

The case for urgent and radical carbon emission reductions

Dr. Maria Sharmina
Dr. Alice Bows-Larkin
Prof. Kevin Anderson

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The University of Manchester



Influencing the future

Decisions made now impact on future climate adaptation

Higher Mitigation = Lower Adaptation

Lower Mitigation = Higher Adaptation

There isn't a '*no climate change*' future

Global ambition

The UK has signed up to make a ***fair*** contribution to...

*“...hold the increase in global temperature **below 2 degrees Celsius**, and take action to meet this objective consistent with **science** and on the basis of **equity**”*

Copenhagen Accord, 2009

...2° C taken as a threshold between ‘acceptable’ and ‘dangerous’ climate change

Global impacts: 2° C

E.g.

Widespread mortality of corals



Increased risks of extreme weather events

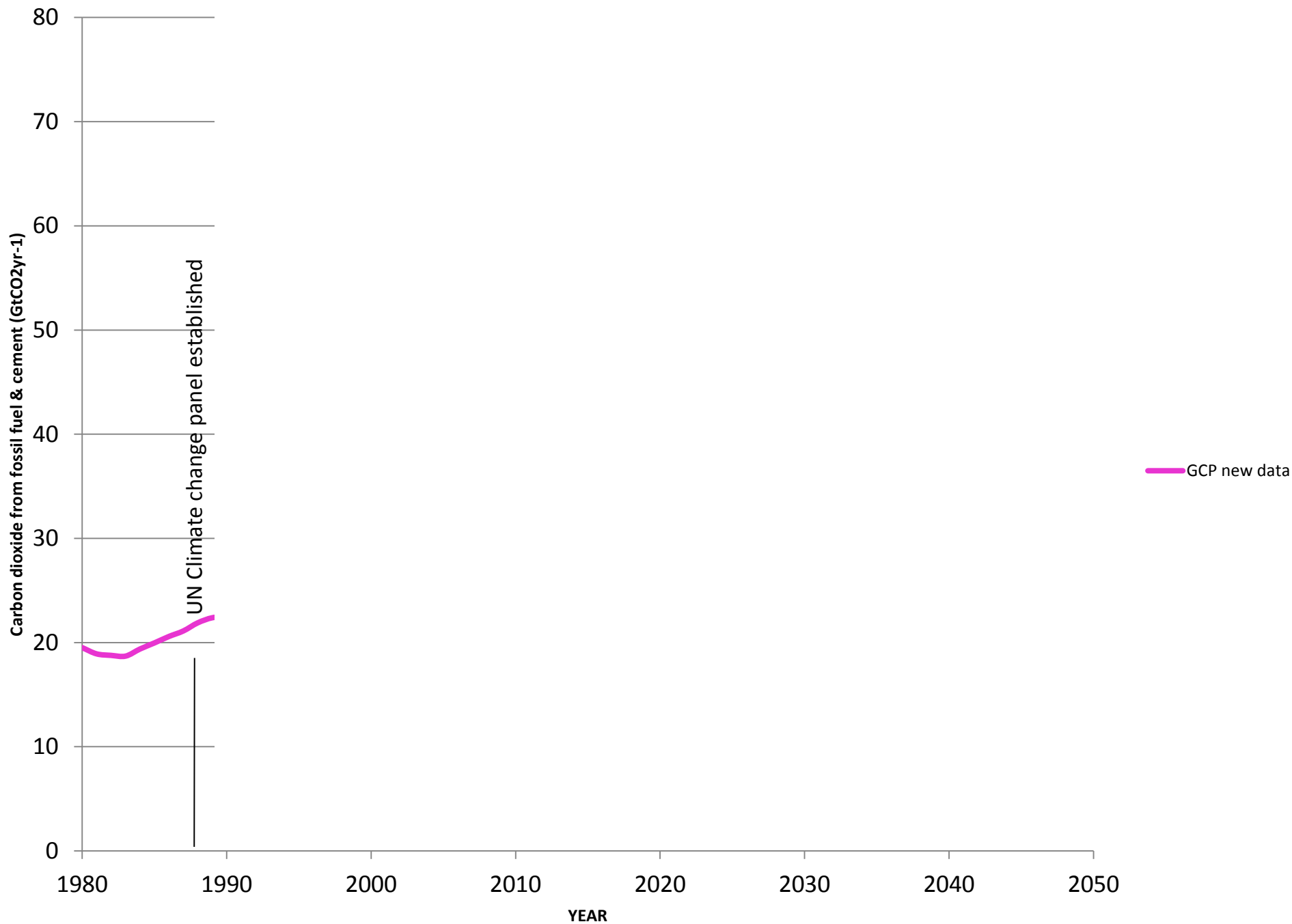
Increased water stress & wildfire frequency

