

Climate Change and Extreme Weather

It is obvious that weather is becoming much more extreme in various parts of the world, and this must cause us deep concern.

As we shall see, scientists are giving dire warnings about the dangers of climate change. I describe this as Secular Eschatology. Of course, as climate change deniers warn us, we have to be alert to any misuse of such eschatology, to bring about political oppression. But we can't let that concern cause us to avoid facing up to the dangers about which the scientists warn us.

As far as biblical eschatology is concerned, there are no explicit references to climate change in the NT prediction of the End Times. But Jesus does speak of natural disasters "There will be great earthquakes, famines and pestilences in various places, and fearful events and great signs from heaven" (Lk 21:11). These are repeating signs. I tend to see them as like signs on a motorway. But the destination gets nearer and it is reasonable to think that such signs will get more serious nearer to the End. So, is it possible that climate change with the very serious weather events, etc., and resulting crises, is a pointer to our being close to the End, especially when related to other similar serious trends and events? Jesus stressed the importance of watching out for such events and trends.

Climate Change controversy

Of course, Climate Change is still a controversial subject in some areas of society, although most people accept that it is taking place, as I do. In fact, NASA confirms that research shows 97% of scientists accept climate change, which has to be very significant (see [Do scientists agree on climate change? – Climate Change: Vital Signs of the Planet \(nasa.gov\)](#)).

Also, in October 2021 the Office for National Statistics did a survey which showed that 75% of adults in the UK were worried about the impact of climate change (see [Three-quarters of adults in Great Britain worry about climate change - Office for National Statistics \(ons.gov.uk\)](#)).

Nevertheless, many objections have been raised by climate change deniers. You may find it helpful to look at a paper which lists 218 such objections and answers all of them. It is an easy read because it describes each objection in a few words and responds (answering the objection) in just one sentence. However, each of those sentences is a hyperlink which can take you to a longer response, if you wish to see it. You will find this at [Arguments from Global Warming Skeptics and what the science really says \(skepticalscience.com\)](#).

Some of the objections to climate change are based on conspiracy theories, e.g. that it is being used to try to bring damaging control of human beings worldwide. Obviously, we must be alert to any such trends in society (not just with respect to combatting climate change, but in many other ways: surveillance, restriction of free speech etc). However, we must avoid becoming paranoid. We need to remember that one of the devil's favourite strategies is to make people take good ideas or actions to extremes, making them harmful. If climate change is happening and can be combatted but we don't accept that and don't take an action, this would lead to disaster.

Even if some claims were to prove inaccurate, or some are about repeating extremes, this does not invalidate the clear indications that we are experiencing very serious and threatening developments in the natural world, weather etc. These must be taken seriously, whatever their cause, and we must do whatever we can to combat them.

We cannot ignore the fact that the human population has grown, from 1 billion in 1800, 3 billion in 1960, 6 billion in 1999 to around 7.9 billion today. Currently it is growing at 67 million per year. This is bound to have greatly increased the amount of carbon dioxide being released into the atmosphere. Dr. Peggy LeMone, a senior scientist in meteorology, calculated that a human being *personally* (through breathing etc) produces some 0.9 kilograms of carbon dioxide each day (although she stresses this is approximate). Then there are factors such as fossil fuel which human beings use. The huge growth in population growth will have greatly increased the emission of carbon dioxide, which scientists know raises the temperature in the environment.

Then there is the Industrial Revolution which started in the mid-18th century. It is quite clear that this will have greatly increased the emission of carbon dioxide. It has been calculated that fossil fuel usage in 1900 produced almost 2 billion metric tons of CO₂. By 1960 this was over 9 billion tons. Data from Carbon Dioxide Information Analysis Center shows that over 35 billion metric tons of CO₂ were released in 2014.

Another very important factor is that, whilst there have been extreme weather events over the centuries, these are now happening with much greater frequency. So, they are becoming more normal, rather than exceptional.

