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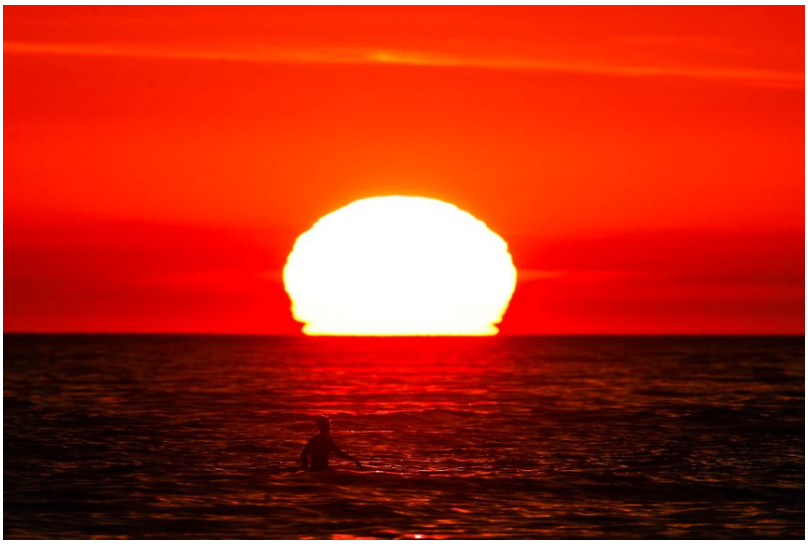
U.S.

Federal Climate Experts Rank Last Year Among Three Warmest in Modern Times

Seventeen of the 18 warmest years on record have occurred since 2000



The trend has been driven in large part by land-use changes, including cutting down forests, and rising emissions of greenhouse gases, including carbon dioxide from the burning of fossil fuels. PHOTO: JAE C. HONG/ASSOCIATED PRESS

By Robert Lee Hotz

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Global temperatures simmered at near-record levels in 2017, even as the world cooled slightly with the waning of a powerful El Nino event that had driven recent warming to levels unprecedented in modern times, federal climate experts said Thursday.

In an annual report, scientists at the National Aeronautics and Space Administration and the National Oceanic and Atmospheric Administration, which independently track the rise and fall of world temperatures for the federal government, ranked last year as among the three warmest since systematic record-keeping began in 1880.

NASA researchers ranked 2017 as the second-warmest year since 1880, while NOAA scientists ranked it as the third-warmest. Both analyses show that the five warmest years on record all occurred since 2010.

"Despite colder-than-average temperatures in any one part of the world, temperatures over the planet as a whole continue the rapid warming trend we've seen over the last 40 years," said Gavin Schmidt, director of NASA's Goddard Institute for Space Studies in New York, which conducted the space agency's analysis.

By NASA's calculation, globally averaged temperatures in 2017 were 1.62 degrees Fahrenheit (0.90 degrees Celsius) warmer than the 1951 to 1980 mean, second only to global temperatures in 2016. In the NOAA analysis, the average temperature across global land and ocean surfaces was 1.51°F (0.84°C) above the 20th-century norm.

The agency teams essentially cross-check other's findings, using different collections of readings from thousands of weather stations and different mathematical methods.

Their calculations are in line with other independent assessments of the year's global warming trend. Preliminary reports by the Japan Meteorological Agency and the World Meteorological Organization, as well satellite-temperature data maintained by researchers at the University of Alabama at Huntsville, all suggest that 2017 was the second- or third-warmest on record.

"There are, of course, year-to-year and decade-to-decade natural fluctuations brought about by variability in the sun, volcanic eruptions and natural oscillations such as El Nino," said atmosphere scientist Kerry Emanuel at the Massachusetts Institute of Technology, who studies the effects of climate change on hurricanes. "But the long-term trend is unmistakable."

Roger Pielke Sr. at the Cooperative Institute for Research In Environmental Sciences in Boulder, Colo., said that the basic methodology used in the rankings is "flawed" because it relies solely on surface temperatures and doesn't take into consideration other measures, such as deep ocean heat, that affect global climate.

John Christy at the University of Alabama at Huntsville, who tracks global temperatures using high-altitude NASA satellite data, said that in his analysis global temperatures are rising more gradually than predicted by the Intergovernmental Panel on Climate Change.

Several climate researchers said that 2017 was notable, even though it didn't match the record pace of previous years.

"What is particularly interesting about today's announcement is that 2017 was a top warm year even without the presence of an El Nino which can often give warm years an extra boost," said J. Marshall Shepherd, Director of University of Georgia's Atmospheric Sciences Program.

All told, 17 of the 18 warmest years on record have occurred since 2000. The trend has been driven in large part by land-use changes, including cutting down forests and paving over natural surfaces, and rising emissions of greenhouse gases, including carbon dioxide from the burning of

fossil fuels and methane from livestock production. A study in 2012 by the non-profit Berkeley Earth group led by physicist Richard Muller determined that variations in the sun's behavior play no detectable role in recent rising temperatures.

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