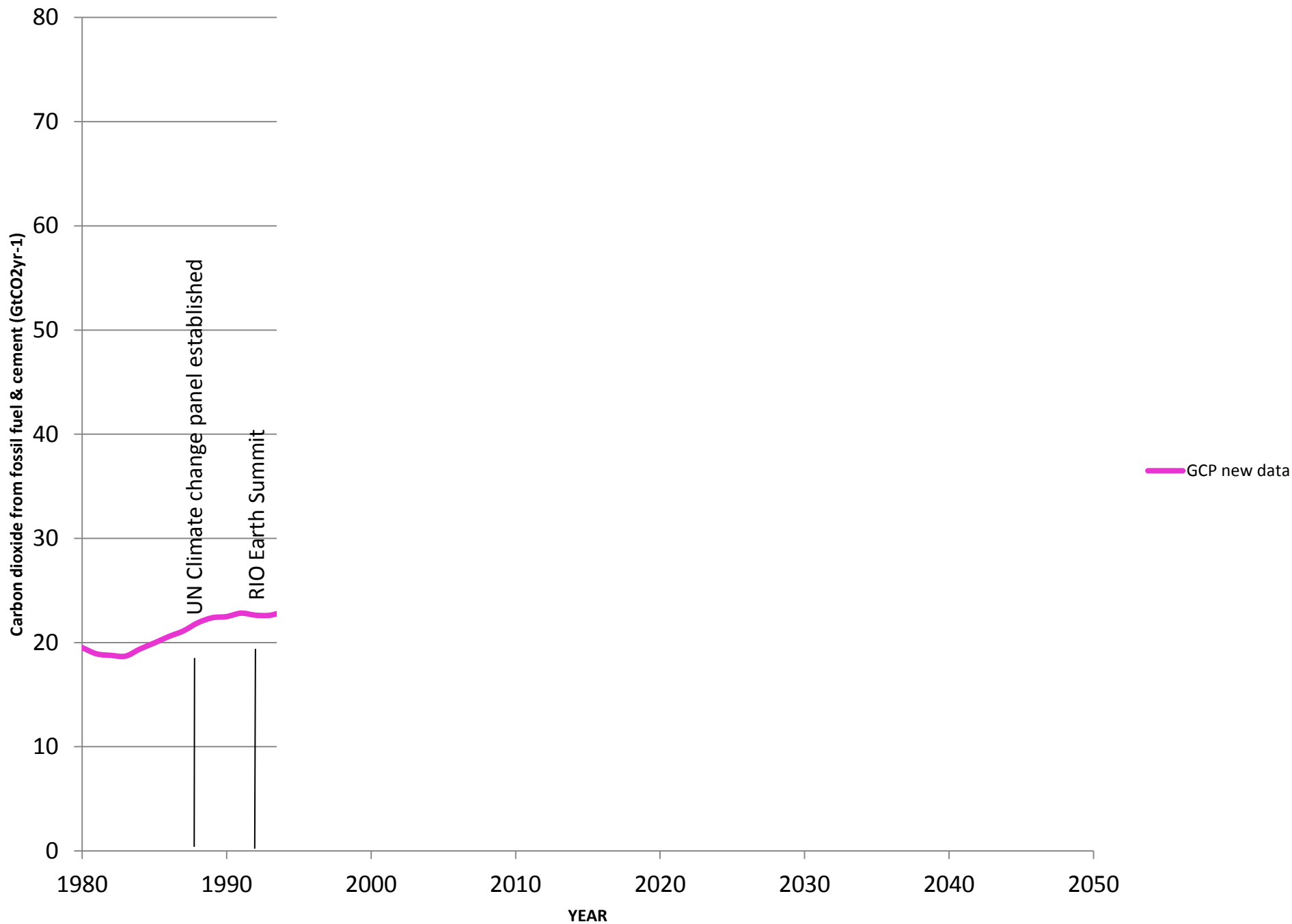


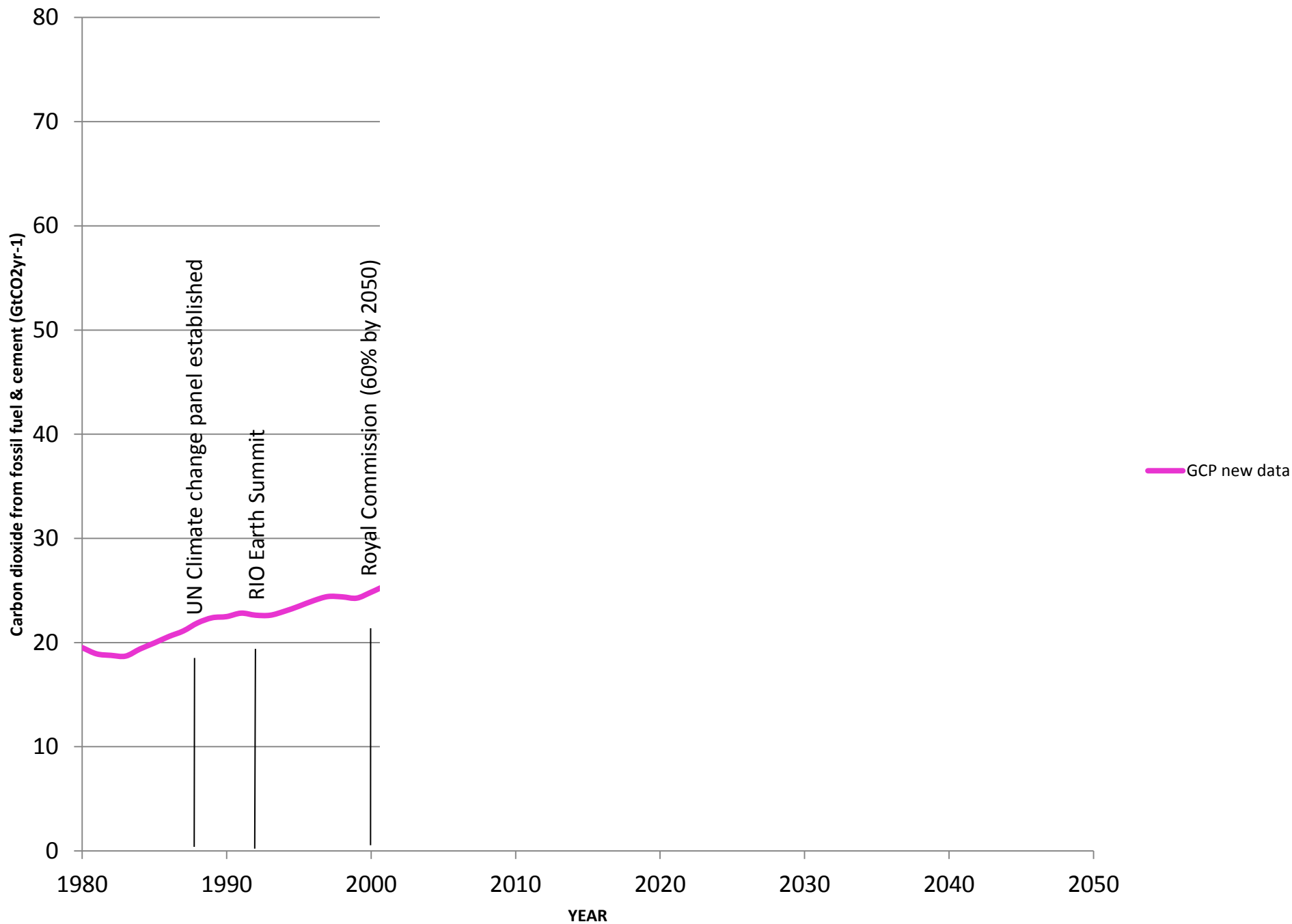
Hundreds of millions of people suffering coastal flooding