There may be conspirators who make false statements about climate change. But to say that hundreds of thousands of scientists are all part of a conspiracy is not credible. It is also not credible to say that hundreds of thousands of scientists are simply going along with the fake news about climate change. After all, scientists thrive on disagreeing with one another

One piece of good news from the UN is that the hole in the Earth's ozone layer, once regarded as the biggest environmental threat, is set to be corrected in the next 20-40 years because governments have taken decisive action. Sadly, governments have failed over other climate threats.

The extensive amount of very cold weather might seem to contradict the idea of global warming. However, the reason is that warming in the Arctic has disrupted the previously stable "polar vortex" which retains cold air around the North Pole. This causes the cold weather to come south, affecting the US, Europe etc.

Global Warming is a reality

It seems obvious that global warming is taking place. NASA says that, while Earth's climate has changed in the past the current warming is happening at a rate not seen in the past 10,000 years. They point out that:

- **Global temperature is rising**
- **The ocean is getting warmer**
- **The ice sheets are shrinking**
- **Glaciers are retreating**
- **Snow cover is decreasing**
- **Sea level is rising**
- **Arctic sea ice is declining rapidly**
- **Extreme events are increasing in frequency**
- **Ocean acidification is increasing**

NASA says "According to the Intergovernmental Panel on Climate Change (IPCC), 'Since systematic scientific assessments began in the 1970s, the influence of human activity on the warming of the climate system has evolved from theory to established fact.'"

In the second part of this paper "The Evidence," I include some evidence for the 9 reasons NASA gives for concluding that climate change and global warming are taking place with serious effects.

Solemn warnings about climate change

(Which also includes warnings about pollution)

António Guterres, secretary general of the United Nations, has given very serious warnings about the dangers of climate change:

Dec 2022: "Humanity has become a weapon of mass extinction and governments must end the 'orgy of destruction. Deforestation and desertification are creating wastelands of once-thriving ecosystems." Our land, water and air are poisoned by chemicals and pesticides, and choked with plastics."

Nov 2022: "We are in the fight of our lives and we are losing ... And our planet is fast approaching tipping points that will make climate chaos irreversible ... We are on a highway to climate hell with our foot on the accelerator ... We are in the fight of our lives and we are losing ... And our planet is fast approaching tipping points that will make climate chaos irreversible ... We are on a highway to climate hell with our foot on the accelerator. We can sign a climate solidarity pact, or a collective suicide pact ... Emissions remain at dangerous and record highs and are still rising. We must close the emissions gap before climate catastrophe closes in on us all."

Sep 2022: "There is nothing natural about the new scale of these disasters. They are the price of humanity's fossil fuel addiction. This year's United in Science report shows climate impacts heading into uncharted territory of destruction."

Feb 2021: "The consequences of our recklessness are already apparent in human suffering, towering economic losses and the accelerating erosion of life on Earth." He pointed out that air pollution is killing 9 million people a

year, Also, one million animal and plant species now face extinction as a result of human pressures such as habitat loss, the wildlife trade and global heating. A 2021 UN environment programme, confirmed that millions of people now die each year as a result of the climate crisis, biodiversity loss and pollution.

Joe Biden said “The existential threat, threat to human existence as we know it, and every day we delay, the cost of inaction increases.”

The head of the UN Environment Programme (UNEP) Inger Andersen “The natural world is under assault from “the five horsemen of the nature apocalypse”, namely the changing use of land and sea, over exploitation of species, climate change, pollution and invasive species. He pointed out that one million animal and plant species face dying out, many within decades and added “Humans depend on nature to survive. From water purification, pollination, carbon storage and production of food to the aesthetic and cultural values that nature provides. Without nature and biodiversity, we really can't survive as a society ... Deforestation, land clearance and agriculture are responsible for around 25 per cent of planet-heating greenhouse gas emissions.”

