

## Impacts of Climate Change

The largest global-scale climate variations in Earth's recent geological past are the ice age cycles, which are cold glacial periods followed by shorter warm periods. The last few of these natural cycles have recurred roughly every 100,000 years. They are mainly paced by slow changes in Earth's orbit, which alter the way the Sun's energy is distributed with latitude and by season on Earth. These orbital changes are very small over the last several hundred years, and alone are not sufficient to cause the observed magnitude of change in temperature since the Industrial Revolution, nor to act on the whole Earth. On ice-age timescales, these gradual orbital variations have led to changes in the extent of ice sheets and in the abundance of CO<sub>2</sub> and other greenhouse gases, which in turn have amplified the initial temperature change. Recent estimates of the increase in global average temperature since the end of the last ice age are 4 to 5 °C (7 to 9 °F). That change occurred over a period of about 7,000 years, starting 18,000 years ago bringing us to a comfortable climate in the 1800's – the pre-industrial world.

CO<sub>2</sub> has risen more than 40% in just the past 200 years, much of this since the 1970s, contributing to human alteration of the planet's energy that has so far warmed the Earth by about 1.25 °C. CO<sub>2</sub> is only one of the so-called greenhouse gases, others are methane (from natural sources, agriculture and petro-chemical processes), F-Gases (from refrigeration, air conditioning, food processing), Nitrous Oxide (from combustion of fossil fuels) and water vapour (as global warming continues, so will the amount of water vapour in the atmosphere.)

If the rise in CO<sub>2</sub> and other GHGs continues unchecked, warming of the same magnitude as the increase out of the ice age can be expected by the end of this century or soon after. This speed of warming is more than ten times that at the end of an ice age, the fastest known natural sustained change on a global scale.

Climate scientists have previously warned that severe effects could occur if the Earth warms more than 1.5 °C above pre-industrial levels. In 2018 the IPCC (Intergovernmental Panel on Climate Change) said that without strengthening climate policies, greenhouse gas emissions are projected to lead to a median global warming of about 3.2 °C by 2100. Based upon COP 26 commitments, the Climate Change Committee are now predicting a 2.7 °C rise in global temperatures by 2100 but what would that look like?

If global temperatures rise by 2.7 °C it is expected that 75% of the global population will become exposed to heat stress (currently 30%), over 40% of the global population will be displaced and in excess of 83m people will die with some estimates stating 73 deaths per 100,000 will die from climate related illnesses or accidents (fires, building collapses, road failures etc) on an ongoing basis. Global population is just under 8bn. Rising global temperatures will not only have a direct impact on the global population but also our whole eco-system could collapse around us. Retreating sea ice at both poles are evidence that our climate is changing at a faster rate than at any other time in history.

## **Thwaites Glacier**

Thwaites' glacier in the Antarctic is the size of Florida or the UK and Ireland combined. It is nicknamed the "Doomsday Glacier" because of its potential to raise sea levels if it collapsed into the Antarctic Ocean. But Thwaites' collapse isn't the only worry, its fall would destabilize other West Antarctic glaciers which could drag more ice into the ocean, raising sea levels even higher. But it is not only the volume of the displaced ice that would cause major problems, the amount of fresh water released from the melting ice could destabilise the ocean currents in both the Atlantic and Pacific Oceans causing further climate shift across the globe. Have you seen the film 'The day after tomorrow?'

Currently the Thwaites Glacier sits on an underwater mountain range which hold is securely in place but increasing sea temperatures and other seismic events in the Antarctic region are starting to melt the ice from underneath which could allow the glacier to move and break off from the main Antarctic ice shelf. The effect of the glacier breaking off and falling into the ocean would cause global rise in sea level of around 26 inches.

One of the largest single studies into climate change is centred on the Thwaites Glacier. The International Thwaites Glacier Collaboration (ITGC) comprising of UK, USA, South Korea, Germany, Sweden, New Zealand and Finland. The research will help vulnerable countries around the world to understand the effects of rising sea levels and the early warning signs of any significant changes that may cause major flooding.

## **What are governments doing to combat climate change around the world?**

The simple answer is 'Just enough to show some progress.' COP26 was a great success ..... if promises and commitments are to be believed! The biggest challenge is behaviour change across the global population. How we travel, heat our homes, cook, what we buy, what we eat all impact global GHG emissions. Early indications from the pandemic show that global GHG emissions dropped by around 3% in 2020 compared to 2019 but are expected increase above the 2019 level when the 2021 figures are finalised. The main impacts have been seen in travel and reduced energy demand.

In Cleobury Mortimer, the Town Council has declared a climate emergency and a working group is being set up and we are looking for volunteers to join the group, please speak to me at the end if you are interested. We have been working with Save Our Shropshire and South Shropshire Climate Action for around 12 months and these organisations are gaining traction. We do have our own challenges in this community, no mains gas and minimal public transport meaning that fossil fuels still remain highly consumed. Grants are available to upgrade gas and oil boilers to heat pumps (grant of £5,000) as well as help with the costs to improve insulation. These are all things that will help to reduce the carbon footprint of Cleobury Mortimer but the added benefit will be a reduction in energy bills – remember, the cheapest, low carbon energy is the energy we do not use.

J Greaves

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