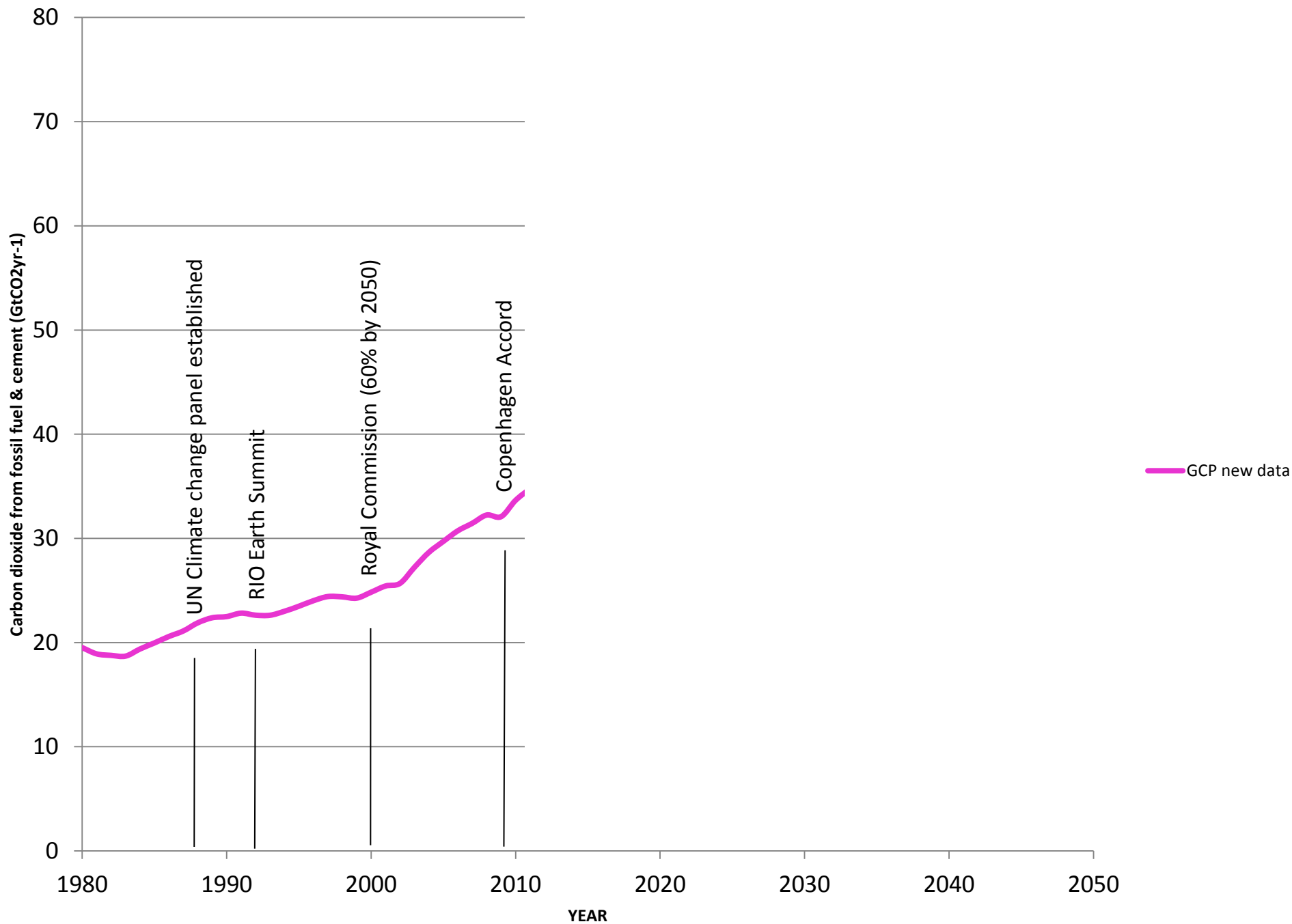


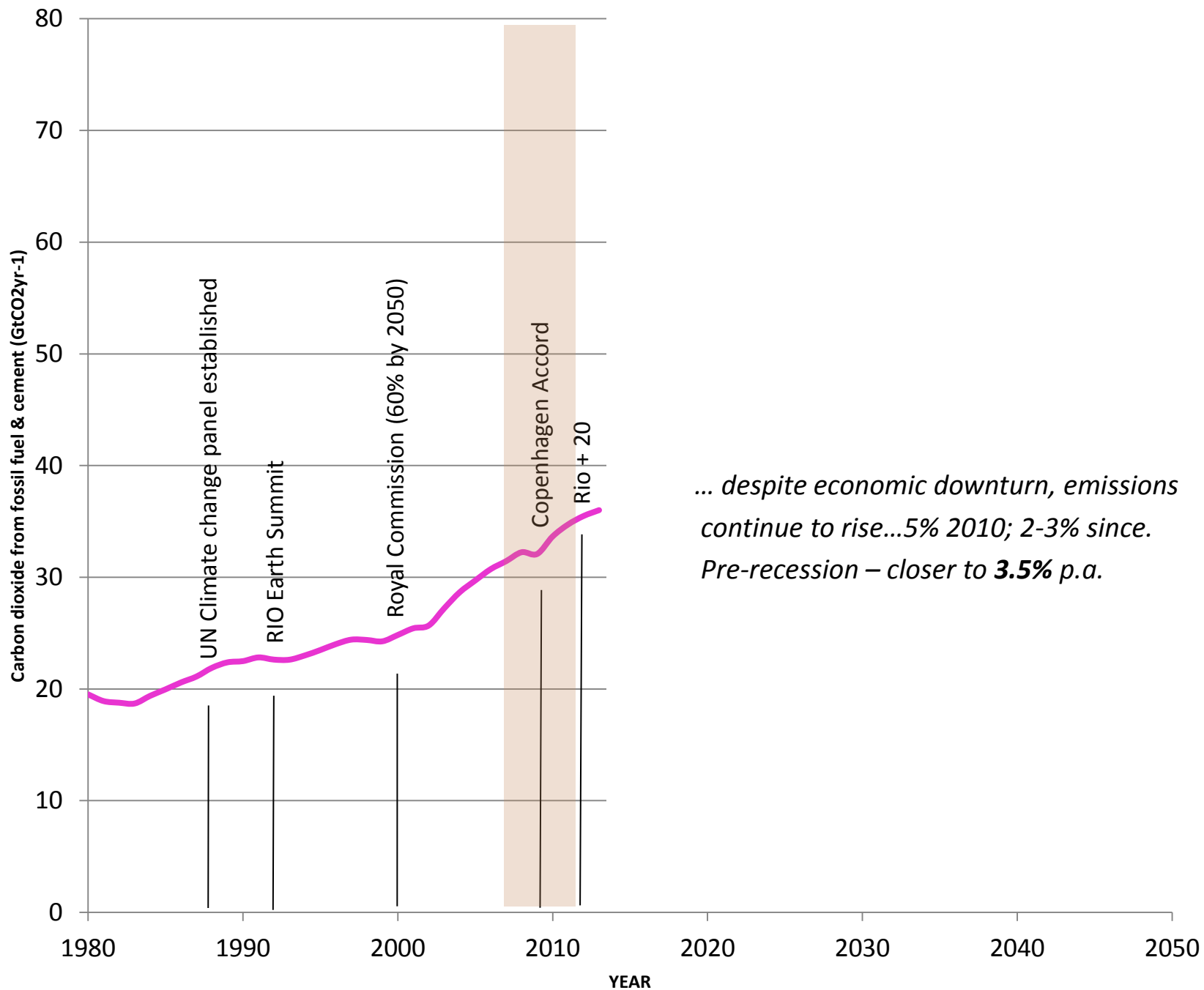
Avoiding 2° C – how are we doing so far?





