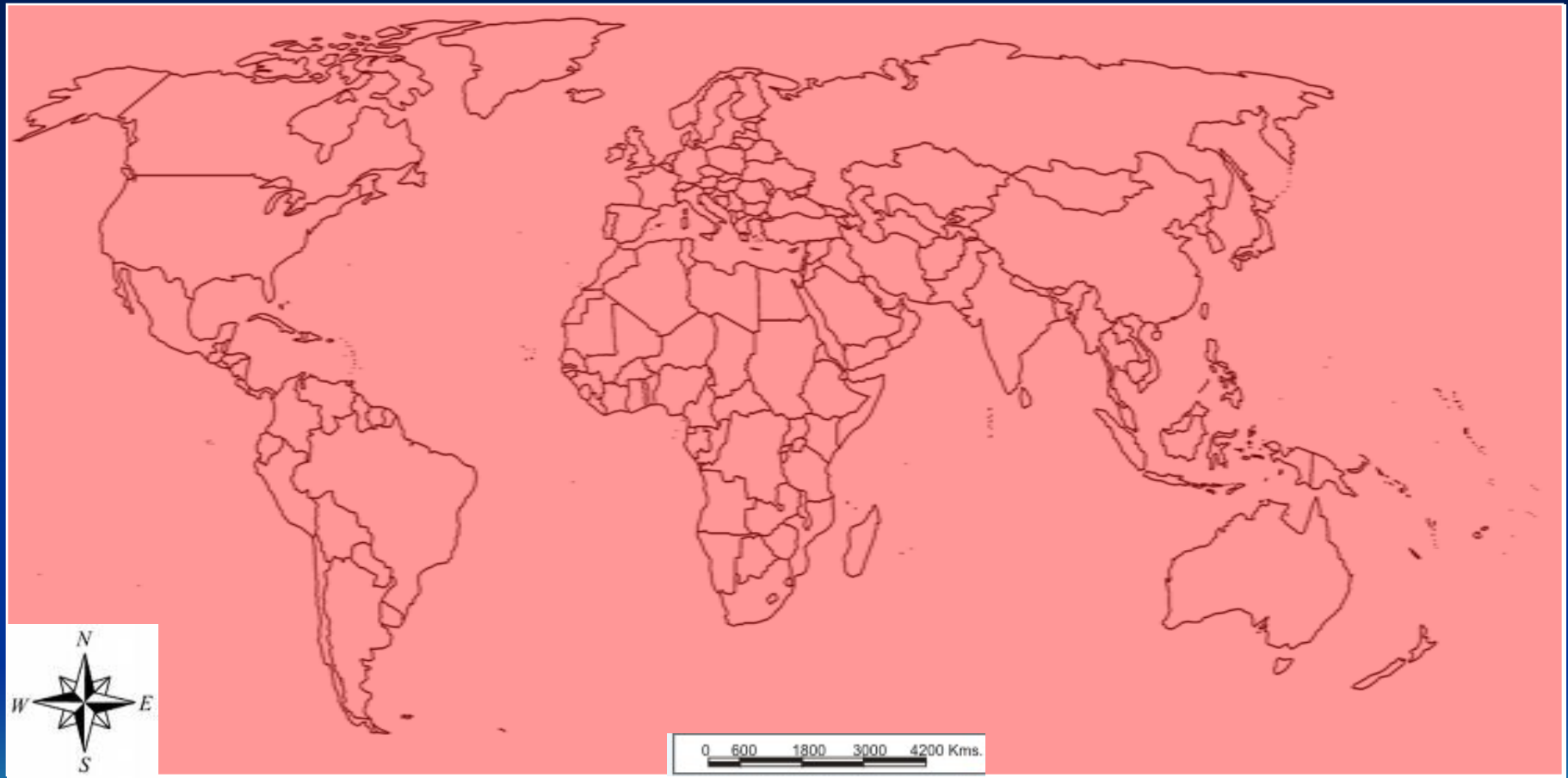


Krishant Dharan

# What Is Climate Change



# Map: Areas Affected By Climate Change



# What Is CLIMATE CHANGE

Climate change is any long-term significant change in the “average weather” that a given region experiences. Average weather may include average temperature, precipitation and wind patterns. It involves changes in the variability or average state of the atmosphere over durations ranging from decades to millions of years. These changes can be caused by dynamic process on Earth, external forces including variations in sunlight intensity, and by human activities. In recent usage, especially in the context of environmental policy, the term “climate change” often refers to changes in modern climate.

