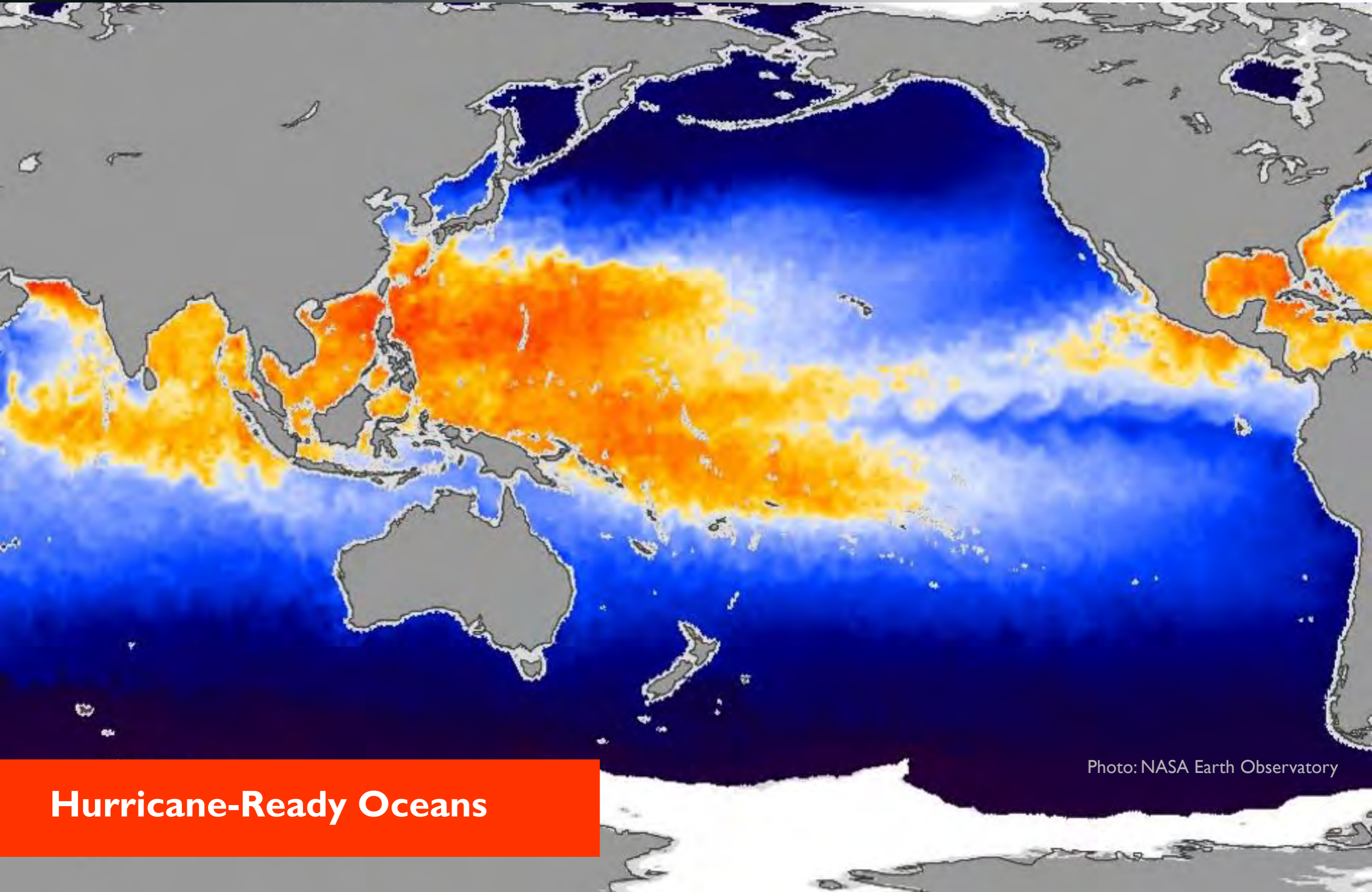
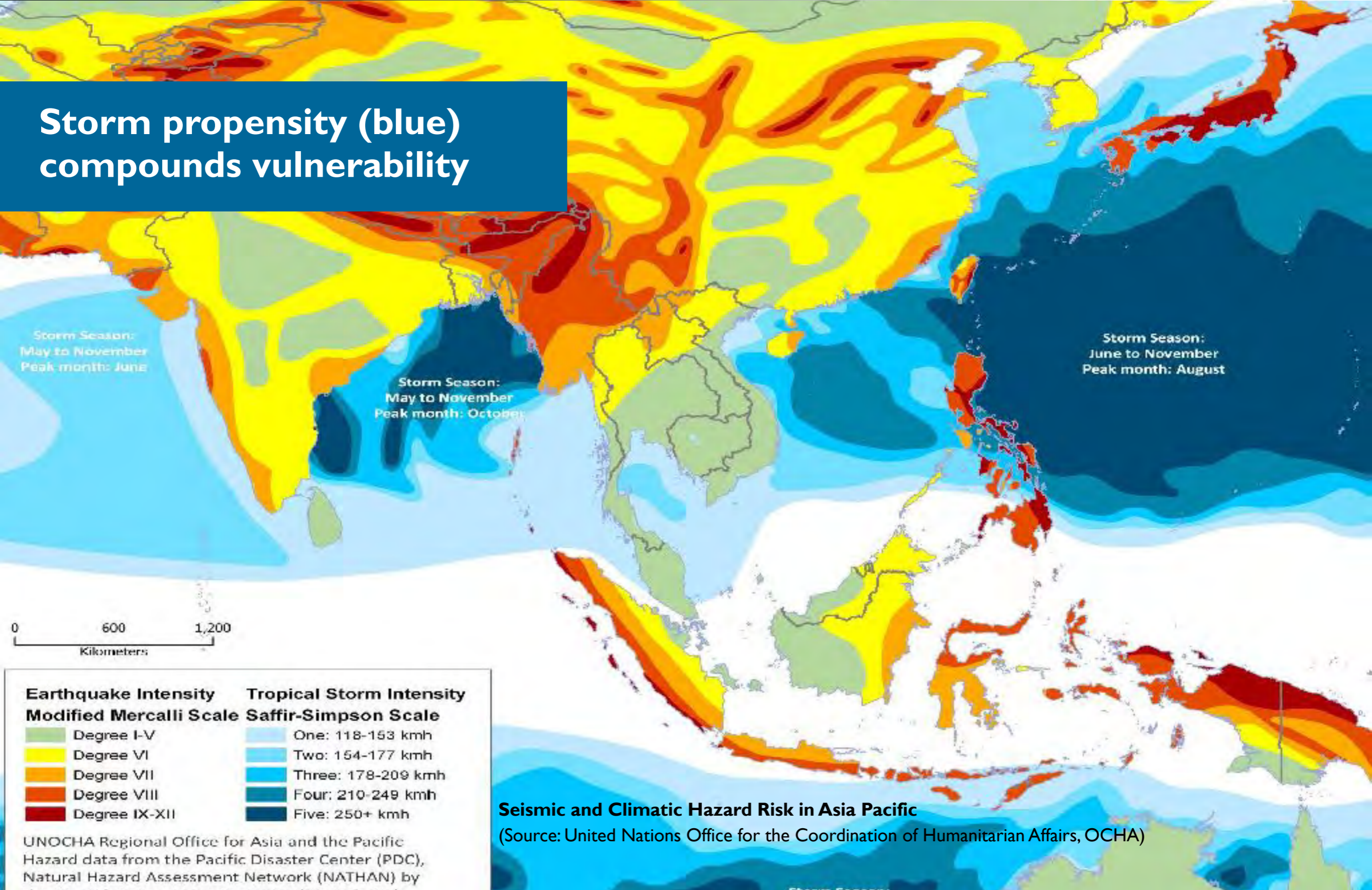


