

A Changing Climate; Should Britain Worry Now?

Rachel White, Research Associate in Atmospheric Physics, Imperial College London

Climate change presents an immediate and imposing threat to many on this planet. For most of us living in Britain however, the threat seems rather more remote. Many of the more dangerous impacts of climate change, such as a possible increase in hurricane strengths or an increase in the number of droughts, seem pretty distant from life in the UK. A 'drought' for us historically tends to mean a restriction of water for hydrating our garden vegetables. And hurricanes generally have a habit of leaving us be. It has even been suggested that climate change may, in the short term, be beneficial for the UK¹. However, with the recent stormy weather fresh in our minds, it is natural to ask: is human-induced climate change something Britons should worry about now?



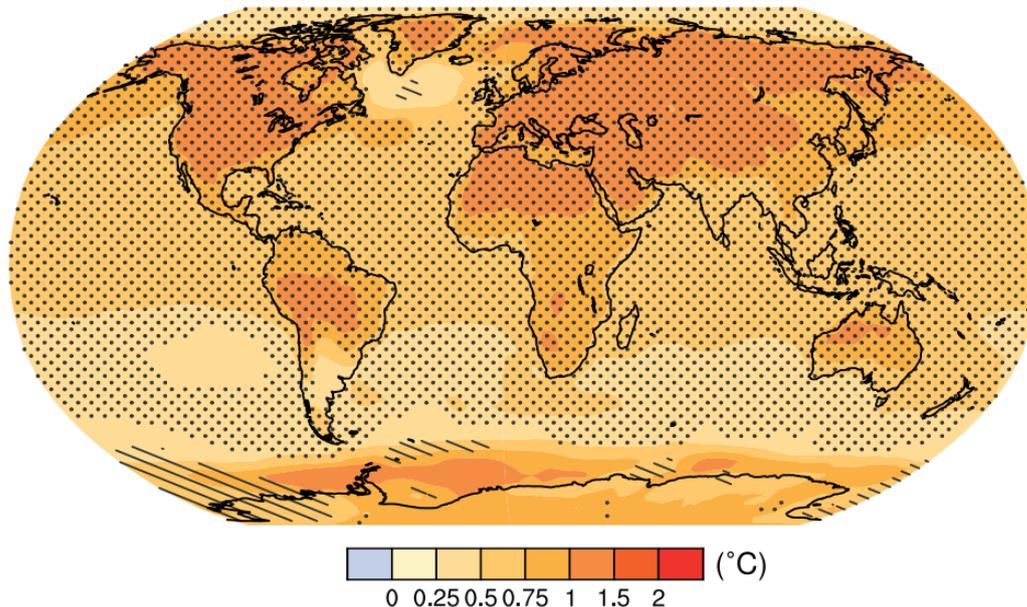
Flooding in Staines-upon-Thames in January 2014 [bayerberg via Wikimedia Commons]

Personally, I find it hard to imagine what my life will be like in 40-50 years. Trying to grasp how climate change may affect this future life is even harder, and I'm a climate scientist. I'm probably not alone in this: research suggests that humans may be intrinsically short-sighted when it comes to thinking about the future². So for now I will consider just the changes that may affect us within the next two decades.

Looking just at estimates for UK temperature changes in the near future, the answer to 'should Britons worry now?' is perhaps 'no, not really!'. The image below shows the predicted increase in summer-time temperatures for 2016 to 2035 compared to average temperatures 20 years ago.

Over the next two decades the UK sees a fairly moderate increase of about 0.75°C. So it will be, on average, 0.75°C hotter over the next 20 years than it was 20 years ago. Although, if we were to look further into the future, this change would be bigger.

This 0.75°C increase will be noticeable only really on the hottest days. An increase in average temperature will increase the chance, and the lengths, of dangerous heat-waves. But, due to our fairly cool weather, the UK is not particularly susceptible to heat-waves. The European heat-wave of 2003 caused an estimated 301 deaths in the UK. However, this is small compared to the impact in Spain, France and Italy, who each saw between 15,000 and 21,000 additional deaths³.



Predicted change in summer surface temperatures for 2016-2035 compared to 1986-2005. Image adapted from figure 11.10 in the IPCC AR5⁴.

So my feeling is that, whilst increasing heat-waves will have a negative impact on Britain over the next 20 years, this impact will be fairly small. Also, with rising temperatures we can expect our winters to get warmer. And this is likely to lead to fewer Britons dying from the effects of very cold temperatures⁵.

So, personally speaking, temperature increases in Britain over the next 20 years do not worry me. But climate change is not just about temperature. Are there other climate change impacts that the average Briton is likely to notice in the next 10-20 years?

What about rain? Storms and floods have swept across the UK this winter, and the possible involvement of climate change has been something of a hot topic. Without the ability to go back in time, we will never know for certain if this flooding would have been just as bad without any human-induced climate change. What we do know is that an increase in the intensity of heavy rain storms, such as those experienced recently, is expected in a warmer climate⁶.