Climate models predict that greenhouse gas emissions will continue to increase atmospheric temperatures. The rise projected for the next 100 years is likely to be more rapid than any natural variations over the past 10,000 years. Because rising temperatures cause changes (often drastic) in the climate, the effect of global warming is often referred to by the more general term, “climate change”.

Climate Change can be classified as a Global Issue because it affects all parts of the globe. Its effects are being seen everywhere, but the cause is still debatable. If there is a drastic change in the Earth’s climate, humans, animals and nature will feel the consequences.



# History of Global Warming

The Earth's climate is constantly changing over time. Many climatologists believe that the temperature of the Earth slowly fluctuates over time. In fact, several scientists estimate that between 15,000 and 30,000 years ago the Earth was covered by large sheets of ice, known as the Ice Age. As the temperature of the Earth began to rise 7,000 years ago, the Ice Age came to an end.

From the late 14th century to the end of the 19th century, the Earth experienced a "Little Ice Age." Extreme cold and harsh conditions caused several famines and the expansion of glaciers, most notably in the Alps, Scandinavia, Iceland and Alaska. However, by 1850 the temperature of the Earth had warmed considerably and scientists were looking for an answer.

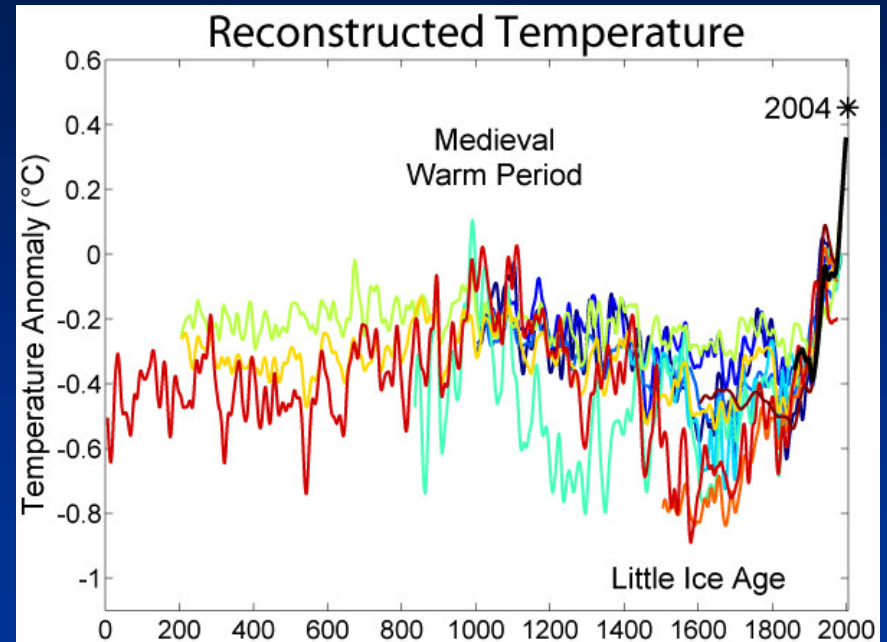
The first theory of global warming came in 1824 when French mathematician Jean Baptiste Joseph Fourier discovered that the Earth's temperature was slowly increasing. Fourier argued that the earth's atmosphere traps solar radiation and reflects it back toward the earth.

In the late 19th century Fourier's theory was labeled the "greenhouse effect" when Nobel Laureate Svante Arrhenius coined the term to explain how carbon dioxide traps heat in the Earth's atmosphere. Arrhenius believed that the greenhouse effect was responsible for the onset of the ice ages. By the 1960's, many scientists dismissed this theory in favour of the hypothesis of Serbian geophysicist, Milutin Milankovitch, relating climate change to the orbital changes of the earth.

In the 1950's, amateur scientist G.S. Callendar warned that the greenhouse effect was true and dramatically impacting the atmosphere of the Earth. Callendar's claims were termed the "Callendar effect," and led to increased research on global warming. Over the next few decades, scientists developed ways to measure the Earth's climate and devised mathematical models to better analyze global temperature. This led to a steady rise in the belief that human activity was dramatically effecting the environment. Scientific studies began to predict that increased carbon dioxide emissions, due to increased use of fossil fuels, would trigger an outbreak of global warming.