Photo: NASA Earth Observatory

Hurricane-Ready Oceans

Storms & Earthquakes

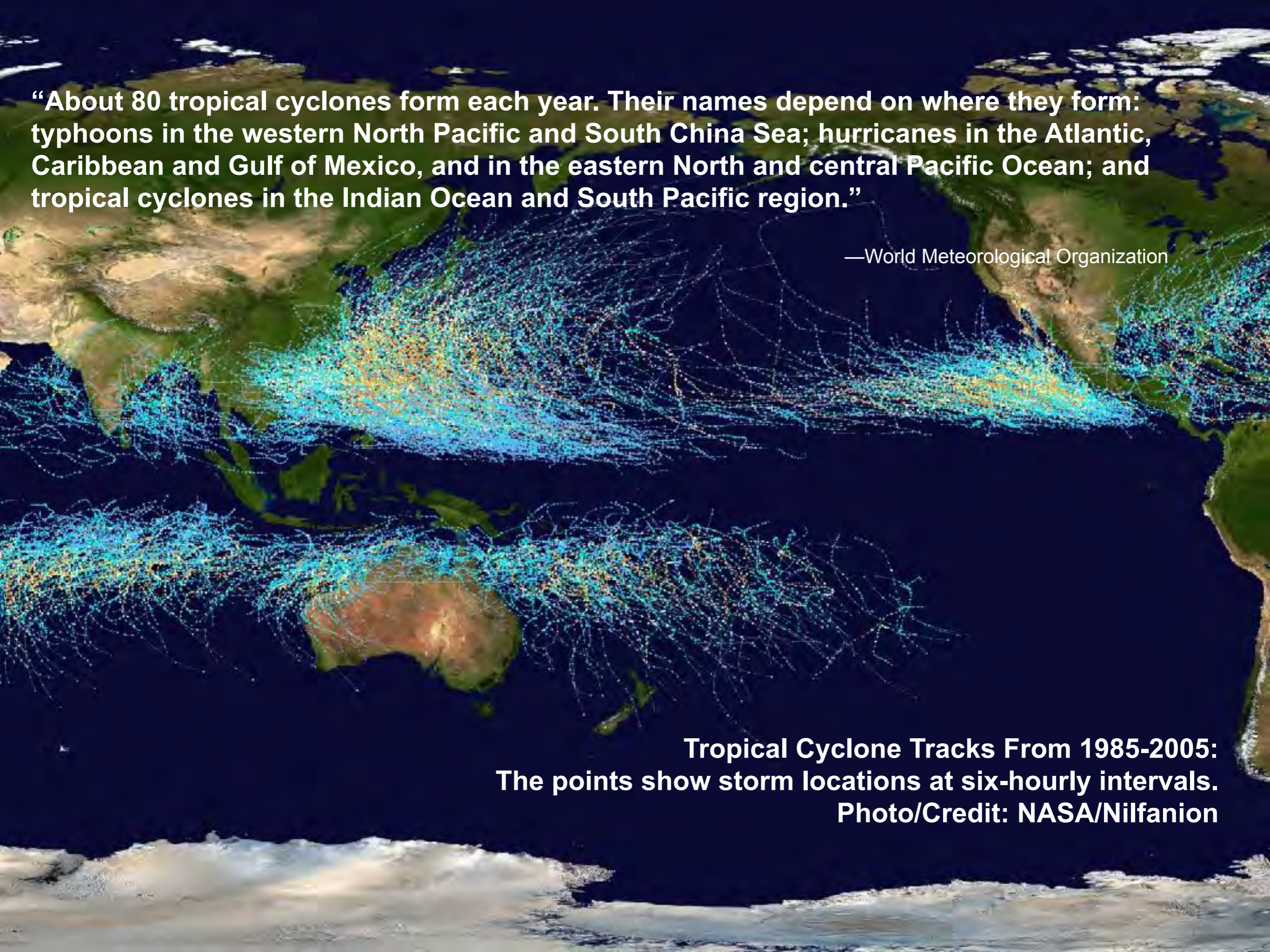


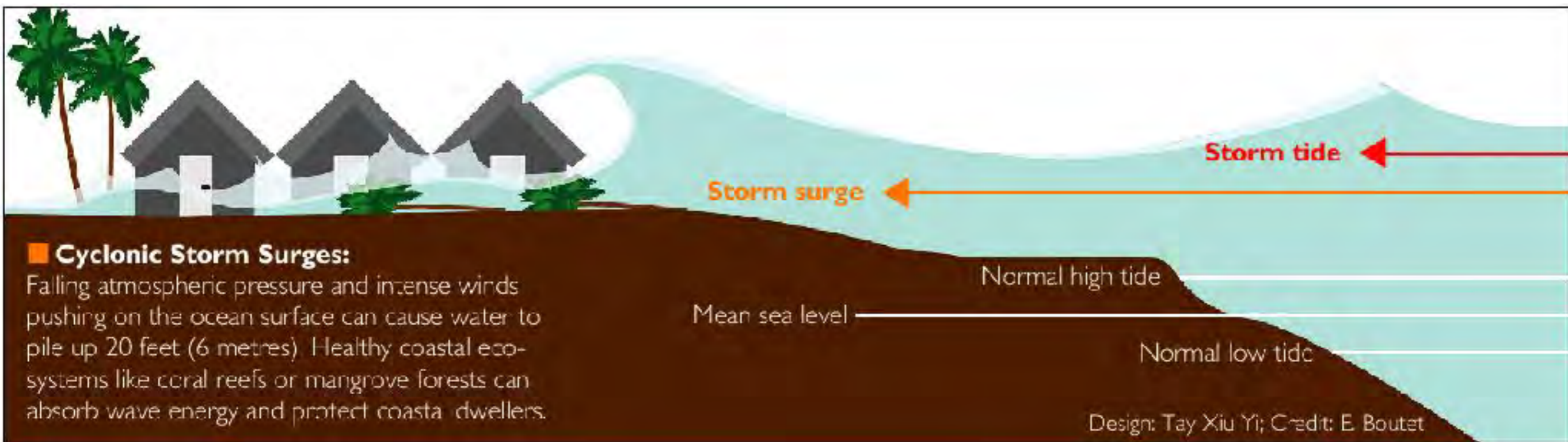
Seismic and Climatic Hazard Risk in Asia Pacific
(Source: United Nations Office for the Coordination of Humanitarian Affairs, OCHA)

“About 80 tropical cyclones form each year. Their names depend on where they form: typhoons in the western North Pacific and South China Sea; hurricanes in the Atlantic, Caribbean and Gulf of Mexico, and in the eastern North and central Pacific Ocean; and tropical cyclones in the Indian Ocean and South Pacific region.”

—World Meteorological Organization

**Tropical Cyclone Tracks From 1985-2005:
The points show storm locations at six-hourly intervals.
Photo/Credit: NASA/Nilfanion**





<http://www.chrispforr.net/phils/survivors/survivors.htm>



Show field research video footage:

File name “Philippines 5”:

20:30 (1 min) – Typhoon belt shifted south

31:00 (1 min) – Wealth accounting

File name “Philippines 8”:

05:00 (1 min) – Severe Tropical Storm Washi



Page last updated at 08:36 GMT, Sunday, 27 September 2009 09:36 UK

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Filipinos swept up in river floods



At least 73 people have been killed and thousands more evacuated due to floods caused by heavy rain in the Philippines.

Philippines President Gloria Arroyo has appealed for donations of clothes, blankets, food and water.

This video begins with footage of people kept afloat by debris being swept along a river in Marikina.

MOST POPULAR VIDEO/AUDIO

EDITOR'S CHOICE



Improvements to the BBC News Website


▶ Watch

<http://news.bbc.co.uk/2/hi/asia-pacific/8277069.stm>

<https://youtu.be/i8bUK07uJUY>

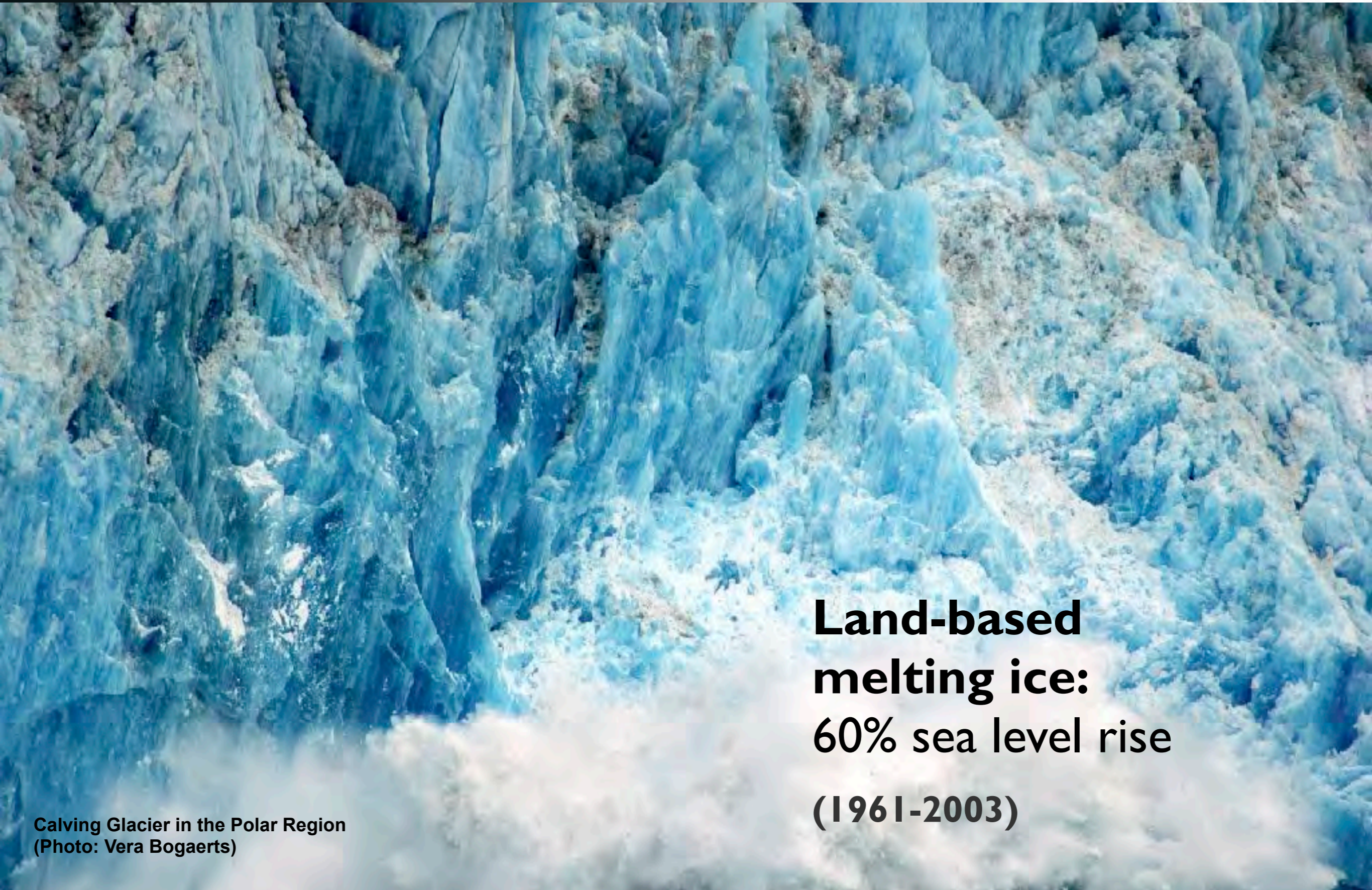


https://youtu.be/DJ_psz7d58U



**Thermal
expansion:
40% sea level rise
(1961-2003)**

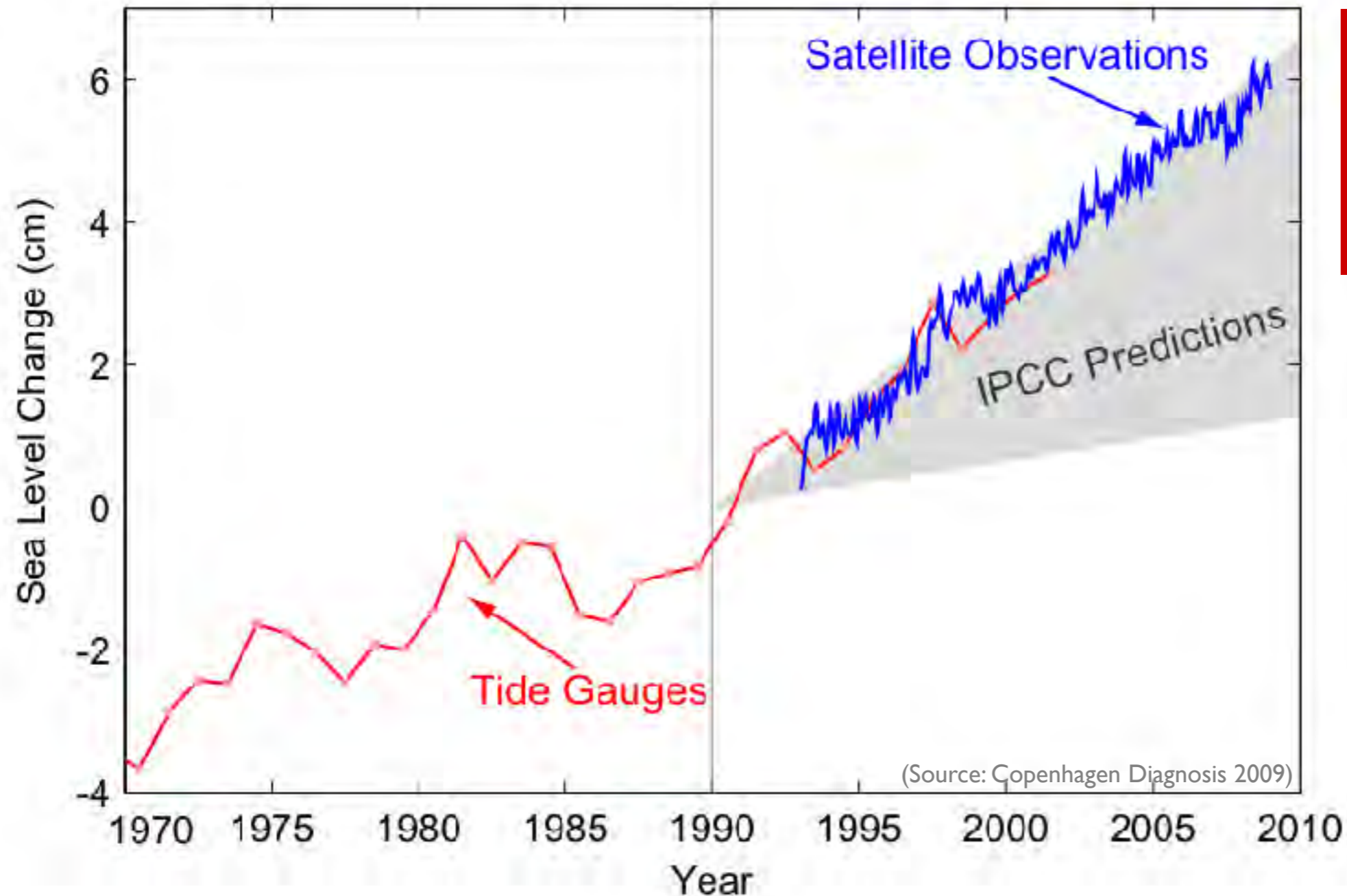
Photo: Tammy Peluso



**Land-based
melting ice:
60% sea level rise
(1961-2003)**

Calving Glacier in the Polar Region
(Photo: Vera Bogaerts)

