



Australian
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ANU Climate Update

2020: a year of
change



Professor Mark Howden

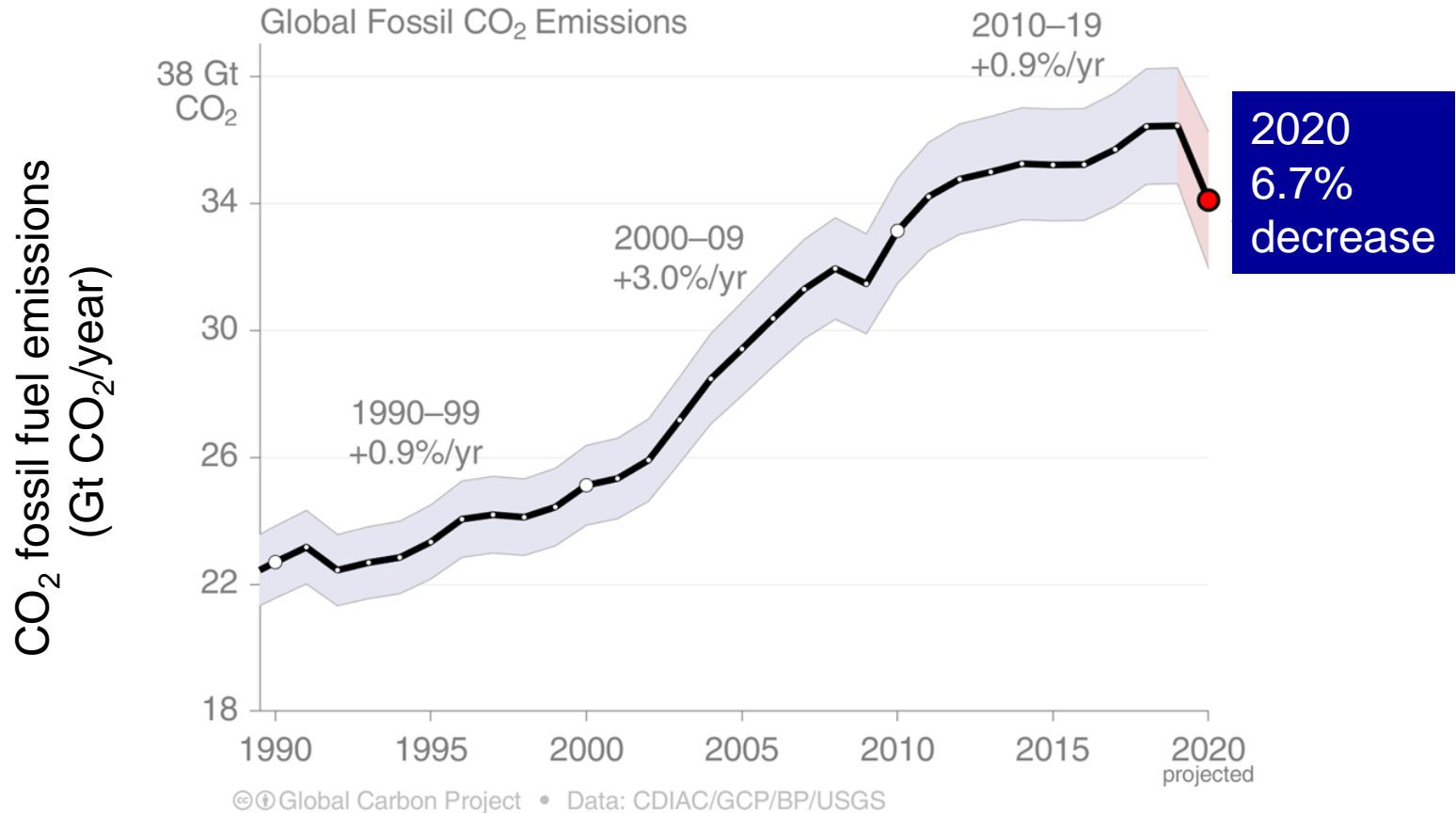
ANU Climate Change Institute

Vice Chair, IPCC Working Group II

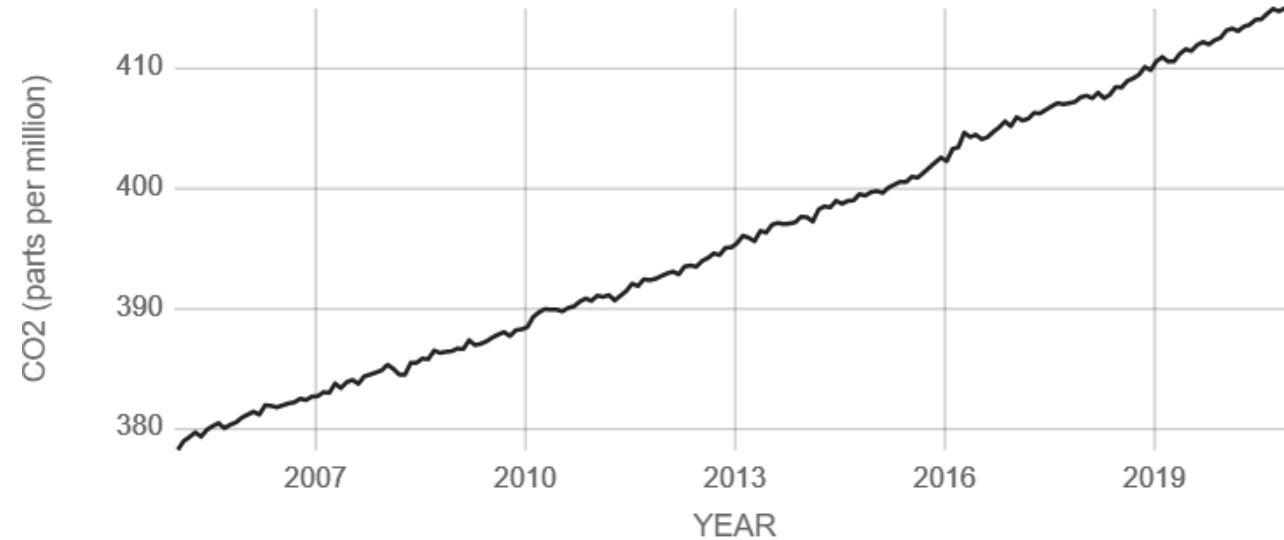
[@ProfMarkHowden](https://twitter.com/ProfMarkHowden)