Media sources during the late 20th century were confused about the effects of the warming; some predicted another ice age, while others predicted the melting of ice caps, which would generate world wide flooding. In 1992, at the United Nations Conference on Environment and Development more than 150 nations signed a declaration committing them to reducing carbon dioxide emissions in their countries. However, in 1994, the United Nations Panel on Climate Change asserted that global warming was still a threat and nations needed to enact drastic changes in order to negate the effects of global warming. This announcement sparked the creation of the Kyoto Protocol, an international agreement to fight global warming. The protocol called for countries to reduce their emission of greenhouse gases and was to take effect in 2005. The treaty was signed and ratified by 125 countries. However, the United States, which is estimated to be the world's largest producer of greenhouse gases, refused to sign the treaty.

Today, scientists disagree on the effects of global warming while some deny the phenomena all together. Despite these arguments many historians point out the direct relationship between man and the environment, often referencing the American Dust Bowl of the 1930s, where large scale soil erosion reduced parts of Colorado, Kansas, New Mexico, Oklahoma and Texas to arid deserts. Currently, many governments and corporations are working to reduce fuel emissions and produce "Earth friendly" products such as hybrid cars. Yet, many scientists warn that global warming is an imminent and pressing problem that needs to be addressed before it becomes irreversible.



# Causes of Climate Change

There are many speculations on how Climate Change has originated. The most prominent one is the man-made, greenhouse gas induced global warming.

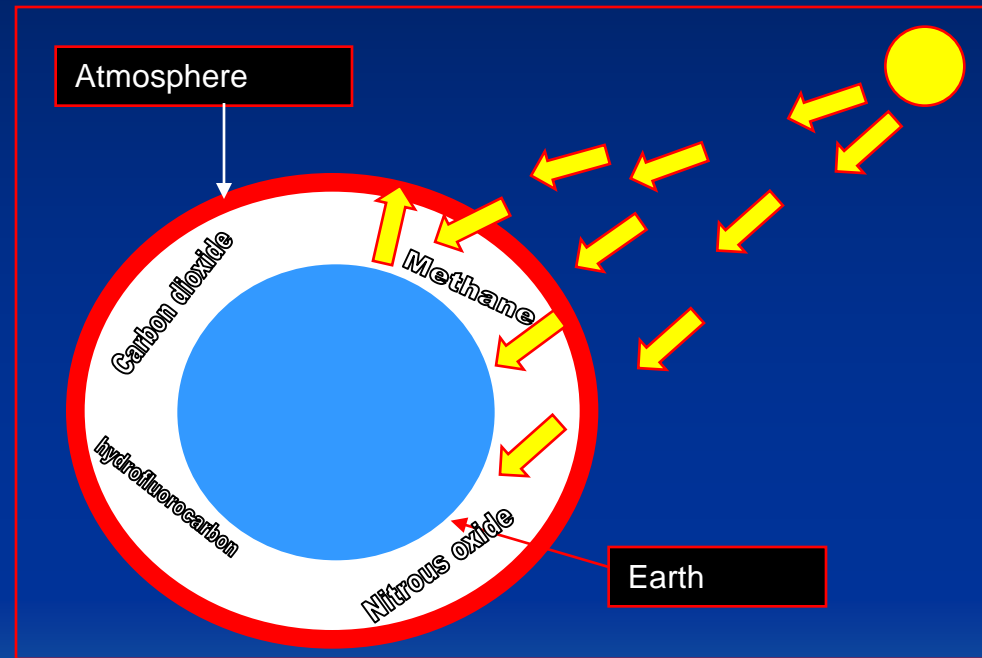
**Man-made warming:** There has been a build up of greenhouse gases like carbon dioxide, methane, nitrous oxide and others in the atmosphere. This causes the heat from the sun to become trapped inside the Earth's atmosphere and thus the planet becomes warmer. Greenhouse gases that naturally occur in the atmosphere make life on earth possible. Without them, too much heat would escape from the atmosphere and the earth's surface would freeze. In too high a concentration, greenhouse gases hold in excessive heat and cause the earth's climate to become more and more unstable.

