



THE CLIMATE IS CHANGING:
WE CAN'T ESCAPE REALITY.

Confused about the science of climate change?

This myth-busting fact sheet helps to set the record straight.

Myth 1: There is no scientific consensus that humans are causing climate change

The National Academies of Science from 19 countries - including the USA, UK, Australia, China and India - as well as The Intergovernmental Panel on Climate Change - made up of over 2,000 scientists from around the world - and the World Meteorological Organization, all agree that climate change is caused by human activities.

Of course scientists must back up their opinions with research and data that survives the peer review, that is the process of subjecting an author's research to the scrutiny of others who are experts in the field. In one survey, 97.4% of climate scientists actively publishing climate papers endorsed the consensus position.

Myth 2: The earth's climate has changed before, so the current changes could be natural.

It is true that the climate HAS changed in the past. However, the changes we are seeing now are different to past natural variations. For example, if we look at ice cores from deep below the surface of Antarctica and Greenland, we see that the world has gone in and out of very cold periods pretty regularly throughout history. We know that this is because of changes in the Earth's orbit, and these cycles are regular and predictable.

The difference between these natural cycles and what's happening now is the speed of the changes. At the moment the changes are about 10 times faster than any natural changes recorded in ice cores.

Myth 3: Global Warming is caused by the sun

Of course the sun plays an important role in determining the climate. However, whilst global temperatures have been shown to be rising steadily upwards over the last 30 years – various independent measurements of solar activity all confirm the sun has shown a slight cooling trend since 1978.



Myth 4: The earth is cooling.

This is incorrect. Weather stations, earth surface measurements, ocean measurements, decreases in snow cover, reductions in Arctic sea ice, longer growing seasons, balloon measurements, boreholes and satellites all show evidence that there's been a warming trend of about 0.8 degrees Celcius since 1900 - more than half of which has occurred since 1979.

And in Australia - The Bureau of Meteorology has reported that since 1950, temperatures have risen on average by about 1°C with an increase in the frequency of heatwaves, a decrease in the numbers of frosts and cold days, and changes in rainfall patterns.

Myth 5: Mars and Pluto are also heating up – and there are no humans there to cause climate change!

Well, firstly, there is very little evidence of warming on Mars. One particular photograph of frozen CO₂ turning to gas is often waved around as evidence – but that could have been due to any number of localised factors, and is certainly not evidence of global warming on Mars. Either way though, the only common input shared by all the planets is the sun – and as we show in Myth 3, the sun has cooled slightly over the last 35 years, so that rules out the sun as a cause of global warming.

Myth 6: It's cheaper and more effective to adapt to climate change, rather than fight it.

This is incorrect. In fact, we are not entirely sure how severe the impacts of climate change may be on society - or how much they'll cost. What we do know however is according to Stern and Garnaut if we act now, the costs of mitigating climate change are small (1% of GDP per year to 2050). But, if we wait, the costs will rise greatly to at least 20% of GDP per year by 2050. The sooner we act, the cheaper and easier it will be to transition to a low-carbon economy.

Myth 7: Scientists can't even predict the weather - why should I trust them on climate?

The issue here is a misunderstanding of what weather is versus what the climate is. So what is weather? Weather is erratic and highly variable. This means that predicting the weather more than a week in advance is really tricky! However, climate is a long term average of the weather. This averaging removes the erratic and highly variable nature of the weather, which allows climate models to successfully predict future climate change.

Myth 8: Isn't carbon dioxide good for plants? Increased levels of it in the atmosphere will surely help both agriculture and forestry.

Free Air Carbon Enrichment (or FACE) tests have been performed to check this theory. They show that temporarily some plants do perform better in carbon rich environments (the invasive vine species in fact!) but as temperature increases any positive effects are reversed because the plants struggle to photosynthesise and survive. Additionally, climate change is likely to cause water shortages in many places, including Australia, which will mean less water for agriculture and forestry.

Myth 9: Isn't water vapour more important than CO2 in the greenhouse effect?

It is true that water vapour is the most potent greenhouse gas. Per unit volume, water vapour traps more heat than CO₂, methane, or any other gas. However, the amount of water vapour in the atmosphere depends on temperature – for every 1°C rise in temperature, the atmosphere can hold 6% more water vapour! As CO₂ will cause a rise in temperature, this will in turn increase the amount of water vapour. So increasing the amount of CO₂ in the atmosphere causes warming itself, but also means the atmosphere can hold more water, leading to even more warming! This is what we call a positive feedback loop.

Myth 10: But, the Antarctic ice is growing, so that disproves global warming.

There are two types of ice in Antarctica - land ice and sea ice. The amount of land ice has been decreasing as the Earth warms, as one would expect. The amount of sea ice on the other hand, has been increasing. At first this seems counter intuitive, but in fact it makes sense! The amount of sea ice depends not only on the temperature of the ocean, but also on a number of other factors such as the strength of the wind and the ocean circulation. At the moment, warming in the Antarctic region is causing changes in the wind and ocean circulation, which are working in combination to increase the amount of sea ice. Future projections indicate that warming ocean temperatures will soon overwhelm these other factors, and the amount of sea ice will begin to decline. Much like the land ice is now!

There you have it – a few myths exposed and the reality of the climate science.

Still curious or want more info? We got our information from the sources below.

Skeptical Science website <http://www.skepticalscience.com/>

The Garnaut Review <http://www.garnautreview.org.au/>

BBC News. Climate scepticism: the top 10.

12 November 2007

http://news.bbc.co.uk/2/hi/in_depth/629/629/7074601.stm

New Scientists. Climate change: a guide for the perplexed.

16 May 2007 by Michael Le Page

<http://www.newscientist.com/article/dn11462-climate-change-a-guide-for-the-perplexed.html>