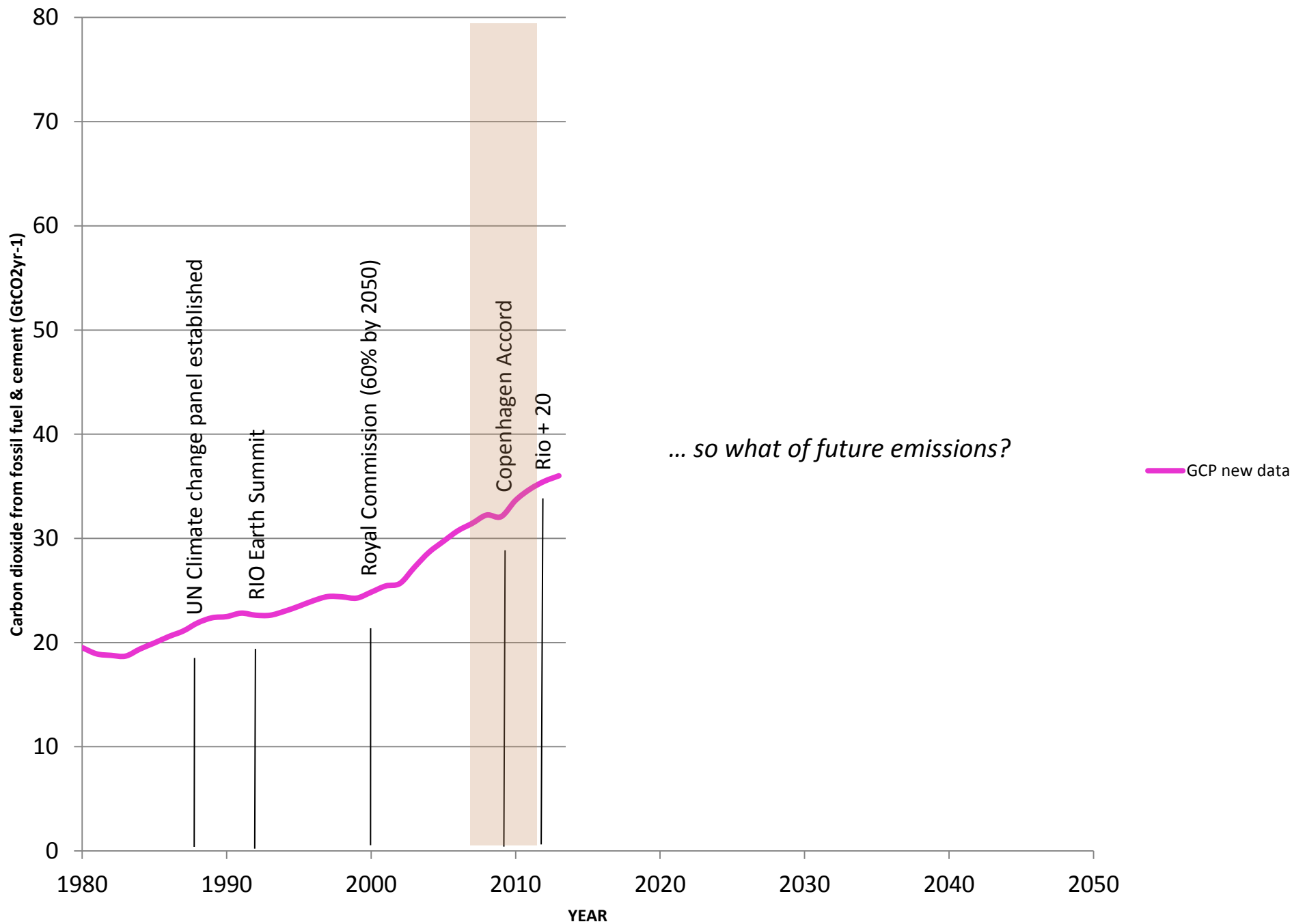


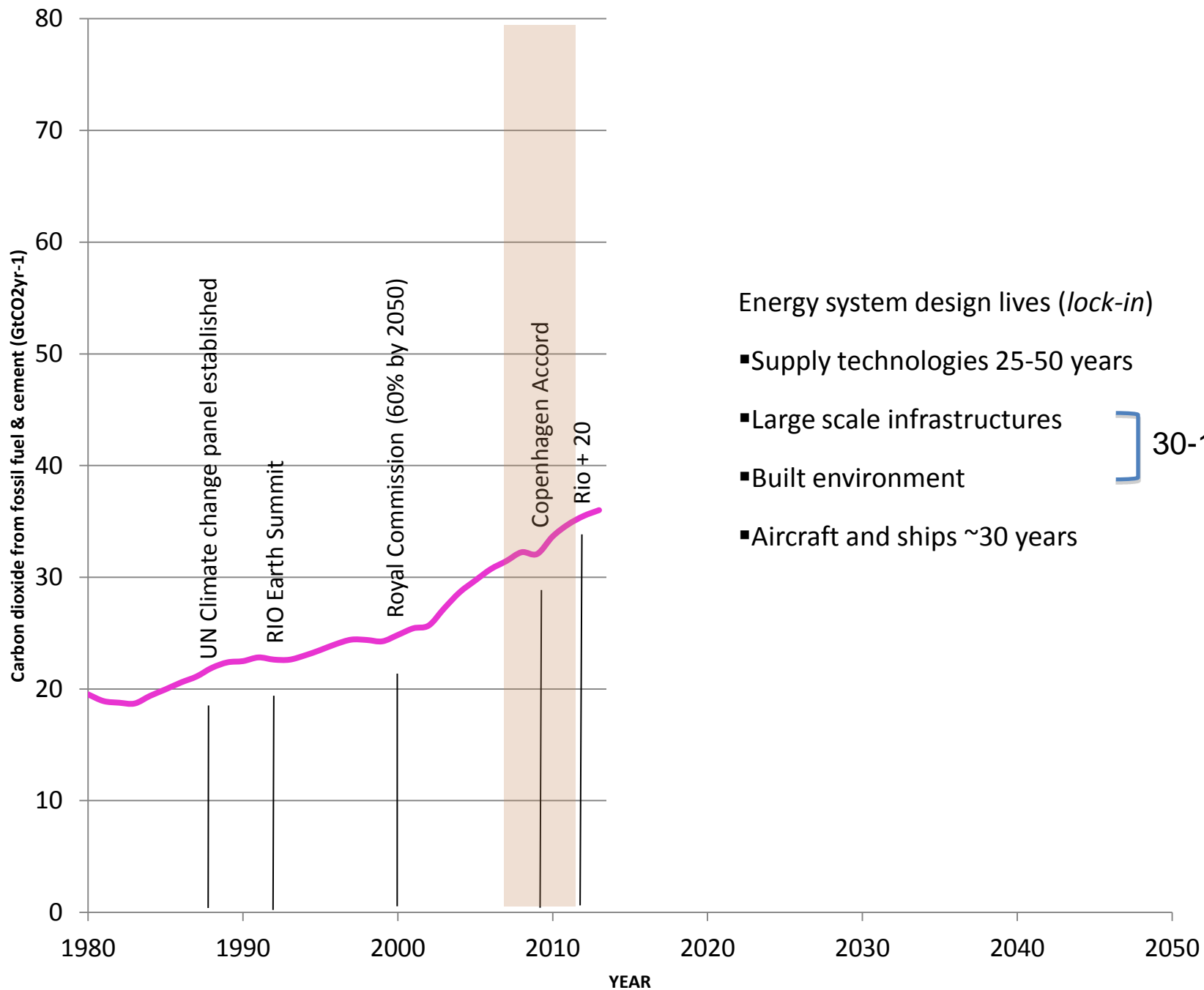




*... despite economic downturn, emissions continue to rise...5% 2010; 2-3% since. Pre-recession – closer to **3.5%** p.a.*

GCP new data





Energy system design lives (*lock-in*)