CO₂ emissions: record fall from COVID



Atmospheric GHGs: still breaking records

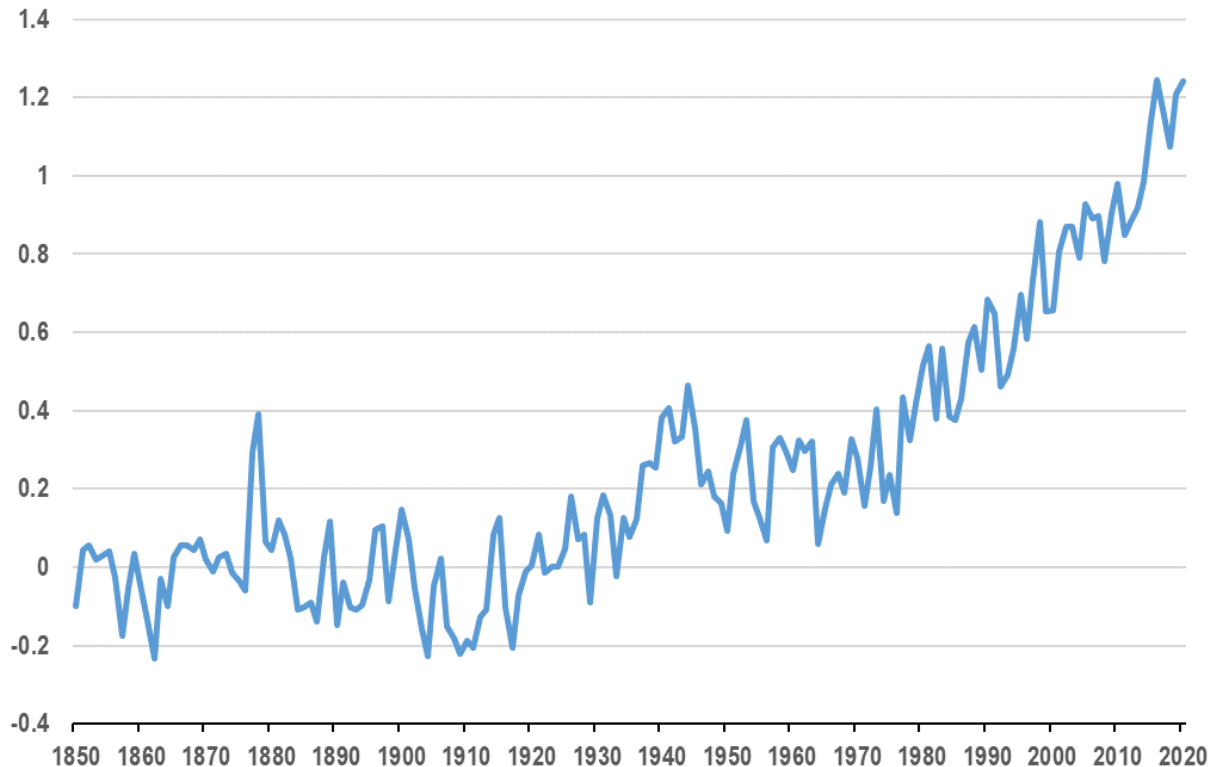


Source: climate.nasa.gov

- CO₂ today
416.5ppm
- Record levels of methane
- Record levels of nitrous oxide
- Record levels of other GHGs

Globally – equal hottest on record

Global mean temperature difference from
1850-1900 (°C)



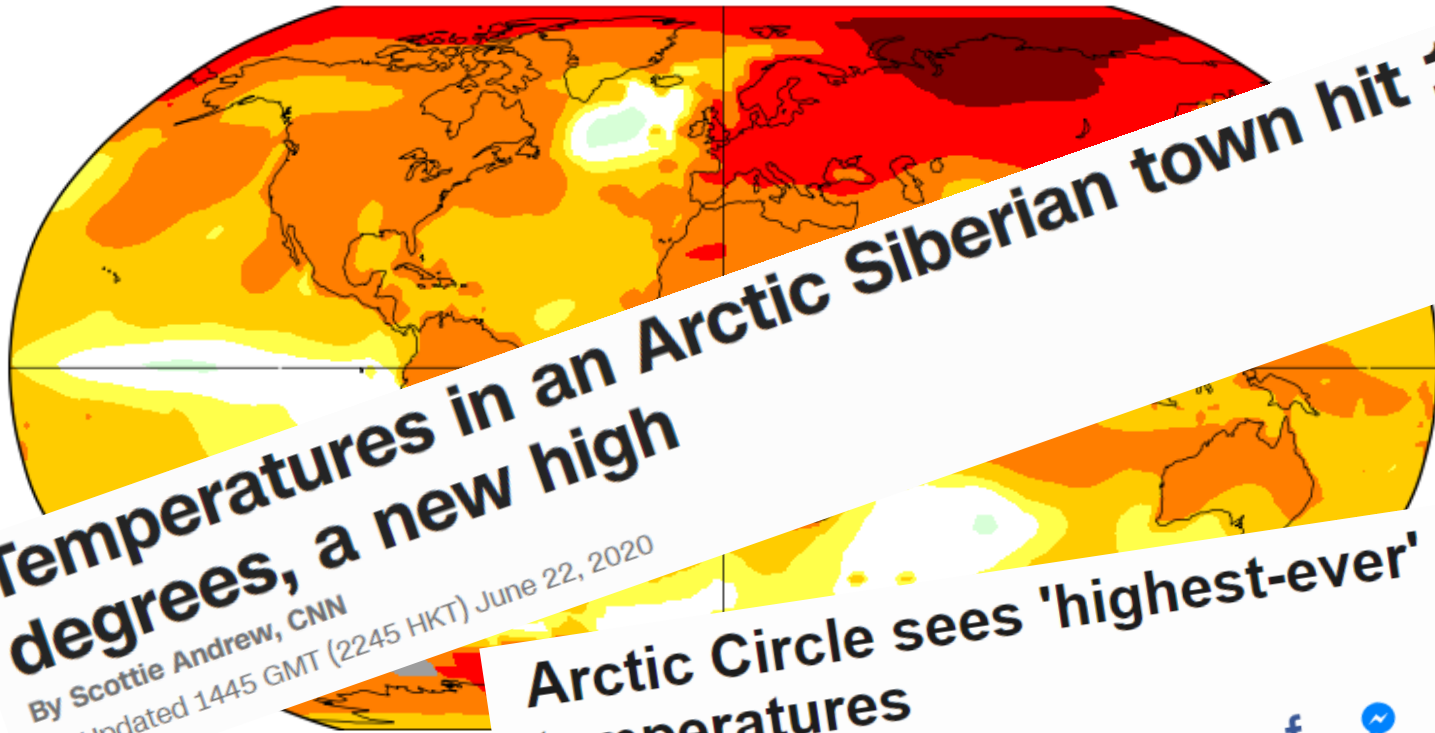
- Equal warmest year on record (1.24°C above the pre-industrial average)
- 4th warmest in Australia

