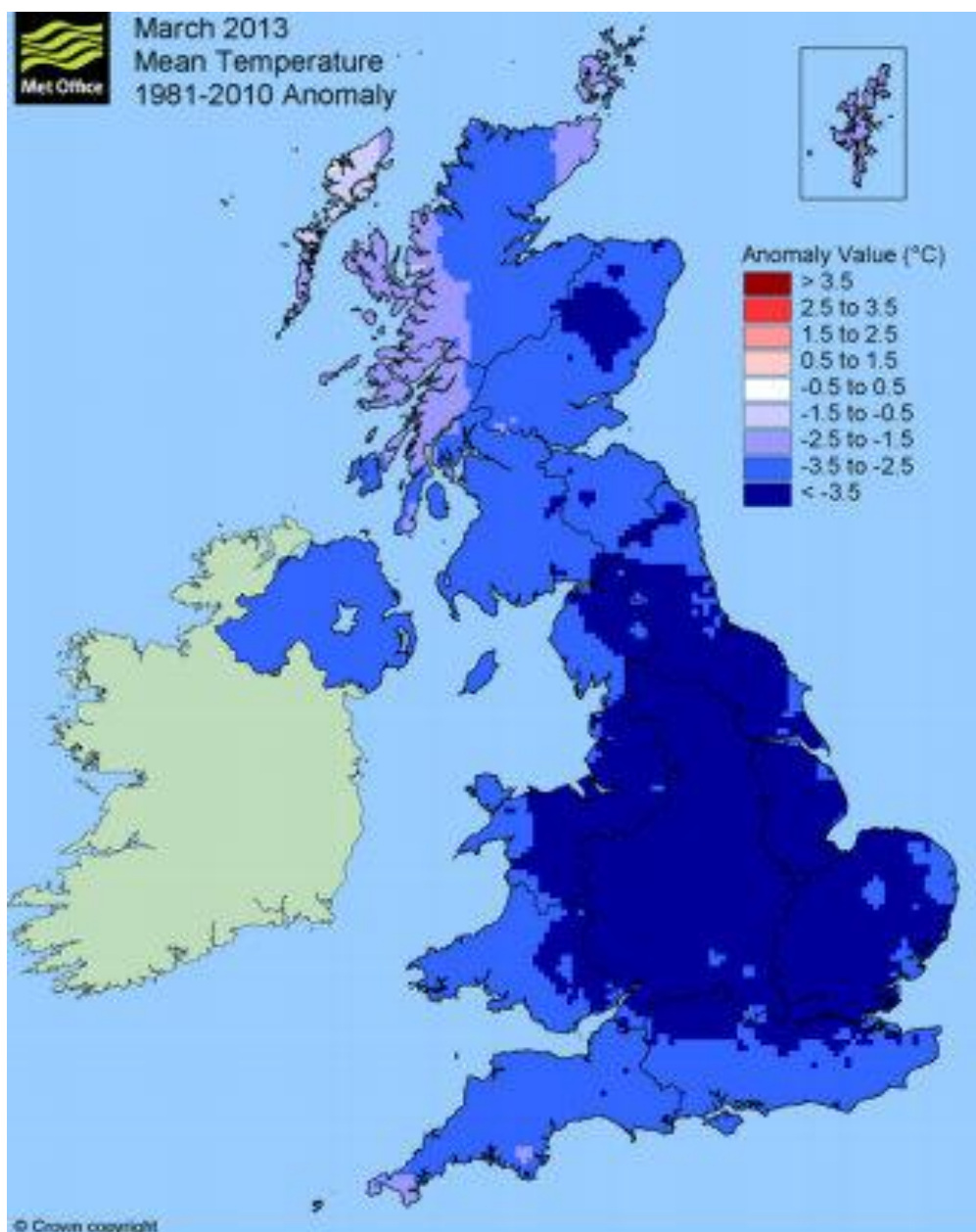


Why was the start to spring 2013 so cold?

The Met Office has released a report ([see at the end of this paper](#)) entitled "why was the start to spring 2013 so cold?", which comes hot on the heels of extensive discussion in the media about the causes of the cold snap. Here's a brief summary of what the UK's national weather service has to say.

This March was the second coldest since records began in 1910, with provisional figures indicating the average UK temperature for the month was 3.3 °C below the 1981 to 2010 long term average.

The Met Office says much of Europe, Russia, Ukraine and the northern USA experienced similarly cold and snowy conditions to the UK.



Some places in the UK were up to 3.5 degrees colder during March 2013 than the average for 1981 to 2010. Source: [Met Office](#)

Why so cold?