It is obvious, as the Intergovernmental Panel on Climate Change (IPCC) said in February 2022, that droughts, floods, heatwaves and other extreme weather are accelerating and wreaking increasing damage. The Report, which is based on 34,000 studies, was produced by more than 1,000 physical and social scientists and unanimously approved by the governments of 195 nations. It points out that, already, 3.5 billion people are highly vulnerable to climate impacts and half the world’s population suffers severe water shortages at some point each year.

There have, of course, been various international agreements on tackling climate change. But it is clear that countries have not always put these decisions into practice.

A 2022 UN Report said that, in practice, progress by world governments has been “woefully inadequate.” Commenting on this, Prof David King, a former UK chief scientific adviser, said: “The report is a dire warning to all countries – none of whom are doing anywhere near enough to manage the climate emergency.”

In March 2023, the Intergovernmental Panel on Climate Change (IPCC) produced its 6th report on Climate Change which is described as “the Final Warning.” It was produced over a period of 8 years by hundreds of leading climate scientists and has been approved by all the world’s governments. Commenting on it, UN secretary general, António Guterres, said: “This report is a clarion call to massively fast-track climate efforts by every country and every sector and on every time frame. Our world needs climate action on all fronts: everything, everywhere, all at once.” There is no new science included but it majors on advising governments how to combat climate change.

It points out that the global temperature is now 1.1°C above the pre-industrial temperature. The temperature rose in 2022 and is in grave danger of reaching the crisis point of 1.5°C, as things are going. It adds that more than 3 billion people already live in areas that are “highly vulnerable” to climate breakdown and half of the world’s population already experiences severe water shortage. The report says that climate change is a justice issue because the richest 10% of households produce 34-45% of global consumption-based emissions, while the poorest 50% contribute 13-15%.

It calls on governments to ban fossil fuel developments and to major on renewable energy and other low-carbon technologies (solar and wind power), to increase energy efficiency, to rethink agriculture and restore forests and degraded natural landscapes

How should we respond?

Alongside numerous other significant eschatological events, we need to see that climate change and global warming are serious enough to be included in Jesus’ predictions of natural disasters which are signs pointing towards his Return. He calls us to look out for such signs. But we are also called by God to care for his creation. So, we need to take practical action to reduce global warming, where we can and to encourage our political leaders to do the same. We can’t just sit back enjoying the eschatology. We need to be responsible.

The evidence

A. Global Temperature Rise

Most warming has happened in the last 40 years. Data from the EU's satellite system shows that the past seven years have been the hottest on record.

The Met Office has recorded that nine out of ten of the hottest days ever recorded in the UK have been since 1990.

We have, of course, had heatwaves before, e.g. in 1976. But Prof Hannah Cloke, a climate scientist at the University of Reading, said "1976 was indeed a heatwave and we have had heatwaves before, but the point is they're happening more often and they're becoming more intense."

In July 2022 the UK had its first 40C day

The 2003 European heatwave caused 70,000 deaths, including more than 2,000 in England, and hit the most vulnerable in society the hardest.

Greenhouse gases are a major contributor to global warming. The three major gases are carbon dioxide, methane, and nitrous oxide. Billions of tons of carbon dioxide are pumped into the atmosphere annually by factories, power plants and vehicles. It traps solar radiation and heats up temperatures around the globe. But Methane is much more powerful at trapping heat than carbon dioxide. It comes from the use of fossil fuels and from cattle belching and flatulence. The increase in keeping cattle is due to increase in population.

A crucial factor is the difference between the amount of energy the Earth receives from sun and the amount it radiates back. The amount trapped by the Earth has doubled since 2006, causing more rapid global warming. The amount of energy Earth traps has almost doubled in the last decade and a half, aiding to more rapid global warming, a recent study has revealed. NASA scientist Norman Loeb said "The magnitude of the increase is unprecedented."