▪ Supply technologies 25-50 years

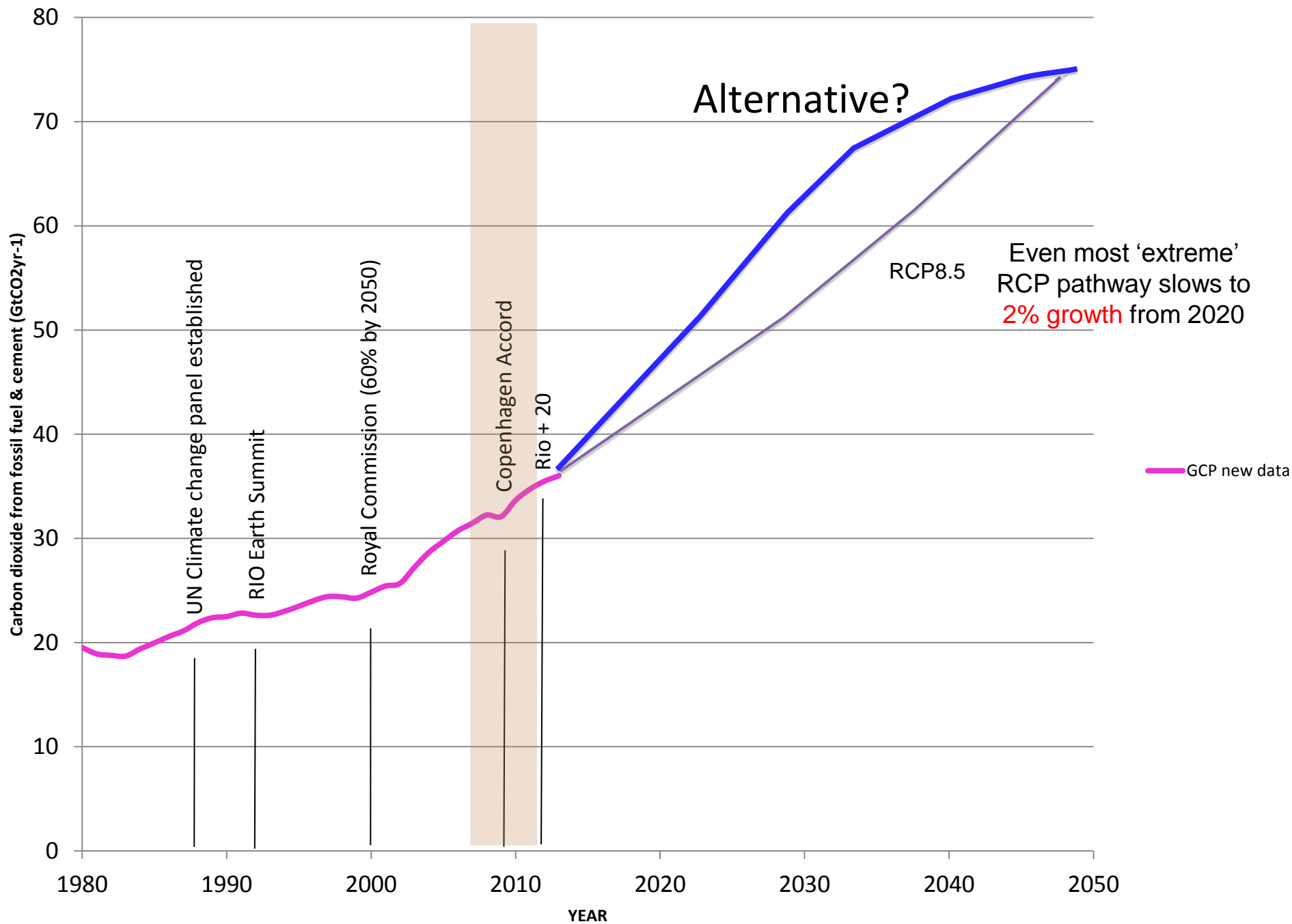
▪ Large scale infrastructures

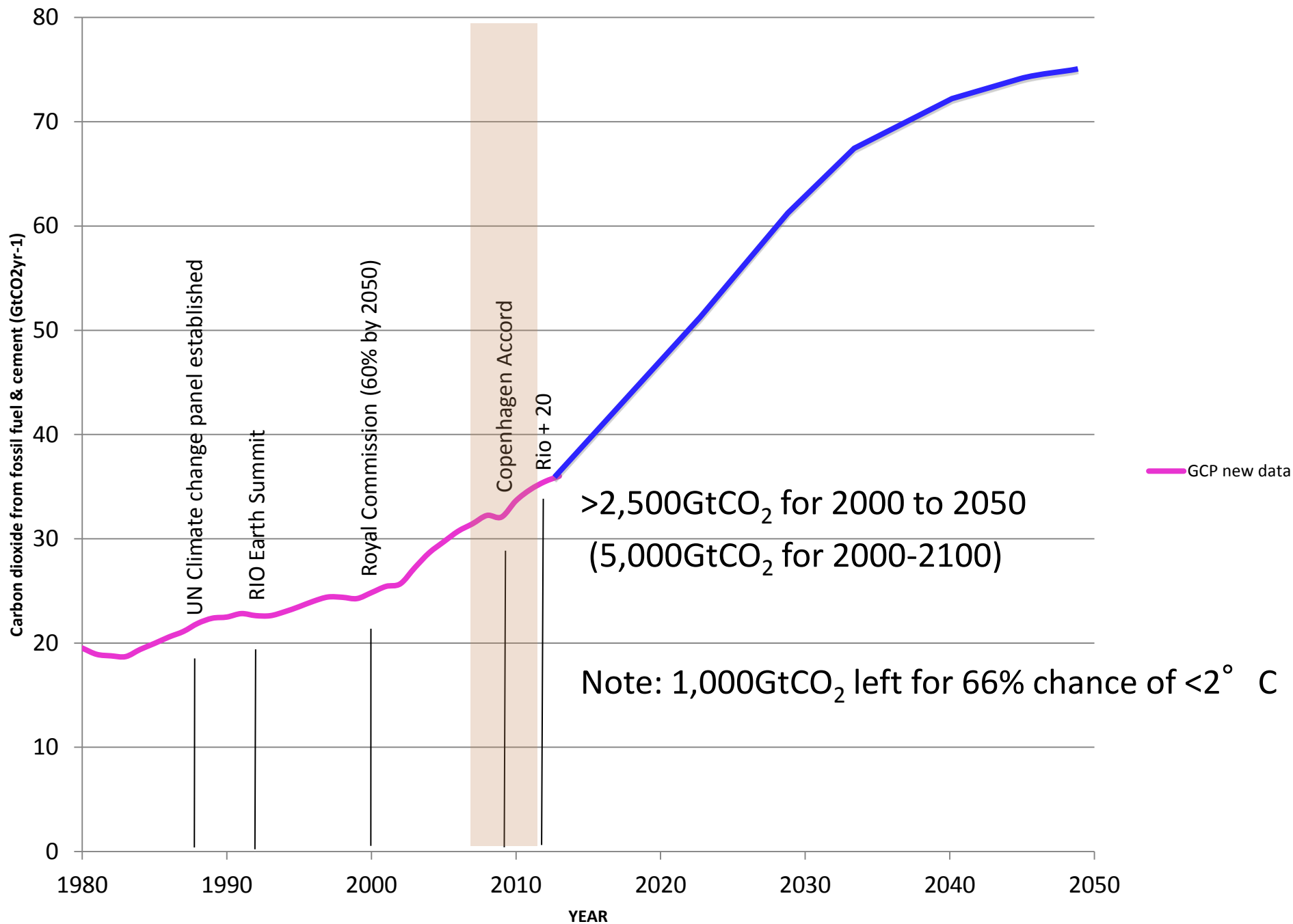
▪ Built environment

▪ Aircraft and ships ~30 years

30-100 years

GCP new data





Where current policy is leading...