The main greenhouse gases are:

- carbon dioxide from burning of fossil fuels and from deforestation;
- methane from farm animals and waste (as a greenhouse gas, methane is 21 times more powerful than carbon dioxide);
- nitrous oxide from soil (nitrous oxide is 310 times more powerful as a greenhouse gas than carbon dioxide);
- synthetic gases like sulphur hexafluoride, perfluorocarbons and hydrofluorocarbons.

We call these gases "greenhouse gases" because they act like the outside covering of a greenhouse, letting the sun's warmth through to heat the ground, but preventing it from escaping back into space. Greenhouse gases absorb heat radiated or reflected from the ground, increasing the temperature of the atmosphere.

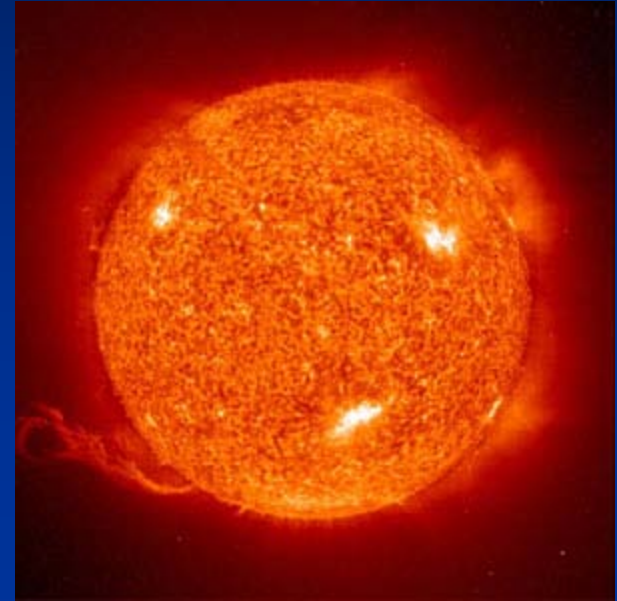
Almost 50 percent of New Zealand's greenhouse gas emissions are made up of methane and nitrous oxide, the two gases most closely associated with farming.



My own creation but is remaining true to the THEORY

# Causes of Climate Change

The “Sun” theory: The sun controls the warming of the Earth. Cosmic rays, from exploding supernovae light years away, enter our atmosphere and ionize the air molecules and create cloud nuclei. These nuclei produce low, wet clouds that reflect solar radiation back to outer space. This cools the Earth. But when the sun becomes really active (recognised by the large no. of sunspots) Solar winds push the cosmic rays away and not reaching us. This causes less clouds made and the Earth enjoys bright, hot days.



# Causes of Climate Change



## The "1,500 year cycle" theory

In 1984, Willi Dansgaard of Denmark and Hans Oeschger of Switzerland published their analysis of the oxygen isotopes in the first ice cores extracted from Greenland. These cores provided 250,000 years of the Earth's climate history. They compared the ratio of "heavy" oxygen-18 isotopes to the "lighter" oxygen-16 isotopes, which indicated the temperature at the time the snow had fallen. They had expected to find evidence of the known 90,000-year Ice Ages and the mild interglacial periods recorded in the ice which they did. However, they did not expect to find anything in between. To their surprise, they found a clear cycle- moderate, albeit abrupt- occurring about every 2,550 years running persistently through both. (this period would soon be reassessed at 1,500 years, +/- 500 years.

The Earth continually warms and cools. The cycle is apparently undeniable, ancient, often abrupt, and global. It is unstoppable. The cycle shifts have occurred roughly coinciding with the build up of the Earth's CO<sub>2</sub> levels. Based on this, the Earth is about 150 years into a moderate Modern Warming that will last for centuries longer.

# People affected by Climate Change

A lot of people are affected by this around the world. In fact, every person is directly affected by Climate Change as this change happens all over the world. Governments are affected. Environmental authorities like the EPA or the Environmental Protection Agency are affected. Many jobs have been set up to research this scary phenomenon. Thousands of jobs reside with the activity of Global Warming. The U.S has spent over \$2 billion a year in the past couple of years to fund for scientists research. So many groups and organisations have been founded to combat this threat.

