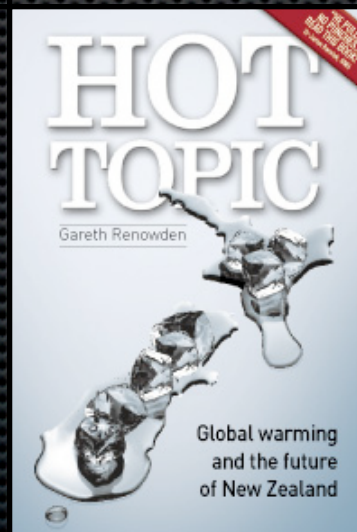


Little country, big issues

Gareth Renowden



The big picture

- ✦ Climate change will shape our lives over the next century

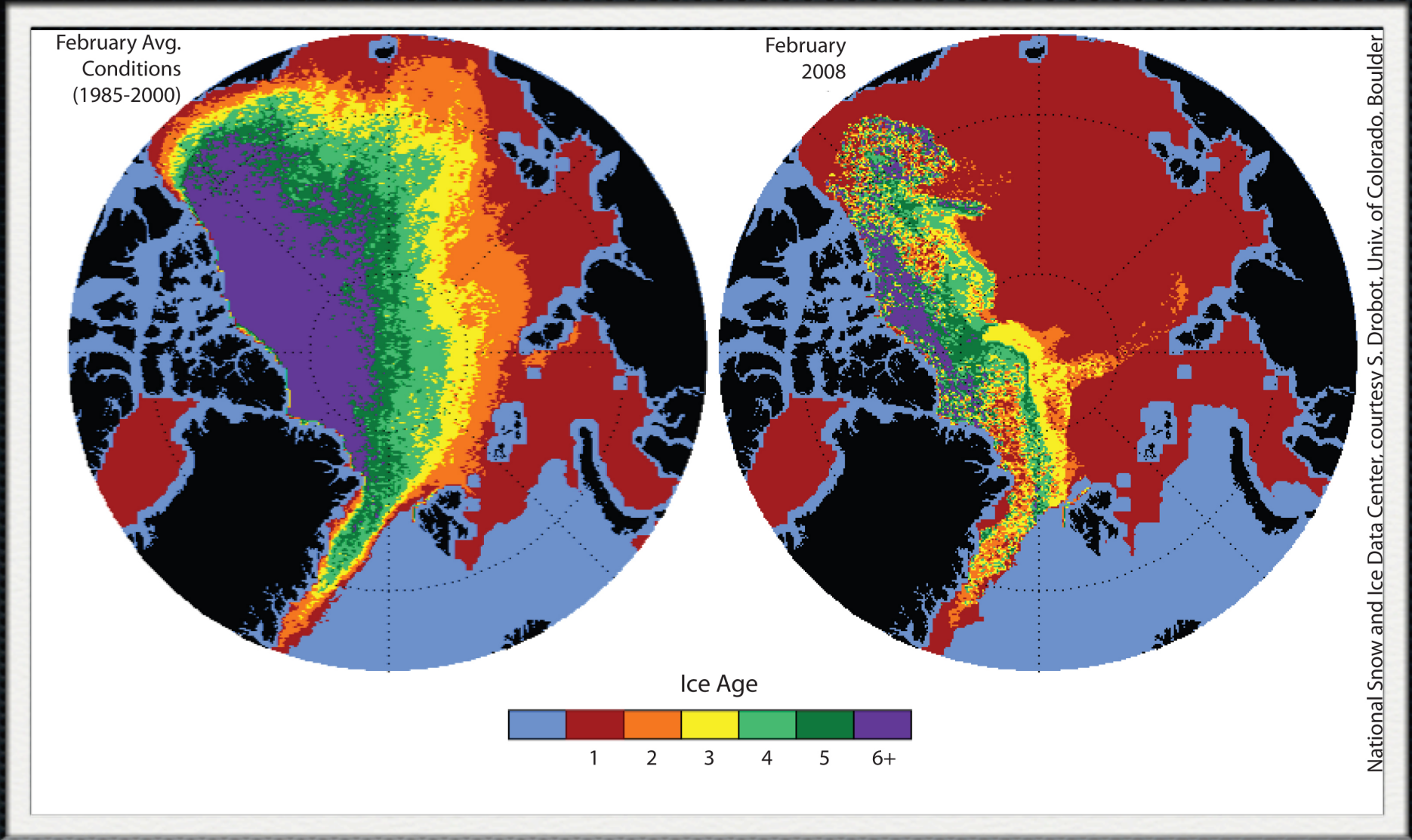


Key science 1

- ✦ 30 years of warming in the pipeline as the earth's energy budget "catches up" with GHG levels
- ✦ Oceans - 70% of the planet's surface - have to warm
- ✦ If we could freeze total GHGs at today's levels (385 ppm CO₂), warming would continue into the 2030s
- ✦ But we can't stabilise GHGs overnight. It will take decades to transform the world's energy and transport infrastructure.