During the winter of 2013-2014 England experienced the largest storm surge since 1953; the stormiest December; and quite possibly the wettest winter in nearly 250 years. Thousands of houses were flooded, displacing families and costing up to £630 million⁷. Flood insurance premium increases are an expected outcome⁸. However, a recent government scheme, Flood Re, places an upper limit on the flood premiums an insurer can charge⁹. The aim is to keep flood insurance affordable. But if flood insurance pay-outs continue to rise, whilst premiums remain capped, then insurers must re-coup their losses somehow. One possibility is to increase the cost of home insurance across the country.

However, given the damage caused this winter, I would personally be rather surprised if current and future UK governments don't pay a fair amount of attention to building and maintaining better flood defences. If this does happen, then even if the recent storms are a sign of things to come, the impacts across Britain may be quite small.

But building flood defences isn't free. It is estimated that, of all the homes in England, about one in six is at risk from flooding¹⁰. To build sufficient defences for these 5 million homes, governments will have to find money from somewhere; this might be from spending cuts, or could be from tax increases.

It is worth mentioning that, despite the severity of the weather, few, if any, people died as a direct result of these floods. Hopefully the impact of changing rain in the UK will therefore have little cost in terms of lives lost. But the economic costs, which I feel may well be felt across the whole country, are certainly a worry to me.

Another impact of a warming climate is sea level rise. In the first place, warmer water simply takes up more space. On top of this, warming temperatures mean that polar ice is melting into our oceans. And as the sea rises up, less and less land is available for the human population to live on.

Again, the UK may well be able to adapt to this in the near future. Our government has sufficient money to build defences against sea level rise, for example improving and extending the Thames Barrier to protect central London. Although, just as with the construction of flood defences, the money must come from somewhere.

However, sea level rise is just one contributor to 'climate migration'. Nearly 200 million people worldwide live in coastal flood zones that are at risk from rising sea levels¹¹. That's over three times the current population of the whole of the UK. And sooner or later many of these people will be forced to leave their homes in search for a safer place to live that's less soggy underfoot. This has already been reported in Bangladesh¹². Add to this other contributors: increased flooding from storms, more severe droughts, or changing rains making agricultural land less productive. Suddenly there are a lot of people needing to migrate to escape severe impacts of climate change.

To me, it doesn't seem so unlikely that less-economically-developed countries will look to the developing world to help these millions of people displaced by climate change. Historically the developed world has had the most benefit from the cheap energy gained from burning fossil fuels that release CO₂ into our atmosphere¹³. Although it's only fair to note that other countries are certainly catching up.

So whilst most of us in Britain should escape the direct impact of having to leave our homes, climate migration will still affect us. As a country we will have to decide how to cope with millions of people who have left their homes because of a changing climate. Maybe we will provide economic aid. Maybe we will provide shelter, adding a significant number of inhabitants to our country. But whatever we choose, my feeling is that we will all notice the change.

One more impact of climate change that will be felt all across the globe is the effect on food production and food security. Flooding, droughts, and shifting temperatures will all impact on the amount of food that can be produced worldwide. These impacts are not all negative: in the short term, increasing global temperatures and CO₂ are expected to help increase food productivity⁵; however this effect reverses in

the long-term if temperatures keep rising. On the other hand, decreasing global food security is a likely outcome of a climate with more extreme weather¹⁴. Food security is essentially the reliability of the supply, and decreasing reliability will lead to volatile, or changeable, prices.

Unfortunately, even if the UK climate changes very little in the near future, this will not provide us with immunity from this particular impact. Only about half of the food we consume within the UK is actually produced here¹⁵.

In some food categories, we're fairly self-sufficient: we produce around 80% of the meat and poultry that we consume. However, this production is not necessarily secure against a changing climate either. The UK imports a lot of its animal feed¹⁵, and so stable production of UK meat depends on crops growing elsewhere in the world.



A British harvest. A common sight in places, but we consume much more than we produce. [Keith Havercroft via Wikimedia Commons]

Within 10 years we may already be experiencing the effects of climate change on our food prices and on the availability of certain foods¹⁴. Of course, some foods will be affected more than others: those of us who like to wake up with a cup of fresh coffee each morning may find climate change impacting on our lives rather too early for comfort¹⁵.

So even if Britain does have the money and technology to adapt to most of the direct climate impacts we are likely to see in the next 10-20 years, I think it's likely we will feel the economic effects of this adaptation. And climate migration and decreasing food security are just two examples of indirect effects which we cannot avoid. This is enough to make me think that climate change really is something we should worry about now.

However, there is also a question of ethics and morality. Just because we are not endangered, should we not be worried for those who will not be so lucky?

Dealing with scientific ethics is a problem that I, as a climate scientist, am fairly unfamiliar with. I don't worry that my computer may feel over-worked, undervalued or unduly stressed by my ordering it to run the millions of calculations involved in a climate model. Scientists putting satellites into orbit to measure surface temperatures don't consider the rights of the Earth to privacy. Scientists up in the Arctic aren't concerned with the pain glaciers may feel when they drill into the ice to help study past climates.

But, personally speaking, I feel that since I am concerned about the influence climate change will have on me over the next two decades, I should also worry about the impacts that are likely to threaten many lives in the years to come.

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