High temperatures almost everywhere

Annual J-D 2020

L-OTI(°C) Anomaly vs 1951-1980

1.02



Temperatures in an Arctic Siberian town hit 100 degrees, a new high

By **Scottie Andrew, CNN**

Updated 1445 GMT (2245 HKT) June 22, 2020

Arctic Circle sees 'highest-ever' recorded temperatures

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7 hours ago | 494

7.0 6.4

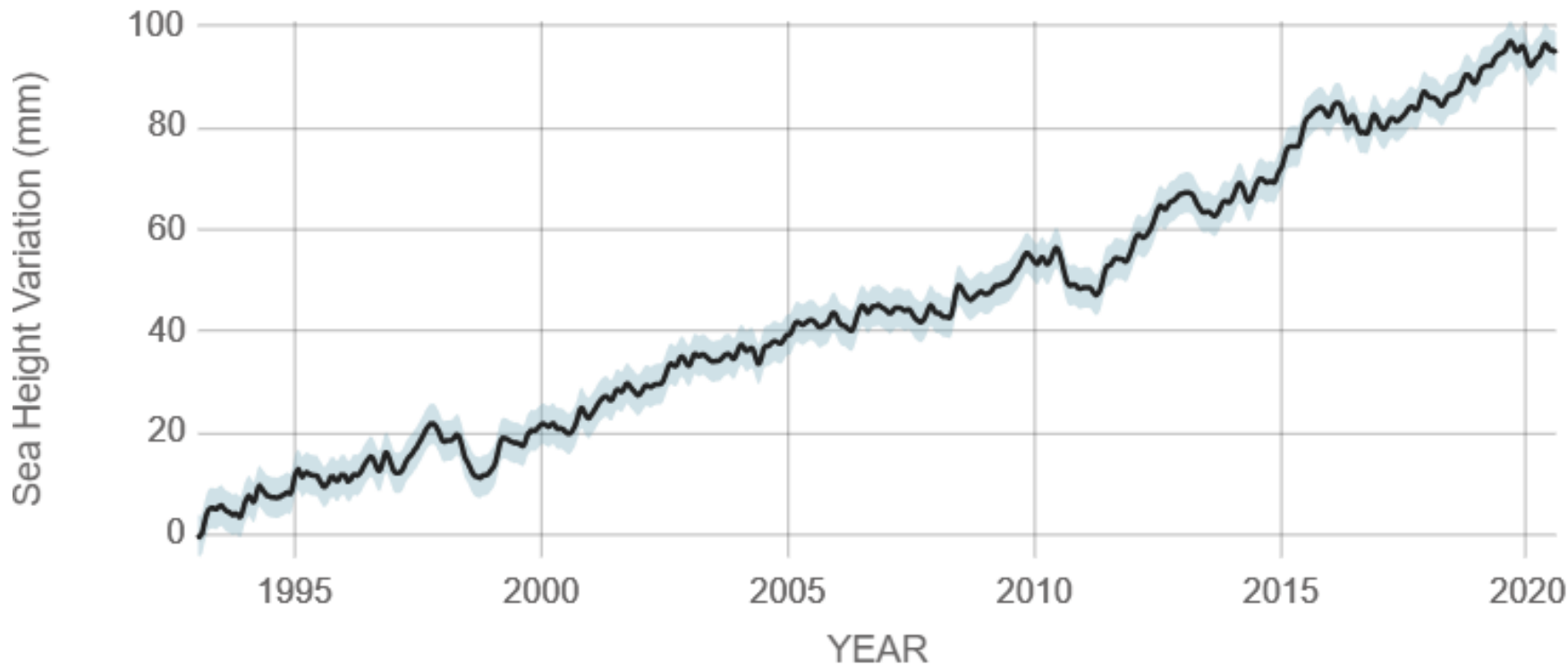
Black summer fires

- 8M Australians affected, 34 lives lost directly and about 430 people died of conditions worsened by smoke
- Over 2500 homes destroyed – immense cost
- Huge numbers of wild animals dead
- Some 18.6M ha burnt, some not recovering
- Clear fingerprint of climate change
- What a difference a La Niña makes
- Extremes getting worse globally





