



Responding to Climate Change Skeptics

Argument 1: The climate has changed before.

What the science says: A common skeptic argument is that climate has changed naturally in the past, long before SUVs and coal-fired power plants, so therefore humans cannot be causing global warming now. Interestingly, the peer-reviewed research into past climate change comes to the opposite conclusion. To understand this, first you have to ask why climate has changed in the past. It doesn't happen by magic. Climate changes when it's forced to change. When our planet suffers an energy imbalance and gains or loses heat, global temperature changes.

There are a number of different forces which can influence the Earth's climate. When the sun gets brighter, the planet receives more energy and warms. When volcanoes erupt, they emit particles into the atmosphere which reflect sunlight, and the planet cools. When there are more greenhouse gases in the atmosphere, the planet warms. These effects are referred to as external forcings because by changing the planet's energy balance, they force climate to change.

It is obviously true that past climate change was caused by natural forcings. However, to argue that this means we can't cause climate change is like arguing that humans can't start bushfires because in the past they've happened naturally. Greenhouse gas increases have caused climate change many times in Earth's history, and we are now adding greenhouse gases to the atmosphere at an increasingly rapid rate.

Looking at the past gives us insight into how our climate responds to external forcings. Using ice cores, for instance, we can work out the degree of past temperature change, the level of solar activity, and the amount of greenhouse gases and volcanic dust in the atmosphere. From this, we can determine how temperature has changed due to past energy imbalances. What we have found, looking at many different periods and timescales in Earth's history, is that when the Earth gains heat, positive feedbacks amplify the warming. This is why we've experienced such dramatic changes in temperature in the past. Our climate is highly sensitive to changes in heat. We can even quantify this: when you include positive feedbacks, a doubling of CO₂ causes a warming of around 3°C.

What does that mean for today? Rising greenhouse gas levels are an external forcing, which has caused climate changes many times in Earth's history. They're causing an energy imbalance and the planet is building up heat. From Earth's history, we know that positive feedbacks will amplify the greenhouse warming. So past climate change doesn't tell us that humans can't influence climate; on the contrary, it tells us that climate is highly sensitive to the greenhouse warming we're now causing.

Argument 2: Animals and plants can adapt.

What the science says: A large number of ancient mass extinction events have been strongly linked to global climate change. Because current climate change is so rapid, the way species typically adapt (e.g. - migration) is, in most cases, simply not be possible. Global change is simply too pervasive and occurring too rapidly.

Argument 3: There is no consensus in the scientific community.

What the science says: A consensus in science is different from a political one. There is no vote. Scientists just give up arguing because the sheer weight of consistent evidence is too compelling, the tide too strong to swim against any longer. Scientists change their minds on the basis of the evidence, and a consensus emerges over time. Not only do scientists stop arguing, they also start relying on each other's work. All science depends on that which precedes it, and when one scientist builds on the work of another, he acknowledges the work of others through citations. The work that forms the foundation of climate change science is cited with great frequency by many other scientists, demonstrating that the theory is widely accepted - and relied upon. More than 95% of scientists working in the disciplines contributing to studies of our climate accept that climate change is almost certainly being caused by human activities. We should also consider official scientific bodies and what they think about climate change. There are no national or major scientific institutions anywhere in the world that dispute the theory of anthropogenic climate change. Not one.

Argument 4: It's the sun.

What the science says: Until about 1960, measurements by scientists showed that the brightness and warmth of the sun, as seen from the Earth, was increasing. Over the same period temperature measurements of the air and sea showed that the Earth was gradually warming. It was not surprising therefore for most scientists to put two and two together and assume that it was the warming sun that was increasing the temperature of our planet.

However, between the 1960s and the present day the same solar measurements have shown that the energy from the sun is now decreasing. At the same time temperature measurements of the air and sea have shown that the Earth has continued to become warmer and warmer. This proves that it cannot be the sun; something else must be causing the Earth's temperature to rise.

Argument 5: It hasn't warmed since 1998.

What the science says: For global records, 2010 is the hottest year on record, tied with 2005.

Argument 6: It's not bad.

What the science says: The economic impacts of climate change alone may be catastrophic, while there have been very few benefits projected at all. Certain scenarios projected would witness massive migration as low-lying countries were flooded. Disruptions to global trade, transport, energy supplies and labor markets, banking and finance, investment and insurance, would all wreak havoc on the stability of both developed and developing nations. Markets would endure increased volatility and institutional investors such as pension funds and insurance companies would experience considerable difficulty.

Developing countries, some of which are already embroiled in military conflict, may be drawn into larger and more protracted disputes over water, energy supplies or food, all of which may disrupt economic growth at a time when developing countries are beset by more egregious manifestations of climate change. It is widely accepted that the detrimental effects of climate change will be visited largely on the countries least equipped to adapt, socially or economically.

*All information contained in this document is from Skeptical Science,
<http://www.skepticalscience.com/>. Please visit their website for more information.