Q&A: What's causing Earth's hottest days to date and what does it mean for our planet?

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Record-breaking heat is possible through mid-August, so we may have one or two more chances to break the record this year, says Texas A&M's Dr. John Nielsen-Gammon. Credit: Abbey Santoro/Texas A&M University Division of Marketing and Communications

On Tuesday, as the United States commemorated its 247th birthday, the

planet experienced its hottest day on record—this according to data from NOAA's National Centers for Environmental Prediction and calculations by the University of Maine's Climate Reanalyzer tool. That record was promptly tied the following day.

Amidst growing concern and alarm around the globe, Texas State Climatologist Dr. John Nielsen-Gammon, a Regents Professor in the Department of Atmospheric Sciences at Texas A&M University, addresses the combination of factors contributing to this record-setting event and what the future holds for our planet.

How much is El Niño to blame for this record temperature day on planet Earth?

El Niño typically makes global temperatures warmer by about a 10th of a degree Celsius. So it's a very minor contributor to this record. The other two times the planet broke its record this century were not El Niño years.

Why is this happening?

With climate change, we break the global temperature record once every few years (the previous record was set on Aug. 14, 2016). This year, the North Atlantic Ocean has been unusually warm, which probably helps. Global temperatures have been ahead of last year's values since April. Since the ocean temperatures are slow to change, a particular day's heat depends a lot on temperatures over land. Typically, waves in the jet stream make some areas warmer than normal and some areas cooler than normal. If the cooler-than-normal places are over the ocean, the temperature there won't change much, so the hotter-than-normal-places over land dominate the change in the global average temperature.

By the way, that's also why we break global temperature records in the Northern Hemisphere summer. The Northern Hemisphere has lots of land, while the Southern Hemisphere is mostly ocean. So in the Northern Hemisphere summer, there's lots of land that's hot and not much land in the Southern Hemisphere that's cold.

Was July 4th a 'heat wave' and did it have any unusual or extreme characteristics?

I wouldn't call it a heat wave, since we're only talking about a difference of 2 degrees or so between July 4 and what was normal during the last couple of decades of the 20th century (1980–1999). The warmest places compared to normal were in parts of Antarctica, from eastern Europe across most of Russia, and in Quebec and Labrador, Canada. Temperatures were considerably below normal in the north-central United States and in a couple of other areas around Antarctica.

How did this record impact human health and safety in the affected areas?

Certainly, the heat would have made fighting the wildfires in Quebec more difficult and more dangerous. In eastern Europe and Russia, I'm not aware of specific news of impacts since attention has been focused on other events in the region. Siberia and the Antarctic are lightly populated. In general, heat is dangerous for outdoor workers and for the elderly, especially those without air conditioning.

What are the potential implications and consequences of this record being broken?

The primary consequence of the record being broken is that it is a news

event that provides an opportunity to put climate change in the headlines. Record-breaking heat is possible through mid-August, so we may have one or two more chances to break the record this year.

What steps (if any) can humans take to prevent the continuous record-breaking cycles?

This record will be broken again in a few years, and there's nothing we can do about that. The actions we take now and in the future to limit climate change will start having major impacts in a few decades. The main challenge is getting an energy system in place that is reliable, affordable and green. Right now, we're very good at pairing any two of the three, and we're making progress on getting to three out of three.

Provided by Texas A&M University

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