There has been so much debate going on about this that many strong believers of one theory have become sceptics because of the fogginess in their theory. Many are being paid to generate false simulations and causing havoc in peoples minds.

The IPCC (Intergovernmental Panel on Climate Change) is a scientific intergovernmental body set up by the World Meteorological Organization (WMO) and by the United Nations Environment Programme (UNEP). Its constituency is made of:

The governments: the IPCC is open to all member countries of WMO and UNEP. Governments participate in plenary sessions of the IPCC where main decisions about the IPCC work programme are taken and reports are accepted, adopted and approved. They also participate in the review of IPCC Reports.

The scientists: hundreds of scientists all over the world contribute to the work of the IPCC as authors, contributors and reviewers.

The people: as United Nations body, the IPCC work aims at the promotion of the United Nations human development goals

The Intergovernmental Panel on Climate Change and Albert Arnold (Al) Gore Jr. were awarded of the Nobel Peace Prize "for their efforts to build up and disseminate greater knowledge about man-made climate change and to lay the foundations for the measures that are needed to counteract such change".

# The Current Situation

The scare of Global Warming has begun a lot of things. The Kyoto Protocol has been set up, in which the participating countries will minimize their fossil fuel burning and generally their CO<sub>2</sub> emissions. Strangely, the U.S has refused to sign the Protocol. A lot of campaigning is going on around the world to make people aware of Climate Change. New research facilities are opening up. A new £1.5m research centre is opening in south west Wales to help fight the battle against climate change. On 29<sup>th</sup> March 2008, more than 30 million people participated in the Earth Hour Project, which began in Sydney in 2007, to turn off their lights and electricity for an hour. And in the age of the internet, the UK arm of search engine Google too turned its home page black ahead of time with the message: "We've turned the lights out. Now it's your turn."

According to many scientists, if we continue to release carbon emissions into the atmosphere, the Earth will warm considerably, melting the polar ice caps, raising the sea levels, and ultimately flooding the world.



# Conclusions: Future of Climate Change

Global Warming can become a huge issue in the near future. It may cause sea levels to drastically rise, cause another Ice Age, wipe out millions of species of trees, birds, animals, and plants, create more violent storms and hurricanes, even overwhelm the Great Atlantic Conveyor which distributes heat from the equator to the poles, thus shutting the Gulf Stream down and the Ice Age to return. Since many scientists think that this Climate Change could accelerate the approach of the upcoming Ice Age, and cold weather is more suited to mosquitoes than the tropical climate thus increasing the likelihood of mosquito-borne diseases like malaria. Although some areas of Earth will become wetter due to global warming, other areas will suffer serious droughts and heat waves. Africa will receive the worst of it, with more severe droughts also expected in Europe. Water is already a dangerously rare commodity in Africa, and according to the IPCC, global warming will exacerbate the conditions and could lead to conflicts and war.

Depending on the theory one believes in, they expect different things in the future, whether it be the flooding of the world or the largest Ice Age.



# Conclusion: Solutions

Climate change is an issue that everyone, young or old, needs to take seriously. Reducing our emissions may limit the extent of climate change, but significant climate change is already unavoidable. Our efforts to mitigate climate change will have to be matched by efforts to adapt to its impacts. Otherwise, life could get very unpleasant.

People need to be careful of how much energy they are using. Things we do everyday, such as heating our homes, offices and schools or driving our cars, produce greenhouse gases that end up in our atmosphere. Wherever you are, in an office, a store, a factory, in the great outdoors or on the road, in schools, or at home, there are bound to be opportunities to save energy.

Here are some tips for reducing the effects of global warming effecting climate change...

## Around the Home

There are many practical things you can do to reduce greenhouse gas emissions, and a great place to start is at home. Here are some ways to reduce emissions, make your home more comfortable and save money.

Turn the lights out when you leave a room

Use energy-efficient lighting products, like compact fluorescent bulbs. They last 10 times longer and use 75 percent less energy than regular bulbs

Unplug stereos, radios, TVs, VCRs, and clocks before you leave to go on holiday; these appliances have standby features which use energy even though they are turned off

Turn off your video game machines and computers before you leave the house

Buy recycled products which use less energy and resources to produce

Check the Energy Efficiency Rating (EER) label when buying new household appliances. The EER label can help you select the most energy-efficient model that meets your needs

Install low-flow showerheads, which use up to 60 percent less water than conventional showers. Fix leaky faucets immediately. At one drop per second, a single leaky washer wastes the equivalent of 16 hot baths every month

## On The Road

About 40% of New Zealand's carbon dioxide emissions come from transport – mostly private cars.

