

Climate change behind recent extreme weather conditions

By Matthew MacEgan
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The American Meteorological Society (AMS) published a report last month called “Explaining Extreme Events of 2013 from a Climate Perspective.” The report provides evidence that human-caused climate change, primarily through the burning of fossil fuels, has played a critical role in the increasing severity and frequency of potentially catastrophic natural events. This marks one of the first instances where a large group of climate scientists have asserted this direct causal connection with the support of solid data.

The report contains data compiled and analyzed by 20 different research groups that include 91 scientists working at research centers and universities around the world. Some of these are the Oxford University in Britain; the University of New South Wales in Sydney, Australia; the National Center for Atmospheric Research in Boulder, Colorado; the Groupe d'étude de l'atmosphère Météorologique in Toulouse, France; the Helmholtz-Zentrum Geesthacht in Germany; the University of Tokyo; and the Chinese Academy of Sciences in Beijing.

The researchers used 22 studies to tackle 16 different events that occurred in 2013, including the California drought, summer heat waves in both Korea and Japan, and abnormally heavy precipitation in India and Germany. They also studied extreme snow accumulation in Spain, Australia's hottest summer on record, and the October blizzard in western South Dakota.

The introduction to the report explains that while natural variability plays a “substantial role in individual events,” evidence from multiple studies “indicates that human influence has changed the frequency of high-impact temperature and precipitation extremes.” They report that “observed changes in several metrics ... are consistent with model-simulated anthropogenic [human] influence at the global scale.”

During 2013, California experienced extremely dry

conditions, resulting from a 12-month accumulated precipitation of less than 34 percent of the normal level. Farmers in the Central Valley were told by federal water agencies that they would receive no irrigation water in 2014, and many small communities were told that they could run out of water entirely within 90 days. The exceedingly low amount of rainfall also contributed to a highly unusual mid-winter wildfire risk. These impacts resulted in the state declaration of “drought emergency” and the federal designation of all of California's 58 counties as “natural disaster areas.”

The seven scientists who contributed to this section of the report noted that this anomaly is “unprecedented in the observational record,” which extends back 119 years. This means that the precipitation deficit in 2013 was the lowest for any consecutive 12-month period since 1895, creating a drought larger than those that occurred between 1976 and 1977 and between 1987 and 1992 in the same region.

After performing numerous statistical tests and analyses, the authors concluded: “We find that extreme geopotential height values in this region, which are a defining metric of this type of atmospheric configuration, occur much more frequently in the present climate than in the absence of human emissions.”

Across the Pacific Ocean, many countries in East Asia experienced one of the hottest summers on record in 2013, resulting in severe damage to societies and ecosystems across the region. In South Korea between June and August of 2013, residents experienced the hottest summer nights and the second hottest summer days since 1954. This resulted in adverse impacts on the country's economy, health, and infrastructure. For example, the heat wave increased electricity consumption to such a height that the South Korea government was forced to issue several power shortage warnings.

Four Korean scientists who contributed to the report

declared “extreme hot temperatures in Korea have become 10 times more likely due to human influence.” Using climate model datasets to assess the impact of global warming on the 2013 Korean heat wave, these researchers found a dominant contribution of greenhouse warming to increasing temperatures over the last half century. In particular, they wrote:

We find that a strong long-term increasing trend observed ... during the last 60 years cannot be explained without the inclusion of recent human-induced greenhouse gas forcing. This is because other external forcings, including solar and volcanic activities (natural) and aerosols (anthropogenic), are likely to induce cooling.

In other words, despite the cooling effects that both natural and human-made events elicit from the environment, summers like the one experienced in South Korea in 2013 are still occurring due to greenhouse warming resulting from human activity.

Three scientists based in the United Kingdom similarly addressed anthropogenic climate change and whether it played a role in the extremely cold UK spring in 2013. They found that March 2013, which was characterized by “prolonged cold spells with strong northeasterly winds drawn from Siberia,” was the coldest March since 1962. They write that while this winter was not unprecedented in terms of coldness, it still had dramatic effects upon agriculture and infrastructure.

During the UK 2013 spring, snowdrifts topped five meters and killed thousands of newborn lambs, costing the UK government £250,000 (approximately \$420,000) in reimbursements to livestock farmers. Frozen soil stunted the growth of cereal crops, and snow-damaged power cables left thousands of residential and business customers in Northern Ireland without electricity.

The researchers produced 1,800 weather simulations spanning the months between September 2012 and August 2013, each containing varying amounts of both human and natural influences. They found that this cold weather event only seemed extreme because of the long term warming of our planet. They write: “Had there been no anthropogenic influence on the climate, the chances of a cold spring would sharply increase from less than 2% to 30%-60%.” Essentially, this cold weather behavior should be more common and widespread, but global warming makes such an event seem like an anomaly.

As we can reasonably expect, not all of the 16 events that occurred in 2013 are the result of human-induced climate change. Investigation of the heavy precipitation event in Germany’s Upper Danube and Elbe basins, for

example, provided no evidence that climate change contributed to the extreme nature of the event. However, the editors explain in the summary of the report that “a failure to find an anthropogenic signal” in some cases does not prove that such signals had “no role to play.”

Out of the 22 studies, thirteen supported the argument that human-caused climate change increased the likelihood or strength of an extreme event, while two more demonstrated that anthropometric influences decreased the same likelihood or strength. Only seven showed no conclusive evidence of human agency, but, as the editors summarized, this human influence, though not detected, may still exist.

What is not addressed by the scientists are the underlying contradictions that create human-induced climate change in the first place. It has long been the perspective of socialists that the capitalist drive for profit and the narrow framework of the nation-state system are the two greatest barriers to the ability of humans to live efficiently and harmoniously with their natural environment. We absolutely insist it is the mismanagement of resources and productive processes that has placed our existence in jeopardy, not economic growth in and of itself.

A great danger exists should humanity not overcome these obstacles and introduce a rational and scientific attitude toward our use of resources: we will find ourselves on a planet unable to sustain our continued existence. It is of the greatest importance that workers and young people therefore take up the fight for socialism, which includes the defense of our natural resources from capitalist exploitation and plunder.

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