Key Science 2

- ✦ Warming is happening faster than expected
- ✦ 2007 Arctic sea ice minimum was a new record - 25% below previous record, set in 2005
- ✦ Used to think summer sea ice was not likely to disappear before the end of the century...
- ✦ ...then middle of the century
- ✦ ...one expert has predicted it could be gone by 2013

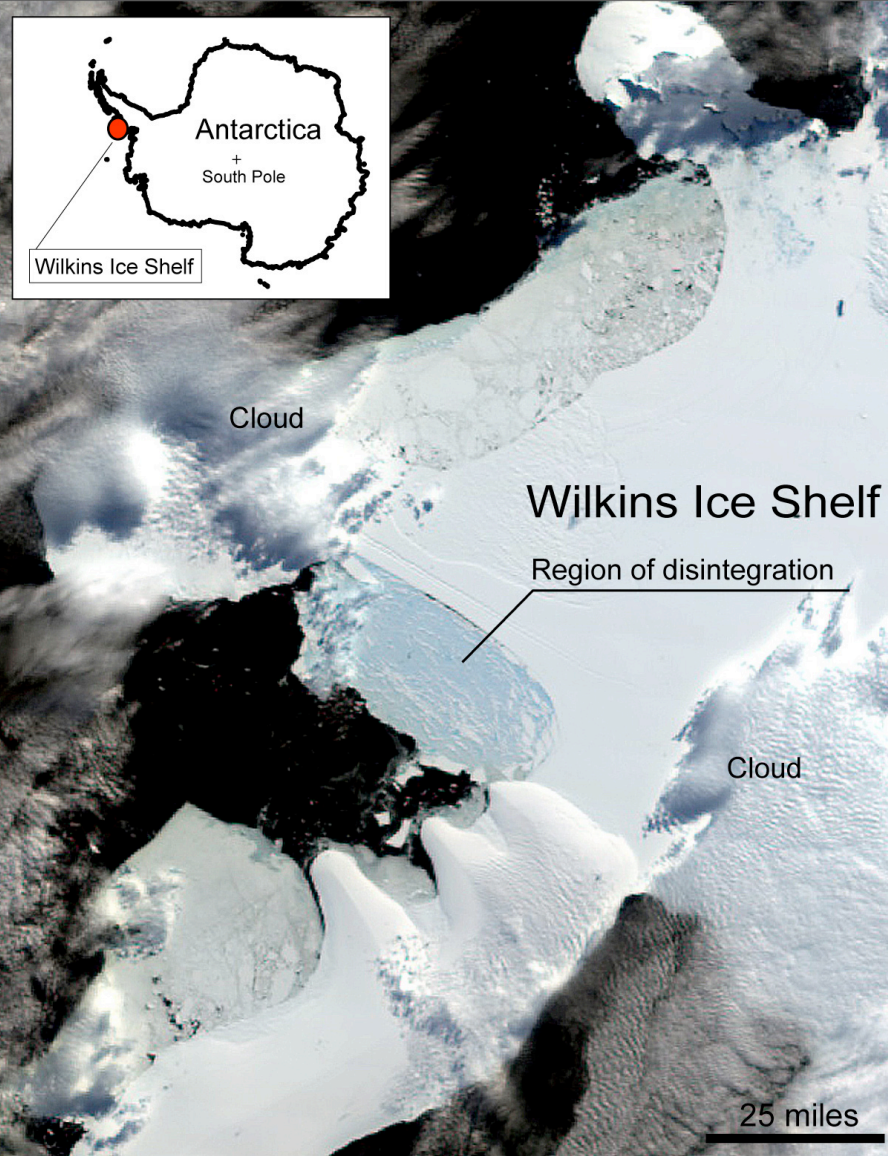


- ✦ Multi-year ice has reduced enormously

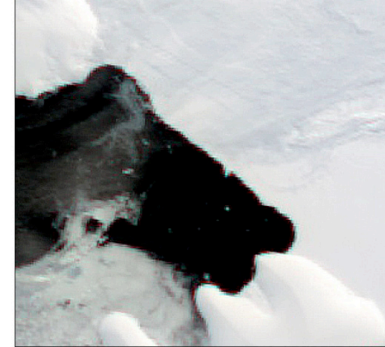


✦ Wilkins Ice Shelf break-up, March 2008

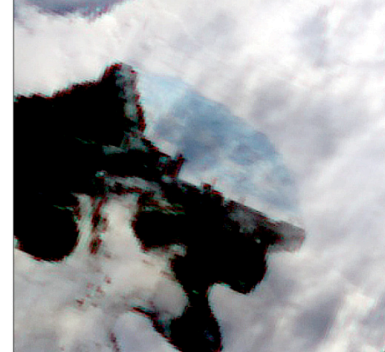
March 6, 2008



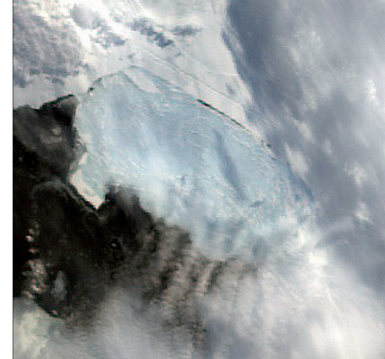
February 28, 2008



February 29, 2008



March 8, 2008



National Snow and Ice Data Center, Boulder, CO

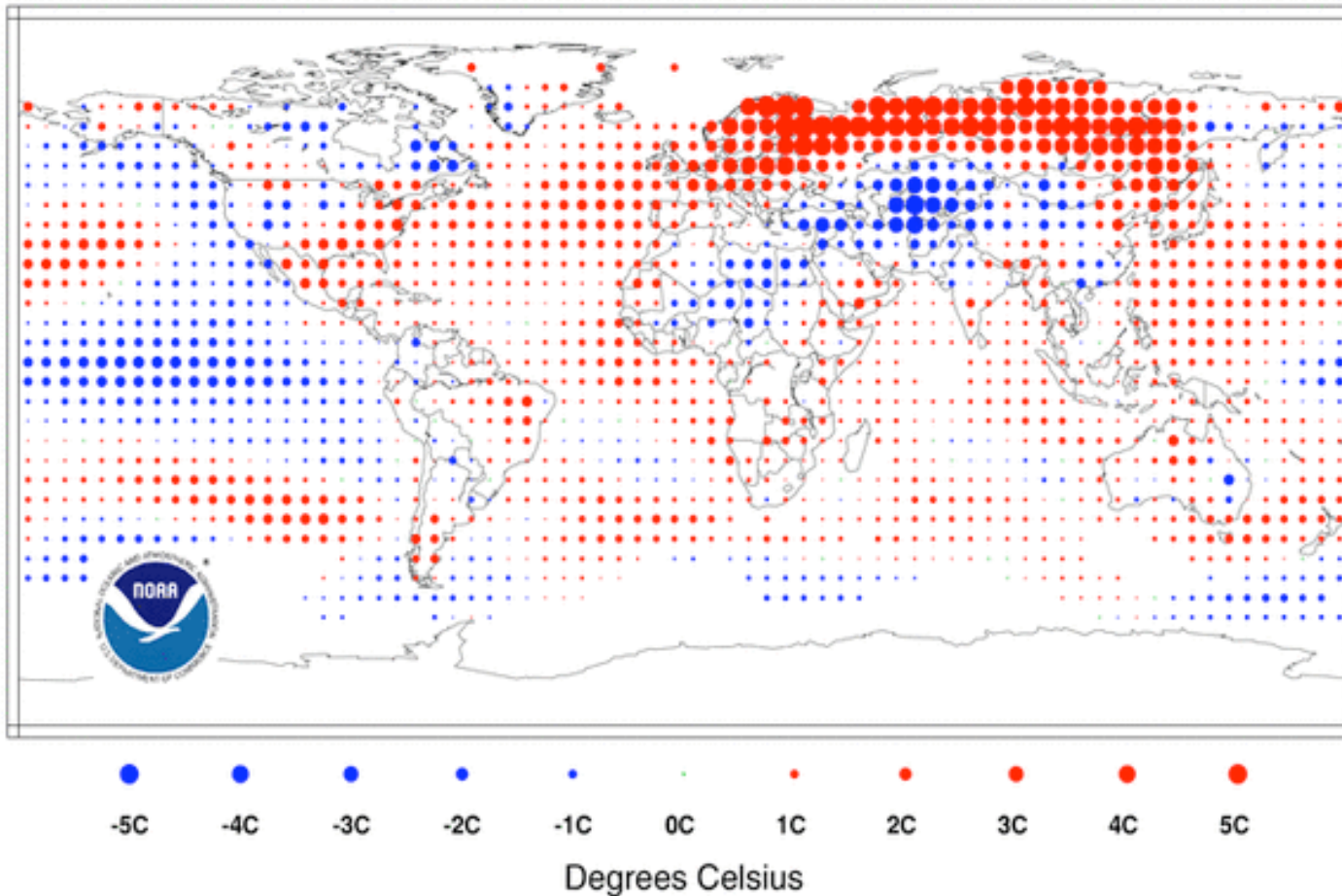
Key science 3

- ✦ Impact of a seasonally ice-free Arctic Ocean on northern hemisphere climate is not well understood
- ✦ Will mean warmer winters
- ✦ 2007/8 NH winter was relatively cool (16th warmest) but Finland and Sweden had their warmest winters since records began over 100 years ago.
- ✦ In some places rapid climate change could be happening now - consequences impossible to predict.

Temperature Anomalies Dec-Feb 2008

(with respect to a 1961-1990 base period)

National Climatic Data Center/NESDIS/NOAA



- Very large warm anomalies over NW Europe & Russia