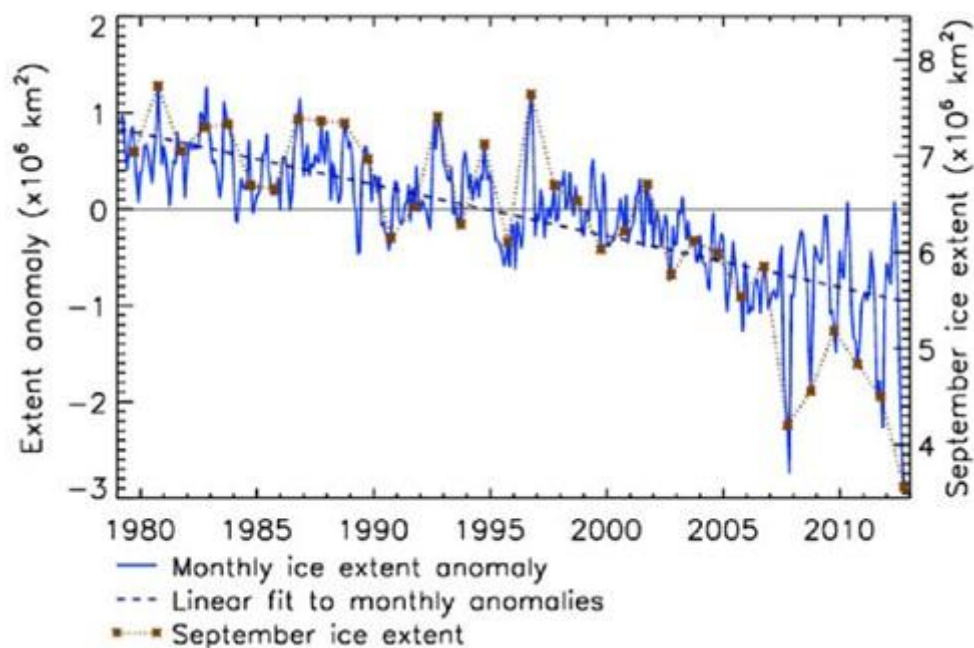
The immediate cause was a natural climate fluctuation called the North Atlantic Oscillation (NAO). The NAO switches between two states, and this winter (in its negative phase) saw a southward shift of the jet stream, bringing cold air over the UK from northern Europe and Russia.

The Met Office identifies three other natural climate variations that may have made the negative NAO phase more likely:

1. One is the recent behaviour of another natural climate fluctuation, called the Madden-Julian Oscillation (**MJO**). It was particularly strong during late February and March.
2. This winter also saw what's called a Sudden Stratospheric Warming (SSW) event, where winds in the stratosphere above the North Pole reverse direction. This brought cold weather conditions to the UK.
3. Finally, Europe's climate is influenced by another natural climate system - the Atlantic Multi-decadal Oscillation (**AMO**). While the influence on UK winters is unclear, the report suggests that "there is some evidence that the changes in Atlantic sea surface temperatures associated with the AMO, dispose the circulation to give drier than normal spring conditions over the UK and northern Europe."

What about the effects of human-caused climate change?

One question that has been much discussed recently is whether the recent rapid decline in Arctic sea ice could contribute to a change in the UK's weather.



The decline in monthly area covered by sea ice in the Arctic (blue) and summer minimum in September (brown). Source: [Met Office](#)

The new report explains how this could work: "It is argued that amplification of global warming over the Arctic is reducing the equator to pole temperature gradient, thereby weakening the strength of the mid-latitude jet streams."

This could allow cold Arctic air to push further south, over mid-latitude countries like the UK, and weather patterns could stay longer in one place.

The possibility of a link between the Arctic and UK weather appears to be gaining scientific support, but the Met Office acknowledges it's still an "area of on-going research". The Met Office said that it's holding an "informal workshop" in the next two to three months for leading UK scientists plus several international experts.

Multiple factors:

While scientists are making progress in working out how climate change could influence the odds of abnormal weather, it would be unwise to attribute one year's events to a single cause. The report points this out, noting that:

"...no single explanation can account for the cold conditions observed".

The report also highlights that although this spring was unusually cold, "it is not unprecedented or outside the expected natural variability of our climate".

Nevertheless, with what the Met Office describes as "particularly heightened interest" in recent weather, getting to grips with how climate change could be affecting things is important. Even if, as the Met Office suggests, the complexities of the UK weather make "communicating the science drivers more complicated and nuanced than some audiences may wish."

Full report:

<http://www.metoffice.gov.uk/media/pdf/i/2/March2013.pdf>