Sea levels keep getting higher



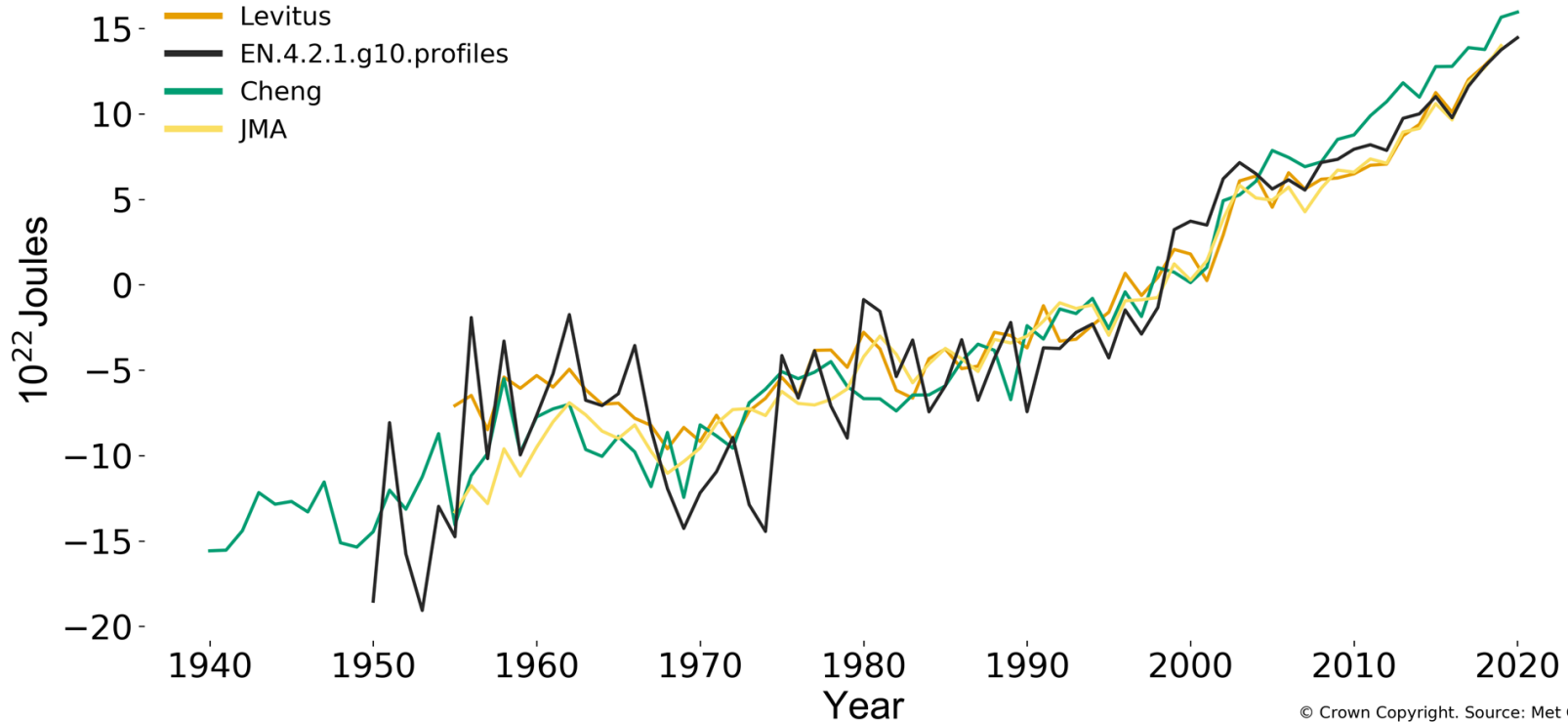
Source: climate.nasa.gov



Seas keep getting hotter

 Met Office

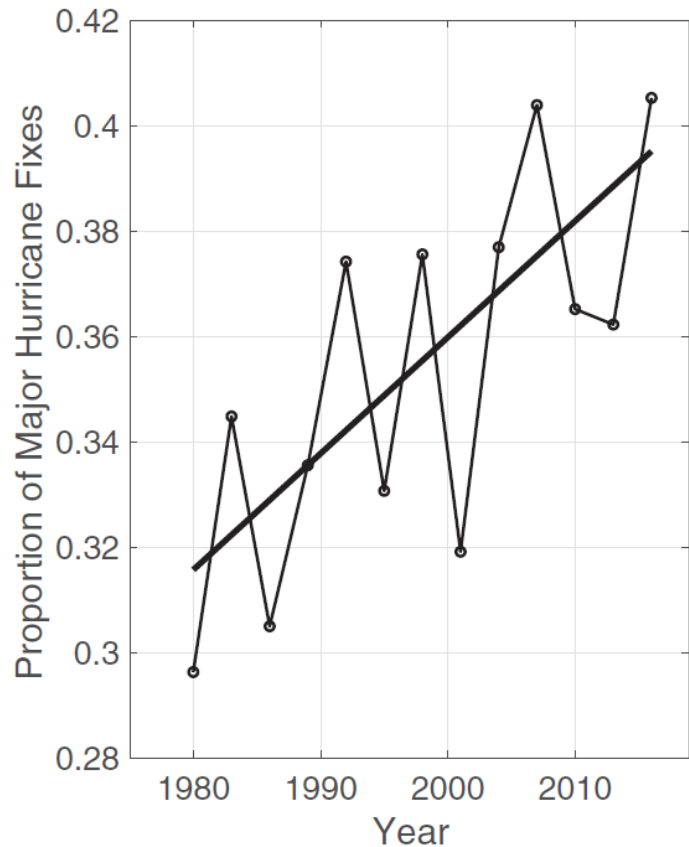
Global ocean heat content difference from 1981-2010 (10^{22} Joules)