New Zealand

- ✦ NZ is fortunate to be an island in a big, cool ocean
- ✦ We will warm more slowly than most, and (with luck) be cushioned from the worst effects - at least in the medium term
- ✦ The effect of the warming will be as if the country was drifting slowly towards the equator
- ✦ The Bay of Plenty will become more like Northland, Canterbury like Hawkes Bay.



Direct challenges

- ✦ Increasing risk of drought
- ✦ Heavier rainfall brings risk of increased flooding and erosion
- ✦ Rising sea level impacts on low-lying shores - Wellington?

Vulnerabilities

- ✦ NZ is vulnerable to direct impacts of climate change - increased drought and floods etc
- ✦ Also vulnerable to direct impacts overseas - effects on our trading partners
- ✦ What happens if climate refugees arrive?
- ✦ Vulnerable to what others do to address climate change (food miles etc)

What can we do?

- ✦ Adapt and mitigate
- ✦ Adapt to the change that's inevitable
- ✦ Mitigate to prevent future change being disastrous (if possible)
- ✦ Mitigation is where all the high profile action is - but preparing to adapt is just as important

Global goals

- ✦ Stabilise atmospheric GHGs at a level that will prevent worst impacts of climate change.
- ✦ What is that level? Urgent debate. Where science meets politics.
 - ✦ Easy (cheaper) targets are higher and riskier.
 - ✦ Tough targets more expensive, harder to achieve.
- ✦ One expert now calling for a target of reducing GHGs to 350 ppm CO₂ (we're at 385 ppm).

How do we do it?

- ✦ Stop burning coal and other fossil fuels
- ✦ Stop chopping down rainforests (probably the cheapest and easiest way to cut emissions by 20%)
- ✦ Start replanting forests
- ✦ Develop & implement low-carbon technologies for energy and transport
- ✦ Develop & implement carbon sequestration technologies to take CO₂ out of fossil fuels
- and the atmosphere

Can we afford it?

- ✦ Can we afford not to do it?
- ✦ Most studies suggest that real costs are relatively low, whereas cost of damages very high
- ✦ Costs in some sectors may be high (moving from coal to wind, for example, creates winners and losers)
- ✦ Likely losers are the ones doing the lobbying against action

Local goals

- ✦ Nothing that NZ does to mitigate our emissions will have any impact on our climate, or the global climate
- ✦ NZ emissions are so small, that even a 90% reduction will have no real impact. 10% of not very much is still not very much.
- ✦ However, we have to be good global citizens. We may only be 4 million people, but the world is made up of lots of groups of 4 million, and we all need to act.