Global sea level change 1970-2010

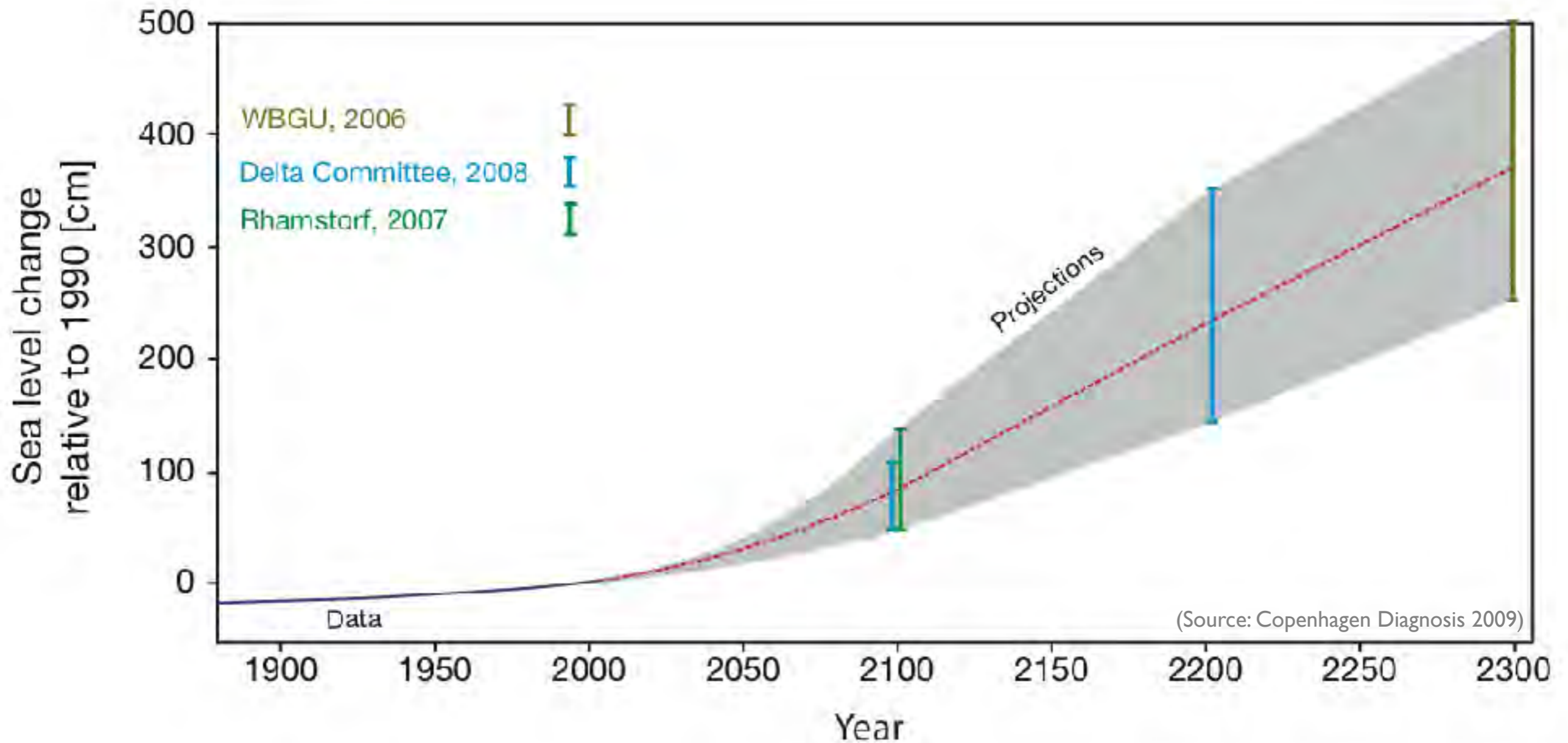


**SLR by 2100:
1-2m**

**Last 15
years:
5cm SLR ~
80% faster
than IPCC**

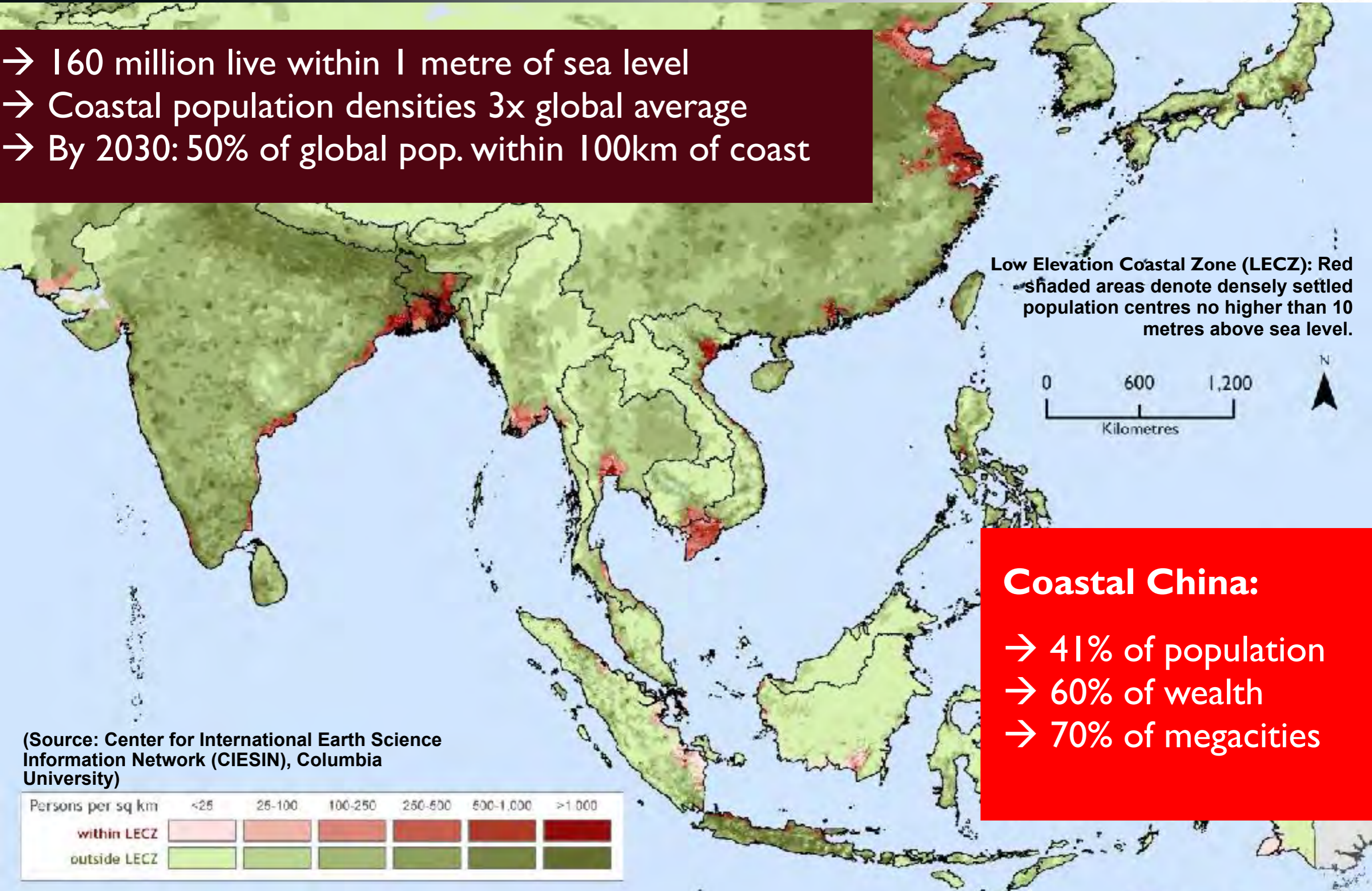
**SLR by 2300:
up to 5m**

Future sea-level projections



Coastal Development

- 160 million live within 1 metre of sea level
- Coastal population densities 3x global average
- By 2030: 50% of global pop. within 100km of coast

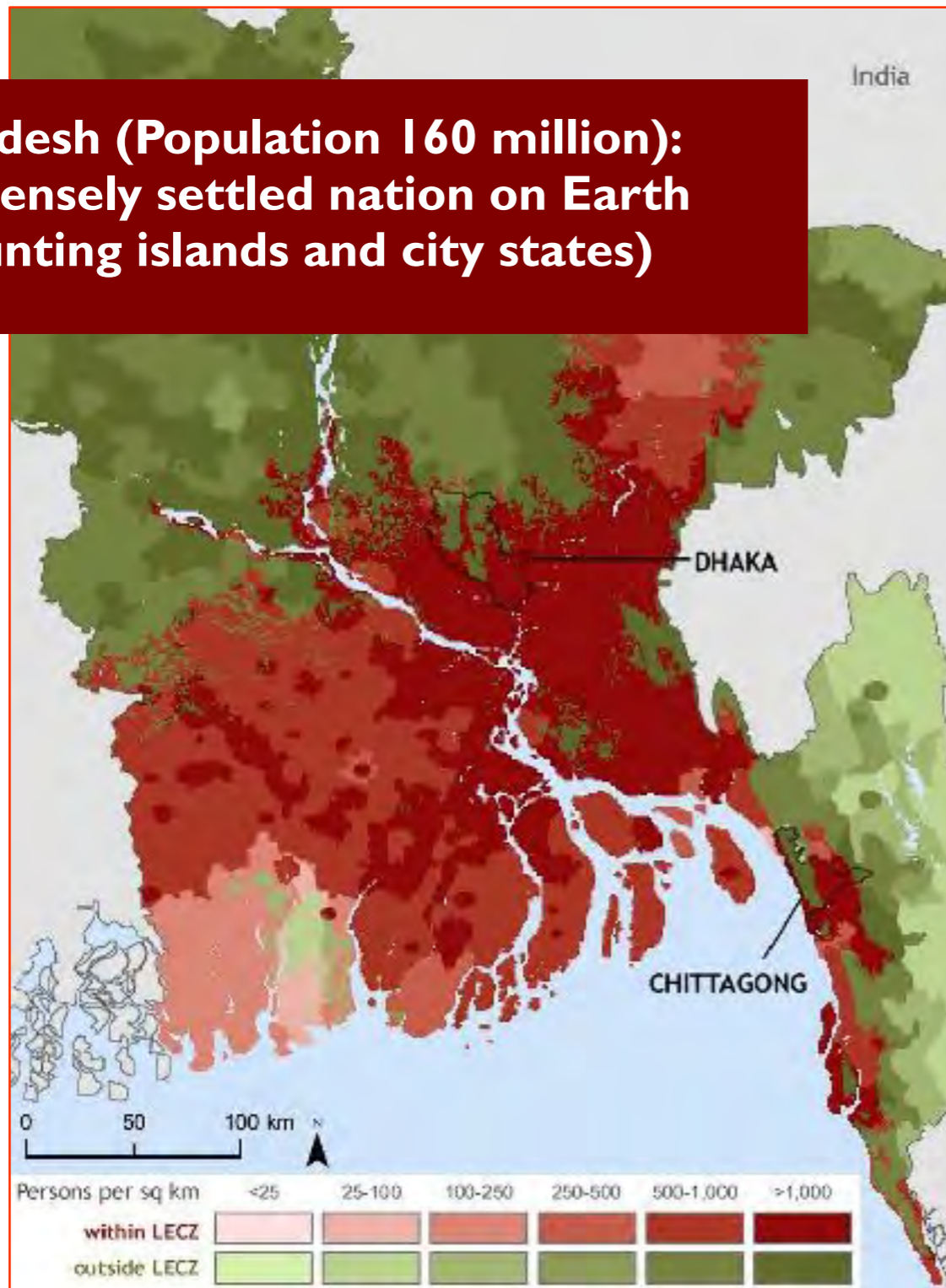


(Source: Center for International Earth Science Information Network (CIESIN), Columbia University)

Coastal China:

- 41% of population
- 60% of wealth
- 70% of megacities

**Bangladesh (Population 160 million):
most densely settled nation on Earth
(discounting islands and city states)**



Low Elevation Coastal Zone (LECZ): Dark red shaded areas denote densely settled population centres no higher than 10 metres above sea level.