Reducing energy consumption by vehicles - including the family car - will be a big part of the climate change solution. Here are some ideas to reduce your fuel consumption, operating costs and exhaust emissions.

Leave the car at home - walk or bike for short trips. For longer trips, take the bus. One busload of passengers takes 40 vehicles off the road during rush hour, saves 70,000 liters of fuel and avoids over 175 tons of emissions a year

Avoid idling your vehicle - ten seconds of idling uses more fuel than restarting your engine

Keep to the speed limit. Driving at 100 km/hr burns 10% more fuel than driving at 90 km/hr. On the highway, maintain a steady speed to reduce fuel consumption

## School Activities

There are many activities your school can do in your area to help reduce New Zealand's greenhouse gas emissions.

Types of initiatives could include:

Tree planting

Alternative transportation programs (car pooling, use of school buses, etc.)

Energy efficiency and alternative energy programs

Waste management programs

Green purchasing practices and policies

Whilst all the above solutions are essential to the issue, I like the "On the Road" solutions because these solutions, if practiced, can make a large difference to the environment, and also resolve traffic problems, cut down accidents and improve people's health.

# Evaluation

I think I have worked well in this assignment. I did quite a lot of research into this topic, analyzed the three prominent theories that surround this topic and I have picked the crucial ideas. I have also used my time well, this time not leaving it for the last minute.

The DVD “The Great Global Warming Swindle” and the book “Unstoppable Global Warming: Every 1,500 years” have been a great source of information. Each one supports a different theory and explains things in a very clear and precise manner on things both resources agree on. They present their evidence in a very believable way supported by statistics, graphs and other tests.

I may have done a bit too much research as I spent many sleepless nights trawling through gigabytes of information when I only needed the most important, which most of I had already found in my first two excursions in the internet.

Next time, I will analyze the issue more clearly and faster than this time as I didn't completely understand. After talking to friends and family I understood what to do. By improving this, I can spend more time on presentation and other aspects of the assignment



# Reference List

Author	Title	Date	Type	Where I found this resource
Martin Durkin	Great Global Warming Swindle	2007	Video	Borrowed from a Friend
S. Fred Singer and Dennis T. Avery	Unstoppable Global Warming: Every 1,500 years	2008	Book	Three Kings Library
N/A	Global Warming History	N/A	News paper article	<a href="http://www.globalwarmingarchive.com">www.globalwarmingarchive.com</a>
N/A	Climate Change	28 <sup>th</sup> March 2008	article	<a href="http://www.wikipedia.org">www.wikipedia.org</a>
N/A	Global Warming effects	September 11, 2007	article	<a href="http://www.environmentalgraffiti.com">www.environmentalgraffiti.com</a>
Alan Zarembo, Los Angeles Times Staff Writer	Global Warming	March 26, 2008	News article	<a href="http://www.latimes.com">www.latimes.com</a>
Marc Morano – Marc_Morano@EPW.Senate.Gov	Climate Momentum Shifting: Prominent Scientists Reverse Belief in Man-made Global Warming - Now Skeptics	May 15, 2007	Govt. report	<a href="http://epw.senate.gov">epw.senate.gov</a>
T. Morris	Irregular variations in climate	N/A	Graph	<a href="http://staffwww.fullcoll.edu">staffwww.fullcoll.edu</a>
REUTERS, NEWSTALK ZB	Lights go out across globe to mark Earth Hour (+photos)	March 30, 2008	News Article	<a href="http://www.nzherald.co.nz">www.nzherald.co.nz</a>
Terry Smyth	Please take a bow, Sydney	March 30, 2008	News Article	<a href="http://www.smh.com.au">www.smh.com.au</a> (Sydney Morning Herald)
Ministry of Agriculture and Fisheries	Global Warming and Climate Change	N/A	govt. article	<a href="http://www.maf.govt.nz">www.maf.govt.nz</a>