Leading or following

- ✦ The world does not owe NZ a living.
- ✦ NZ is small - we're an easy target.
- ✦ NZ Inc has to be proactive, and seen to be at the very least up with the leaders.
- ✦ Long term carbon neutrality is a good (and achievable) goal, but has to be more than words
- ✦ NZ brand has to be Clean, Green - and Low Carbon

Big challenges

- ✦ Agriculture: pastoral and dairy farming - can we reduce emissions? A scientific opportunity as well as an economic challenge.
- ✦ Agriculture accounts for 50% of emissions
- ✦ Land use change: move to crops that are intrinsically low carbon and high value
- ✦ Develop forestry as carbon sink and biofuel source - another opportunity

Big challenges 2

- ✦ Adapt tourist industry to meet problems of distance - long haul flying could become unfashionable
- ✦ Develop low carbon energy infrastructure
- ✦ Develop low carbon transport infrastructure
- ✦ All of these actions will bring significant change to the NZ economy and our lifestyles

Adapting to change

- ✦ Adapting to change is something we all have to do.
- ✦ The smaller the adaptation required, the easier (and cheaper) it will be - so mitigation remains important
- ✦ Adaptive “capacity” is how well-equipped we are to cope
- ✦ If the risk of drought is increasing, then adapt farming systems to be able to cope.

Developing resilience

- ✦ Resilience is about being able to cope with change as it happens - to resist shocks and recover from damage
- ✦ Being prepared for an earthquake is about resilience
- ✦ But it also applies at a national and international level
- ✦ As climate impacts stress international relationships (climate refugees), we will have to minimise conflict
- ✦ Resilience in NZ terms means being able to fend for ourselves when the going gets tough

Technology to the rescue?

- ✦ Technologies to reduce carbon emissions already exist, and in many cases are already cheap enough to use
- ✦ Wind, wave & tidal, geothermal and solar renewables available and being built
- ✦ New solar photovoltaic technologies are coming along fast
- ✦ Hybrid vehicles are becoming trendy
- ✦ Electric vehicles are beginning to arrive



- ✦ Tesla Roadster: US\$100,000, available now



✦ Loremo GT: 3.0l/100km diesel due soon

Empowering change

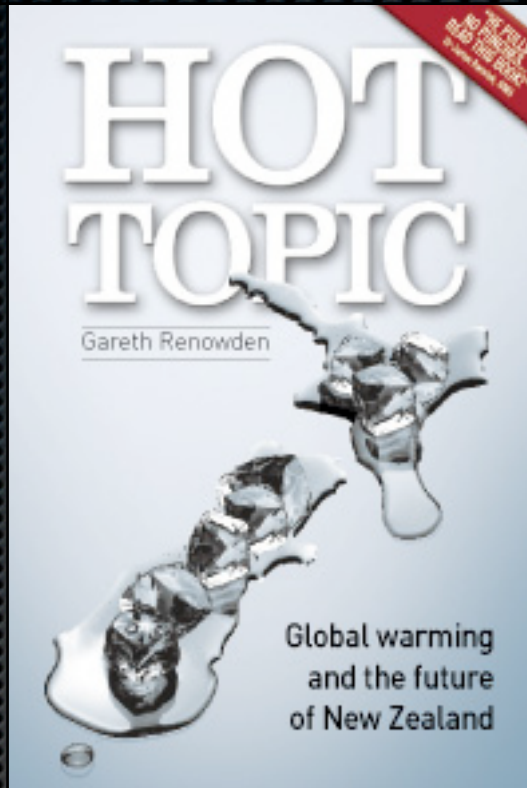
- ✦ The risk: that urgent action on a global scale won't begin until a major climate disaster unfolds
- ✦ We have to empower our leaders to act prudently now to avoid the prospect of major climate impacts
- ✦ Action on climate change has to be at the centre of national and international action, not an afterthought or bolt-on optional accessory

Living within our means

- ✦ The ultimate challenge: maximising the number of people that can live fulfilling lives on a healthy Earth.
- ✦ If we can't work out a way to do it, the planet will do it for us. And it won't care how many of us are left, or how fulfilling our lives are.
- ✦ NZ's small population and large land area means we are well-equipped to be carbon neutral and truly sustainable

Bottom line

- ✦ Is it bad?
- ✦ Yes
- ✦ How bad?
- ✦ Worse than we thought
- ✦ Can we cope?
- ✦ Yes, with a bit of luck, plenty of work, and lots of goodwill
- ✦ When do we start?
- ✦ Now, because tomorrow might be too late



Gareth Renowden

<http://hot-topic.co.nz/>
World Peace Summit
Wellington March 29 2008