Graphic: Centre for International Earth Science Information Network (CIESIN), Columbia University

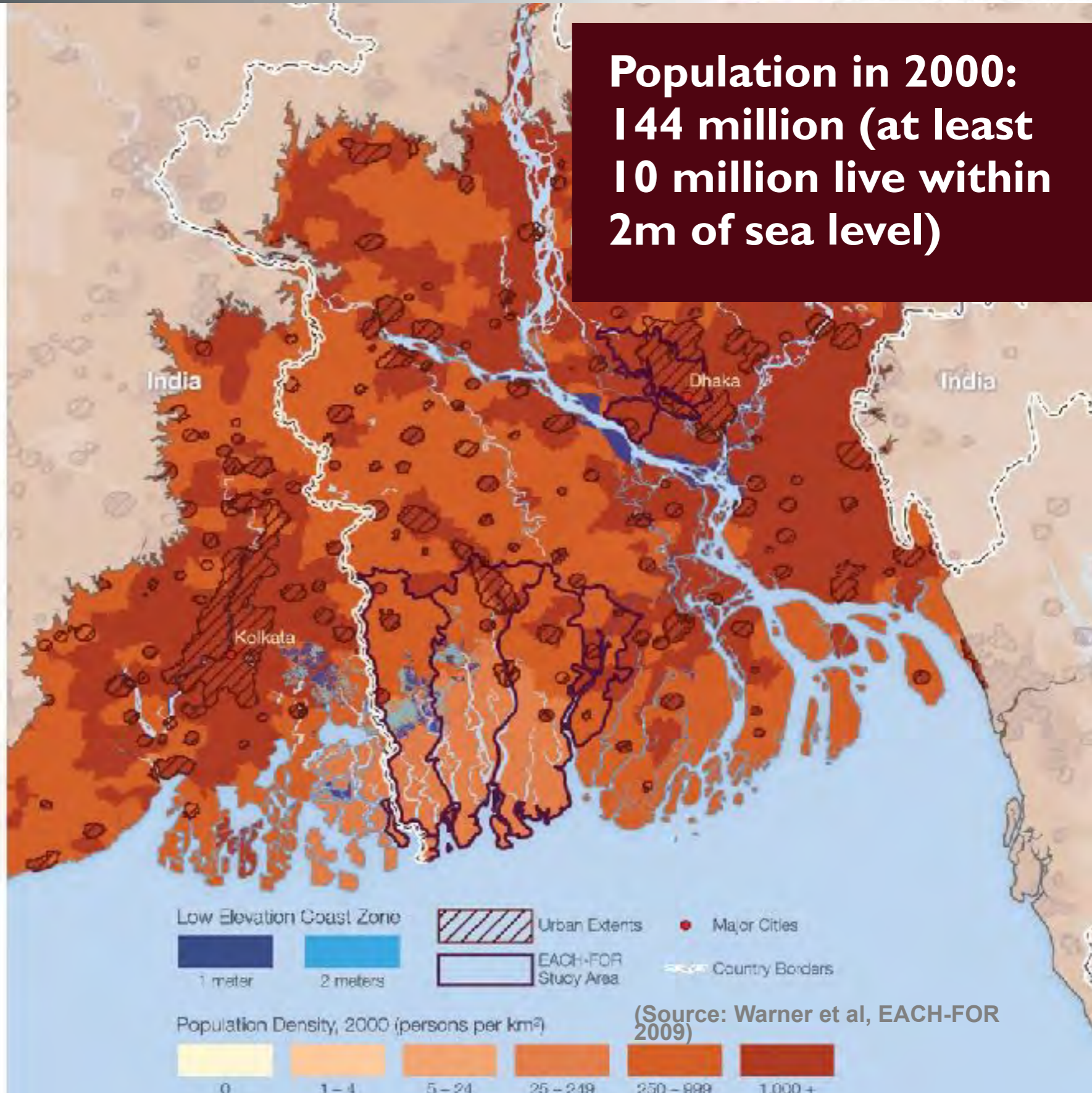
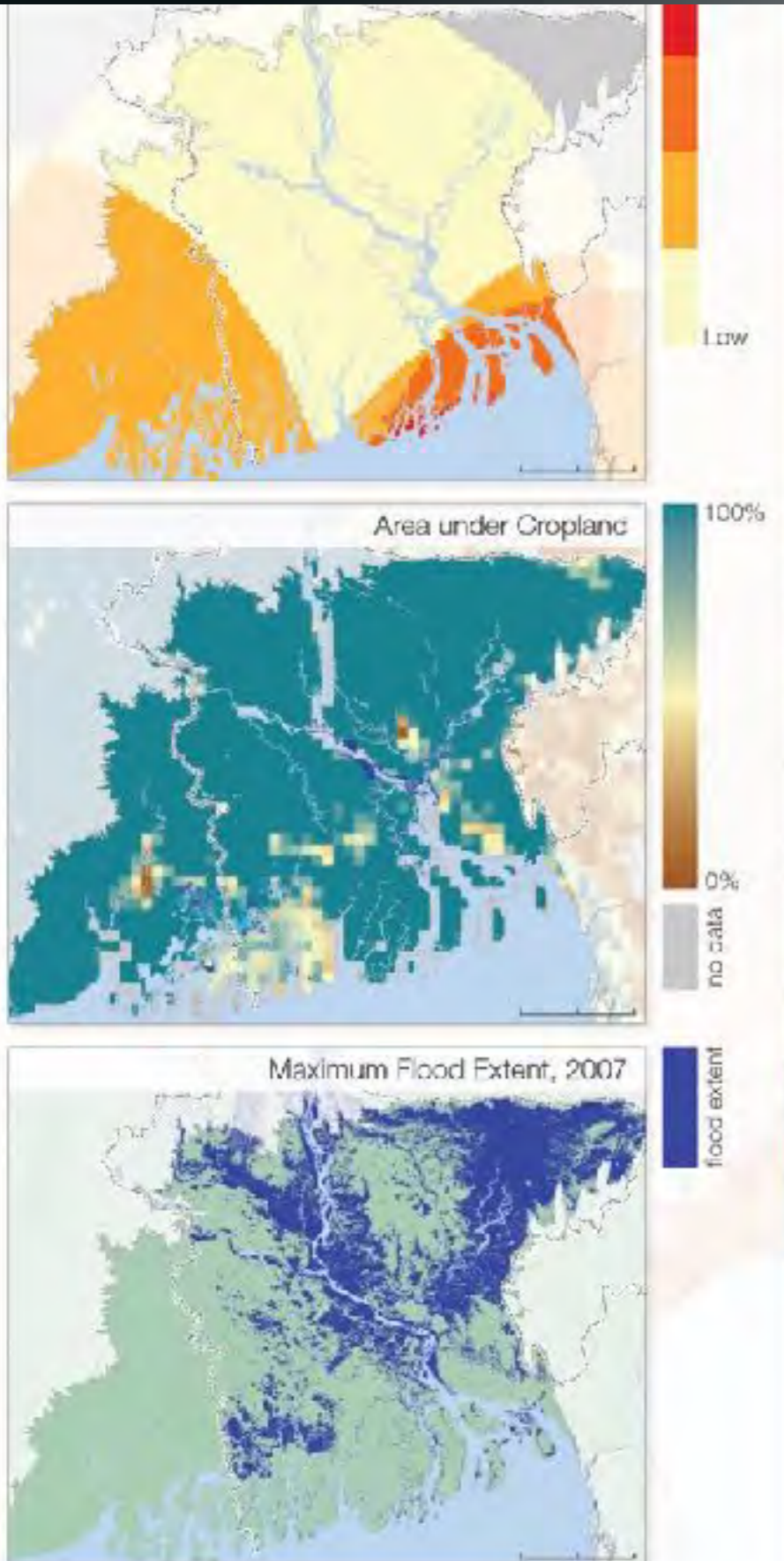
Figure 3.3: Selected hot spots in the world indicating the “[r]elative vulnerability of coastal deltas as shown by the indicative population potentially displaced by current sea-level trends to 2050 (Extreme = >1 million; High = 1 million to 50,000; Medium = 50,000 to 5,000; following Ericson et al., 2006).” (Nicholls et al 2007, p. 327)



Source: Nicholls et al 2007, p. 327; cf, slide 13, below.

Map quoted from <http://www.ipcc.ch/graphics/ar4-wg2/jpg/fig-6-6.jpg> (last accessed 10 Oct 2013); <http://www.ipcc.ch/pdf/presentations/briefing-geneva-2007-05/climate-changes-impact-coastal.pdf>

The Ganges Delta



**Population in 2000:
144 million (at least
10 million live within
2m of sea level)**



Adapted from Milliman *et al.* (1989).
Presentation by Sir John Houghton 7 Sep 2011



Mohammad Shamsuddoha:

“Bhola – Bangladesh’s biggest island – is eroding. From a size of 6,400km² in the 1960s, Bhola is now only half its original size.”

*(General Secretary
Equity & Justice
Working Group)*



**Bhola Island,
Bangladesh**

Tajumuddin, Bhola, Bangladesh: (Photo: Johannes Luetz)




Present: 100,000 displaced p.a.
SLR 1m: 65 million?
SLR 3m: 92 million?
SLR 5m: 128 million?
(Rajan, 2008)

Bhola Island, Bangladesh

Tajumuddin, Bhola, Bangladesh: (Photo: Johannes Luetz)

Abdul Mannan: “The place where I was born lies 5 kilometres out in the sea. I’ve already moved my home and family four times.” Community elder Abdul Mannan (centre) points out signs of erosion.



Abdul Mannan: “People are constantly moving back. This family left last week. Only the toilet pit is left.”

**Bhola Island,
Bangladesh**

Tajumuddin, Bhola, Bangladesh: (Photo: Johannes Luetz)



Abdul Mannan, 2011

Bridge to “nowhere” (2011)



Show field research video footage:

File name “Bangladesh I”:

55:00 (1min) – Bridge to “nowhere”

(Photo: Johannes Luetz)

Outside



Photo: Johannes Luetz

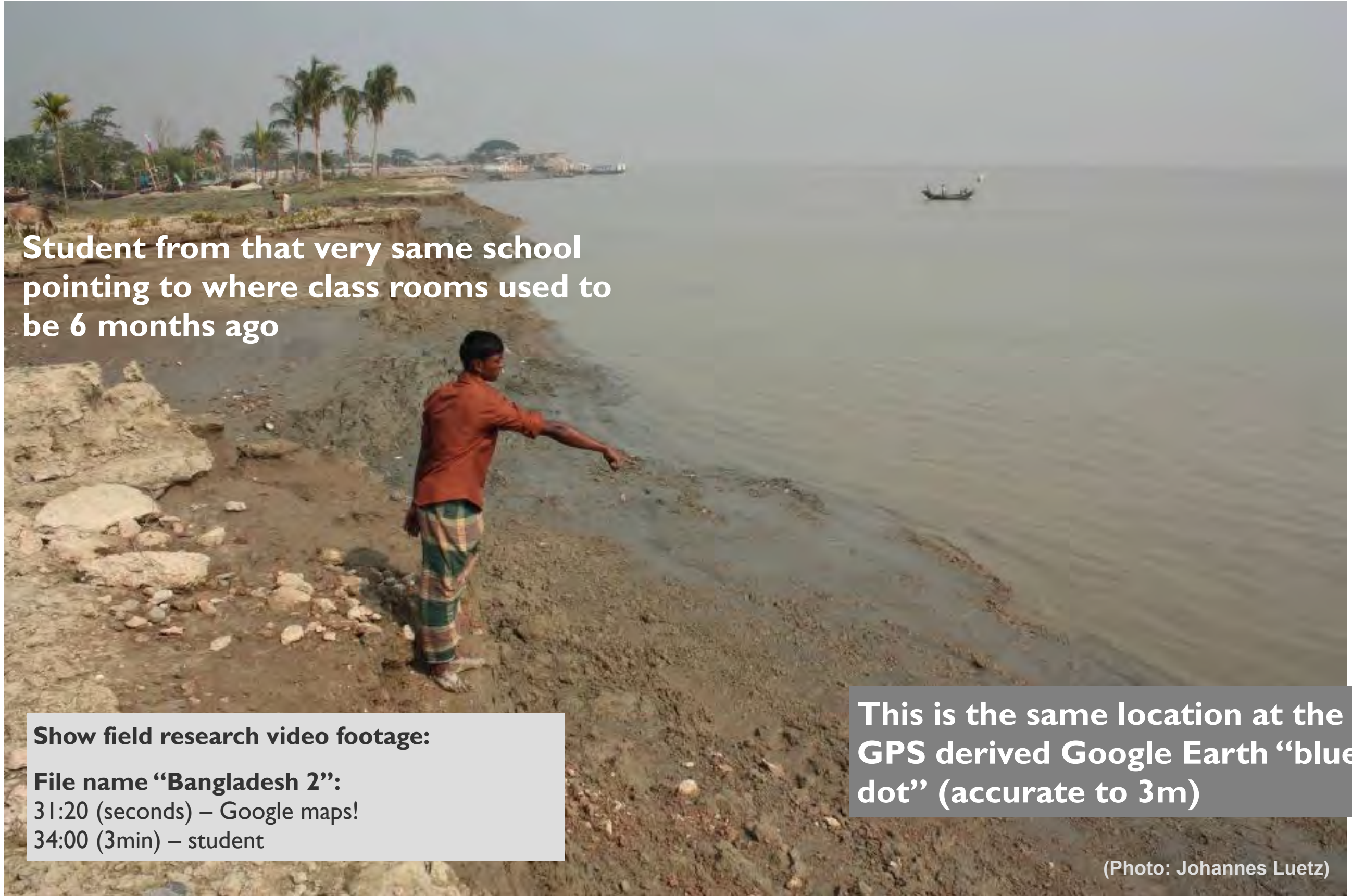


<http://goo.gl/maps/IhuUJ>

← Google Earth: School building still visible

Blue dot (accurate to 3m) indicates our GPS position supposedly 100m from shore

(Photo: Johannes Luetz)



Student from that very same school pointing to where class rooms used to be 6 months ago

Show field research video footage:

File name “Bangladesh 2”:

31:20 (seconds) – Google maps!