Trees are a major factor in absorbing carbon dioxide, which is why the massive destruction of forests, especially in the Amazon, is a serious problem. On the other hand, forest fires, which have greatly increased in recent times produces a great deal of carbon dioxide.

A Met Office study, found that if urgent action to cut emissions is not taken, Europe could see heatwaves of 50C every year by the end of the century.

B. Warming Oceans

In 2019 scientists discovered that ocean waters were at their hottest in recorded human history. This can lead to rapid environmental and ecological changes threatening the livelihoods of people living in coastal communities. The UN said that this warming of oceans is "poised to unleash misery on a global scale," with declining fish stocks, the melting of sea ice and glaciers.

Scientists have discovered that frozen methane deposits in the Arctic Ocean have started to be released off the East Siberian coast. They are known as the "sleeping giants of the carbon cycle" because they release far more heat than carbon dioxide.

It is also known that warmer oceans reflect less of the sun's heat, which causes more waring.

C. Shrinking Ice Sheets

There has been extensive melting of polar ice. Prof Dame Jane Francis, director of the British Antarctic Survey has witnessed temperatures in the Antarctic of 40C above the seasonal norm, and 30C above in the Arctic. The planet has already lost a staggering 28 trillion tonnes of ice from its ice sheets and glaciers, triggering sea level rises.

Scientists report that ice in Greenland was melting by one million tonnes a minute in 2019 - faster than at any time in the past 12,000 years. In August 2021 they were shocked when rain fell on the 10,551' peak of Greenland's ice cap for the first time ever recorded.

The Intergovernmental Panel on Climate Change has stated that it is "unequivocal" that carbon emissions from human activities are heating the planet, causing melting ice and rising sea level, etc.

D. Glacial Retreat

A recent global study has found that the world's glaciers are melting at almost double the speed they were 20 years ago. Every year several decades' worth of ice accumulation is being lost. From 2000 to 2019, glaciers lost 267 gigatonnes (Gt) of ice per year, which is equal to 21% of sea-level rise. This could cause a billion people to face water shortage before 2050.

Thawing of permafrost leads to carbon feedback causing greater carbon dioxide and methane emissions.

E. Decreased Snow Cover

Over the last century average snowfall has decreased in many regions. Scientists have discovered that the annual snowfall on the Greenland Ice Sheet is no longer enough to replenish the snow and ice lost in the summer.

F. Sea Level Rise

The Met Office reported that the rate of sea level rise was 1.5mm a year from the start of the 20th century. However, over the period 1993-2019, it increased to over 3mm a year. Rising sea levels threatens huge numbers of people.

If the Greenland ice sheet were to melt it would raise sea level by 7 metres. It would take only one metre to flood London, New York and Tokyo. If the Antarctic ice sheet melted it would raise sea levels by 2.5 metres.

G. Declining Arctic Sea Ice

There have been temperatures 30°C above normal in the Arctic and 40°C in the Antarctic in recent times. One specialist team say they have found evidence that the Arctic Sea ice could disappear in 15 years.

In 2022 a huge ice shelf, half the size of the city of Rome, in Antarctica collapsed due to high temperatures. These ice shelves are extensions of ice sheets that float over the ocean, playing an important role in restraining inland ice. Without them, inland ice flows faster into the ocean, resulting in sea level rise.

Rapid Arctic ice melting increased the likelihood of violent storms in the northern hemisphere. A large increase in the release of meltwater from Greenland and the Arctic creates freshwater pools in the sea which cools faster than saltwater, increasing the temperature difference from the northern hemisphere to the southern hemisphere which creates extreme storms.

H. Extreme Events

For a long time, scientists have warned that climate change is triggering extreme weather events. Warmer temperatures cause more moisture to accumulate in the atmosphere which leads to rain or snow.

There have been huge storms and catastrophic floods in many countries. They have caused life-threatening flooding, flash-freezing and travel chaos.

