

Global warming will increase the severity of hurricanes

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A recent analysis published in the journal *Nature* (“A global slowdown of tropical-cyclone translation speed,” James P. Kossin, 7 June 2018), studying the intensity and resultant damage of hurricanes over the past three quarters of a century, predicts that future hurricanes will be more severe as a result of human-induced climate change. Changing wind patterns, warmer air and higher humidity have already created “superstorms” which have displaced hundreds of thousands of people and caused billions of dollars in damages, a trend which is expected to accelerate.

The analysis by Kossin, who works for the US National Oceanographic and Atmospheric Administration (NOAA), looked at data collected between 1949 and 2016. Comparing the changes to hurricane rainfall and wind speeds to the rise in average global temperatures, which rose by 0.5 degrees Celsius in that period, Kossin found a strong causal link between global warming and increasingly severe hurricanes.

First, atmospheric warming slows summertime tropical circulation—the general speed of prevailing winds closer to the equator, where hurricanes tend to form. Consequently, the forward motion of storms (but not necessarily the speed of internal circulation) slows. This means that a hurricane will spend more time over any particular location—potentially days instead of hours.

Second, atmospheric warming results in higher temperatures within storms. Warmer air has a higher capacity to carry moisture. Therefore, other things being equal, rainfall quantities from any given hurricane will tend to increase, especially toward the center of circulation, that is, near the eye of the storm.

Kossin predicts that the combination of slower-moving storms and higher rainfall rates means that when a hurricane hits a particular area it will tend to linger, thus dumping larger quantities of water than would have been the case in the past. This conjunction of factors was especially evident last year when Hurricane Harvey devastated Texas. Such events are likely to become more frequent if the current trend of increasing global temperatures continues.

While local factors will influence the rate at which this

change occurs, the general trend is clear. During the period studied, speed of tropical cyclones and hurricanes decreased by 10 percent globally. In the northwest Pacific the reduction was 30 percent, in the north Atlantic 20 percent, and in the Australian region 19 percent. Significantly, the rate of change has accelerated over the second half of this time span, again linking more intense hurricanes to climate change.

Of further concern, Kossin cites studies which indicate that tropical cyclones are migrating farther northward in several regions, another consequence of global warming. This means that areas where such storms rarely ventured in the past, and are little prepared, are now increasingly vulnerable. The devastating effects on coastal portions of New York and New Jersey from Superstorm Sandy, the largest Atlantic hurricane ever recorded, foreshadows what will likely become the “new normal.” Preparation for this future—such as was evidenced last year by hurricanes Harvey, Irma and Maria—is totally inadequate for the scale of the devastation to come.

Another recent study published by the Union of Concerned Scientists (UCS), *Hurricanes and Climate Change* (1 December 2017), corroborates and expands on this dire prognosis. In the North Atlantic, hurricane intensity, if not frequency, has been increasing since the 1970s.

“In the future, there may not necessarily be more hurricanes, but there will likely be more intense hurricanes that carry higher wind speeds and more precipitation as a result of global warming. The impacts of this trend are likely to be exacerbated by sea level rise and a growing population along coastlines.”

For example, since the late 20th century, the probability of storms of the intensity of Hurricane Harvey hitting Texas has risen from 1 in every 100 years to 1 every 16 years. Furthermore, “Since the mid-1970s, the number of hurricanes that reach Categories 4 and 5 in strength [the two highest wind speed categories] has roughly doubled.”

The UCS report also correlates the intensification of hurricanes with human-induced global warming. Of

particular significance is the rise in sea surface temperatures, which has been especially pronounced in the North Atlantic. Warmer seas pump more moisture into developing tropical storm systems and create greater atmospheric instability.

The damage to coastal areas during hurricanes is compounded by sea-level rise, also a consequence of global warming. Since the beginning of the 20th century, on average, sea level has risen 7-8 inches, and the rate is likely to accelerate in the future, with predictions of between one and four feet by the end of the 21st century. Combined with a hurricane's storm surge, higher sea levels will increase the extent of flooding in low-lying areas, especially if landfall occurs at high tide.

During Harvey, the combination of enhanced storm surge coupled with increased rainfall wrought havoc in low-lying areas of Houston, where both industrial and residential development had taken place in increasingly vulnerable terrain. Roughly 123 million people in the US, 40 percent of the population, live in coastal counties.

These processes have been developing over decades, with consequences that have been predicted. After each major event, such as Katrina and Sandy, bourgeois politicians repeat that there are "lessons learned." And yet, when new catastrophes occur, with hundreds of thousands of people affected and hundreds losing their lives, the total inadequacy of the response is repeated. A just-released self-evaluation by FEMA of its response to the devastation of Puerto Rico by Hurricane Maria is a damning indictment of the callous indifference and utter lack of preparation for the storm that was predicted in advance to have a major impact on the island.

The link between human activity and climate change is no surprise. Ever since the development of agriculture, succeeding technological advances, and the concomitant growth in human population size, anthropogenic alterations to the environment have progressively increased. At first, the effects on climate were relatively minor and localized. However, since the beginning of the industrial revolution, human impacts on the environment and climate, caused by activities such as massive deforestation, alterations to hydrologic patterns, and environmental pollution, have accelerated markedly, as evinced by such indicators as increasing storms, droughts and wildfires. These processes are rapidly reaching a crisis point, threatening a catastrophic collapse of civilization on a global scale.

Since the development of class society, climate-changing human activities have been blindly driven by the interests of various ruling classes, with little knowledge or concern regarding their consequences to the lower classes or humanity as a whole. Under capitalism, this process has accelerated exponentially.

Now, just as the anthropogenic effects on the environment are reaching a qualitatively higher stage, with potentially devastating outcomes, the global capitalist crisis is also approaching a breaking point. Consequently, even the meager efforts undertaken over the last few decades seeking to at least slow the progress of environmental degradation and climate change (e.g., the Paris agreement), as inadequate as these have been, are being undermined or swept away entirely.

This conjunction of factors is no accident, but expresses a fundamental contradiction. The very technological and scientific progress whose byproducts are having such dangerous consequences produces the tools necessary to effectively address these problems (renewable energy, pollution controls, biodegradable or otherwise recyclable materials, etc.)

The resources, both technological and financial, exist to effectively avert environmental catastrophe. But these are under control of the parasitic ruling class, which seeks only to perpetuate and expand its wealth, regardless of the consequences, even if that leads to the ultimate catastrophe—nuclear war. The Trump administration's attack on environmental regulations, undertaken simultaneously with major increases in military spending, are only the most acute expression of this worldwide process.

Under a rationally planned economy, democratically controlled by the working class, the vast scientific, technological and financial resources that already exist would be engaged to halt and reverse environmental degradation and associated climate change. This can only happen, however, if the working class expropriates the major banks and corporations and establishes a socialist society.

The author also recommends:

Climate change and the struggle against capitalism
[14 July 2017]



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