El Niño and the acceleration of global warming

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New temperature records have been set in the early months of 2016, according to data compiled by NASA. A driver behind what one researcher referred to as "extraordinary" temperatures has been the presence of an abnormally long El Niño. At the same time, research over the last several years has shown how El Niño and its cool-water counterpart, La Niña, have been affected and made more extreme by human-induced climate change.

El Niño and La Niña are phases of what scientists call the "El Niño Southern Oscillation," a cycle of alternating warm and cold temperatures in the central and eastern parts of the Pacific Ocean that research suggests has been happening for at least 100,000 years. The changes in ocean temperatures produce significant shifts in air pressure over whole regions of the globe, inducing powerful weather patterns that have proven devastating for human habitation in many parts of the world.

The most recent El Niño, which just recently came to a close after lasting two years, has been referred to as the strongest in two decades. It has been held responsible for record flooding in Argentina, Paraguay, Bolivia, Uruguay, and Brazil, as well as flooding and landslides in Ethiopia, which killed more than 100 people. It has been thought to have directly caused droughts in South Africa, Thailand, and Venezuela, affecting millions of people and, in the latter case, resulted in electricity rationing. It has also been blamed for the intensity of Tropical Cyclone Winston, which destroyed parts of Fiji in February, as well as having enhanced the Pacific cyclone season generally.

The continuing wildfires in Alberta and Saskatchewan, Canada are also in part attributed to the hot and dry conditions brought about by the current El Niño cycle. Moreover, while specific fires cannot be directly linked to global warming, higher temperatures in general mean less snowpack during winter, allowing for more frequent and intense wildfires.

Though El Niño is a natural phenomenon, in recent years many researchers have shown that its intensity has been exacerbated by global warming. An article published in *Nature* in January of 2014, for example, presents evidence that the increased frequency of "extreme" El Niño occurrences, such as the one which just closed, is largely due to surface water warming more quickly in the equatorial Pacific Ocean. The authors state, "We should expect more occurrences of devastating weather events, which will have pronounced implications for twenty-first century climate."

Two years later, new data are supporting their predictions. The National Oceanic and Atmospheric Administration (NOAA) recently reported that April marks the seventh consecutive month of average global temperatures being at least 1 degree Celsius above the 20th-century average. In addition, NASA's land-ocean temperature index shows that the last seven months saw about a 30 percent increase in sea surface temperature over the same months one year earlier.

Other metrics show the same warming. Measurements taken in January indicate that on a single day the northern hemisphere reached 2 degrees C above the pre-industrial average, a result that has only a one hundredth of one percent chance of happening without human-induced climate change. Data from the North Pole in December show temperatures above freezing, more than 30 degrees Celsius above average. Mark Serreze, who is the director of the US National Snow and Ice Data Center, stated, "I've been studying Arctic climate for 35 years and have never seen anything like this before."

The consequences to the environment and human life are not limited to more severe storms. A recent update from NOAA shows that both El Niño and global warming are resulting in the longest global coral die-off on record, which will likely extend well into 2017. The event is referred to as “global coral bleaching,” the result of disease and heat stress caused by high ocean temperatures. NOAA reports indicate that some areas have already seen bleaching two years in a row, which means that the coral have no time to recover from their ailments. The potential cost to human well-being is high: 500 million people depend upon reefs for food and to protect coastlines from storms and erosion. Coral reefs contribute approximately $30 billion to the world economy each year.

While some attribute the recent heat events to El Niño alone, others state that this only accounts for a small amount of the anomalous warmth. Michael Mann, the director of Penn State Earth System Science Center, stated, “We would have set an all-time global temperature record even without any help from El Niño.”

This was echoed by Jeff Knight, from the Met Office Hadley Centre, stated that while additional heat from a big El Niño does contribute to the conditions, this contribution is relatively small. He stated earlier this year that “the bottom line is that the contributions of the current El Niño and wind patterns to the very warm conditions globally over the last couple of months are relatively small compared to the anthropogenically [human] driven increase in global temperature since pre-industrial times.” Put another way, global warming is the more fundamental problem that must be overcome.