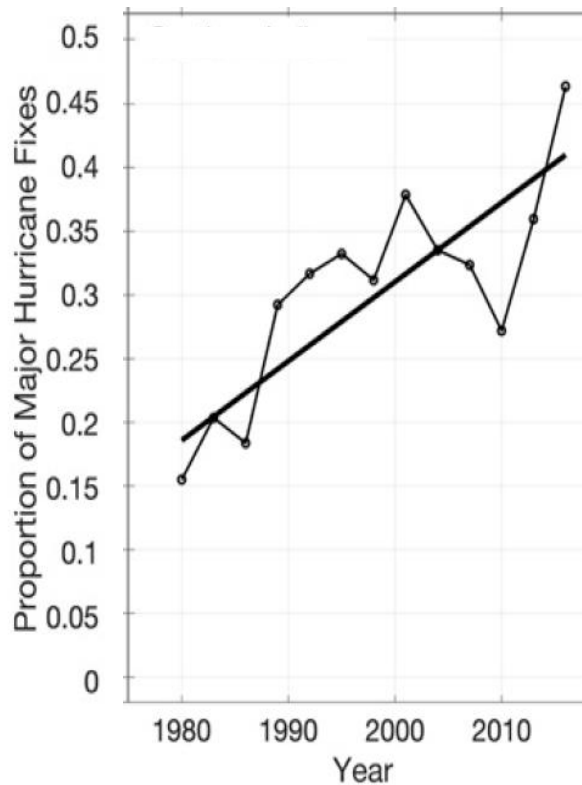


More, stronger cyclones

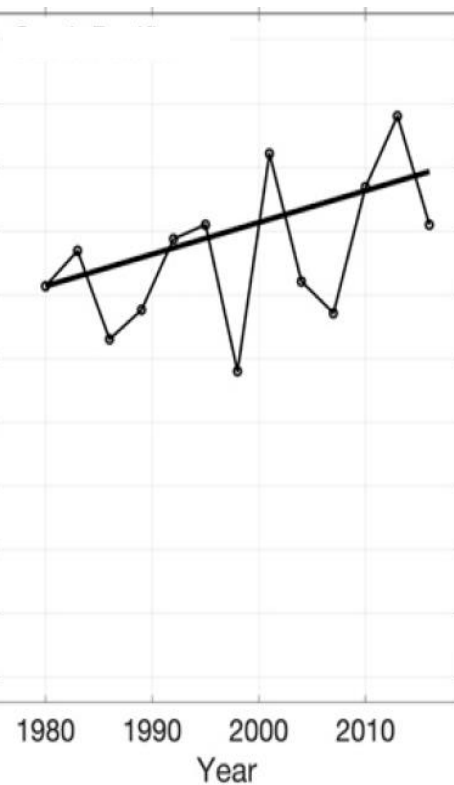
Global



Southern Indian



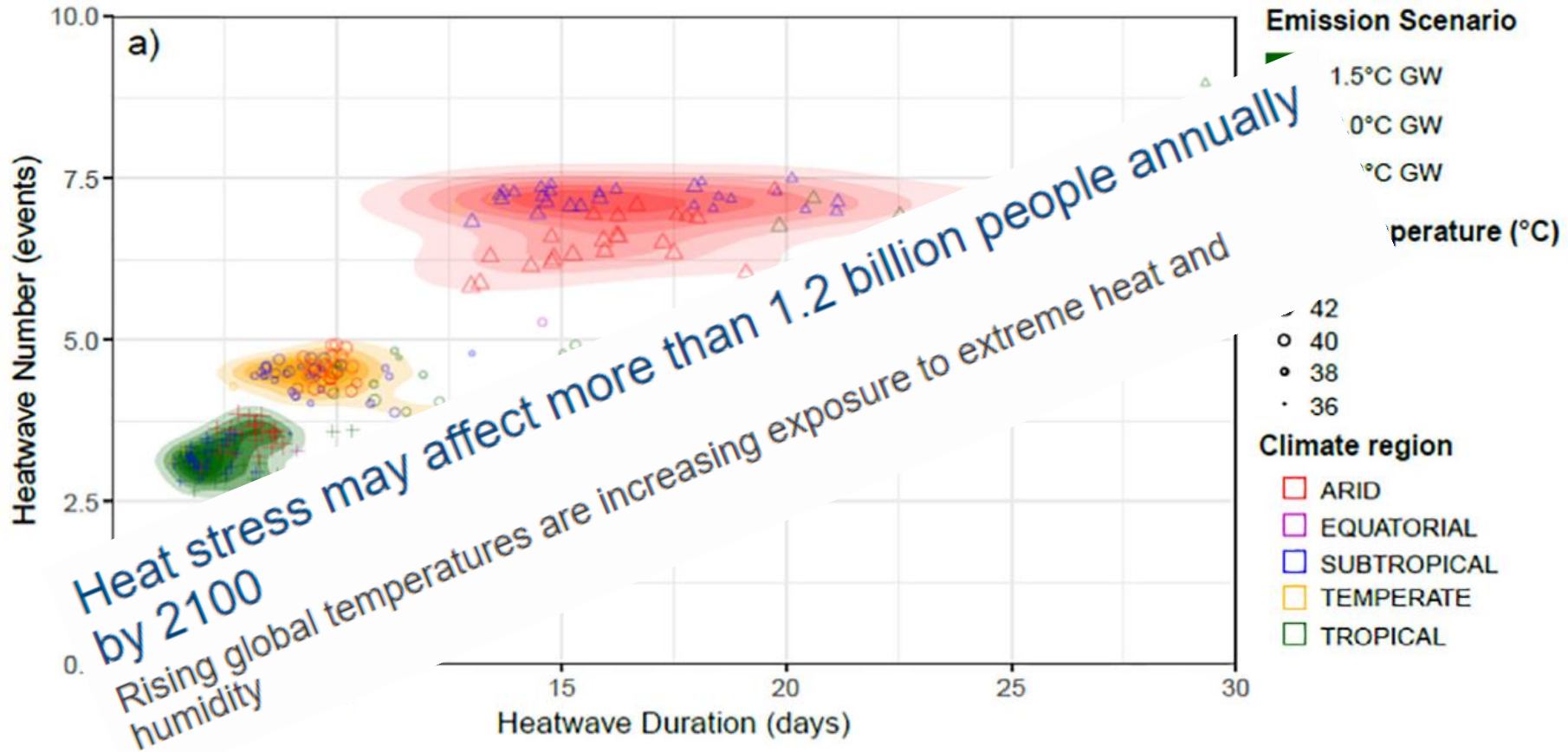
South Pacific



Higher sensitivity, faster change

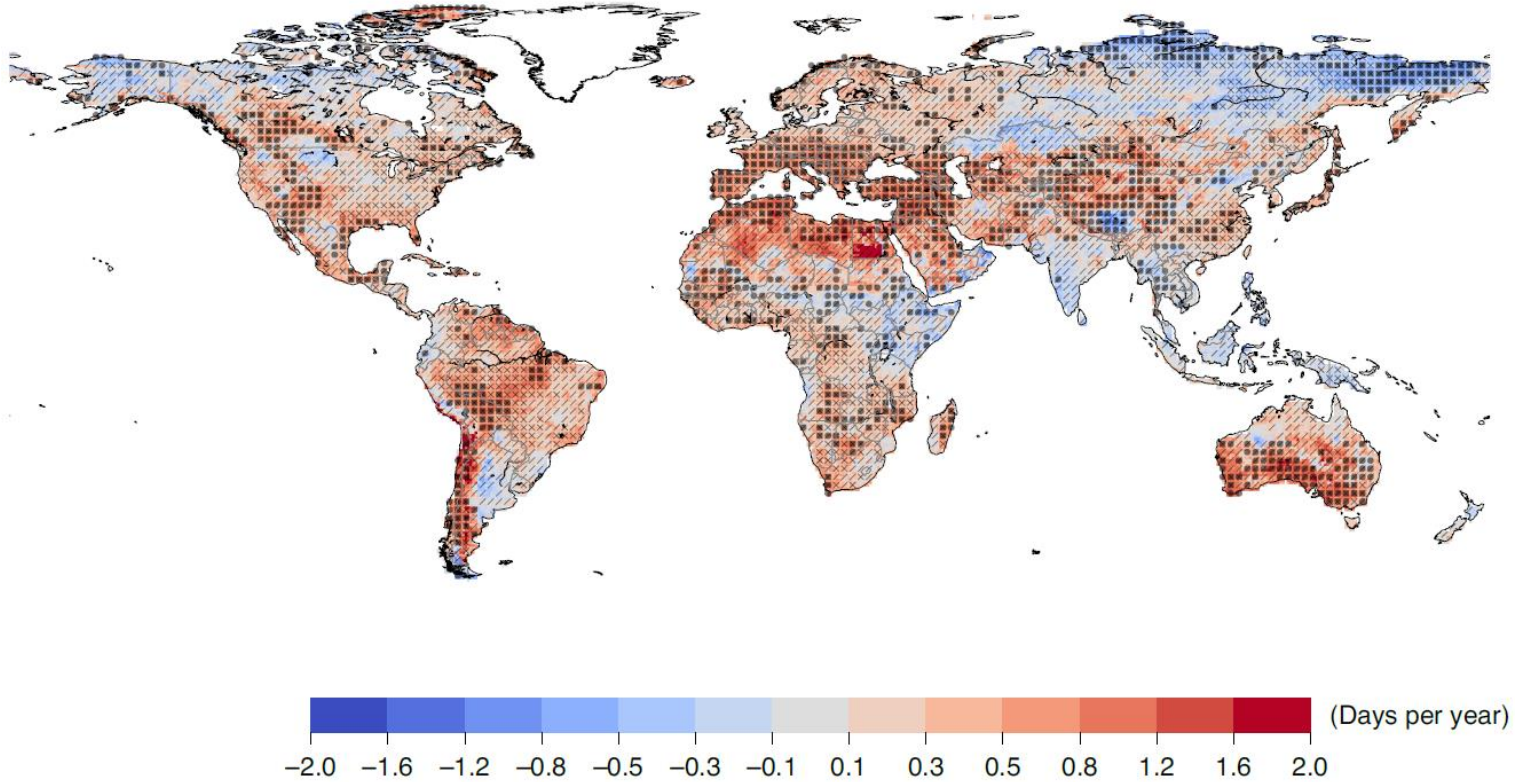
- Previous estimates of climate sensitivity to doubling of CO₂ were 1.5 to 4.5°C (AR5 likely range)
- Recent re-evaluation to 2.3 to 4.5°C
 - consistent with palaeo, historical evidence
- Means that high-emissions and low climate change are unlikely, also unable to rule out higher end values
- The best estimate of when 1.5°C may occur has been brought forward about ten years to the early 2030's
- A 24% chance that 1.5°C exceeded at least once in next four years