34:00 (3min) – student

This is the same location at the GPS derived Google Earth “blue dot” (accurate to 3m)

(Photo: Johannes Luetz)

<https://youtu.be/PBJeelgnadU>



Climate Migration- Bangladesh on the move



AboutUNSW



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0





Show field research video footage:

File name “Bangladesh 5”:

46:00 (1min) – Dhaka tenants, settlements

59:00 (30sec) – Bhola-CEGIS (6km@61min)

00:00 (3min) – INDIA I: erosion/ accretion

Md. Faruk, migrant from Bhola Island interviewed at Dhaka slum

(Photo: Johannes Luetz)

- Why is climate change fundamentally a human rights issue?
- Which rights are in jeopardy?
- Whose rights need protecting?
- Who is responsible? (past / future)
- What are pertinent challenges?

“The earth is the Lord’s, and everything in it, the world, and all who live in it.”

Psalm 24:1

Photo from Apollo 17, taken as the crew was traveling toward the moon.

This picture was taken in 1972, during the last Apollo mission. It is the last photo of Earth taken from halfway between Earth and the moon. It is unique because the entire circle of the earth is revealed; the photo helps us think about our planet in its entirety.

Theological Considerations of “Creation Care”

“Care for Creation” prompted by “Crisis of Creation”

- Global warming
- Environmental degradation
- Species extinction
- etc

“Sin problem” — “Gospel solution”

- Reconciliation requires repentance - *metanoia* - “turn-around” in attitude and behaviour (Mk 1:15)
- Repentance and reconciliation involve vertical and horizontal dimensions, i.e., God and Creation
- *Creatio ex nihilo* (looking back) — *Creatio continua* (looking ahead)

Creational Responsibility

- *Createes* — “wonderfully made” (Ps 139:13-14)
Creation — “very good” (Gen 1:31)
- Creational responsibility based on Gen 1:28
“Fill the earth and subdue it. Rule over the fish in the sea and the birds in the sky and over every living creature that moves on the ground.”
- God instructed to name animals (Gen 2:19-20):
Signifies paternal/maternal/parental relationship and responsibility (*pater/mater spiritualis*)

End-time Scenarios

- “Heaven and earth will pass away” (Mt 24:35)
- “...looking forward to new heaven and new earth, where righteousness dwells” (2 Pet 3:13; cf Is 65:17; Rev 21:1)
- “For nation will rise against nation, and kingdom against kingdom, and there will be famines and earthquakes in various places” (Mt 24:7)
- Uncomfortable questions?
- Apocalyptic fatalism?

Three eschatological models

(1) Rainbow Model

- “Never again will I destroy all living creatures, as I have done. As long as the earth endures, seedtime and harvest, cold and heat, summer and winter, day and night will never cease.” (Gen. 8:21-22)

Three eschatological models

(2) Apocalypse Model

- “For in the days before the flood, people were eating and drinking, marrying and giving in marriage, up to the day Noah entered the ark; and they knew nothing about what would happen until the flood came and took them all away. *That is how it will be at the coming of the Son of Man.*” (Mt 24:38-39)

The energy trapped by man-made global warming pollution is now “...equivalent to exploding

400,000

Hiroshima atomic bombs per day 365 days per year.”

James Hansen
Former Director, NASA Goddard Institute for Space Studies

Three eschatological models

(3) Nineveh Model

- “Go to the great city of Nineveh and preach against it, because its wickedness has come up before me.” (Jonah 1:2; NIV)
- “Yet forty days and Nineveh will be overthrown.” (Jonah 3:4; KJV)

Three eschatological models

(3) Nineveh Model

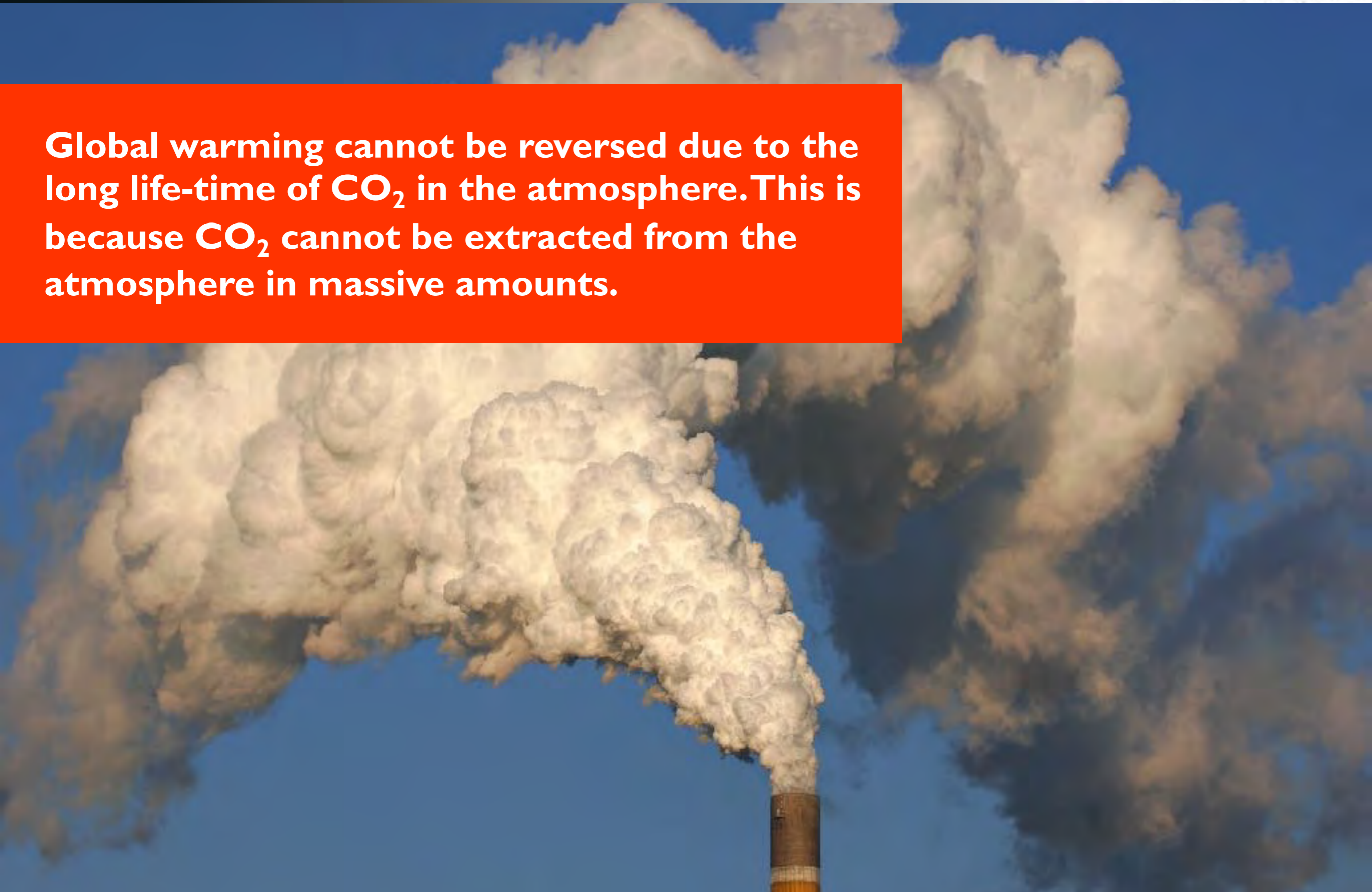
- “The Ninevites believed God. A fast was proclaimed, and all of them, from the greatest to the least, put on sackcloth and sat down in the dust” (v. 5) Even the king of the city “took off his royal robes, covered himself with sackcloth and sat down in the dust” (v. 6)
- “And God saw their works, that they turned from their evil way; and God repented of the evil that he said he would do unto them; and he did it not” (v. 10)

Intergenerational equity

- “Those of us alive today are the first generation to know that we live in the Age of Global Warming. We may also be the last generation to have any chance of doing something about it. Our forebears had the excuse of ignorance. Our descendants will have the excuse of helplessness. We have no excuse.”

(William Antholis and Strobe Talbott (2010) *Fast Forward: Ethics and Politics in the Age of Global Warming*, The Brookings Institution)

Global warming cannot be reversed due to the long life-time of CO_2 in the atmosphere. This is because CO_2 cannot be extracted from the atmosphere in massive amounts.





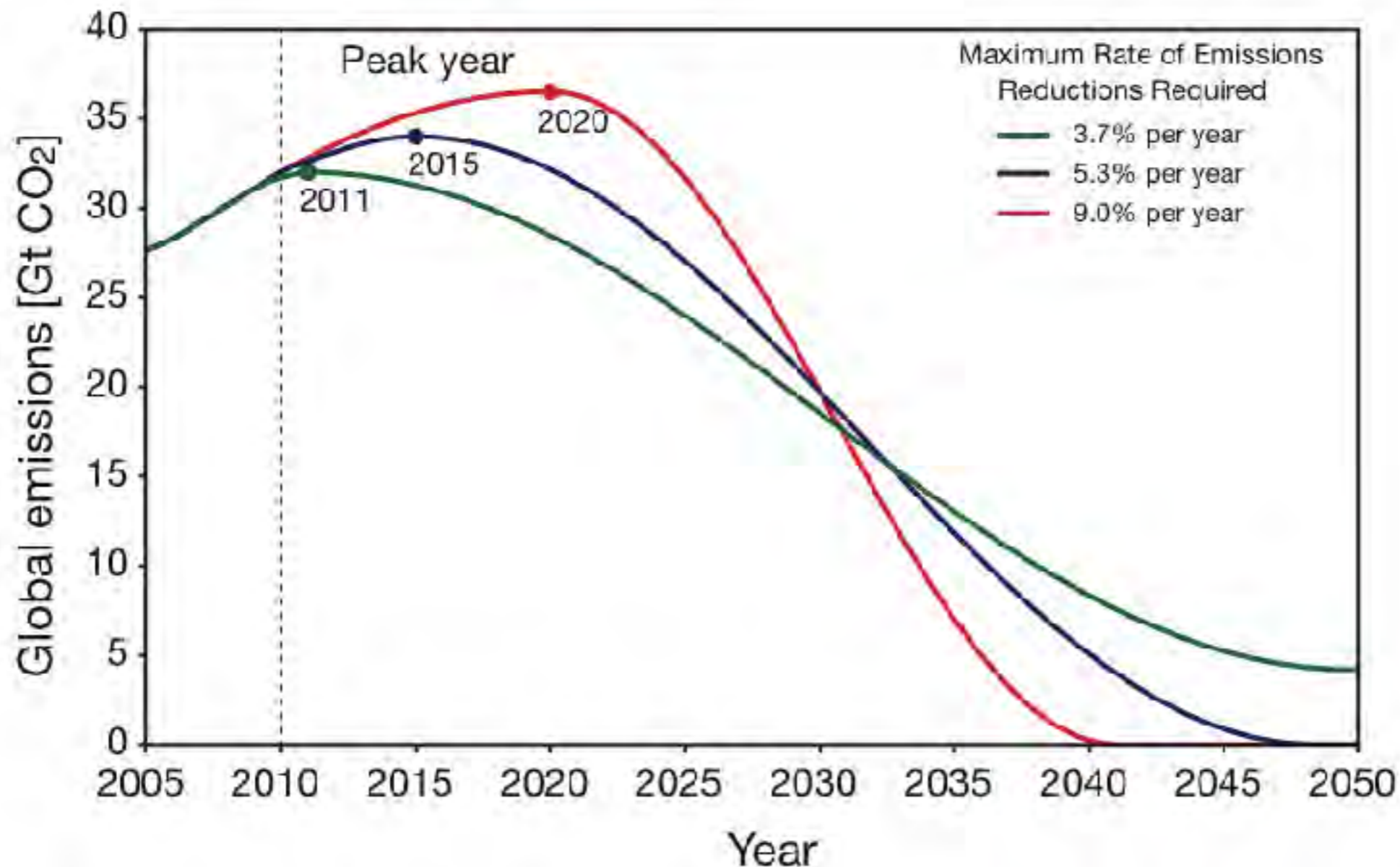
Global warming can be completely stopped. The temperature at which global warming will finally stop depends mainly on the total amount of CO₂ released into the atmosphere since industrialisation.