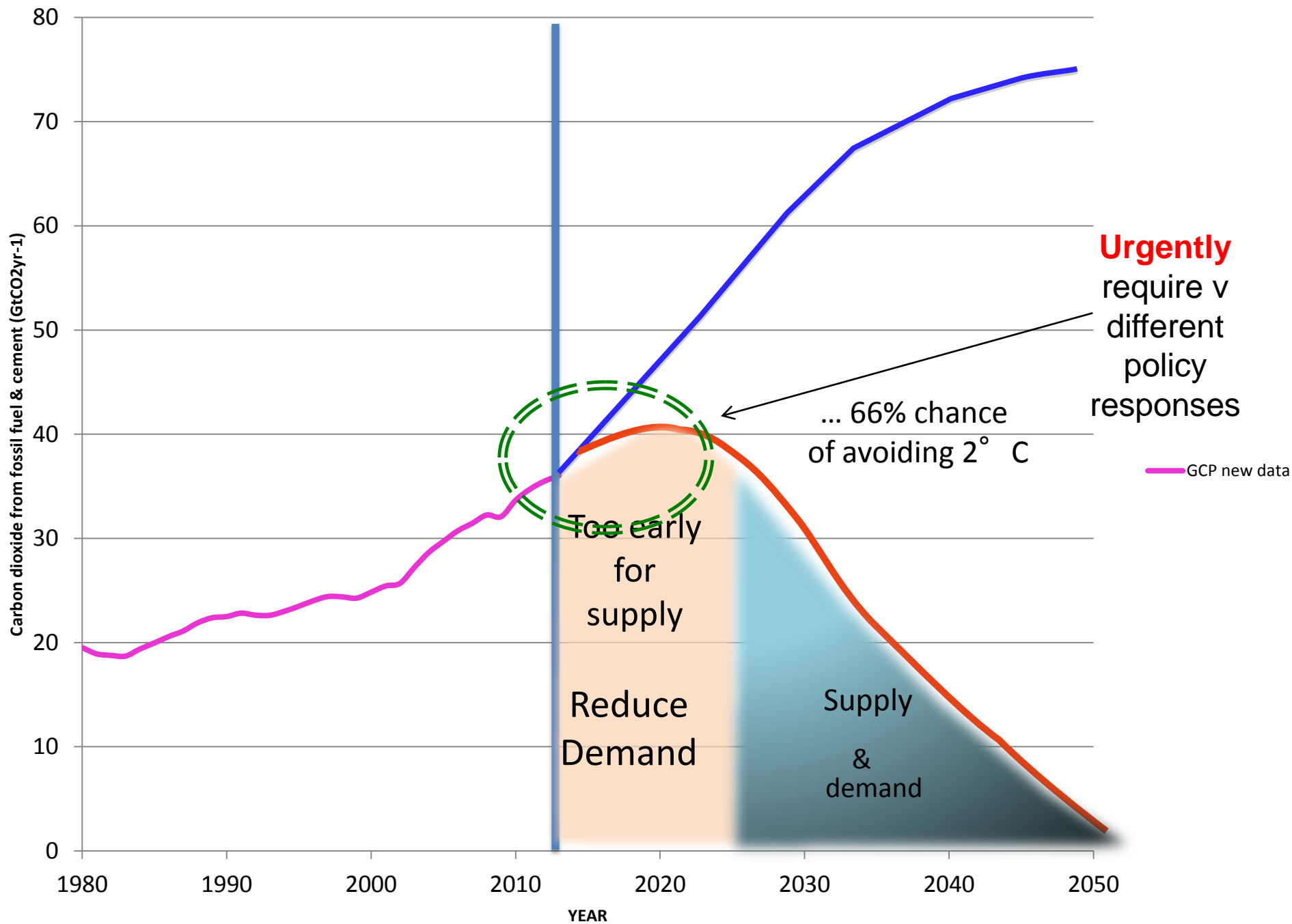
Global emissions continuing to grow

Lower Mitigation = **Higher** Adaptation


Currently policies in line with 4° C-6° C by
2100

(Anderson & Bows, 2010; Betts et al., 2010; Rogelj et al., 2010)

Because of a severe delay
to set in train measures to
avoid 2° C – how can we
now meet this target?



How feasible is change?



“To keep ... global average temperature rise close to 2° C ... the UK [must] cut emissions by at least 80% ... the good news is that reductions of that size are possible without sacrificing the benefits of economic growth and rising prosperity.”

Committee on Climate Change first report p.xiii & 7 (2009/11)

2° C – an alternative take ...

If we consider it appropriate for poorer nations to have enough emission budget to develop and improve their welfare, then **for the wealthier nations...**

*“...dangerous climate change can only be avoided if economic growth is exchanged, **at least temporarily***, for a period of planned austerity within Annex 1 nations...”.*

Anderson & Bows 2011

**until low carbon energy supply is widespread*

How can such
radically different interpretations
arise from the same science?

Consequently, very different results for 2° C

Characteristic	Anderson & Bows	Typical 2° C scenarios
Probability of exceeding 2° C	37%	50 to 80%
Global emissions peak year	2020	In the past! to 2016
Non-Annex 1 nations peak	2025	2017/18
Deforestation considered	Yes	No
Annex 1 mitigation rate	8-10% p.a.	3-4% p.a.

If avoiding 2°C is too difficult

... what about a 4°C future?

(i.e. a larger carbon budget and lower rates of mitigation)

Google Earth

File Edit View Tools Add Help

Search

Fly To Find Businesses Directions

Fly to e.g., 1600 Pennsylvania Ave, 20006

Places

- Temporary Places
- 4-Degrees-090710.kml
 - 4 Degrees 090710
 - Map Introduction
 - Map
 - More information
 - Climate Change Impacts
 - Climate Change Imp...
 - Background inform...
 - The Amazon forest
 - Agriculture
 - Water Availability
 - Sea level rise
 - Carbon Cycle
 - Temperature Rises
 - Health
 - Impacts
 - Impact - Forest ...
 - Impact - Crops
 - Impact - Water

