Nighttime Heat Waves In Pacific Northwest Have Quadrupled In Frequency Over The Past 33 Years

by Nathan

Nighttime heat waves in the Pacific Northwest have quadrupled in frequency over the past 33 years, according to new research from the University of Washington. Specifically — the region of Washington state west of the Cascades experienced only three nighttime heat waves during the years of 1901-1980, but 12 nighttime heat waves during the years since 1980.

To clarify — a nighttime heat wave is when the daily low is in the top 1% of the temperatures on record — so, for example, in Seattle that means a low above 61.5 F that lasts for at least three nights in a row is a nighttime heat wave.

“In general, minimum daily temperatures have been warming faster than maximum temperatures, so we’re not surprised to see a trend in the minimum events,” stated corresponding author Karin Bumbaco, a research scientist at the Joint Institute for the Study of the Atmosphere and Ocean. “Still, we were surprised to see this significant increase in the frequency of nighttime heat waves.”

The researchers began this new work “after fielding questions during the July 2009 heat wave, which broke temperature records and led to a local run on fans and air conditioners. People wanted to know how that event compared with others in the history books.”

The University of Washington continues:

The two ran the numbers with the help of Oregon State University’s Kathie Dello at the Oregon Climate Service. They studied temperature readings west of the Cascade Mountains in Washington and Oregon from 1901 to 2009, looking for instances where the daytime high or nighttime low temperature hit the top 1 percent of readings for at least three consecutive days.
The 2009 scorcher set records in daytime temperature, but it was the string of warm nights that stood out, Bumbaco said. By their definition it was a three-day daytime heat wave in the Pacific Northwest — but included eight consecutive hot nights, the longest seen in the observational record.

“It was hard to cool down at night, there wasn’t much relief at all,” Bumbaco stated.

The new research has also provided some answers with regard to the mechanism behind the rapid increase in nighttime heat waves — high humidity which serves to trap heat.

“It’s well known that Pacific Northwest heat waves occur when breeze off the ocean is replaced with air flow from the east, which warms up as it flows down the western slope of the Cascade Mountains. But the researchers also found another trait for nighttime heat waves. The records show that nighttime heat waves happen during high humidity, where water vapor in the air serves as a blanket to trap heat.”

“Forecasters already do a good job at predicting when heat is coming into the region, but this might help differentiate between hot days versus hot nights,” Bumbaco stated.

The current predictions are that climate change will cause heat waves in the region to become more frequent, longer, and more extreme — both during the day and during the night.

Though it was not part of the study, the recent late-June 2013 hot spell included just two extremely hot days, but readings at SeaTac Airport showed it qualified as yet another nighttime heat wave.

The study also includes a preliminary look at health effects from heat waves, which in the U.S. account for about 1,500 deaths each year. It found a 50% increase in the number of regional hospitalizations coded as being related to heat on dates the authors identified as heat waves. The most heat-related hospital admissions were during the 2009 heat wave and during a 2006 event that had the warmest nights on record. This corroborates other studies suggesting that nighttime heat has the most impact on human health.

Northwesterners are unlikely to draw sympathy from people across the country who are weathering triple-digit summer temperatures. But there is reason for concern. Because the region has mild temperatures people are not acclimatized to extreme heat and, perhaps most importantly, most people do not own air conditioners in their homes.

The new research was just published in the July issue of the *Journal of Applied Meteorology and Climatology*.

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For the fate of the sons of men and the fate of beasts is the same; as one dies, so dies the other. They all have the same breath, and man has no advantage over the beasts; for all is vanity. - Ecclesiastes 3:19