**The sooner
emissions stop,
the lower the
final warming will
be.**

**Zero Emissions?
Zero Regrets!**



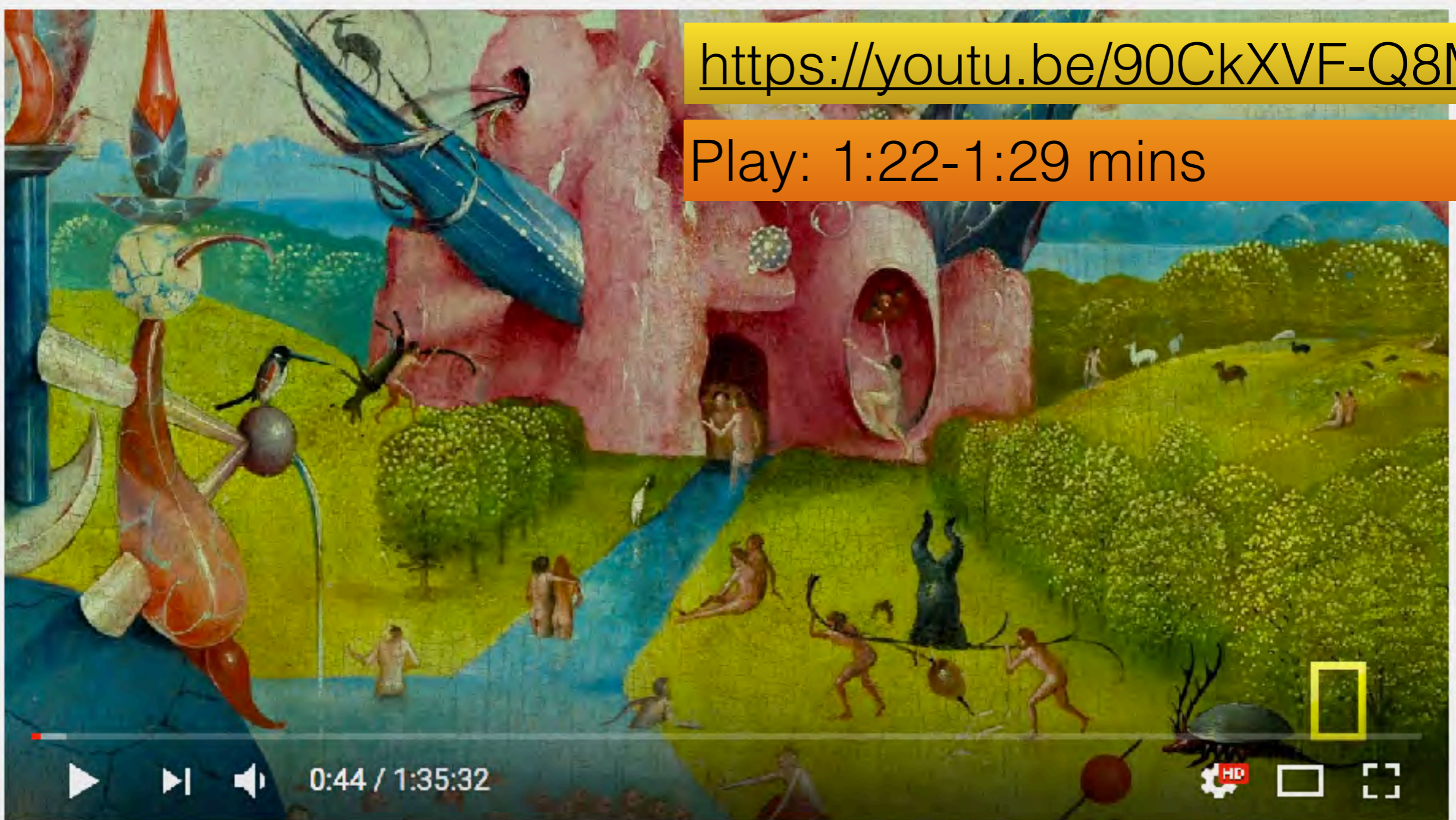
Exemplary emissions pathways which remain within 750Gt and leave a 67% chance of limiting global warming to 2°C



Solving the climate dilemma: The budget approach; WBGU Special Report 2009

<https://youtu.be/90CkXVF-Q8M>

Play: 1:22-1:29 mins



0:44 / 1:35:32

#5 on Trending

Before the Flood - Full Movie | National Geographic



National Geographic

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7,696,454 views

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👍 226,169 🗨️ 8,662

Why should Christians care?

- *First:* **If God is cares for the truth, His followers should promote the truth, too**

“Then you will know the **truth**, and the **truth** will set you free.” (John 8:32)

“God is spirit, and his worshipers must worship in the Spirit and in **truth**.” (John 4:24)

“But when he, the Spirit of **truth**, comes, he will guide you into all the **truth**. He will not speak on his own; he will speak only what he hears, and he will tell you what is yet to come.” (John 16:13)



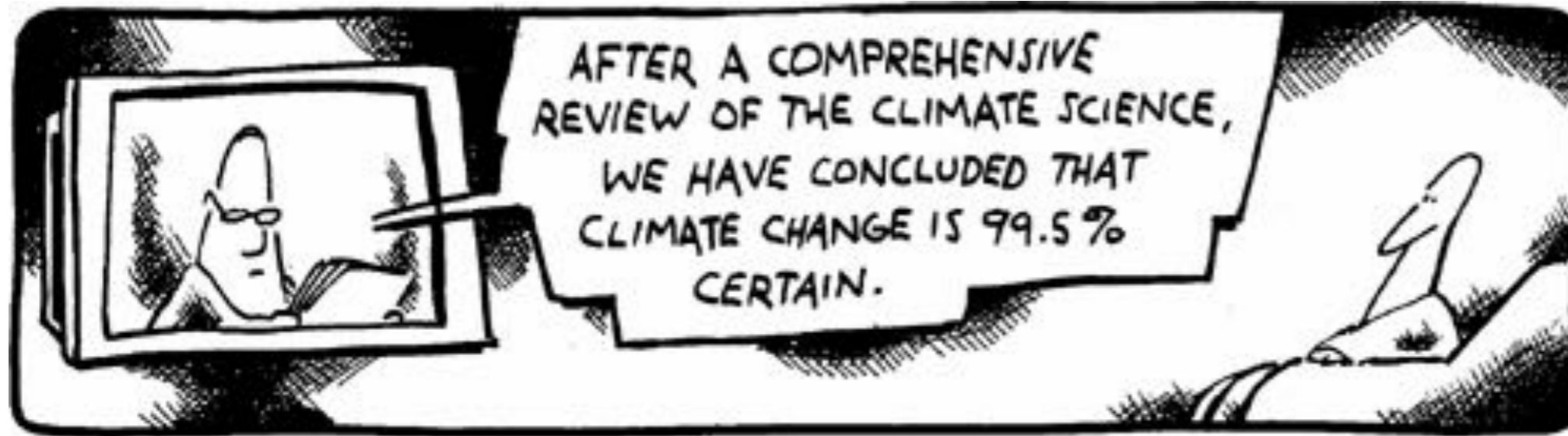
(Source: ppt
Stephen H. Schneider)

God & Truth

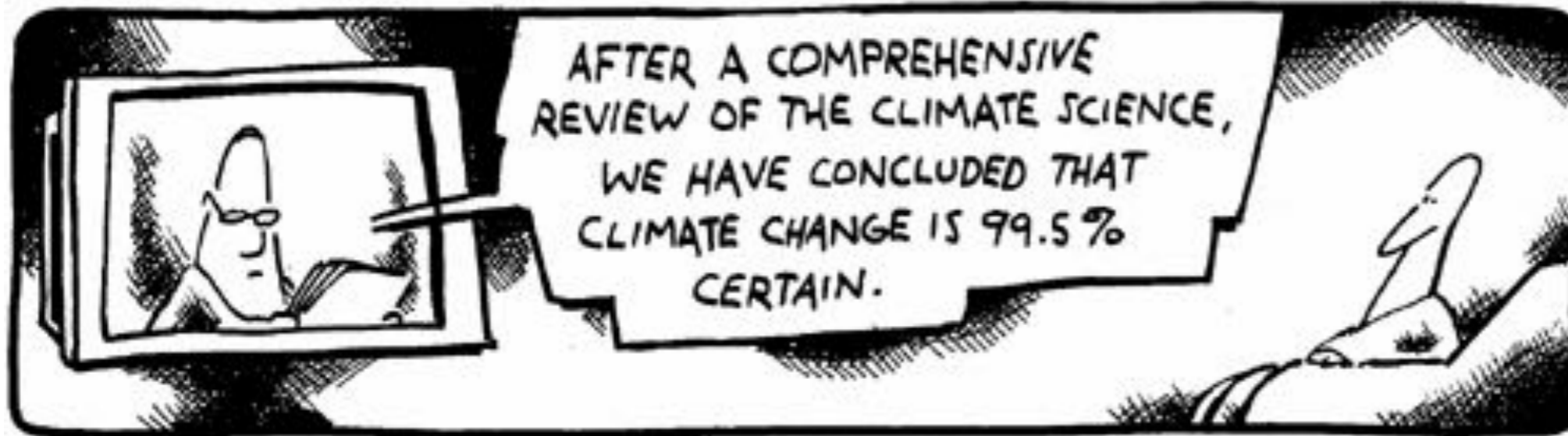
- 37 “You are a king, then!” said Pilate. Jesus answered, “You say that I am a king. In fact, the reason I was born and came into the world is to testify to the **truth**. Everyone on the side of **truth** listens to me.”
- 38 “**What is truth?**” retorted Pilate. With this he went out again to the Jews gathered there and said, “I find no basis for a charge against him. 39 But it is your custom for me to release to you one prisoner at the time of the Passover. Do you want me to release ‘the king of the Jews’?”