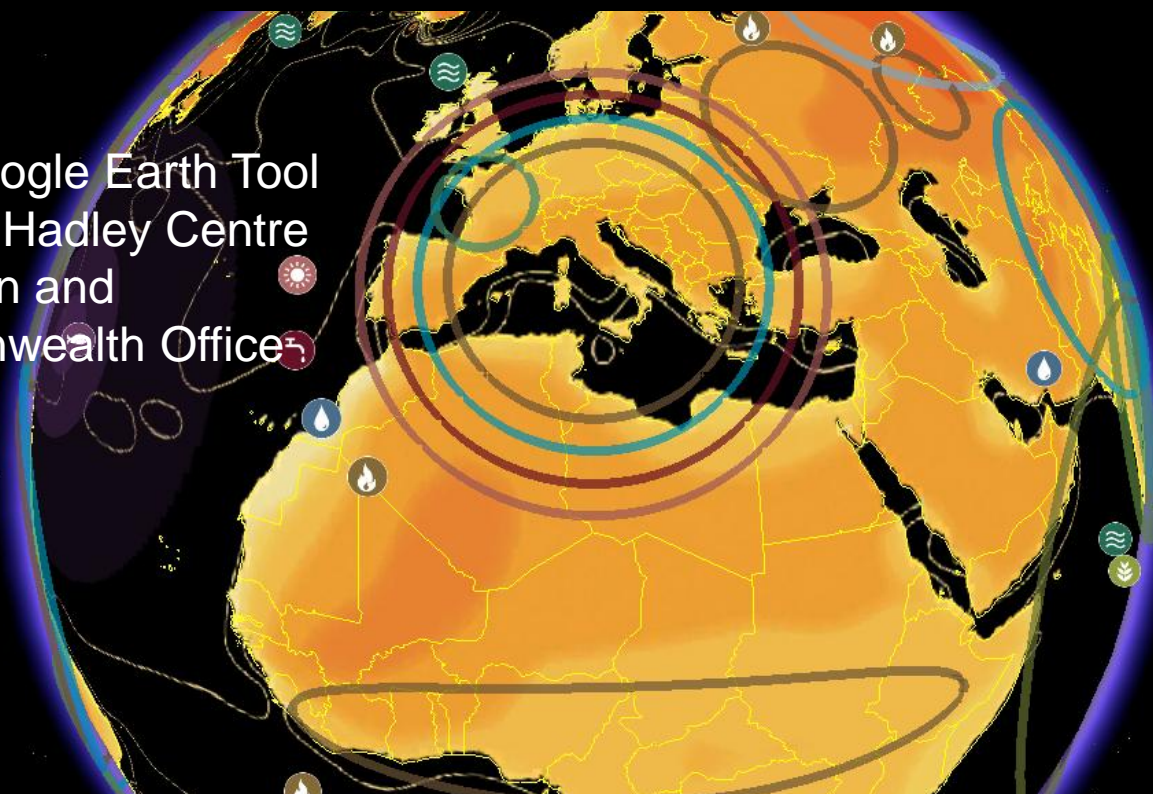
Layers

Earth Gallery >>

- Primary Database
- Borders and Labels
- Places
- Photos
- Roads
- 3D Buildings
- Ocean
- Street View
- Weather
- Gallery
- Global Awareness
- More

Global impacts: 4° C

4° C Google Earth Tool
from the Hadley Centre
& Foreign and
Commonwealth Office



+ °Celsius

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
2	4	5	7	9	11	13	14	16	18	20	22	23	25	27	29