Heatwaves become much worse

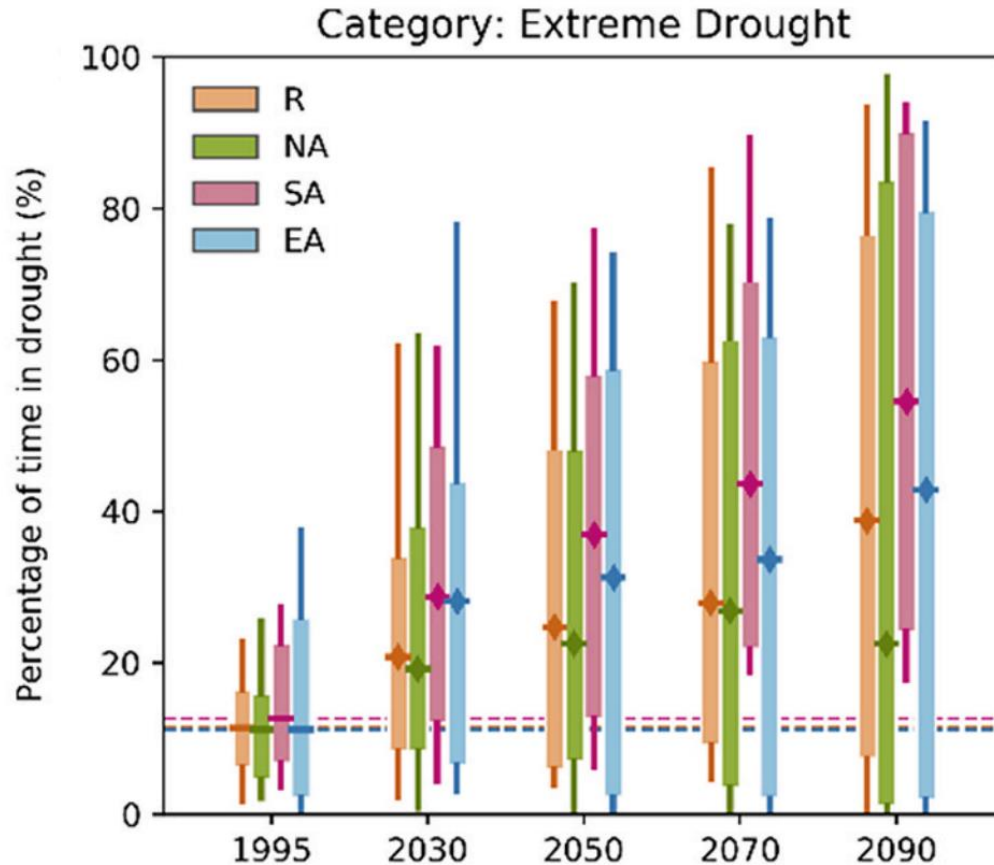




Drought becomes much worse: global

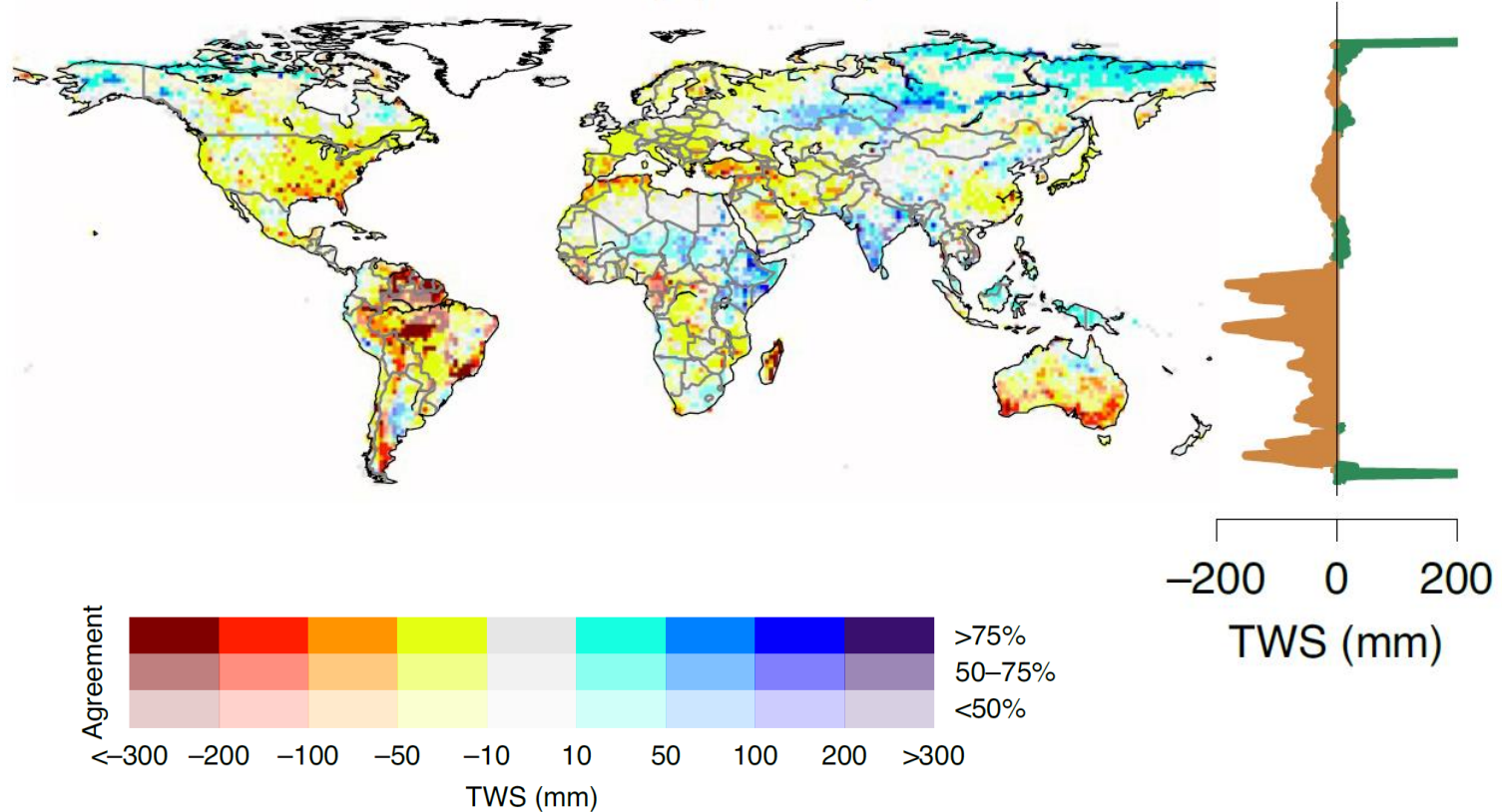


Drought becomes much worse: Australia



Climate reduces total water storage

Late century (RCP6.0)





Sea level rise higher with warming





One 'solution': stop collecting evidence

Trump says he asked for coronavirus testing to be slowed down because there were so many cases

United States now has 2.2 million cases with some states still recording record one-day rises