God & **Truth**

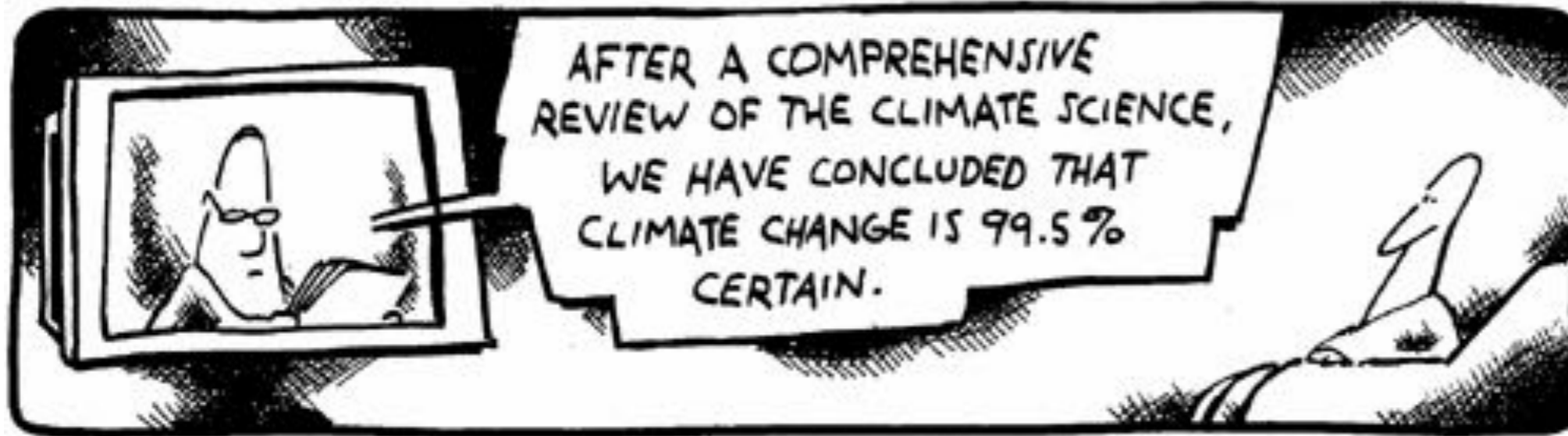
- If it is really true that 97% of climate science research agrees that humans are chiefly to blame for the climate crisis now gathering momentum (Cook et al 2013, Cook 2014), ... *how should we then live?*



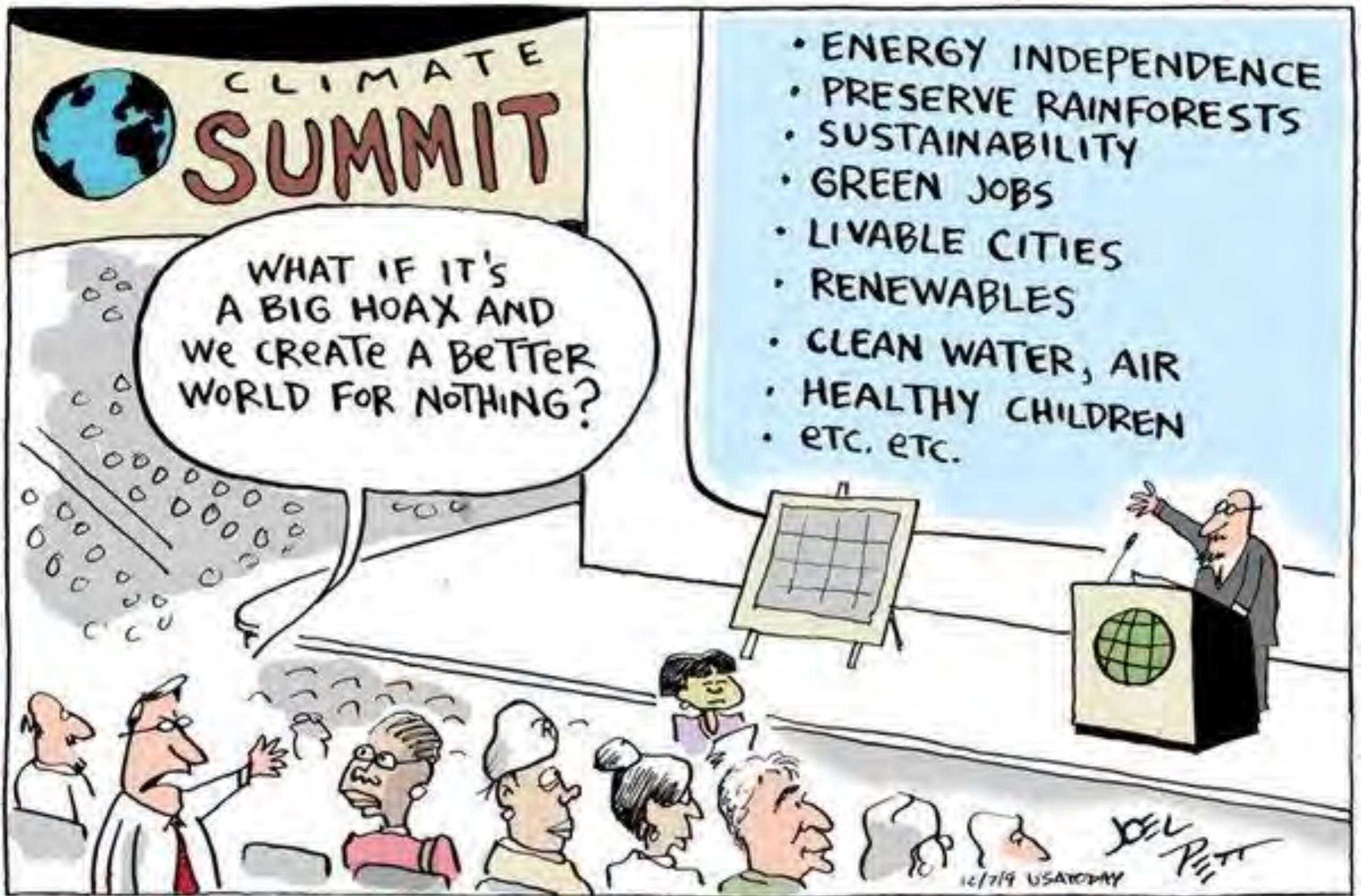
(Source: ppt
Stephen H. Schneider)



(Source: ppt
Stephen H. Schneider)

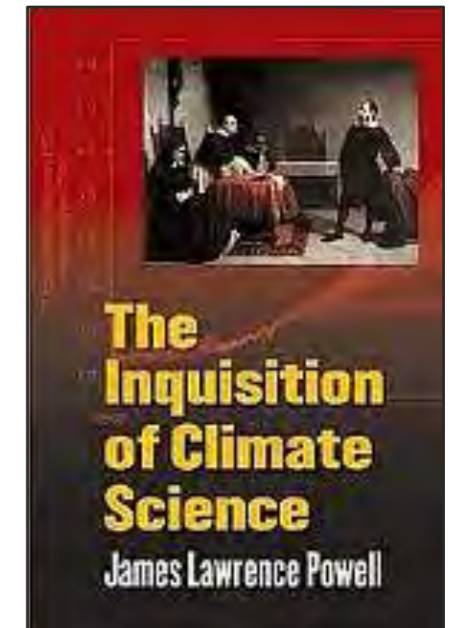
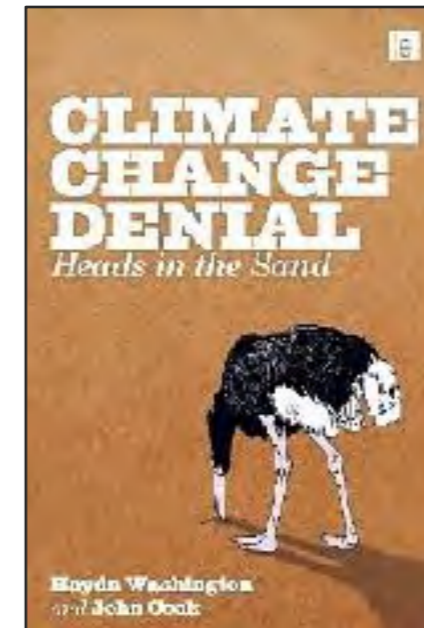
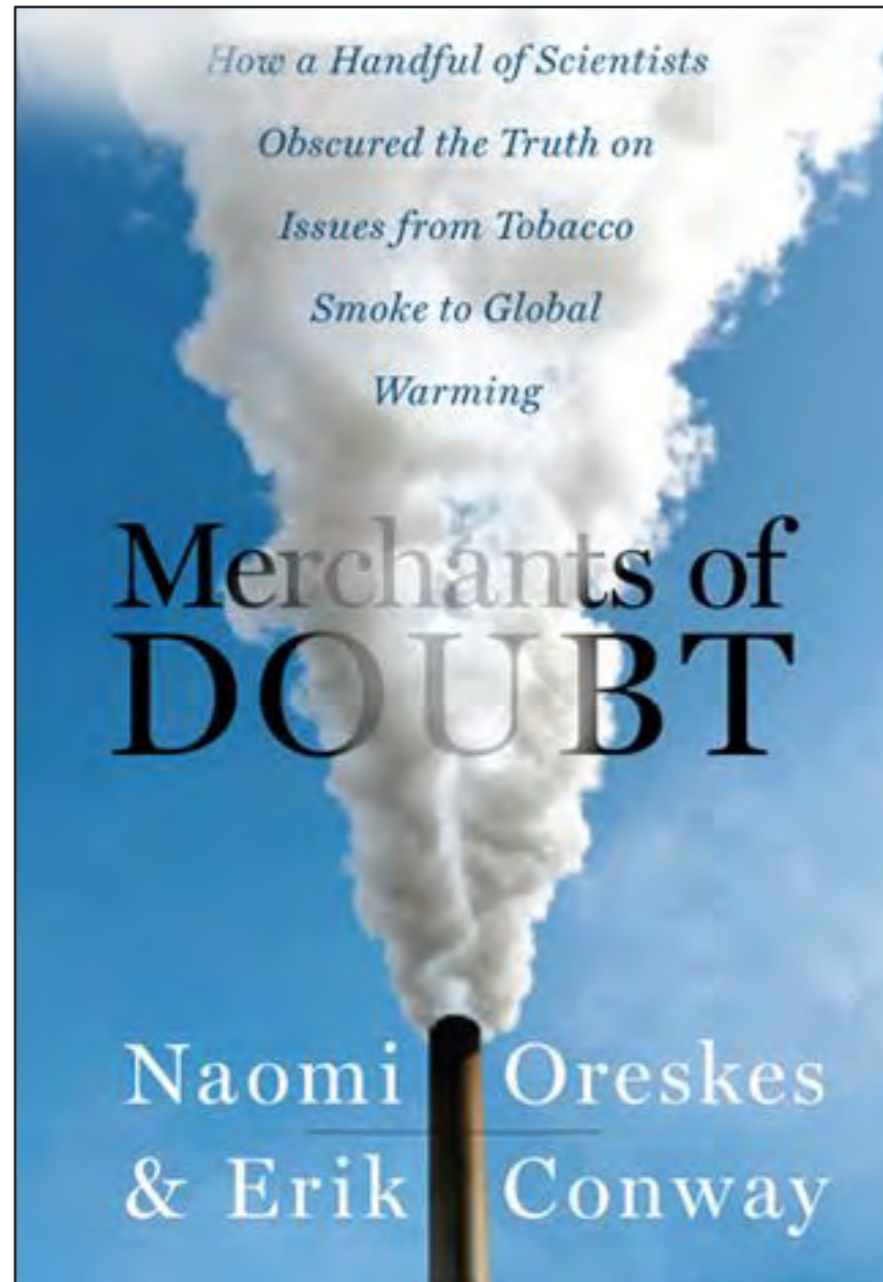


(Source: ppt
Stephen H. Schneider)





<http://climateresearchproject.org/video/doubters/>
<http://youtu.be/YhDacrIIaSA>



<http://www.merchantsofdoubt.org/>

Why should Christians care?

- *Second:* **If God cares for His Creation, His followers should care for Creation, too**
“God saw all that he had made, and it was very good” (Gen. 1:31)

Why should Christians care?

- *Third:* **If God can be known through Creation, then Creation has inherent worth in and of itself (apart from utilitarian value to humans)**
“For since the creation of the world God’s invisible qualities—his eternal power and divine nature—have been clearly seen, being understood from what has been made, so that people are without excuse.” (Rom. 1:20)

Creation & God

- **Implication: If you want to know your Creator, learn about Creation.**

If God can be “known” through what He has made, then “Creation Care” is an epistemological priority of the highest order. Following this argument, epistemologically speaking, God becomes progressively less “knowable” from what He has made as the defacing and destruction of His Creation continues...)

Why should Christians care?

- *Fourth:* **If God cares for the poor, His followers should care for the poor, too**
“The Spirit of the Lord is on me, because he has anointed me to proclaim good news to the poor.” (Lk. 4:18)

2014 Report

Rising inequality...



What is the equation represented in these two pictures?

2014

Oxfam: “The bottom half of the world’s population owns the same as the richest 85 people in the world.”

“The world's wealthiest people aren't known for travelling by bus, but if they fancied a change of scene then the richest 85 people on the globe – who between them control as much wealth as the poorest half of the global population put together – could squeeze onto a single double-decker.”