+ °Fahrenheit

Global impacts: 4° C

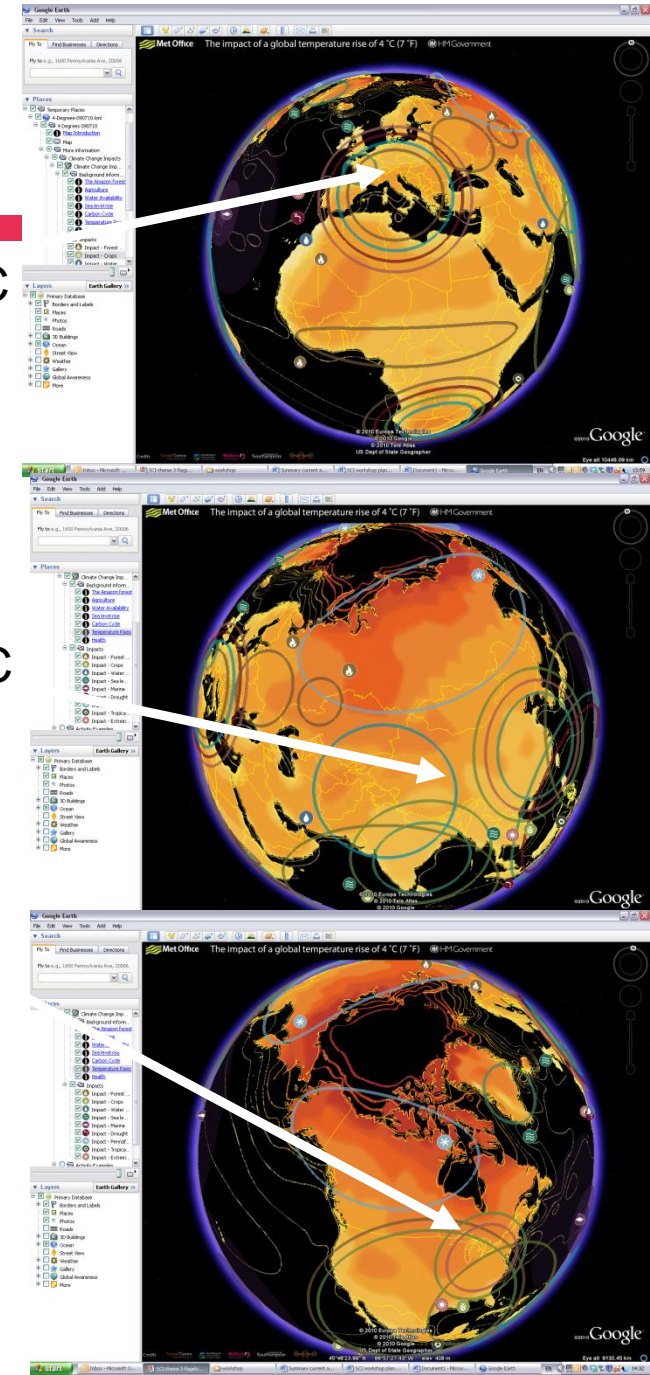
+8° C

Hottest days



+6° C

+10-12° C



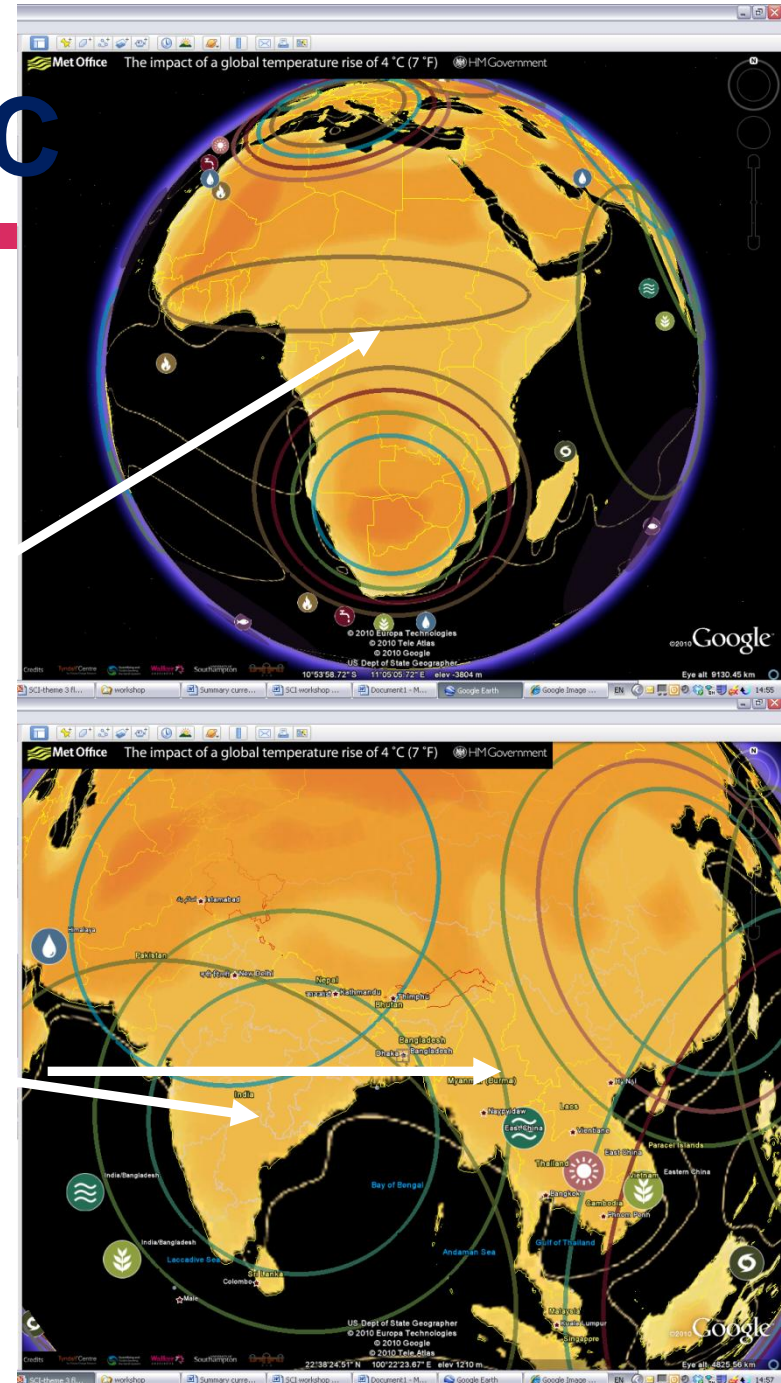
Global impacts: 4° C

Food crops



40%
reduction
in maize
& wheat
yields in
low
latitudes

30%
decrease
in rice
yields



There is a widespread view that 4° C is...

- Incompatible with an organised global community
- Beyond 'adaptation'
- Devastating to eco-systems
- Highly unlikely to be stable ('tipping points')

... consequently ...

4° C should be avoided at 'all' costs

i.e. the future's impossible!

- We can't mitigate for 2° C to 3° C
- And we can't live with 4° C ... or more

at least within our blinkered mindset

... and then ask ...

...have we the *agency* to deliver the unprecedented reduction rates necessary to 'stay below 2° C' ?

Agency

- **Equity** – a message of hope; perhaps?
- **Technology** – how far, how fast & how soon?
- **Growth** – useful proxy or obstructive dogma?

Equity

... who are the emitters?

Little chance of polices working for all 7 billion

... but how many people really need to reduce emissions?

40% to 60% emissions from 1% to 5% population

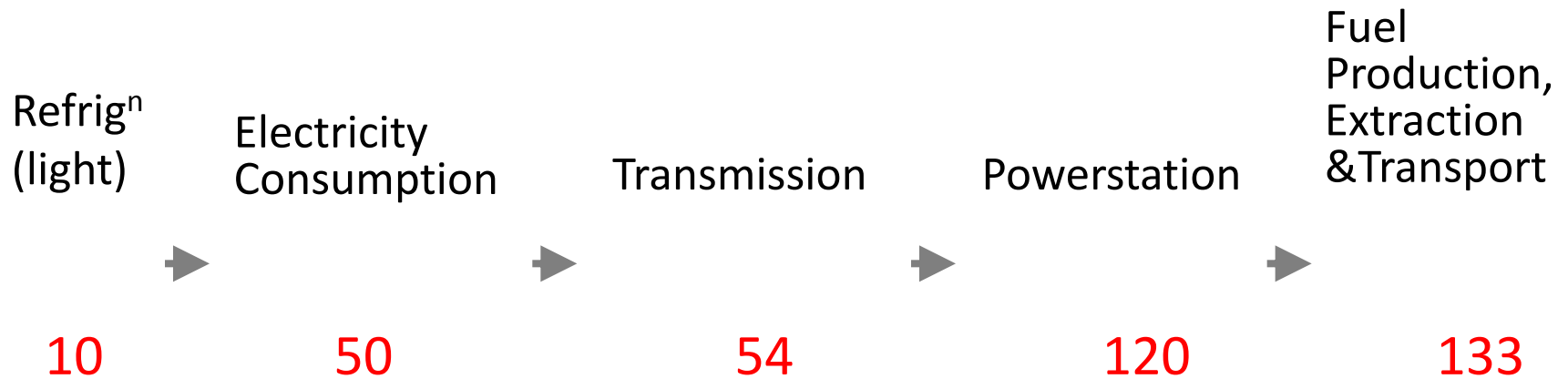
Who are they?

Climate scientists, OECD (& other) academics, anyone who gets on a plane once a year – middle classes...

Technology

... refocus on demand

The electricity system



**Demand opportunities dwarf
those from supply in short-term**

Growth

... a misguided proxy?

Growth is a proxy for many social goods

Including:

- Welfare (health, life expectancy)
- Employment/income
- Equity
- Literacy rates
- Crime & safety, etc.
- Time with family & friends

Economic growth itself has no meaningful value

£350b QE or £300b retrofit of $\frac{2}{3}$ of UK's housing stock

- Reduce fuel poverty (over 5 million homes)
 - Reduce energy bills
 - Reduce vulnerability to volatile energy prices
 - Provide mass skilled & *semi-skilled* employment
- as well as:
- *Reduce emissions*
 - *Increase resilience to a changing climate*

To summarise

For 2° C mitigation, we need a paradigm shift in UK:

- Be candid about the timeframe for 2° C budgets (2013-2025/30)
- Recognise that UK reduction rates need to be ~10% p.a.
- Escape the dogma of price/finance as the principal mechanism for delivering 2° C
- Acknowledge we're not short of capital, just the initiative & courage to reallocate wealth towards low-carbon infrastructure

Don't shoot the messenger: *implications for policy* (Annex 1)

- Should avoid 4° C at all costs
- The UK and rest of Annex 1 need ~70% decarbonisation over next decade
- Only small % of global population need radical mitigation
- Low carbon energy supply cannot deliver early reductions in the UK
- Principal response is to reduce energy demand now

Ultimately

- We must escape the shackles of a twentieth century mindset if we are ever to resolve twenty-first century challenges
- This will demand leadership, courage, innovative thinking, engaged teams and difficult choices

Thank you

Email: maria.sharmina@manchester.ac.uk

Twitter: @alicebows

@KevinCimate

Web: kevinanderson.info