In December 2021 a devastating tornado tore through four US states for four hours. It is thought to be the longest distance for a tornado in US history. Kentucky Governor Andy Beshear said "This is the deadliest tornado event we have ever had...I've got towns that are gone, that are just, I mean, gone."

Because of extreme storms with heavy rains, raging winds and huge hail stones, huge numbers of poisonous scorpions have invaded the city of Aswan, Egypt. Hundreds of people have been stung and some have died.

There have been hailstorms with hail stones the size of golf balls, which have dented car roofs.

There have been huge disastrous wildfires in numerous countries, including Siberia (of all places).

Scientists say they are shocked by the intensity and scale of the recent floods in western Europe, which have killed many people. Of course, there have been extreme storms in the past but global warming means there will be more water in the atmosphere, and so more rain. Dr Michael Byrne, a lecturer in climate science at the University of St Andrews says this is “100 per cent for certain, because of climate change.”

The South African Weather Service said “globally, all forms of severe and extreme weather ... are becoming more frequent and more extreme than in the recent past (as a direct result of global warming and associated climate change).

Dr Jess Neumann, a hydrologist at the University of Reading, said: “Flooding from intense summer rainfall is going to happen more frequently. No city, town or village is immune to flooding.”

Prof Lizzie Kendon at the UK Met Office said a recent study “shows that, in addition to the intensification of rainfall with global warming, we can also expect a big increase in slow-moving storms.

J. Ocean Acidification

Ocean acidification has increased by about 30% since the beginning of the Industrial Revolution

An increasing amount of carbon dioxide is being released into the atmosphere. When it mixes with ocean water it makes the water more acidic. This can harm corals, shellfish and other sea creatures. The Great Barrier Reef has been harmed as a result.

The effects of climate change on society

A 2016 study found two-thirds of the global population, four billion people, faced water shortages, and many were at increased risk of floods and droughts brought on by the climate crisis.

Research has found that one billion people could face life-threatening heat stress if global warming reaches 2C above pre-industrial levels. Heat stress causes heat exhaustion, with symptoms of heavy sweating, rapid pulse, and potentially additional strain on the heart and other organs. Currently, 68 million people around the world are affected by heat stress. But Met Office scientists estimate that, if the 2C temperature rise happens this number could increase 15-fold.

Wildfires in Australia have likely released some 900 million tons of carbon dioxide into the atmosphere. NASA said “The smoke is expected to make at least one full circuit around the globe, returning once again to the skies over Australia.” This can cause unusual storms (pyrocumulonimbus events), when moisture becomes trapped in smoke in the cold upper air and forms a cloud that produces dry lightning.

The European Union's Joint Research Centre reported that in 2022 Europe suffered its worst drought in at least 500 years. It led to wildfires, reducing crop yields and impacting electricity generation.

Climate change is a justice issue

TEAR Fund says “The poorest 3.5 billion people are responsible for just ten per cent of emissions, but these same people are already facing the worst impacts of climate change. In 2016, world hunger increased for the first time in more than a decade. It’s continued to increase every year since because of climate change and conflict, with climate change exacerbating the risk of conflict. Our reliance on fossil fuels is pushing our global neighbours deeper into poverty.”

By 2030, it is estimated that up to 118 million extremely poor people (those living on less than \$1.90 a day) will be exposed to drought, floods and extreme heat in Africa, if adequate response measures are not put in place.

David Beasley, executive director of the World Food Programme said that in 2020 some 38 million people worldwide were displaced “strictly because of climate shocks, climate change,” leaving them vulnerable to hunger. He says a worst-case scenario could see that number soar to 216 million people displaced due to climate change by 2050.

UNICEF say that almost half the world's 2.2 billion children are already at "extremely high risk" from the impacts of the climate crisis and pollution. They called the situation "unimaginably dire."

Large numbers of people could be forced to migrate within their countries and across borders. Extreme environmental events and rapid change could also destabilise economies, causing unemployment, lack of resources, very high living costs and political and social unrest.