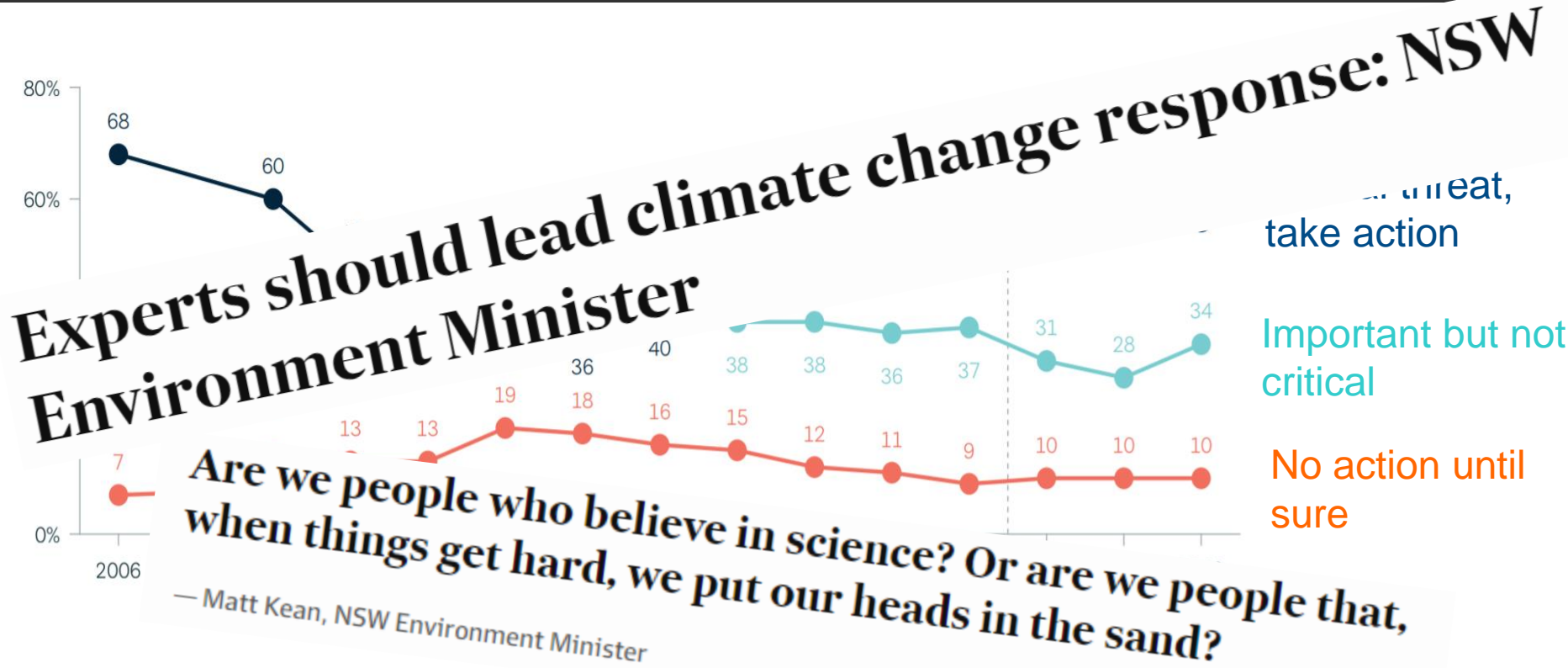
Phil Thomas New York | @philipthomaspt |



"When you do testing to that extent you're going to find more people."
"You're going to find more cases, so I said to my people, 'Slow the testing down please.'
"They test and they test and we got tests — people don't know what's going on. We got tests, 'We got another one over here'.
'Testing is a double-edged sword. In one way it tells you, you have cases. In another way it tells you where the cases are.'



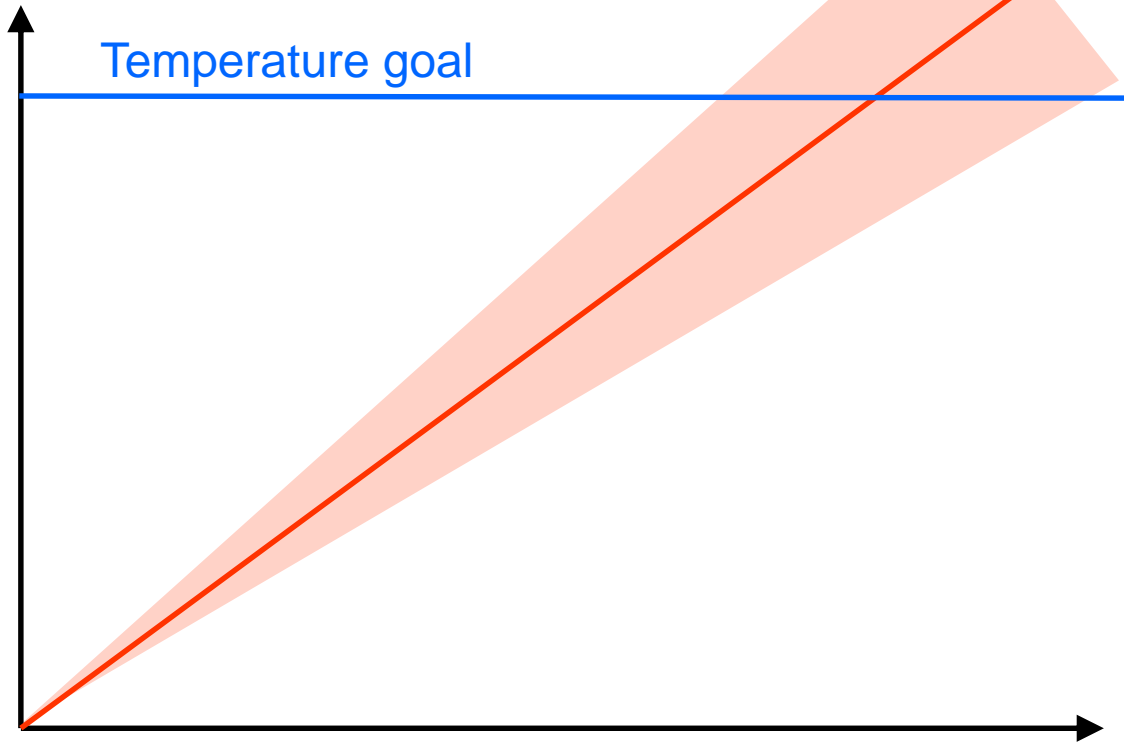
Public demand for action remains strong





Understanding the CO₂ budget approach

Global temperature increase from
pre-industrial (°C)