(The Guardian)

Photo: NASA

Photo: Johannes Luetz

Global inequalities are rising

- “Focusing exclusively on economic growth and income generation as a development strategy is perilous as it leads to the **accumulation of wealth by a few** and **deepens the poverty of many**. [...] Ignoring inequality in the pursuit of development is perilous.” (The Inequality Predicament, Report on the World Social Situation 2005, United Nations DESA)
- “...economic growth will not be enough to end world poverty [which] will require **forms of redistribution**” (Hopper 2012, p. 23; ref. World Development Report 2006)

Why should Christians care?

- *Fifth:* **If God cares for those who are hurting, His followers should care for those in pain, too**
“He heals the brokenhearted and binds up their wounds.” (Ps. 147:3)
“For we know that the whole creation groans and travails in pain together until now.” (AKJV, Rom. 8:22)

Why should Christians care?

- *Sixth:* **Knowing the right thing to do, but not doing it, this is considered “sin”**

“17 If anyone, then, knows the good they ought to do and doesn’t do it, it is sin for them.” (James 4:17)

Why should Christians care?

- *Seventh:* **God expressly asks us to love “our neighbour”, and to love “the least”**
Our “neighbour”: Luke 10:25-37 (Good Samaritan)
The “least”: Matthew 25:31-46 (Sheep & Goats)

Why should Christians care?

- *In summary:* **If God is a God of justice, then we must be about the business of justice, too**
David & Nathan (2 Sam. 12)

What can you I/you/we do?

1. **Pray** — for God's Creation and your/our role in it
2. **Divest** — from fossil fuels; look at your super
3. **Decarbonise** — aim for “zero” emissions lifestyle

Documentary Suggestion

Six video documentaries available online...

- Three personal research documentaries
(my field research)
- Three professional feature documentaries
(simple climate science)

<https://youtu.be/KBq2jNrD-yg>



Bolivia: Leaving the land



UNSWTV



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19



1

<https://youtu.be/PBJeelgnadU>






Climate Migration- Bangladesh on the move



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Climate change Catastrophic Science

Climate refugees: the communities displaced by global warming - video

Source: UNSW

Thursday 6 August 2015 15:53 AEST



Comments

53



With climate change set to force millions of people from their homes due to more frequent extreme weather events and rising sea levels, one academic has been travelling the world to see how the people facing relocation feel. 'There's just no place like home,' says University of New South Wales lecturer Johannes Luetz. 'People want to stay where they are,' he explains, citing work in the Maldives to artificially raise islands. For others, forward planning and community education are just as important as addressing the 'protection gaps' prevalent at the international level

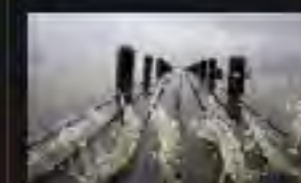
More from Catastrophic Science



Radioactive seas: how nuclear disasters help climate research



Climate refugees: the communities displaced by global



How science can help lessen the impact of storm surges on



How terrorist attacks are being studied to make



The gastric-brooding frog: how to bring a species back



Tsunamis: how a new discovery could reduce future



<https://youtu.be/90CkXVF-Q8M>

#5 on Trending

Before the Flood - Full Movie | National Geographic



National Geographic

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HOME

<https://youtu.be/jqxEENMKaeCU>



1:27 / 1:33:17



HOME



homeproject



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<https://youtu.be/KuCGVwJIRd0>

Do the Math - The Movie



350.org

Subscribe 8,052

51,563 views

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511 19

Thank you!

Q&A



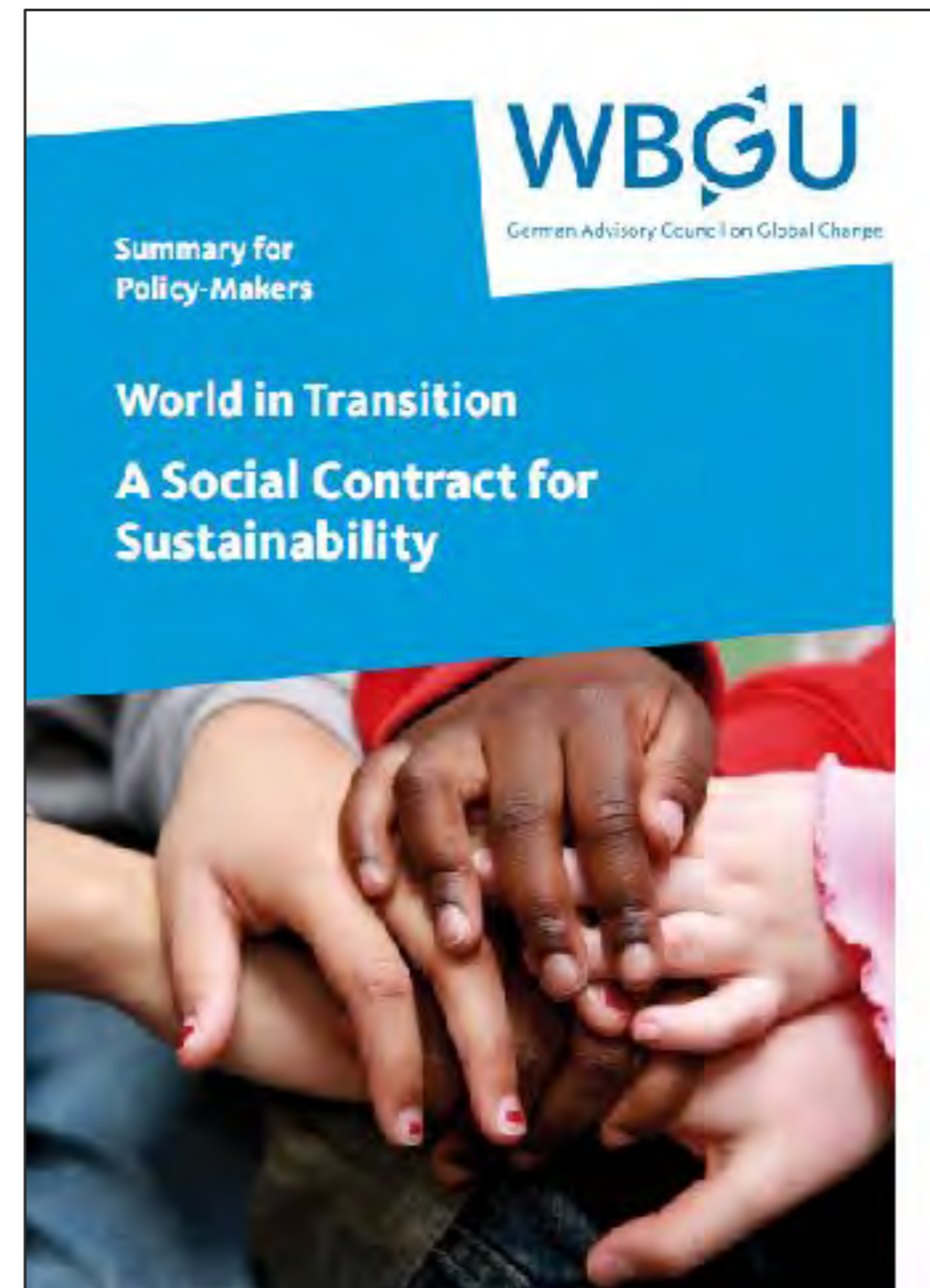
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BACKUP SLIDES

World in Transition: Social Contract for Sustainability

Flagship Report 2011

<http://www.wbgu.de/en/home>



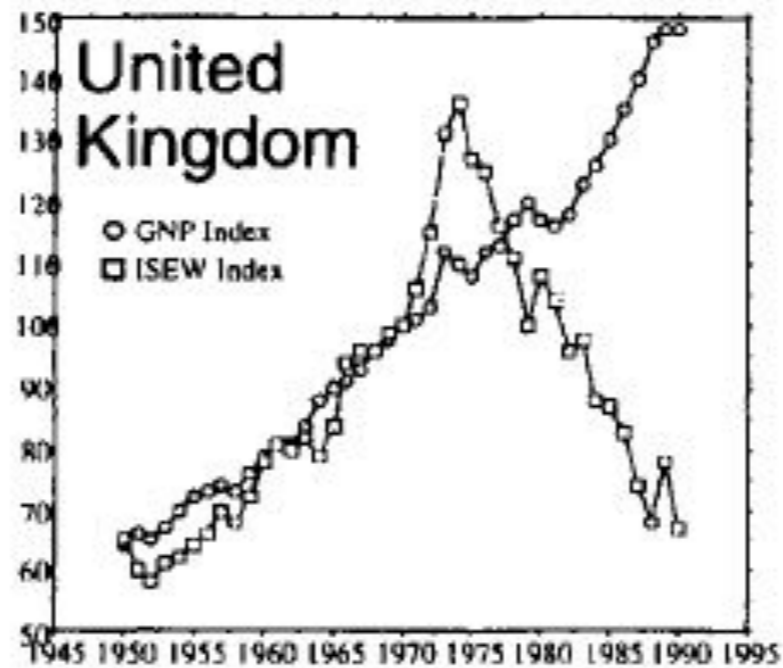
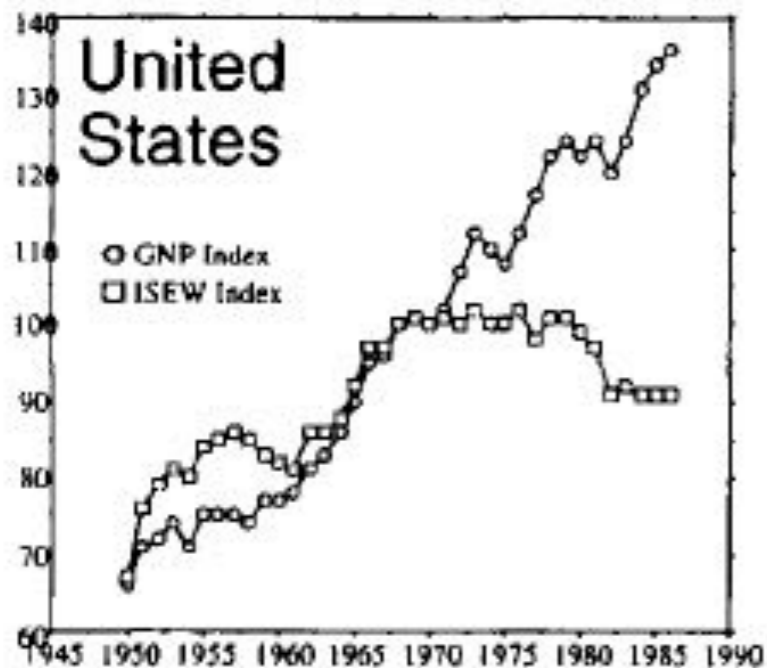
Annual per-capita CO₂ emissions below 1 ton

A decarbonised global society with near-zero emissions of CO₂ needs to be reached by 2050 (1 Person = 1t CO₂)



Economic growth and quality of life: A threshold hypothesis

“... for every society there seems to be a period in which economic growth (as conventionally measured) brings about an improvement in the quality of life, but only up to a point – the threshold point – beyond which, if there is more economic growth, quality of life may begin to deteriorate.” (Max-Neef 1995; Genuine Progress Indicators GPI; Index of Sustainable Economic Welfare ISEW; Environment and Sustainable Development Indicators ESDI)



Insight, hindsight, foresight

“A favourite concept of mine is the 200-year present, a way of thinking about change. The 200-year present began 100 years ago with the year of birth of the people who have reached their hundredth birthday today. The other boundary of the 200-year present, 100 years from now, is the hundredth birthday of the babies born today. If you take that span, you and I will have had contact with a lot of people from different parts of that span. So think in terms of events over that span and realise how long change takes.”

(Elise Boulding, Professor Emeritus of Sociology at Dartmouth College and Former Secretary General of the International Peace Research Association, interviewed by Julian Portilla in 2003)

***“When it comes to the future,
there are three kinds of people:
those who let it happen, those who
make it happen, and those who
wonder what happened.”***

(John M. Richardson, Jr., American Academic, born 1938)