



## **Climate change made European heatwave more likely, scientists find**

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Climate change made the ongoing heatwave in most places in northern Europe more than twice as likely to occur, scientists have found.

Researchers with the World Weather Attribution network compared the currently high temperatures with historical records at seven weather stations in northern Europe – two in Finland, one each in Denmark, the Irish Republic, the Netherlands, Norway and Sweden. These stations were selected because current temperature data could be accessed in real time, and they possess digitised records extending back to the early 1900s. The scientists also used computer models to assess the impact of man-made climate change.

For each year in the historical record, they looked at the hottest consecutive three-day period. For 2018, it was the hottest three days of the year so far – either observed or in the short-term forecast.

“We found that for the weather station in the far north, in the Arctic Circle, the current heat wave is just extraordinary – unprecedented in the historical record,” said Dr Geert Jan van Oldenborgh, Senior Researcher at the Royal Netherlands Meteorological Institute (KNMI).

“And while that is a striking finding, it’s hard for us to quantify the increase in likelihood accurately because summer temperatures vary a lot from year to year, making it impossible to estimate the trend from the observations. The same is true for the other three northern stations.

“But for the three stations further south – in the Netherlands, Denmark and Ireland – the historical record does allow us to make a calculation, and it shows that climate change has generally increased the odds of the current heatwave more than two-fold.”

Of these three stations, the one showing the lowest increase in likelihood due to anthropogenic climate change is Dublin, with a factor of 1.2-3.3 and a best estimate of 2. For Copenhagen the odds have increased by a factor 2.4-12, with a best estimate of 5; and for De Bild (Netherlands), 1.6-16, best estimate 3.3. For the four stations further north, observations and models indicate an increase in likelihood, but it has much harder to quantify.

The scientists caution that this is a preliminary analysis: it is being published before the end of the heatwave, so the definition of the “extreme event” is in part based on the forecast

temperatures. Robust quantitative results about the summer season 2018 can only be made after the summer.

Nevertheless, they say, the signal of climate change is unambiguous.

“The logic that climate change will do this is inescapable – the world is becoming warmer, and so heatwaves like this are becoming more common,” said Dr Friederike Otto, Deputy Director of the Environmental Change Institute at the University of Oxford

“What was once regarded as unusually warm weather will become commonplace – in some cases, it already has.

“So this is something that society can and should prepare for – but equally there is no doubt that we can and should constrain the increasing likelihood of all kinds of extreme weather events by restricting greenhouse gas emissions as sharply as possible.”

The WWA team plans to publish these results formally in a scientific journal. This will form part of a more in-depth analysis of this extraordinary summer; the team will also assess whether climate change played a role in the prolonged high pressure seen in northern Europe since May, and if so, to what extent.

Previous published studies by the group have shown that climate change increased the chances of the heavy rainfall experienced in northern England in the 2015-16 winter and in Houston due to hurricane Harvey, and that climate change has not changed the likelihood of the 2014 Sao Paulo drought.

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