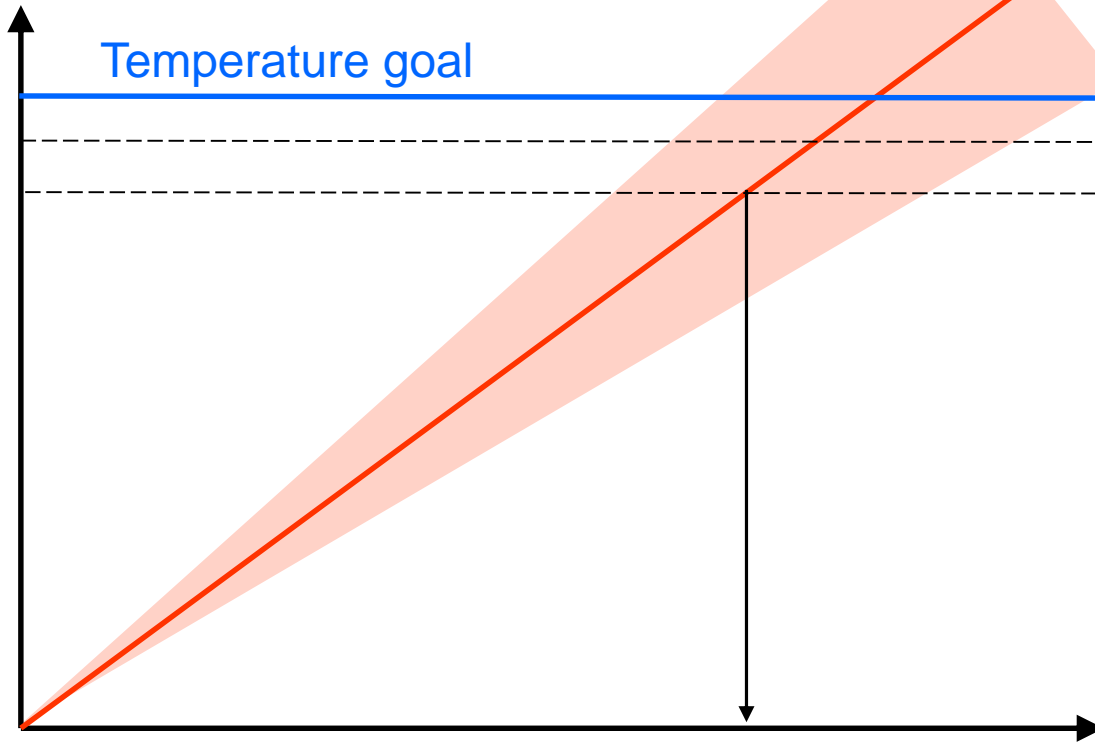


Cumulative CO₂ emissions from now



Understanding the CO₂ budget approach

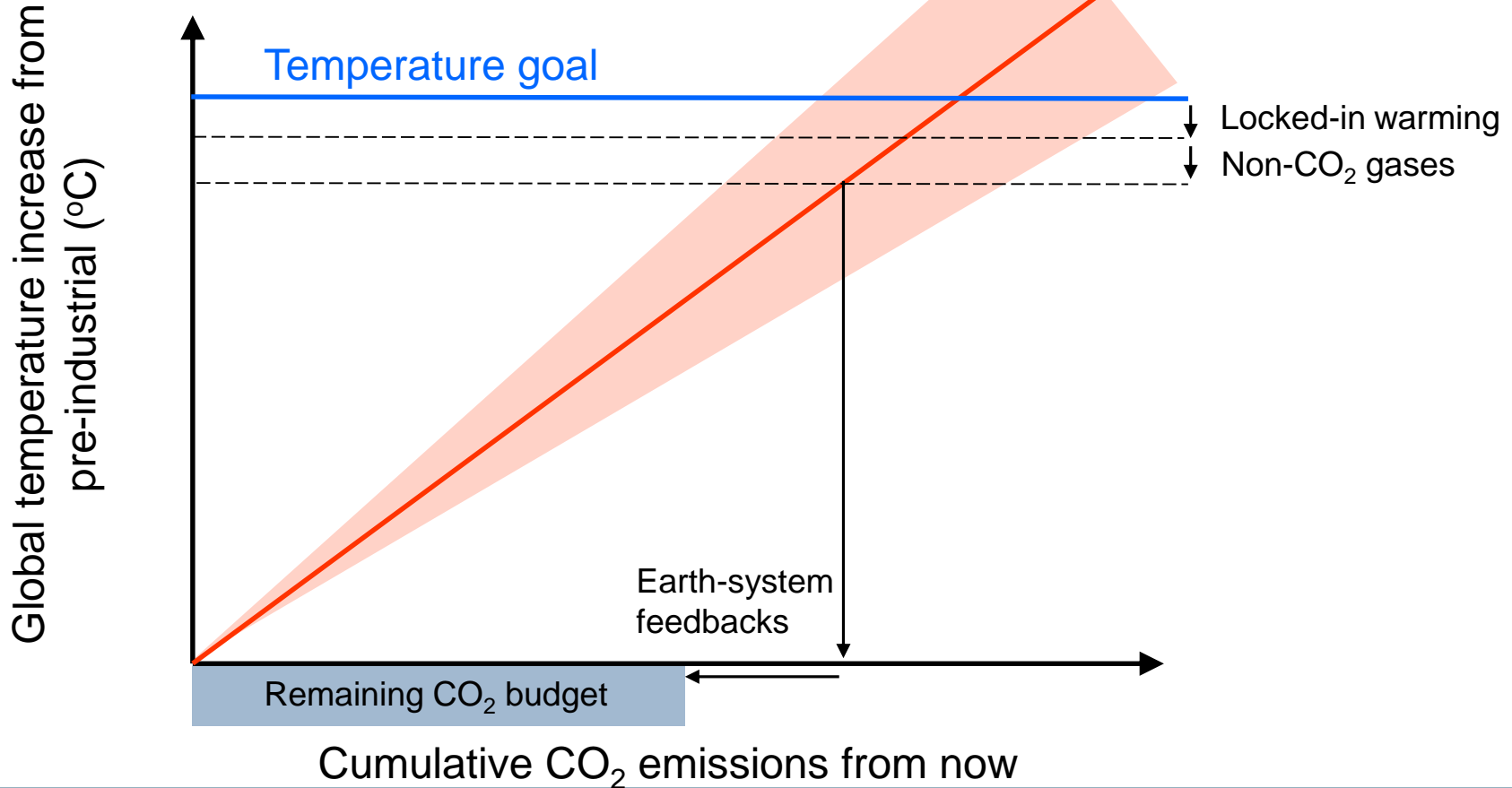
Global temperature increase from pre-industrial (°C)



Cumulative CO₂ emissions from now



Understanding the CO₂ budget approach



- We can now emit about 390Gt of CO₂ and have a 50:50 chance of limiting warming to 1.5°C above pre-industrial
 - current emissions are around 42Gt/year
- So at current rates we have 9.3 years (390/42) before we would have to go to net zero and still have a fair chance of staying below 1.5°C. COVID makes little difference
- The numbers for staying below 2°C are about 27 years
 - if we accept lower probabilities of staying within the Paris Agreement goals then add a few extra years
- Every year we delay large-scale mitigation matters

- The time to net zero is not fixed – it is a function of achieving interim targets
- Stronger interim targets push out the net-zero date
 - and vice versa
- Net zero is necessary but not sufficient to meet Paris goals
- Setting both a firm net-zero target **and** matching interim targets so as to avoid problematic climate change is crucial for our nation – it is not a ‘vanity project’
- Increasingly clear that action is much less costly than inaction

Key messages

- The evidence of climate change and its impacts keeps accumulating and the news is not good
- Future projections look worse the more we know
- Rapid and substantial action is needed and publically supported
- We all have roles to play - together





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Thankyou

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Each half a degree matters

Each year matters

Each choice matters

